— Flemington Landfill —
May 1998 Sampling Event
Statistical Analysis Report

Environmental Investigations, Inc.

Aug. 20, 1998

(Site wells were abandoned
subsequent to this event)

STATISTICAL ANALYSIS

REPORT

Old Flemington Landfill
New Hanover County, North Carolina

ENVIRONMENTAL INVESTIGATIONS, INC.

Prepared By:
Environmental Investigations, Inc.
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Durham, North Carolina

August 20, 1998

INTRODUCTION

This statistical analysis report has been prepared by Environmental Investigations, Inc. (EI) in response to the Final Consent Decree United States of America vs. Waste Industries, Inc., et al., Civil Action File No. 80-4-CIV-7 to perform and analyze groundwater monitoring data from the Old Flemington Landfill. Included in this report are Figure 1: Site Location Map, Figure 2: Monitoring Well Sample Locations Map, Table 1: Groundwater Elevation Data for the five (5) remaining wells and Table 2: Summary of Groundwater Analytical Results. Appendix A presents the Baseline Sampling Analysis for each detected parameter. A summary of sampling procedures and protocol along with a description of statistical methods utilized are included in the text of the report.

SUMMARY OF SAMPLING PROCEDURES AND PROTOCOL

Sample Collection Procedures

The five (5) groundwater monitoring wells at the former landfill were first opened to allow the static levels to equilibrate. Groundwater levels were measured and recorded prior to purging the wells. Approximately three (3) well volumes were purged from the subject wells with teflon bailers. The wells were then allowed several hours to recharge and stabilize. Groundwater samples were collected from the five (5) monitoring wells using dedicated teflon bailers and placed in laboratory provided glass containers.

Equipment Decontamination Procedures

Decontamination of field sampling equipment (groundwater level indicator) was conducted as follows:

- Equipment was washed using phosphate-free laboratory detergent (Liquinox®) and tap water.
- Equipment was then rinsed with commercially-available distilled water.
- Equipment was rinsed with pesticide-grade isopropanol.
- Equipment was rinsed with organic-free water.

Sample Handling and Chain-of-Custody Procedures

The sample handling and chain-of-custody procedures utilized in this project were consistent with North Carolina and EPA Region IV standard operating procedures.

All sample identification, chain-of-custody records, receipt for sample forms, and field records were recorded with waterproof, non-erasable ink. If errors were made in any of these documents,

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corrections were made by crossing a single line through the error and entering the correct information. All corrections were initialed and dated. All corrections were made by the individual making the error.

Information on sampling containers was entered using stick-on labels; these labels were not capable of being removed without leaving obvious indications of the attempt. Labels were not placed over previously recorded information. Corrections to information recorded on stick-on labels were made as stated above.

Sample bottles were labeled at each sampling location prior to the collection of each sample. Once sample bottles were filled they were placed in sealable plastic bags and placed in a cooler with ice. Ice was "double bagged" in heavy duty sealable polyethylene bags and properly sealed. The ice bags were placed on top of and/or between the samples. All remaining space between the bottles was filled with ice.

Sample Identification

The method of sample identification used was determined based on the type of sample collected and the sample location. Samples collected for laboratory analysis were identified by using stick-on labels which were affixed on to the sample containers, as described above. The following information was included on the sample label using waterproof, non-erasable ink:

- project number;
- field identification or sample station number;
- date and time of sample collection;
- designation of the sample as a grab or composite;
- type of sample (water, soil, sediment, etc.);
- the initials of the sampler(s);
- whether the sample is preserved or unpreserved; and
- the general types of analysis to be performed.

Chain-of-Custody Procedures

Sample labels were completed for each sample using waterproof, non-erasable ink as described above. Samples were sealed as soon as possible following collection utilizing a stick-on custody

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seal. The sampler or sample custodian entered the date and their signature on each seal.

Chain-of-Custody documents were completed following each sample run, following placement of custody seals on the sample containers. Information entered on the Chain-of-Custody Record included the following:

- The project number;
- The project name;
- Signature of sampling team leader;
- The well sample location number, date, and time of sample collection, grab or composite sample designation, and a brief description of the type of sample and/or the sampling location;
- Required analysis; and
- The Federal Express air bill number;

A completed Chain-of-Custody Record was sealed in a plastic bag and placed in each cooler prior to sealing the cooler for shipment by Federal Express Overnight Priority Services to the laboratory. One copy of the completed Chain-of-Custody Record was retained in the project files. When preparing shipments, the "Relinquished By" box on the Chain-Of-Custody Record was filled in; however, the "Received By" box was left blank.

DESCRIPTION OF STATISTICAL METHODS

Eighteen monitoring wells were abandoned in 1998 based on groundwater sample results showing constituent concentrations below 15A NCAC 2L .0202 cleanup standards. The five (5) remaining monitoring wells were used to determine current site-specific conditions in regard to potential site closure at the Old Flemington Landfill. Background levels were based upon data obtained from the most recent monitoring well sampling event. Monitoring well MW-1I was used for background concentration comparison purposes.

Statistical analysis data from groundwater monitoring at Resource Conservation and Recovery Act (RCRA) sites was used to determine if an increase in specific contaminant concentrations occurred (Code of Federal Regulations under 40 CFR Parts 264-265). The statistical analysis method utilized for this baseline sampling analysis was based on a Test of Proportions-Normal Distribution Curve. The goal of the statistical analysis, for a monitoring site under corrective action, was to determine whether concentrations of hazardous constituents are still above compliance limits or have been effectively reduced below the compliance limit.

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A limited set of monitoring well data with a proportion of detected values greater than 50% was used, an analysis of variance is usually recommended (Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities-Interim Final Guidance, USEPA document PB89-151047, Office of Solid Waste Management Division, April, 1989, Section 5.2). However, a Test of Proportions method was employed since the background well, MW-1I, is indicative of other background wells previously abandoned at the site.

Concentrations higher than background levels were determined for benzene, chlorobenzene, and 1,4-dichlorobenzene. The statistical evidence showed that the proportion of compliance well samples where 1,2-dichlorobenzene, 1,3-dichlorobenzene, calcium, sulfate, nitrate, and nitrite were detected did not exceed the proportion of background well samples where these constituents were detected. Sodium, chloride, carbonate alkalinity and bicarbonate alkalinity could not be statistically analyzed since there is not a 15A NCAC 2L .0202 groundwater standard for these constituents.

RECOMMENDED MONITORING SCHEDULE

Final determinations of subsequent site monitoring plans and/or a petition for site closure status will be made by the USEPA-RCRA Enforcement and Compliance Branch based on review of the third year annual groundwater monitoring and this statistical analysis report.

CONCLUSIONS

Upgradient wells (MW-1S, MW-1I and MW-1D) and downgradient wells (MW-4I, MW-4D, MW-5I, MW-5D, MW-7I, MW-7D, MW-11S, MW-11I and MW-11D) sampled in previous monitoring well sampling events showed constituent concentrations below North Carolina NCAC 2L cleanup standards for groundwater. The above referenced wells were subsequently abandoned in the spring of 1998.

Monitoring well MW-1I has remained below quantitation limit (BQL) for benzene during the last three years. Benzene concentrations in MW-2S have decreased from 5.3 ug/L to 5.0 ug/L during the same monitoring period. Monitoring well MW-2I showed a decline in benzene concentrations from 12.0 ug/L in November, 1995 to 1.0 ug/L in July, 1998. Monitoring well MW-3I showed no change in the benzene level of 5.0 ug/L since the previous monitoring event. Monitoring well MW-10I showed a reduction in benzene concentrations from 8.0 ug/L in November, 1997 to 7.0 ug/L in July, 1998.

The volatile organic compound (VOC) constituents chlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene and 1,4-dichlorobenzene are all below the NCAC 2L cleanup standards for groundwater in the five (5) remaining wells.

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Values for pH have increased in all five (5) wells to within or just below NCAC 2L standards.

The specific conductance measured in all five (5) monitoring wells has increased in each well during the three (3) year period. This increase may corroborate the continued trend in decreasing constituent levels.

The statistical analysis showed that the proportion of samples where three (3) constituents, benzene, chlorobenzene, and 1,4-dichlorobenzene were detected does exceed the proportion of background well samples where these constituents were detected. The analysis indicates that there is no statistically significant increase in contaminant levels for these three (3) constituents. However, only the constituent benzene was detected at concentrations at or above 15A NCAC 2L .0202 groundwater standards in four (4) of the five (5) wells. See **Table 2: Summary of Groundwater Analytical Results.**

Trends in groundwater quality have generally improved at the Old Flemington Landfill with constituent concentrations below or approaching 15A NCAC 2L .0202 groundwater cleanup standards based on the last three (3) years of groundwater monitoring data. It is the opinion of EI that site closure should be considered based on the results of the most recent annual monitoring and the enclosed statistical analysis study.

EI appreciates the opportunity to assist New Hanover County with this statistical analysis report for the Old Flemington Landfill. If you have any questions or comments, please do not hesitate to contact us at (919)544-7500.

Sincerely,

Michael Fallon
Environmental Geologist

David C. Brewster, P.G.
Director - Subsurface Investigations

NORTH CAROLINA LICENSED SEAL 02 GEOLOGIST DAVID CHASE BREWSTER

Attachments:
Tables
Figures
Appendices

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TABLES

TABLE 1
Groundwater Elevation Data
Old Flemington Landfill, New Hanover, North Carolina
EI Project No. 15-711-540

Monitoring Well No.	Elevation TOC (feet)	July 3, 1996		November 5, 1997		July 7, 1998	
		Depth to Water (ft. below TOC)	Groundwater Elevation (feet)	Depth to Water (ft. below TOC)	Groundwater Elevation (feet)	Depth to Water (ft. below TOC)	Groundwater Elevation (feet)
MW-1I	25.23	14.42	10.81	14.63	10.60	13.37	11.86
MW-2S	30.86	20.91	9.95	21.18	9.68	19.98	10.88
MW-2I	30.74	20.41	10.33	20.64	10.10	19.49	11.25
MW-3I	17.07	7.44	9.63	7.53	9.54	6.79	10.28
MW-10I	15.08	6.24	8.84	6.31	8.77	5.71	9.37

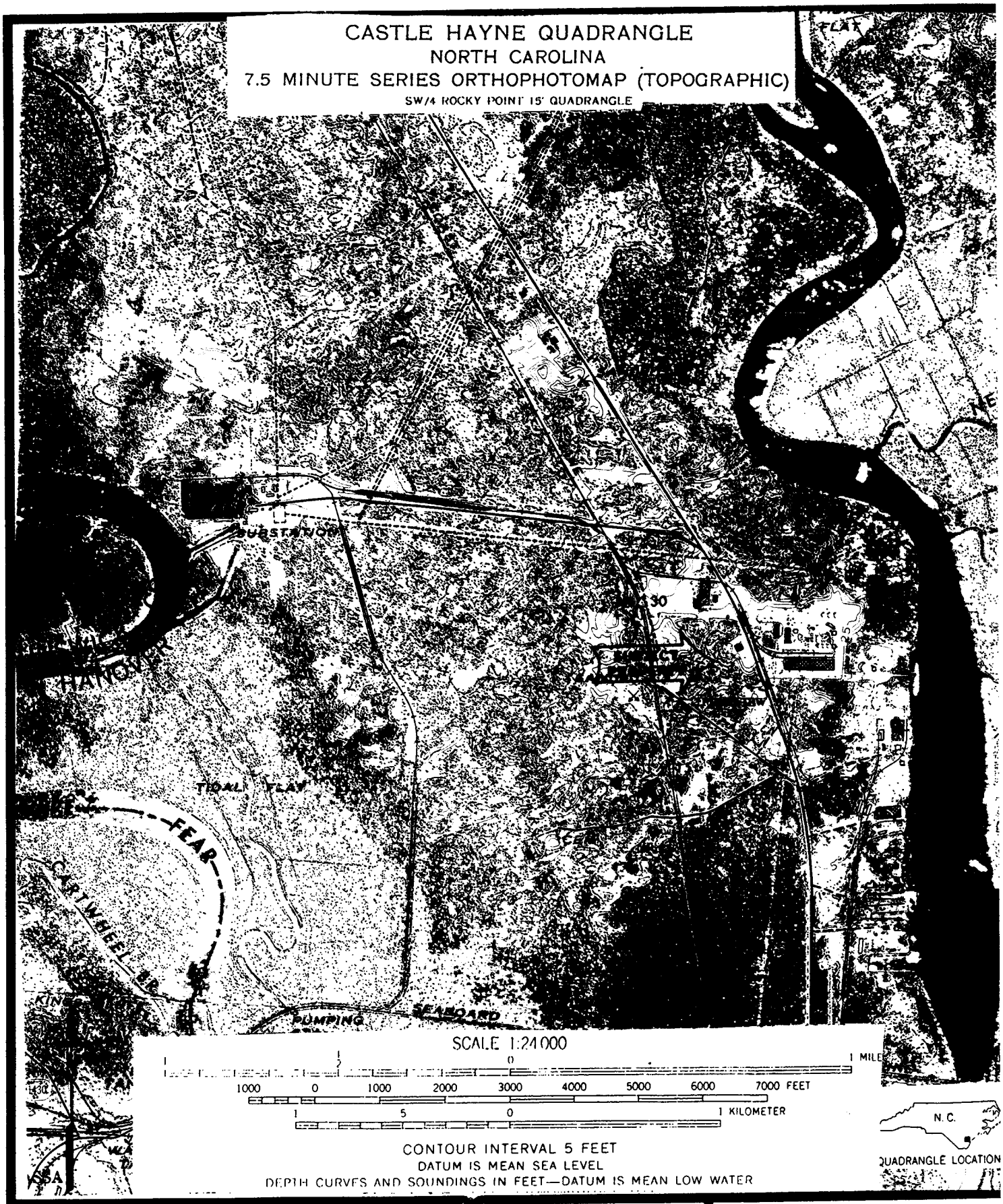
TOC - Top of Casing
I - Intermediate Depth Well
S - Shallow Depth Well

Table 2
Summary of Groundwater Analytical Results
Old Flemington Landfill, New Hanover County, North Carolina
EI Project No. 15-711-540

CONSTITUENTS ANALYZED	NCAC Limits 2L	SAMPLE POINT LOCATIONS-Monitoring Wells														
		MW-1I Intermediate			MW-2S Shallow			MW-2I Intermediate			MW-3I Intermediate			MW-10I Intermediate		
Sample Date	**ug/l**	7/3/96	11/5/97	7/7/98	7/3/96	11/5/97	7/7/98	7/3/96	11/5/97	7/7/98	7/3/96	11/5/97	7/7/98	7/3/96	11/5/97	7/7/98
Compound (ug/l)		**Volatile Organic Compounds - GCMS 624**														
Benzene	1	BQL	BQL	BQL	**5.3**	**5.0**	**5.0**	**11.0**	**12.0**	**1.0**	BQL	**5.0**	**5.0**	**6.8**	**8.0**	**7.0**
Chlorobenzene	50	BQL	BQL	BQL	20	20.0	23.0	13.0	16.0	18.0	BQL	19.0	16.0	19.0	23.0	24.0
1,2-Dichlorobenzene	620	NA	BQL	BQL	NA	2.0	2.0	NA	3.0	3.0	NA	1.0	1.0	NA	1.0	1.0
1,3-Dichlorobenzene	620	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	6.0	BQL	BQL	BQL
1,4-Dichlorobenzene	75	BQL	BQL	BQL	5.5	11.0	12.0	6.8	11.0	8.0	BQL	6.0	6.0	5.4	1.0	9.0
Parameter (mg/l)		**Metals - Method 6010A**														
Calcium	NS	18.50	3.88	8.63	85.10	68.40	79.90	101.00	84.40	77.80	5.28	38.00	53.40	124.00	110.00	116.00
Sodium	NS	10.90	2.90	3.83	5.16	9.53	8.30	32.40	23.50	28.70	BQL	7.59	7.95	34.10	32.80	26.30
Parameter (mg/l)		**Inorganics**														
TOC-Total Organic Carbon	NS	8.10	1.72	2.10	16.60	13.80	13.40	23.20	14.00	18.10	1.76	8.90	9.60	20.60	14.50	21.50
COD-Chemical Oxygen Demand	NS	BQL	8.30	64.10	45.00	50.10	38.90	56.00	46.50	50.40	BQL	3.80	38.90	61.00	51.70	38.90
Chloride	250	13.20	27.90	8.74	6.15	54.10	26.70	37.90	73.90	33.00	3.03	52.90	15.10	43.60	73.90	32.00
Sulfate	250	3.40	BQL	3.53	4.70	BQL	BQL	BQL	21.50	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Nitrate	10	BQL	0.05	BQL	BQL	0.03	0.02	BQL	BQL	BQL	5.37	0.10	0.99	BQL	BQL	0.05
Nitrite	1	BQL	BQL	BQL	0.04	BQL	BQL	0.04	BQL	BQL	BQL	0.02	0.03	BQL	BQL	BQL
Carbonate Alkalinity	NS	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL	BQL
Bicarbonate Alkalinity	NS	110	71	41	302	324	390	504	418	479	14	233	289	575	609	559
Parameter		**Field Measurements**														
pH	6.5-8.5	**6.20**	**5.30**	**6.47**	**6.00**	**5.33**	**6.44**	**6.20**	**5.29**	**6.50**	**5.29**	**5.20**	**6.40**	**6.40**	**5.40**	6.65
Sp Conductance (uS/cm)	NS	224	55	1025	536	47	1061	902	79	1141	79	27	644	1000	110	1199

Note: BQL = Below Quantitation Limit
NS = No Standard
NA = Not Analyzed
Bold Type - In Excess of NC 2L Class GA Standards

FIGURES



DWN NO.	1
DWN BY:	USGS
CHK BY:	VNC
DATE:	11/24/97
Pro. No.:	16-601-665
SCALE:	1"= 2,400'

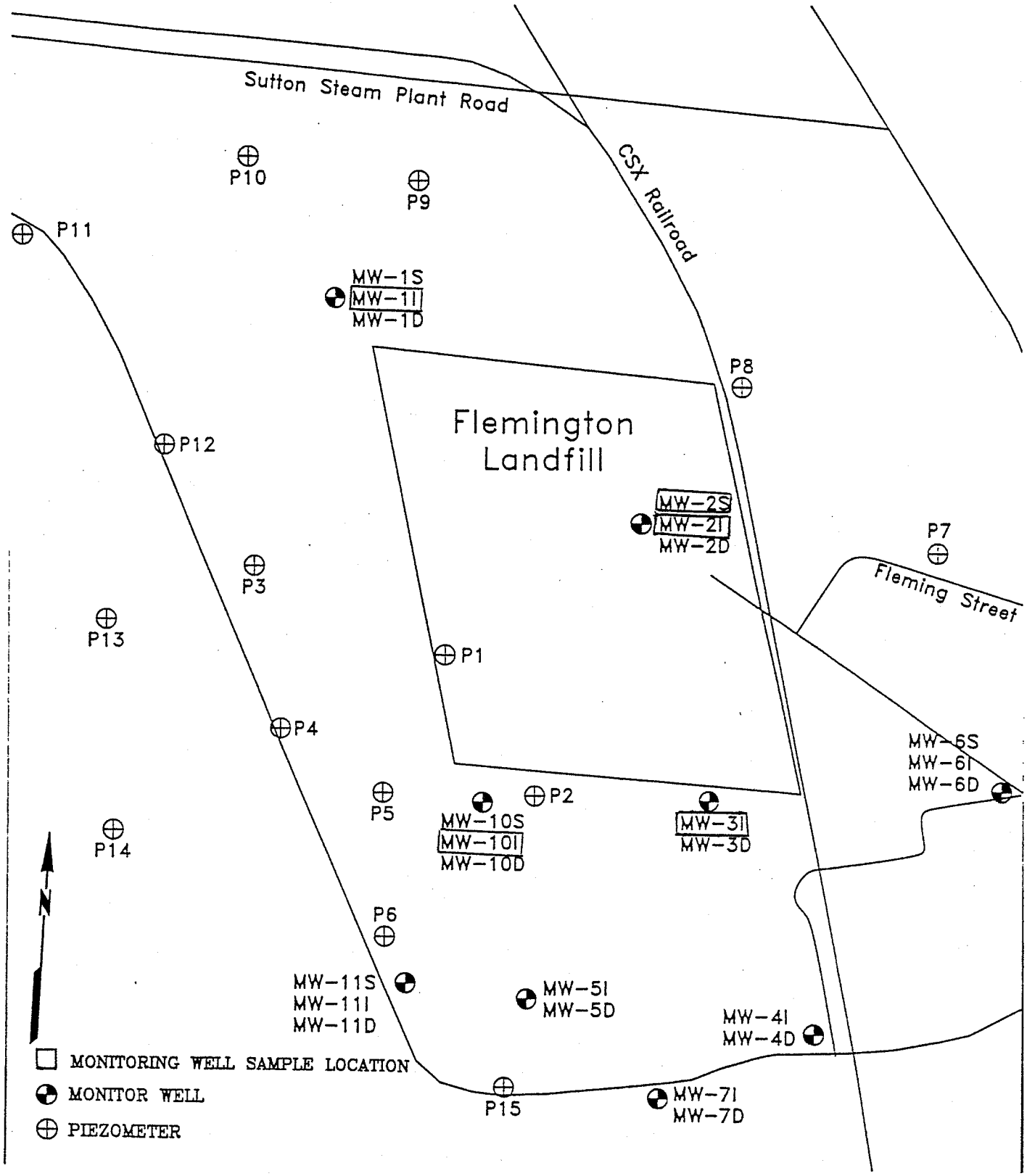
FIGURE 1

SITE LOCATION MAP

Old Flemington Landfill

New Hanover County, North Carolina

ENVIRONMENTAL INVESTIGATIONS P.A.



DWN NO.	FIGURE 2
DWN BY:	ABR
CHK BY:	VNC
DATE:	11/24/97
Pro. No.:	16-601-665
SCALE:	1"= 150'

FIGURE 2
MONITORING WELL SAMPLE
LOCATIONS MAP
Old Flemington Landfill
New Hanover, North Carolina

ENVIRONMENTAL INVESTIGATIONS

APPENDICES

Appendix A

Baseline Sampling Analysis

Baseline Sampling Analysis

Parameter: Benzene

Sample Location	Date Sampled 7/3/96 (PPM)	11/5/97 (PPM)	7/7/98 (PPM)
MW-1I	*1.00*	*1.00*	*1.00*
MW-2S	5.30	5.00	5.00
MW-2I	11.00	12.00	*1.00*
MW-3I	*1.00*	5.00	5.00
MW-10I	6.80	8.00	7.00

Sample Location	Date Sampled 7/3/96 (Detection)	11/5/97 (Detection)	7/7/98 (Detection)
MW-1I			
MW-2S	Detected	Detected	Detected
MW-2I	Detected	Detected	
MW-3I		Detected	Detected
MW-10I	Detected	Detected	Detected
Number of Detects	3	4	3
Number of Non-Detects	2	1	2

Total Percentage of Non-Detects	33%

< 15%	ANOVA Table
15% - 50%	One-Way Nonparametric Analysis of Variance
50% <	Test of Proportions

A One-Way Nonparametric Analysis of Variance will be used.

Y Detected Compliance Samples	10
X Detected Background Samples	0
n Number of Samples	15
P Proportion of Detected Samples	67%

Tests to Determine use of the Normal Distribution

nP > 5?	10	*Normal Distribution may be used*
n(1-P) > 5?	5	*Normal Distribution invalid*

n_b Number of Background Samples	3
n_c Number of Compliance Samples	12
P_b Proportion of Detects in Background Samples	0%
P_c Proportion of Detects in Compliance Samples	83%

Sd Standard Error of of Differences in Proportions	Z Computed Statistic	Zt Tabulated Statistic
0.340	2.45	1.96

The computed statistic is HIGHER than the 97.5th percentile of the normal distribution.

This provides statistically significant evidence at the 5% significance level that the proportion of compliance well samples where Benzene was detected DOES exceed the proportion of background well samples where Benzene was detected.

Baseline Sampling Analysis

Parameter: Chlorobenzene

Sample Location	Date Sampled 7/3/96 (PPM)	11/5/97 (PPM)	7/7/98 (PPM)
MW-1I	*1.00*	*1.00*	*1.00*
MW-2S	20.00	20.00	23.00
MW-2I	13.00	16.00	18.00
MW-3I	*1.00*	19.00	16.00
MW-10I	19.00	23.00	24.00

Sample Location	Date Sampled 7/3/96 (Detection)	11/5/97 (Detection)	7/7/98 (Detection)
MW-1I			
MW-2S	Detected	Detected	Detected
MW-2I	Detected	Detected	Detected
MW-3I		Detected	Detected
MW-10I	Detected	Detected	Detected
Number of Detects	3	4	4
Number of Non-Detects	2	1	1

Total Percentage of Non-Detects	27%

<15%	ANOVA Table
15% - 50%	One-Way Nonparametric Analysis of Variance
50% <	Test of Proportions

A One-Way Nonparametric Analysis of Variance will be used.

Y: Detected Compliance Samples	11
X: Detected Background Samples	0
n: Number of Samples	15
P: Proportion of Detected Samples	73%

Tests to Determine use of the Normal Distribution

nP > 5?	11	*Normal Distribution may be used*
n(1-P) > 5?	4	*Normal Distribution invalid*

n_b: Number of Background Samples	3
n_c: Number of Compliance Samples	12
P_b: Proportion of Detects in Background Samples	0%
P_c: Proportion of Detects in Compliance Samples	92%

Sd: Standard Error of of Differences in Proportions	Z: Computed Statistic	Zt: Tabulated Statistic
0.319	2.87	1.96

The computed statistic is HIGHER than the 97.5th percentile of the normal distribution.

This provides statistically significant evidence at the 5% significance level that the proportion of compliance well samples where Chlorobenzene was detected DOES exceed the proportion of background well samples where Chlorobenzene was detected.

Baseline Sampling Analysis

Parameter: 1,2-Dichlorobenzene

Sample Location	Date Sampled		
	7/3/96 (PPM)	11/5/97 (PPM)	7/7/98 (PPM)
MW-1I	*1.00*	*1.00*	*1.00*
MW-2S	*1.00*	2.00	2.00
MW-2I	*1.00*	3.00	3.00
MW-3I	*1.00*	*1.00*	*1.00*
MW-10I	*1.00*	*1.00*	*1.00*

Sample Location	Date Sampled		
	7/3/96 (Detection)	11/5/97 (Detection)	7/7/98 (Detection)
MW-1I			
MW-2S		Detected	Detected
MW-2I		Detected	Detected
MW-3I			
MW-10I			
Number of Detects	0	2	2
Number of Non-Detects	5	3	3

Total Percentage of Non-Detects	73%

< 15%	ANOVA Table
15% - 50%	One-Way Nonparametric Analysis of Variance
50% <	Test of Proportions

The Test of Proporations will be used.

Y Detected Compliance Samples	4
X Detected Background Samples	0
n Number of Samples	15
P Proportion of Detected Samples	27%

Tests to Determine use of the Normal Distribution

nP > 5?	4	*Normal Distribution invalid*
n(1-P) > 5?	11	*Normal Distribution may be used*

n_b Number of Background Samples	3
n_c Number of Compliance Samples	12
P_b Proportion of Detects in Background Samples	0%
P_c Proportion of Detects in Compliance Samples	33%

Sd Standard Error of of Differences in Proportions	Z Computed Statistic	Zt Tabulated Statistic
0.319	1.04	1.96

The computed statistic is LOWER than the 97.5th percentile of the normal distribution.

This provides statistically significant evidence at the 5% significance level that the proportion of compliance well samples where 1,2-Dichlorobenzene was detected DOES NOT exceed the proportion of background well samples where 1,2-Dichlorobenzene was detected.

Baseline Sampling Analysis

Parameter: 1,3-Dichlorobenzene

Sample Location	Date Sampled		
	7/3/96 (PPM)	11/5/97 (PPM)	7/7/98 (PPM)
MW-1I	1.00	1.00	1.00
MW-2S	1.00	1.00	1.00
MW-2I	1.00	1.00	1.00
MW-3I	1.00	1.00	6.00
MW-10I	1.00	1.00	1.00

Sample Location	Date Sampled		
	7/3/96 (Detection)	11/5/97 (Detection)	7/7/98 (Detection)
MW-1I			
MW-2S			
MW-2I			
MW-3I			Detected
MW-10I			
Number of Detects	0	0	1
Number of Non-Detects	5	5	4

Total Percentage of Non-Detects	93%

<15%	ANOVA Table
15% - 50%	One-Way Nonparametric Analysis of Variance
50% <	Test of Proportions

The Test of Proporations will be used.

Y Detected Compliance Samples	1
X Detected Background Samples	0
n Number of Samples	15
P Proportion of Detected Samples	7%

Tests to Determine use of the Normal Distribution

nP > 5?	1	*Normal Distribution invalid*
n(1-P) > 5?	14	*Normal Distribution may be used*

n_b Number of Background Samples	3
n_c Number of Compliance Samples	12
P_b Proportion of Detects in Background Samples	0%
P_c Proportion of Detects in Compliance Samples	8%

Sd Standard Error of of Differences in Proportions	Z Computed Statistic	Zt Tabulated Statistic
0.180	0.46	1.96

The computed statistic is LOWER than the 97.5th percentile of the normal distribution

This provides statistically significant evidence at the 5% significance level that the proportion of compliance well samples where 1,3-Dichlorobenzene was detected DOES NOT exceed the proportion of background well samples where 1,3-Dichlorobenzene was detected.

Baseline Sampling Analysis

Parameter: 1,4-Dichlorobenzene

Sample Location	Date Sampled 7/3/96 (PPM)	11/5/97 (PPM)	7/7/98 (PPM)
MW-1I	*1.00*	*1.00*	*1.00*
MW-2S	5.50	11.00	12.00
MW-2I	6.80	11.00	*8.00*
MW-3I	*1.00*	6.00	6.00
MW-10I	5.40	*1.00*	9.00

Sample Location	Date Sampled 7/3/96 (Detection)	11/5/97 (Detection)	7/7/98 (Detection)
MW-1I			
MW-2S	Detected	Detected	Detected
MW-2I	Detected	Detected	Detected
MW-3I		Detected	Detected
MW-10I	Detected		Detected
Number of Detects	3	3	4
Number of Non-Detects	2	2	1

Total Percentage of Non-Detects	33%

<15%	ANOVA Table
15% - 50%	One-Way Nonparametric Analysis of Variance
50% <	Test of Proportions

A One-Way Nonparametric Analysis of Variance will be used.

Y Detected Compliance Samples	10
X Detected Background Samples	0
n Number of Samples	15
P Proportion of Detected Samples	67%

Tests to Determine use of the Normal Distribution

nP > 5?	10	*Normal Distribution may be used*
n(1-P) > 5?	5	*Normal Distribution invalid*

n_b Number of Background Samples	3
n_c Number of Compliance Samples	12
P_b Proportion of Detects in Background Samples	0%
P_c Proportion of Detects in Compliance Samples	83%

Sd Standard Error of of Differences in Proportions	Z Computed Statistic	Zt Tabulated Statistic
0.340	2.45	1.96

The computed statistic is HIGHER than the 97.5th percentile of the normal distribution.

This provides statistically significant evidence at the 5% significance level that the proportion of compliance well samples where 1,4-Dichlorobenzene was detected DOES exceed the proportion of background well samples where 1,4-Dichlorobenzene was detected.

Baseline Sampling Analysis

Parameter: Calcium

Sample Location	Date Sampled		
	7/8/96 (PPM)	11/5/97 (PPM)	7/7/98 (PPM)
MW-1I	10.90	2.90	3.83
MW-2S	5.16	9.53	8.30
MW-2I	32.40	23.50	28.70
MW-3I	*0.10*	7.59	7.95
MW-10I	34.10	32.80	26.30

Sample Location	Date Sampled		
	7/3/96 (Detection)	11/5/97 (Detection)	7/7/98 (Detection)
MW-1I	Detected	Detected	Detected
MW-2S	Detected	Detected	Detected
MW-2I	Detected	Detected	Detected
MW-3I		Detected	Detected
MW-10I	Detected	Detected	Detected
Number of Detects	4	5	5
Number of Non-Detects	1	0	0

Total Percentage of Non-Detects	7%

< 15%	ANOVA Table
15% - 50%	One-Way Nonparametric Analysis of Variance
50% <	Test of Proportions

An ANOVA Table will be used.

Y Detected Compliance Samples	11
X Detected Background Samples	3
n Number of Samples	15
P Proportion of Detected Samples	93%

Tests to Determine use of the Normal Distribution

nP > 5?	14	*Normal Distribution may be used*
n(1-P) > 5?	1	*Normal Distribution invalid*

n_b Number of Background Samples	3
n_c Number of Compliance Samples	12
P_b Proportion of Detects in Background Samples	100%
P_c Proportion of Detects in Compliance Samples	92%

Sd Standard Error of of Differences in Proportions	Z Computed Statistic	Zt Tabulated Statistic
0.180	0.46	1.96

The computed statistic is LOWER than the 97.5th percentile of the normal distribution.

This provides statistically significant evidence at the 5% significance level that the proportion of compliance well samples where Calcium was detected DOES NOT exceed the proportion of background well samples where Calcium was detected.

Baseline Sampling Analysis

Parameter: Sulfate

Sample Location	Date Sampled		
	7/3/96 (PPM)	11/5/97 (PPM)	7/7/98 (PPM)
MW-1I	3.40	*2.00*	3.53
MW-2S	4.70	*2.00*	*2.00*
MW-2I	*2.00*	21.50	*2.00*
MW-3I	*2.00*	*2.00*	*2.00*
MW-10I	*2.00*	*2.00*	*2.00*

Sample Location	Date Sampled		
	7/3/96 (Detection)	11/5/97 (Detection)	7/7/98 (Detection)
MW-1I	Detected		Detected
MW-2S	Detected		
MW-2I		Detected	
MW-3I			
MW-10I			
Number of Detects	2	1	1
Number of Non-Detects	3	4	4

Total Percentage of Non-Detects	73%

<15%	ANOVA Table
15% - 50%	One-Way Nonparametric Analysis of Variance
50% <	Test of Proportions

The Test of Proportions will be used.

Y Detected Compliance Samples	2
X Detected Background Samples	2
n Number of Samples	15
P Proportion of Detected Samples	27%

Tests to Determine use of the Normal Distribution

nP > 5?	4	*Normal Distribution invalid*
n(1-P) > 5?	11	*Normal Distribution may be used*

n_b Number of Background Samples	3
n_c Number of Compliance Samples	12
P_b Proportion of Detects in Background Samples	67%
P_c Proportion of Detects in Compliance Samples	17%

Sd Standard Error of of Differences in Proportions	Z Computed Statistic	Zt Tabulated Statistic
0.319	1.57	1.96

The computed statistic is LOWER than the 97.5th percentile of the normal distribution.

This provides statistically significant evidence at the 5% significance level that the proportion of compliance well samples where Sulfate was detected DOES NOT exceed the proportion of background well samples where Sulfate was detected.

Baseline Sampling Analysis

Parameter: Nitrate

Sample Location	Date Sampled 7/3/96 (PPM)	11/5/97 (PPM)	7/7/98 (PPM)
MW-1I	*0.02*	0.05	*0.02*
MW-2S	*0.02*	0.03	*0.02*
MW-2I	*0.02*	*0.02*	*0.02*
MW-3I	5.37	0.10	0.99
MW-10I	*0.02*	*0.02*	0.05

Sample Location	Date Sampled 7/3/96 (Detection)	11/5/97 (Detection)	7/7/98 (Detection)
MW-1I		Detected	
MW-2S		Detected	
MW-2I			
MW-3I	Detected	Detected	Detected
MW-10I			Detected
Number of Detects	1	3	2
Number of Non-Detects	4	2	3

Total Percentage of Non-Detects	60%

< 15%	ANOVA Table
15% - 50%	One-Way Nonparametric Analysis of Variance
50% <	Test of Proportions

The Test of Proportions will be used.

Y Detected Compliance Samples	5
X Detected Background Samples	1
n Number of Samples	15
P Proportion of Detected Samples	40%

Tests to Determine use of the Normal Distribution

nP > 5?	6	*Normal Distribution may be used*
n(1-P) > 5?	9	*Normal Distribution may be used*

n_b Number of Background Samples	3
n_c Number of Compliance Samples	12
P_b Proportion of Detects in Background Samples	33%
P_c Proportion of Detects in Compliance Samples	42%

Sd Standard Error of of Differences in Proportions	Z Computed Statistic	Zt Tabulated Statistic
0.354	0.24	1.96

The computed statistic is LOWER than the 97.5th percentile of the normal distribution.

This provides statistically significant evidence at the 5% significance level that the proportion of compliance well samples where Nitrate was detected DOES NOT exceed the proportion of background well samples where Nitrate was detected.

Baseline Sampling Analysis

Parameter: Nitrite

Sample Location	Date Sampled 7/3/96 (PPM)	11/5/97 (PPM)	7/7/98 (PPM)
MW-1I	*0.02*	*0.02*	*0.02*
MW-2S	0.04	*0.02*	*0.02*
MW-2I	0.04	*0.02*	*0.02*
MW-3I	*0.02*	*0.02*	0.03
MW-10I	*0.02*	*0.02*	*0.02*

Sample Location	Date Sampled 7/3/96 (Detection)	11/5/97 (Detection)	7/7/98 (Detection)
MW-1I			
MW-2S	Detected		
MW-2I	Detected		
MW-3I			Detected
MW-10I			
Number of Detects	2	0	1
Number of Non-Detects	3	5	4

Total Percentage of Non-Detects	80%

<15%	ANOVA Table
15%-50%	One-Way Nonparametric Analysis of Variance
50%<	Test of Proportions

The Test of Proportions will be used.

Y Detected Compliance Samples	3
X Detected Background Samples	0
n Number of Samples	15
P Proportion of Detected Samples	20%

Tests to Determine use of the Normal Distribution

nP > 5?	3	*Normal Distribution invalid*
n(1-P) > 5?	12	*Normal Distribution may be used*

n_b Number of Background Samples	3
n_c Number of Compliance Samples	12
P_b Proportion of Detects in Background Samples	0%
P_c Proportion of Detects in Compliance Samples	25%

Sd Standard Error of of Differences in Proportions	Z Computed Statistic	Zt Tabulated Statistic
0.289	0.87	1.96

The computed statistic is LOWER than the 97.5th percentile of the normal distribution.

This provides statistically significant evidence at the 5% significance level that the proportion of compliance well samples where Nitrite was detected DOES NOT exceed the proportion of background well samples where Nitrite was detected.

TABLE 1

ANNUAL SAMPLING EVENT

WELL CONSTRUCTION DETAILS

Well Number	Date Drilled	Total Depth	Casing Diameter	Screened Interval	Grout Interval	Hydrogeologic Unit	MP* Elevation
Parrish Used Parts							
CC-31, **r-106**	9/01/92	58'	2"	42'-52'	LS-26'	Intermediate	30.29'
Landfill Access Road							
CC-31, **q-35**	8/27/92	48'	2"	36'-46'	LS-20'	Intermediate	17.13'
Beside RR Tracks							
CC-31, **q-39**	8/25/92	53'	2"	41'-51'	LS-30'	Intermediate	28.47'
CP&L Access Road-North							
CC-31, **q-43**	8/27/92	33'	2"	21'-31'	LS-10'	Intermediate	14.99'
CP&L Access Road-South							
CC-31, **q-47**	8/26/92	42'	2"	31'-41'	LS-15'	Intermediate	19.12'
New Monitoring Well Set							
cc-31, **q-200**	2/20/95	43'	2"	33'-43'	LS-15'	Intermediate	15.77'
cc-31, **q-201**	2/21/95	53'	2"	43'-53'	LS-15'	Intermediate	19.35'
cc-31, **r-202**	2/22/95	73'	2"	63'-73'	LS-26.5'	Intermediate	37.13'
PELA Monitoring Wells							
MW-1I	-	60.03'	2"	37.5'-57.5'	24'-32'	Intermediate	25.23
MW-2I	-	65.5'	2"	43'-63'	25'-36'	Intermediate	30.74
MW-3I	-	33.5'	2"	11'-31'	3'-7'	Intermediate	17.07
MW-6I	-	63.5'	2"	41'-61'	32'-37'	Intermediate	17.32
MW-10I	-	41'	2"	35.5'-40.5'	30'-34.5'	Intermediate	15.08

* - measuring point (elevation is relative to mean sea level)

TABLE 7

ANNUAL SAMPLING EVENT - MAY, 1998

GROUNDWATER SAMPLE LABORATORY RESULTS

Constituent (unit)	Stand.	r-106 †	q-35 †	q-39	q-43	q-47	q-200	q-201	r-202	MW-1I	MW-2I	MW-3I	MW-6I †	MW-10I
pH* (s.u.)	6.5 - 8.5	-	-	4.26	3.50	5.64	5.18	**4.25**	**5.83**	**5.07**	**6.34**	**6.16**	-	6.62
specific conductance* (μ)	-	-	-	40	38	390	50	40	850	135	1000	550	-	1050
temperature* (°C)	-	-	-	20.0	21.5	19.0	19.0	20.0	19.0	19.0	18.0	19.5	-	19.0
laboratory pH (s.u.)	6.5 - 8.5	-	-	**4.9**	**4.2**	7.0	**6.2**	**4.6**	7.0	6.5	6.6	**6.2**	-	6.6
alkalinity - pH-4.5 (PPM)	-	-	-	2	<1	170	16	1	100	50	410	260	-	490
alkalinity - pH-8.3 (PPM)	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1
carbonate (PPM)	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1
bicarbonate (PPM)	-	-	-	2	<1	210	20	1	120	61	500	320	-	600
chloride (PPM)	250	-	-	6	4	18	3	4	45	7	38	14	-	32
dissolved solids (PPM)	500	-		25	14	220	44	18	**580**	63	430	270	-	**520**
TKN as N (PPM)	-	-	-	0.2	0.2	3.0	0.1	0.1	6.7	3.3	51	27	-	47
$NO_2 + NO_3$ as N (PPM)	11	-	-	0.56	0.26	<0.01	<0.01	0.24	0.20	0.03	0.08	1.3	-	0.01
silver (PPM)	0.018	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005
chromium (PPM)	0.05	-	-	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	-	<0.025
iron (PPM)	0.3	-	-	**0.440**	**1.30**	**10.00**	**2.5**	**0.45**	**36.0**	**6.8**	**52.0**	**46.0**	-	**34.0**
lead (PPM)	0.015	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	-	<0.010
zinc (PPM)	2.1	-	-	0.014	0.023	0.018	0.018	0.026	0.028	0.056	0.028	0.029	-	0.019

All analyses are recorded in parts per billion unless otherwise indicated ( ). See bottom of table for key.

TABLE 7

ANNUAL SAMPLING EVENT - MAY, 1998

GROUNDWATER SAMPLE LABORATORY RESULTS

Constituent	Stand.	r-106 †	q-35 †	q-39	q-43	q-47	q-200	q-201	r-202	MW-1I	MW-2I	MW-3I	MW-6I †	MW-10I
Purgeable Organics														
1,1-dichloroethene	7	-	-	U	U	U	U	U	U	U	U	U	-	U
methylene chloride	5	-	-	U	U	U	U	U	U	U	U	U	-	U
t-1,2dichloroethene	70	-	-	U	U	U	U	U	U	U	U	U	-	U
1,1-dichloroethane	700	-	-	U	U	0.32	U	U	0.41	U	U	U	-	U
2,2-dichloropropane	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
c-1,2dichloroethene	70	-	-	U	U	2.0	U	U	U	U	U	U	-	U
chloroform	0.19	-	-	U	U	U	U	U	U	U	U	U	-	U
bromochloromethane	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
1,1,1 trichloroethane	200	-	-	U	U	U	U	U	U	U	U	U	-	U
1,1-dichloropropene	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
carb.tetrachloride	0.3	-	-	U	U	U	U	U	U	U	U	U	-	U
1,2dichloroethane	0.38	-	-	U	U	U	U	U	U	U	D,T	U	-	U
trichloroethene	2.8	-	-	U	U	U	U	U	U	U	U	U	-	U
1,2dichloropropane	0.56	-	-	U	U	U	U	U	U	U	U	U	-	U
bromodichloromethane	0.6	-	-	U	U	U	U	U	U	U	U	U	-	U

All analyses are recorded in parts per billion unless otherwise indicated ( ). See bottom of table for key.

TABLE 7

ANNUAL SAMPLING EVENT - MAY, 1998

GROUNDWATER SAMPLE LABORATORY RESULTS (CON'T.)

Constituent	Stand.	r-106 †	q-35 †	q-39	q-43	q-47	q-200	q-201	r-202	MW-1I	MW-2I	MW-3I	MW-6I †	MW-10I
dibromomethane	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
c-1,3-dichloropropene	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
t-1,3-dichloropropene	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
1,1,2-trichloroethane	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
tetrachloroethene	0.7	-	-	U	U	U	U	U	U	U	U	U	-	U
1,3-dichloropropane	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
dibromochloromethane	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
1,2-dibromoethane	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
chlorobenzene	50	-	-	U	U	2.2	U	U	4.1	0.81	11 E	8.3 E	-	15 E
1,1,1,2tetrachloroethane	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
bromoform	0.19	-	-	U	U	U	U	U	U	U	U	U	-	U
1,1,2,2tetrachloroethane	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
1,2,3-trichloropropane	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
bromobenzene	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
2-chlorotoluene	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
4-chlorotoluene	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
1,3-dichlorobenzene	620	-	-	U	U	U	U	U	U	U	0.38 E	D, T	-	D
1,4-dichlorobenzene	75	-	-	U	U	0.83	U	U	0.81	0.58	6.3	5.6	-	6.8
1,2-dichlorobenzene	62	-	-	U	U	0.53	U	U	U	0.29	2.6	1.1	-	1.5
1,2dibromo3chloropropane	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
1,2,4-trichlorobenzene	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
hexachlorobutadiene	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
1,2,3-trichlorobenzene	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
methyl-tert-butyl-ether	200	-	-	U	U	U	U	U	8.9	U	U	U	-	U

All analyses are recorded in parts per billion unless otherwise indicated ( ). See bottom of table for key.

TABLE 7

ANNUAL SAMPLING EVENT - MAY, 1998

GROUNDWATER SAMPLE LABORATORY RESULTS (CON'T.)

Constituent	Standard	r-106 †	q-35 †	q-39	q-43	q-47	q-200	q-201	r-202	MW-1I	MW-2I	MW-3I	MW-6I †	MW-10I
benzene	1	-	-	U	U	U	U	U	U	U	**9.0**	**3.4**	-	**5.9**
toluene	1000	-	-	U	U	U	U	U	U	U	U	U	-	U
ethyl benzene	29	-	-	U	U	U	U	U	U	U	U	U	-	U
m,p-xylenes	530	-	-	U	U	U	U	U	U	U	U	U	-	U
o-xylenes	530	-	-	U	U	U	U	U	U	U	U	U	-	U
styrene	100	-	-	U	U	U	U	U	U	U	U	U	-	U
isopropylbenzene	70	-	-	U	U	U	U	U	U	U	2.5	1.0	-	1.6
n-propylbenzene	70	-	-	U	U	U	U	U	U	U	3.3	1.1 E	-	2.1
1,3,5-trimethylbenzene	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
tert-butylbenzene	70	-	-	U	U	U	U	U	U	U	U	U	-	U
1,2,4-trimethylbenzene	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
sec-butylbenzene	70	-	-	U	U	U	U	U	U	U	U	U	-	D, T
p-isopropyltoluene	ADL	-	-	U	U	U	U	U	U	U	U	U	-	U
n-butylbenzene	70	-	-	U	U	U	U	U	U	U	U	U	-	U
naphthalene	21	-	-	U	U	U	U	U	U	U	**29**	7.1	-	5.4
2-methyl naphthalene	28	-	-	U	U	U	U	U	U	U	6 D	2 D	-	U
unidentified peaks (#)	-	-	-	0	0	0	0	0	0	0	**12**	**6**	-	**9**

All analyses are recorded in parts per billion unless otherwise indicated ( ). See key below.

Bold denotes a violation of the 15A NCAC 2L groundwater quality standards.

* - field measurement
† - monitoring well destroyed or abandoned
u- standard units
μ - μMhos/cm^2
@ - sample diluted prior to analysis
U - sample analyzed for this compound but not detected
c - cis
t - trans
T - tentatively identified, not confirmed
D - detected below quantitation limit
M - GC/MS analysis performed
\# - number of peaks
S - several
E - estimated value

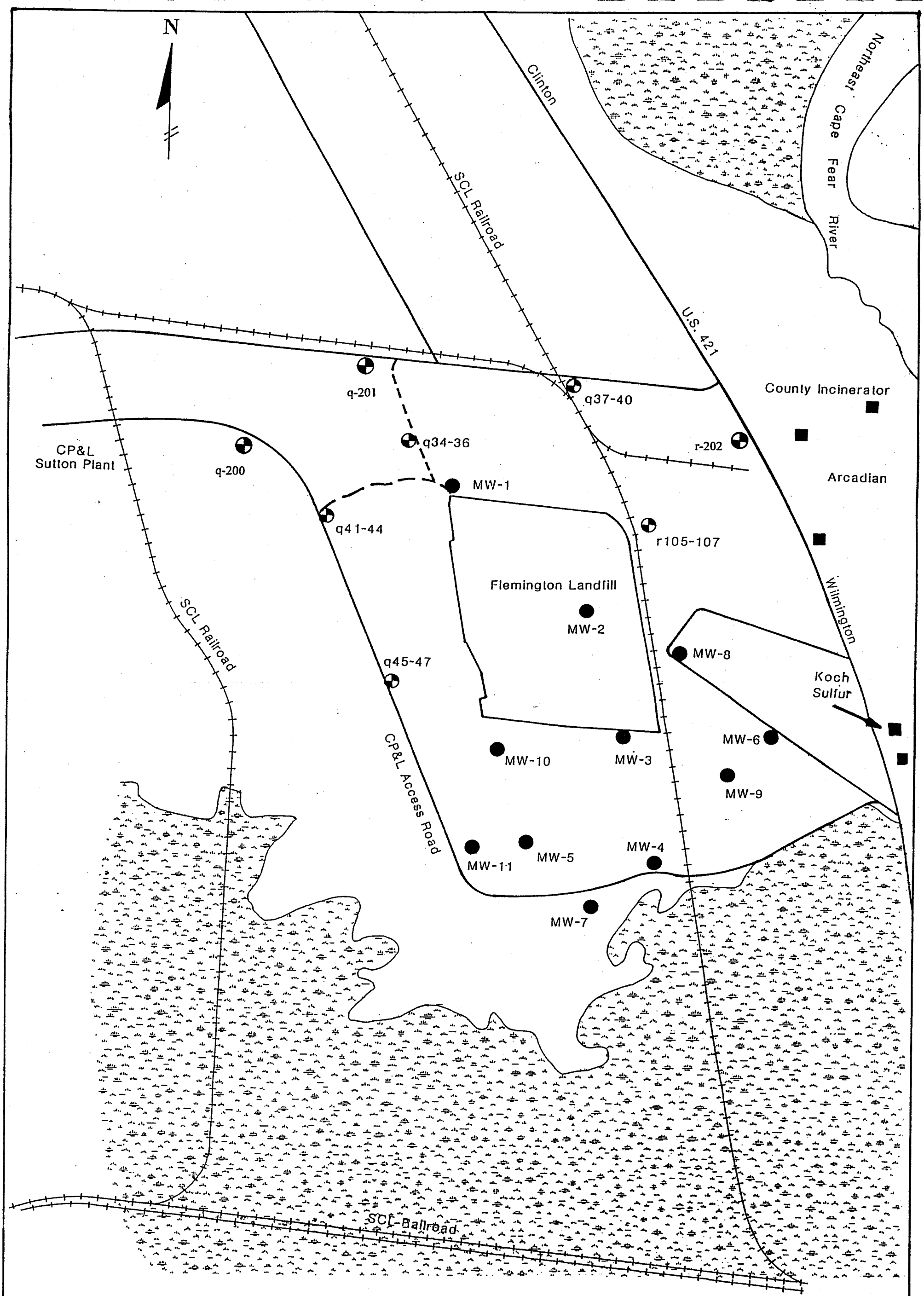


Figure 1
Monitoring Well Locations

N.C. DEHNR Wells
PELA Wells
Marshlands

Flemington Landfill
New Hanover County Incident No. 177

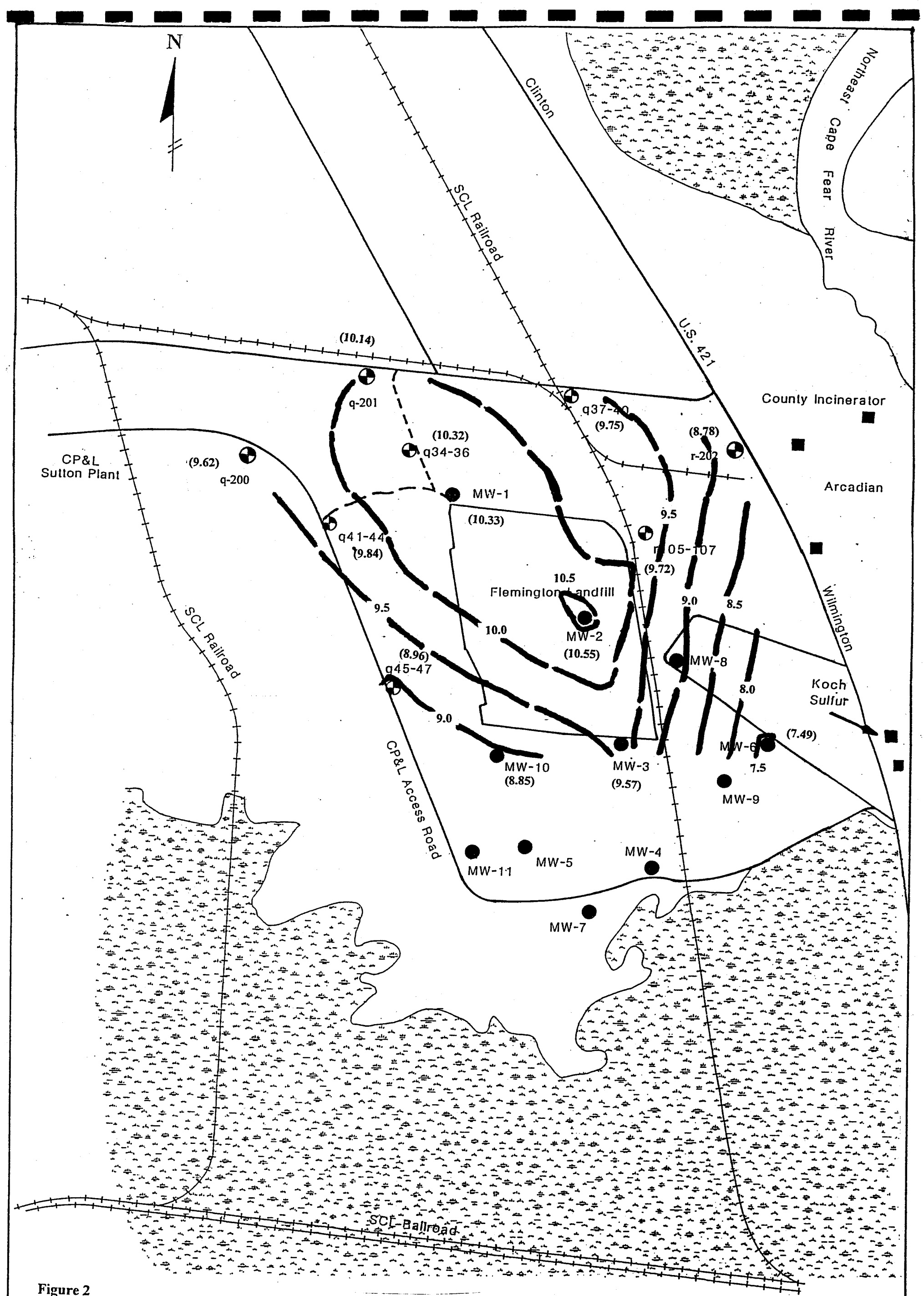


Figure 2
Water Table Elevation Contours As Of December, 1995
(All Measurements Expressed In Feet)

Water Table Elevations Based On Top Of Casing Elevations Relative to Mean Sea Level

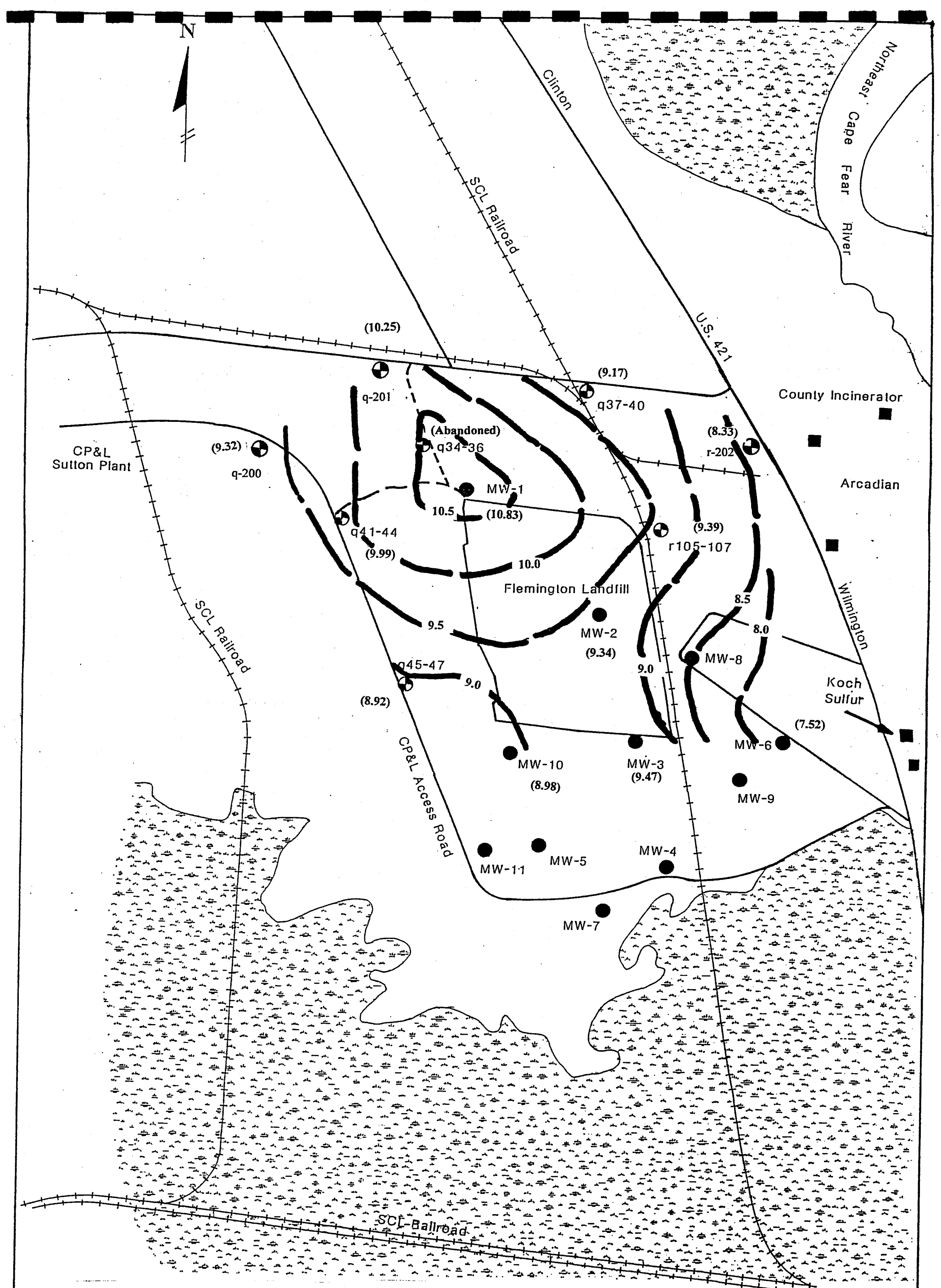


Figure 3
Water Table Elevation Contours As Of April, 1997
(All Measurements Expressed In Feet)
Water Table Elevations Based On Top Of Casing Elevations Relative to Mean Sea Level

0 400 800 1200 1600 2000
SCALE (Feet)

N.C. DEHNR Wells
PELA Wells
Marshlands

Flemington Landfill
New Hanover County Incident No. 177

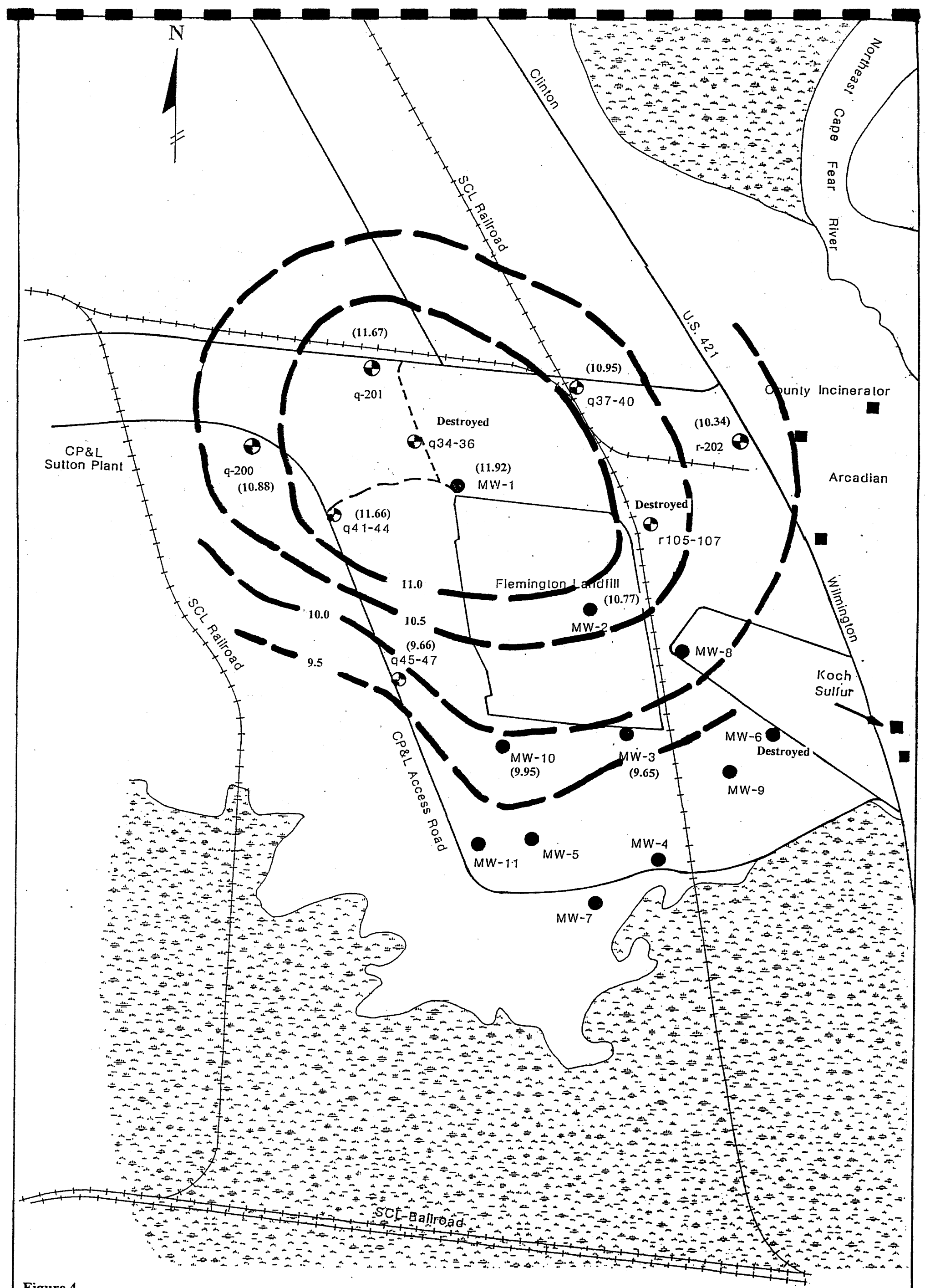
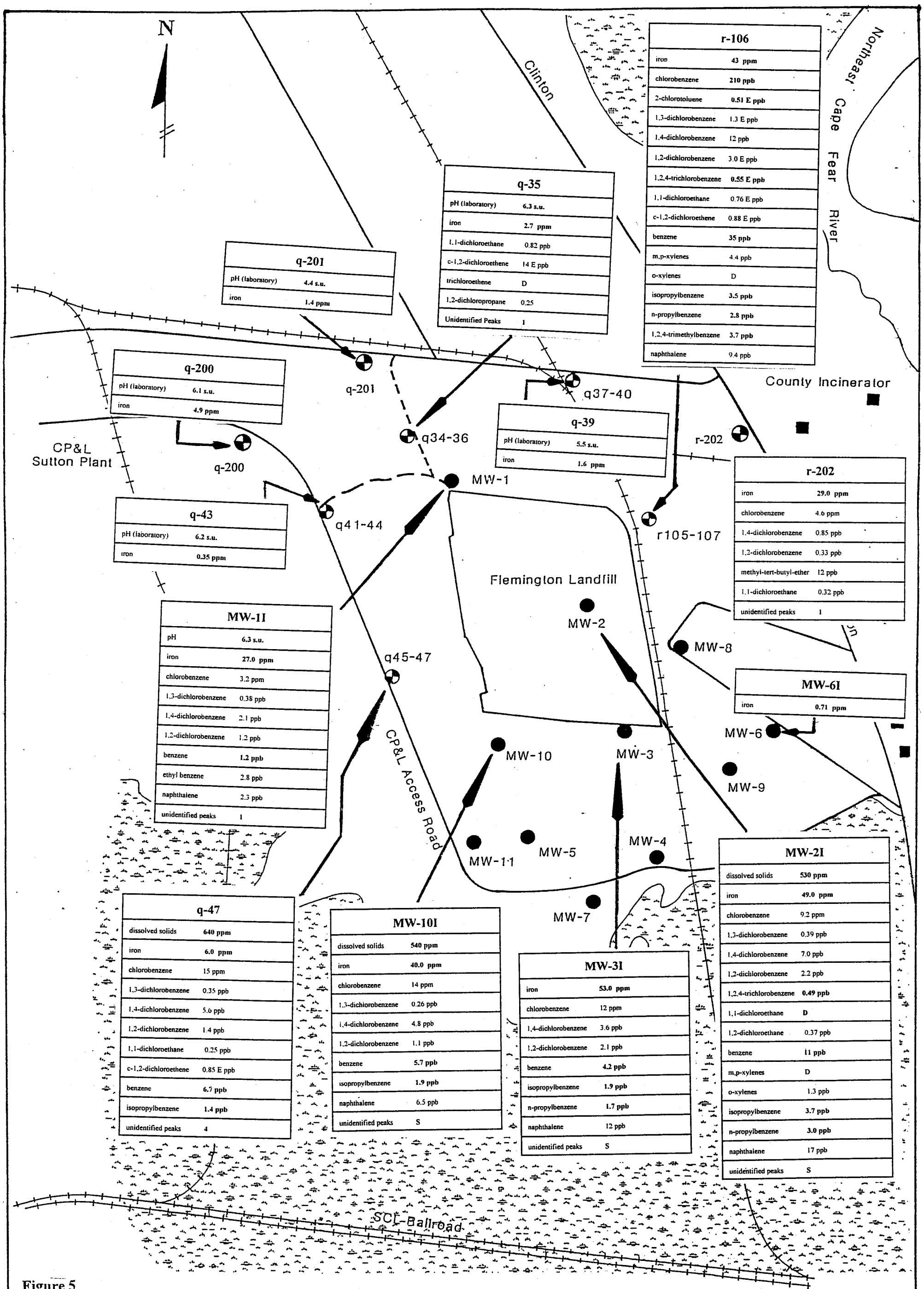


Figure 4
WATER TABLE ELEVATIONS AS OF MAY, 1998
(All Measurements Expressed in Feet)
Water Table Elevations Based On Top of Casing Elevations Relative to Mean Sea Level

N.C. DEHNR Wells
PELA Wells
Marshlands

Flemington Landfill
New Hanover County Incident No. 177



q-35	
pH (laboratory)	6.3 s.u.
iron	2.7 ppm
1,1-dichloroethane	0.82 ppb
c-1,2-dichloroethene	14 E ppb
trichloroethene	D
1,2-dichloropropane	0.25
Unidentified Peaks	1

r-106	
iron	43 ppm
chlorobenzene	210 ppb
2-chlorotoluene	0.51 E ppb
1,3-dichlorobenzene	1.3 E ppb
1,4-dichlorobenzene	12 ppb
1,2-dichlorobenzene	3.0 E ppb
1,2,4-trichlorobenzene	0.55 E ppb
1,1-dichloroethane	0.76 E ppb
c-1,2-dichloroethene	0.88 E ppb
benzene	35 ppb
m,p-xylenes	4.4 ppb
o-xylenes	D
isopropylbenzene	3.5 ppb
n-propylbenzene	2.8 ppb
1,2,4-trimethylbenzene	3.7 ppb
naphthalene	9.4 ppb

q-201	
pH (laboratory)	4.4 s.u.
iron	1.4 ppm

q-200	
pH (laboratory)	6.1 s.u.
iron	4.9 ppm

q-39	
pH (laboratory)	5.5 s.u.
iron	1.6 ppm

r-202	
iron	29.0 ppm
chlorobenzene	4.6 ppm
1,4-dichlorobenzene	0.85 ppb
1,2-dichlorobenzene	0.33 ppb
methyl-tert-butyl-ether	12 ppb
1,1-dichloroethane	0.32 ppb
unidentified peaks	1

q-43	
pH (laboratory)	6.2 s.u.
iron	0.35 ppm

MW-1I	
pH	6.3 s.u.
iron	27.0 ppm
chlorobenzene	3.2 ppm
1,3-dichlorobenzene	0.38 ppb
1,4-dichlorobenzene	2.1 ppb
1,2-dichlorobenzene	1.2 ppb
benzene	1.2 ppb
ethyl benzene	2.8 ppb
naphthalene	2.3 ppb
unidentified peaks	1

MW-6I	
iron	0.71 ppm

MW-2I	
dissolved solids	530 ppm
iron	49.0 ppm
chlorobenzene	9.2 ppm
1,3-dichlorobenzene	0.39 ppb
1,4-dichlorobenzene	7.0 ppb
1,2-dichlorobenzene	2.2 ppb
1,2,4-trichlorobenzene	0.49 ppb
1,1-dichloroethane	D
1,2-dichloroethane	0.37 ppb
benzene	11 ppb
m,p-xylenes	D
o-xylenes	1.3 ppb
isopropylbenzene	3.7 ppb
n-propylbenzene	3.0 ppb
naphthalene	17 ppb
unidentified peaks	S

q-47	
dissolved solids	640 ppm
iron	6.0 ppm
chlorobenzene	15 ppm
1,3-dichlorobenzene	0.35 ppb
1,4-dichlorobenzene	5.6 ppb
1,2-dichlorobenzene	1.4 ppb
1,1-dichloroethane	0.25 ppb
c-1,2-dichloroethene	0.85 E ppb
benzene	6.7 ppb
isopropylbenzene	1.4 ppb
unidentified peaks	4

MW-10I	
dissolved solids	540 ppm
iron	40.0 ppm
chlorobenzene	14 ppm
1,3-dichlorobenzene	0.26 ppb
1,4-dichlorobenzene	4.8 ppb
1,2-dichlorobenzene	1.1 ppb
benzene	5.7 ppb
isopropylbenzene	1.9 ppb
naphthalene	6.5 ppb
unidentified peaks	S

MW-3I	
iron	53.0 ppm
chlorobenzene	12 ppm
1,4-dichlorobenzene	3.6 ppb
1,2-dichlorobenzene	2.1 ppb
benzene	4.2 ppb
isopropylbenzene	1.9 ppb
n-propylbenzene	1.7 ppb
naphthalene	12 ppb
unidentified peaks	S

Figure 5

Inorganic 15A NCAC 2L Groundwater Quality Violations And Laboratory Detected VOC Concentrations Based On December, 1995 Data

(VOC Concentrations In Excess of 15A NCAC 2L Groundwater Quality Standards Are Illustrated in Bold Type.)

N.C. DEHNR Wells

PELA Wells

Marshlands

Flemington Landfill

New Hanover County Incident No. 177

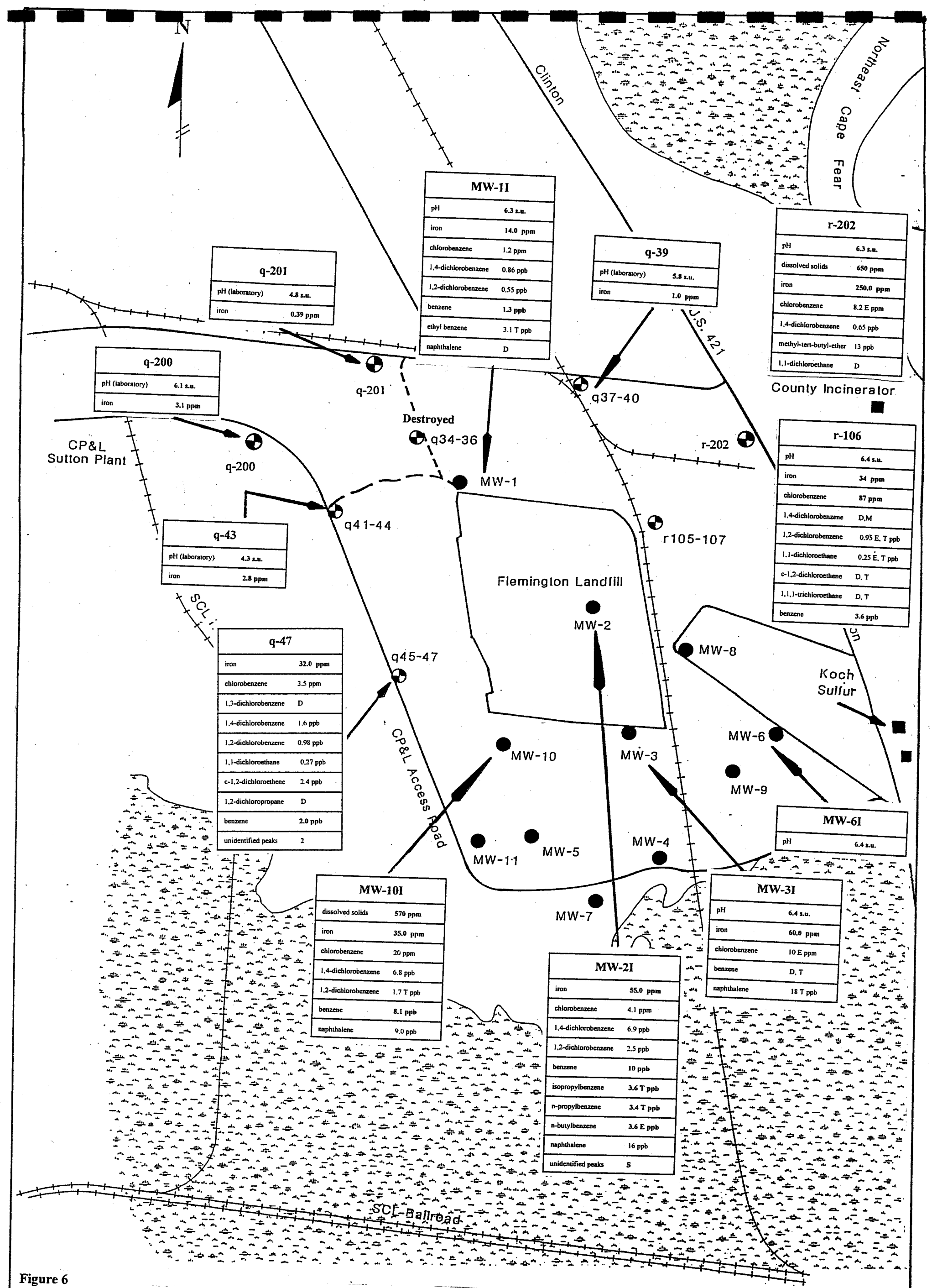


Figure 6
INORGANIC 15A NCAC 2L GROUNDWATER QUALITY VIOLATIONS AND LABORATORY DETECTED VOC CONCENTRATIONS BASED ON APRIL/MAY, 1997 DATA
(VOC Concentrations In Excess of 15A NCAC 2L Groundwater Quality Standards Are Illustrated in Bold Type)

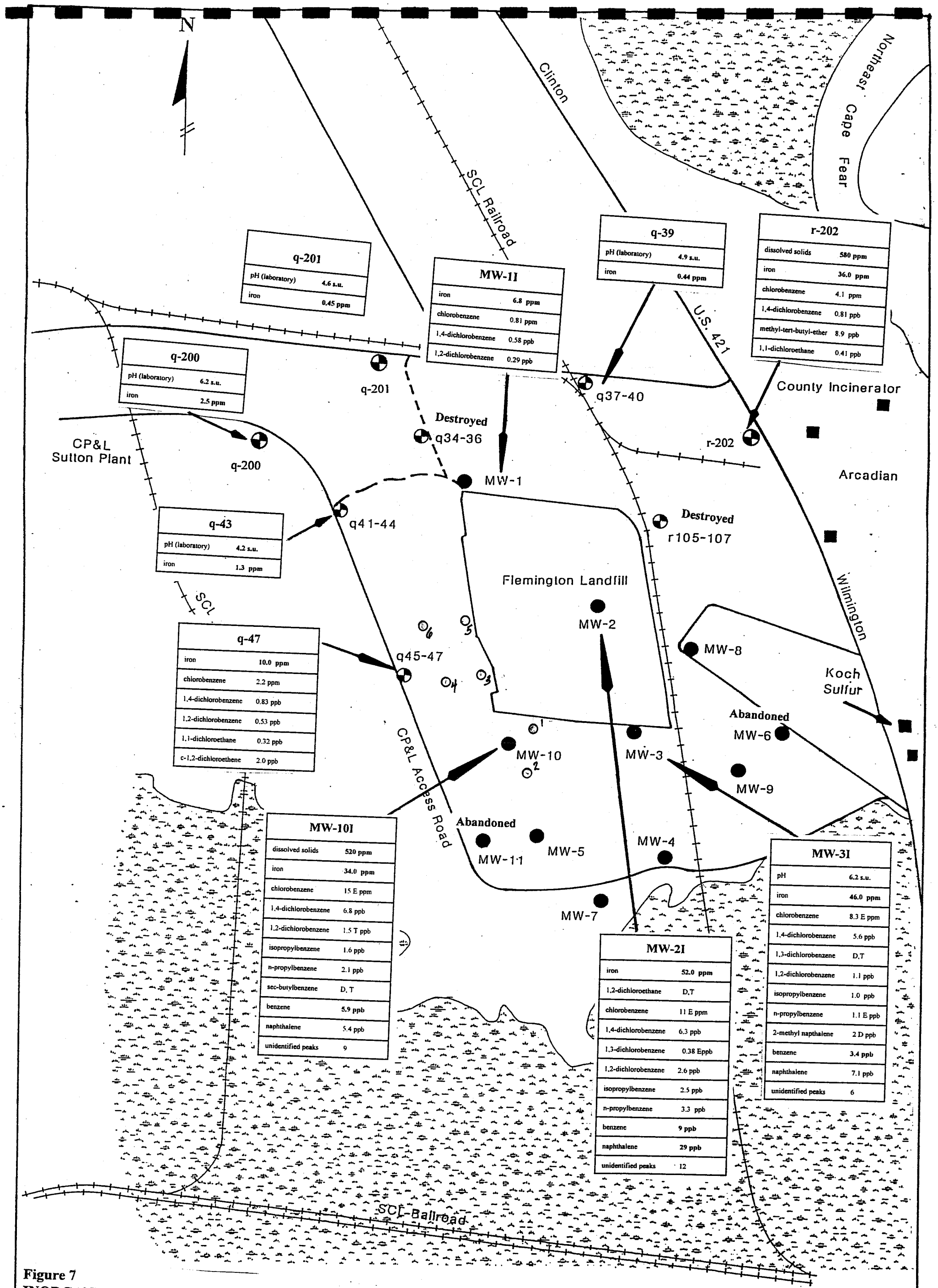


Figure 7
INORGANIC 15A NCAC 2L GROUNDWATER QUALITY VIOLATIONS AND LABORATORY DETECTED VOC CONCENTRATIONS BASED ON MAY, 1998 DATA
(VOC Concentrations In Excess of 15A NCAC 2L Groundwater Quality Standards Are Illustrated in Bold Type)

N.C. DEHNR Wells
PELA Wells
Marshlands

Flemington Landfill
New Hanover County Incident No. 177

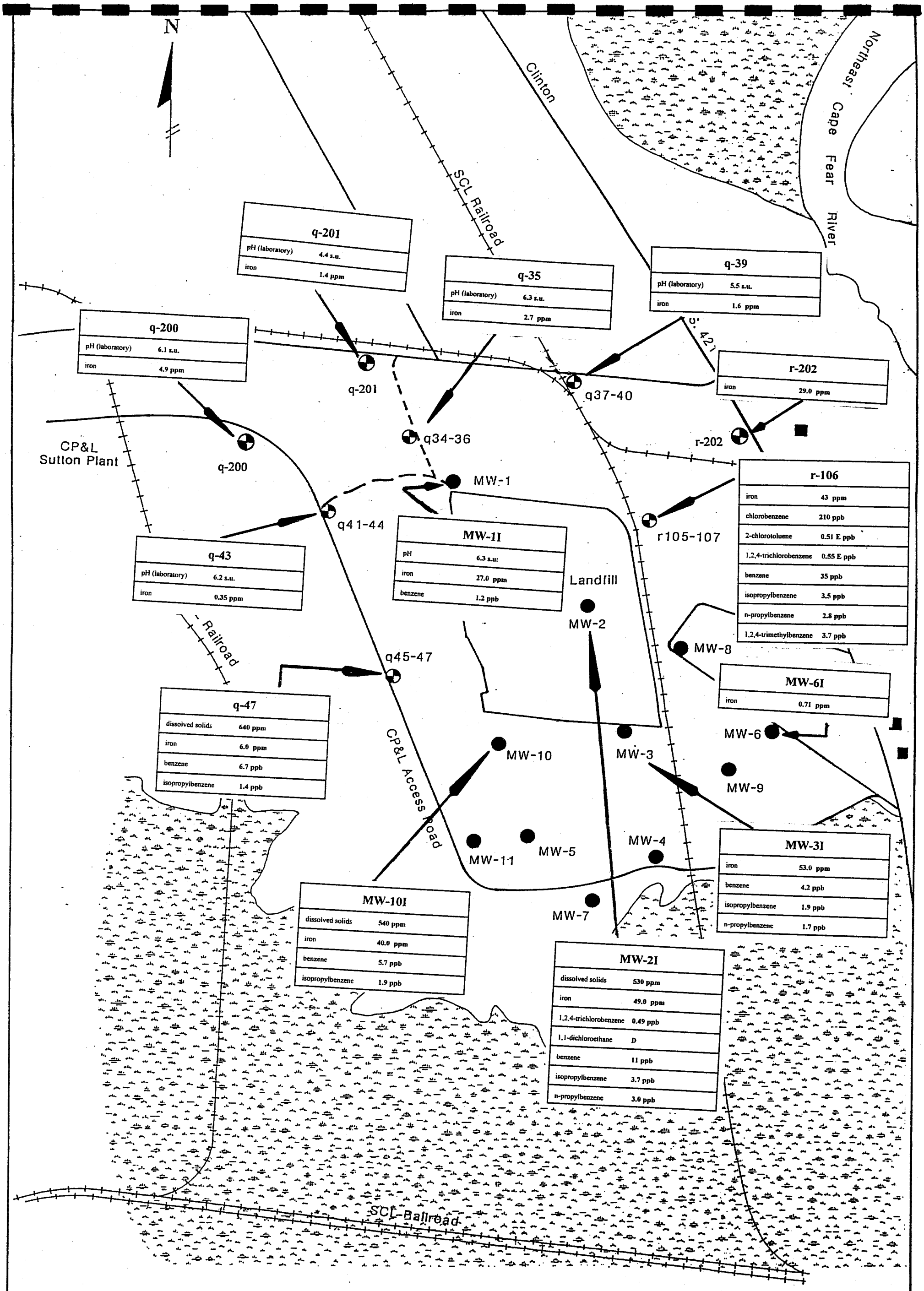


Figure 8
15A NCAC 2L Groundwater Quality Violations Based On December, 1995 Data

N.C. DEHNR Wells
PELA Wells
Marshlands

Flemington Landfill
New Hanover County Incident No. 177

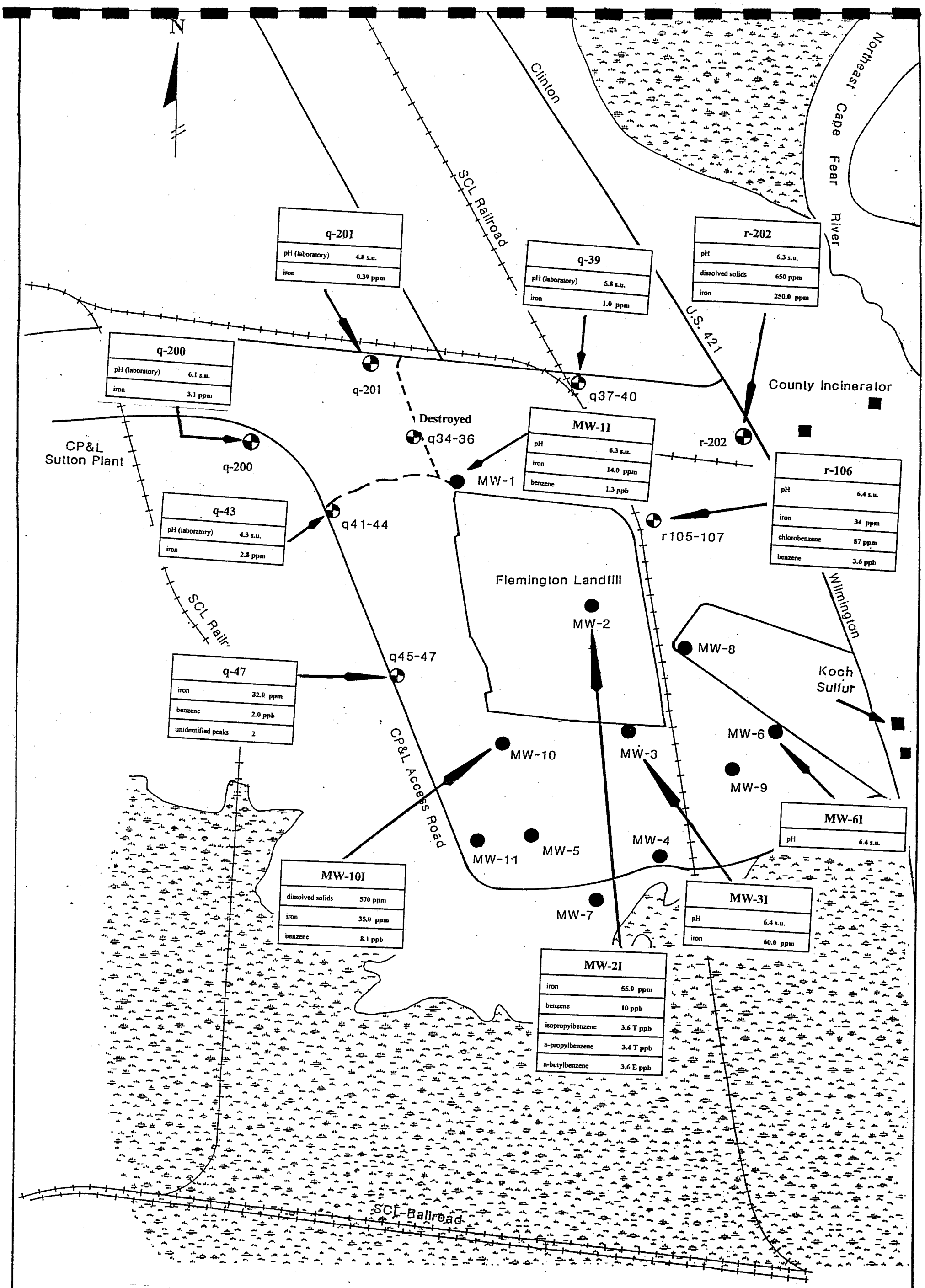


Figure 9

15A NCAC 2L Groundwater Quality Violations Based On April/May, 1997 Data

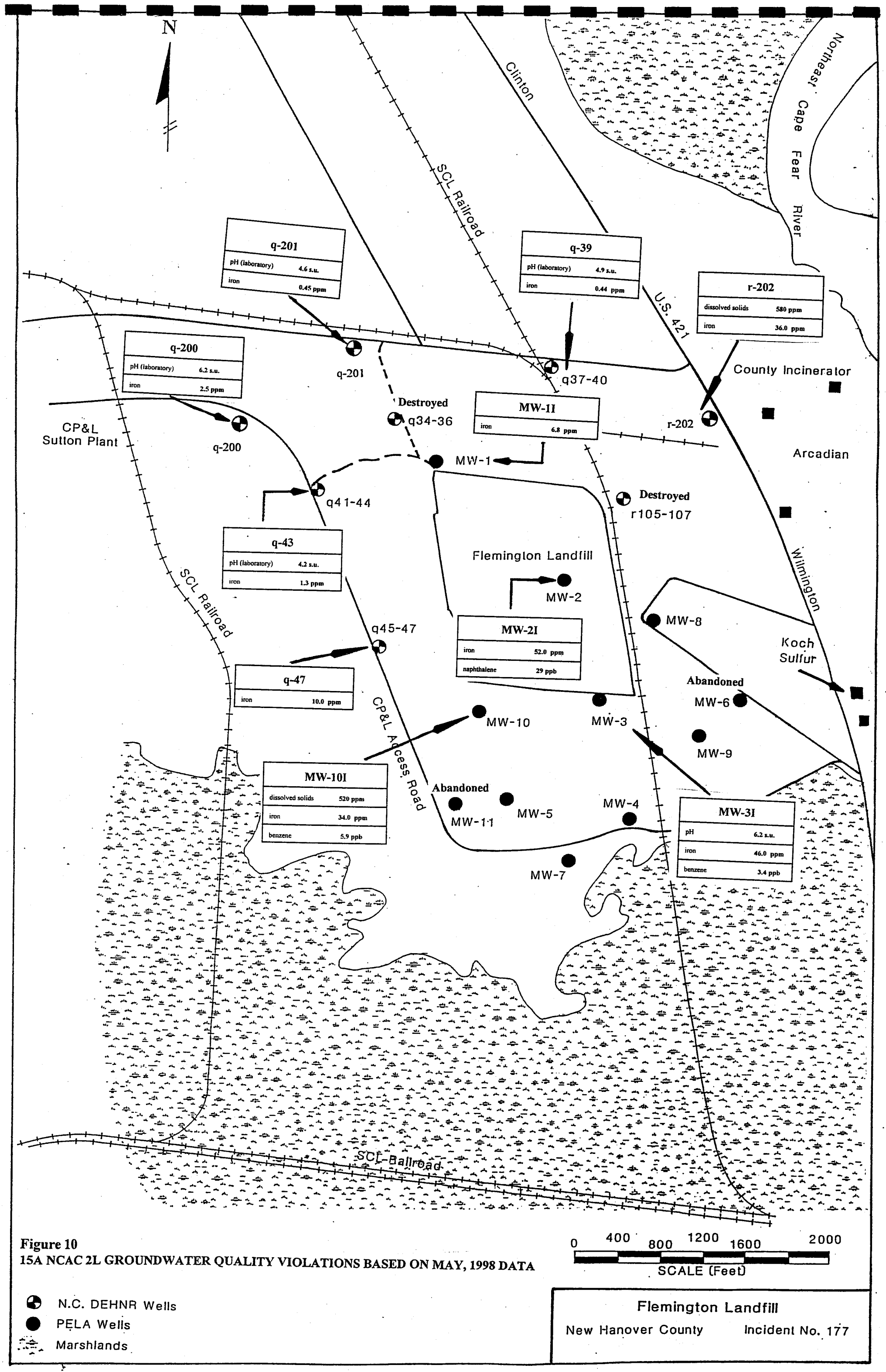


Figure 10
15A NCAC 2L GROUNDWATER QUALITY VIOLATIONS BASED ON MAY, 1998 DATA