

**POST-CLOSURE  
OPERATION AND MAINTENANCE PLAN  
TAYLOR'S LANE COMPOST SITE  
MAMARONECK, NEW YORK**

Prepared for

Village of Mamaroneck  
169 Mt. Pleasant Avenue  
Mamaroneck, New York 10543

February 1998

Prepared by

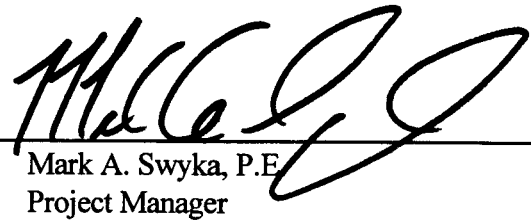
EMCON  
EMCON/Wehran-New York, Inc.  
Crossroads Corporate Center  
One International Blvd., Suite 700  
Mahwah, New Jersey 07495  
(201) 512-5700

Project 84556-003.000

**Post-Closure Operation and Maintenance Plan  
Taylor's Lane Compost Site**

The material and data in this report were prepared under the supervision and direction of the undersigned.

EMCON



Mark A. Swyka, P.E.  
Project Manager

## CONTENTS

---

<b>1 INTRODUCTION</b>	<b>1-1</b>
<b>2 CLOSURE DESIGN</b>	<b>2-1</b>
<b>3 POST-CLOSURE MAINTENANCE AND MONITORING PLAN</b>	<b>3-1</b>
3.1 General	3-1
3.2 Post-Closure Maintenance	3-1
3.3 Post-Closure Monitoring	3-2
3.4 Recordkeeping and Reporting	3-3
<b>4 SITE PLAN</b>	<b>4-5</b>
<b>LIMITATIONS</b>	
<b>DRAWINGS</b>	
<b>APPENDIX A FEASIBILITY STUDY EXCERPT</b>	
<b>APPENDIX B ENGINEERING DESIGN EXCERPT</b>	
<b>APPENDIX C STANDARD OPERATING PROCEDURES FOR FIELD SAMPLING</b>	
<b>APPENDIX D GROUNDWATER MONITORING WELL BORING LOGS</b>	

## 1 INTRODUCTION

---

The Taylor's Lane Compost Site is located in the Village of Mamaroneck, New York. The site has been classified as a Class 2, inactive hazardous waste site, by the New York State Department of Environmental Conservation (NYSDEC). The Remedial Investigation/Feasibility Study Report for the site, prepared by Malcolm Pirnie in April 1993, provides a description of the site and a detailed explanation of the site's history. A copy of a portion of Section 1 of the Pirnie report is included in Appendix A to this O&M Plan.

The Record of Decision (ROD) for the site ordered the primary remedy of final cover. EMCON/Wehran-New York, Inc. (EMCON) prepared the remedial design (May 1995), and provided construction quality assurance monitoring throughout the course of implementation of the primary remedy. The closure of the Taylor's Lane Compost Site was completed in the Spring of 1997, in accordance with the requirements of 6 NYCRR Part 360-2.15, effective December 31, 1988 and revised May 28, 1991. Final certification of the final cover construction was filed with NYSDEC in September 1997.

The post-closure period commenced with the completion of the final cover construction. Activities at the site, will now be governed by the post-closure operations and maintenance procedures covered within this Post-Closure Operation and Maintenance Plan (O&M Plan). This O&M Plan has been prepared to meet the requirements of Section 2.9 of 6 NYCRR Part 360, effective November 26, 1996.

## 2 CLOSURE DESIGN

---

The closure design consists of the following components:

- Gas venting system
- Final cover
- Stormwater controls

The closure design and construction considerations have been presented in detail in the following documents:

- Final Engineering Design Report for Closure of the Taylor's Lane Compost Site, prepared by Wehran-New York, Inc., March 1995, revised May 1995.
- Final Bid Documents and Technical Specifications for the Closure of the Taylor's Lane Compost Site, prepared by Wehran-New York, Inc., March 1995, revised May 1995.
- Construction Plans for the for the Closure of the Taylor's Lane Compost Site, prepared by Wehran-New York, Inc., March 1995, revised May 1995.

The final cover system is described in detail in Section 3 - Landfill Closure Design of the Final Engineering Design Report. A copy of this section is included in Appendix B of this O&M Plan.

## **3 POST-CLOSURE MAINTENANCE AND MONITORING PLAN**

---

### **3.1 General**

Upon completion of closure of the Taylor's Lane Compost Site, the 30-year post-closure period commenced. Post-closure involves a program for monitoring and maintenance of the environmental controls in place at the facility. Post-closure activities include the performance of routine inspection, groundwater monitoring, routine maintenance, and reporting. Each of these project aspects is discussed in subsequent sections.

Post-closure monitoring inspections of the final cover system will be performed by individuals familiar with multi-layered cover systems and experience in recognizing evidence of subsidence or erosion damage, etc.

### **3.2 Post-Closure Maintenance**

#### **3.2.1 Final Cover Maintenance**

The final cover will be inspected on an annual basis to observe for erosion, damage to vegetation, stability, and settlement. Inspections will be conducted to determine the need to repair the final cover and vegetation. Inspections will be performed by individuals familiar with multi-layered cover systems. A report describing the results of the inspection as well as any recommended maintenance or repair work will be prepared and forwarded to the Village.

Repairs will be conducted by the Village, as necessary using appropriate lightweight equipment and/or tools, to ensure the integrity of the landfill final cover. Based on observations of similar landfill sites, it is expected that a portion of the vegetation and topsoil components of the final cover will require maintenance over the post-closure period.

### **3.2.2 Drainage System Maintenance**

The surface water drainage system composed of diversion swales, and culverts will be inspected on an annual basis. Inspections will be performed by individuals familiar with multi-layered cover systems. A report describing the results of the inspection as well as any recommended maintenance or repair work will be prepared and forwarded to the Village.

Any significant accumulation of sediments in the drainage system that can affect the performance of the system, will be removed periodically. Repair, including cleaning, revegetation and regrading, will be conducted as necessary by the Village using appropriate lightweight equipment and/or tools. Based upon observations of similar projects, it is assumed that maintenance will be required until the firm establishment of drainage system vegetation.

### **3.2.3 Vegetative Maintenance**

Vegetative will be inspected on an annual basis. Inspections will be performed by individuals familiar with multi-layered cover systems. A report describing the results of the inspection as well as any recommended maintenance or repair work will be prepared and forwarded to the Village.

Vegetative maintenance will be performed as required, in response to the routine site inspections. Additionally, during the initial 2 years of vegetation establishment, fertilizer will be applied annually.

Mowing will be conducted as required at a frequency of approximately 4 to 6 times per year to prevent the establishment of deep-rooted vegetation. The site will be maintained for passive recreation use.

## **3.3 Post-Closure Monitoring**

### **3.3.1 Groundwater**

Environmental monitoring of groundwater quality will be conducted at the site. The post-closure monitoring well network, shown on the Construction Plans, will be sampled twice each year (every six months) for the first 5 years in accordance with the ROD.

Groundwater will be sampled for the target compound list of volatile organic compounds, pesticides, arsenic, cadmium, copper, lead, mercury, and zinc. The frequency of

groundwater monitoring may be adjusted based upon the results of the first 5-year monitoring results.

If modifications to the groundwater monitoring program are required, Departmental (NYSDEC) approval will be sought prior to its implementation. In addition, damaged groundwater monitoring wells that cannot be rehabilitated, and wells that will no longer be part of the Long-Term Monitoring Program, will be decommissioned in accordance with the NYSDEC document *Groundwater Monitoring Well Decommissioning Procedures*, dated October 1996.

The procedures for groundwater monitoring are included in Appendix C of the O&M Plan. In addition the logs of the groundwater monitoring are also included in Appendix D to this report.

### **3.3.2 Landfill Gas Monitoring**

In response to local resident concern, emissions from the 8 on-site landfill gas vents was monitored for VOCs and combustible gas on December 4, 1997. These vents will be monitored again during the next semi-annual monitoring event. Although continuation of monitoring is not anticipated beyond mid-year 1998, if significant detections of landfill gas are recorded, monitoring will continue.

### **3.3.3 Surface Water Monitoring**

Monitoring of surface outfall into Magid Pond was performed on December 4, 1997. Surface water samples were collected at the outfall and were analyzed for the same parameter list as the groundwater monitoring wells. The surface water will be monitored again during the next semi-annual monitoring event. Unless significantly elevated levels of listed contaminants are detected, the surface water monitoring will not continue.

## **3.4 Recordkeeping and Reporting**

Procedures to monitor the post-closure operation and maintenance of the landfill, including a program of self-inspection, recordkeeping and reporting, as required by the NYSDEC, is discussed in this section.

### **3.4.1 Recordkeeping**

The following information will be recorded and maintained in the landfill files. Required information will be reported to NYSDEC on a regular basis, as discussed subsequently. Various records will be kept for the appropriate time periods as summarized below:



- Records of all supporting or supplemental data developed for closure construction of the facility, will be kept throughout the facility's post-closure period.
- All records pertaining to monitoring data (including calibration/maintenance records, original instrumentation recordings, reports, laboratory analyses, etc.) will be kept at least 3 years from the date of the original activity.
- All groundwater quality records will be kept throughout the post-closure period.

Specific records to be maintained include, at a minimum, the information outlined as follows:

- Facility inspection reports and maintenance activities as well as corrective and preventive maintenance data.
- Results of groundwater monitoring.

### **3.4.2 Reporting**

Annual reports will be prepared and submitted by the Owner to the NYSDEC for the operation, maintenance and monitoring activities of the landfill, which were described previously in this section.

## 4 SITE PLAN

---

A site plan depicting the configuration of the Taylor's Lane site upon completion of closure is included within this O&M Report. The site plan shows final grades as reported by the landfill closure contractor. This plan also includes the final configuration of the drainage features both on-site and on adjacent properties which are related to or have been affected by the implementation of the remedial closure at the site.

## LIMITATIONS

---

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

**DRAWINGS**

**APPENDIX A**  
**FEASIBILITY STUDY EXCERPT**

**Phase I - RI/FS**

**MAMARONECK TAYLOR LANE  
LEAF COMPOST SITE  
FINAL FEASIBILITY STUDY**

**Village of Mamaroneck, New York**

**April 1993  
PROJECT 1547-02-1**

**VOLUME I of II**

**MALCOLM  
PIRNIE**

**ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS**

## 1.0 INTRODUCTION

---

The Taylor Lane Leaf Compost site, owned by the Village of Mamaroneck (Village), is currently listed in the New York State Registry of Inactive Hazardous Waste Disposal sites. An Administrative Order of Consent between the Village and the New York State Department of Environmental Conservation (NYSDEC) was executed in August 1989 and set forth the performance standards and schedule for work at the site.

The Village implemented Phase I of the remedial program in April 1990, and the results were compiled by Malcolm Pirnie, Inc. and presented in the "Mamaroneck Taylor Lane Leaf Compost Site Final Remedial Investigation (RI) Report (Volume 1)," submitted to the NYSDEC in June 1992. As detailed in the RI report, contamination at the site is concentrated in fill material, which is partially saturated, and is composed primarily of a matrix of silt, fine sands, ash, and miscellaneous debris.

Between January and April 1992, Malcolm Pirnie, Inc. conducted additional field activities to better define the nature and extent of contamination in areas identified as having elevated contaminant concentrations during the RI (Volume 1). A compilation of the results from this additional work are presented in the "Mamaroneck Taylor Lane Leaf Compost Site Supplemental Remedial Investigation (Volume 2)."

In this Feasibility Study report (FS), data obtained during the RI (Volume 1) are used in conjunction with data collected during the Supplemental RI (Volume 2) to evaluate and select remedial technologies for use at the site.

### 1.1 PURPOSE AND ORGANIZATION OF REPORT

---

This Feasibility Study (FS) has been prepared in accordance with the requirements set forth under the New York Code of Rules and Regulations of the State of New York (NYCRR) Part 375 Inactive Hazardous Waste Sites. The format of this report is consistent with guidelines established in the United States Environmental Protection Agency (USEPA) document, "Guidance for Conducting Remedial Investigation and Feasibility Studies Under CERCLA, Interim Final, October 1988."

The objective of the FS report is to identify remedial alternatives which are capable of containing or remediating isolated areas of fill along the site's eastern border, fill material

down to a depth of 15 feet, leachate contained within the fill, and groundwater beneath the fill. For the purposes of this report, the groundwater contained within the fill layer is referred to as leachate. As indicated in Table 1-1, the primary constituents of concern at the site are volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and heavy metals. A more detailed analysis of the nature and extent of contamination is discussed in Section 1.4.

The ecological risk assessment presented in the RI determined that several pesticides and inorganic compounds (heavy metals) were of concern in the sediments in Magid Pond, a wetland area located west of the site. Although contaminant levels were elevated relative to sediment guidelines, it was determined that the contaminants were not directly related to the site. As indicated in Table 1-2, a comparison of sediment data from Magid Pond was made to data from similar aquatic wetlands located in nearby residential and commercial areas. Based on an analysis of the results, it appears that contaminant levels detected in Magid Pond sediments do not reflect input from the site, but rather are indicative of an area-wide condition resulting from anthropogenic non-point sources. Therefore, the FS does not address remediation alternatives for Magid Pond sediment materials.

Numerous remedial technologies have been evaluated and screened on the basis of following three criteria: implementation potential, cost, and effectiveness. Technologies that were not eliminated during the first round of screening have been further developed into remedial alternatives according to site specific conditions. After completing a detailed evaluation for each remedial alternative, a final comparison of the alternatives was made, and the most feasible alternatives identified. Remedial alternatives have been evaluated according to seven of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) criteria, including:

- Overall protection of human health and the environment
- Compliance with applicable or relevant and appropriate requirements (ARARs) of federal and state environmental and public health laws
- Long-term effectiveness and permanence or, consistency with the remedy
- Reduction of toxicity, mobility, or volume of contaminants
- Short-term effectiveness
- Implementability
- Cost

Two additional NCP criteria, state acceptance and community acceptance, will be considered at the completion of the FS Report. State acceptance will be evaluated by the



TABLE 1-1

**PRIMARY CONSTITUENTS  
OF CONCERN**

<u>CONTAMINANTS</u>	<u>BERM</u>	<u>FILL</u>	<u>LEACHATE</u>	<u>GROUNDWATER</u>
VOCs	X	X	X	X (1)
SVOCs (paHs)	X	X	X	
Pesticides	X	X	X	X (2)
PCBs		X		
Metals	X	X	X	X (3)

(1) Vinyl Chloride; 1,2 DCE

(2) alpha-BHC, beta-BHC, gamma-BHC, Dieldrin, alpha-Chlordane

(3) Chromium, Iron, Lead, Manganese, Nickel, Cyanide

TABLE 1-2  
MAGID POND COMPARATIVE DATA ANALYSIS

	MAGID POND SEDIMENT RANGE	OTTER CREEK SEDIMENT RANGE	PRYER MANOR MARSH SEDIMENT RANGE (1)	PREMIUM RIVER SEDIMENT RANGE (1)	GARDENS LAKE SEDIMENT RANGE (1,2)	NEW YORK SEDIMENT CRITERIA (4)
PESTICIDES	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
4,4'-DDE	96 - 190	43 - 110	230 - 780	<0.05 - <164	<580 - <1100	1,300 / 21.5 (5)
4,4'-DDD	120 - 260	77 - 110	160 - 280	<0.2 - <307	<580 - <1100	1,300 / 21.5 (5)
4,4'-DDT	140 - 310	77	160 - 250	<0.15 - <7,452	<580 - <1100	1,300 / 21.5 (5)
aldrin	33 - 97	14 - 16	<80 - <121.2	<0.10 - <559	<290 - <550	218.4 / 20.02 (5)
alpha-BHC	ND	6.7	<80 - <121.2	<0.05 - <394	<290 - <550	-
alpha-chlordane	35 - 84	25 - 26	180 - <800	<0.05 - <2,642 (3)	<2900 - <5500 (3)	0.156
endosulfan sulfate	ND	86	<160 - <242.4	<0.05 - 15.7 - <329	<580 - <1100	0.78
gamma-chlordane	34 - 120	29 - 47	140 - <800	<0.05 - <2,642 (3)	<2900 - <5500 (3)	0.156
INORGANICS	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
aluminum	4590 - 20,200	11,600 - 20,800	-	-	12,578	-
arsenic	6.0 - 19.7	4.4 - 13.3	-	4.1 - 13.1	25.0	5
barium	150 - 368	58.2 - 190	-	-	-	-
beryllium	ND	0.48	-	-	<0.3	-
cadmium	3.7 - 7.2	2.6 - 4.6	-	3.3 - 4.7	1.3	0.8
calcium	12,200 - 27,300	1400 - 79,300	-	-	-	-
chromium	17.3 - 62.9	37.2 - 53.9	-	7.6 - 59.2	26.6	26
cobalt	6.50	5.7 - 15.1	-	-	-	-
copper	16.9 - 180.0	33.4 - 111	-	45.0 - 243.8	65.2	19
iron	20,300 - 85,900	30,300 - 40,800	-	-	15,316	2.4%
lead	36.1 - 406.0	43 - 161	-	35.8 - 863.7	131.1	27
magnesium	3130 - 10,100	8260 - 9000	-	-	-	-
manganese	459 - 2370	261 - 424	-	-	466	428
mercury	0.32 - 0.93	0.24 - 1.2	-	2.55	0.5	0.11
nickel	12.8 - 58.7	19.2 - 29.3	-	15.9 - 53.4	17.6	22
potassium	616 - 2990	3760 - 9560	-	-	1,478	-
selenium	2.4 - 7.9	ND	-	-	1.3	-
silver	ND	ND	-	-	<0.6	-
sodium	1010 - 8460	948 - 13,000	-	-	-	-
vanadium	27.8 - 99.0	37.5 - 67.4	-	-	-	-
zinc	98.9 - 417	89.7 - 261	-	74.2 - 1,120	163.7	85

(1) For Pesticides, detection limits varied; values with a "<" indicate value was below detection limit.

(2) Inorganics values represent a composite of six samples.

(3) Values are for total chlordane.

(4) Criteria based on NYDEC Guidance Document (1989) used as guidance by the Division of Fish and Wildlife and is neither a standard nor a policy of the Department.

(5) Aquatic toxicity based criterion / Wildlife residue based criterion  
- = Data Not Available  
ND = Not Detected

NYSDEC in the Proposed Remedial Action Plan (PRAP), and will identify the remedial alternative preferred by the state. Community acceptance will also be evaluated by the NYSDEC in the Record of Decision (ROD) after the public comment period.

Section 1.0 of the report presents a general site description, site history, and the details of previous field investigations. General response actions and applicable or relevant and appropriate requirements (ARARs) for the site are also presented. To better characterize the nature and extent of contamination, detected contaminant concentrations were compared to established ARARs, and illustrated pictorially.

Section 2.0 of the report details the identification and screening process for various remedial technologies. In-situ technologies and excavation with on-site and off-site treatment options are presented as remedial action alternatives. Capping of the site area, with and without groundwater containment system were also examined. Extraction and disposal options for leachate and groundwater are described, and a summary of the preliminary screening results presented for both media.

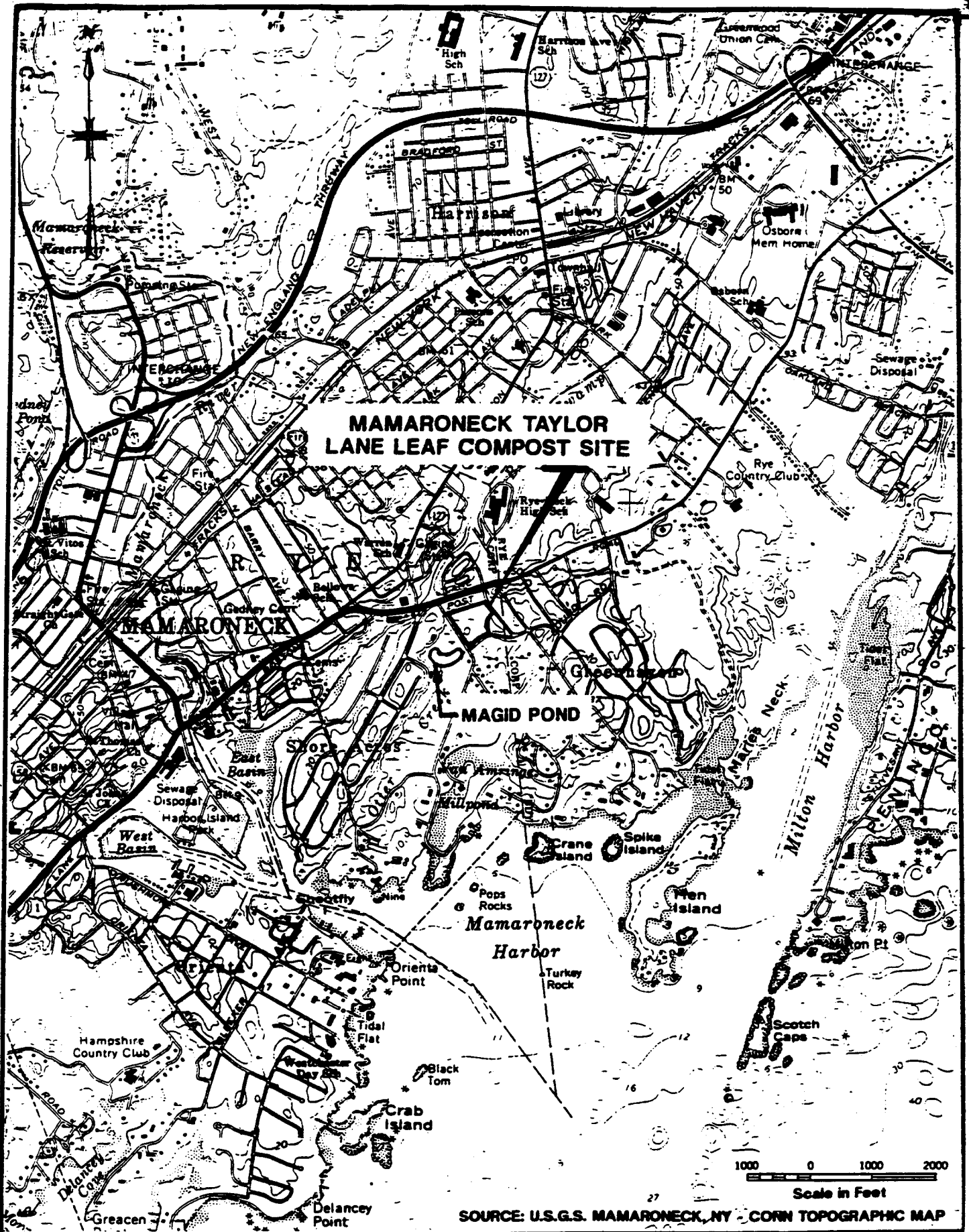
The development of the alternatives, including the no action alternative (as required by the NCP), is presented in Section 3.0. Section 4.0 of the report presents a detailed analysis of the remedial action alternatives as compared with the NCP criteria. Section 5.0 evaluates each alternative with respect to future land use considerations.

## **1.2 SITE BACKGROUND**

---

### **1.2.1 Site Location and Description**

The Mamaroneck Taylor Lane Leaf Compost site is located in the Village of Mamaroneck in Westchester County, New York. A map presenting the geographic location of the site is given in Figure 1-1. The site is situated between Old Boston Post Road to the north, Taylor Lane to the west, Shadow Lane to the south, and Greenhaven Road to the east. A gas station, single family residence, automobile dealership, and a plant nursery are located immediately north of the site between Old Boston Post Road and the site. Single family homes border the site property on the northeast and southeast boundary. The total site area is approximately 7.5 acres and consists primarily of grass and wood debris piles. A wetland area consisting of Magid Pond and Otter Creek is located west of the site, across from Taylor Lane.



**MALCOLM  
PIRNIE**

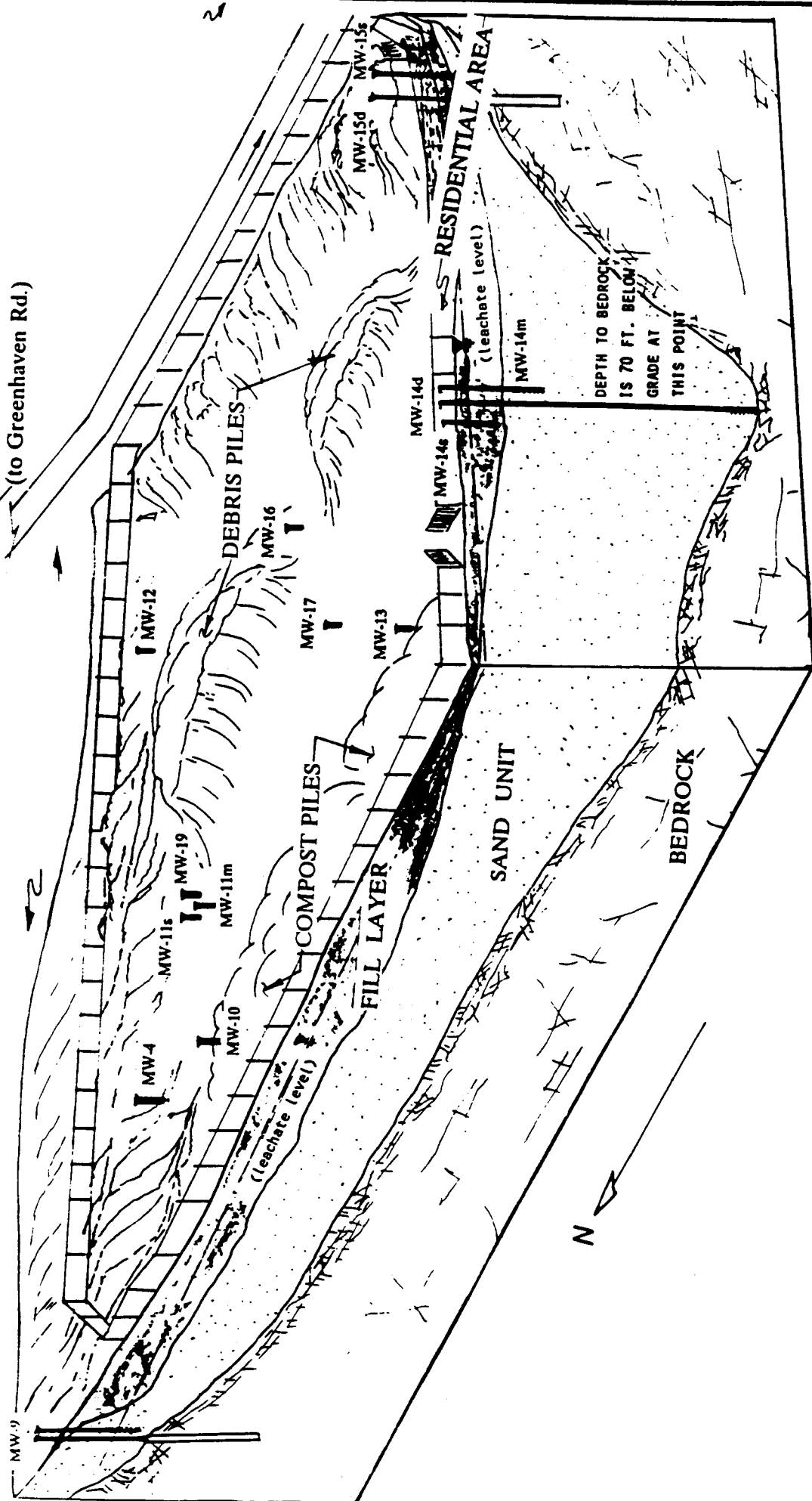
VILLAGE OF MAMARONECK, NEW YORK  
**MAMARONECK TAYLOR LANE LEAF COMPOST SITE**  
**LOCATION MAP**

MALCOLM PIRNIE, INC.

**FIGURE 1-1**

(to Post Rd.)

GREENHAVEN RD.



(to Greenhaven Rd.)

RESIDENTIAL AREA

DEPTH TO BEDROCK IS 70 FT. BELOW GRADE AT THIS POINT

N

NOT TO SCALE

(to Magid Pond)

**MALCOLM PIRNIE**

**MAMARONECK TAYLOR LANE LEAF COMPOST SITE**  
BLOCK DIAGRAM ILLUSTRATION OF  
FILL LAYER, SAND UNIT and BEDROCK

MALCOLM PIRNIE, INC.

FIGURE 1-2

TABLE 1-3

CHRONOLOGY OF SITE HISTORY ACTIVITIES  
Mamaroneck Taylor Lane Leaf Compost Site

<u>Date</u>	<u>Description of Event</u>
Prior to 1970	Site used as a municipal waste landfill where industrial and incinerator ash were allegedly disposed of.
July 1987	Malcolm Pirnie, Inc. conducts field studies to assess the subsurface environmental conditions, under the observation of the NYDSEC.
December 1988	Site classified as a Class 2 hazardous waste site and placed on the New York State Superfund Registry.
August 1989	Village enters into an Administrative Order on Consent with the NYSDEC to perform a four stage remedial program, including: a Remedial Investigation, Feasibility Study, Remedial Design and Implementation.
May 1990	On-site surface water and sediment investigations conducted by Malcolm Pirnie, Inc. One surface water and one sediment sample collected from each of the two standing water areas located in the northern portion of the site. One round of ground water sampling conducted in Magid Pond.
October 1990	Malcolm Pirnie, Inc. conducted excavation of 44 soil trenches, and collected soil samples from eight of the trenches.
November 1990	Nineteen soil borings ranging from a depth of 8 to 78 feet were drilled to determine the depth of fill material, nature of underlying soils, and depth to bedrock in selected areas.
December 1990	Twelve additional monitoring wells were installed, supplementing the six existing wells. Six monitoring wells were placed in paired clusters at three locations.
January 1991	Two rounds of ground water sampling were collected from the twelve newly installed wells and from two of the previously installed wells. Soil sampling was conducted and consisted of two hand borings on the eastern berm.
August 1991	Supplemental soil sampling was conducted and consisted of seven hand borings.

TABLE 1-3  
(Continued)

CHRONOLOGY OF SITE HISTORY ACTIVITIES  
Mamaroneck Taylor Lane Leaf Compost Site

<u>Date</u>	<u>Description of Event</u>
January 1992	Malcolm Pirnie, Inc. performed supplemental field work including the installation of three additional wells, and seven piezometer clusters. Draft Remedial Investigation Report submitted to the NYSDEC for their review and comment.
April 1992	Malcolm Pirnie, Inc. and the NYSDEC jointly conducted a pumping test. Water levels were monitored in the pumping well and in the observation wells and at piezometer locations. Pumping test was conducted for 24-hours at a rate of 1 gpm.
May 1992	Draft Remedial Investigation Report (Volume 2) submitted to the NYSDEC for review.
June 1992	Final Remedial Investigation Report (Volume 1) approved by the NYSDEC.
August 1992	NYSDEC conducts public information meeting to discuss the results of the Remedial Investigation Report.
September 1992	Supplemental Remedial Investigation Report (Volume II) approved by the NYSDEC.
January 1993	Draft Feasibility Study Report submitted to the NYSDEC.

Investigation, Feasibility Study, Remedial Design and Remedial Action. This document, upon the approval of the NYSDEC, will satisfy the RI/FS requirement of the remedial program. Table 1-3 presents a chronological summary of key events that have occurred at the Mamaroneck site from its inception as a leaf composting facility, to present day conditions.

### **13 PREVIOUS INVESTIGATIONS**

---

All associated field activities at the Mamaroneck Taylor Lane site were conducted by Malcolm Pirnie, Inc. under the observation of the NYSDEC. The physical setting and extent of leachate and groundwater contamination at the site were the focus of the initial RI and Supplemental RI. Details regarding methodology and results of these field activities are available in Volumes 1 and 2 of the "Mamaroneck Taylor Lane Leaf Compost Site Remedial Investigation Reports."

#### **13.1 Remedial Investigation (Volume I)**

In February 1988, Malcolm Pirnie, Inc. installed three monitoring wells, MW-2, MW-3, and MW-4, on the site in order to monitor the groundwater flow in both the vertical and horizontal directions, and to provide additional information on subsurface geological conditions. Groundwater sampling in the wells occurred in March 1988. Monitoring well MW-1 had been installed prior to the Work Plan approved by the NYSDEC, and was therefore not included in the sampling rounds. Three wells, MW-5, MW-6, and MW-7, were subsequently installed in April 1988, and additional groundwater samples were collected in June 1988. Between November and December 1990, 12 more monitoring wells were installed; six of the wells were placed in paired clusters (MW-9s and 9d, MW-14m and 14d, and MW-15s and 15d). In two of the clusters, the deep well was drilled into bedrock (MW-9 and MW-15); in MW-14, the deep well was screened at a depth just above the overburden/bedrock interface. The remaining six wells (MW-10, MW-11, MW-12, MW-13, MW-16, and MW-17) were constructed as shallow groundwater monitoring wells.

Surface water and sediment investigations were conducted by Malcolm Pirnie, Inc. in May and September 1990, and again in October 1991, to characterize the chemical quality of both on-site and off-site water bodies. One surface water sample and one sediment



sample were collected from each of the two standing water areas located in the northern portion of the site. In addition, a sediment sample and one surface water sample were collected from the ditch located on the east side of Taylor Lane. The samples were analyzed for Target Compound List (TCL) parameters and Target Analyte List (TAL) parameters, landfill leachate parameters (including most conventional water quality parameters as described in the RI), and Total Petroleum Hydrocarbons (TPH). TCL includes the following parameters: volatile organic compounds, acid/base/neutral extractable compounds (semi-volatiles), and pesticides/PCBs (polychlorinated biphenyls). Metals and cyanides were also included on the list of TAL parameters. TPH were analyzed individually.

Soil trenching was also conducted during October 1990. Trench locations were selected on the basis of previous geophysical and soil gas survey results. A total of 44 trenches were excavated, and soil samples were collected from eight of the trenches for TCL/TAL and TPH analysis.

Nineteen soil borings ranging from a depth of 8 to 78 feet were drilled from November 5 through 27, 1990 to determine the depth of fill material, nature of underlying soils, and depth to bedrock in selected areas. Continuous split-spoon samples were collected from the ground surface to an approximate depth of 10 to 14 feet, with samples continuing every 5 feet thereafter, to a total depth of approximately 5 feet below the fill material. Four borings on the west side of the site were drilled to refusal to confirm the depth to bedrock indicated from geophysical surveys. Supplemental soil sampling was conducted in August 1991 and consisted of seven hand borings: HB-3 through HB-9. Hand borings HB-1 and HB-2 had been previously dug on the eastern berm in January 1991.

Two groundwater sampling rounds were conducted at the site under the initial RI. The first round of sampling was performed during January 1991, and the second round on April 8 and 9, 1991. Samples were collected from the 12 newly installed wells, and from two of the three previously installed wells (MW-4, MW-6). As previously indicated, MW-1 was not sampled due to the lack of inspection at the time of its construction. Samples were collected and analyzed for full TCL/TAL parameters, as well as landfill leachate parameters, and TPH.

### **1.3.2 Supplemental Remedial Investigation (Volume 2)**

Based on the NYSDEC determination that additional information was needed to fully characterize the site, Malcolm Pirnie, Inc. performed supplemental field work between

January and April 1992. As part of the Supplemental RI, three additional wells, (MW-11M, MW-14M, MW-19) and seven piezometer clusters, (PZ-1, PZ-2, PZ-3, PZ-4, PZ-5, PZ-6, PZ-7) were installed at pre-determined NYSDEC approved locations.

A total of six fill samples and three sand layer samples were collected and analyzed for cation exchange capacity (CEC) and total organic carbon (TOC) from borings at the locations of wells MW-11M, MW-14M, and PZ-4. The CEC and TOC data were evaluated to determine the capacity of the soils to retard the migration of contaminants from the fill into the groundwater.

Three groundwater samples from MW-11M, MW-14M, and MW-19, and one surface water sample were collected during the Supplemental RI, and analyzed for full TAL/TCL parameters, oil and grease, bicarbonate, carbonate, and TSS. The purpose of performing these water quality analyses was to evaluate treatment and disposal alternatives during the FS. The groundwater samples were also analyzed for NYCRR Part 360 landfill leachate parameters, which provided usable data for the comparison of groundwater quality data collected during the initial RI (Volume 1). Groundwater samples were also collected from newly installed wells MW-11M, MW-19, and MW-14M. One surface water sample was collected in the area of staff gage SG-4, in the southern corner of the site.

In April 1992, Malcolm Pirnie, Inc. and the NYSDEC jointly conducted a pump test on MW-19. Water levels were monitored in the pumping well and in the observation wells, MW-11M, MW-11S, and at piezometer locations, PZ-2S, PZ-2D, PZ-1S, and PZ-1D. Background water levels were collected in MW-17, which screens the same zone as the pumping well and would reflect changes in the natural conditions of the aquifer, but would be outside the zone of influence of pumping. The details of the pumping test can be found in Volume 2 of the RI.

#### **1.4 NATURE AND EXTENT OF CONTAMINATION**

---

The field activities which were previously described in Section 1.3 were conducted to characterize the nature and extent of contamination at the site. Based on an extensive review of the data, it appears that contamination at the Taylor Lane site is concentrated primarily within the fill/soils material and groundwater contained in the fill (referred to as leachate for purposes of this report), and to a lesser extent in the groundwater in the lower sand unit. However, a clear distribution or pattern of contaminants was not found in the

fill/soils material, leachate or groundwater data. Rather, the sampling results are consistent with a random deposition of commercial, residential and small volumes of industrial waste, which were all allegedly disposed of at the site.

#### **1.4.1 Nature and Extent of Contaminants in Fill/Soils Material**

During the Malcolm Pirnie, Inc. field investigations, a total of twenty-four soil (fill) locations were sampled at the Mamaroneck site. Of these samples, 13 were taken from soil borings, 6 from trench areas, 4 from monitoring well borings, and 2 from hand borings. Each soil (fill) sample was analyzed for full TCL, TAL, and TPH parameters.

A review of the data indicates that the spatial distribution of VOCs in the fill is sporadic and discontinuous. VOCs detected throughout the site are as follows: acetone, ethylbenzene, 4-methyl-2-pentanone, styrene, toluene, xylene, benzene, tetrachloroethene, methylene chloride, 2-butanone, and toluene.

TCL semi-volatile compounds were also detected sporadically over much of the site. Exceptions occur on the southeastern perimeter of the site where two samples, TR-13, and TR-15, had no detectable SVOCs. Poly-aromatic hydrocarbons, such as benzo(a)pyrene, benzo(b)fluoranthene, naphthalene, and phenanthrene were detected in the highest concentrations throughout the site.

TCL pesticide concentrations were also detected throughout the site area. The maximum detected concentration of 4,4'-DDD occurred at the location of soil boring, SB-13, at a value of 7,500 ug/kg. Aroclor 1254 was detected at 7800 ug/kg in SB-07. Other major pesticides detected in the fill were the following: alpha-chlordane, gamma-chlordane, and 4,4'-DDT, alpha-BHC, gamma-BHC and delta-BHC. Some of the previously listed pesticides may originate from the composting operations conducted on the site prior to the RI investigation, when lawn clippings and leaf collections from throughout the community were brought to the site. The common use of pesticides on lawn and garden debris may account for the low pesticide concentrations detected in the fill/soils.

PCBs were not detected in any hand boring samples. Concentrations of PCBs in the soil borings, monitoring well borings, and trenches, varied with the maximum concentration occurring in soil boring location MW-11 at a value of 12,000 ug/kg.

TPH data indicate that detected concentrations were sporadic, but low throughout the site. The maximum concentration detected on-site was in soil boring location MW-11, at a level of 26,000 ug/kg. A soil sample taken directly from a drum in Trench 13 contained

a TPH estimate of 290,000 ug/kg; however, this sample is not necessarily indicative of the site's extent of contamination.

TAL inorganic parameters were detected in the fill throughout the site and may result from incomplete burning of the ash, cinder, and slag contained in the fill. Low temperature combustion of coal, wood, and other flammable materials will preferentially concentrate as naturally occurring metals in the residue. The overall occurrence of metals shows concentrations above typical NY State background compositions throughout the site. The most frequently detected inorganic compounds in the fill are as follows: arsenic, barium, cadmium, chromium, copper, lead, mercury, zinc, and cyanide.

#### 1.4.2 Nature and Extent of Contaminants in Leachate

A total of 12 monitoring wells were sampled for leachate during field investigations, and analyzed for TCL/TAL parameters. TCL compounds were detected in both rounds of leachate sampling, and were concentrated in the vicinity of monitoring well MW-11. Total VOC concentrations occur generally in a north-south trending area. The concentrations diminish rapidly with increasing distance from monitoring well MW-11. The primary detected contaminants include toluene, xylene, 4-methyl-2-pentanone, and ethylbenzene.

TCL semi-volatile compounds were also sporadically detected throughout the site, ranging in non detectable (ND) in MW-6, MW-10, MW-12, MW-14 and MW-15, to 130 ppb in MW-11S. The major SVOCs detected in on-site leachate included dibenzofuran, bis(2-ethylhexyl)phthalate, benzylalcohol, and 2-methylnaphthalene.

Low concentrations of TCL pesticides were detected in the leachate over much of the site. Pesticides were also detected in concentrations ranging from non detect in MW-6 and MW-15, to 870 ppb of 4,4'-DDD in MW-11. The pesticides 4,4'-DDE, alpha-chlordane, and alpha-BHC occur most frequently on site.

PCBs were detected only in monitoring wells MW-10 and MW-1S. The reported levels of Aroclor-1254 were 420 ppb in MW-10 and 1.3 ppb in MW-14S.

TAL inorganic parameters in the leachate were heterogeneously detected throughout the site; however, several individual inorganic chemicals had high, localized concentrations. The following inorganic compounds occurred frequently throughout the site: aluminum, arsenic, beryllium, cadmium, chromium, lead, nickel, zinc, and cyanide.

#### **1.43 Nature and Extent of Contaminants in Groundwater**

A total of 14 groundwater samples and one field duplicate sample were collected from the 12 new monitoring wells and two existing site wells during each sampling event. The only VOCs detected in the groundwater were 1,2-dichloroethene and vinyl chloride. Bis(2-ethylhexyl)phthalate was the only SVOC detected in the groundwater in the lower sand unit, and was detected in the location of MW-14D. No PCBs were detected in any of the monitoring wells screened in the lower aquifer. Pesticides were detected in MW-11M and MW-14M, at levels of 0.270 ppb, and 0.039 ppb, respectively. The inorganic compounds detected in the groundwater were similar to those observed in the leachate. The maximum concentration of total lead occurred in the location of MW-9D, at a level of 76.3 ppb, and the maximum concentration of cyanide was found in MW-14M, at a level of 70.8 ppb.

#### **1.44 Nature and Extent of Contaminants in Magid Pond**

The compounds of concern in Magid Pond include: total PAHs; bis(2-ethylhexyl)-phthalate; 4,4'- DDT, DDD and DDE; aldrin; chlordane; endosulfan sulfate; aluminum; barium; copper; iron; lead; mercury; and vanadium. Several of the compounds identified, particularly, the PAHs, bis(2-ethylhexyl)phthalate, and inorganic compounds, are ubiquitous in the environment, and are typically found in road runoff and storm water in highly populated areas. As previously indicated, the presence of these compounds in the Magid Pond/Otter Creek area may not be the result of contamination at the Taylor Lane site, but partially or entirely a result of storm water runoff from adjacent roads, and residential and commercial development.

#### **1.45 Nature and Extent of Contaminants in Ambient Air**

During RI activities, very low levels of volatile gases were detected by the HNu. Background HNu levels appear to equal 0.2 ppm calibration gas equivalents at nearly all times. Occasional HNu readings up to 0.4 equivalents were registered. No Lower Explosive Limit (LEL) readings above zero were registered. It does not appear that the site is off-gassing ionizable volatiles, and the low HNu levels appear to represent normal background levels and variability. However, the potential generation of explosive and combustible gases would need to be further monitored during the implementation of any remedial action at the site. The National Ambient Air Quality Standards (AAQS) and Ambient Guideline Concentrations (ACGs) would be serve as air ARAR action limits during remedial activities.

**1.4.6 Summary of Fate and Transport of Contaminants and Findings of Human Health Risk Assessment and Environmental Risk Assessment.**

**Fate and Transport**

The fate of site contaminants appears to be primarily controlled by the high percentage of organic carbon content of the compost, fill, and underlying unconsolidated sediments. Contaminants can be expected to adsorb onto particle surfaces and the overall potential for contaminant migration appears limited. Volatile contaminants show minor movement in the direction of groundwater (leachate) flow particularly in the vicinity of monitoring well MW-11. The low frequency of detection of SVOCs compounds in the groundwater indicates the limited potential for leaching from the fill to occur.

Pesticide migration appears limited to the vicinity of monitoring well MW-11, where leaching to the groundwater from areas with elevated concentrations in the fill appears to be occurring. PCB migration is very limited and appears concentrated around monitoring well MW-10.

Limited leaching from the fill into the groundwater of inorganic contaminants can be expected with re-adsorption back onto other particulates. The CEC and TOC results, detailed in the RI (Volume 2), support the conclusion that the organic and inorganic compounds will preferentially bind and adsorb to the fill material, thus significantly reducing the mobility of the contaminants from the site.

**Human Health Risk Assessment**

A risk assessment for the site was performed as a supplement to the Remedial Investigation (Volume 1 - Appendix N). The quantitative risk assessment developed "reasonable maximum exposure scenarios" to estimate the magnitude and likelihood of potential risks associated with the site in its present condition. Although there were many chemicals detected on site, only a handful effected the risk estimates. These compounds were: arsenic, lead, and polycyclic aromatic hydrocarbons (PAHs). In particular, lead concentrations in the surficial soils, the berm, on-site surface water, and groundwater are of concern from a non-cancer standpoint.

From a cancer risk standpoint, the PAHs are cause for some concern. Other chemicals of lesser concern included arsenic and PCBs. Generally, the USEPA sets as a threshold target for remediation, residual risks from  $10^{-4}$  to  $10^{-6}$ . The risks calculated for the Mamaroneck site generally fell within this range.

The human health risk assessment provided an analysis of baseline risks in the absence of any major action to control or mitigate site contamination. In accordance with USEPA guidance, the analysis addressed the consequences of "reasonable maximum exposure" to site contaminants. The USEPA recommends use of this approach, which yields the maximum exposure that is reasonably expected to occur at a site.

Included in the analysis were three exposure scenarios:

1. Exposure to workers in the event that leaf composting operations on the site resume without any remediation. Frequent contact with the most heavily contaminated surficial soils is assumed;
2. Exposure to residents from contaminants in the berm at the site perimeter and in soils on the residential side of the stone wall at the eastern edge of the site. The berm is located partially outside the fence directly adjacent to residential property. Frequent contact with the most heavily contaminated material in the berm is assumed, and a child is assumed to be the most likely individual exposed; and
3. Exposure to trespassers who may gain access to the site in its current condition. Contact with the most heavily contaminated surficial soils is assumed. It is also assumed that the trespasser may also come in contact with sediment and surface waters while on the property.

Elevated concentrations of lead in surficial soils, the berm, sediment, surface and groundwater contribute to a health concern from a non-cancer standpoint. The USEPA has an interim soil lead guideline of 500 to 1,000 mg/kg, the lower limit of which is exceeded in on-site soil and berm samples.

From a cancer risk standpoint, the carcinogenic PAHs also are cause for some concern; however, the analysis was heavily weighted due to the fact that all PAHs having some evidence of carcinogenicity were conservatively treated as if they were as potent as benzo(a)pyrene. The residual risks calculated still remain generally within the USEPAs target range of  $10^{-4}$  to  $10^{-6}$ .

Other exposure pathways were also examined. Monitoring data acquired during the remedial investigation indicate that fugitive dusts or vapors are not a problem at this time, and thus the surrounding neighborhood would not be expected to be at risk. There is a potential for basements to flood with groundwater from the site; however, no residential properties lie downgradient of the site.

### Environmental Risk Assessment

The Environmental Risk Assessment of the Taylor Lane site also included off-site areas. Contamination present in surface water and sediment in the Magid Pond/Otter Creek (off-site) area may present a potential risk to wildlife inhabiting the area. It should be noted however, that field investigations have shown that Magid Pond and Otter Creek appear to be thriving ecosystems, with a variety of wildlife species. Large numbers of waterfowl are known to use the area, and a successful breeding pair of mute swans was observed, with three young. No records exist of fish kills in the area (The Nature Conservancy personal communication, 1991) and no signs were seen of stressed conditions.

## 1.5 SUMMARY OF ARARs/SCGs

---

This section presents site-specific cleanup criteria to be used in the evaluation of alternatives for remediating the Taylor Lane site. Three categories of criteria are applicable to this remediation: applicable or relevant and appropriate requirements (ARARs), New York State standards, criteria, and guidelines (SCGs), and criteria to be considered (TBCs).

Chemical-specific ARARs are defined in the NCP, 40 CFR 300.5, as promulgated federal or state standards, requirements, criteria, or limitations that are determined to be legally enforceable and generally applicable for site conditions. ARARs derived from state regulations that are more stringent than comparable federal ARARs will be used in accordance with the requirements of the NCP.

SCGs are criteria specifically related to New York State. These SCGs include promulgated standards as well as State guidelines and procedures. Criteria to be considered (TBCs) category, as defined in 40 CFR 300.400, consist of advisories, criteria, or guidance that were developed by federal or state agencies that may be useful in developing site remedies, and may include New York State SCGs.

### 1.5.1 Cleanup Criteria for Fill/Soils

Since there are no promulgated Federal or New York State standards available for the cleanup of contaminated soils, the Division of Hazardous Waste Remediation, Proposed Division Technical and Administrative Guidance Memorandum (TAGM) titled "Determination of Cleanup Goals", served as a TBC or SCG, and provided a basis and procedure to



**APPENDIX B**  
**ENGINEERING DESIGN EXCERPT**

## **3.0 LANDFILL CLOSURE DESIGN**

### **3.1 GENERAL**

A gas venting system, final cover, and stormwater controls are to be utilized in the closure of the Taylor's Lane Compost Site. The gas venting system will intercept, collect, and passively vent landfill gas to the atmosphere. The final cover and the stormwater controls will minimize the infiltration and percolation of stormwater through the waste to limit the release of contaminants into the groundwater.

### **3.2 LIMIT OF FINAL COVER**

A series of trenches and borings were performed during the RI/FS to characterize the nature and extent of on-site wastes. The result of this investigation resulted in a determination to construct final cover to the site fence which represents the limit of the disturbed area.

### **3.3 FINAL COVER DESIGN**

#### **3.3.1 General**

The final cover for the Taylor's Lane Compost Site has been designed to provide stable, long-term protection from exposure of landfilled waste, and is intended to limit infiltration and support vegetative growth. The final cover and associated stormwater management features will greatly reduce the amount of water infiltrating into the waste by providing a low permeability barrier, and reducing surface ponding.

The final cover system proposed for this site is designed to fulfill the requirements of 6 NYCRR Part 360-2.13(p-s), effective December 31, 1988, revised May 28, 1991. The final cover system, from bottom to top includes prepared subgrade, a gas venting layer, a 40 mil flexible membrane liner (FML), a 24-inch barrier protection layer, and a 6-inch topsoil layer. The final cover components are discussed individually in the following sections.

The final cover system will be graded as a series of ridges and valleys in order to minimize quantity of fill required during construction to maintain minimum design slopes. The minimum slope of the FML from ridge to valley will be 2 percent. A variance is

required from the Part 360 requirement of 4 percent minimum slopes. This variance request is included in Appendix 3.3.1.

### **3.3.2 Subgrade Preparation**

The existing cover soils will require regrading to provide a smooth, uniform surface to facilitate placement of the low permeability barrier cover and to provide positive drainage from the completed final cover system. The design minimizes the regrading and disruption of in-place soils.

Drums remaining on-site will be disposed of. The four over pack drums and the drums containing personal protective equipment will be removed and disposed at an appropriate facility. Based upon discussions with NYSDEC, the drill cuttings will be emptied and spread on-site. The piles of debris located on-site will be spread in thin lifts across the site prior to placement of any fill. Logs and stumps will be chipped prior to spreading. The debris will be spread in thin lifts over as much of the site as possible to minimize potential for the differential settlement. The contents of the debris piles are based upon the information contained in the Remedial Investigation documents prepared by Malcolm Pirnie. Based upon this information, hazardous waste is not anticipated to be present in the debris piles. Cutting into the existing soil is limited as much as possible to minimize the potential for exposing waste. Once a suitable surface is prepared, the remainder of the construction will proceed.

Off-site fill will not be required to achieve minimum slopes. Slopes will be maintained at a minimum grade of 2 percent. The slopes of areas graded in a ridge and valley configuration may be adjusted in the field up to a maximum of 10 percent, if approved or directed by the Engineer, in the event that excess fill material is identified at the site.

### **3.3.3 Gas Venting Layer**

The initial component of final cover is the gas venting layer which will be constructed on the prepared subgrade. This layer will consist of 12 inches of recycled glass aggregate or a geocomposite drain. The recycled glass aggregate will have a minimum hydraulic conductivity of  $1 \times 10^{-3}$  sec, with a maximum of 5 percent by weight passing the No. 200 sieve. The geocomposite drain alternative is included as a contingency in the event

that insufficient quantities of acceptable recycled glass is available at the time of construction.

The gas venting layer will be constructed in accordance with Part 360-2.13(p). The gas venting layer variance, for the use of geocomposite drain, applications and equivalency demonstration is included in Appendix 3.3.3. The gas venting layer to be used will depend on the availability of broken recycled glass and economic considerations. A filter layer will not be placed beneath the gas venting layer, as it is unnecessary in this application. The filter layer variance is presented in Appendix 3.3.5.

Gas collection pipes will be included within this layer to collect and transmit landfill gas to passive vent risers. Passive vent risers will be placed around the landfill at the high point of the gas collection pipes and at the perimeter of the site. This configuration will effectively vent gas while maintaining adequate open space for the walk trail. Each vent will be protected by being enclosed by a stockade fence. The use of a passive gas venting system is supported by the findings of the Remedial Investigation Report which indicate that soil gas concentrations were less than 100 percent of the lower explosive limit (LEL) at the site boundary. Through addition of the proposed gas venting system to the landfill, perimeter gas concentrations are expected to be less than 25 percent of the LEL.

The gas venting layer, collection pipes, and vents are detailed on the Construction Plans.

### **3.3.4 Barrier Layer**

The barrier layer will consist of a 40 mil flexible membrane liner (FML) in conformance with Part 360-2.13(r). This material is resistant to the constituents routinely found in the leachate and decomposition gases of landfills. FML compatibility data has been included in Appendix 3.3.4.

### **3.3.5 Barrier Protection Layer**

The barrier protection layer will consist of a minimum of 24 inches of soil material suitable to protect the integrity of the low permeability barrier cover.

Perforated corrugated HDPE pipes within subangular stone envelopes will be utilized within the barrier protection layer to promote drainage as shown on the Construction Plans. The pipes will be located above the FML, and within the valleys of the final cover system.

The pipes will be placed at minimum slopes of 0.5 percent at the end of the catch basin. The catch basin discharges to will the culvert which conveys water from the site.

The barrier protection layer will be capable of supporting root growth but has no specific requirements in terms of permeability or gradation. However, it must be free of material which will damage the geosynthetic components of the final cover system.

### **3.3.6 Topsoil and Vegetative Cover**

The barrier protection layer will be overlain with a topsoil layer, 6 inches thick, with proper pH and nutrient content to sustain the growth of perennial grasses. The topsoil will be spread in a single lift and vegetation will be established. The landfill vegetation is described in detail in Section 3.4.3 of this report.

## **3.4 STORMWATER MANAGEMENT**

Stormwater management is critical in minimizing leachate generation, ensuring the longevity of the landfill cover system and avoiding adverse impact to the environment. Managing stormwater includes maintaining the integrity of the landfill final cover through erosion control, and limiting the transport of sediments off site.

As shown on the Construction Plans, a system of diversion swales and culverts have been designed to control stormwater runoff. The proposed surface drainage system will minimize leachate generation and soil erosion, and will control sediment transportation and peak runoff rates. The landfill grades have been designed to provide diversion of overland runoff through channels to minimize soil erosion. The drainage system for the final cover system has been designed for the peak discharge of the 25-year, 24-hour storm in accordance with the requirements of Part 360-2.15(i). The drainage system will convey stormwater from the site without ponding, in accordance with the Village's design guidance.

Under the proposed design, all stormwater will be directed across Taylor Lane, by upgrading the existing system of catch basins and culverts, to Magid Pond. Currently, the drainage from the east side of Taylor Lane drops into a catch basin, crosses the road through an 18-inch RCP placed deep under the road (to avoid utilities), and discharges on the opposite site from a catch basin through a shallow 18-inch RCP culvert to Magid Pond. The upgrade will include new catch basins and replacement of the 18-inch RCP culverts with 30-inch RCP culverts.

The control of stormwater is discussed in the following sections. Design calculations for the drainage control features proposed for the closure are included in Appendix 3.4. Details of the drainage control features are shown on the Construction Plans.

### **3.4.1 Surface Drainage Controls**

Drainage control features are designed to accommodate stormwater runoff from the 25-year, 24-hour, Type III storm, as determined using methods from the Soil Conservation Service, Technical Release No. 55 in accordance with 6 NYCRR Part 360, and New York State Guidelines for Urban Erosion and Sediment control. The proposed surface drainage system will minimize leachate generation and soil erosion, and will control sediment transportation and peak runoff rates. The final landfill grades have been designed to provide diversion of overland runoff through swales to minimize soil erosion.

Peak flows were determined based upon the proposed top of subgrade plan. Actual peak flows may be less since the final slopes of the athletic field will be milder than the slopes of the subgrade. Therefore, the design presented is actually conservative.

#### **Channels**

Channels collect runoff from the surface of the landfill final cover. The channels are formed by the contouring of the final cover and collect surface runoff and run at a slopes varying from 0.5 to 1 percent to the southwest corner of the site. The design velocity in these channels is less than 3.0 feet per second and are designed to be grass-lined. The velocities in the channels were determined using Manning's equation, and the linings specified are consistent with New York State Guidelines for Urban Erosion and Sediment Control.

#### **Culverts**

Channelization of flow requires improvement of existing stormwater culverts as shown on the Construction Plans. Inlet and outlet protection was designed using the New York State Guidelines for Erosion and Sediment Control. The culverts were designed using methodology from the Federal Highway Authority HDS No. 5 - Hydraulic Design of Highway Culverts for the 25-year, 24-hour, Type III storm flow.

### **Off-Site Drainage**

On-site activities appear to have caused diversion of surface water runoff away from the site and across adjacent properties. To remedy this situation, a drain will be constructed on the adjacent properties along the property line. This drain will consist of a geocomposite drain placed at or near the existing ground surface and covered with topsoil. At the low end of the geocomposite drain, water will be transferred to a perforated pipe in a stone filter envelope. The geocomposite drain will be graded to drain collected stormwater to the Shadow Lane storm sewer system.

### **3.4.2 Soil Erosion and Sediment Control**

Soil erosion and sediment control at the site will proceed with each step of the construction. Temporary sediment control features, such as silt fences and hay bales, will be utilized during the construction of the intermediate layers of the final cover system. Upon completion of the protective soil layer installation, the construction of the permanent stormwater control features on the final cover will commence.

Stormwater control features in areas adjacent to the final cover will be constructed to allow collection and discharge of the channelized stormwater flow in a controlled manner to the existing stormwater system. The channels will be maintained during final cover construction in order to ensure design capacity and limit sediment and debris deposition within the channels.

The upgraded catch basins of the road drainage system will have a 2-foot sump to still the stormwater and collect settlement. These sumps will be inspected and cleaned by the Village Highway Department.

### **3.4.3 Landfill Vegetation**

The primary purposes for establishment of vegetation on the final cover are to protect slopes from erosion, enhance evapotranspiration, and improve aesthetics. If efforts to establish vegetation needed for adequate erosion protection are successful, then the vegetation requirements for evapotranspiration and aesthetics are also satisfied. The general varieties of vegetation for erosion protection include temporary and permanent vegetation.

Temporary vegetation is established with winter rye grass in topsoiled areas where permanent cover cannot be established until the following planting season. Temporary

vegetation should be employed on all areas that will remain uncovered, with no ongoing activity in excess of 30 days to control runoff and prevent soil erosion. Permanent vegetation should be placed on all areas as soon as possible after they reach final grades.

Permanent vegetation has been selected in accordance with the New York State Guidelines for Urban Erosion and Sedimentation Control for recreational areas.

### **3.5 REGULATORY COMPLIANCE REQUIREMENTS**

Based upon the design elements of the remedial activities at the Taylor Lane Compost site. The series of regulatory permit equivalencies and/or approvals, identified in Table 3.5-1, have been addressed.

Determinations regarding the following issues identified in Table 3.5-1, including:

- The presence and jurisdictional concerns regarding wetlands (both state and federally regulated).
- Stormwater runoff concerns associated with construction and closure.
- Vegetation clearing associated with construction.

Additionally, it is understood based upon guidance from NYSDEC representatives that landfill gas emitted from passive gas vents does not currently require a NYSDEC permit.

### **3.6 END USE**

The proposed end use of the facility is as a walk trail for the recreational use of Village residents. The design of the final cover drainage piping system and of the gas venting system has been developed to accommodate this end use.

### **3.7 VARIANCES**

#### ***Introduction***

The final cover system has been designed in general accordance with 6 NYCRR Part 360 requirements. The site will be graded to a series of ridges and valleys, through the redistribution of on-site materials. The minimum slope of the prepared subgrade from ridge to valley, will be 2 percent. The materials will be distributed to eliminate existing depressions, to contour slopes, and to achieve minimum slopes. A gas venting layer,



consisting of recycled glass or geocomposite drain, shall be installed above the prepared subgrade. The installation of the filter layer, between the prepared subgrade and the gas venting layer, was found to be unnecessary. Three variances are required for the construction as described: 1) the omission of the filter layer requires a variance from Section 2.13, Paragraphs (o) and (p); 2) the utilization of geogrid as a venting layer requires a variance from Section 2.13, Paragraph (p); and 3) the decrease of FML slope from 4 to 2 percent requires a variance from Section 2.13, Paragraph (r).

### **3.7.1 Minimum Slope**

The proposed variance is to install the flexible membrane liner at a minimum slope of 2 percent, rather than the 4 percent required by 6 NYCRR Part 360, Section 2.13, Paragraph r(2)(ii).

Limited environmental impact is expected with the variance. The regulations cited above require minimum slopes of 4 percent to prevent ponding of surface water due to differential settlement. At this site, waste was placed to a depth of only approximately 16 feet. Therefore, differential settlement will be minimal; 2 percent shall be adequate to prevent ponding of surface water.

By reducing the minimum slopes from 4 to 2 percent, the site can essentially be regraded using on-site material. The required volume of fill to achieve flexible membrane liner grades is reduced by approximately 17,000 cubic yards. Assuming a unit cost of \$6 per cubic yard, the use of 2 percent slopes will save the Village \$102,000. The variance request is presented in Appendix 3.3.1.

### **3.7.2 Gas Venting Layer**

The proposed alternate gas venting layer will consist of a geocomposite drain, with 12-inch deep collection trenches in place of the required 12-inch soil layer. The proposed alternative has greater venting capabilities than the required 12-inch soil layer, while providing sufficient protection to the overlying flexible membrane liner.

No environmental impact is associated with the variance; the alternative has been shown to be equivalent with the required gas venting layer.

The variance significantly reduces the cost of the gas venting layer to the Village. The variance request is presented in Appendix 3.3.3.

### **3.7.3 Filter Layer**

The proposed variance eliminates the filter layer located below the gas venting layer and above the prepared subgrade.

A filter layer is not required beneath the recycled glass. Comparison of the textural description of the site surface soils to the gradation of the recycled glass shows that the two materials demonstrate filter compatibility. This demonstration is included in Appendix 3.3.5.

The variance significantly reduces the cost of the filter layer to the Village. The variance request is presented in Appendix 3.3.5.

**APPENDIX C**  
**STANDARD OPERATING PROCEDURES**  
**FOR FIELD SAMPLING**

**APPENDIX C  
STANDARD OPERATING PROCEDURES  
FOR FIELD SAMPLING  
TAYLOR'S LANE COMPOST SITE  
MAMARONECK, NEW YORK**

Prepared for

Village of Mamaroneck  
169 Mt. Pleasant Avenue  
Mamaroneck, New York 10543

February 1998

Prepared by

EMCON  
EMCON/Wehran-New York, Inc.  
Crossroads Corporate Center  
One International Blvd., Suite 700  
Mahwah, New Jersey 07495  
(201) 512-5700

Project 84556-003.000

## **CONTENTS**

---

<b>1 DECONTAMINATION PROCEDURES</b>	<b>1-1</b>
<b>2 GROUNDWATER SAMPLING</b>	<b>2-1</b>
2.1 Monitoring Well Purging	2-1
2.2 Monitoring Well Sampling	2-2
2.3 Metals Filtration	2-3
<b>3 DUPLICATE OR SPLIT SAMPLING</b>	<b>3-1</b>
<b>4 RECORD KEEPING AND CHAIN-OF-CUSTODY</b>	<b>4-1</b>
<b>5 PH MEASUREMENT</b>	<b>5-1</b>
<b>6 SPECIFIC CONDUCTANCE MEASUREMENT</b>	<b>6-1</b>
<b>7 TEMPERATURE MEASUREMENT</b>	<b>7-1</b>
<b>8 DISSOLVED OXYGEN CONCENTRATION MEASUREMENT</b>	<b>8-1</b>
<b>9 OXIDATION-REDUCTION POTENTIAL MEASUREMENT</b>	<b>9-1</b>
<b>10 TURBIDITY MEASUREMENT</b>	<b>10-1</b>

## TABLES AND ILLUSTRATIONS

---

<b>Tables</b>	<b>Follows Page</b>
2-1 Sampling Equipment List	2-1
2-2 Well Factor Chart	2-1

## 1 DECONTAMINATION PROCEDURES

---

All reusable sampling equipment (bailers, trowels, bowls, etc.) will be pre-cleaned prior to field entry. The following cleaning procedures will be used:

1. Alconox detergent and potable water scrub.
2. Potable water rinse.
3. Ten percent nitric acid rinse (when sampling for metals). Carbon steel split-spoons will be rinsed with a one percent nitric acid solution (when sampling for metals).
4. Deionized water rinse or potable water rinse.
5. Methanol rinse.
6. Deionized water rinse.
7. Air dry.

Following this decontamination procedure, equipment will be wrapped in aluminum foil or stored in sealed polyethylene bags for on-site use. Whenever possible, pre-cleaned equipment will be used; however, if the need arises, equipment will be cleaned in the field according to the general procedures described above.

## 2 GROUNDWATER SAMPLING

---

The primary objective of groundwater sampling is to collect and preserve representative samples, and adhere to proper custody procedures in their prompt shipment to the certified laboratory for analyses within the specified holding times. A listing of the equipment required to purge and sample groundwater monitoring wells is provided in Table 2-1.

### 2.1 Monitoring Well Purging

Unless dedicated purging equipment is used (i.e., dedicated bailers), upgradient wells will always be purged prior to downgradient wells to minimize any possibility of cross-contamination. Wells are purged using one of the following:

1. PVC or Teflon bailed dedicated permanently to a single monitoring well location.
2. Lubricant-free stainless steel submersible pump with polyethylene discharge tubing (Keck Geophysical Instruments, Inc., Model No. SP-81 for 2-inch diameter wells, or equivalent).
3. Centrifugal pump connected to new drinking water quality polyethylene tubing.
4. Pre-cleaned Teflon bailer connected to new solid braid nylon rope.

Wells are purged in the following manner:

1. Inspect well protective casing, and remove well casing cap. Make note in field book if cap is missing.
2. Use calibrated steel tape or electronic water level indicator (Slope Indicator Company Model 51453, or equivalent) to measure, within 0.01 inches, the static water level and depth to bottom from reference mark at top of protective casing. Record measurements in field book.
3. Thoroughly rinse steel tape or electronic water level indicator with deionized water.



4. Calculate well volume by subtracting static water level from depth to bottom, and multiply by the appropriate well factor on Table 2-2.
5. The pump or bailer should remove water from the top of the water column so as to assure removal of all stagnant water in the well.
6. Direct bailed or pumped water away from the well casing or into containers for disposal.
7. Remove purging equipment.
8. Allow for overnight recovery of well prior to sampling.

## 2.2 Monitoring Well Sampling

Unless dedicated sampling equipment is used, upgradient wells will be sampled prior to downgradient wells. Wells are sampled in the following manner:

1. Obtain static water level measurement using electronic water level indicator.
2. Immediately after purging and recovery collect volatile organics if necessary, using a dedicated bailer or pre-cleaned Teflon bailer suspended on new solid-braid rope.
3. Following overnight recovery, obtain additional sample with dedicated bailer or a pre-cleaned Teflon bailer suspended on new, solid-braid rope. Transfer sample directly from the Teflon bailer to the parameter-specific sample vessels labeled appropriately (sample ID Number and preservative), and place in coolers with ice or ice packs. After collecting a sample for field parameters and appearance, fill sample bottles in the following order: unfiltered metals, metal filtration flask, any organic fractions (semi-volatile organics, pesticides/PCBs if required) inorganics and indicator parameters. A specific procedure for metals filtration, should it be required, is provided in SOP 2.3.
4. Record duplicate measurements of pH, Eh, temperature, and specific conductance at this time, along with the date and the time the sample was obtained. Sample appearance such as color, odor, and turbidity will also be recorded.
5. Calibrate all field chemistry equipment every four hours in accordance with the instrument use and calibration SOPs. Details on the calibration and calibration frequency will be recorded in the field logbook.

6. Follow recordkeeping and chain-of-custody procedures as detailed in SOP 4.0.
7. Replace all well caps and lock protective well cover.
8. Between wells, clean any equipment needed for additional sampling locations using the same decontamination procedures as outlined in SOP 1, or use pre-cleaned equipment.
9. At the end of the sampling day, the coolers will be taped shut with the custodian's initials placed on custody seals at points of entry. Samples will be shipped via overnight express to the contract laboratory for morning delivery, picked up by courier or delivered directly to the laboratory by the field personnel at the end of the sampling day.
10. Contact with the laboratory will be made within 24 hours after each sampling event to ensure that samples arrived safely and with proper integrity preserved.

### **2.3 Metals Filtration**

Samples for dissolved metals analysis will be field-filtered prior to sample preservation. The following procedure will be used:

1. Assemble pre-cleaned filter flask, funnel sections, and vacuum hand pump.
2. Insert a new 0.45 um poresize/47 mm diameter cellulose nitrate membrane filter between the two sections of the filter funnel.
3. Transfer water from bailer to top section of filter funnel. Fill funnel completely or partially, depending on water clarity.
4. Operate hand pump until 50 to 76 cm of mercury vacuum is achieved.
5. Replace filter when top section of funnel is empty, or when filter becomes clogged. With very turbid samples it may be necessary to change the filter after every 100 mls of water.
6. When sufficient filtered sample is obtained, transfer sample from filter flask to sample bottle containing appropriate preservative, taking care that no sample water enters into the tubing leading to the vacuum hand pump.
7. Between wells, thoroughly field-clean assembly as described in SOP 1.

8. Following field-cleaning of the filter assembly, repeat Steps 2 through 7 on the next sample.

### 3 DUPLICATE OR SPLIT SAMPLING

---

Duplicate (replicate) samples are collected to provide a check of both sampling technique and analytical reproducibility at the same laboratory. Split samples (destined for different laboratories) are often used by governmental agencies on a limited basis on projects requiring agency oversight, to evaluate inter-laboratory variability. Duplicate and split samples are obtained by equally dividing a sample collected at one location so as to have two samples which should provide equivalent analytical results.

When splitting or duplicating water samples, water collected in a sampling device (i.e., bailer, Kemmerer, etc.) should be divided equally among the same parameter-specific bottles for both the sample and the duplicate sample. When sampling for volatile organics, vials should be filled on an alternating basis from each sample set. Other bottles should be filled in such a way as to ensure that the same amount of water from the sampling device is transferred to the same parameter-specific bottle from each set each time the device is retrieved (e.g., when sampling for metals with a bailer, the metals bottle from each set would be filled halfway with one bail of water and topped off with the next).

When splitting or duplicating soil or sediment samples, it is also important to alternate the bottle filling sequence between sample sets to ensure a representative "split". When sampling for volatile organics, the vials should be filled first on an alternating basis prior to homogenizing the remaining sample. The remaining soil jars should then be filled, alternating between sample sets.

## **4 RECORD KEEPING AND CHAIN-OF-CUSTODY**

---

Field records will be documented in the field logbook and will contain sufficient information such that someone else can reconstruct the sampling event without reliance on the sample collector's memory. The logbook is a controlled document which records all major on-site activities. The logbook is a bound notebook with pages that cannot be removed without cutting or tearing pages. Daily entries into the logbook may contain a variety of information. At the beginning of each day the following information must be recorded:

- Date
- Start time
- Weather
- All field personnel present
- Any visitors present

Entries in the field log book will include, at a minimum, the following:

- Start of completion time of borehole, monitoring well installation or sampling activities.
- Sampling point name and description.
- Type of sample containers used.
- Preservatives used.
- Well purging procedure and equipment.
- Well-specific information such as static water level, depth, and volume purged.
- Sample collection procedure and equipment.
- Collector's sample identification numbers.
- Laboratory's sample identification numbers and sample shipment information.
- References such as maps or photographs of the sampling site, if available.
- Field observations.
- Pertinent weather factors such as temperature, wind direction, and precipitation.
- Any field measurements made, such as pH, specific conductance, or sample appearance.
- Health and safety protocols, (e.g., level of protection).
- Deviations from established protocols, if any.

Chain-of-custody records for all samples shall be maintained. A sample shall be considered to be "in custody" of an individual if said sample is either in direct view of or otherwise directly controlled by that individual. Storage of samples during custody shall be accomplished according to established preservation techniques, in appropriately sealed storage containers. Chain-of-custody shall be accomplished when the samples or sealed sample coolers are directly transferred from one individual to the next, with the first individual witnessing the signature of the recipient upon the chain-of-custody record.

If samples are to be sent via a courier (e.g., Federal Express), signed Chain-of-Custody Forms will be included in each cooler documenting sample content. A copy should be kept with the sampling personnel.

The chain-of-custody records will contain the following information:

- Respective sample numbers of the laboratory and EMCON, if available.
- Signature of collector.
- Date and of time of collection.
- Sample type (e.g., groundwater, surface water).
- Identification of well or sampling point.
- Number of containers.
- Parameters requested for analysis, if appropriate.
- Signature of person(s) involved in the chain of possession.
- Description of sample bottles and their condition.
- Problems associated with sample collection (i.e., breakage, no preservatives), if any.

Upon return to the office, field data sheets, test pit logs, and borings logs should be completed and placed in the project file. Photo copies should be made of all field logbook pages and be placed in the site file. This ensures a record exists in the office of all field and sampling activities, and limits the potential loss of field notes due to the loss or destruction of the logbook in the field.

## 5 PH MEASUREMENT

---

pH is the measure of the acidity or alkalinity of a solution. It is defined as the negative logarithm of the hydrogen ion activity. Hydrogen ion activity is related to the hydrogen ion concentration, which in relatively weak solution is nearly equal. For all practical purposes, pH is the measure of the hydrogen ion concentration.

The operation of a pH meter relies on the same principal as many other ion-specific electrodes. Measurement relies on establishment of a potential difference in the response to hydrogen ion concentration across a membrane in the electrode. The membrane is conductive to ionic concentrations, which in combination with a reference electrode (which can be combined into a single "combination" electrode), can generate a potential difference proportional to the hydrogen ion concentration.

Variation in solution temperature will effect the association of hydrogen and hydroxide ions, which without proper compensation will affect the pH. pH meters have several controls to compensate for the variations between electrodes and the different responses to changes in temperature.

Because of the great variety of pH meters available, operators should refer to the manufacturer's instruction manual for specific calibration, operation, and troubleshooting procedures for their instrument. The following general procedure is used for measuring pH in the field with a pH meter:

1. The instrument and batteries should be checked and calibrated prior to the initiation of the field effort. pH electrodes should be kept moist at all times.
2. Buffer solutions used for calibration should be checked. Buffer solutions will degrade upon exposure to the atmosphere.
3. Select either 4.01 and 7.00, or 7.00 and 10.01 buffers, whichever will bracket the expected sample range. Calibration with all three buffers will allow Level II data to be generated.
4. Make sure all electrolyte solutions within the electrodes(s) are at their proper levels and that no air bubbles are present within the electrode(s).
5. Immerse the electrode(s) in a pH-7 buffer solution.

6. Adjust the temperature compensator to the proper temperature (on models with automatic temperature adjustments, immerse the temperature probe into the buffer solution). Alternatively, the buffer solution may be immersed in the sample and allowed to reach temperature equilibrium before equipment calibration. It is best to maintain buffer solution at or near expected sample temperature before calibration.
7. Adjust the pH meter to read 7.0.
8. Remove the electrode(s) from the buffer and rinse well with deionized water. Immerse the electrode(s) in pH-4 or -10 buffer solution (depending on the expected pH of the sample) and adjust the slope control to read the appropriate pH. At least three successive readings during calibration, one minute apart, should be within  $\pm 0.1$  pH unit. For best results, the standardization and slope adjustments should be repeated at least once daily before use and every four hours thereafter. All calibration procedures and measurements should be recorded in the logbook.
9. Immerse the electrode(s) in the unknown sample, slowly stirring the probe until the pH stabilizes. Stabilization may take several seconds to minutes. If the pH continues to drift, the sample temperature may not be stable, a chemical reaction (e.g., degassing) may be taking place in the sample, or the meter or electrode may be malfunctioning. This must be clearly noted in the logbook.
10. Read and record the pH and temperature of the sample, after adjusting the temperature compensator to the sample temperature. pH should be recorded to the nearest 0.1 pH unit.
11. Rinse the electrode(s) with deionized water.



## 6 SPECIFIC CONDUCTANCE MEASUREMENT

---

Conductivity is a numerical expression of the ability of a water sample to carry an electric current. This value depends on the total concentration of ionized substances dissolved in the water and the temperature at which the measurement is made. It is important to obtain a specific conductance measurement soon after taking a sample, since temperature changes, precipitation reactions, and absorption of carbon dioxide from the air all affect the specific conductance.

Specific conductance can be used to identify the direction and extent of the migration of contaminants in groundwater and surface water. It can also be used as a measure of subsurface biodegradation or to indicate alternate sources of groundwater contamination.

A conductance cell and a Wheatstone Bridge (for the measurement of potential difference) may be used for measurement of electrical resistance. The ratio of current applied to voltage across the cell may also be used as a measure of conductance. Depending on ionic strength of the aqueous solution to be tested, a potential difference is developed across the cell which can be converted directly or indirectly (depending on instrument type) to a measurement of specific conductance.

Because many conductivity meters are available, operators should refer to the manufacturers instruction manual for specific calibration, operation, and troubleshooting procedures. The following procedure is used for obtaining specific conductance measurements:

1. Check batteries and calibrate instrument before going into the field.
2. Calibrate the instrument using a potassium chloride standard solution by completely immersing the electrode into the solution. Check the temperature of the calibration solution and adjust temperature dial on meter (if not self-compensating). Record calibration measurements and time in the field logbook.
3. Check the mmho value of the solution in terms of the temperature. Adjust the Cell Constants dial until the display reads the appropriate value.
4. Rinse the electrode with one or more portions of the sample to be tested.

5. Immerse the electrode in the sample, adjust the temperature setting to the sample temperature, and measure the conductivity.
6. Read and record the results in the field logbook. Report the results to the nearest ten units for readings under 1,000  $\mu\text{mhos/cm}$  and the nearest 100 units for readings over 1,000  $\mu\text{mhos/cm}$ .
7. Repeat the procedure with fresh sample until reproducible (i.e.,  $\pm 5$  percent) results are obtained.

If the specific conductance measurements become erratic, or inspection shows that any platinum black has flaked off the electrode, replatinization of the electrode is necessary. See the manufacturer's instructions for details.

## 7 TEMPERATURE MEASUREMENT

---

In combination with other parameters, temperature can be a useful indicator of the likelihood of biological action in a water sample. Temperature measurements should be taken in situ, or as quickly as possible in the field. Collected water samples may rapidly equilibrate with the temperature of their surroundings.

Many meters such as specific conductance or dissolved oxygen meters have temperature measurement capabilities. If these instruments are to be used to make temperature measurements, they should be checked prior to entering the field and at least at the start of each day and every four hours thereafter against a thermometer with an unbroken column of mercury.

If a thermometer is used on a collected water sample:

1. Rinse the thermometer with a portion of the collected sample.
2. Immerse the thermometer in the sample until temperature equilibrium is obtained (1 to 3 minutes). To avoid the possibility of contamination, the thermometer should not be inserted into samples which will undergo subsequent chemical analysis.
3. Record values in a field logbook to the nearest 0.5°C.

## **8 DISSOLVED OXYGEN CONCENTRATION MEASUREMENT**

---

Dissolved oxygen (DO) levels in water depend on the physical, chemical and biochemical activities in the water body. If at all possible, DO measurements should be taken in situ, since concentration may show a large change in a short time if the sample is exposed to the atmosphere.

Dissolved oxygen probes are normally electrochemical cells that have two solid metal electrodes of different nobility immersed in an electrolyte. The electrolyte is retained by an oxygen-permeable membrane. When a suitable potential exists between the two metals, the reduction of oxygen to hydroxide ion (OH) occurs and an electrical current is developed that is directly proportional to the rate of arrival of oxygen molecules.

If the water body being sampled is not flowing, it is necessary to stir the sample or probe to ensure that a fresh supply of sample is in contact with the membrane. Without a fresh water supply, the oxygen in the layer along the membrane is quickly depleted and false low readings are obtained. Stirring, however, should not be so vigorous that additional oxygen is introduced through the air-water interface at the sample surface. Temperature variations can also effect dissolved oxygen measurements, although most instruments provide for automatic temperature compensation

The instrument operator should follow the manufacturer's instructions to obtain an accurate reading. The following general steps should be used to measure the dissolved oxygen concentration:

1. The equipment should be calibrated and its batteries checked before going to the field.
2. The probe should be conditioned in a water sample for as long a period as practical before its use in the field. Long period of dry storage followed by short periods of use in the field may result in inaccurate readings.
3. The instrument should be calibrated in the field at the start of the day and at least every four hours or as necessary by placing the probe in a freshly air-saturated water sample of known temperature. All calibration times, measurements, and adjustments should be recorded in the field logbook. Dissolved oxygen values for air-saturated water can be determined by

consulting a table listing oxygen solubility's as a function of temperature and salinity which should be kept with each instrument.

4. Immerse the probe in the sample. Be sure to provide for sufficient flow past the membrane, either by stirring the sample, or placing the probe in a flowing stream. Probes without stirrers placed in wells can be moved up and down.
5. Record the dissolved oxygen content and temperature of the sample in the field logbook. Also indicate whether or not the measurement was taken in situ. Read the DO dial to the nearest 0.1 mg/l.
6. Recalibrate the probe when the membrane is replaced, or as needed. Follow the manufacturer's instructions. Duplicate analyses should agree within  $\pm 0.1$  mg/l.

## 9 OXIDATION-REDUCTION POTENTIAL MEASUREMENT

---

The oxidation-reduction potential (ORP) provides a measure of the tendency of organic or inorganic compounds to exist in an oxidized state. The technique therefore provides evidence of the likelihood of anaerobic degradation of biodegradable organics or the ratio of activities of oxidized to reduced species in the sample.

When an inert metal electrode and a reference electrode are immersed in a solution, an ORP electrode pair is established. This electrode pair allows the potential difference between the two electrodes to be measured which will be dependent on the concentration of the ions in solution using this measurement; the ability of a solution to oxidize or reduce species may be determined. Supplemental measurements, such as dissolved oxygen, may be correlated with ORP to provide a knowledge of the quality of the solution, water, or wastewater.

The following procedure is used for measuring oxidation-reduction potential:

1. The equipment should be calibrated and have its batteries checked before going to the field.
2. Check that the platinum probe is clean and that the platinum bond or tip is unoxidized. If dirty, polish the electrode with emery paper or clean in accordance with manufacturer's instructions.
3. Thoroughly rinse the electrode with deionized water.
4. Verify the sensitivity of the electrodes by noting the change in millivolt reading when the pH of the test solution is altered. The ORP will increase when the pH of the test solution decreases, and the ORP will decrease if the test solution pH is increased. Place the sample in a clean beaker and agitate the sample. Insert the electrodes and note the ORP or millivolt reading. Add a small amount of a dilute NaOH solution and note the value of the ORP. If the ORP drops sharply when the NaOH is added, the electrodes are sensitive and operating properly. If the ORP increases sharply when the NaOH is added, the polarity is reversed and must be corrected in accordance with the manufacturer's instructions. If the ORP does not respond as above when the NaOH is added, the electrodes should be cleaned and the above procedure repeated.

5. After the instrument has been checked for sensitivity, rinse the electrodes thoroughly. Place the sample in a clean sample cup and insert the electrodes. Set temperature compensator to the sample temperature. Provide adequate agitation throughout the measurement period. Read the millivolt potential of the solution, allowing sufficient time for the system to stabilize and reach temperature equilibrium. A system that is very slow to stabilize properly will not yield a meaningful ORP. Record all results in a field logbook, including ORP (to nearest 10 mV), sample temperature, and pH at the time of measurement.

## 10 TURBIDITY MEASUREMENT

---

Turbidity is a measure of the clarity of a liquid. Turbidity is effected by suspended colloidal droplets or fine particles. The turbidimeter measures turbidity by passing a light beam through a sample into a light shield which acts to minimize stray light. As the light passes through the sample, some light is scattered by the turbidity of the sample. Light scattered at a 90° angle is sensed by a photocell which drives the meter. Meter scales are generally calibrated in nephelometric turbidity units (NTU) to provide direct readouts.

Operators should refer to the manufacturers instruction manual for specific calibration and operating procedures. The following general procedures should be used when measuring turbidity:

1. Check battery to ensure sufficient power supply.
2. Zero instrument electronically in the 1.0 to 10 scale by placing focusing template in sample holder and adjusting zero control to read zero NTU.
3. Check 10 to 100 scale to verify that meter still indicates zero NTU. Readjust meter is necessary.
4. Place turbidity standard into sample holder, place light shield on, and allow meter to stabilize.
5. Adjust span control for a readings of 10 NTU. Remove standard and instrument is ready to use. Do not readjust span.
6. Select appropriate range that will exceed expected turbidity of sample.
7. Place focusing template into sample holder and adjust zero control to read zero NTU.
8. Fill vial with sample to be measured into sample holder. Cover sample with the light shield and allow the meter to stabilize. Read turbidity of sample.
9. Meter should be recalibrated before each set of tests.



10. When attempting to measure samples with a turbidity greater than the range of the instrument, samples can be diluted with distilled or deionized water. This can be done using a graduated cylinder to measure a dilution water to sample ratio. The meter reading is then multiplied by the ratio to obtain the actual turbidity measurement.

**Table 2-1**

**Standard Operating Procedures for Field Sampling  
Equipment List**

<b>Purge Equipment</b>
Submersible Pump
Discharge Hose
Water Level Indicator
Bailer
Rope
Gloves
Watch
Pail
Calculator
Log Book

<b>Sampling Equipment</b>
Bailer
Rope
Gloves
Sample Containers
pH Meter
Conductivity Meter
Oxidation-reduction Potential Meter
Turbidity Meter
Thermometer
Filtration Apparatus (if analyzing for dissolved metals)
Log Book

<b>Decontamination Equipment</b>
Deionized Water
Methanol
10% Nitric Acid Solution (if analyzing for dissolved metals)
Alconox Soap

**Table 2-2**

**Standard Operating Procedures for Field Sampling  
Well Factor Chart for Volume Calculations**

<b>Well Diameter (inches)</b>	<b>Factor (gallons/foot)</b>
3/4	0.02
1	0.04
1¼	0.06
1½	0.09
1¾	0.12
2	0.16
2½	0.25
3	0.37
4	0.65
5	1.00
6	1.50
8	2.60

**APPENDIX D**  
**GROUNDWATER MONITORING WELL**  
**BORING LOGS**

CLIENT: <u>Village of Mamaroneck</u>		<b>General Borings, Inc.</b> P.O. BOX 7135 PROSPECT, CT 06712		SHEET <u>1</u> OF <u>1</u> HOLE NO. <u>MW-94-1-Shallow</u>	
GBI JOB NO. <u>85-94</u>		PROJECT NAME <u>Taylor Lane</u>		LINE	
FOREMAN-DRILLER <u>R.S. J.C.</u>		LOCATION <u>Compost Site Project #94-8A</u>		STATION <u>5' Southeast of MW-94-1 Deep</u>	
INSPECTOR <u>A.Z.</u>		<u>Mamaroneck, NY</u>		OFFSET	
GROUND WATER OBSERVATIONS AT <u>8</u> FT. AFTER <u>0</u> HOURS		CASING TYPE <u>HA</u>		SAMPLER <u>SS</u>	
AT _____ FT. AFTER _____ HOURS		SIZE I.D. <u>4 1/2"</u>		CORE BAR. _____	
		HAMMER WT. _____		LBS. <u>140</u>	
		HAMMER FALL _____		BIT <u>30"</u>	
				DATE <u>10/13</u> <u>10/13/94</u>	
				SURFACE ELEV. _____	
				GROUND WATER ELEV. _____	

DEPTH	CASING BLOWS PER FOOT	SAMPLE				BLOWS PER 6" ON SAMPLER (FORCE ON TUBE)			CORING TIME PER FT. (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		NO	TYPE	PEN	REC	DEPTH @ BOT	0-6	6-12				
											.3'	3" Blacktop
											.5'	3" Road Pack
											2.0'	Brown-black fine-coarse SAND, trace silt and few cobbles
5		1	SS	24"	18"	8.0'	2	3	3	Dry	6.0'	PEAT
										Loose		
		2	SS	24"	18"	10.0'	3	2	4	Dry		
										Loose		
		3	SS	24"	20"	12.0'	3	2	9	Moist		
10									15	Medium	11.0'	Gray SILT.
		4	SS	24"	22"	14.0'	26	17	16	Wet	11.5'	Gray-brown coarse-fine SAND and GRAVEL, trace silt.
									12	Dense		
		5	SS	24"	24"	16.0'	WOR/12"		5	Wet	15.0'	Tan very fine-medium SAND, trace gravel and silt.
15									5	Loose	16.0'	EOB END OF BORING 16.0' Soil
20												Set well at 16.0'
25												7 Bags Morie #1
												1/2 Bag Bentonite
												2 Bags Portland
												1 Curb Box
												10.0' Screen
30												6.0' Riser
35												
40												

TYPE OF SAMPLES:  
D= DRY W= WASHED C= CORED A= AUGER SS= SPLIT SPOON  
UB= UNDISTURBED BALL CHECK UP= UNDISTURBED PISTON VT= VANE SPOON  
PROPORTIONS USED TRACE= 0-10% LITTLE= 10-20% SOME= 20-35%. AND= 35-50%

CLIENT: Village of Mamaroneck	<b>General Borings, Inc.</b> P.O. BOX 7135 PROSPECT, CT 06712		SHEET <u>1</u> OF <u>1</u> HOLE NO. <u>MW-94-2-Shallow</u>
GBI JOB NO. 85-94	PROJECT NAME Taylor Lane	LINE	
FOREMAN-DRILLER R.S. J.C.	LOCATION Compost Site Project #94-8A	STATION	
INSPECTOR A.Z.	Mamaroneck, NY	OFFSET	
GROUND WATER OBSERVATIONS AT <u>6</u> FT. AFTER <u>0</u> HOURS	CASING TYPE <u>HA</u>	SAMPLER <u>SS</u>	CORE BAR.
AT _____ FT. AFTER _____ HOURS	SIZE I.D. <u>4 1/2"</u>	<u>1-3/8"</u>	
	HAMMER WT. _____	<u>140</u> LBS.	BIT
	HAMMER FALL	<u>30"</u>	
		DATE <u>10/13</u>	Start <u>10/13/94</u> Finish
		SURFACE ELEV. _____	
		GROUND WATER ELEV. _____	

DEPTH	CASING BLOWS PER FOOT	SAMPLE				BLOWS PER 6" ON SAMPLER (FORCE ON TUBE)			CORING TIME PER FT. (MIN)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR. LOSS OF WASH WATER. SEAMS IN ROCK. ETC.
		NO	TYPE	PEN	REC.	DEPTH @ BOT	0-6	6-12				
5	1	SS	24"	6"	8.0'	4	3	7	8	Wet Medium	Dark Gray fine-coarse SAND, little silt, trace gravel.	
	2	SS	24"	6"	10.0'	6	8	38	48	Wet Dense		Dark tan CLAY, little silt.
10	3	SS	24"	24"	12.0'	21	28	26	20	Wet Dense	Dark gray fine-coarse SAND, some gravel, trace silt.	
	4	SS	24"	24"	14.0'	6	12	13	15	Wet Medium	Gray fine-coarse SAND and GRAVEL	
15											14.0' EOB	END OF BORING 14.0' Soil
20												10.0' Screen 4.0' Riser 7 Bags Sand 1/2 Bag Bentonite Pellets 1 Curb Box
25												
30												
35												
40												

TYPE OF SAMPLES.  
D= DRY W= WASHED C= CORED A= AUGER SS= SPLIT SPOON  
UB= UNDISTURBED BALL CHECK UP= UNDISTURBED PISTON VT= VANE SPOON  
PROPORTIONS USED TRACE= 0-10% LITTLE= 10-20% SOME= 20-35%. AND= 35-50%

CLIENT: Village of Mamaroneck	<b>General Borings, Inc.</b> P.O. BOX 7135 PROSPECT. CT 06712	SHEET <u>1</u> OF <u>1</u> HOLE NO. <u>MW-94-3-Shallow</u>
GBI JOB NO. 85-94	PROJECT NAME Taylor Lane	LINE
FOREMAN-DRILLER R.S. J.C.	LOCATION Compost Site Project #94-8A	STATION
INSPECTOR A.Z.	Mamaroneck, NY	OFFSET
GROUND WATER OBSERVATIONS AT <u>6</u> FT. AFTER <u>0</u> HOURS  AT _____ FT. AFTER _____ HOURS	CASING HA TYPE _____ SIZE I.D. <u>4 1/2"</u> HAMMER WT. _____ HAMMER FALL _____	SAMPLER SS CORE BAR _____ <u>1-3/8"</u> LBS. BIT _____ <u>30"</u>
		DATE <u>10/25</u> <sup>Start</sup> <u>10/25/94</u> <sup>Finish</sup> SURFACE ELEV. _____ GROUND WATER ELEV. _____

DEPTH	CASING BLOWS PER FOOT	SAMPLE				DEPTH @ BOT	BLOWS PER 6" ON SAMPLER (FORCE ON TUBE)			CORING TIME PER FT (MIN)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR. LOSS OF WASH WATER. SEAMS IN ROCK. ETC.
		NO	TYPE	PEN	REC		0-6	6-12	12-18				
5													
		1	SS	24"	24"	10.0'	4	2	2		Wet	1) Dark brown PEAT (organics)	
									2	Very	Loose		
10		2	SS	24"	24"	12.0'	1	1	1		Wet	2) Same	
									2	Very	Loose		
		3	SS	24"	24"	14.0'	1	2	1		Wet	3) Same	
									2	Very	Loose		
		4	SS	24"	24"	16.0'	6	16	16		Wet	4) Same	
									15		Dense		
15		5	SS	24"	24"	18.0'	16	20	11		Wet	5) Dark brown fine-coarse SAND and PEAT.	
									22		Dense		
												18.0'	
												EOB	END OF BORING 18.0' Soil
20													10.0' Screen
													8.0' Riser
													7 Bags Sand
													3/4 Bag Bentonite Pellets
25													1 Curb Box
30													
35													
40													

TYPE OF SAMPLES:  
D= DRY W= WASHED C= CORED A= AUGER SS= SPLIT SPOON  
UB= UNDISTURBED BALL CHECK UP= UNDISTURBED PISTON VT= VANE SPOON  
PROPORTIONS USED TRACE= 0-10% LITTLE= 10-20% SOME= 20-35% AND= 35-50%

CLIENT: Village of Mamaroneck	<b>General Borings, Inc.</b> P.O. BOX 7135 PROSPECT, CT 06712	SHEET <u>1</u> OF <u>2</u> HOLE NO. <u>MW-94-1-Deep</u>
GBI JOB NO. 85-94	PROJECT NAME Taylor Lane	LINE
FOREMAN-DRILLER R.S. J.C.	LOCATION Compost Site Project #94-8A	STATION
INSPECTOR A.Z.	Mamaroneck, NY	OFFSET
GROUND WATER OBSERVATIONS AT <u>11</u> FT. AFTER <u>0</u> HOURS	TYPE CASING <u>HA</u> SAMPLER <u>SS</u> CORE BAR. _____ SIZE I.D. <u>4 1/2"</u> <u>1-3/8"</u> _____ HAMMER WT. _____ <u>140</u> LBS. BIT _____ HAMMER FALL <u>30"</u>	Start Finish DATE <u>10/11</u> <u>10/12/94</u> SURFACE ELEV. _____ GROUND WATER ELEV. _____

DEPTH	CASING BLOWS PER FOOT	SAMPLE				BLOWS PER 6" ON SAMPLER (FORCE ON TUBE)			CORING TIME PER FT (MIN.)	MOIST DENSITY OR CONSIST.	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		NO	TYPE	PEN	REC	DEPTH @ BOT	0-6	6-12				
5		1	SS	24"	18"	3.0'	28	19	9	Dry	.3'	3" Blacktop
									10	Medium	2.0'	Black-brown fine-medium SAND, little silt, trace gravel.
5		2	SS	24"	10"	7.0'	50	42	18	Moist	5.0'	Few Cobbles and boulders
									11	Very Dense	7.0'	Cobbles Brown-black fine-medium SAND, some silt, trace gravel.
10		3	SS	24"	1"	12.0'	4	3	4	Moist	10.0'	Same 10.5' Peat
									8	Loose	13.0'	Change
15		4	SS	24"	8"	17.0'	10	8	10	Wet	15.0'	Brown fine SAND, trace medium sand and gravel.
									13	Medium		
20		5	SS	24"	24"	22.0'	14	12	13	Wet	20.0'	Tan fine SAND, little silt.
									12	Medium	21.5'	Gray fine SAND, little silt, trace medium sand.
25		6	SS	24"	24"	27.0'	8	6	7	Wet	25.0'	Gray very fine-fine SAND, little to trace silt.
									8	Medium		
30		7	SS	24"	24"	32.0'	11	12	14	Wet	30.0'	Gray-brown coarse to fine SAND, some gravel, trace silt.
									22	Medium		
35		8	SS	24"	24"	37.0'	26	12	8	Wet	35.0'	Same
									8	Medium		
40		9	SS	24"	24"	42.0'	5	8	10	Wet	40.0'	Gray very fine-fine SAND, little silt.

TYPE OF SAMPLES: 20 Medium  
D= DRY W= WASHED C= CORED A= AUGER SS= SPLIT SPOON  
UB= UNDISTURBED BALL CHECK UP= UNDISTURBED PISTON VT= VANE SPOON  
PROPORTIONS USED TRACE= 0-10% LITTLE= 10-20% SOME= 20-35% AND= 35-50%



CLIENT: Village of Mamaroneck	<b>General Borings, Inc.</b> P.O. BOX 7135 PROSPECT, CT 06712		SHEET <u>2</u> OF <u>2</u> HOLE NO. <u>MW-94-1-Deep</u>
GBI JOB NO. 85-94	PROJECT NAME Taylor Lane	LINE	
FOREMAN-DRILLER R.S. J.C.	LOCATION Compost Site Project #94-8A	STATION	
INSPECTOR A.Z.	Mamaroneck, NY	OFFSET	
GROUND WATER OBSERVATIONS AT <u>11</u> FT AFTER <u>0</u> HOURS Note: Groundwater tidal 10:30 AT <u>2'</u> FT AFTER <u>24</u> HOURS 9:00	CASING TYPE <u>RA</u> SIZE I.D. <u>4 1/2"</u> HAMMER WT. <u>140</u> LBS HAMMER FALL <u>30"</u>	SAMPLER CORE BAR TYPE <u>SS</u> SIZE <u>1-3/8"</u> LBS <u>140</u> BIT 30"	DATE <u>10/12</u> <u>10/12/94</u> SURFACE ELEV. _____ GROUND WATER ELEV. _____

DEPTH	CASING BLOWS PER FOOT	SAMPLE				BLOWS PER 6" ON SAMPLER (FORCE ON TUBE)	CORING TIME PER FT MIN	DENSITY OR CONSIST.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS N ROCK, ETC.
		NO	TYPE	PEN	REC					
45	10	SS	24"	24"	47.0'	7	7	14	Wet Medium	45.0' Same
50	11	SS	24"	12"	52.0'	W	O	R	Wet Very Loose	50.0' Same
55	12	SS	24"	18"	57.0'	12	8	5	Wet Medium	55.0' Gray very fine SAND and SILT.
60	13	SS	24"	24"	62.0'	W	OR	12" 18"	Wet Medium	60.0' Same 61.5' Decomposed BEDROCK 63.0' GNEISS, SCHIST and MICA.
65										EOB END OF BORING 63.0' Soil
70										10.0' Screen 53.0' Riser 1 Bag Bentonite Pellets 9 Bags Morie #1 8 Bags Cement 1 8" Curb Box
75										
80										

TYPE OF SAMPLES.  
D= DRY W= WASHED C= CORED A= AUGER SS= SPLIT SPOON  
UB= UNDISTURBED BALL CHECK UP= UNDISTURBED PISTON VT= VANE SPOON  
PROPORTIONS USED TRACE= 0-10% LITTLE= 10-20% SOME= 20-35% AND= 35-50%

CLIENT: <u>Village of Mamaroneck</u>	<b>General Borings, Inc.</b> P.O. BOX 7135 PROSPECT, CT 06712	SHEET <u>1</u> OF <u>2</u> HOLE NO. <u>MW-94-2 Deep</u>
GBI JOB NO. <u>85-94</u>	PROJECT NAME <u>Taylor Lane</u>	LINE
FOREMAN-DRILLER <u>R.S. J.C.</u>	LOCATION <u>Compost Site Project #94-8A</u>	STATION
INSPECTOR <u>A.Z.</u>	<u>Mamaroneck, NY</u>	OFFSET
GROUND WATER OBSERVATIONS AT <u>8</u> FT. AFTER <u>0</u> HOURS	CASING TYPE <u>HA</u> SAMPLER <u>SS</u> CORE BAR. _____ SIZE I.D. <u>4 1/2"</u> <u>1-3/8"</u> _____ HAMMER WT. _____ <u>140</u> LBS. BIT _____ HAMMER FALL _____ <u>30"</u>	DATE <u>10/14</u> <u>10/14/94</u> SURFACE ELEV. _____ GROUND WATER ELEV. _____

DEPTH	CASING BLOWS PER FOOT	SAMPLE				BLOWS PER 6" ON SAMPLER (FORCE ON TUBE)			CORING TIME PER FT (MIN)	MOIST DENSITY OR CONSIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		NO	TYPE	PEN	REC	DEPTH @ BOT	0-6	6-12				
											.3'	Blacktop
											.5'	Road pack
5	1	SS	24"	120"	7.0'	15	12	3		Medium	5.0'	Brown fine-medium SAND and MICA little-some silt.
											5.8'	PEAT
10	2	SS	24"	120"	12.0'	12	15	14		Loose	9.0'	Change
											10.0'	Gray coarse to fine SAND and GRAVEL, trace silt.
15	3	SS	24"	118"	17.0'	12	6	6		Medium	15.0'	Same
20	4	SS	24"	124"	22.0'	12	10	7		Medium	21.0'	Gray fine-medium SAND, trace silt.
25	5	SS	24"	124"	27.0'	5	4	3		Loose		
30	6	SS	24"	124"	32.0'	WOR	4	3		Loose	29.0'	Same
35	7	SS	24"	124"	37.0'	4	5	7		Medium	35.0'	Light gray very fine-fine SAND, little to some silt.
40	8	SS	24"	124"	42.0'	WOR/12"		8			40.0'	Same

TYPE OF SAMPLES: 7 Medium  
D= DRY W= WASHED C= CORED A= AUGER SS= SPLIT SPOON  
UB= UNDISTURBED BALL CHECK UP= UNDISTURBED PISTON VT= VANE SPOON  
PROPORTIONS USED TRACE= 0-10% LITTLE= 10-20% SOME= 20-35% AND= 35-50%

CLIENT <u>Village of Mamaroneck</u>		<b>General Borings, Inc.</b> P.O. BOX 7135 PROSPECT, CT 06712		SHEET <u>2</u> OF <u>2</u> HOLE NO <u>MW-94-2-Deep</u>						
GBI JOB NO <u>85-94</u>		PROJECT NAME <u>Taylor Lane</u>		LINE						
FOREMAN-DRILLER <u>R.S. J.C.</u>		LOCATION <u>Compost Site Project #94-8A</u>		STATION						
INSPECTOR <u>A.Z.</u>		<u>Mamaroneck, NY</u>		OFFSET						
GROUND WATER OBSERVATIONS AT <u>8</u> FT. AFTER <u>0</u> HOURS		CASING TYPE <u>HA</u> SAMPLE <u>SS</u> CORE BAR _____		Start Finish DATE <u>10/13</u> <u>10/13/94</u>						
AT _____ FT. AFTER _____ HOURS		SIZE I.D. <u>4 1/2"</u> <u>1-3/8"</u> _____		SURFACE ELEV _____						
		HAMMER WT. _____ <u>140</u> LB. BIT _____		GROUND WATER ELE. / _____						
		HAMMER FALL <u>30"</u>								
DEPTH	CASING BLOWS PER FOOT	SAMPLE				BLOWS PER 6" ON SAMPLER (FORCE ON TUBE)	CORING TIME PER MIN	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR LOSS OF WASH WATER SEAMS N ROCK, ETC
		NO	TYPE	PEN	REC					
45	9	SS	24"	24"	47.0'	W 10	R/24"			45.0' Same
50	10	SS	24"	24"	52.0'	10	23 18			21 Dense 52.0'
55	11	SS	24"	24"	57.0'	7	8 11			12 Medium 57.0'
60	12	SS	9"	9"	62.0'	63	63/3"			Very Dense 62.0' Gray very fine-fine SAND, with claying silt layers.
65	13	SS	19"	19"	67.0'	7	11 50			50/1" Very Dense 67.0' Same
70	14	SS	2"	2"	69.8'	90	12"			69.8' Very Dense 69.8' Gray medium-fine SAND and SILT, some medium gravel.
75										EOB END OF BORING 69.8' Soil
80										10.0' Screen 55.0' Riser 8 Bags Sand 3/4 Bag Bentonite Pellets 8 Bags Cement 1 Gel 1 Curb Box
TYPE OF SAMPLES D= DRY W= WASHED C= CORED A= AUGER SS= SPLIT SPOON UB= UNDISTURBED BALL CHECK UP= UNDISTURBED PISTON VT= VANE SPOON PROPORTIONS USED TRACE= 0-10% LITTLE= 10-20% SOME= 20-35% AND= 35-50%										

CLIENT: Village of Mamaroneck	<b>General Borings, Inc.</b> P.O. BOX 7135 PROSPECT, CT 06712	SHEET <u>1</u> OF <u>1</u> HOLE NO. <u>MW-94-3-Deep</u>
GBI JOB NO. 85-94	PROJECT NAME Taylor Lane	LINE
FOREMAN-DRILLER R.S. J.C.	LOCATION Compost Site Project #94-8A	STATION
INSPECTOR A.Z.	Mamaroneck, NY	OFFSET
GROUND WATER OBSERVATIONS AT <u>6</u> FT. AFTER <u>0</u> HOURS	TYPE CASING SAMPLER CORE BAR. HA SS	Start Finish DATE <u>10/26</u> <u>10/27/94</u>
AT _____ FT. AFTER _____ HOURS	SIZE I.D. <u>4 1/4"</u> <u>1-3/8"</u>	SURFACE ELEV. _____
	HAMMER WT. _____ <u>140</u> LBS. BIT	GROUND WATER ELEV. _____
	HAMMER FALL <u>30"</u>	

DEPTH	CASING BLOWS PER FOOT	SAMPLE					BLOWS PER 6" ON SAMPLER (FORCE ON TUBE)			CORING TIME PER FT. (MIN)	MOIST DENSITY OR CONSIST	STRATA CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOIL REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
		NO	TYPE	PEN	REC	DEPTH @ BOT	0-6	6-12	12-18				
5	1	SS	24"	24"	7.0'	18	15	5		Wet Loose		1) Gray fine-medium SAND, trace fine gravel.	
10	2	SS	24"	24"	12.0'	11	4	2		Wet Loose		2) Dark brown PEAT.	
15	3	SS	24"	24"	17.0'	5	3	3		Wet Loose		3) Gray fine-medium SAND, trace silt.	
20	4	SS	24"	24"	22.0'	8	8	8		Wet Medium		4) Same	
25	5	SS	24"	24"	27.0'	3	4	6		Wet Medium		5) Gray fine-medium SAND and GRAVEL, trace silt.	
30	6	SS	24"	8"	32.0'	4	11	46		Wet Dense		6) Gray fine SAND and fine-coarse GRAVEL and ROCK FRAGMENTS	
											32.0'	EOB END OF BORING 32.0' Soil	
35												20.0' Riser	
												10.0' Screen	
												8 Bags Sand	
												3 Bags Grout	
												1 Bag Bentonite Pellets	
40												1 Curb Box	

TYPE OF SAMPLES:  
D= DRY W= WASHED C= CORED A= AUGER SS= SPLIT SPOON  
UB= UNDISTURBED BALL CHECK UP= UNDISTURBED PISTON VT= VANE SPOON  
PROPORTIONS USED TRACE= 0-10% LITTLE= 10-20% SOME= 20-35% AND= 35-50%