

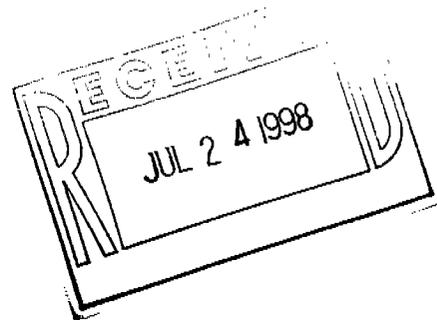
NATURAL ATTENUATION MONITORING REPORT

**MELVIN YARBORO PROPERTY
2205 OAK HILL DRIVE
GREENSBORO, NORTH CAROLINA**

JULY 23, 1998

LEGACY ENVIRONMENTAL SERVICES, INC.





NATURAL ATTENUATION MONITORING REPORT

MELVIN YARBORO PROPERTY
2205 OAK HILL DRIVE
GREENSBORO, NORTH CAROLINA

JULY 24, 1998

PREPARED BY: LEGACY ENVIRONMENTAL SERVICES, INC.



LEGACY ENVIRONMENTAL SERVICES, INC.

P.O. Box 4560, Greensboro, NC 27404-4560, Phone (336) 316-0452, FAX (336) 299-1961

July 24, 1998

Melvin Yarboro
1072 Tarry Church Road
Star, North Carolina 27356

Reference: Natural Attenuation Monitoring Report
Melvin Yarboro Property
2205 Oak Hill Drive
Greensboro, North Carolina *10017*

Dear Mr. Yarboro:

Please find enclosed a report summarizing the natural attenuation monitoring activities conducted at the above referenced facility. Site assessment activities in 1994 and 1995 at this site revealed a release of petroleum in soils and groundwater in the vicinity of a 550 gallon heating oil UST, which was removed from the site on February 24, 1993. Following the soil remediation activities, the three of the remaining five on-site monitor wells were resampled for the purpose of natural attenuation monitoring as specified in the Corrective Action Plan.

If you have questions regarding this report, please contact our office.

Sincerely,

Brandon Moore, Staff Geologist

Henry Nemargut, P.E.
Legacy Environmental Services, Inc.

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NATURAL ATTENUATION MONITORING REPORT

MELVIN YARBORO PROPERTY 2205 OAK HILL DRIVE GREENSBORO, NORTH CAROLINA

1.0 Introduction and Background

1.1 Introduction

Melvin Yarboro owns a property containing one occupied structure used for residence located at 2205 Oak Hill Drive in Greensboro (Guilford County), North Carolina. Figure 1 illustrates the location of this facility on the U.S.G.S. Topographic Map of the Greensboro Quadrangle. This site previously contained one 550 gallon heating oil UST used for heating of the residence. The site layout and former tank location are illustrated in Figure 2. In February of 1993, soil contamination was discovered below the heating oil tank during UST Closure sampling. This contamination showed TPH levels of 1,450 parts per million (ppm) by EPA Method 3550 and 145 ppm by Method 5030.

Following discovery of the release, Melvin Yarboro contracted Legacy Environmental Services (Legacy) to perform comprehensive site assessment activities at the site. Legacy's Comprehensive Site Assessment (CSA) report was submitted on March 10, 1995. Following completion of the CSA, Legacy prepared a Corrective Action Plan (CAP) which determined excavation and off-site disposal to be the most efficient method of soil remediation. Legacy's CAP for this site was submitted on April 4, 1997. The heating oil UST was removed from the site on February 24, 1993, and Legacy's UST Closure report was submitted on March 24, 1993. Refer to Legacy's Site Remediation report dated August 29, 1997 for further information regarding the soil remediation activities. Following the remediation of contaminated soils at the project site, the CAP specified sampling of the on-site monitor wells quarterly for the first year. These activities have been conducted to verify that residual petroleum constituents in the groundwater are not migrating towards adjacent properties.

1.2 Scope of Services

This natural attenuation monitoring report contains documentation concerning the following activities which have been conducted at this facility:

- o A monitor well sampling event conducted on MW-3, MW-4, and MW-5 by Legacy on June 9, 1998.
- o Laboratory analyses of groundwater samples conducted by Froehling and Robertson, Inc. of Richmond, VA.
- o The approximate groundwater flow direction and hydraulic gradient at the site calculated by Legacy.
- o Isoconcentration maps illustrating the current contaminant levels in the monitoring wells at the facility prepared by Legacy.

2.0 Field Activities

2.1 Ground Water Flow Direction and Gradient

In order to estimate the groundwater flow direction in the vicinity of the petroleum release, elevations of the monitor well casings were measured using surveying equipment. Static water levels were obtained from each of the wells and the data was used to compute a potentiometric surface map which is included as Figure 3.

Groundwater data and monitoring well information, which are summarized in Table 1, were also used to estimate the hydraulic gradient at the project site. Using the horizontal distance between the monitor wells and the static water levels, the groundwater was estimated to be flowing in a east to southeast direction with a hydraulic gradient of approximately 0.0727 ft/ft.

2.2 Monitor Well Sampling and Analyses

On June 9, 1999 monitor wells MW-3, MW-4, and MW-5 were sampled for analyses utilizing EPA Methods 602 + Xylenes and 625 + 10 largest peaks. Before sampling, the monitor wells were purged by removing a minimum of three well volumes to ensure that the samples were representative of the actual groundwater conditions. The wells were developed using disposable plastic balers suspended with unused nylon string. Following development of the groundwater monitoring wells, samples were obtained from the disposable balers.

All samples were placed in laboratory supplied glassware, labeled with sample location, analysis to be performed, time, date and sampler's name. The sample jars were then immediately placed in a cooler, chilled with ice to approximately 4°C in preparation of transportation to an analytical laboratory utilizing EPA approved chain-of-custody procedures.

Following receipt of the laboratory analytical results, no petroleum constituents were discovered above laboratory detection limits in any of the three monitoring wells which were sampled during this investigation. Table 2 summarizes the laboratory analytical results, and Appendix A contains copies of the analytical reports.

2.3 Plume Development

In the original sampling event conducted in 1995, Benzene and Naphthalene were reported above 2L Standards in MW-1. However, no compounds were reported above laboratory detection limits at the site following soil remediation activities. The soil excavation activities coupled with natural processes appear to have remediated the groundwater in the vicinity of the release source. Table 3 contains the time based analytical results for Total BTEX, and Figure 6 illustrates the same information graphically. The figure and graph referenced above indicate that the contaminant plume at this site has decreased following remedial activities.

3.0 Conclusions and Recommendations

3.1 General Summary

One natural attenuation monitoring event conducted at the Yarboro property located at 2205 Oak Hill Drive in Greensboro, NC has been completed. From a review of all information gathered during this remediation project, Legacy Environmental Services, Inc. makes the following conclusions:

- o No petroleum constituents were detected above current listed 2L Standards in the groundwater samples at the project site.
- o The contaminants in the groundwater at 2205 Oak Hill Drive are not migrating towards the down-gradient property. Natural attenuation appears to have effectively remediated the groundwater at the site.

3.2 Recommendations

Legacy recommends no further assessment or remedial actions at the 2205 Oak Hill Drive. The monitor wells at this facility should be abandoned and the site closed. A copy of this monitoring report should be forwarded to the following address:

Guilford County Health Department
1100 E. Wendover Avenue
Greensboro, North Carolina 27405

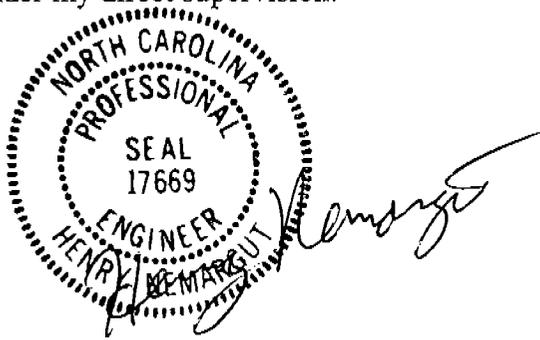
3.3 Limitations

This report has been prepared for the exclusive use of Melvin Yarboro for the specific application to the referenced site located in Guilford County, North Carolina. The assessment was conducted based on the scope of work and level of effort desired by the client. Our findings have been developed in accordance with generally accepted standards in the practice of Natural Attenuation Monitoring in the State of North Carolina, available information and our professional judgement. No other warranty is expressed or implied.

The data presented in this report are indicative of conditions that existed at the precise locations sampled and at the time the samples were collected. Additionally, the data obtained from the samples would be interpreted as meaningful with respect to the parameters indicated in the laboratory reports. No additional information can be logically inferred from this data.

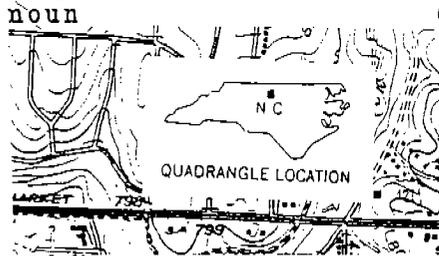
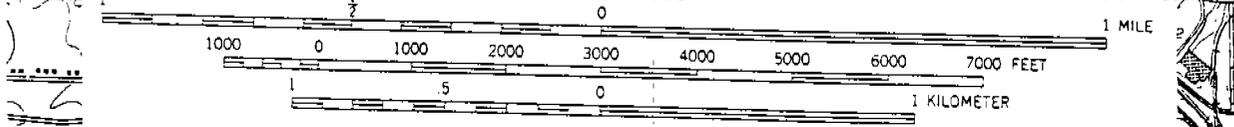
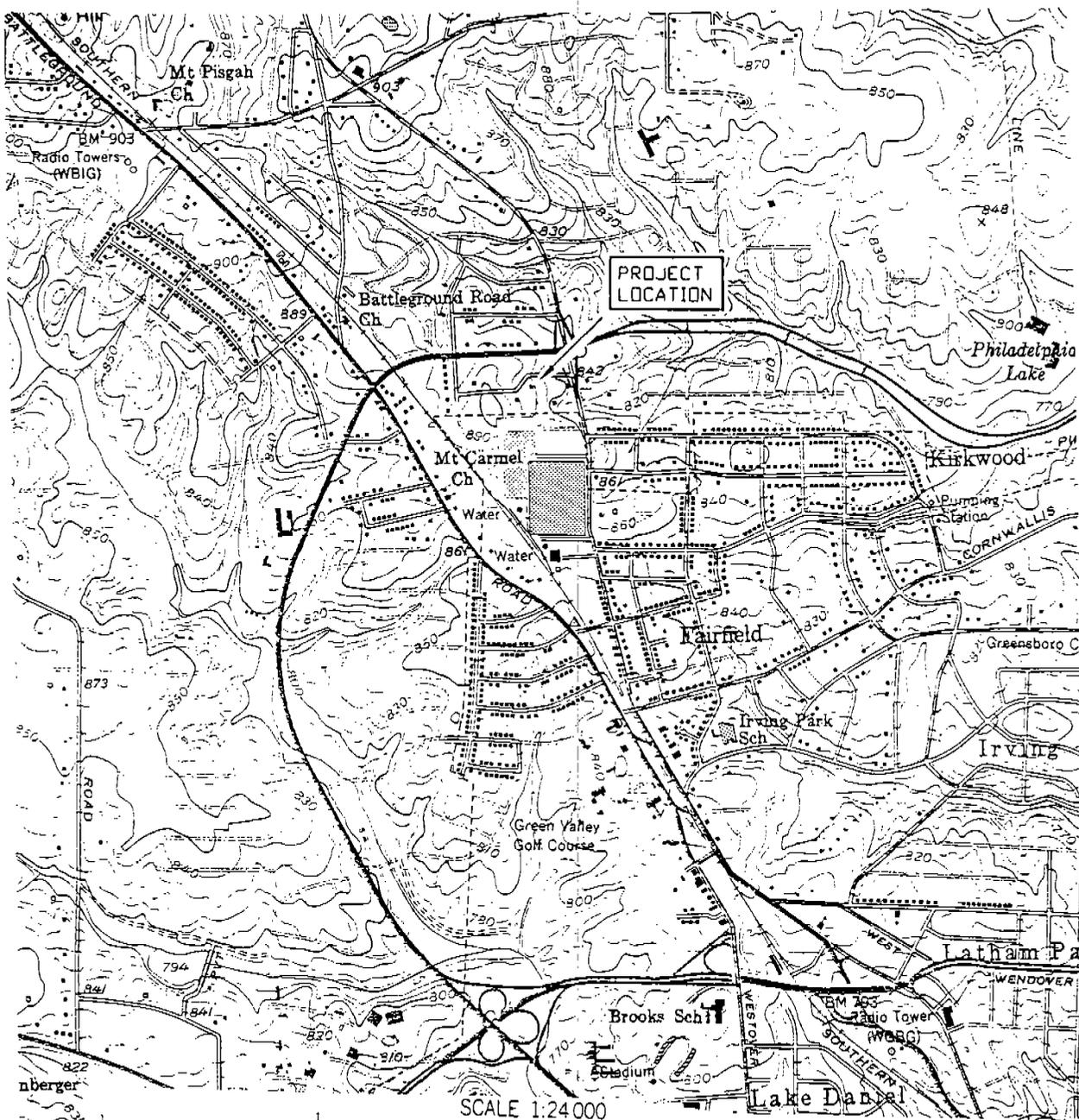
4.0 Professional Certification

The Natural Attenuation Monitoring Report for this site has been prepared by Legacy Environmental Services, Inc. under the direct supervision of licensed engineers or geologists. Technical review of this document has been provided by Henry Nemargut Engineering Services. All engineering work performed on this project was conducted under my direct supervision:



Henry Nemargut, P.E.
Henry Nemargut Engineering Services
North Carolina License #17669

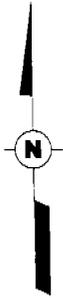
FIGURES



CONTOUR INTERVAL 10 FEET
GREENSBORO, N. C.
 36079-A7-TF-024
 1951
 PHOTOREVISED 1968
 DMA 5056 III SE-SERIES V842

LEGACY ENVIRONMENTAL SERVICES, INC. GREENSBORO, NORTH CAROLINA	
CLIENT: MELVIN YARBOROUGH GREENSBORO, NC.	
PROJECT: NATURAL ATTENUATION MONITORING 2205 OAK HILL DRIVE GREENSBORO, N.C.	
TITLE: PROJECT LOCATION U.S.G.S. TOPO MAP GREENSBORO QUADRANGLE	
SCALE:	1"=2000'
DATE:	7/24/98
DWN. BY:	KDM
DWG. #:	1-98-1532

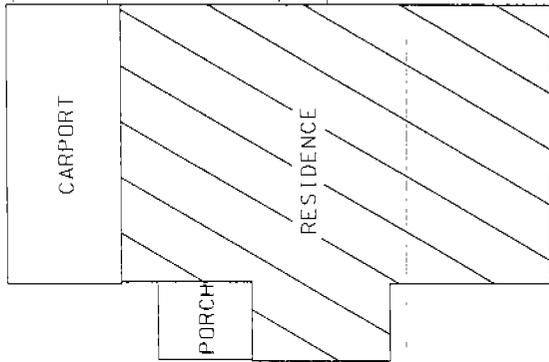
FIGURE 1



OAK HILL DRIVE

DRIVEWAY

MW-2



FORMER UST
LOCATION

MW-6

MW-5

MW-3

MW-4

LEGEND

SCALE



⊗ MONITOR WELL LOCATION

▨ STONE WALL

≡ BRICK WALL

—x— FENCELINE

FIGURE 2

SCALE: 1"=20'
DATE: 7/24/98
DWN.BY: KBM
DWG.# 1'98-153

TITLE:
SITE LAYOUT AND
MONITOR WELL LOCATIONS

PROJECT:
NATURAL ATTENUATION MONITORING
2205 OAK HILL DRIVE
GREENSBORO, N.C.

CLIENT:
MELVIN YARBOROUGH
GREENSBORO, NC



LEGACY
ENVIRONMENTAL
SERVICES, INC.
GREENSBORO, NORTH CAROLINA

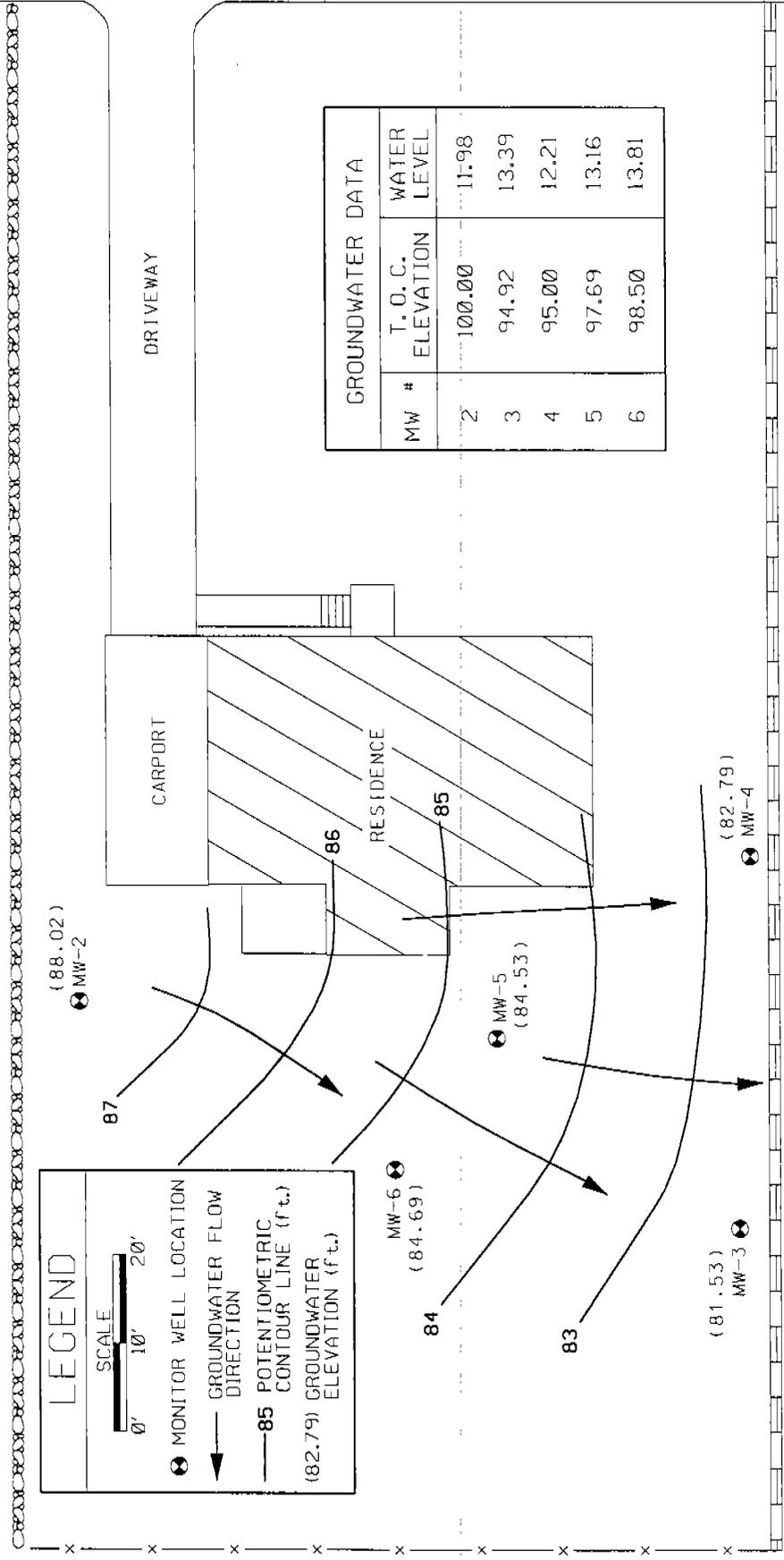
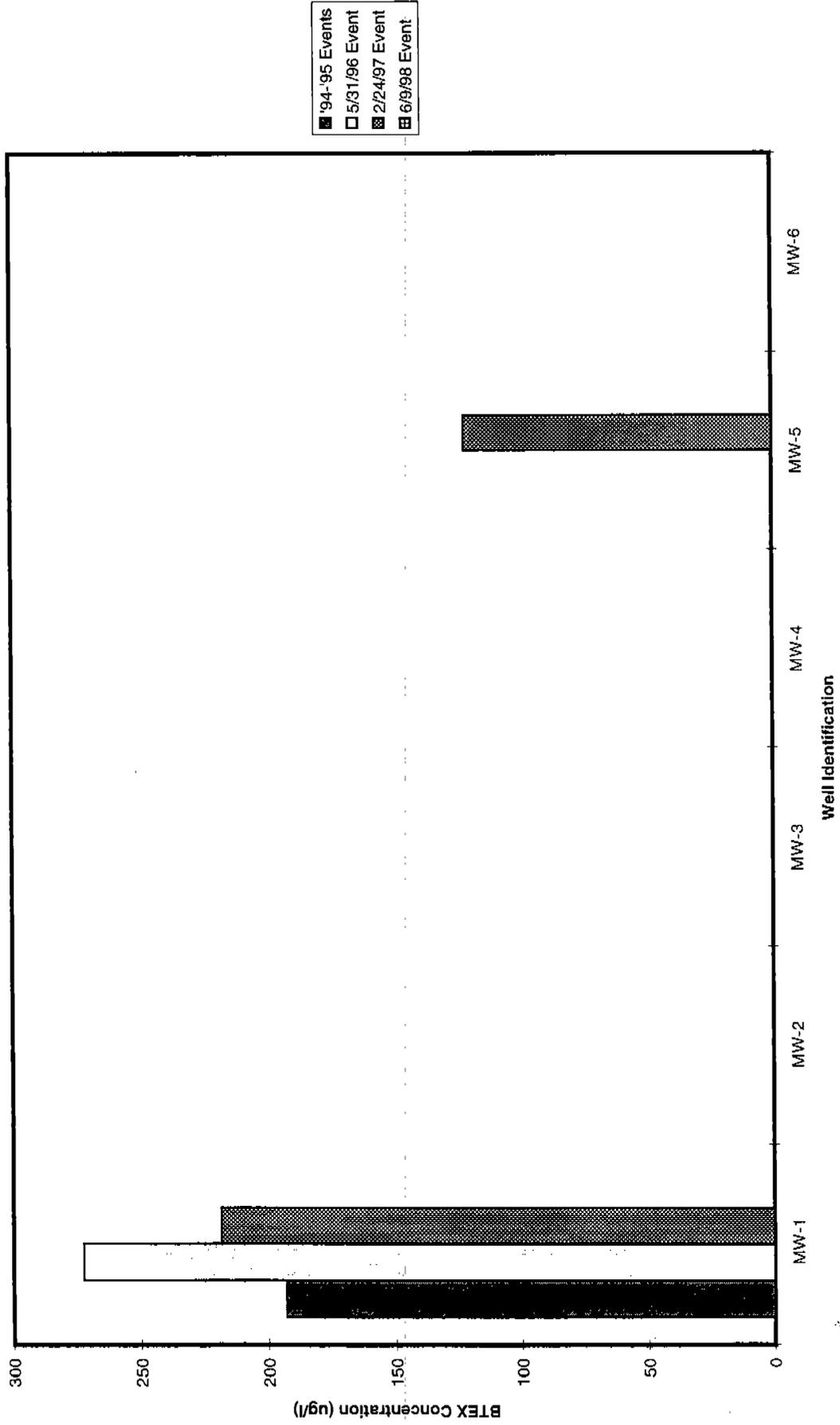


FIGURE 3

SCALE: 1"=20'	PROJECT: ATTENUATION MONITORING NATURAL 2205 OAK HILL DRIVE GREENSBORO, N.C.	CLIENT: MELVIN YARBOROUGH GREENSBORO, NC	LEGACY ENVIRONMENTAL SERVICES, INC. GREENSBORO, NORTH CAROLINA
DATE: 7/24/98			
DWN.BY: KBM			
DWG. # 1.98-153A			

FIGURE 4: Total BTEX vs. Time



TABLES

TABLE 1

Monitoring Well Information and Groundwater Elevations

2205 Oak Hill Drive

Guilford County, Greensboro, North Carolina

Well Number	Top of Casing Elevation	Top of Screen Elevation	Bottom of Screen Elevation	Depth to Water	Groundwater Elevation
MW-2	100.00	86.00	66.00	11.98	88.02
MW-3	94.92	80.92	60.92	13.39	81.53
MW-4	95.00	71.00	61.00	12.21	82.79
MW-5	97.69	80.69	60.69	13.16	84.53
MW-6	98.50	88.50	73.50	13.81	84.69

All measurements taken in feet on 6/9/98 and based on an arbitrary benchmark of 100.00 feet at MW-2.

X98-160A

TABLE 2

Summary of Groundwater Laboratory Analytical Results

2205 Oak Hill Drive

Greensboro, Guilford County, North Carolina

CONSTITUENT	MW-3	MW-4	MW-5	2L Standard
Date	6/9/98	6/9/98	6/9/98	
Benzene	BDL	BDL	BDL	1
Toluene	BDL	BDL	BDL	1,000
Ethylbenzene	BDL	BDL	BDL	29
Xylenes (total)	BDL	BDL	BDL	530
BTEX (total)	BDL	BDL	BDL	NSE
1,2 Dichlorobenzene	BDL	BDL	BDL	NSE
1,3 Dichlorobenzene	BDL	BDL	BDL	NSE
1,4 Dichlorobenzene	BDL	BDL	BDL	NSE
Naphthalene	BDL	BDL	BDL	21
TTCs (total)	BDL	BDL	BDL	NSE

All results reported in micrograms per liter (ug/l)

BDL = Below Detection Limits

TTCs = Total Tentatively Identified Compounds

NSE = No Standard Established

TABLE 3
Time Based Laboratory Analytical Results - Total TICs
 2205 Oak Hill Drive
 Greensboro, North Carolina

Date of Sampling	Total TICs Concentration					
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6
3/18/94-2/1/95	193	BDL	BDL	BDL	BDL	N/A
5/31/96	272.5	BDL	BDL	BDL	BDL	BDL
2/24/97	218.3	BDL	BDL	BDL	121.82	BDL
6/9/98	N/A	N/A	BDL	BDL	BDL	N/A

All results reported in micrograms per liter (ug/l)
 TICs = Tentatively Identified Compounds
 N/A = Data not available for this sampling event

X98-160B

APPENDIX A
GROUNDWATER LABORATORY
ANALYTICAL RESULTS

SINCE



1881

FROEHLING & ROBERTSON, INC.
 GEOTECHNICAL • ENVIRONMENTAL • MATERIALS
 ENGINEERS • LABORATORIES
 "OVER ONE HUNDRED YEARS OF SERVICE"

CERTIFICATE OF ANALYSIS

June 22, 1998

Page 1 of 3

LAB #: 9806109
 CLIENT: Legacy Environmental Services, Inc.
 P.O. Box 4560
 Greensboro, NC 27404
 Attn: Brandon Moore

PROJECT: 2205 Oak Hill Drive

PROJECT #: P-342 P

SAMPLES COLLECTED BY: B. Moore
 LAB RECEIPT: 6/12/98, 1025

<u>PARAMETER</u>	<u>ANALYSIS DATE/TIME</u>	<u>METHOD</u>	<u>ANALYST</u>
Purgeable Aromatics	6/17/98, 2218	EPA 602 BYCC/MS	EDG
Semivolatile Ext. BN	6/15/98, 1430	EPA 625	SS
Semivolatile Org Cmps.	6/17/98, 2013	EPA 625	EDG/BD
Library Search	6/22/98, 1026		BD

Audrey N. Bruback
 Laboratory Manager

ANB/psg

HEADQUARTERS: 3015 DUMBARTON ROAD • BOX 27624 • RICHMOND, VA 23261-7524
 TELEPHONE (804) 264-2701 • FAX (804) 264-1202

BRANCHES: ASHEVILLE, NC • ATLANTA, GA • BALTIMORE, MD • CHARLOTTE, NC
 CHESAPEAKE, VA • CROZET, VA • FAYETTEVILLE, NC • FREDERICKSBURG, VA
 GREENVILLE, SC • RALEIGH, NC • ROANOKE, VA • STERLING, VA • WINSTON SALEM, NC

CERTIFICATIONS: AIHA ELLAP - 8942
 NIST NVLAP - 102060-0
 VIRGINIA DRINKING WATER - 00150
 NORTH CAROLINA DEIRN - 432
 SOUTH CAROLINA DHEC - 93010001 & - 93010002
 CHARTER MEMBER - ACIL



RESULTS:

F&R #:	9806109-01	9806021-02	9806109-03
SAMPLE ID:	MW-3	MW-4	MW-5
DATE/TIME:	6/09/98, 1450	6/09/98, 1445	6/09/98, 1515
TYPE:	Water/grab	Water/grab	Water/grab

Purgeable Aromatics, µg/L

ReportingLimit:

Benzene	BDL	BDL	BDL	1
Toluene	BDL	BDL	BDL	1
Ethylbenzene	BDL	BDL	BDL	1
Total Xylenes	BDL	BDL	BDL	3
Chlorobenzene	BDL	BDL	BDL	1
1,2-Dichlorobenzene	BDL	BDL	BDL	1
1,3-Dichlorobenzene	BDL	BDL	BDL	1
1,4-Dichlorobenzene	BDL	BDL	BDL	1

F&R #:	9806109-01	9806021-02	9806109-03
SAMPLE ID:	MW-3	MW-4	MW-5
DATE/TIME:	6/09/98, 1450	6/09/98, 1445	6/09/98, 1515
TYPE:	Water/grab	Water/grab	Water/grab

ReportingLimit:

Semivolatile Cmps(µg/L):

Acenaphthene	BDL	BDL	BDL	10
Acenaphthylene	BDL	BDL	BDL	10
Anthracene	BDL	BDL	BDL	10
Benzidine	BDL	BDL	BDL	10
Benzo[a]anthracene	BDL	BDL	BDL	10
Benzo[a]pyrene	BDL	BDL	BDL	10
Benzo[b]fluoranthene	BDL	BDL	BDL	10
Benzo[g,h,i]perylene	BDL	BDL	BDL	10
Benzo[k]fluoranthene	BDL	BDL	BDL	10
bis(2-Chloroethoxy)methane	BDL	BDL	BDL	10
bis(2-Chloroethyl)ether	BDL	BDL	BDL	10
bis(2-Chloroisopropyl) ether	BDL	BDL	BDL	10
bis(2-Ethylhexyl)phthalate	BDL	BDL	BDL	10
4-Bromophenyl-phenylether	BDL	BDL	BDL	10
Butylbenzylphthalate	BDL	BDL	BDL	10
4-Chloro-3-methylphenol	BDL	BDL	BDL	10
2-Chloronaphthalene	BDL	BDL	BDL	10

µg/L = micrograms per kilogram

BDL = Below Detection Limit

No library search compounds detected for 8270.



F&R #:	9806109-01	9806021-02	9806109-03
SAMPLE ID:	MW-3	MW-4	MW-5
DATE/TIME:	6/09/98, 1450	6/09/98, 1445	6/09/98, 1515
TYPE:	Water/grab	Water/grab	Water/grab

Reporting Limit:

Semivolatile Cmps (µg/L) cont. .:

2-Chlorophenol	BDL	BDL	BDL	10
4-Chlorophenyl-phenylether	BDL	BDL	BDL	10
Chrysene	BDL	BDL	BDL	10
Dibenz[a,h]anthracene	BDL	BDL	BDL	10
1,2-Dichlorobenzene	BDL	BDL	BDL	10
1,3-Dichlorobenzene	BDL	BDL	BDL	10
1,4-Dichlorobenzene	BDL	BDL	BDL	10
3,3'-Dichlorobenzidine	BDL	BDL	BDL	10
Diethylphthalate	BDL	BDL	BDL	10
Dimethylphthalate	BDL	BDL	BDL	10
Di-n-butylphthalate	BDL	BDL	BDL	10
2,4-Dinitrotoluene	BDL	BDL	BDL	10
2,6-Dinitrotoluene	BDL	BDL	BDL	10
Di-n-octylphthalate	BDL	BDL	BDL	10
Fluoranthene	BDL	BDL	BDL	10
Fluorene	BDL	BDL	BDL	10
Hexachlorobenzene	BDL	BDL	BDL	10
Hexachlorobutadiene	BDL	BDL	BDL	10
Hexachlorocyclopentadiene	BDL	BDL	BDL	10
Hexachloroethane	BDL	BDL	BDL	10
Indeno[1,2,3-cd]pyrene	BDL	BDL	BDL	10
Isophorone	BDL	BDL	BDL	10
Naphthalene	BDL	BDL	BDL	10
Nitrobenzene	BDL	BDL	BDL	10
n-Nitroso-di-n-propylamine	BDL	BDL	BDL	10
n-Nitrosodiphenylamine	BDL	BDL	BDL	10
Phenanthrene	BDL	BDL	BDL	10
Pyrene	BDL	BDL	BDL	10
1,2,4-Trichlorobenzene	BDL	BDL	BDL	10

µg/L = micrograms per Liter

BDL = Below Detection Limit

No library search compounds detected for 8270.



LEGACY ENVIRONMENTAL SERVICES, INC.

P.O. Box 4560, Greensboro, NC 27404-4560, Phone (336) 316-0452, FAX (336) 299-1961

9806109

CHAIN OF CUSTODY RECORD

Facility: 2205 Oak Hill Drive

LES Job #: P-342P

Samplers signature: Brandon Moore Printed name: Brandon Moore

Sample Number	Sample Location	Date	Time	Sample Type			No. of Contents	Analysis Required
				Water				
				Comp	Grab	Soil		
01 MW-3	Monitor Well # 3	6/9/98	2:15P		X		4	602 + Xylenes, 625 Base Neutral Extractables Only w/ 10 largest peaks
02 MW-4	Monitor Well # 4	6/9/98	2:45P		X		4	↓ ↓
03 MW-5	Monitor Well # 5	6/9/98	3:15P		X		4	↓ ↓

Note: Unless otherwise noted, the regulatory agency is the NCDENR for these samples.
 Any subcontracted laboratory services must be preapproved.
 Our written purchase order accompanied by this record is your notice to proceed.

Relinquished by: (Signature) <u>Brandon Moore</u>	Received by: (Signature) <u>T. Weiner</u>	Date / Time <u>6/9/98 4:30p</u>
Relinquished by: (Signature)	Received by: (Signature)	Date / Time
Relinquished by: (Signature)	Received by: (Signature)	Date / Time
Methods of shipment:	Received for laboratory by: (Signature) <u>[Signature]</u>	Date / Time <u>6/12/98 1025</u>
Conditions upon receipt: <u>Temp see 9806108</u>	Remarks:	