Corrective Action Evaluation Report

Halifax County Landfill
Halifax County, North Carolina

Prepared For:

Halifax County Department of Public Utilities
26 N. King Street
Halifax, North Carolina 27839

Prepared By:

G.N. Richardson & Associates, Inc.
Engineering and Geological Services
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Raleigh, North Carolina 27603

June 2012

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Halifax County Landfill
Halifax County, North Carolina

Prepared for:

Halifax County Department of Public Utilities
Halifax, North Carolina

RSG Project No. HALIFAX-8

Madeline German, P.G.
Staff Geologist

Joan A. Smyth, P.G.
Principal, Senior Hydrogeologist

June 2012

RICHARDSON SMITH GARDNER
& ASSOCIATES
ENGINEERING & GEOLOGICAL
SERVICES

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NC DENR
Division of Waste Management - Solid Waste

Environmental Monitoring Reporting Form

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Instructions:

- **Prepare one form for each individually monitored unit.**
- **Please type or print legibly.**
- Attach a notification table with values that attain or exceed NC 2L groundwater standards or NC 2B surface water standards. The notification must include a preliminary analysis of the cause and significance of each value. (e.g. naturally occurring, off-site source, pre-existing condition, etc.).
- Attach a notification table of any groundwater or surface water values that equal or exceed the reporting limits.
- Attach a notification table of any methane gas values that attain or exceed explosive gas levels. This includes any structures on or nearby the facility (NCAC 13B .1629 (4)(a)(i).
- Send the original signed and sealed form, any tables, and Electronic Data Deliverable to: Compliance Unit, NCDENR-DWM, Solid Waste Section, 1646 Mail Service Center, Raleigh, NC 27699-1646.

Solid Waste Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner):

Richardson Smith Gardner and Associates, Inc.

Contact for questions about data formatting. Include data preparer's name, telephone number and E-mail address:

Name: Madeline German Phone: 919-828-0577 x222

E-mail: madeline@rsgengineers.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Halifax County Closed MSW Landfill	921 Liles Rd, Aurelian Springs, NC	42-04	.0500	August 19-20, 2009; February 16-18, 2010; August 23-25, 2010; February 21-23, 2011; August 24-25, 2011; February 20-23, 2012

Environmental Status: (Check all that apply)

☐ Initial/Background Monitoring ☐ Detection Monitoring ☒ Assessment Monitoring ☒ Corrective Action

Type of data submitted: (Check all that apply)

☒ Groundwater monitoring data from monitoring wells
☐ Groundwater monitoring data from private water supply wells
☐ Leachate monitoring data
☒ Surface water monitoring data
☐ Methane gas monitoring data
☒ Corrective action data (specify) MNA Parameters
☐ Other(specify)

Notification attached?

☐ No. No groundwater or surface water standards were exceeded.
☒ Yes, a notification of values exceeding a groundwater or surface water standard is attached. It includes a list of groundwater and surface water monitoring points, dates, analytical values, NC 2L groundwater standard, NC 2B surface water standard or NC Solid Waste GWPS and preliminary analysis of the cause and significance of any concentration.
☐ Yes, a notification of values exceeding an explosive methane gas limit is attached. It includes the methane monitoring points, dates, sample values and explosive methane gas limits.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

Madeline German, PG — Geologist — 919-828-0577 x 222

Facility Representative Name (Print) — Title — (Area Code) Telephone Number

Signature — Date: 6/13/2012

Affix NC Licensed Professional Geologist Seal

NORTH CAROLINA LICENSED SEAL 2[illegible] GEOLOGIST MADELINE GERMAN 6/13/2012

14 N. Boylan Avenue, Raleigh, NC 27603

Facility Representative Address

C0828

NC PE Firm License Number (if applicable effective May 1, 2009)

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HALIFAX COUNTY
CORRECTIVE ACTION EVALUATION REPORT

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1 INTRODUCTION

1.1 Site Background

The Halifax County Landfill (North Carolina Permit # 42-04) is located at 921 Liles Road, Littleton, Halifax County North Carolina situated southwest of Roanoke Rapids, North Carolina near Aurelian Springs. Prior to operation as a construction and demolition (C&D) landfill the site operated as an unlined municipal solid waste (MSW) landfill, but stopped accepting MSW in December, 1997 and was closed with a compacted soil cover before September, 1998. An interim cover was used on the closed MSW landfill area that is currently receiving C&D waste, and the remaining areas were closed in accordance with 15A NCAC 13B.0500. Halifax County is currently transporting MSW to a Subtitle D landfill in Virginia and accepting construction and demolition waste into a C&D landfill (permit 42-04 CDLF-1998) located on top of the closed MSW landfill, to bring the closed landfill area up to final closure contours. Halifax County also operates a coal ash monofill landfill unit (permit 42-04-indus-1994) located north of the MSW landfill. A topographic map showing the facility location is provided as **Figure 1**.

Halifax County retained Richardson Smith Gardner and Associates, Inc. (RSG) to develop a *Corrective Action Plan* (CAP) for the closed C&D over existing, unlined MSW. The CAP was intended to develop and implement a site-specific remediation plan to address groundwater contamination possibly associated with the closed MSW landfill. A CAP was prepared in accordance with Rules 15A NCAC 13B .1636 & .1637 and submitted to the North Carolina Department of Environment and Natural Resources (NCDENR), Division of Waste Management (DWM), Solid Waste Section (SWS) in May 2009 and approved June 8, 2009.

1.2 Sampling History

Semi-annual ground and surface water monitoring for Appendix I constituents was initiated at the Halifax County Landfill in December, 1993. Monitoring has included Appendix I detection monitoring (1993 - 1995) and Appendix II assessment monitoring (1995 - present). On-going ground water monitoring at this site has indicated ground water impacts above the 2L ground water standards (15A NCAC 2L.0200 through .0202). In 2007, an Assessment of Corrective Measures was prepared to evaluate remediation options at the site. The CAP was written in response to rule 15A NCAC 13B.0547 requiring a CAP be submitted with a Permit Application for C&D landfills accepting waste on top of closed MSW landfills.

A summary of existing monitoring wells is included as **Table 1**. Well construction records are provided in **Appendix A.**

1.3 Aquifer Characteristics

The site lies on the eastern edge of the Eastern Piedmont Physiographic Province; slightly west of the Coastal Plain overlap. This site is bounded by NC 48 to the north, Brewers Creek to the east and south and a tributary of Brewers Creek to the south and west.

Depths to ground water generally range from near surface in lowland areas along Brewer's Creek and its tributary to up to 45 ft. below grade along the ridge east of the landfill. Groundwater flow direction is generally west towards Brewer's Creek and its tributary, which is consistent with flow patterns since 1993. There are minor seasonal variations in the flow pattern, but the overall

flow direction remains stable. Please note Brewer's Creek has historically been blocked by a beaver dam downgradient of the site, which has impacted the area near MW-2Aa and MW-3A with slow moving water and an enlarged ponded area. **Table 2** presents the historical water levels measured at the site.

Ground water velocities on-site ranged from 0.011 ft/day in MW-16A to 0.327 ft/day in MW-2A during the most recent sampling event. **Table 3** presents ground water velocity calculations from the spring 2012 ground water monitoring event. A single-day potentiometric map is presented as **Figure 3**.

1.4 Contaminant Distribution

The constituents of concern named in the CAP were benzene, methylene chloride, toluene, tetrachloroethene, trichloroethene and vinyl chloride. Heptachlor and alpha BHC were constituents of concern for MW-15R only. Bis(2-ethylhexyl)phthalate was included to be re-evaluated with the baseline data; further discussion is provided in **Section 3.4**. No contamination is documented outside the 250 foot compliance boundary.

Ground water impact is limited to relatively small areas located immediately upgradient and downgradient of the landfill. Downgradient wells MW-3AS, MW-3D, MW-2A, MW-2D, MW-6D and MW-17 indicate impact. Although MW-6S is not sampled, it is assumed to be impacted due to its location adjacent to MW-6D and the fact that it is screened in the same aquifer, but a higher elevation than MW-6D. These wells are located within 175 feet from the waste boundary.

In the upgradient area, near MW-15R and MW-16A, impact is primarily due to landfill gas migration and phase transference. The area adjacent to MW-15R is approximately 210 feet from the waste mass and MW-16A is located 140 feet from the waste mass.

The most recent groundwater quality sample results collected February 20, 2012 detected 1,1-dichloroethane (MW-3AS & MW16A), benzene (MW-3AS, MW-6D & MW-16A), tetrachloroethene (MW-15R, MW-16A & MW-17), trichloroethene (MW-16A) and vinyl chloride (MW-2AD & MW-3AS) at concentrations above their respective North Carolina Groundwater Standards (2L Standards).

Historic water quality sampling results are presented in **Table 4**. **Figure 4** illustrates the reported detections above the 2L Standards for February 2012. Isoconcentration maps illustrating total VOCs over the past four sampling events are provided as **Figure 5**.

1.5 Site Conceptual Model

Boring logs and construction records indicate the subsurface lithology below the site is composed primarily of sand and silty sand to a depth of approximately 40 feet bgs. Bedrock was encountered at 32 feet bgs in MW-18D, on the southwestern, downgradient side of the landfill. Hydraulic conductivity values were measured in select wells by slug testing and range from 0.057 ft/day (MW-16A) to 1.835 ft/day (MW-2A). Porosity values were assumed from Groundwater and Wells by Driscoll at 20%. Approximate groundwater velocity ranges from 0.011 ft/day (MW-16A) to 0.371 ft/day (MW-2A). Groundwater flows through unconsolidated sediment from east to west towards the local discharge feature of Brewer's Creek.

Landfill gas and phase transference are influencing the upgradient plume's migration path. The primary mechanism for downgradient plume movement advective flow thorough the unconsolidated subsurface soils.

Chemical degradation processes, primarily that of half-life decay, are typically expressed based on surface water measurements. In general, four constituents (benzene, tetrachloroethene, trichloroethene and vinyl chloride) are detected in downgradient monitoring wells above ground water standards, while six constituents (benzene, methylene chloride, tetrachloroethylene, trichloroethene, heptachlor and alpha BHC) are detected upgradient of the landfill. These constituents undergo volatilization when released from soil, ground or surface water. Half-life reactions in groundwater vary greatly.

Half-Life in Groundwater [1]		
Constituent	**Half-Life (high)**	**Half-Life (low)**
Alpha BHC	11.7 years	4.99 years-
Benzene	24 months	10 days
Heptachlor	7.6 years	1.6 years
Methylene Chloride	8 weeks	10 days
Tetrachloroethene	2 years	12 months
Trichloroethene	4.5 years	10.7 months
Vinyl Chloride	95 months	8 weeks

Reductive dechlorination is the common biotransformation path for most chlorinated solvents. It should be noted that no organic contaminants have been detected in surface water samples collected.

1.6 Regulatory Status

The Halifax County Landfill operates as a C&D landfill over a closed MSW landfill under permit No. 42-04. Halifax County has been under a Corrective Action Plan for over two years. Water quality monitoring is performed semi-annually.

[1] Howard, P.H., Boethling, R.S., Jarvis, W.F., Myelan, W.M., and Michalenko, E.M., 1991, Handbook of Environmental Degradation Rates, Lewis Publishers, Inc, Chelsea, MI.

2 CORRECTIVE ACTION SUMMARY

2.1 Aquifer Conditions

The groundwater contaminant source appears to be the former MSW landfill unit. The downgradient contamination mechanism is either precipitation that has percolated through the landfill waste, allowing VOCs to partition from solid/liquid phases into a dissolved phase, and subsequently migrated downwards to mix with groundwater or landfill gas. Impact to upgradient wells was previously determined to be from landfill gas through phase transference. The CAP identified benzene, methylene chloride, toluene, tetrachloroethene, trichloroethene and vinyl chloride as constituents of concern. Contamination is not outside the compliance boundary.

The pesticides heptachlor and alpha BHC have been detected in ground water from well MW-15R. These two constituents have very low vapor pressures and would not be expected to migrate upgradient via phase transference. There is no evidence of ground water flow reversal in this area; therefore, it is likely these constituents are due to old farm practices on this property prior to its development as a landfill.

Bis(2-ethylhexyl)phthalate was proposed to be re-evaluated based on water quality results over the baseline sampling period. Additional assessment for this parameter is presented in **Section 3.4**.

2.1.1 Physical Changes

Halifax County has continued C&D landfill operation. Several remedies have been implemented to assist with landfill gas control in the northern plume area. In the summer of 1999 a 15 foot deep passive gas vent trench was installed, running approximately 350 feet in length, parallel to the east edge of waste before MW-15 and MW-15R. Four passive vents are associated with this trench. Two flares were proposed in the CAP, to be installed on the existing end vents and sealing the other two, however, there was only enough gas to maintain one flare on the landfill gas trench (all other vents are closed). The second flare was moved and installed on a passive vent closer to MW-16A. The solar flare vent system was installed August, 26, 2010.

2.1.2 Chemical Changes

The CAP listed benzene, methylene chloride, toluene, tetrachloroethene, trichloroethene and vinyl chloride as constituents of concern. Heptachlor and alpha BHC were constituents of concern for MW-15R only. Methylene chloride and toluene were proposed for removal from the constituent of concern list in a letter to the SWS dated March 9, 2012 due to lack of detections.

Since 2008 Halifax County has generally seen a reduction in the quantity of 2L Standard exceedances. Total VOC concentrations in the up and down gradient AOCs have shown a decrease in contamination concentrations, indicating natural degradation is occurring. In the upgradient AOC total VOCs in MW-15R and MW-16A decreased from 147.3 ug/l, in the August 2008 sampling event to 111.2 ug/l in the most recent sampling event performed February 2012. The downgradient AOC saw a total VOC reduction from 162.3 ug/l to 42.3 ug/l.

Based on water quality laboratory results several trends can be observed. Metals continue to be present across the facility, including background well MW-1, in ground and surface water

samples. They are still considered to be naturally occurring. Sampling results for trichloroethene and vinyl chloride indicated decreased concentrations and number of well detections across the site. Benzene concentrations decreased across the site. Tetrachloroethene concentrations remained constant over the study period. Overall, total VOCs in groundwater have reduced.

2.2 Plume Characteristics

2.2.1 Physical Changes

The downgradient plume remains delineated within the property boundary on the southwestern side by Brewer's Creek. No detections in surface water samples indicate local drainage features remain non-impacted. Stream dilution processes effectively control local contaminant migration. Active and passive landfill gas methods are used upgradient near MW-15R and MW-16A.

2.2.2 Chemical Changes

The CAP identified different target constituents for the different areas of concern (AOC), upgradient and downgradient. Benzene, 1,1-dichloroethane, tetrachloroethene and trichloroethene were identified in upgradient samples collected during the February 2012 semi-annual monitoring event, above their 2L Standards. Benzene, 1,1-dichloroethane, tetrachloroethene and vinyl chloride were identified in downgradient samples above their 2L Standards. Biochlor models of the downgradient plume are presented in **Appendix B**.

3 CORRECTIVE ACTION PLAN UPDATES

A number of factors influenced selection of remedy alternatives.

- Groundwater contamination exists at relatively low levels (ppb range).
- The horizontal ground water impact is limited to approximately 200 feet downgradient and upgradient of the landfill.
- Calculations of Hazard Index and excess cancer risk are within U.S. EPA acceptable limits.
- Landfill gas is influencing groundwater contamination at upgradient locations.
- It is likely that natural attenuation is already occurring at the site.

Remediation of relatively low-level contamination in the 100ppb or less range can be difficult, expensive and may not be achievable. A multi-phase approach provides the best opportunities for success.

3.1 Modifications to Selected Remedy

3.2 Upgradient Contamination (Landfill Gas Collection System)

Impacted groundwater upgradient of the landfill is located near MW-15R and MW-16A. This impact is primarily due to landfill gas migration and phase transference. The impact in the area adjacent to MW-15R is approximately 210 feet from the waste mass and monitoring well MW-16A is located 140 feet from the waste mass. During the summer of 1999 a 350 foot long trench was constructed east of the C&D over closed MSW to a maximum depth of 15 feet below grade, backfilled with stone and a header pipe attached to four passive landfill gas vents. Since 2000 VOC concentrations in groundwater samples have generally shown a concentration reduction. The solar flare vent system was installed August 26, 2010. One flare was installed in the proposed location on the end vent of the existing trench the second was installed on an existing passive vent near MW-16A. Flare locations are shown on **Figure 3.**

The groundwater monitoring network has been sampled semi-annually in accordance with the CAP. Monitoring wells MW-15R and MW-16A are the impacted wells in the upgradient area and have been analyzed for the SWS list of MNA parameters to establish a baseline. Analytical results indicate VOC concentrations are reducing. Sampling modifications for the upgradient AOC will be implemented upon SWS approval per the March 9, 2012 *Parameter Reduction Request* letter.

3.3 Downgradient Contamination (Monitored Natural Attenuation)

Groundwater contamination exists in the unconfined, shallow aquifer. Natural attenuation mechanisms are actively controlling groundwater contamination movement in this area. Downgradient ground water impact is limited to a relatively small area including wells MW-3A, MW-3D, and MW-2A, MW-2D, MW-6D and MW-17. Although MW-6S is not sampled, it is assumed to be impacted due to its location adjacent to MW-6D and the fact that it is screened in the same aquifer (only at higher elevations than MW-6D). These wells are located within 175 feet of the waste boundary.

The groundwater monitoring network has been sampled semi-annually in accordance with the CAP. Monitoring wells MW-2A, MW-2D, MW-3A, MW-3D, MW-6D and MW-17 are the impacted wells in the downgradient area that have been analyzed for the SWS list of MNA parameters to establish a baseline. In a letter report submitted to SWS, dated March 9, 2012 RSG requested reduced sampling parameters.

1. MW-2A, MW-6D, MW-17 and MW-18S have had no or low detections over the baseline period. They will be sampled for designated MNA parameters annually. Detection/assessment monitoring will continue semi-annually.
2. MW-7D will be analyzed for Appendix I parameters, semi-annually, due to no recent detections and low historic detections.
3. MW-18D and G-13 will continue with their current sampling schedules.
4. Sampling will continue as approved in the CAP for MW-2AD, MW-3AS and MW-3D.

RSG proposed to remove methylene chloride and toluene as constituents of concern due to their lack of detections. Methylene chloride, over the past five years, has either not been detected or was below the SWS limit and 2L Standard, except in MW-15R where it is oscillating around the 2L Standard. Toluene has not been detected since 2009.

Additionally, the MNA parameters hydrogen, volatile fatty acids, dissolved methane, ethane and ethane, BOD and carbon dioxide will be analyzed every third year (spring and fall events).

3.4 Bis (2-ethylhexyl) phthalate

Bis (2-ethylhexyl) phthalate was detected in samples from several baseline sampling events. Because it has a known history as a field contaminant and was inconsistently detected in collected samples it has was not considered a constituent of concern. Recent detections appear to be artifact contamination from sampling, based on similar concentrations reported in multiple wells for the same event. Overall, bis (2-ethylhexyl) phthalate detections appear to be occurring with less frequency and in lower concentrations. After re-evaluating and reviewing the sampling history, baseline data supports the CAP assessment that bis (2-ethylhexyl) phthalate is not a constituent of concern. Further evaluation of this constituent is not warranted.

3.5 Contingency Plan

At this juncture the contingency plan presented in the CAP does not need to be implemented. Surficial drainage features provide natural barriers to contamination migration off Halifax Counties property. The current methods and MNA have shown a reduction in total VOC concentrations. If triggers described in the CAP occur additional alternatives may be presented to the SWS for approval as necessary.

4 CONCLUSION

4.1 Evaluation of Effectiveness

Certain changes in the physical and chemical characteristics of the contaminant plume should occur as remediation progresses. Contaminant concentrations are expected to decrease over the remediation period, resulting in a decrease in the physical extent of the plume. Over the baseline sampling period reductions in total VOCs have been observed.

Upgradeient Plume

Installation of a trench and solar vent flares in conjunction with natural attenuation processes will continue to reduce total VOC concentrations for this AOC. Monitoring will continue to track contaminant reductions.

Downgradient Plume

The contaminant plume is delineated by Brewers Creek. Impacted wells should show continued steady decreases in VOC concentrations, with minimal effect on groundwater chemistry. Large fluctuations from the 2008 contaminant levels my not be observed for 3-5 years.

4.2 Report Submittals

Brief status updates regarding the remediation efforts will be submitted within the semi-annual groundwater sampling reports. Their purpose is to keep the SWS informed on the remediation progress and aware of situations that may require amendments to the current CAP. Text, tables, pictures, etc. may be used to illustrate the existing site conditions. Proposed changes to the sampling or remediation plan will be submitted to NCDENR for approval as applicable. Additional CAER will be submitted at five year intervals until corrective action is complete.

4.3 Completeness of Corrective Action

Reduction of low-level contamination in Halifax County may be achieved through natural attenuation and active or passive landfill gas recovery. Institutional controls limit access to the site. The source area has been capped to limit infiltration and continued disposal of C&D waste has allowed for better site topography and drainage which enhances surface water run-off.

The corrective action remedial strategies shall remain in place until remedial goals have been met. In this case, the remedial goals are contaminant levels that do not exceed the 2L ground water standards, SWS groundwater protection standards, or, if no standard exists, EPA MCLs. If these remedial strategies prove to be inadequate, alternative remedial strategies should be developed. At that time, alternative corrective action goals may be set (with the approval of NCDENR).

Figures

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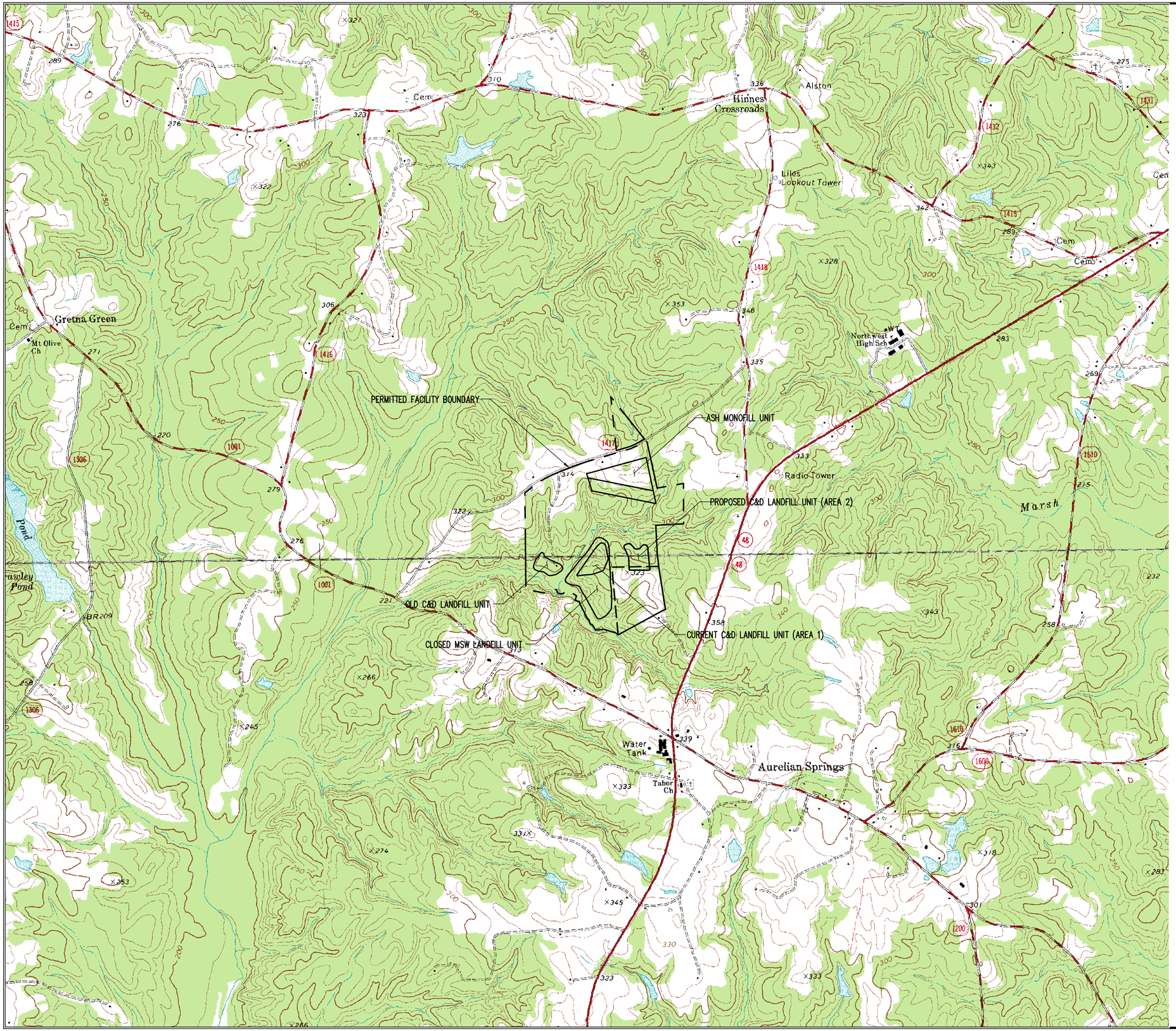

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REFERENCES

1. TOPOGRAPHY REFERENCES U.S.G.S. 7.5 MIN. QUADRANGLES "THELMA, NC", DATED 1973, AND "AURELIAN SPRINGS, NC", DATED 1973.

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NO.	DATE	REVISION

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SEAL

SEAL

PROJECT TITLE:
HALIFAX COUNTY LANDFILL SITE
AURELIAN SPRINGS, NC

DRAWING TITLE:
TOPOGRAPHIC MAP

DESIGNED BY: J.A.S.	DRAWN BY: J.A.L.
CHECKED BY:	PROJECT NO.: HALIFAX 08-1
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FILE NAME: HALI-D0120	
SHEET NO.	DRAWING NO. FIG. 1

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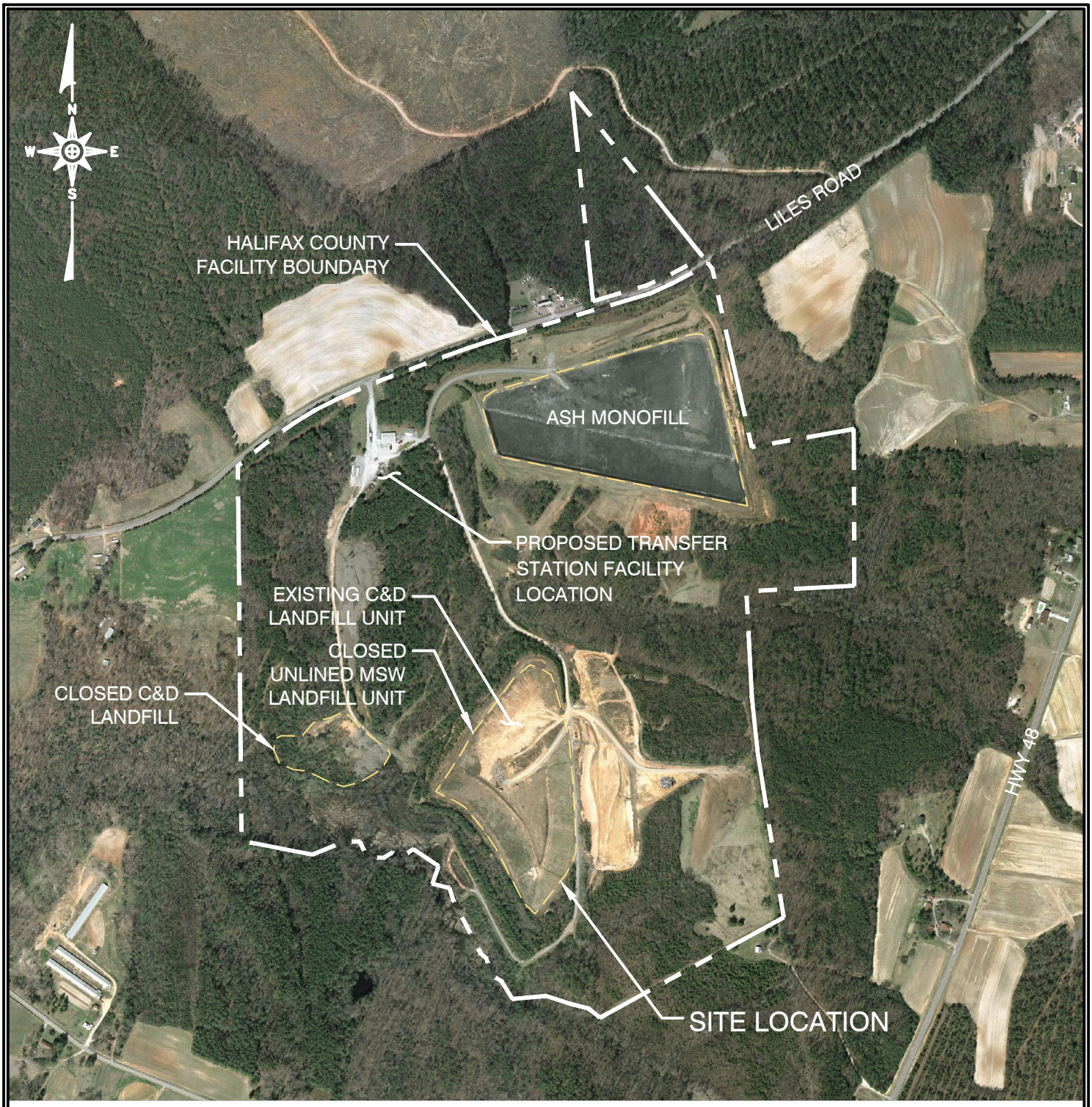

0 800' 1600'

REFERENCE:

1. AERIAL PHOTOGRAPHY OBTAINED FROM HALIFAX COUNTY GIS DEPARTMENT.

HALIFAX COUNTY LANDFILL
SITE LOCATION MAP

RICHARDSON SMITH GARDNER & ASSOCIATES
14 N. Boylan Ave.
Raleigh, N.C. 27603
NC LIC. NO. C-0828 (Engineering)
www.rsgengineers.com
ph: 919-828-0577
fax: 919-828-3899

SCALE:	DRAWN BY:	CHECKED BY:	DATE:	PROJECT NO.	FIGURE NO.	FILE NAME
AS SHOWN	W.R.B.	J.A.S.	Apr. 2012	HALIFAX 8	2	HALI-A0178

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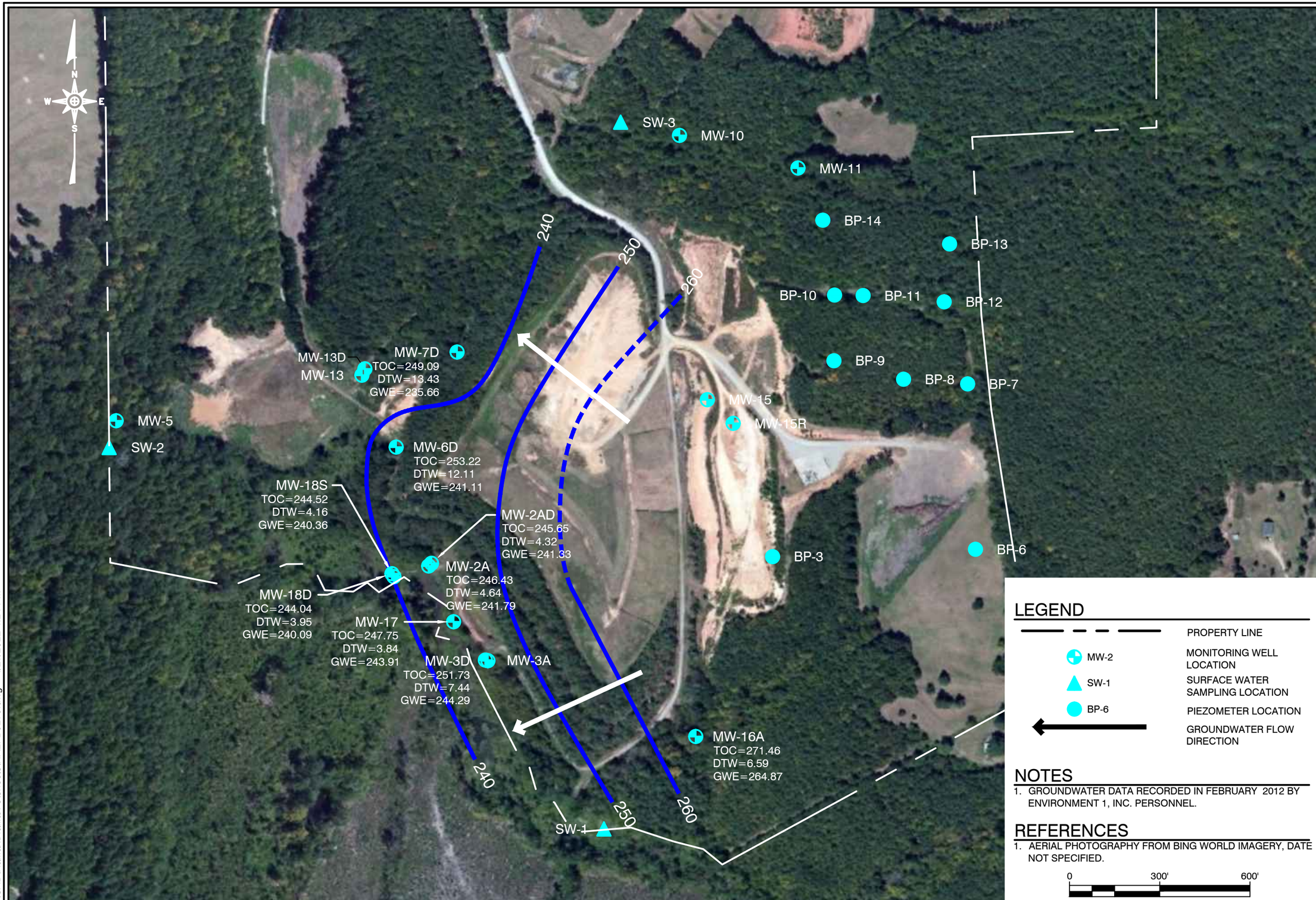

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FIGURE NO.	3
FILE NAME	HALI-B0179
SCALE:	AS SHOWN
PROJECT NO.	HALIFAX 8
CHECKED BY:	
DRAWN BY:	J.A.L.
DATE:	Apr. 2012

TITLE: HALIFAX COUNTY CLOSED MSW LANDFILL POTENTIOMETRIC SURFACE MAP FEBRUARY 2012

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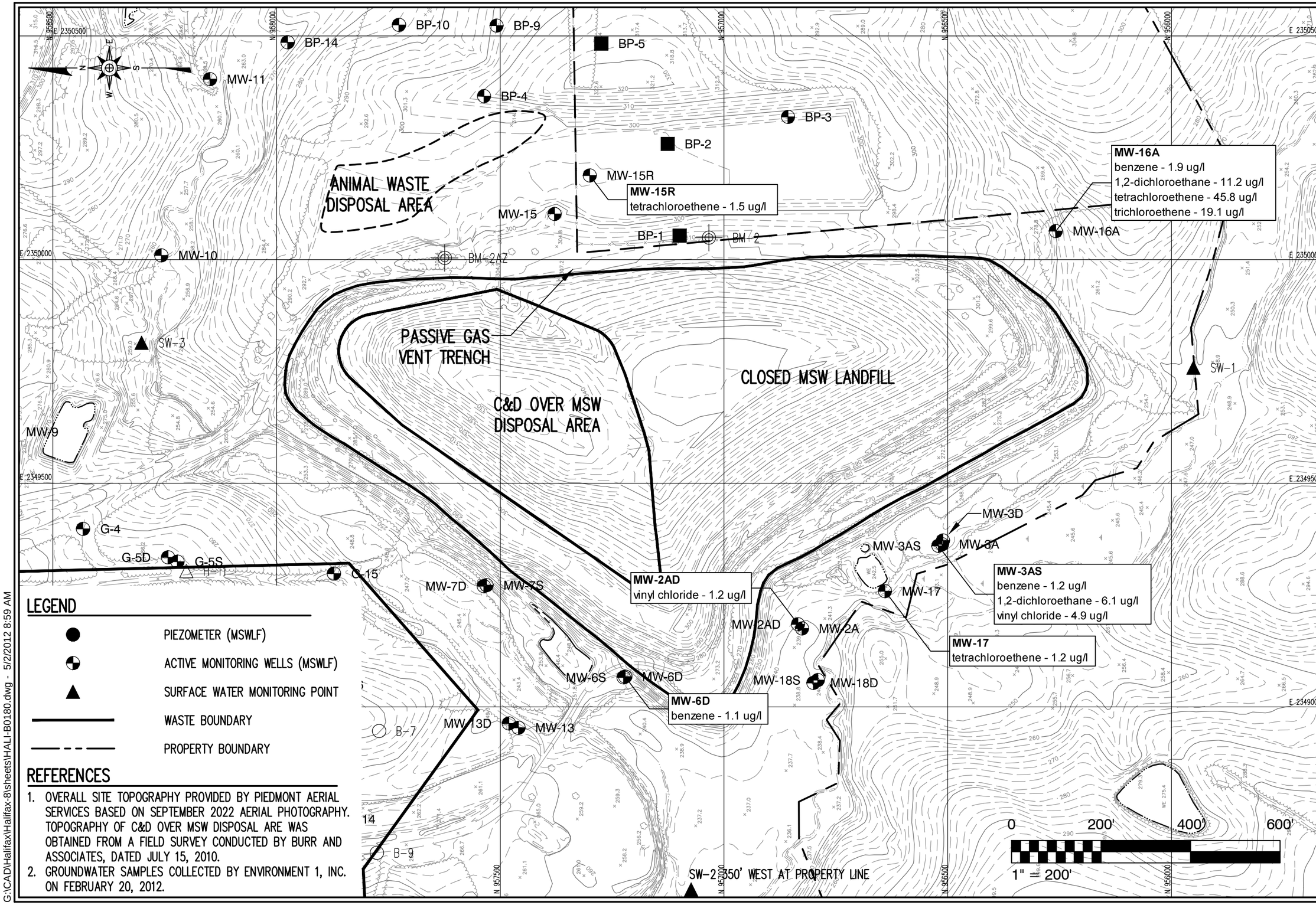

LEGEND

- PIEZOMETER (MSWLF)
- ACTIVE MONITORING WELLS (MSWLF)
- SURFACE WATER MONITORING POINT
- WASTE BOUNDARY
- PROPERTY BOUNDARY

REFERENCES

1. OVERALL SITE TOPOGRAPHY PROVIDED BY PIEDMONT AERIAL SERVICES BASED ON SEPTEMBER 2022 AERIAL PHOTOGRAPHY. TOPOGRAPHY OF C&D OVER MSW DISPOSAL ARE WAS OBTAINED FROM A FIELD SURVEY CONDUCTED BY BURR AND ASSOCIATES, DATED JULY 15, 2010.
2. GROUNDWATER SAMPLES COLLECTED BY ENVIRONMENT 1, INC. ON FEBRUARY 20, 2012.

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fax: 919-828-3899
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FIGURE NO.	4
FILE NAME	HALI-B0180
SCALE:	AS SHOWN
PROJECT NO.	HALIFAX 8
CHECKED BY:	J.A.S.
DRAWN BY:	W.R.B.
DATE:	May. 2012

TITLE: HALIFAX COUNTY LANDFILL
FEBRUARY 2012
DETECTIONS ABOVE THE
2 L STANDARD

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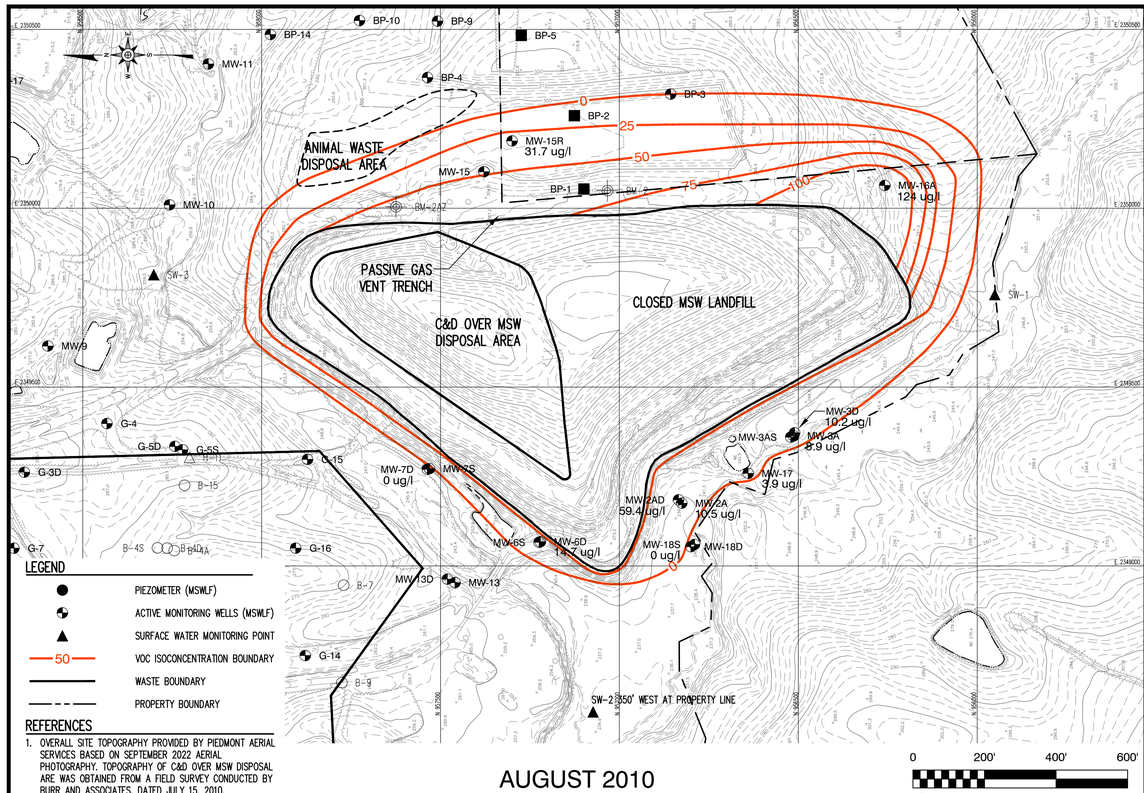
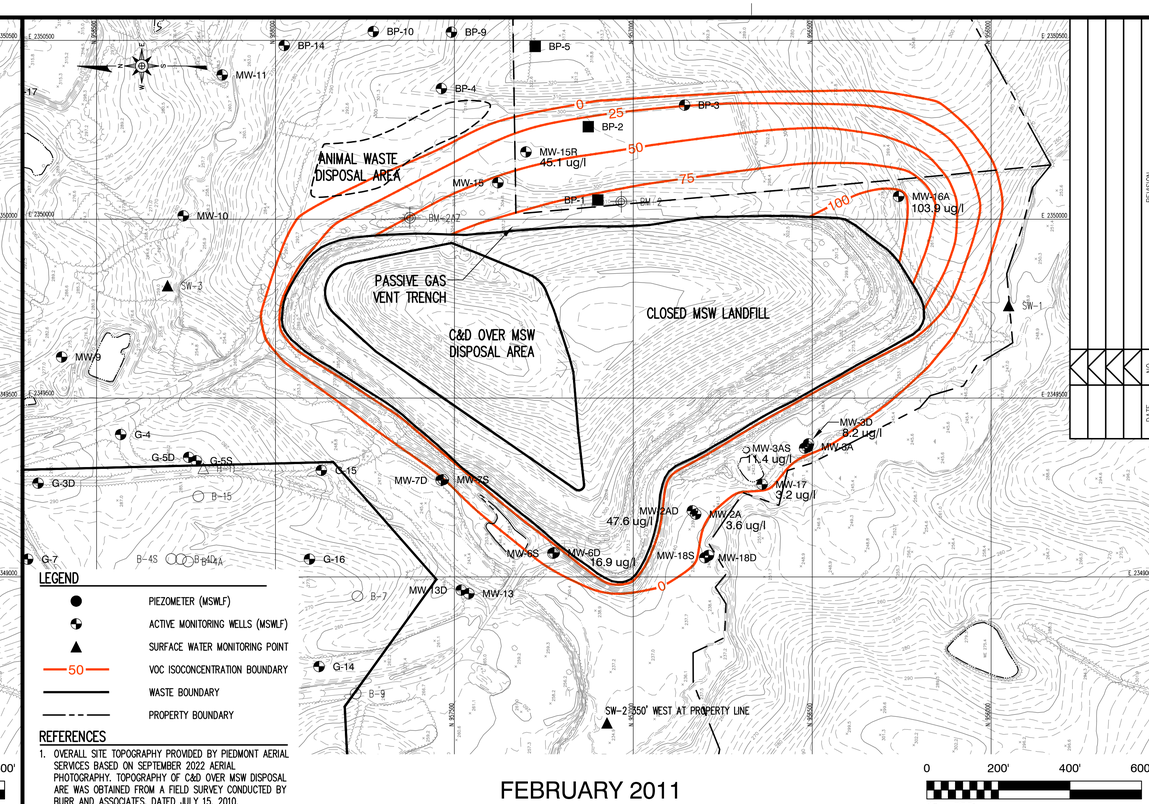
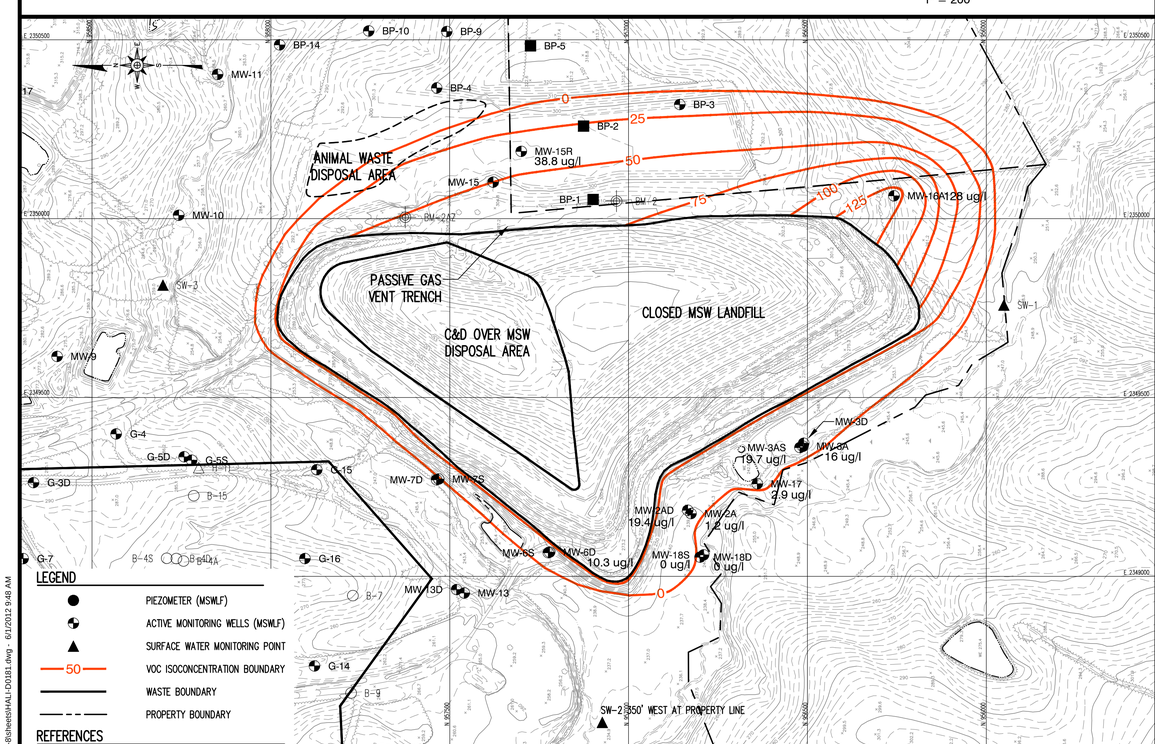


AUGUST 2010



FEBRUARY 2011



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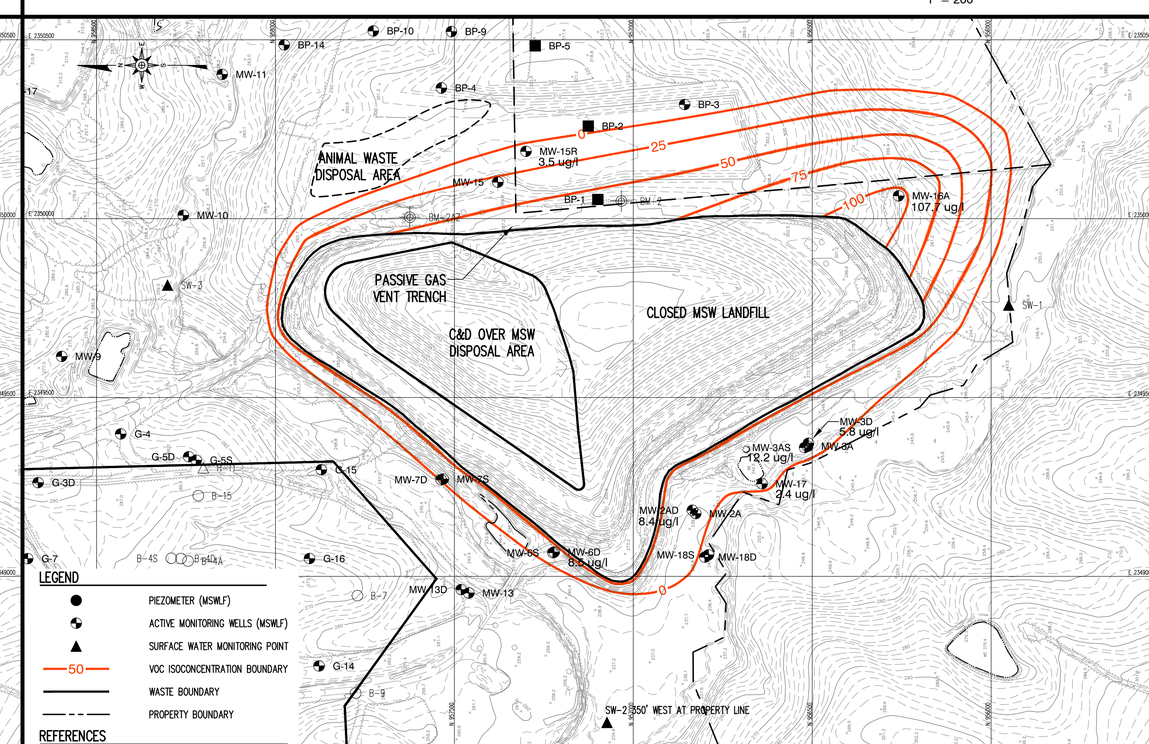

FEBRUARY 2012

LEGEND

- PIEZOMETER (MSWLF)
- ACTIVE MONITORING WELLS (MSWLF)
- SURFACE WATER MONITORING POINT
- 50 — VOC ISOCONCENTRATION BOUNDARY
- WASTE BOUNDARY
- PROPERTY BOUNDARY

REFERENCES

1. OVERALL SITE TOPOGRAPHY PROVIDED BY PIEDMONT AERIAL SERVICES BASED ON SEPTEMBER 2022 AERIAL PHOTOGRAPHY. TOPOGRAPHY OF C&D OVER MSW DISPOSAL ARE WAS OBTAINED FROM A FIELD SURVEY CONDUCTED BY BURR AND ASSOCIATES, DATED JULY 15, 2010.

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NO.	DATE	REVISION

SEAL

PROJECT TITLE: HALIFAX COUNTY LANDFILL CORRECTIVE ACTION EVALUATION REPORT SPRING 2012

DRAWING TITLE: TOTAL VOC ISOCONCENTRATION MAP

DESIGNED BY: J.A.S.	DRAWN BY: W.R.B.
CHECKED BY:	PROJECT NO.: HALIFAX-8
SCALE: AS SHOWN	DATE: MAY 2012
FILE NAME: HALI-D0181	
SHEET NO.	DRAWING NO. FIG. 4

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Tables

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RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES

Table 1: Well Construction Details
Halifax County CAER

Date: 5/22/2012
By: MG

WELL	Date Installed	Top-of-Casing Elevation	Northing	Easting	Depth to Bottom	Screen Interval	Soil Type
MW-1	NA	NA	959456.22	2349068.34	42.36*	NA	NA
MW-2a	7/26/1995	246.43	956825.71	2349175.45	14	4 - 14	Silt and Sand
MW-2ad	9/1/1999	245.65	956834.65	2349184.78	40	35 - 40	Granite
MW-3a	7/25/1995	525.68	956512.79	2349363.69	9	4 - 9	Sand
MW-3d	7/25/1995	251.73	956510.55	2349372.14	19	9 - 19	Clayey Silt/Silty Sand
MW-6d	10/31/1991	253.22	957221.32	2349067.58	40	25 - 40	Sandy Silt
MW-7d	10/31/1991	249.09	957537.07	2349270.12	40	25 - 40	Sandy Silt
MW-15r	8/31/1999	299.78	957299.99	2350188.01	45	30 - 40	Sandy Silt
MW-16a	7/26/1995	271.46	956258.52	2350063.60	15	4 - 14	Clayey Sand
MW-17	10/3/2007	247.75	956640.30	2349258.59	25	15 - 25	Saprolite
MW-18S	10/16/2007	244.52	956790.28	2349059.93	19	8 - 18	Clayey Silty Sand
MW-18D	10/17/2007	244.04	956800.30	2349053.61	52	47 -52	Granite

NOTE:
1. NA = Data Not Available
2, * Depth to Bottom for MW-1 from Februay 2012 laboratory report.

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RICHARDSON SMITH GARDNER & ASSOCIATES
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Table 2: Historic Groundwater Elevation Data

Halifax County CAER

Date: 5/22/2012
By: MG

Well	2/6/2001	8/28/2001	2/7/2002	8/14/2002	2/13/2003	8/7/2003	2/24/2004	08/12/04	2/16/2005	8/16/2005	2/14/2006	8/22/2006
MW-1	--	--	--	--	--	--	--	--	--	--	--	--
MW-2a	241.24	241.32	241.47	240.96	241.68	241.49	241.04	241.28	241.55	241.22	241.59	241.21
MW-2ad	240.86	240.91	241.14	240.52	241.38	241.11	240.83	240.94	241.24	240.86	241.25	240.87
MW-3a	243.47	243.55	243.98	243.39	244.51	244.03	243.11	243.66	244.11	243.72	244.18	243.49
MW-3d	243.28	243.35	243.81	243.23	244.29	243.78	242.80	243.39	243.87	243.45	243.91	243.25
MW-6d	240.57	240.28	240.92	240.22	241.57	241.19	241.66	241.02	241.68	240.90	241.45	240.87
MW-7d	245.09	244.57	245.11	244.22	245.79	245.35	246.35	245.95	245.99	245.30	245.84	245.10
MW-15r	268.71	263.10	267.59	266.45	269.01	274.18	271.02	269.29	270.03	268.33	268.41	269.20
MW-16a	265.97	265.02	265.67	263.55	267.20	268.11	267.12	265.98	266.64	265.09	266.15	264.85
MW-17	--	--	--	--	--	--	--	--	--	--	--	--
MW-18s	--	--	--	--	--	--	--	--	--	--	--	--
MW-18d	--	--	--	--	--	--	--	--	--	--	--	--
BP-3	179.80	--	--	--	--	--	--	--	--	--	--	285.97
BP-9	--	--	--	--	--	--	--	--	284.72	280.55	265.09	278.21

Well	2/14/2007	8/9/2007	2/19/2008	11/0/2008	2/17/2009	8/25/2009	2/17/2010	8/24/2010	2/22/2011	8/24/2011	2/20/2012
MW-1	--	--	--	--	--	--	--	--	--	--	--
MW-2a	241.73	241.26	241.18	240.77	240.92	241.18	241.31	241.18	241.64	241.41	241.79
MW-2ad	241.47	240.90	240.90	242.46	240.93	240.80	241.07	240.80	241.24	240.87	241.33
MW-3a	244.33	243.78	243.48	242.97	243.82	243.74	243.63	243.74	244.22	--	--
MW-3d	243.95	243.56	243.16	242.73	243.49	243.40	243.36	243.40	243.89	243.74	244.29
MW-6d	241.87	240.99	241.33	240.78	241.07	240.46	241.60	240.46	241.24	240.17	241.11
MW-7d	246.32	245.14	245.65	244.95	245.39	244.84	246.19	244.84	245.73	244.45	216.11
MW-15r	273.14	270.24	268.06	272.43	269.55	267.78	269.87	267.78	266.08	266.33	--
MW-16a	268.07	265.04	265.30	265.29	264.99	263.39	266.72	263.39	264.30	262.30	264.87
MW-17	--	--	242.43	242.12	243.03	243.03	242.50	243.03	243.51	243.53	243.91
MW-18s	--	--	239.47	239.79	240.16	239.97	240.29	239.97	240.11	239.98	240.36
MW-18d	--	--	240.02	239.58	239.95	--	240.17	--	240.08	--	240.09
BP-3	289.58	287.19	285.85	289.16	285.91	284.11	286.08	284.11	282.89	282.99	--
BP-9	280.67	275.92	272.57	273.84	272.15	272.88	275.25	272.88	271.82	269.63	--

Well	Observed High	Observed Low	Difference	Average
MW-1	--	--	--	--
MW-2a	241.79	240.77	1.02	241.32
MW-2ad	242.46	240.52	1.94	241.07
MW-3a	244.51	242.97	1.54	243.76
MW-3d	244.29	242.73	1.56	243.54
MW-6d	241.87	240.17	1.70	241.02
MW-7d	246.35	216.11	30.24	244.10
MW-15r	274.18	263.10	11.08	268.94
MW-16a	268.11	262.30	5.81	265.44
MW-17	243.91	242.12	1.79	243.01
MW-18s	240.36	239.47	0.89	240.01
MW-18d	240.17	239.58	0.59	239.98
BP-3	289.58	179.80	109.78	276.97
BP-9	284.72	265.09	19.63	274.73

Measurements reported in feet above mean sea level
Measurements collected from top of casing.
NA indicates water level measurement not collected during this event.

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Table 3: Groundwater Velocities (February 20-23, 2012)
Halifax County CAER

Date: 5/22/2012
By:MG

Monitoring Location	TOC Elevation (ft)	Depth to Water (ft)	Water Table Elevation (ft)	Hydraulic Conductivity (ft/day)	Assumed Porosity	Hydraulic Gradient (ft/ft)	Ground Water Velocity (ft/day)
MW-1	--	37.22	--	--	--	--	--
MW-2A	246.43	4.64	241.79	1.835	0.2	0.036	0.327
MW-2AD	245.65	4.32	241.33	--	--	--	--
MW-3AS	--	8.03	--	--	--	--	--
MW-3D	251.73	7.44	244.29	--	--	--	--
MW-6D	253.22	12.11	241.11	--	--	--	--
MW-7D	249.09	32.98	216.11	--	--	--	--
MW-16A	271.46	6.59	264.87	0.057	0.2	0.038	0.011
MW-17	247.75	3.84	243.91	--	--	--	--
MW-18S	244.52	4.16	240.36	--	--	--	--
MW-18D	244.04	3.95	240.09	--	--	--	--

NOTE:

1.) MW-1 is not used in the ground water characterization calculations due to its remote location from the landfill
2.) NS = Not Sampled
3.) Hydraulic Conductivity data from slug tests performed by G.N. Richardson and Associates in 1997.
4.) Porosity values assumed from Groundwater & Wells (Driscoll)
5.) Velocity Calculated from V=K*I/n
    V = velocity
    K = Hydraulic Conductivity
    I = Gradient
    n = Porosity
6.) Deep wells not used in velocity calculations

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Table 4: Historic VOC Detections

Halifax County CAER

Date: 5/22/2012
By: MG

Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-1	2-Butanone	1.8	ug/l	08/09/2007	4000	100	
MW-1	2-Butanone (Methyl ethyl ketone)	4.4	ug/l	08/19/2008	4000	100	
MW-1	Acetone	2.2	ug/l	02/19/2008	6000	100	
MW-1	Acetone	5.7	ug/l	08/19/2008	6000	100	
MW-1	**Bis-(2-Ethylhexyl) Phthalate**	**33.0**	**ug/l**	**02/25/1997**	**3**	**15**	**30**
MW-1	**Bis-(2-Ethylhexyl) Phthalate**	**60.0**	**ug/l**	**02/25/1999**	**3**	**15**	**57**
MW-1	Chloromethane	0.3	ug/l	08/19/2008	3	1	
MW-1	Toluene	0.4	ug/l	08/09/2007	600	1	
MW-1	Toluene	0.3	ug/l	02/19/2008	600	1	
MW-2A	**1,1-Dichloroethane**	**13.0**	**ug/l**	**08/09/1995**	**6**	**5**	**7**
MW-2A	**1,1-Dichloroethane**	**21.0**	**ug/l**	**12/04/1995**	**6**	**5**	**15**
MW-2A	**1,1-Dichloroethane**	**31.0**	**ug/l**	**02/25/1997**	**6**	**5**	**25**
MW-2A	**1,1-Dichloroethane**	**16.0**	**ug/l**	**08/18/1997**	**6**	**5**	**10**
MW-2A	**1,1-Dichloroethane**	**18.0**	**ug/l**	**02/02/1998**	**6**	**5**	**12**
MW-2A	**1,1-Dichloroethane**	**17.0**	**ug/l**	**09/10/1998**	**6**	**5**	**11**
MW-2A	**1,1-Dichloroethane**	**19.0**	**ug/l**	**02/25/1999**	**6**	**5**	**13**
MW-2A	**1,1-Dichloroethane**	**15.5**	**ug/l**	**10/07/1999**	**6**	**5**	**9.5**
MW-2A	**1,1-Dichloroethane**	**14.0**	**ug/l**	**02/02/2000**	**6**	**5**	**8**
MW-2A	1,1-Dichloroethane	5.2	ug/l	02/12/2003	6	5	
MW-2A	**1,1-Dichloroethane**	**22.6**	**ug/l**	**02/24/2004**	**6**	**5**	**16.6**
MW-2A	**1,1-Dichloroethane**	**13.0**	**ug/l**	**02/15/2005**	**6**	**5**	**7**
MW-2A	1,1-Dichloroethane	5.0	ug/l	08/16/2005	6	5	
MW-2A	**1,1-Dichloroethane**	**8.2**	**ug/l**	**02/14/2006**	**6**	**5**	**2.2**
MW-2A	**1,1-Dichloroethane**	**13.6**	**ug/l**	**02/14/2007**	**6**	**5**	**7.6**
MW-2A	1,1-Dichloroethane	4.4	ug/l	08/09/2007	6	5	
MW-2A	**1,1-Dichloroethane**	**16.8**	**ug/l**	**02/19/2008**	**6**	**5**	**10.8**
MW-2A	**1,1-Dichloroethane**	**15.5**	**ug/l**	**08/19/2008**	**6**	**5**	**9.5**
MW-2A	**1,1-Dichloroethane**	**6.5**	**ug/l**	**02/17/2009**	**6**	**5**	**0.5**
MW-2A	1,1-Dichloroethane	5.8	ug/l	08/19/2009	6	5	
MW-2A	**1,1-Dichloroethane**	**14.6**	**ug/l**	**02/17/2010**	**6**	**5**	**8.6**
MW-2A	1,1-Dichloroethane	5.1	ug/l	08/23/2010	6	5	
MW-2A	1,1-Dichloroethane	0.8	ug/l	08/25/2011	6	5	
MW-2A	1,1-Dichloroethane	1	ug/l	2/22/2012	6	5	
MW-2A	1,1-Dichloroethene	0.2	ug/l	08/09/2007	7	5	
MW-2A	1,1-Dichloroethene	0.7	ug/l	02/19/2008	7	5	
MW-2A	1,1-Dichloroethene	0.4	ug/l	02/17/2009	7	5	
MW-2A	1,1-Dichloroethene	1.0	ug/l	02/17/2010	7	5	
MW-2A	1,1-Dichloroethene (-ethylene)	0.8	ug/l	08/19/2008	7	5	
MW-2A	1,1-Dichloroethene (-ethylene)	0.3	ug/l	08/19/2009	7	5	
MW-2A	1,2-Dichloroethane	0.3	ug/l	02/19/2008	0.4	1	
MW-2A	1,2-Dichloroethane	0.3	ug/l	08/19/2008	0.4	1	
MW-2A	1,2-Dichloroethane	0.4	ug/l	02/17/2010	0.4	1	
MW-2A	**1,2-Dichloropropane**	**9.5**	**ug/l**	**02/02/1998**	**0.6**	**1**	**8.9**
MW-2A	1,2-Dichloropropane	0.2	ug/l	02/19/2008	0.6	1	
MW-2A	1,4-Dichlorobenzene	0.6	ug/l	02/19/2008	6	1	
MW-2A	1,4-Dichlorobenzene	0.5	ug/l	08/19/2008	6	1	
MW-2A	1,4-Dichlorobenzene	1.1	ug/l	02/17/2010	6	1	
MW-2A	2-Butanone	2.1	ug/l	08/09/2007	4000	100	
MW-2A	2-Butanone	0.9	ug/l	02/17/2009	4000	100	
MW-2A	2-Butanone (Methyl ethyl ketone)	3.5	ug/l	08/19/2008	4000	100	
MW-2A	Acetone	1.4	ug/l	08/09/2007	6000	100	
MW-2A	Acetone	3.2	ug/l	02/19/2008	6000	100	
MW-2A	Acetone	5.4	ug/l	08/19/2008	6000	100	
MW-2A	Acetone	1.3	ug/l	08/19/2009	6000	100	
MW-2A	Benzene	0.5	ug/l	02/19/2008	1	1	
MW-2A	Benzene	0.6	ug/l	08/19/2008	1	1	

RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES

Table 4: Historic VOC Detections

Halifax County CAER

Date: 5/22/2012
By: MG

Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-2A	Benzene	0.3	ug/l	02/17/2009	1	1	
MW-2A	Benzene	0.3	ug/l	08/19/2009	1	1	
MW-2A	Benzene	0.8	ug/l	02/17/2010	1	1	
MW-2A	Chlorobenzene	0.2	ug/l	08/09/2007	50	3	
MW-2A	Chlorobenzene	1.1	ug/l	02/19/2008	50	3	
MW-2A	Chlorobenzene	1.6	ug/l	08/19/2008	50	3	
MW-2A	Chlorobenzene	1.0	ug/l	02/17/2009	50	3	
MW-2A	Chlorobenzene	1.0	ug/l	08/19/2009	50	3	
MW-2A	Chlorobenzene	2.5	ug/l	02/17/2010	50	3	
MW-2A	Chloroethane	1.1	ug/l	02/19/2008	3000	10	
MW-2A	Chloroethane	0.7	ug/l	02/17/2010	3000	10	
MW-2A	Chloromethane	0.3	ug/l	08/19/2008	3	1	
MW-2A	Cis-1,2-Dichloroethene	12.0	ug/l	08/09/1995	70	5	
MW-2A	Cis-1,2-Dichloroethene	21.0	ug/l	12/04/1995	70	5	
MW-2A	Cis-1,2-Dichloroethene	26.0	ug/l	02/15/1996	70	5	
MW-2A	Cis-1,2-Dichloroethene	16.0	ug/l	08/08/1996	70	5	
MW-2A	Cis-1,2-Dichloroethene	32.0	ug/l	02/25/1997	70	5	
MW-2A	Cis-1,2-Dichloroethene	12.0	ug/l	08/18/1997	70	5	
MW-2A	Cis-1,2-Dichloroethene	15.0	ug/l	02/02/1998	70	5	
MW-2A	Cis-1,2-Dichloroethene	10.0	ug/l	09/10/1998	70	5	
MW-2A	Cis-1,2-Dichloroethene	16.0	ug/l	02/25/1999	70	5	
MW-2A	Cis-1,2-Dichloroethene	17.3	ug/l	10/07/1999	70	5	
MW-2A	Cis-1,2-Dichloroethene	15.0	ug/l	02/02/2000	70	5	
MW-2A	Cis-1,2-Dichloroethene	16.7	ug/l	02/24/2004	70	5	
MW-2A	Cis-1,2-Dichloroethene	11.6	ug/l	02/15/2005	70	5	
MW-2A	Cis-1,2-Dichloroethene	7.6	ug/l	02/14/2006	70	5	
MW-2A	Cis-1,2-Dichloroethene	11.8	ug/l	02/14/2007	70	5	
MW-2A	Cis-1,2-Dichloroethene	2.7	ug/l	08/09/2007	70	5	
MW-2A	Cis-1,2-Dichloroethene	15.8	ug/l	02/19/2008	70	5	
MW-2A	Cis-1,2-Dichloroethene	11.9	ug/l	08/19/2008	70	5	
MW-2A	Cis-1,2-Dichloroethene	6.9	ug/l	02/17/2009	70	5	
MW-2A	Cis-1,2-Dichloroethene	4.7	ug/l	08/19/2009	70	5	
MW-2A	Cis-1,2-Dichloroethene	18.7	ug/l	02/17/2010	70	5	
MW-2A	Cis-1,2-Dichloroethene	0.5	ug/l	2/22/2012	70	5	
MW-2A	cis-1,2-Dichloroethene (-ethylene)	0.3	ug/l	08/25/2011	70	5	
MW-2A	Dichlorodifluoromethane	0.3	ug/l	08/09/2007	1000	5	
MW-2A	Dichlorodifluoromethane	1.0	ug/l	02/19/2008	1000	5	
MW-2A	Dichlorodifluoromethane	1.0	ug/l	08/19/2008	1000	5	
MW-2A	Dichlorodifluoromethane	0.5	ug/l	02/17/2009	1000	5	
MW-2A	Dichlorodifluoromethane	0.5	ug/l	08/19/2009	1000	5	
MW-2A	Dichlorodifluoromethane	0.9	ug/l	02/17/2010	1000	5	
MW-2A	Dinoseb	2.7	ug/l	02/02/1998	NE	1	
MW-2A	Tetrachloroethene	0.5	ug/l	02/19/2008	0.7	1	
MW-2A	Tetrachloroethene	0.4	ug/l	02/17/2010	0.7	1	
MW-2A	Toluene	0.4	ug/l	08/09/2007	600	1	
MW-2A	Toluene	0.3	ug/l	02/19/2008	600	1	
MW-2A	trans-1,2-Dichloroethene	24.0	ug/l	02/15/1996	100	5	
MW-2A	trans-1,2-Dichloroethene	18.0	ug/l	08/08/1996	100	5	
MW-2A	trans-1,2-Dichloroethene	0.2	ug/l	02/19/2008	100	5	
MW-2A	trans-1,2-Dichloroethene	0.2	ug/l	08/19/2008	100	5	
MW-2A	**Trichloroethene**	**15.0**	**ug/l**	**08/09/1995**	**3**	**1**	**12**
MW-2A	**Trichloroethene**	**25.0**	**ug/l**	**12/04/1995**	**3**	**1**	**22**
MW-2A	**Trichloroethene**	**25.0**	**ug/l**	**02/15/1996**	**3**	**1**	**22**
MW-2A	**Trichloroethene**	**16.0**	**ug/l**	**08/08/1996**	**3**	**1**	**13**
MW-2A	**Trichloroethene**	**21.0**	**ug/l**	**02/25/1997**	**3**	**1**	**18**
MW-2A	**Trichloroethene**	**6.5**	**ug/l**	**08/18/1997**	**3**	**1**	**3.5**
MW-2A	**Trichloroethene**	**5.4**	**ug/l**	**09/10/1998**	**3**	**1**	**2.4**

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Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-2A	Trichloroethene	8.2	ug/l	02/25/1999	3	1	5.2
MW-2A	Trichloroethene	9.2	ug/l	10/07/1999	3	1	6.2
MW-2A	Trichloroethene	5.8	ug/l	02/02/2000	3	1	2.8
MW-2A	Trichloroethene	10.3	ug/l	02/24/2004	3	1	7.3
MW-2A	Trichloroethene	5.2	ug/l	02/15/2005	3	1	2.2
MW-2A	Trichloroethene	5.1	ug/l	02/14/2007	3	1	2.1
MW-2A	Trichloroethene	0.6	ug/l	08/09/2007	3	1	
MW-2A	Trichloroethene	5.6	ug/l	02/19/2008	3	1	2.6
MW-2A	Trichloroethene	4.0	ug/l	08/19/2008	3	1	1
MW-2A	Trichloroethene	2.6	ug/l	02/17/2009	3	1	
MW-2A	Trichloroethene	2.0	ug/l	08/19/2009	3	1	
MW-2A	Trichloroethene	7.3	ug/l	02/17/2010	3	1	4.3
MW-2A	Vinyl chloride	1.8	ug/l	08/09/2007	0.03	1	1.77
MW-2A	Vinyl chloride	3.3	ug/l	02/19/2008	0.03	1	3.27
MW-2A	Vinyl chloride	8.0	ug/l	08/19/2008	0.03	1	7.97
MW-2A	Vinyl chloride	3.3	ug/l	02/17/2009	0.03	1	3.27
MW-2A	Vinyl chloride	4.9	ug/l	08/19/2009	0.03	1	4.87
MW-2A	Vinyl chloride	5.2	ug/l	02/17/2010	0.03	1	5.17
MW-2A	Vinyl chloride	5.4	ug/l	08/23/2010	0.03	1	5.37
MW-2A	Vinyl chloride	3.6	ug/l	02/21/2011	0.03	1	3.57
MW-2A	Vinyl chloride	1.2	ug/l	08/25/2011	0.03	1	1.17
MW-2AD	1,1-Dichloroethane	13.0	ug/l	02/02/2000	6	5	7
MW-2AD	1,1-Dichloroethane	12.0	ug/l	05/02/2000	6	5	6
MW-2AD	1,1-Dichloroethane	19.0	ug/l	08/10/2000	6	5	13
MW-2AD	1,1-Dichloroethane	26.0	ug/l	02/06/2001	6	5	20
MW-2AD	1,1-Dichloroethane	13.0	ug/l	08/07/2001	6	5	7
MW-2AD	1,1-Dichloroethane	6.6	ug/l	02/07/2002	6	5	0.6
MW-2AD	1,1-Dichloroethane	7.5	ug/l	08/14/2002	6	5	1.5
MW-2AD	1,1-Dichloroethane	9.9	ug/l	02/12/2003	6	5	3.9
MW-2AD	1,1-Dichloroethane	14.4	ug/l	08/07/2003	6	5	8.4
MW-2AD	1,1-Dichloroethane	27.3	ug/l	02/24/2004	6	5	21.3
MW-2AD	1,1-Dichloroethane	31.5	ug/l	08/12/2004	6	5	25.5
MW-2AD	1,1-Dichloroethane	20.6	ug/l	02/15/2005	6	5	14.6
MW-2AD	1,1-Dichloroethane	30.4	ug/l	08/16/2005	6	5	24.4
MW-2AD	1,1-Dichloroethane	27.2	ug/l	02/14/2006	6	5	21.2
MW-2AD	1,1-Dichloroethane	26.6	ug/l	08/22/2006	6	5	20.6
MW-2AD	1,1-Dichloroethane	31.4	ug/l	02/14/2007	6	5	25.4
MW-2AD	1,1-Dichloroethane	36.8	ug/l	08/09/2007	6	5	30.8
MW-2AD	1,1-Dichloroethane	29.0	ug/l	02/19/2008	6	5	23
MW-2AD	1,1-Dichloroethane	31.4	ug/l	08/19/2008	6	5	25.4
MW-2AD	1,1-Dichloroethane	28.4	ug/l	02/17/2009	6	5	22.4
MW-2AD	1,1-Dichloroethane	25.5	ug/l	08/19/2009	6	5	19.5
MW-2AD	1,1-Dichloroethane	21.8	ug/l	02/17/2010	6	5	15.8
MW-2AD	1,1-Dichloroethane	25.1	ug/l	08/23/2010	6	5	19.1
MW-2AD	1,1-Dichloroethane	17.8	ug/l	02/21/2011	6	5	11.8
MW-2AD	1,1-Dichloroethane	6.6	ug/l	08/25/2011	6	5	0.6
MW-2AD	1,1-Dichloroethane	5	ug/l	2/22/2012	6	5	
MW-2AD	1,1-Dichloroethene	0.4	ug/l	08/09/2007	7	5	
MW-2AD	1,1-Dichloroethene	0.2	ug/l	02/19/2008	7	5	
MW-2AD	1,1-Dichloroethene	0.4	ug/l	02/17/2009	7	5	
MW-2AD	1,1-Dichloroethene	0.2	ug/l	02/17/2010	7	5	
MW-2AD	1,1-Dichloroethene (-ethylene)	0.2	ug/l	08/19/2008	7	5	
MW-2AD	1,1-Dichloroethene (-ethylene)	0.5	ug/l	08/19/2009	7	5	
MW-2AD	1,1-Dichloroethene (-ethylene)	0.2	ug/l	08/25/2011	7	5	
MW-2AD	1,2-Dichloroethane	0.4	ug/l	08/09/2007	0.4	1	
MW-2AD	1,2-Dichloroethane	0.2	ug/l	02/19/2008	0.4	1	

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Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-2AD	1,2-Dichloroethane	0.2	ug/l	08/19/2008	0.4	1	
MW-2AD	1,2-Dichloroethane	0.3	ug/l	02/17/2009	0.4	1	
MW-2AD	1,2-Dichloroethane	0.4	ug/l	08/19/2009	0.4	1	
MW-2AD	1,2-Dichloropropane	0.2	ug/l	08/09/2007	0.6	1	
MW-2AD	1,2-Dichloropropane	0.2	ug/l	02/19/2008	0.6	1	
MW-2AD	1,2-Dichloropropane	0.2	ug/l	02/17/2009	0.6	1	
MW-2AD	1,4-Dichlorobenzene	0.7	ug/l	08/09/2007	6	1	
MW-2AD	1,4-Dichlorobenzene	0.7	ug/l	02/19/2008	6	1	
MW-2AD	1,4-Dichlorobenzene	0.7	ug/l	08/19/2008	6	1	
MW-2AD	1,4-Dichlorobenzene	1.1	ug/l	02/17/2009	6	1	
MW-2AD	1,4-Dichlorobenzene	1.3	ug/l	08/19/2009	6	1	
MW-2AD	1,4-Dichlorobenzene	1.3	ug/l	02/17/2010	6	1	
MW-2AD	1,4-Dichlorobenzene	1.4	ug/l	08/23/2010	6	1	
MW-2AD	1,4-Dichlorobenzene	1.3	ug/l	02/21/2011	6	1	
MW-2AD	1,4-Dichlorobenzene	0.4	ug/l	08/25/2011	6	1	
MW-2AD	2-Butanone	1.7	ug/l	08/09/2007	4000	100	
MW-2AD	2-Butanone (Methyl ethyl ketone)	4.0	ug/l	08/19/2008	4000	100	
MW-2AD	2-Butanone (Methyl ethyl ketone)	2.1	ug/l	08/19/2009	4000	100	
MW-2AD	Acetone	5.3	ug/l	02/19/2008	6000	100	
MW-2AD	Acetone	5.6	ug/l	08/19/2008	6000	100	
MW-2AD	Acetone	1.8	ug/l	08/19/2009	6000	100	
MW-2AD	Benzene	0.9	ug/l	08/09/2007	1	1	
MW-2AD	**Benzene**	**1.3**	**ug/l**	**02/19/2008**	**1**	**1**	**0.3**
MW-2AD	**Benzene**	**1.2**	**ug/l**	**08/19/2008**	**1**	**1**	**0.2**
MW-2AD	Benzene	0.7	ug/l	02/17/2009	1	1	
MW-2AD	Benzene	0.8	ug/l	08/19/2009	1	1	
MW-2AD	**Benzene**	**1.4**	**ug/l**	**02/17/2010**	**1**	**1**	**0.4**
MW-2AD	Benzene	0.3	ug/l	2/22/2012	1	1	
MW-2AD	**Bis-(2-Ethylhexyl) Phthalate**	**25.0**	**ug/l**	**08/10/2000**	**3**	**15**	**22**
MW-2AD	**Bis-(2-Ethylhexyl) Phthalate**	**13.3**	**ug/l**	**02/17/2010**	**3**	**15**	**10.3**
MW-2AD	Chlorobenzene	1.1	ug/l	08/09/2007	50	3	
MW-2AD	Chlorobenzene	0.9	ug/l	02/19/2008	50	3	
MW-2AD	Chlorobenzene	0.9	ug/l	08/19/2008	50	3	
MW-2AD	Chlorobenzene	1.2	ug/l	02/17/2009	50	3	
MW-2AD	Chlorobenzene	1.5	ug/l	08/19/2009	50	3	
MW-2AD	Chlorobenzene	1.6	ug/l	02/17/2010	50	3	
MW-2AD	Chlorobenzene	1.4	ug/l	08/25/2011	50	3	
MW-2AD	Chlorobenzene	1	ug/l	2/22/2012	50	3	
MW-2AD	Chloroethane	2.5	ug/l	08/09/2007	3000	10	
MW-2AD	Chloroethane	2.5	ug/l	02/19/2008	3000	10	
MW-2AD	Chloroethane	2.4	ug/l	08/19/2008	3000	10	
MW-2AD	Chloroethane	2.2	ug/l	02/17/2009	3000	10	
MW-2AD	Chloroethane	1.9	ug/l	08/19/2009	3000	10	
MW-2AD	Chloroethane	1.7	ug/l	02/17/2010	3000	10	
MW-2AD	Chloroethane	0.7	ug/l	08/25/2011	3000	10	
MW-2AD	Chloromethane	0.3	ug/l	02/19/2008	3	1	
MW-2AD	Chloromethane	0.3	ug/l	08/19/2008	3	1	
MW-2AD	Cis-1,2-Dichloroethene	11.8	ug/l	08/12/2004	70	5	
MW-2AD	Cis-1,2-Dichloroethene	5.2	ug/l	02/15/2005	70	5	
MW-2AD	Cis-1,2-Dichloroethene	13.6	ug/l	08/16/2005	70	5	
MW-2AD	Cis-1,2-Dichloroethene	11.0	ug/l	02/14/2006	70	5	
MW-2AD	Cis-1,2-Dichloroethene	16.0	ug/l	08/22/2006	70	5	
MW-2AD	Cis-1,2-Dichloroethene	10.2	ug/l	02/14/2007	70	5	
MW-2AD	Cis-1,2-Dichloroethene	22.9	ug/l	08/09/2007	70	5	
MW-2AD	Cis-1,2-Dichloroethene	11.0	ug/l	02/19/2008	70	5	
MW-2AD	Cis-1,2-Dichloroethene	12.6	ug/l	08/19/2008	70	5	
MW-2AD	Cis-1,2-Dichloroethene	19.9	ug/l	02/17/2009	70	5	

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MW-2AD	Cis-1,2-Dichloroethene	22.2	ug/l	08/19/2009	70	5	
MW-2AD	Cis-1,2-Dichloroethene	12.7	ug/l	02/17/2010	70	5	
MW-2AD	Cis-1,2-Dichloroethene	23.8	ug/l	08/23/2010	70	5	
MW-2AD	Cis-1,2-Dichloroethene	21.7	ug/l	02/21/2011	70	5	
MW-2AD	Cis-1,2-Dichloroethene	6.2	ug/l	2/22/2012	70	5	
MW-2AD	cis-1,2-Dichloroethene (-ethylene)	9.4	ug/l	08/25/2011	70	5	
MW-2AD	Delta-BHC	0.0	ug/l	02/19/2008	NE	0.05	
MW-2AD	Dichlorodifluoromethane	0.3	ug/l	08/09/2007	1000	5	
MW-2AD	Dichlorodifluoromethane	1.0	ug/l	02/19/2008	1000	5	
MW-2AD	Dichlorodifluoromethane	0.5	ug/l	08/19/2008	1000	5	
MW-2AD	Dichlorodifluoromethane	0.3	ug/l	02/17/2009	1000	5	
MW-2AD	Dichlorodifluoromethane	0.2	ug/l	08/19/2009	1000	5	
MW-2AD	Dichlorodifluoromethane	0.9	ug/l	02/17/2010	1000	5	
MW-2AD	Dinoseb	1.5	ug/l	10/07/1999	NE	1	
MW-2AD	Dinoseb	2.6	ug/l	02/02/2000	NE	1	
MW-2AD	**Gamma-BHC (Lindane)**	**0.073**	**ug/l**	**02/21/2011**	**0.03**	**0.05**	**0.043**
MW-2AD	Methylene Chloride	0.2	ug/l	08/09/2007	5	1	
MW-2AD	Methylene Chloride	0.3	ug/l	08/19/2008	5	1	
MW-2AD	Methylene Chloride	0.2	ug/l	02/17/2009	5	1	
MW-2AD	Methylene Chloride	0.2	ug/l	08/19/2009	5	1	
MW-2AD	Tetrachloroethene	0.3	ug/l	02/19/2008	0.7	1	
MW-2AD	Toluene	0.5	ug/l	08/09/2007	600	1	
MW-2AD	Toluene	0.3	ug/l	02/19/2008	600	1	
MW-2AD	trans-1,2-Dichloroethene	0.3	ug/l	08/09/2007	100	5	
MW-2AD	trans-1,2-Dichloroethene	0.2	ug/l	02/19/2008	100	5	
MW-2AD	trans-1,2-Dichloroethene	0.2	ug/l	08/19/2008	100	5	
MW-2AD	trans-1,2-Dichloroethene	0.2	ug/l	02/17/2009	100	5	
MW-2AD	trans-1,2-Dichloroethene	0.2	ug/l	08/19/2009	100	5	
MW-2AD	**Trichloroethene**	**5.5**	**ug/l**	**08/12/2004**	**3**	**1**	**2.5**
MW-2AD	**Trichloroethene**	**5.4**	**ug/l**	**08/09/2007**	**3**	**1**	**2.4**
MW-2AD	**Trichloroethene**	**3.2**	**ug/l**	**02/19/2008**	**3**	**1**	**0.2**
MW-2AD	**Trichloroethene**	**3.5**	**ug/l**	**08/19/2008**	**3**	**1**	**0.5**
MW-2AD	**Trichloroethene**	**4.1**	**ug/l**	**02/17/2009**	**3**	**1**	**1.1**
MW-2AD	**Trichloroethene**	**4.2**	**ug/l**	**08/19/2009**	**3**	**1**	**1.2**
MW-2AD	**Trichloroethene**	**3.4**	**ug/l**	**02/17/2010**	**3**	**1**	**0.4**
MW-2AD	**Trichloroethene**	**4.1**	**ug/l**	**08/23/2010**	**3**	**1**	**1.1**
MW-2AD	**Trichloroethene**	**3.4**	**ug/l**	**02/21/2011**	**3**	**1**	**0.4**
MW-2AD	Trichloroethene	1	ug/l	2/22/2012	3	1	
MW-2AD	Trichloroethene (-ethylene)	1.3	ug/l	08/25/2011	3	1	
MW-2AD	**Vinyl chloride**	**7.0**	**ug/l**	**02/14/2007**	**0.03**	**1**	**6.97**
MW-2AD	**Vinyl chloride**	**5.8**	**ug/l**	**08/09/2007**	**0.03**	**1**	**5.77**
MW-2AD	**Vinyl chloride**	**4.1**	**ug/l**	**02/19/2008**	**0.03**	**1**	**4.07**
MW-2AD	**Vinyl chloride**	**5.5**	**ug/l**	**08/19/2008**	**0.03**	**1**	**5.47**
MW-2AD	**Vinyl chloride**	**5.2**	**ug/l**	**02/17/2009**	**0.03**	**1**	**5.17**
MW-2AD	**Vinyl chloride**	**4.3**	**ug/l**	**08/19/2009**	**0.03**	**1**	**4.27**
MW-2AD	**Vinyl chloride**	**5.0**	**ug/l**	**02/17/2010**	**0.03**	**1**	**4.97**
MW-2AD	**Vinyl chloride**	**5.0**	**ug/l**	**08/23/2010**	**0.03**	**1**	**4.97**
MW-2AD	**Vinyl chloride**	**3.3**	**ug/l**	**02/21/2011**	**0.03**	**1**	**3.27**
MW-2AD	**Vinyl chloride**	**2.1**	**ug/l**	**08/25/2011**	**0.03**	**1**	**2.07**
MW-2AD	**Vinyl Chloride**	**1.2**	**ug/l**	**2/22/2012**	**0.03**	**1**	**1.17**
MW-3A	**1,1-Dichloroethane**	**9.0**	**ug/l**	**08/08/1996**	**6**	**5**	**3**
MW-3A	1,1-Dichloroethane	5.3	ug/l	08/18/1997	6	5	
MW-3A	**1,1-Dichloroethane**	**18.0**	**ug/l**	**02/02/1998**	**6**	**5**	**12**
MW-3A	1,1-Dichloroethane	5.6	ug/l	09/10/1998	6	5	
MW-3A	**1,1-Dichloroethane**	**17.0**	**ug/l**	**02/25/1999**	**6**	**5**	**11**
MW-3A	**1,1-Dichloroethane**	**25.0**	**ug/l**	**02/02/2000**	**6**	**5**	**19**

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Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-3A	**1,1-Dichloroethane**	**29.0**	**ug/l**	**08/10/2000**	**6**	**5**	**23**
MW-3A	**1,1-Dichloroethane**	**20.0**	**ug/l**	**08/07/2001**	**6**	**5**	**14**
MW-3A	**1,1-Dichloroethane**	**21.0**	**ug/l**	**02/07/2002**	**6**	**5**	**15**
MW-3A	**1,1-Dichloroethane**	**8.9**	**ug/l**	**08/14/2002**	**6**	**5**	**2.9**
MW-3A	**1,1-Dichloroethane**	**13.2**	**ug/l**	**02/12/2003**	**6**	**5**	**7.2**
MW-3A	**1,1-Dichloroethane**	**11.9**	**ug/l**	**08/07/2003**	**6**	**5**	**5.9**
MW-3A	**1,1-Dichloroethane**	**10.5**	**ug/l**	**02/24/2004**	**6**	**5**	**4.5**
MW-3A	**1,1-Dichloroethane**	**11.3**	**ug/l**	**08/12/2004**	**6**	**5**	**5.3**
MW-3A	**1,1-Dichloroethane**	**7.1**	**ug/l**	**02/15/2005**	**6**	**5**	**1.1**
MW-3A	**1,1-Dichloroethane**	**7.3**	**ug/l**	**08/16/2005**	**6**	**5**	**1.3**
MW-3A	**1,1-Dichloroethane**	**8.4**	**ug/l**	**02/14/2006**	**6**	**5**	**2.4**
MW-3A	**1,1-Dichloroethane**	**8.3**	**ug/l**	**08/22/2006**	**6**	**5**	**2.3**
MW-3A	**1,1-Dichloroethane**	**6.6**	**ug/l**	**02/14/2007**	**6**	**5**	**0.6**
MW-3A	1,1-Dichloroethane	5.6	ug/l	08/09/2007	6	5	
MW-3A	**1,1-Dichloroethane**	**7.1**	**ug/l**	**02/19/2008**	**6**	**5**	**1.1**
MW-3A	**1,1-Dichloroethane**	**6.2**	**ug/l**	**08/19/2008**	**6**	**5**	**0.2**
MW-3A	1,1-Dichloroethane	5.1	ug/l	02/17/2009	6	5	
MW-3A	1,1-Dichloroethane	3.9	ug/l	08/19/2009	6	5	
MW-3A	1,1-Dichloroethane	3.5	ug/l	02/17/2010	6	5	
MW-3A	1,1-Dichloroethene	0.3	ug/l	08/09/2007	7	5	
MW-3A	1,1-Dichloroethene	0.2	ug/l	02/19/2008	7	5	
MW-3A	1,1-Dichloroethene (-ethylene)	0.2	ug/l	08/19/2008	7	5	
MW-3A	**1,2-Dichloroethane**	**7.0**	**ug/l**	**02/25/1997**	**0.4**	**1**	**6.6**
MW-3A	1,2-Dichloroethane	0.2	ug/l	02/19/2008	0.4	1	
MW-3A	1,2-Dichloroethane	0.2	ug/l	08/19/2008	0.4	1	
MW-3A	1,2-Dichloroethane	0.2	ug/l	02/17/2009	0.4	1	
MW-3A	1,2-Dichloropropane	0.3	ug/l	08/09/2007	0.6	1	
MW-3A	**1,2-Dichloropropane**	**1.1**	**ug/l**	**02/19/2008**	**0.6**	**1**	**0.5**
MW-3A	**1,2-Dichloropropane**	**0.8**	**ug/l**	**08/19/2008**	**0.6**	**1**	**0.2**
MW-3A	**1,2-Dichloropropane**	**1.0**	**ug/l**	**02/17/2009**	**0.6**	**1**	**0.4**
MW-3A	**1,2-Dichloropropane**	**0.8**	**ug/l**	**08/19/2009**	**0.6**	**1**	**0.2**
MW-3A	**1,2-Dichloropropane**	**0.7**	**ug/l**	**02/17/2010**	**0.6**	**1**	**0.1**
MW-3A	1,4-Dichlorobenzene	0.4	ug/l	08/09/2007	6	1	
MW-3A	**1,4-Dichlorobenzene**	**7.3**	**ug/l**	**02/19/2008**	**6**	**1**	**1.3**
MW-3A	1,4-Dichlorobenzene	2.6	ug/l	08/19/2008	6	1	
MW-3A	1,4-Dichlorobenzene	3.6	ug/l	02/17/2009	6	1	
MW-3A	1,4-Dichlorobenzene	3.2	ug/l	08/19/2009	6	1	
MW-3A	1,4-Dichlorobenzene	2.6	ug/l	02/17/2010	6	1	
MW-3A	1,4-Dichlorobenzene	1.8	ug/l	08/23/2010	6	1	
MW-3A	2,4-D	3.8	ug/l	02/12/2003	70	2	
MW-3A	2,4-D	2.7	ug/l	08/07/2003	70	2	
MW-3A	2-Butanone	2.2	ug/l	08/09/2007	4000	100	
MW-3A	2-Butanone (Methyl ethyl ketone)	4.6	ug/l	08/19/2008	4000	100	
MW-3A	2-Butanone (Methyl ethyl ketone)	1.8	ug/l	08/19/2009	4000	100	
MW-3A	Acetone	1.4	ug/l	08/09/2007	6000	100	
MW-3A	Acetone	2.7	ug/l	02/19/2008	6000	100	
MW-3A	Acetone	6.6	ug/l	08/19/2008	6000	100	
MW-3A	Acetone	1.5	ug/l	08/19/2009	6000	100	
MW-3A	**Benzene**	**10.0**	**ug/l**	**02/02/1998**	**1**	**1**	**9**
MW-3A	**Benzene**	**7.8**	**ug/l**	**08/10/2000**	**1**	**1**	**6.8**
MW-3A	**Benzene**	**5.2**	**ug/l**	**02/07/2002**	**1**	**1**	**4.2**
MW-3A	**Benzene**	**6.1**	**ug/l**	**08/12/2004**	**1**	**1**	**5.1**
MW-3A	Benzene	0.8	ug/l	08/09/2007	1	1	
MW-3A	**Benzene**	**2.6**	**ug/l**	**02/19/2008**	**1**	**1**	**1.6**
MW-3A	**Benzene**	**2.1**	**ug/l**	**08/19/2008**	**1**	**1**	**1.1**
MW-3A	**Benzene**	**3.1**	**ug/l**	**02/17/2009**	**1**	**1**	**2.1**
MW-3A	**Benzene**	**2.6**	**ug/l**	**08/19/2009**	**1**	**1**	**1.6**

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Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-3A	**Benzene**	**2.9**	**ug/l**	**02/17/2010**	**1**	**1**	**1.9**
MW-3A	**Benzene**	**1.7**	**ug/l**	**08/23/2010**	**1**	**1**	**0.7**
MW-3A	Beta-BHC	0.032	ug/l	02/19/2008	NE	0.05	
MW-3A	**Bis-(2-Ethylhexyl) Phthalate**	**200.0**	**ug/l**	**02/25/1999**	**3**	**15**	**197**
MW-3A	Chlorobenzene	5.0	ug/l	08/08/1996	50	3	
MW-3A	Chlorobenzene	8.7	ug/l	02/02/2000	50	3	
MW-3A	Chlorobenzene	28.0	ug/l	08/10/2000	50	3	
MW-3A	Chlorobenzene	11.0	ug/l	08/07/2001	50	3	
MW-3A	Chlorobenzene	15.0	ug/l	02/07/2002	50	3	
MW-3A	Chlorobenzene	12.4	ug/l	02/12/2003	50	3	
MW-3A	Chlorobenzene	6.5	ug/l	08/07/2003	50	3	
MW-3A	Chlorobenzene	7.2	ug/l	08/12/2004	50	3	
MW-3A	Chlorobenzene	5.5	ug/l	02/15/2005	50	3	
MW-3A	Chlorobenzene	5.6	ug/l	02/14/2007	50	3	
MW-3A	Chlorobenzene	0.6	ug/l	08/09/2007	50	3	
MW-3A	Chlorobenzene	3.7	ug/l	02/19/2008	50	3	
MW-3A	Chlorobenzene	4.3	ug/l	08/19/2008	50	3	
MW-3A	Chlorobenzene	6.3	ug/l	02/17/2009	50	3	
MW-3A	Chlorobenzene	5.9	ug/l	08/19/2009	50	3	
MW-3A	Chlorobenzene	7.6	ug/l	02/17/2010	50	3	
MW-3A	Chlorobenzene	3.8	ug/l	08/23/2010	50	3	
MW-3A	Chloroethane	11.0	ug/l	02/02/2000	3000	10	
MW-3A	Chloroethane	0.7	ug/l	08/09/2007	3000	10	
MW-3A	Chloroethane	1.5	ug/l	02/19/2008	3000	10	
MW-3A	Chloroethane	1.4	ug/l	02/17/2009	3000	10	
MW-3A	Chloroethane	1.4	ug/l	02/17/2010	3000	10	
MW-3A	Chloromethane	0.2	ug/l	08/19/2008	3	1	
MW-3A	Cis-1,2-Dichloroethene	33.0	ug/l	08/08/1996	70	5	
MW-3A	Cis-1,2-Dichloroethene	27.0	ug/l	02/25/1997	70	5	
MW-3A	Cis-1,2-Dichloroethene	17.0	ug/l	08/18/1997	70	5	
MW-3A	Cis-1,2-Dichloroethene	70.0	ug/l	02/02/1998	70	5	
MW-3A	Cis-1,2-Dichloroethene	9.9	ug/l	09/10/1998	70	5	
MW-3A	Cis-1,2-Dichloroethene	31.0	ug/l	02/25/1999	70	5	
MW-3A	Cis-1,2-Dichloroethene	44.0	ug/l	02/02/2000	70	5	
MW-3A	**Cis-1,2-Dichloroethene**	**89.0**	**ug/l**	**08/10/2000**	**70**	**5**	**19**
MW-3A	Cis-1,2-Dichloroethene	52.0	ug/l	08/07/2001	70	5	
MW-3A	**Cis-1,2-Dichloroethene**	**84.0**	**ug/l**	**02/07/2002**	**70**	**5**	**14**
MW-3A	Cis-1,2-Dichloroethene	24.8	ug/l	08/14/2002	70	5	
MW-3A	Cis-1,2-Dichloroethene	56.5	ug/l	02/12/2003	70	5	
MW-3A	Cis-1,2-Dichloroethene	57.3	ug/l	08/07/2003	70	5	
MW-3A	Cis-1,2-Dichloroethene	46.8	ug/l	02/24/2004	70	5	
MW-3A	Cis-1,2-Dichloroethene	43.2	ug/l	08/12/2004	70	5	
MW-3A	Cis-1,2-Dichloroethene	27.0	ug/l	02/15/2005	70	5	
MW-3A	Cis-1,2-Dichloroethene	11.8	ug/l	08/16/2005	70	5	
MW-3A	Cis-1,2-Dichloroethene	17.1	ug/l	02/14/2006	70	5	
MW-3A	Cis-1,2-Dichloroethene	5.8	ug/l	08/22/2006	70	5	
MW-3A	Cis-1,2-Dichloroethene	8.1	ug/l	08/09/2007	70	5	
MW-3A	Cis-1,2-Dichloroethene	10.8	ug/l	02/19/2008	70	5	
MW-3A	Cis-1,2-Dichloroethene	5.0	ug/l	08/19/2008	70	5	
MW-3A	Cis-1,2-Dichloroethene	0.5	ug/l	02/17/2009	70	5	
MW-3A	Cis-1,2-Dichloroethene	0.9	ug/l	08/19/2009	70	5	
MW-3A	Cis-1,2-Dichloroethene	0.9	ug/l	02/17/2010	70	5	
MW-3A	Dichlorodifluoromethane	0.2	ug/l	08/09/2007	1000	5	
MW-3A	Dichlorodifluoromethane	0.2	ug/l	08/19/2008	1000	5	
MW-3A	Dichlorodifluoromethane	0.2	ug/l	08/19/2009	1000	5	
MW-3A	**Heptachlor**	**0.09**	**ug/l**	**02/02/1998**	**0.008**	**0.05**	**0.082**
MW-3A	Methylene Chloride	0.2	ug/l	08/19/2008	5	1	

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MW-3A	Tetrachloroethene	0.4	ug/l	08/09/2007	0.7	1	
MW-3A	Toluene	5.1	ug/l	08/16/2005	600	1	
MW-3A	Toluene	0.5	ug/l	08/09/2007	600	1	
MW-3A	Toluene	0.3	ug/l	02/19/2008	600	1	
MW-3A	Toluene	0.2	ug/l	08/19/2008	600	1	
MW-3A	Toluene	0.4	ug/l	02/17/2009	600	1	
MW-3A	Toluene	0.5	ug/l	08/19/2009	600	1	
MW-3A	Toluene	0.3	ug/l	02/17/2010	600	1	
MW-3A	trans-1,2-Dichloroethene	0.4	ug/l	02/19/2008	100	5	
MW-3A	trans-1,2-Dichloroethene	0.2	ug/l	08/19/2008	100	5	
MW-3A	**Trichloroethene**	**6.0**	**ug/l**	**08/08/1996**	**3**	**1**	**3**
MW-3A	**Trichloroethene**	**7.9**	**ug/l**	**08/10/2000**	**3**	**1**	**4.9**
MW-3A	**Trichloroethene**	**8.7**	**ug/l**	**02/07/2002**	**3**	**1**	**5.7**
MW-3A	**Trichloroethene**	**7.7**	**ug/l**	**02/24/2004**	**3**	**1**	**4.7**
MW-3A	Trichloroethene	2.0	ug/l	08/09/2007	3	1	
MW-3A	Trichloroethene	1.9	ug/l	02/19/2008	3	1	
MW-3A	Trichloroethene	1.0	ug/l	08/19/2008	3	1	
MW-3A	**Vinyl chloride**	**12.0**	**ug/l**	**02/02/2000**	**0.03**	**1**	**11.97**
MW-3A	**Vinyl chloride**	**16.2**	**ug/l**	**02/12/2003**	**0.03**	**1**	**16.17**
MW-3A	**Vinyl chloride**	**16.3**	**ug/l**	**08/07/2003**	**0.03**	**1**	**16.27**
MW-3A	**Vinyl chloride**	**11.8**	**ug/l**	**02/24/2004**	**0.03**	**1**	**11.77**
MW-3A	**Vinyl chloride**	**16.1**	**ug/l**	**08/12/2004**	**0.03**	**1**	**16.07**
MW-3A	**Vinyl chloride**	**5.1**	**ug/l**	**02/14/2007**	**0.03**	**1**	**5.07**
MW-3A	**Vinyl chloride**	**4.7**	**ug/l**	**08/09/2007**	**0.03**	**1**	**4.67**
MW-3A	**Vinyl chloride**	**3.3**	**ug/l**	**02/19/2008**	**0.03**	**1**	**3.27**
MW-3A	**Vinyl chloride**	**3.9**	**ug/l**	**08/19/2008**	**0.03**	**1**	**3.87**
MW-3A	**Vinyl chloride**	**1.3**	**ug/l**	**02/17/2009**	**0.03**	**1**	**1.27**
MW-3A	**Vinyl chloride**	**1.0**	**ug/l**	**08/19/2009**	**0.03**	**1**	**0.97**
MW-3A	**Vinyl chloride**	**2.1**	**ug/l**	**02/17/2010**	**0.03**	**1**	**2.07**
MW-3A	**Vinyl chloride**	**1.6**	**ug/l**	**08/23/2010**	**0.03**	**1**	**1.57**
MW-3AS	**1,1-Dichloroethane**	**6.4**	**ug/l**	**08/25/2011**	**6**	**5**	**0.4**
MW-3AS	**1,1-Dichloroethane**	**6.1**	**ug/l**	**2/22/2012**	**6**	**5**	**0.1**
MW-3AS	1,1-Dichloroethene (-ethylene)	0.3	ug/l	08/25/2011	7	5	
MW-3AS	1,2-Dichloropropane	0.3	ug/l	08/25/2011	0.6	1	
MW-3AS	1,4-Dichlorobenzene	2.1	ug/l	02/21/2011	6	1	
MW-3AS	1,4-Dichlorobenzene	0.5	ug/l	08/25/2011	6	1	
MW-3AS	1,4-Dichlorobenzene	0.6	ug/l	2/22/2012	6	1	
MW-3AS	**Benzene**	**2.7**	**ug/l**	**02/21/2011**	**1**	**1**	**1.7**
MW-3AS	Benzene	0.6	ug/l	08/25/2011	1	1	
MW-3AS	**Benzene**	**1.2**	**ug/l**	**2/22/2012**	**1**	**1**	**0.2**
MW-3AS	Chlorobenzene	5.3	ug/l	02/21/2011	50	3	
MW-3AS	Chlorobenzene	0.6	ug/l	08/25/2011	50	3	
MW-3AS	Chlorobenzene	1.9	ug/l	2/22/2012	50	3	
MW-3AS	Chloroethane	0.6	ug/l	08/25/2011	3000	10	
MW-3AS	Chloroethane	1.1	ug/l	2/22/2012	3000	10	
MW-3AS	Cis-1,2-Dichloroethene	3.3	ug/l	2/22/2012	70	5	
MW-3AS	cis-1,2-Dichloroethene (-ethylene)	9.3	ug/l	08/25/2011	70	5	
MW-3AS	Trichloroethene	0.6	ug/l	2/22/2012	3	1	
MW-3AS	Trichloroethene (-ethylene)	1.9	ug/l	08/25/2011	3	1	
MW-3AS	**Vinyl chloride**	**1.3**	**ug/l**	**02/21/2011**	**0.03**	**1**	**1.27**
MW-3AS	**Vinyl chloride**	**2.1**	**ug/l**	**08/25/2011**	**0.03**	**1**	**2.07**
MW-3AS	**Vinyl Chloride**	**4.9**	**ug/l**	**2/22/2012**	**0.03**	**1**	**4.87**
MW-3D	**1,1-Dichloroethane**	**19.8**	**ug/l**	**10/07/1999**	**6**	**5**	**13.8**
MW-3D	1,1-Dichloroethane	4.3	ug/l	08/09/2007	6	5	
MW-3D	1,1-Dichloroethane	5.0	ug/l	02/19/2008	6	5	
MW-3D	**1,1-Dichloroethane**	**6.9**	**ug/l**	**08/19/2008**	**6**	**5**	**0.9**

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MW-3D	**1,1-Dichloroethane**	**6.7**	**ug/l**	**02/17/2009**	**6**	**5**	**0.7**
MW-3D	**1,1-Dichloroethane**	**6.5**	**ug/l**	**08/19/2009**	**6**	**5**	**0.5**
MW-3D	**1,1-Dichloroethane**	**6.5**	**ug/l**	**02/17/2010**	**6**	**5**	**0.5**
MW-3D	**1,1-Dichloroethane**	**7.5**	**ug/l**	**08/23/2010**	**6**	**5**	**1.5**
MW-3D	**1,1-Dichloroethane**	**9.0**	**ug/l**	**02/21/2011**	**6**	**5**	**3**
MW-3D	**1,1-Dichloroethane**	**7.6**	**ug/l**	**08/25/2011**	**6**	**5**	**1.6**
MW-3D	1,1-Dichloroethane	5.8	ug/l	2/22/2012	6	5	
MW-3D	1,1-Dichloroethene	0.3	ug/l	08/09/2007	7	5	
MW-3D	1,1-Dichloroethene	0.4	ug/l	02/19/2008	7	5	
MW-3D	1,1-Dichloroethene	0.4	ug/l	02/17/2009	7	5	
MW-3D	1,1-Dichloroethene	0.4	ug/l	02/17/2010	7	5	
MW-3D	1,1-Dichloroethene	0.2	ug/l	2/22/2012	7	5	
MW-3D	1,1-Dichloroethene (-ethylene)	0.4	ug/l	08/19/2008	7	5	
MW-3D	1,1-Dichloroethene (-ethylene)	0.4	ug/l	08/19/2009	7	5	
MW-3D	1,1-Dichloroethene (-ethylene)	0.2	ug/l	08/25/2011	7	5	
MW-3D	**1,2-Dichloropropane**	**2.1**	**ug/l**	**02/19/2008**	**0.6**	**1**	**1.5**
MW-3D	2-Butanone	1.0	ug/l	08/09/2007	4000	100	
MW-3D	2-Butanone (Methyl ethyl ketone)	2.7	ug/l	08/19/2008	4000	100	
MW-3D	2-Butanone (Methyl ethyl ketone)	1.2	ug/l	08/19/2009	4000	100	
MW-3D	Acetone	2.2	ug/l	02/19/2008	6000	100	
MW-3D	Acetone	3.9	ug/l	08/19/2008	6000	100	
MW-3D	Alpha-BHC	0.042	ug/l	02/19/2008	NE	0.05	
MW-3D	Benzene	0.2	ug/l	08/09/2007	1	1	
MW-3D	Benzene	0.2	ug/l	02/19/2008	1	1	
MW-3D	Benzene	0.3	ug/l	08/19/2008	1	1	
MW-3D	Benzene	0.3	ug/l	02/17/2009	1	1	
MW-3D	Benzene	0.3	ug/l	08/19/2009	1	1	
MW-3D	Benzene	0.3	ug/l	02/17/2010	1	1	
MW-3D	Benzene	0.4	ug/l	08/25/2011	1	1	
MW-3D	**Bis-(2-Ethylhexyl) Phthalate**	**32.0**	**ug/l**	**08/12/2004**	**3**	**15**	**29**
MW-3D	**Bis-(2-Ethylhexyl) Phthalate**	**11.3**	**ug/l**	**02/17/2010**	**3**	**15**	**8.3**
MW-3D	Chlorobenzene	7.0	ug/l	10/07/1999	50	3	
MW-3D	Chlorobenzene	0.2	ug/l	08/19/2009	50	3	
MW-3D	Chloromethane	0.2	ug/l	08/19/2008	3	1	
MW-3D	Cis-1,2-Dichloroethene	1.2	ug/l	08/09/2007	70	5	
MW-3D	Cis-1,2-Dichloroethene	1.3	ug/l	02/19/2008	70	5	
MW-3D	Cis-1,2-Dichloroethene	2.2	ug/l	08/19/2008	70	5	
MW-3D	Cis-1,2-Dichloroethene	2.7	ug/l	02/17/2009	70	5	
MW-3D	Cis-1,2-Dichloroethene	3.3	ug/l	08/19/2009	70	5	
MW-3D	Cis-1,2-Dichloroethene	4.0	ug/l	02/17/2010	70	5	
MW-3D	Cis-1,2-Dichloroethene	6.4	ug/l	02/21/2011	70	5	
MW-3D	Cis-1,2-Dichloroethene	3	ug/l	2/22/2012	70	5	
MW-3D	cis-1,2-Dichloroethene (-ethylene)	6.0	ug/l	08/25/2011	70	5	
MW-3D	Delta-BHC	0.067	ug/l	08/12/2004	NE	0.05	
MW-3D	Dichlorodifluoromethane	5.5	ug/l	02/02/2000	1000	5	
MW-3D	Dichlorodifluoromethane	7.1	ug/l	08/10/2000	1000	5	
MW-3D	Dichlorodifluoromethane	1.8	ug/l	08/09/2007	1000	5	
MW-3D	Dichlorodifluoromethane	2.2	ug/l	02/19/2008	1000	5	
MW-3D	Dichlorodifluoromethane	1.7	ug/l	08/19/2008	1000	5	
MW-3D	Dichlorodifluoromethane	1.3	ug/l	02/17/2009	1000	5	
MW-3D	Dichlorodifluoromethane	1.4	ug/l	08/19/2009	1000	5	
MW-3D	Dichlorodifluoromethane	1.3	ug/l	02/17/2010	1000	5	
MW-3D	Dichlorodifluoromethane	1.1	ug/l	08/25/2011	1000	5	
MW-3D	Dichlorodifluoromethane	0.6	ug/l	2/22/2012	1000	5	
MW-3D	Dinoseb	2.6	ug/l	10/07/1999	NE	1	
MW-3D	**Gamma-BHC (Lindane)**	**0.033**	**ug/l**	**02/19/2008**	**0.03**	**0.05**	**0.003**
MW-3D	Methylene Chloride	0.7	ug/l	08/09/2007	5	1	

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MW-3D	Methylene Chloride	0.6	ug/l	08/19/2008	5	1	
MW-3D	Methylene Chloride	0.3	ug/l	02/17/2009	5	1	
MW-3D	Methylene Chloride	0.2	ug/l	08/19/2009	5	1	
MW-3D	**Napththalene**	**17.0**	**ug/l**	**08/10/2000**	**6**	**10**	**11**
MW-3D	**Tetrachloroethene**	**1.9**	**ug/l**	**08/09/2007**	**0.7**	**1**	**1.2**
MW-3D	**Tetrachloroethene**	**2.3**	**ug/l**	**02/19/2008**	**0.7**	**1**	**1.6**
MW-3D	**Tetrachloroethene**	**2.5**	**ug/l**	**08/19/2008**	**0.7**	**1**	**1.8**
MW-3D	**Tetrachloroethene**	**2.2**	**ug/l**	**02/17/2009**	**0.7**	**1**	**1.5**
MW-3D	**Tetrachloroethene**	**2.1**	**ug/l**	**08/19/2009**	**0.7**	**1**	**1.4**
MW-3D	**Tetrachloroethene**	**1.9**	**ug/l**	**02/17/2010**	**0.7**	**1**	**1.2**
MW-3D	**Tetrachloroethene**	**1.5**	**ug/l**	**08/23/2010**	**0.7**	**1**	**0.8**
MW-3D	**Tetrachloroethene**	**1.5**	**ug/l**	**02/21/2011**	**0.7**	**1**	**0.8**
MW-3D	**Tetrachloroethene**	**0.9**	**ug/l**	**2/22/2012**	**0.7**	**1**	**0.2**
MW-3D	**Tetrachloroethene (-ethylene)**	**1.2**	**ug/l**	**08/25/2011**	**0.7**	**1**	**0.5**
MW-3D	Toluene	0.6	ug/l	08/09/2007	600	1	
MW-3D	Toluene	0.3	ug/l	02/19/2008	600	1	
MW-3D	**Trichloroethene**	**5.4**	**ug/l**	**10/07/1999**	**3**	**1**	**2.4**
MW-3D	Trichloroethene	1.9	ug/l	08/09/2007	3	1	
MW-3D	Trichloroethene	2.1	ug/l	08/19/2008	3	1	
MW-3D	Trichloroethene	1.7	ug/l	02/17/2009	3	1	
MW-3D	Trichloroethene	1.4	ug/l	08/19/2009	3	1	
MW-3D	Trichloroethene	1.3	ug/l	02/17/2010	3	1	
MW-3D	Trichloroethene	1.2	ug/l	08/23/2010	3	1	
MW-3D	Trichloroethene	1.3	ug/l	02/21/2011	3	1	
MW-3D	Trichloroethene	0.8	ug/l	2/22/2012	3	1	
MW-3D	Trichloroethene (-ethylene)	1.2	ug/l	08/25/2011	3	1	
MW-6	1,1-Dichloroethane	6.0	ug/l	02/25/1997	6	5	
MW-6	**Bis-(2-Ethylhexyl) Phthalate**	**620.0**	**ug/l**	**02/25/1999**	**3**	**15**	**617**
MW-6	Chlorobenzene	5.0	ug/l	02/15/1996	50	3	
MW-6	Chlorobenzene	5.7	ug/l	02/02/1998	50	3	
MW-6	Dinoseb	2.3	ug/l	02/02/1998	NE	1	
MW-6	Isophorone	10.0	ug/l	08/09/1995	40	10	
MW-6D	1,1-Dichloroethane	1.0	ug/l	08/09/2007	6	5	
MW-6D	1,1-Dichloroethane	0.4	ug/l	02/19/2008	6	5	
MW-6D	1,1-Dichloroethane	0.5	ug/l	08/19/2008	6	5	
MW-6D	1,1-Dichloroethane	0.3	ug/l	08/19/2009	6	5	
MW-6D	1,1-Dichloroethane	0.5	ug/l	02/17/2010	6	5	
MW-6D	1,2-Dichlorobenzene	0.3	ug/l	08/09/2007	20	5	
MW-6D	1,2-Dichlorobenzene	0.2	ug/l	02/19/2008	20	5	
MW-6D	1,2-Dichlorobenzene	0.3	ug/l	08/19/2008	20	5	
MW-6D	1,2-Dichlorobenzene	0.2	ug/l	08/19/2009	20	5	
MW-6D	1,2-Dichloroethane	0.2	ug/l	08/09/2007	0.4	1	
MW-6D	1,4-Dichlorobenzene	1.9	ug/l	08/09/2007	6	1	
MW-6D	1,4-Dichlorobenzene	1.8	ug/l	02/19/2008	6	1	
MW-6D	1,4-Dichlorobenzene	2.4	ug/l	08/19/2008	6	1	
MW-6D	1,4-Dichlorobenzene	2.4	ug/l	02/17/2009	6	1	
MW-6D	1,4-Dichlorobenzene	2.2	ug/l	08/19/2009	6	1	
MW-6D	1,4-Dichlorobenzene	1.7	ug/l	02/17/2010	6	1	
MW-6D	1,4-Dichlorobenzene	2.5	ug/l	08/23/2010	6	1	
MW-6D	1,4-Dichlorobenzene	2.1	ug/l	02/21/2011	6	1	
MW-6D	1,4-Dichlorobenzene	1.7	ug/l	08/25/2011	6	1	
MW-6D	1,4-Dichlorobenzene	1.8	ug/l	2/22/2012	6	1	
MW-6D	2,4-D	2.6	ug/l	08/10/2000	70	2	
MW-6D	2,4-D	3.1	ug/l	02/24/2004	70	2	
MW-6D	2-Butanone	1.8	ug/l	08/09/2007	4000	100	
MW-6D	2-Butanone (Methyl ethyl ketone)	3.1	ug/l	08/19/2008	4000	100	

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Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-6D	2-Butanone (Methyl ethyl ketone)	1.6	ug/l	08/19/2009	4000	100	
MW-6D	4,4-DDD	0.055	ug/l	2/22/2012	0.1	0.1	
MW-6D	Acetone	1.3	ug/l	08/09/2007	6000	100	
MW-6D	Acetone	3.2	ug/l	02/19/2008	6000	100	
MW-6D	Acetone	4.7	ug/l	08/19/2008	6000	100	
MW-6D	Acetone	3.2	ug/l	08/19/2009	6000	100	
MW-6D	Alpha-BHC	0.054	ug/l	02/24/2004	NE	0.05	
MW-6D	Alpha-BHC	0.038	ug/l	02/19/2008	NE	0.05	
MW-6D	**Benzene**	**2.1**	**ug/l**	**08/09/2007**	**1**	**1**	**1.1**
MW-6D	**Benzene**	**1.7**	**ug/l**	**02/19/2008**	**1**	**1**	**0.7**
MW-6D	**Benzene**	**2.2**	**ug/l**	**08/19/2008**	**1**	**1**	**1.2**
MW-6D	**Benzene**	**1.8**	**ug/l**	**02/17/2009**	**1**	**1**	**0.8**
MW-6D	**Benzene**	**1.8**	**ug/l**	**08/19/2009**	**1**	**1**	**0.8**
MW-6D	**Benzene**	**1.8**	**ug/l**	**02/17/2010**	**1**	**1**	**0.8**
MW-6D	**Benzene**	**1.9**	**ug/l**	**08/23/2010**	**1**	**1**	**0.9**
MW-6D	**Benzene**	**1.8**	**ug/l**	**02/21/2011**	**1**	**1**	**0.8**
MW-6D	**Benzene**	**1.6**	**ug/l**	**08/25/2011**	**1**	**1**	**0.6**
MW-6D	**Benzene**	**1.1**	**ug/l**	**2/22/2012**	**1**	**1**	**0.1**
MW-6D	**Bis-(2-Ethylhexyl) Phthalate**	**15.1**	**ug/l**	**08/09/2007**	**3**	**15**	**12.1**
MW-6D	**Bis-(2-Ethylhexyl) Phthalate**	**10.6**	**ug/l**	**02/17/2010**	**3**	**15**	**7.6**
MW-6D	Chlorobenzene	41.0	ug/l	08/10/2000	50	3	
MW-6D	Chlorobenzene	7.4	ug/l	02/07/2002	50	3	
MW-6D	Chlorobenzene	15.7	ug/l	08/14/2002	50	3	
MW-6D	Chlorobenzene	7.5	ug/l	02/12/2003	50	3	
MW-6D	Chlorobenzene	5.5	ug/l	08/07/2003	50	3	
MW-6D	Chlorobenzene	10.2	ug/l	08/12/2004	50	3	
MW-6D	Chlorobenzene	7.9	ug/l	08/16/2005	50	3	
MW-6D	Chlorobenzene	7.5	ug/l	02/14/2006	50	3	
MW-6D	Chlorobenzene	7.6	ug/l	08/22/2006	50	3	
MW-6D	Chlorobenzene	5.4	ug/l	02/14/2007	50	3	
MW-6D	Chlorobenzene	9.7	ug/l	08/09/2007	50	3	
MW-6D	Chlorobenzene	9.5	ug/l	02/19/2008	50	3	
MW-6D	Chlorobenzene	11.9	ug/l	08/19/2008	50	3	
MW-6D	Chlorobenzene	11.8	ug/l	02/17/2009	50	3	
MW-6D	Chlorobenzene	10.0	ug/l	08/19/2009	50	3	
MW-6D	Chlorobenzene	18.5	ug/l	02/17/2010	50	3	
MW-6D	Chlorobenzene	10.3	ug/l	08/23/2010	50	3	
MW-6D	Chlorobenzene	13.0	ug/l	02/21/2011	50	3	
MW-6D	Chlorobenzene	7.0	ug/l	08/25/2011	50	3	
MW-6D	Chlorobenzene	5.6	ug/l	2/22/2012	50	3	
MW-6D	Chloroethane	0.6	ug/l	08/09/2007	3000	10	
MW-6D	Chloroethane	0.9	ug/l	08/19/2008	3000	10	
MW-6D	Chloroethane	0.7	ug/l	08/25/2011	3000	10	
MW-6D	Chloroethane	0.7	ug/l	2/22/2012	3000	10	
MW-6D	Cis-1,2-Dichloroethene	1.1	ug/l	02/19/2008	70	5	
MW-6D	Cis-1,2-Dichloroethene	1.1	ug/l	08/19/2008	70	5	
MW-6D	Cis-1,2-Dichloroethene	1.0	ug/l	02/17/2009	70	5	
MW-6D	Cis-1,2-Dichloroethene	0.7	ug/l	08/19/2009	70	5	
MW-6D	Cis-1,2-Dichloroethene	1.5	ug/l	02/17/2010	70	5	
MW-6D	Delta-BHC	0.170	ug/l	10/07/1999	NE	0.05	
MW-6D	Delta-BHC	0.086	ug/l	02/02/2000	NE	0.05	
MW-6D	Delta-BHC	0.084	ug/l	08/12/2004	NE	0.05	
MW-6D	Delta-BHC	0.042	ug/l	02/19/2008	NE	0.05	
MW-6D	Dichlorodifluoromethane	0.2	ug/l	08/09/2007	1000	5	
MW-6D	Dichlorodifluoromethane	0.2	ug/l	08/19/2008	1000	5	
MW-6D	Dinoseb	2.3	ug/l	10/07/1999	NE	1	
MW-6D	**Heptachlor**	**0.042**	**ug/l**	**08/19/2009**	**0.008**	**0.05**	**0.034**

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MW-6D	Methylene Chloride	0.2	ug/l	08/09/2007	5	1	
MW-6D	**Napththalene**	**44.0**	**ug/l**	**08/10/2000**	**6**	**10**	**38**
MW-6D	Toluene	0.5	ug/l	08/09/2007	600	1	
MW-6D	Toluene	0.2	ug/l	02/19/2008	600	1	
MW-6D	**Vinyl chloride**	**1.4**	**ug/l**	**08/09/2007**	**0.03**	**1**	**1.37**
MW-6D	**Vinyl chloride**	**0.9**	**ug/l**	**02/19/2008**	**0.03**	**1**	**0.87**
MW-6D	**Vinyl chloride**	**1.1**	**ug/l**	**08/19/2008**	**0.03**	**1**	**1.07**
MW-6D	**Vinyl chloride**	**0.9**	**ug/l**	**02/17/2009**	**0.03**	**1**	**0.87**
MW-6D	**Vinyl chloride**	**0.7**	**ug/l**	**08/19/2009**	**0.03**	**1**	**0.67**
MW-6D	**Vinyl chloride**	**1.1**	**ug/l**	**02/17/2010**	**0.03**	**1**	**1.07**
MW-7	**Bis-(2-Ethylhexyl) Phthalate**	**59.0**	**ug/l**	**02/25/1997**	**3**	**15**	**56**
MW-7	**Bis-(2-Ethylhexyl) Phthalate**	**46.0**	**ug/l**	**02/25/1999**	**3**	**15**	**43**
MW-7	Dinoseb	1.6	ug/l	02/02/1998	NE	1	
MW-7	Dinoseb	2.9	ug/l	04/16/1998	NE	1	
MW-7D	2-Butanone	1.9	ug/l	08/09/2007	4000	100	
MW-7D	2-Butanone (Methyl ethyl ketone)	3.6	ug/l	08/19/2008	4000	100	
MW-7D	Acetone	1.3	ug/l	08/09/2007	6000	100	
MW-7D	Acetone	3.0	ug/l	02/19/2008	6000	100	
MW-7D	Acetone	5.1	ug/l	08/19/2008	6000	100	
MW-7D	Alpha-BHC	0.037	ug/l	02/19/2008	NE	0.05	
MW-7D	**Bis-(2-Ethylhexyl) Phthalate**	**23.0**	**ug/l**	**08/10/2000**	**3**	**15**	**20**
MW-7D	**Bis-(2-Ethylhexyl) Phthalate**	**31.0**	**ug/l**	**02/15/2005**	**3**	**15**	**28**
MW-7D	**Bis-(2-Ethylhexyl) Phthalate**	**14.8**	**ug/l**	**08/19/2008**	**3**	**15**	**11.8**
MW-7D	**Bis-(2-Ethylhexyl) Phthalate**	**11.1**	**ug/l**	**02/17/2010**	**3**	**15**	**8.1**
MW-7D	Delta-BHC	0.043	ug/l	02/19/2008	NE	0.05	
MW-7D	Napththalene	5.8	ug/l	08/10/2000	6	10	
MW-7D	Toluene	0.4	ug/l	08/09/2007	600	1	
MW-7D	Toluene	0.2	ug/l	02/19/2008	600	1	
MW-15	1,1,1-Trichloroethane	6.0	ug/l	12/04/1995	200	1	
MW-15	1,1,1-Trichloroethane	6.0	ug/l	02/15/1996	200	1	
MW-15	**1,1-Dichloroethane**	**76.0**	**ug/l**	**09/26/1994**	**6**	**5**	**70**
MW-15	**1,1-Dichloroethane**	**68.0**	**ug/l**	**10/31/1994**	**6**	**5**	**62**
MW-15	**1,1-Dichloroethane**	**73.0**	**ug/l**	**01/09/1995**	**6**	**5**	**67**
MW-15	**1,1-Dichloroethane**	**96.0**	**ug/l**	**03/17/1995**	**6**	**5**	**90**
MW-15	**1,1-Dichloroethane**	**64.0**	**ug/l**	**08/09/1995**	**6**	**5**	**58**
MW-15	**1,1-Dichloroethane**	**75.0**	**ug/l**	**12/04/1995**	**6**	**5**	**69**
MW-15	**1,1-Dichloroethane**	**76.0**	**ug/l**	**02/15/1996**	**6**	**5**	**70**
MW-15	**1,1-Dichloroethane**	**66.0**	**ug/l**	**08/08/1996**	**6**	**5**	**60**
MW-15	**1,1-Dichloroethane**	**78.0**	**ug/l**	**02/25/1997**	**6**	**5**	**72**
MW-15	**1,1-Dichloroethane**	**68.0**	**ug/l**	**08/18/1997**	**6**	**5**	**62**
MW-15	**1,1-Dichloroethane**	**73.0**	**ug/l**	**02/02/1998**	**6**	**5**	**67**
MW-15	**1,1-Dichloroethane**	**45.0**	**ug/l**	**09/10/1998**	**6**	**5**	**39**
MW-15	**1,1-Dichloroethane**	**56.0**	**ug/l**	**02/25/1999**	**6**	**5**	**50**
MW-15	**1,1-Dichloroethane**	**40.7**	**ug/l**	**10/07/1999**	**6**	**5**	**34.7**
MW-15	**1,1-Dichloroethane**	**37.0**	**ug/l**	**02/02/2000**	**6**	**5**	**31**
MW-15	**1,1-Dichloroethane**	**49.0**	**ug/l**	**08/10/2000**	**6**	**5**	**43**
MW-15	**1,1-Dichloroethene**	**8.0**	**ug/l**	**02/25/1997**	**7**	**5**	**1**
MW-15	1,2,4-Trichlorobenzene	20.0	ug/l	08/09/1995	70	10	
MW-15	1,2,4-Trichlorobenzene	33.0	ug/l	12/04/1995	70	10	
MW-15	1,2-Dichlorobenzene	5.6	ug/l	02/02/2000	20	5	
MW-15	**1,2-Dichloropropane**	**52.0**	**ug/l**	**01/09/1995**	**0.6**	**1**	**51.4**
MW-15	**1,2-Dichloropropane**	**70.0**	**ug/l**	**03/17/1995**	**0.6**	**1**	**69.4**
MW-15	**1,2-Dichloropropane**	**33.0**	**ug/l**	**02/02/1998**	**0.6**	**1**	**32.4**
MW-15	**1,4-Dichlorobenzene**	**9.5**	**ug/l**	**08/18/1997**	**6**	**1**	**3.5**
MW-15	**1,4-Dichlorobenzene**	**14.0**	**ug/l**	**02/02/1998**	**6**	**1**	**8**
MW-15	**1,4-Dichlorobenzene**	**11.0**	**ug/l**	**09/10/1998**	**6**	**1**	**5**

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MW-15	**1,4-Dichlorobenzene**	**17.0**	**ug/l**	**02/25/1999**	**6**	**1**	**11**
MW-15	**1,4-Dichlorobenzene**	**18.2**	**ug/l**	**10/07/1999**	**6**	**1**	**12.2**
MW-15	**1,4-Dichlorobenzene**	**23.0**	**ug/l**	**02/02/2000**	**6**	**1**	**17**
MW-15	**1,4-Dichlorobenzene**	**12.0**	**ug/l**	**08/10/2000**	**6**	**1**	**6**
MW-15	Aldrin	0.060	ug/l	02/02/1998	NE	0.05	
MW-15	Alpha-BHC	0.125	ug/l	08/10/2000	NE	0.05	
MW-15	**Benzene**	**8.0**	**ug/l**	**01/09/1995**	**1**	**1**	**7**
MW-15	**Benzene**	**9.0**	**ug/l**	**03/17/1995**	**1**	**1**	**8**
MW-15	**Benzene**	**8.0**	**ug/l**	**12/04/1995**	**1**	**1**	**7**
MW-15	**Benzene**	**9.0**	**ug/l**	**02/15/1996**	**1**	**1**	**8**
MW-15	**Benzene**	**9.0**	**ug/l**	**08/08/1996**	**1**	**1**	**8**
MW-15	**Benzene**	**19.0**	**ug/l**	**02/25/1997**	**1**	**1**	**18**
MW-15	**Benzene**	**12.0**	**ug/l**	**08/18/1997**	**1**	**1**	**11**
MW-15	**Benzene**	**13.0**	**ug/l**	**02/02/1998**	**1**	**1**	**12**
MW-15	**Benzene**	**11.0**	**ug/l**	**09/10/1998**	**1**	**1**	**10**
MW-15	**Benzene**	**15.0**	**ug/l**	**02/25/1999**	**1**	**1**	**14**
MW-15	**Benzene**	**15.0**	**ug/l**	**10/07/1999**	**1**	**1**	**14**
MW-15	**Benzene**	**16.0**	**ug/l**	**02/02/2000**	**1**	**1**	**15**
MW-15	**Benzene**	**14.0**	**ug/l**	**08/10/2000**	**1**	**1**	**13**
MW-15	Beta-BHC	0.650	ug/l	10/07/1999	NE	0.05	
MW-15	Beta-BHC	0.730	ug/l	02/02/2000	NE	0.05	
MW-15	**Bis-(2-Ethylhexyl) Phthalate**	**21.0**	**ug/l**	**02/25/1997**	**3**	**15**	**18**
MW-15	**Bis-(2-Ethylhexyl) Phthalate**	**76.0**	**ug/l**	**02/25/1999**	**3**	**15**	**73**
MW-15	Chloroethane	25.0	ug/l	09/26/1994	3000	10	
MW-15	Chloroethane	25.0	ug/l	10/31/1994	3000	10	
MW-15	Chloroethane	20.0	ug/l	01/09/1995	3000	10	
MW-15	Chloroethane	19.0	ug/l	03/17/1995	3000	10	
MW-15	Chloroethane	12.0	ug/l	08/09/1995	3000	10	
MW-15	Chloroethane	20.0	ug/l	12/04/1995	3000	10	
MW-15	Chloroethane	20.0	ug/l	02/15/1996	3000	10	
MW-15	Chloroethane	17.0	ug/l	08/08/1996	3000	10	
MW-15	Chloroethane	13.0	ug/l	08/18/1997	3000	10	
MW-15	Chloroethane	11.9	ug/l	02/02/1998	3000	10	
MW-15	Chloroethane	11.0	ug/l	02/25/1999	3000	10	
MW-15	Chloroethane	12.6	ug/l	10/07/1999	3000	10	
MW-15	Cis-1,2-Dichloroethene	29.0	ug/l	10/31/1994	70	5	
MW-15	Cis-1,2-Dichloroethene	34.0	ug/l	03/17/1995	70	5	
MW-15	Cis-1,2-Dichloroethene	28.0	ug/l	08/09/1995	70	5	
MW-15	Cis-1,2-Dichloroethene	26.0	ug/l	12/04/1995	70	5	
MW-15	Cis-1,2-Dichloroethene	40.0	ug/l	02/15/1996	70	5	
MW-15	Cis-1,2-Dichloroethene	41.0	ug/l	08/08/1996	70	5	
MW-15	Cis-1,2-Dichloroethene	67.0	ug/l	02/25/1997	70	5	
MW-15	Cis-1,2-Dichloroethene	60.0	ug/l	08/18/1997	70	5	
MW-15	Cis-1,2-Dichloroethene	62.0	ug/l	02/02/1998	70	5	
MW-15	Cis-1,2-Dichloroethene	48.0	ug/l	09/10/1998	70	5	
MW-15	Cis-1,2-Dichloroethene	62.0	ug/l	02/25/1999	70	5	
MW-15	Cis-1,2-Dichloroethene	61.0	ug/l	10/07/1999	70	5	
MW-15	Cis-1,2-Dichloroethene	52.0	ug/l	02/02/2000	70	5	
MW-15	Cis-1,2-Dichloroethene	70.0	ug/l	08/10/2000	70	5	
MW-15	Delta-BHC	0.058	ug/l	02/02/2000	NE	0.05	
MW-15	Dinoseb	1.7	ug/l	08/10/2000	NE	1	
MW-15	Ethylbenzene	75.0	ug/l	09/26/1994	600	1	
MW-15	Ethylbenzene	10.0	ug/l	01/09/1995	600	1	
MW-15	Ethylbenzene	7.0	ug/l	12/04/1995	600	1	
MW-15	Ethylbenzene	11.0	ug/l	08/18/1997	600	1	
MW-15	Ethylbenzene	7.5	ug/l	02/02/1998	600	1	
MW-15	Ethylbenzene	8.2	ug/l	02/25/1999	600	1	

RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES

Table 4: Historic VOC Detections

Halifax County CAER

Date: 5/22/2012
By: MG

Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-15	Ethylbenzene	10.6	ug/l	10/07/1999	600	1	
MW-15	Ethylbenzene	19.0	ug/l	02/02/2000	600	1	
MW-15	Ethylbenzene	5.5	ug/l	08/10/2000	600	1	
MW-15	**Methylene Chloride**	**305.0**	**ug/l**	**09/26/1994**	**5**	**1**	**300**
MW-15	**Methylene Chloride**	**329.0**	**ug/l**	**10/31/1994**	**5**	**1**	**324**
MW-15	**Methylene Chloride**	**353.0**	**ug/l**	**01/09/1995**	**5**	**1**	**348**
MW-15	**Methylene Chloride**	**371.0**	**ug/l**	**03/17/1995**	**5**	**1**	**366**
MW-15	**Methylene Chloride**	**350.0**	**ug/l**	**08/09/1995**	**5**	**1**	**345**
MW-15	**Methylene Chloride**	**354.0**	**ug/l**	**12/04/1995**	**5**	**1**	**349**
MW-15	**Methylene Chloride**	**269.0**	**ug/l**	**08/08/1996**	**5**	**1**	**264**
MW-15	**Methylene Chloride**	**258.0**	**ug/l**	**02/25/1997**	**5**	**1**	**253**
MW-15	**Methylene Chloride**	**184.0**	**ug/l**	**08/18/1997**	**5**	**1**	**179**
MW-15	**Methylene Chloride**	**109.0**	**ug/l**	**02/02/1998**	**5**	**1**	**104**
MW-15	**Methylene Chloride**	**120.0**	**ug/l**	**02/25/1999**	**5**	**1**	**115**
MW-15	**Methylene Chloride**	**157.0**	**ug/l**	**10/07/1999**	**5**	**1**	**152**
MW-15	**Methylene Chloride**	**136.0**	**ug/l**	**08/10/2000**	**5**	**1**	**131**
MW-15	**Tetrachloroethene**	**21.0**	**ug/l**	**10/31/1994**	**0.7**	**1**	**20.3**
MW-15	**Tetrachloroethene**	**22.0**	**ug/l**	**03/17/1995**	**0.7**	**1**	**21.3**
MW-15	**Tetrachloroethene**	**20.0**	**ug/l**	**08/09/1995**	**0.7**	**1**	**19.3**
MW-15	**Tetrachloroethene**	**29.0**	**ug/l**	**12/04/1995**	**0.7**	**1**	**28.3**
MW-15	**Tetrachloroethene**	**22.0**	**ug/l**	**02/15/1996**	**0.7**	**1**	**21.3**
MW-15	**Tetrachloroethene**	**7.0**	**ug/l**	**08/08/1996**	**0.7**	**1**	**6.3**
MW-15	**Tetrachloroethene**	**5.9**	**ug/l**	**08/18/1997**	**0.7**	**1**	**5.2**
MW-15	**Tetrachloroethene**	**9.5**	**ug/l**	**02/02/1998**	**0.7**	**1**	**8.8**
MW-15	**Tetrachloroethene**	**6.4**	**ug/l**	**02/25/1999**	**0.7**	**1**	**5.7**
MW-15	**Tetrachloroethene**	**5.6**	**ug/l**	**10/07/1999**	**0.7**	**1**	**4.9**
MW-15	**Tetrachloroethene**	**5.3**	**ug/l**	**02/02/2000**	**0.7**	**1**	**4.6**
MW-15	**Tetrachloroethene**	**5.7**	**ug/l**	**08/10/2000**	**0.7**	**1**	**5**
MW-15	**Toluene**	**605.0**	**ug/l**	**09/26/1994**	**600**	**1**	**5**
MW-15	Toluene	500.0	ug/l	10/31/1994	600	1	
MW-15	Toluene	77.0	ug/l	01/09/1995	600	1	
MW-15	Toluene	31.0	ug/l	03/17/1995	600	1	
MW-15	Toluene	50.0	ug/l	08/09/1995	600	1	
MW-15	Toluene	33.0	ug/l	12/04/1995	600	1	
MW-15	Toluene	18.0	ug/l	02/15/1996	600	1	
MW-15	Toluene	8.0	ug/l	08/08/1996	600	1	
MW-15	Toluene	25.0	ug/l	02/25/1997	600	1	
MW-15	Toluene	9.8	ug/l	08/18/1997	600	1	
MW-15	Toluene	7.0	ug/l	02/02/1998	600	1	
MW-15	Toluene	13.0	ug/l	09/10/1998	600	1	
MW-15	Toluene	19.0	ug/l	02/25/1999	600	1	
MW-15	Toluene	16.0	ug/l	10/07/1999	600	1	
MW-15	Toluene	56.0	ug/l	02/02/2000	600	1	
MW-15	Toluene	9.4	ug/l	08/10/2000	600	1	
MW-15	**Trichloroethene**	**62.0**	**ug/l**	**09/26/1994**	**3**	**1**	**59**
MW-15	**Trichloroethene**	**50.0**	**ug/l**	**10/31/1994**	**3**	**1**	**47**
MW-15	**Trichloroethene**	**50.0**	**ug/l**	**08/09/1995**	**3**	**1**	**47**
MW-15	**Trichloroethene**	**64.0**	**ug/l**	**12/04/1995**	**3**	**1**	**61**
MW-15	**Trichloroethene**	**70.0**	**ug/l**	**02/15/1996**	**3**	**1**	**67**
MW-15	**Trichloroethene**	**44.0**	**ug/l**	**08/08/1996**	**3**	**1**	**41**
MW-15	**Trichloroethene**	**49.0**	**ug/l**	**02/25/1997**	**3**	**1**	**46**
MW-15	**Trichloroethene**	**28.0**	**ug/l**	**08/18/1997**	**3**	**1**	**25**
MW-15	**Trichloroethene**	**20.0**	**ug/l**	**09/10/1998**	**3**	**1**	**17**
MW-15	**Trichloroethene**	**24.0**	**ug/l**	**02/25/1999**	**3**	**1**	**21**
MW-15	**Trichloroethene**	**22.0**	**ug/l**	**10/07/1999**	**3**	**1**	**19**
MW-15	**Trichloroethene**	**18.0**	**ug/l**	**02/02/2000**	**3**	**1**	**15**
MW-15	**Trichloroethene**	**29.0**	**ug/l**	**08/10/2000**	**3**	**1**	**26**

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Table 4: Historic VOC Detections

Halifax County CAER

Date: 5/22/2012
By: MG

Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-15	Xylenes	189.0	ug/l	09/26/1994	500	5	
MW-15	Xylenes	197.0	ug/l	10/31/1994	500	5	
MW-15	Xylenes	86.0	ug/l	01/09/1995	500	5	
MW-15	Xylenes	152.0	ug/l	03/17/1995	500	5	
MW-15	Xylenes	130.0	ug/l	08/09/1995	500	5	
MW-15	Xylenes	95.0	ug/l	12/04/1995	500	5	
MW-15	Xylenes	139.0	ug/l	02/15/1996	500	5	
MW-15	Xylenes	61.0	ug/l	08/08/1996	500	5	
MW-15	Xylenes	121.0	ug/l	02/25/1997	500	5	
MW-15	Xylenes	130.0	ug/l	08/18/1997	500	5	
MW-15	Xylenes	146.0	ug/l	02/02/1998	500	5	
MW-15	Xylenes	48.0	ug/l	09/10/1998	500	5	
MW-15	Xylenes	64.0	ug/l	02/25/1999	500	5	
MW-15	Xylenes	75.5	ug/l	10/07/1999	500	5	
MW-15	Xylenes	126.0	ug/l	02/02/2000	500	5	
MW-15	Xylenes	68.0	ug/l	08/10/2000	500	5	
MW-15R	1,1,1-Trichloroethane	0.2	ug/l	08/09/2007	200	1	
MW-15R	**1,1-Dichloroethane**	**6.3**	**ug/l**	**02/02/2000**	**6**	**5**	**0.3**
MW-15R	**1,1-Dichloroethane**	**10.0**	**ug/l**	**08/10/2000**	**6**	**5**	**4**
MW-15R	**1,1-Dichloroethane**	**27.0**	**ug/l**	**02/06/2001**	**6**	**5**	**21**
MW-15R	**1,1-Dichloroethane**	**22.0**	**ug/l**	**08/07/2001**	**6**	**5**	**16**
MW-15R	**1,1-Dichloroethane**	**18.0**	**ug/l**	**02/07/2002**	**6**	**5**	**12**
MW-15R	**1,1-Dichloroethane**	**23.4**	**ug/l**	**08/14/2002**	**6**	**5**	**17.4**
MW-15R	**1,1-Dichloroethane**	**24.0**	**ug/l**	**02/12/2003**	**6**	**5**	**18**
MW-15R	**1,1-Dichloroethane**	**24.7**	**ug/l**	**08/07/2003**	**6**	**5**	**18.7**
MW-15R	**1,1-Dichloroethane**	**18.1**	**ug/l**	**02/24/2004**	**6**	**5**	**12.1**
MW-15R	**1,1-Dichloroethane**	**17.0**	**ug/l**	**08/12/2004**	**6**	**5**	**11**
MW-15R	**1,1-Dichloroethane**	**9.3**	**ug/l**	**02/15/2005**	**6**	**5**	**3.3**
MW-15R	**1,1-Dichloroethane**	**13.0**	**ug/l**	**08/16/2005**	**6**	**5**	**7**
MW-15R	**1,1-Dichloroethane**	**12.4**	**ug/l**	**02/14/2006**	**6**	**5**	**6.4**
MW-15R	**1,1-Dichloroethane**	**13.1**	**ug/l**	**08/22/2006**	**6**	**5**	**7.1**
MW-15R	**1,1-Dichloroethane**	**9.3**	**ug/l**	**02/14/2007**	**6**	**5**	**3.3**
MW-15R	**1,1-Dichloroethane**	**10.3**	**ug/l**	**08/09/2007**	**6**	**5**	**4.3**
MW-15R	**1,1-Dichloroethane**	**6.5**	**ug/l**	**02/19/2008**	**6**	**5**	**0.5**
MW-15R	1,1-Dichloroethane	4.7	ug/l	08/19/2008	6	5	
MW-15R	**1,1-Dichloroethane**	**6.4**	**ug/l**	**02/17/2009**	**6**	**5**	**0.4**
MW-15R	**1,1-Dichloroethane**	**8.1**	**ug/l**	**08/19/2009**	**6**	**5**	**2.1**
MW-15R	1,1-Dichloroethane	5.3	ug/l	02/17/2010	6	5	
MW-15R	**1,1-Dichloroethane**	**7.9**	**ug/l**	**08/23/2010**	**6**	**5**	**1.9**
MW-15R	**1,1-Dichloroethane**	**9.1**	**ug/l**	**02/21/2011**	**6**	**5**	**3.1**
MW-15R	**1,1-Dichloroethane**	**7.0**	**ug/l**	**08/24/2011**	**6**	**5**	**1**
MW-15R	1,1-Dichloroethane	4.1	ug/l	2/21/2012	6	5	
MW-15R	**1,2-Dichloroethane**	**0.6**	**ug/l**	**08/09/2007**	**0.4**	**1**	**0.2**
MW-15R	1,2-Dichloroethane	0.4	ug/l	02/19/2008	0.4	1	
MW-15R	1,2-Dichloroethane	0.4	ug/l	08/19/2008	0.4	1	
MW-15R	**1,2-Dichloroethane**	**0.5**	**ug/l**	**02/17/2009**	**0.4**	**1**	**0.1**
MW-15R	**1,2-Dichloroethane**	**0.6**	**ug/l**	**08/19/2009**	**0.4**	**1**	**0.2**
MW-15R	**1,2-Dichloroethane**	**0.5**	**ug/l**	**02/17/2010**	**0.4**	**1**	**0.1**
MW-15R	**1,2-Dichloroethane**	**0.6**	**ug/l**	**08/24/2011**	**0.4**	**1**	**0.2**
MW-15R	1,2-Dichloroethane	0.4	ug/l	2/21/2012	0.4	1	
MW-15R	**1,4-Dichlorobenzene**	**6.7**	**ug/l**	**02/12/2003**	**6**	**1**	**0.7**
MW-15R	**1,4-Dichlorobenzene**	**8.5**	**ug/l**	**08/07/2003**	**6**	**1**	**2.5**
MW-15R	**1,4-Dichlorobenzene**	**14.7**	**ug/l**	**02/24/2004**	**6**	**1**	**8.7**
MW-15R	**1,4-Dichlorobenzene**	**10.5**	**ug/l**	**08/12/2004**	**6**	**1**	**4.5**
MW-15R	1,4-Dichlorobenzene	5.7	ug/l	02/15/2005	6	1	
MW-15R	**1,4-Dichlorobenzene**	**9.6**	**ug/l**	**02/14/2007**	**6**	**1**	**3.6**

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Table 4: Historic VOC Detections

Halifax County CAER

Date: 5/22/2012
By: MG

Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-15R	**1,4-Dichlorobenzene**	**10.2**	**ug/l**	**08/09/2007**	**6**	**1**	**4.2**
MW-15R	**1,4-Dichlorobenzene**	**10.7**	**ug/l**	**02/19/2008**	**6**	**1**	**4.7**
MW-15R	1,4-Dichlorobenzene	4.1	ug/l	08/19/2008	6	1	
MW-15R	1,4-Dichlorobenzene	5.8	ug/l	02/17/2009	6	1	
MW-15R	**1,4-Dichlorobenzene**	**12.3**	**ug/l**	**08/19/2009**	**6**	**1**	**6.3**
MW-15R	**1,4-Dichlorobenzene**	**6.6**	**ug/l**	**02/17/2010**	**6**	**1**	**0.6**
MW-15R	1,4-Dichlorobenzene	4.2	ug/l	08/23/2010	6	1	
MW-15R	2,4-D	2.04	ug/l	02/06/2001	70	2	
MW-15R	2,4-D	0.39	ug/l	02/17/2009	70	2	
MW-15R	2-Butanone	1.8	ug/l	08/09/2007	4000	100	
MW-15R	2-Butanone (Methyl ethyl ketone)	3.4	ug/l	08/19/2008	4000	100	
MW-15R	Acetone	1.5	ug/l	08/09/2007	6000	100	
MW-15R	Acetone	2.7	ug/l	02/19/2008	6000	100	
MW-15R	Acetone	5.1	ug/l	08/19/2008	6000	100	
MW-15R	Alpha-BHC	0.054	ug/l	08/12/2004	NE	0.05	
MW-15R	Alpha-BHC	0.094	ug/l	02/14/2007	NE	0.05	
MW-15R	Alpha-BHC	0.292	ug/l	08/09/2007	NE	0.05	
MW-15R	Alpha-BHC	0.335	ug/l	02/19/2008	NE	0.05	
MW-15R	Alpha-BHC	0.061	ug/l	02/17/2009	NE	0.05	
MW-15R	**Benzene**	**6.5**	**ug/l**	**08/07/2001**	**1**	**1**	**5.5**
MW-15R	**Benzene**	**5.6**	**ug/l**	**02/07/2002**	**1**	**1**	**4.6**
MW-15R	**Benzene**	**8.0**	**ug/l**	**08/14/2002**	**1**	**1**	**7**
MW-15R	**Benzene**	**9.0**	**ug/l**	**02/12/2003**	**1**	**1**	**8**
MW-15R	**Benzene**	**7.2**	**ug/l**	**08/07/2003**	**1**	**1**	**6.2**
MW-15R	Benzene	0.3	ug/l	08/09/2007	1	1	
MW-15R	Benzene	0.2	ug/l	02/17/2009	1	1	
MW-15R	Benzene	0.3	ug/l	08/19/2009	1	1	
MW-15R	Beta-BHC	0.080	ug/l	10/07/1999	NE	0.05	
MW-15R	Beta-BHC	0.430	ug/l	08/12/2004	NE	0.05	
MW-15R	Beta-BHC	0.433	ug/l	02/15/2005	NE	0.05	
MW-15R	Beta-BHC	0.270	ug/l	08/16/2005	NE	0.05	
MW-15R	Beta-BHC	0.040	ug/l	02/17/2010	NE	0.05	
MW-15R	**Bis-(2-Ethylhexyl) Phthalate**	**24.0**	**ug/l**	**08/22/2006**	**3**	**15**	**21**
MW-15R	**Bis-(2-Ethylhexyl) Phthalate**	**47.0**	**ug/l**	**02/14/2007**	**3**	**15**	**44**
MW-15R	**Bis-(2-Ethylhexyl) Phthalate**	**31.0**	**ug/l**	**08/09/2007**	**3**	**15**	**28**
MW-15R	**Bis-(2-Ethylhexyl) Phthalate**	**14.3**	**ug/l**	**08/19/2008**	**3**	**15**	**11.3**
MW-15R	**Bis-(2-Ethylhexyl) Phthalate**	**11.4**	**ug/l**	**02/17/2010**	**3**	**15**	**8.4**
MW-15R	**Bis-(2-Ethylhexyl) Phthalate**	**25.0**	**ug/l**	**02/21/2011**	**3**	**15**	**22**
MW-15R	**Bis-(2-Ethylhexyl) Phthalate**	**23.0**	**ug/l**	**08/24/2011**	**3**	**15**	**20**
MW-15R	Chlorobenzene	0.2	ug/l	08/09/2007	50	3	
MW-15R	Chlorobenzene	0.2	ug/l	02/17/2009	50	3	
MW-15R	Chlorobenzene	0.3	ug/l	08/19/2009	50	3	
MW-15R	Chloroethane	0.3	ug/l	08/09/2007	3000	10	
MW-15R	Chloromethane	0.2	ug/l	08/19/2008	3	1	
MW-15R	Cis-1,2-Dichloroethene	20.0	ug/l	02/06/2001	70	5	
MW-15R	Cis-1,2-Dichloroethene	17.0	ug/l	08/07/2001	70	5	
MW-15R	Cis-1,2-Dichloroethene	26.0	ug/l	02/07/2002	70	5	
MW-15R	Cis-1,2-Dichloroethene	31.3	ug/l	08/14/2002	70	5	
MW-15R	Cis-1,2-Dichloroethene	36.7	ug/l	02/12/2003	70	5	
MW-15R	Cis-1,2-Dichloroethene	32.3	ug/l	08/07/2003	70	5	
MW-15R	Cis-1,2-Dichloroethene	11.1	ug/l	02/24/2004	70	5	
MW-15R	Cis-1,2-Dichloroethene	11.9	ug/l	08/12/2004	70	5	
MW-15R	Cis-1,2-Dichloroethene	7.9	ug/l	02/15/2005	70	5	
MW-15R	Cis-1,2-Dichloroethene	5.6	ug/l	02/14/2007	70	5	
MW-15R	Cis-1,2-Dichloroethene	7.8	ug/l	08/09/2007	70	5	
MW-15R	Cis-1,2-Dichloroethene	4.4	ug/l	02/19/2008	70	5	
MW-15R	Cis-1,2-Dichloroethene	2.4	ug/l	08/19/2008	70	5	

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Halifax County CAER

Date: 5/22/2012
By: MG

Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-15R	Cis-1,2-Dichloroethene	4.5	ug/l	02/17/2009	70	5	
MW-15R	Cis-1,2-Dichloroethene	6.8	ug/l	08/19/2009	70	5	
MW-15R	Cis-1,2-Dichloroethene	3.7	ug/l	02/17/2010	70	5	
MW-15R	Cis-1,2-Dichloroethene	6.6	ug/l	08/23/2010	70	5	
MW-15R	Cis-1,2-Dichloroethene	5.9	ug/l	02/21/2011	70	5	
MW-15R	Cis-1,2-Dichloroethene	1	ug/l	2/21/2012	70	5	
MW-15R	cis-1,2-Dichloroethene (-ethylene)	3.5	ug/l	08/24/2011	70	5	
MW-15R	Delta-BHC	0.068	ug/l	02/02/2000	NE	0.05	
MW-15R	Delta-BHC	0.120	ug/l	08/12/2004	NE	0.05	
MW-15R	Delta-BHC	0.089	ug/l	02/15/2005	NE	0.05	
MW-15R	Delta-BHC	0.067	ug/l	02/19/2008	NE	0.05	
MW-15R	Dichlorodifluoromethane	0.4	ug/l	08/09/2007	1000	5	
MW-15R	Dichlorodifluoromethane	0.3	ug/l	02/19/2008	1000	5	
MW-15R	Dichlorodifluoromethane	0.2	ug/l	08/19/2008	1000	5	
MW-15R	Dichlorodifluoromethane	0.2	ug/l	02/17/2009	1000	5	
MW-15R	Endrin	0.177	ug/l	02/06/2001	2	0.1	
MW-15R	**Gamma-BHC (Lindane)**	**0.085**	**ug/l**	**02/15/2005**	**0.03**	**0.05**	**0.055**
MW-15R	**Gamma-BHC (Lindane)**	**0.098**	**ug/l**	**02/14/2007**	**0.03**	**0.05**	**0.068**
MW-15R	**Gamma-BHC (Lindane)**	**0.039**	**ug/l**	**08/19/2009**	**0.03**	**0.05**	**0.009**
MW-15R	**Heptachlor**	**0.069**	**ug/l**	**02/06/2001**	**0.008**	**0.05**	**0.061**
MW-15R	**Heptachlor**	**0.088**	**ug/l**	**08/09/2007**	**0.008**	**0.05**	**0.08**
MW-15R	**Heptachlor**	**0.041**	**ug/l**	**08/19/2008**	**0.008**	**0.05**	**0.033**
MW-15R	**Methylene Chloride**	**16.0**	**ug/l**	**02/06/2001**	**5**	**1**	**11**
MW-15R	**Methylene Chloride**	**29.0**	**ug/l**	**08/07/2001**	**5**	**1**	**24**
MW-15R	**Methylene Chloride**	**24.0**	**ug/l**	**02/07/2002**	**5**	**1**	**19**
MW-15R	**Methylene Chloride**	**40.0**	**ug/l**	**08/14/2002**	**5**	**1**	**35**
MW-15R	**Methylene Chloride**	**45.3**	**ug/l**	**02/12/2003**	**5**	**1**	**40.3**
MW-15R	**Methylene Chloride**	**33.1**	**ug/l**	**08/07/2003**	**5**	**1**	**28.1**
MW-15R	**Methylene Chloride**	**12.5**	**ug/l**	**02/24/2004**	**5**	**1**	**7.5**
MW-15R	**Methylene Chloride**	**12.4**	**ug/l**	**02/14/2007**	**5**	**1**	**7.4**
MW-15R	**Methylene Chloride**	**6.5**	**ug/l**	**08/09/2007**	**5**	**1**	**1.5**
MW-15R	Methylene Chloride	2.3	ug/l	02/19/2008	5	1	
MW-15R	Methylene Chloride	3.1	ug/l	08/19/2008	5	1	
MW-15R	Methylene Chloride	3.8	ug/l	02/17/2009	5	1	
MW-15R	**Methylene Chloride**	**6.0**	**ug/l**	**08/19/2009**	**5**	**1**	**1**
MW-15R	Methylene Chloride	3.2	ug/l	02/17/2010	5	1	
MW-15R	**Methylene Chloride**	**7.7**	**ug/l**	**08/23/2010**	**5**	**1**	**2.7**
MW-15R	**Methylene Chloride**	**8.2**	**ug/l**	**02/21/2011**	**5**	**1**	**3.2**
MW-15R	Methylene chloride	4.2	ug/l	08/24/2011	5	1	
MW-15R	Methylene Chloride	2	ug/l	2/21/2012	5	1	
MW-15R	**Napththalene**	**9.1**	**ug/l**	**08/10/2000**	**6**	**10**	**3.1**
MW-15R	**Tetrachloroethene**	**5.6**	**ug/l**	**02/06/2001**	**0.7**	**1**	**4.9**
MW-15R	**Tetrachloroethene**	**5.4**	**ug/l**	**08/07/2001**	**0.7**	**1**	**4.7**
MW-15R	**Tetrachloroethene**	**5.6**	**ug/l**	**02/07/2002**	**0.7**	**1**	**4.9**
MW-15R	**Tetrachloroethene**	**6.3**	**ug/l**	**08/14/2002**	**0.7**	**1**	**5.6**
MW-15R	**Tetrachloroethene**	**5.6**	**ug/l**	**02/12/2003**	**0.7**	**1**	**4.9**
MW-15R	**Tetrachloroethene**	**5.1**	**ug/l**	**02/24/2004**	**0.7**	**1**	**4.4**
MW-15R	**Tetrachloroethene**	**3.3**	**ug/l**	**08/09/2007**	**0.7**	**1**	**2.6**
MW-15R	**Tetrachloroethene**	**2.5**	**ug/l**	**02/19/2008**	**0.7**	**1**	**1.8**
MW-15R	**Tetrachloroethene**	**1.9**	**ug/l**	**08/19/2008**	**0.7**	**1**	**1.2**
MW-15R	**Tetrachloroethene**	**2.5**	**ug/l**	**02/17/2009**	**0.7**	**1**	**1.8**
MW-15R	**Tetrachloroethene**	**3.1**	**ug/l**	**08/19/2009**	**0.7**	**1**	**2.4**
MW-15R	**Tetrachloroethene**	**2.5**	**ug/l**	**02/17/2010**	**0.7**	**1**	**1.8**
MW-15R	**Tetrachloroethene**	**2.5**	**ug/l**	**08/23/2010**	**0.7**	**1**	**1.8**
MW-15R	**Tetrachloroethene**	**2.5**	**ug/l**	**02/21/2011**	**0.7**	**1**	**1.8**
MW-15R	**Tetrachloroethene**	**1.5**	**ug/l**	**2/21/2012**	**0.7**	**1**	**0.8**
MW-15R	**Tetrachloroethene (-ethylene)**	**2.6**	**ug/l**	**08/24/2011**	**0.7**	**1**	**1.9**

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Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-15R	Toluene	0.4	ug/l	08/09/2007	600	1	
MW-15R	Toluene	0.2	ug/l	02/19/2008	600	1	
MW-15R	**Trichloroethene**	**16.0**	**ug/l**	**02/02/2000**	**3**	**1**	**13**
MW-15R	**Trichloroethene**	**12.0**	**ug/l**	**05/02/2000**	**3**	**1**	**9**
MW-15R	**Trichloroethene**	**17.0**	**ug/l**	**08/10/2000**	**3**	**1**	**14**
MW-15R	**Trichloroethene**	**22.0**	**ug/l**	**02/06/2001**	**3**	**1**	**19**
MW-15R	**Trichloroethene**	**25.0**	**ug/l**	**08/07/2001**	**3**	**1**	**22**
MW-15R	**Trichloroethene**	**21.0**	**ug/l**	**02/07/2002**	**3**	**1**	**18**
MW-15R	**Trichloroethene**	**21.0**	**ug/l**	**08/14/2002**	**3**	**1**	**18**
MW-15R	**Trichloroethene**	**20.0**	**ug/l**	**02/12/2003**	**3**	**1**	**17**
MW-15R	**Trichloroethene**	**16.2**	**ug/l**	**08/07/2003**	**3**	**1**	**13.2**
MW-15R	**Trichloroethene**	**8.6**	**ug/l**	**02/24/2004**	**3**	**1**	**5.6**
MW-15R	**Trichloroethene**	**8.5**	**ug/l**	**08/12/2004**	**3**	**1**	**5.5**
MW-15R	**Trichloroethene**	**3.4**	**ug/l**	**02/14/2007**	**3**	**1**	**0.4**
MW-15R	**Trichloroethene**	**4.4**	**ug/l**	**08/09/2007**	**3**	**1**	**1.4**
MW-15R	Trichloroethene	2.9	ug/l	02/19/2008	3	1	
MW-15R	Trichloroethene	1.3	ug/l	08/19/2008	3	1	
MW-15R	Trichloroethene	2.6	ug/l	02/17/2009	3	1	
MW-15R	**Trichloroethene**	**3.5**	**ug/l**	**08/19/2009**	**3**	**1**	**0.5**
MW-15R	Trichloroethene	2.1	ug/l	02/17/2010	3	1	
MW-15R	Trichloroethene	2.8	ug/l	08/23/2010	3	1	
MW-15R	Trichloroethene	2.6	ug/l	02/21/2011	3	1	
MW-15R	Trichloroethene	0.7	ug/l	2/21/2012	3	1	
MW-15R	Trichloroethene (-ethylene)	2.0	ug/l	08/24/2011	3	1	
MW-15R	Trichlorofluoromethane	0.3	ug/l	08/09/2007	2000	1	
MW-15R	Xylenes	8.0	ug/l	02/02/2000	500	5	
MW-15R	Xylenes	14.0	ug/l	02/06/2001	500	5	
MW-15R	Xylenes	17.0	ug/l	08/07/2001	500	5	
MW-15R	Xylenes	17.0	ug/l	02/07/2002	500	5	
MW-15R	Xylenes	22.3	ug/l	08/14/2002	500	5	
MW-15R	Xylenes	23.8	ug/l	02/12/2003	500	5	
MW-15R	Xylenes	24.9	ug/l	08/07/2003	500	5	
MW-15R	Xylenes	5.9	ug/l	02/24/2004	500	5	
MW-15R	Xylenes	2.2	ug/l	08/09/2007	500	5	
MW-15R	Xylenes	0.6	ug/l	02/19/2008	500	5	
MW-15R	Xylenes	0.5	ug/l	08/19/2008	500	5	
MW-15R	Xylenes	0.7	ug/l	02/17/2009	500	5	
MW-15R	Xylenes	0.8	ug/l	08/19/2009	500	5	
MW-16A	1,1,1-Trichloroethane	0.3	ug/l	08/09/2007	200	1	
MW-16A	1,1,1-Trichloroethane	0.2	ug/l	02/19/2008	200	1	
MW-16A	1,1,1-Trichloroethane	0.2	ug/l	08/19/2008	200	1	
MW-16A	1,1,1-Trichloroethane	0.2	ug/l	02/17/2009	200	1	
MW-16A	**1,1,2,2-Tetrachloroethane**	**0.6**	**ug/l**	**2/21/2012**	**0.2**	**3**	**0.4**
MW-16A	**1,1-Dichloroethane**	**9.6**	**ug/l**	**02/24/2004**	**6**	**5**	**3.6**
MW-16A	**1,1-Dichloroethane**	**12.3**	**ug/l**	**08/12/2004**	**6**	**5**	**6.3**
MW-16A	**1,1-Dichloroethane**	**9.8**	**ug/l**	**02/15/2005**	**6**	**5**	**3.8**
MW-16A	**1,1-Dichloroethane**	**12.1**	**ug/l**	**08/16/2005**	**6**	**5**	**6.1**
MW-16A	**1,1-Dichloroethane**	**12.9**	**ug/l**	**02/14/2006**	**6**	**5**	**6.9**
MW-16A	**1,1-Dichloroethane**	**13.6**	**ug/l**	**08/22/2006**	**6**	**5**	**7.6**
MW-16A	**1,1-Dichloroethane**	**13.4**	**ug/l**	**02/14/2007**	**6**	**5**	**7.4**
MW-16A	**1,1-Dichloroethane**	**14.3**	**ug/l**	**08/09/2007**	**6**	**5**	**8.3**
MW-16A	**1,1-Dichloroethane**	**10.3**	**ug/l**	**02/19/2008**	**6**	**5**	**4.3**
MW-16A	**1,1-Dichloroethane**	**13.2**	**ug/l**	**08/19/2008**	**6**	**5**	**7.2**
MW-16A	**1,1-Dichloroethane**	**10.6**	**ug/l**	**02/17/2009**	**6**	**5**	**4.6**
MW-16A	**1,1-Dichloroethane**	**9.6**	**ug/l**	**08/19/2009**	**6**	**5**	**3.6**
MW-16A	**1,1-Dichloroethane**	**8.0**	**ug/l**	**02/17/2010**	**6**	**5**	**2**

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Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-16A	**1,1-Dichloroethane**	**11.3**	**ug/l**	**08/23/2010**	**6**	**5**	**5.3**
MW-16A	**1,1-Dichloroethane**	**12.4**	**ug/l**	**02/21/2011**	**6**	**5**	**6.4**
MW-16A	**1,1-Dichloroethane**	**11.5**	**ug/l**	**08/24/2011**	**6**	**5**	**5.5**
MW-16A	**1,1-Dichloroethane**	**11.2**	**ug/l**	**2/21/2012**	**6**	**5**	**5.2**
MW-16A	1,1-Dichloroethene	0.4	ug/l	08/09/2007	7	5	
MW-16A	1,1-Dichloroethene	0.3	ug/l	02/19/2008	7	5	
MW-16A	1,1-Dichloroethene	0.4	ug/l	02/17/2009	7	5	
MW-16A	1,1-Dichloroethene	0.4	ug/l	2/21/2012	7	5	
MW-16A	1,1-Dichloroethene (-ethylene)	0.4	ug/l	08/19/2008	7	5	
MW-16A	1,1-Dichloroethene (-ethylene)	0.2	ug/l	08/19/2009	7	5	
MW-16A	1,1-Dichloroethene (-ethylene)	0.4	ug/l	08/24/2011	7	5	
MW-16A	1,2-Dichlorobenzene	0.9	ug/l	08/09/2007	20	5	
MW-16A	1,2-Dichlorobenzene	0.7	ug/l	02/19/2008	20	5	
MW-16A	1,2-Dichlorobenzene	1.0	ug/l	08/19/2008	20	5	
MW-16A	1,2-Dichlorobenzene	1.0	ug/l	02/17/2009	20	5	
MW-16A	1,2-Dichlorobenzene	1.0	ug/l	08/19/2009	20	5	
MW-16A	1,2-Dichlorobenzene	0.5	ug/l	02/17/2010	20	5	
MW-16A	1,2-Dichlorobenzene	0.8	ug/l	08/24/2011	20	5	
MW-16A	1,2-Dichloroethane	0.3	ug/l	08/09/2007	0.4	1	
MW-16A	1,2-Dichloroethane	0.2	ug/l	02/19/2008	0.4	1	
MW-16A	1,2-Dichloroethane	0.3	ug/l	08/19/2008	0.4	1	
MW-16A	1,2-Dichloropropane	0.6	ug/l	08/09/2007	0.6	1	
MW-16A	1,2-Dichloropropane	0.4	ug/l	02/19/2008	0.6	1	
MW-16A	1,2-Dichloropropane	0.6	ug/l	08/19/2008	0.6	1	
MW-16A	1,2-Dichloropropane	0.5	ug/l	02/17/2009	0.6	1	
MW-16A	1,2-Dichloropropane	0.6	ug/l	08/19/2009	0.6	1	
MW-16A	1,2-Dichloropropane	0.3	ug/l	02/17/2010	0.6	1	
MW-16A	1,2-Dichloropropane	0.3	ug/l	08/24/2011	0.6	1	
MW-16A	1,2-Dichloropropane	0.4	ug/l	2/21/2012	0.6	1	
MW-16A	1,4-Dichlorobenzene	1.4	ug/l	08/09/2007	6	1	
MW-16A	1,4-Dichlorobenzene	1.1	ug/l	02/19/2008	6	1	
MW-16A	1,4-Dichlorobenzene	1.5	ug/l	08/19/2008	6	1	
MW-16A	1,4-Dichlorobenzene	1.5	ug/l	02/17/2009	6	1	
MW-16A	1,4-Dichlorobenzene	1.8	ug/l	08/19/2009	6	1	
MW-16A	1,4-Dichlorobenzene	0.9	ug/l	02/17/2010	6	1	
MW-16A	1,4-Dichlorobenzene	1.5	ug/l	08/23/2010	6	1	
MW-16A	1,4-Dichlorobenzene	1.2	ug/l	08/24/2011	6	1	
MW-16A	2,3,4,6-Tetrachlorophenol	23.0	ug/l	08/09/1995	200	10	
MW-16A	2-Butanone	2.1	ug/l	08/09/2007	4000	100	
MW-16A	2-Butanone (Methyl ethyl ketone)	2.8	ug/l	08/19/2008	4000	100	
MW-16A	Acetone	2.1	ug/l	08/09/2007	6000	100	
MW-16A	Acetone	3.0	ug/l	02/19/2008	6000	100	
MW-16A	Acetone	4.6	ug/l	08/19/2008	6000	100	
MW-16A	Aldrin	0.037	ug/l	02/17/2009	NE	0.05	
MW-16A	Alpha-BHC	0.039	ug/l	02/19/2008	NE	0.05	
MW-16A	**Benzene**	**2.9**	**ug/l**	**08/09/2007**	**1**	**1**	**1.9**
MW-16A	**Benzene**	**2.0**	**ug/l**	**02/19/2008**	**1**	**1**	**1**
MW-16A	**Benzene**	**2.7**	**ug/l**	**08/19/2008**	**1**	**1**	**1.7**
MW-16A	**Benzene**	**2.5**	**ug/l**	**02/17/2009**	**1**	**1**	**1.5**
MW-16A	**Benzene**	**2.5**	**ug/l**	**08/19/2009**	**1**	**1**	**1.5**
MW-16A	**Benzene**	**1.5**	**ug/l**	**02/17/2010**	**1**	**1**	**0.5**
MW-16A	**Benzene**	**2.5**	**ug/l**	**08/23/2010**	**1**	**1**	**1.5**
MW-16A	**Benzene**	**1.2**	**ug/l**	**02/21/2011**	**1**	**1**	**0.2**
MW-16A	**Benzene**	**2.1**	**ug/l**	**08/24/2011**	**1**	**1**	**1.1**
MW-16A	**Benzene**	**1.9**	**ug/l**	**2/21/2012**	**1**	**1**	**0.9**
MW-16A	**Bis-(2-Ethylhexyl) Phthalate**	**62.0**	**ug/l**	**02/25/1997**	**3**	**15**	**59**
MW-16A	**Bis-(2-Ethylhexyl) Phthalate**	**160.0**	**ug/l**	**02/25/1999**	**3**	**15**	**157**

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Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-16A	**Bis-(2-Ethylhexyl) Phthalate**	**11.1**	**ug/l**	**08/09/2007**	**3**	**15**	**8.1**
MW-16A	Bromochloromethane	6.8	ug/l	08/14/2002	NE	3	
MW-16A	Bromoform	1	ug/l	2/21/2012	4	3	
MW-16A	Chlorobenzene	1.1	ug/l	08/09/2007	50	3	
MW-16A	Chlorobenzene	0.9	ug/l	02/19/2008	50	3	
MW-16A	Chlorobenzene	1.2	ug/l	08/19/2008	50	3	
MW-16A	Chlorobenzene	1.1	ug/l	02/17/2009	50	3	
MW-16A	Chlorobenzene	1.1	ug/l	08/19/2009	50	3	
MW-16A	Chlorobenzene	0.7	ug/l	02/17/2010	50	3	
MW-16A	Chlorobenzene	0.9	ug/l	08/24/2011	50	3	
MW-16A	Chlorobenzene	0.7	ug/l	2/21/2012	50	3	
MW-16A	Chloroethane	0.9	ug/l	08/09/2007	3000	10	
MW-16A	Chloroethane	1.0	ug/l	02/19/2008	3000	10	
MW-16A	Chloroethane	1.0	ug/l	08/19/2008	3000	10	
MW-16A	Chloroethane	0.8	ug/l	02/17/2009	3000	10	
MW-16A	Chloroethane	0.7	ug/l	08/19/2009	3000	10	
MW-16A	Chloroethane	0.5	ug/l	02/17/2010	3000	10	
MW-16A	Chloroethane	0.7	ug/l	08/24/2011	3000	10	
MW-16A	Chloromethane	0.2	ug/l	08/19/2008	3	1	
MW-16A	Chloromethane	0.6	ug/l	08/19/2009	3	1	
MW-16A	Cis-1,2-Dichloroethene	9.6	ug/l	02/24/2004	70	5	
MW-16A	Cis-1,2-Dichloroethene	20.3	ug/l	08/12/2004	70	5	
MW-16A	Cis-1,2-Dichloroethene	22.1	ug/l	02/15/2005	70	5	
MW-16A	Cis-1,2-Dichloroethene	27.7	ug/l	08/16/2005	70	5	
MW-16A	Cis-1,2-Dichloroethene	27.3	ug/l	02/14/2006	70	5	
MW-16A	Cis-1,2-Dichloroethene	32.4	ug/l	08/22/2006	70	5	
MW-16A	Cis-1,2-Dichloroethene	35.7	ug/l	02/14/2007	70	5	
MW-16A	Cis-1,2-Dichloroethene	40.5	ug/l	08/09/2007	70	5	
MW-16A	Cis-1,2-Dichloroethene	26.3	ug/l	02/19/2008	70	5	
MW-16A	Cis-1,2-Dichloroethene	35.1	ug/l	08/19/2008	70	5	
MW-16A	Cis-1,2-Dichloroethene	32.4	ug/l	02/17/2009	70	5	
MW-16A	Cis-1,2-Dichloroethene	29.8	ug/l	08/19/2009	70	5	
MW-16A	Cis-1,2-Dichloroethene	19.1	ug/l	02/17/2010	70	5	
MW-16A	Cis-1,2-Dichloroethene	29.6	ug/l	08/23/2010	70	5	
MW-16A	Cis-1,2-Dichloroethene	18.6	ug/l	02/21/2011	70	5	
MW-16A	Cis-1,2-Dichloroethene	23.1	ug/l	2/21/2012	70	5	
MW-16A	cis-1,2-Dichloroethene (-ethylene)	26.4	ug/l	08/24/2011	70	5	
MW-16A	Dichlorodifluoromethane	9.4	ug/l	08/12/2004	1000	5	
MW-16A	Dichlorodifluoromethane	7.1	ug/l	02/14/2006	1000	5	
MW-16A	Dichlorodifluoromethane	9.6	ug/l	02/14/2007	1000	5	
MW-16A	Dichlorodifluoromethane	4.7	ug/l	08/09/2007	1000	5	
MW-16A	Dichlorodifluoromethane	9.3	ug/l	02/19/2008	1000	5	
MW-16A	Dichlorodifluoromethane	6.3	ug/l	08/19/2008	1000	5	
MW-16A	Dichlorodifluoromethane	7.1	ug/l	02/17/2009	1000	5	
MW-16A	Dichlorodifluoromethane	6.7	ug/l	08/19/2009	1000	5	
MW-16A	Dichlorodifluoromethane	5.3	ug/l	02/17/2010	1000	5	
MW-16A	Dichlorodifluoromethane	5.3	ug/l	08/23/2010	1000	5	
MW-16A	Dichlorodifluoromethane	6.7	ug/l	02/21/2011	1000	5	
MW-16A	Dichlorodifluoromethane	10.0	ug/l	08/24/2011	1000	5	
MW-16A	Dichlorodifluoromethane	6.6	ug/l	2/21/2012	1000	5	
MW-16A	**Heptachlor**	**0.044**	**ug/l**	**08/19/2009**	**0.008**	**0.05**	**0.036**
MW-16A	**Methylene Chloride**	**18.5**	**ug/l**	**02/24/2004**	**5**	**1**	**13.5**
MW-16A	**Methylene Chloride**	**42.1**	**ug/l**	**08/12/2004**	**5**	**1**	**37.1**
MW-16A	**Methylene Chloride**	**49.3**	**ug/l**	**02/15/2005**	**5**	**1**	**44.3**
MW-16A	**Methylene Chloride**	**53.4**	**ug/l**	**08/16/2005**	**5**	**1**	**48.4**
MW-16A	**Methylene Chloride**	**46.6**	**ug/l**	**02/14/2006**	**5**	**1**	**41.6**
MW-16A	**Methylene Chloride**	**18.3**	**ug/l**	**08/22/2006**	**5**	**1**	**13.3**

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Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-16A	**Methylene Chloride**	**48.3**	**ug/l**	**02/14/2007**	**5**	**1**	**43.3**
MW-16A	**Methylene Chloride**	**22.5**	**ug/l**	**08/09/2007**	**5**	**1**	**17.5**
MW-16A	Methylene Chloride	1.2	ug/l	02/19/2008	5	1	
MW-16A	**Methylene Chloride**	**20.0**	**ug/l**	**08/19/2008**	**5**	**1**	**15**
MW-16A	**Methylene Chloride**	**6.4**	**ug/l**	**02/17/2009**	**5**	**1**	**1.4**
MW-16A	Methylene Chloride	4.4	ug/l	08/19/2009	5	1	
MW-16A	Methylene Chloride	2.6	ug/l	02/17/2010	5	1	
MW-16A	Methylene Chloride	1.4	ug/l	08/23/2010	5	1	
MW-16A	Methylene Chloride	1.7	ug/l	02/21/2011	5	1	
MW-16A	Methylene chloride	3.1	ug/l	08/24/2011	5	1	
MW-16A	**Tetrachloroethene**	**5.8**	**ug/l**	**02/07/2002**	**0.7**	**1**	**5.1**
MW-16A	**Tetrachloroethene**	**5.1**	**ug/l**	**02/12/2003**	**0.7**	**1**	**4.4**
MW-16A	**Tetrachloroethene**	**7.5**	**ug/l**	**08/07/2003**	**0.7**	**1**	**6.8**
MW-16A	**Tetrachloroethene**	**16.7**	**ug/l**	**02/24/2004**	**0.7**	**1**	**16**
MW-16A	**Tetrachloroethene**	**21.7**	**ug/l**	**08/12/2004**	**0.7**	**1**	**21**
MW-16A	**Tetrachloroethene**	**15.6**	**ug/l**	**02/15/2005**	**0.7**	**1**	**14.9**
MW-16A	**Tetrachloroethene**	**20.9**	**ug/l**	**08/16/2005**	**0.7**	**1**	**20.2**
MW-16A	**Tetrachloroethene**	**23.2**	**ug/l**	**02/14/2006**	**0.7**	**1**	**22.5**
MW-16A	**Tetrachloroethene**	**22.1**	**ug/l**	**08/22/2006**	**0.7**	**1**	**21.4**
MW-16A	**Tetrachloroethene**	**23.6**	**ug/l**	**02/14/2007**	**0.7**	**1**	**22.9**
MW-16A	**Tetrachloroethene**	**26.6**	**ug/l**	**08/09/2007**	**0.7**	**1**	**25.9**
MW-16A	**Tetrachloroethene**	**31.9**	**ug/l**	**02/19/2008**	**0.7**	**1**	**31.2**
MW-16A	**Tetrachloroethene**	**36.6**	**ug/l**	**08/19/2008**	**0.7**	**1**	**35.9**
MW-16A	**Tetrachloroethene**	**37.0**	**ug/l**	**02/17/2009**	**0.7**	**1**	**36.3**
MW-16A	**Tetrachloroethene**	**40.9**	**ug/l**	**08/19/2009**	**0.7**	**1**	**40.2**
MW-16A	**Tetrachloroethene**	**35.1**	**ug/l**	**02/17/2010**	**0.7**	**1**	**34.4**
MW-16A	**Tetrachloroethene**	**52.2**	**ug/l**	**08/23/2010**	**0.7**	**1**	**51.5**
MW-16A	**Tetrachloroethene**	**44.9**	**ug/l**	**02/21/2011**	**0.7**	**1**	**44.2**
MW-16A	**Tetrachloroethene**	**45.8**	**ug/l**	**2/21/2012**	**0.7**	**1**	**45.1**
MW-16A	**Tetrachloroethene (-ethylene)**	**53.1**	**ug/l**	**08/24/2011**	**0.7**	**1**	**52.4**
MW-16A	Toluene	0.6	ug/l	08/09/2007	600	1	
MW-16A	Toluene	0.3	ug/l	02/19/2008	600	1	
MW-16A	trans-1,2-Dichloroethene	0.4	ug/l	08/09/2007	100	5	
MW-16A	trans-1,2-Dichloroethene	0.2	ug/l	02/19/2008	100	5	
MW-16A	trans-1,2-Dichloroethene	0.4	ug/l	08/19/2008	100	5	
MW-16A	trans-1,2-Dichloroethene	0.3	ug/l	02/17/2009	100	5	
MW-16A	trans-1,2-Dichloroethene	0.4	ug/l	08/19/2009	100	5	
MW-16A	trans-1,2-Dichloroethene	0.3	ug/l	02/17/2010	100	5	
MW-16A	trans-1,2-Dichloroethene	0.5	ug/l	08/24/2011	100	5	
MW-16A	trans-1,2-Dichloroethene	0.4	ug/l	2/21/2012	100	5	
MW-16A	**Trichloroethene**	**6.2**	**ug/l**	**08/07/2003**	**3**	**1**	**3.2**
MW-16A	**Trichloroethene**	**12.4**	**ug/l**	**02/24/2004**	**3**	**1**	**9.4**
MW-16A	**Trichloroethene**	**17.2**	**ug/l**	**08/12/2004**	**3**	**1**	**14.2**
MW-16A	**Trichloroethene**	**14.1**	**ug/l**	**02/15/2005**	**3**	**1**	**11.1**
MW-16A	**Trichloroethene**	**16.8**	**ug/l**	**08/16/2005**	**3**	**1**	**13.8**
MW-16A	**Trichloroethene**	**18.3**	**ug/l**	**02/14/2006**	**3**	**1**	**15.3**
MW-16A	**Trichloroethene**	**19.2**	**ug/l**	**08/22/2006**	**3**	**1**	**16.2**
MW-16A	**Trichloroethene**	**20.5**	**ug/l**	**02/14/2007**	**3**	**1**	**17.5**
MW-16A	**Trichloroethene**	**20.8**	**ug/l**	**08/09/2007**	**3**	**1**	**17.8**
MW-16A	**Trichloroethene**	**17.4**	**ug/l**	**02/19/2008**	**3**	**1**	**14.4**
MW-16A	**Trichloroethene**	**20.2**	**ug/l**	**08/19/2008**	**3**	**1**	**17.2**
MW-16A	**Trichloroethene**	**18.5**	**ug/l**	**02/17/2009**	**3**	**1**	**15.5**
MW-16A	**Trichloroethene**	**19.9**	**ug/l**	**08/19/2009**	**3**	**1**	**16.9**
MW-16A	**Trichloroethene**	**14.7**	**ug/l**	**02/17/2010**	**3**	**1**	**11.7**
MW-16A	**Trichloroethene**	**20.2**	**ug/l**	**08/23/2010**	**3**	**1**	**17.2**
MW-16A	**Trichloroethene**	**20.1**	**ug/l**	**02/21/2011**	**3**	**1**	**17.1**
MW-16A	**Trichloroethene**	**19.1**	**ug/l**	**2/21/2012**	**3**	**1**	**16.1**

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Location I D	Parameter Name	Concentration	Units	Sample Date	2L Standard	SWS Limit	Exceedance
MW-16A	**Trichloroethene (-ethylene)**	**20.6**	**ug/l**	**08/24/2011**	**3**	**1**	**17.6**
MW-16A	Trichlorofluoromethane	1.3	ug/l	08/09/2007	2000	1	
MW-16A	Trichlorofluoromethane	0.9	ug/l	02/19/2008	2000	1	
MW-16A	Trichlorofluoromethane	1.3	ug/l	08/19/2008	2000	1	
MW-16A	Trichlorofluoromethane	1.3	ug/l	02/17/2009	2000	1	
MW-16A	Trichlorofluoromethane	0.9	ug/l	08/19/2009	2000	1	
MW-16A	Trichlorofluoromethane	0.8	ug/l	02/17/2010	2000	1	
MW-16A	Trichlorofluoromethane	0.7	ug/l	08/24/2011	2000	1	
MW-16A	Trichlorofluoromethane	0.6	ug/l	2/21/2012	2000	1	
MW-16A	**Vinyl chloride**	**0.8**	**ug/l**	**08/09/2007**	**0.03**	**1**	**0.77**
MW-16A	**Vinyl chloride**	**0.5**	**ug/l**	**02/19/2008**	**0.03**	**1**	**0.47**
MW-16A	**Vinyl chloride**	**0.8**	**ug/l**	**08/19/2008**	**0.03**	**1**	**0.77**
MW-16A	**Vinyl chloride**	**0.8**	**ug/l**	**02/17/2009**	**0.03**	**1**	**0.77**
MW-16A	**Vinyl chloride**	**0.7**	**ug/l**	**08/24/2011**	**0.03**	**1**	**0.67**
MW-16A	**Vinyl Chloride**	**0.7**	**ug/l**	**2/21/2012**	**0.03**	**1**	**0.67**
MW-16A	Xylenes	2.3	ug/l	08/09/2007	500	5	
MW-16A	Xylenes	1.8	ug/l	08/19/2008	500	5	
MW-16A	Xylenes	1.3	ug/l	02/17/2009	500	5	
MW-16A	Xylenes	0.7	ug/l	08/24/2011	500	5	
MW-17	1,1-Dichloroethane	3.1	ug/l	08/09/2007	6	5	
MW-17	1,1-Dichloroethane	2.0	ug/l	02/19/2008	6	5	
MW-17	1,1-Dichloroethane	3.4	ug/l	08/19/2008	6	5	
MW-17	1,1-Dichloroethane	2.8	ug/l	02/17/2009	6	5	
MW-17	1,1-Dichloroethane	3.8	ug/l	08/19/2009	6	5	
MW-17	1,1-Dichloroethane	3.3	ug/l	02/17/2010	6	5	
MW-17	1,1-Dichloroethane	4.8	ug/l	08/25/2011	6	5	
MW-17	1,1-Dichloroethane	4.7	ug/l	2/22/2012	6	5	
MW-17	1,1-Dichloroethene	0.2	ug/l	08/09/2007	7	5	
MW-17	1,1-Dichloroethene	0.2	ug/l	02/17/2010	7	5	
MW-17	1,1-Dichloroethene	0.2	ug/l	2/22/2012	7	5	
MW-17	1,1-Dichloroethene (-ethylene)	0.2	ug/l	08/19/2008	7	5	
MW-17	1,1-Dichloroethene (-ethylene)	0.2	ug/l	08/25/2011	7	5	
MW-17	2-Butanone (Methyl ethyl ketone)	3.8	ug/l	08/19/2008	4000	100	
MW-17	2-Butanone (Methyl ethyl ketone)	1.3	ug/l	08/19/2009	4000	100	
MW-17	Acetone	4.1	ug/l	02/19/2008	6000	100	
MW-17	Acetone	5.3	ug/l	08/19/2008	6000	100	
MW-17	Acetone	1.6	ug/l	08/19/2009	6000	100	
MW-17	Benzene	0.2	ug/l	08/19/2009	1	1	
MW-17	**Bis-(2-Ethylhexyl) Phthalate**	**11.8**	**ug/l**	**02/17/2010**	**3**	**15**	**8.8**
MW-17	Chlorobenzene	0.2	ug/l	08/19/2009	50	3	
MW-17	Chloromethane	0.2	ug/l	08/19/2008	3	1	
MW-17	Cis-1,2-Dichloroethene	1.4	ug/l	08/09/2007	70	5	
MW-17	Cis-1,2-Dichloroethene	0.9	ug/l	02/19/2008	70	5	
MW-17	Cis-1,2-Dichloroethene	1.4	ug/l	08/19/2008	70	5	
MW-17	Cis-1,2-Dichloroethene	1.2	ug/l	02/17/2009	70	5	
MW-17	Cis-1,2-Dichloroethene	3.0	ug/l	08/19/2009	70	5	
MW-17	Cis-1,2-Dichloroethene	1.6	ug/l	02/17/2010	70	5	
MW-17	Cis-1,2-Dichloroethene	2.4	ug/l	2/22/2012	70	5	
MW-17	cis-1,2-Dichloroethene (-ethylene)	2.8	ug/l	08/25/2011	70	5	
MW-17	Dichlorodifluoromethane	1.9	ug/l	08/19/2009	1000	5	
MW-17	Dichlorodifluoromethane	1.7	ug/l	08/25/2011	1000	5	
MW-17	Dichlorodifluoromethane	1.1	ug/l	2/22/2012	1000	5	
MW-17	**Heptachlor**	**0.042**	**ug/l**	**08/19/2009**	**0.008**	**0.05**	**0.034**
MW-17	Methylene Chloride	0.2	ug/l	08/09/2007	5	1	
MW-17	Methylene Chloride	0.2	ug/l	02/19/2008	5	1	
MW-17	Methylene Chloride	0.7	ug/l	08/19/2008	5	1	

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MW-17	Methylene Chloride	0.4	ug/l	02/17/2009	5	1	
MW-17	Methylene Chloride	0.8	ug/l	08/19/2009	5	1	
MW-17	**Tetrachloroethene**	**1.1**	**ug/l**	**08/09/2007**	**0.7**	**1**	**0.4**
MW-17	**Tetrachloroethene**	**1.4**	**ug/l**	**02/19/2008**	**0.7**	**1**	**0.7**
MW-17	**Tetrachloroethene**	**1.7**	**ug/l**	**08/19/2008**	**0.7**	**1**	**1**
MW-17	**Tetrachloroethene**	**1.6**	**ug/l**	**02/17/2009**	**0.7**	**1**	**0.9**
MW-17	**Tetrachloroethene**	**1.5**	**ug/l**	**08/19/2009**	**0.7**	**1**	**0.8**
MW-17	**Tetrachloroethene**	**1.6**	**ug/l**	**02/17/2010**	**0.7**	**1**	**0.9**
MW-17	**Tetrachloroethene**	**1.8**	**ug/l**	**08/23/2010**	**0.7**	**1**	**1.1**
MW-17	**Tetrachloroethene**	**1.5**	**ug/l**	**02/21/2011**	**0.7**	**1**	**0.8**
MW-17	**Tetrachloroethene**	**1.2**	**ug/l**	**2/22/2012**	**0.7**	**1**	**0.5**
MW-17	**Tetrachloroethene (-ethylene)**	**1.5**	**ug/l**	**08/25/2011**	**0.7**	**1**	**0.8**
MW-17	Toluene	0.3	ug/l	02/19/2008	600	1	
MW-17	Trichloroethene	1.8	ug/l	08/09/2007	3	1	
MW-17	Trichloroethene	1.3	ug/l	02/19/2008	3	1	
MW-17	Trichloroethene	1.8	ug/l	08/19/2008	3	1	
MW-17	Trichloroethene	1.5	ug/l	02/17/2009	3	1	
MW-17	Trichloroethene	2.3	ug/l	08/19/2009	3	1	
MW-17	Trichloroethene	1.6	ug/l	02/17/2010	3	1	
MW-17	Trichloroethene	2.1	ug/l	08/23/2010	3	1	
MW-17	Trichloroethene	1.7	ug/l	02/21/2011	3	1	
MW-17	Trichloroethene	1.2	ug/l	2/22/2012	3	1	
MW-17	Trichloroethene (-ethylene)	1.4	ug/l	08/25/2011	3	1	
MW-17	Trichlorofluoromethane	0.3	ug/l	08/09/2007	2000	1	
MW-17	Trichlorofluoromethane	0.2	ug/l	02/19/2008	2000	1	
MW-17	Trichlorofluoromethane	0.3	ug/l	08/19/2008	2000	1	
MW-18D	1,1-Dichloroethane	1.5	ug/l	08/09/2007	6	5	
MW-18D	1,1-Dichloroethane	1.1	ug/l	02/19/2008	6	5	
MW-18D	1,1-Dichloroethane	1.2	ug/l	08/19/2008	6	5	
MW-18D	1,1-Dichloroethane	1.0	ug/l	02/17/2009	6	5	
MW-18D	1,1-Dichloroethane	0.9	ug/l	02/17/2010	6	5	
MW-18D	2-Butanone (Methyl ethyl ketone)	3.3	ug/l	08/19/2008	4000	100	
MW-18D	Acetone	2.8	ug/l	02/19/2008	6000	100	
MW-18D	Acetone	5.0	ug/l	08/19/2008	6000	100	
MW-18D	Chloromethane	0.2	ug/l	08/19/2008	3	1	
MW-18D	Cis-1,2-Dichloroethene	0.8	ug/l	08/09/2007	70	5	
MW-18D	Cis-1,2-Dichloroethene	0.6	ug/l	02/19/2008	70	5	
MW-18D	Cis-1,2-Dichloroethene	0.6	ug/l	08/19/2008	70	5	
MW-18D	Cis-1,2-Dichloroethene	0.5	ug/l	02/17/2009	70	5	
MW-18D	Cis-1,2-Dichloroethene	0.6	ug/l	02/17/2010	70	5	
MW-18D	Tetrachloroethene	0.2	ug/l	02/19/2008	0.7	1	
MW-18D	Toluene	0.3	ug/l	02/19/2008	600	1	
MW-18D	Trichloroethene	0.3	ug/l	08/09/2007	3	1	
MW-18D	Trichloroethene	0.2	ug/l	02/19/2008	3	1	
MW-18D	Trichloroethene	0.3	ug/l	08/19/2008	3	1	
MW-18D	Trichloroethene	0.2	ug/l	02/17/2009	3	1	
MW-18S	1,1-Dichloroethane	1.2	ug/l	08/09/2007	6	5	
MW-18S	1,1-Dichloroethane	0.5	ug/l	02/19/2008	6	5	
MW-18S	1,1-Dichloroethane	1.4	ug/l	08/19/2008	6	5	
MW-18S	1,1-Dichloroethane	0.7	ug/l	02/17/2009	6	5	
MW-18S	1,1-Dichloroethane	0.9	ug/l	08/19/2009	6	5	
MW-18S	1,1-Dichloroethane	0.3	ug/l	02/17/2010	6	5	
MW-18S	1,1-Dichloroethane	0.4	ug/l	08/25/2011	6	5	
MW-18S	2-Butanone	1.4	ug/l	08/09/2007	4000	100	
MW-18S	2-Butanone (Methyl ethyl ketone)	3.3	ug/l	08/19/2008	4000	100	
MW-18S	Acetone	9.1	ug/l	08/09/2007	6000	100	

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MW-18S	Acetone	3.2	ug/l	02/19/2008	6000	100	
MW-18S	Acetone	5.4	ug/l	08/19/2008	6000	100	
MW-18S	Acetone	2.6	ug/l	08/19/2009	6000	100	
MW-18S	Chloroethane	0.3	ug/l	08/19/2009	3000	10	
MW-18S	Chloromethane	0.2	ug/l	08/19/2008	3	1	
MW-18S	Chloromethane	0.2	ug/l	08/19/2009	3	1	
MW-18S	Cis-1,2-Dichloroethene	0.2	ug/l	08/09/2007	70	5	
MW-18S	Cis-1,2-Dichloroethene	0.3	ug/l	02/19/2008	70	5	
MW-18S	Cis-1,2-Dichloroethene	0.6	ug/l	08/19/2008	70	5	
MW-18S	Cis-1,2-Dichloroethene	0.2	ug/l	02/17/2009	70	5	
MW-18S	Toluene	0.3	ug/l	08/09/2007	600	1	
MW-18S	Toluene	0.3	ug/l	02/19/2008	600	1	
MW-18S	**Vinyl chloride**	**0.7**	**ug/l**	**08/09/2007**	**0.03**	**1**	**0.67**
MW-18S	**Vinyl chloride**	**0.5**	**ug/l**	**02/19/2008**	**0.03**	**1**	**0.47**
MW-18S	**Vinyl chloride**	**0.7**	**ug/l**	**08/19/2008**	**0.03**	**1**	**0.67**
MW-18S	**Vinyl chloride**	**0.4**	**ug/l**	**02/17/2009**	**0.03**	**1**	**0.37**
MW-18S	**Vinyl chloride**	**0.4**	**ug/l**	**08/19/2009**	**0.03**	**1**	**0.37**

NOTE:
1. Exceedance value is calculated over the 2L Standard.
2. Bold indicated detection above the 2L Standard.
3. Highlighting indicates detection above the 2L Standard in last 5 years (since 2007).

RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES

Table 5: MNA Parameter Summary

Halifax CAER

Date: 5/22/2012
By: MG

	Date	BOD (ug/l)	COD (ug/l)	Nitrate Nitrogen as N (ug/l)	TOC (ug/l)	Total Alkalinity (ug/l)	Chloride (ug/l)	Sulfate (ug/l)	Sulfide (ug/l)	Iron (ug/l)
MW-2A	8/19/2009	5100	23000	90 J	5180	93000	7000	10100 J	<1000	NS
	2/16/2010	7800	13000	NS	1860	128000	5000	<250000	<1000	19800
	8/23/2010	7000	44000	80 J	6540	124000	6000	<250000	<1000	19130
	2/21/2011*	4400	24000	<10000	5640	106000	7000	<250000	<1000	28850
	8/24/2011	<2000	26000	50 J	8540	101000	5000	6300	<100	26225
	2/20/2012	<2000	25000	<30	645	96000	6000	<5000	<100	
MW-2AD	8/19/2009	<2000	10000	<10000	<1000	306000	7000	10500 J	<1000	NS
	2/16/2010	<2000	12000	<10000	1040	284000	6000	23000 J	<1000	3005
	8/23/2010	<2000	17000	<10000	1170	289000	5000	13600 J	<1000	2565
	2/21/2011	<2000	<10000	<10000	<1000	271000	6000	21300 J	<1000	3500
	8/24/2011	<2000	<20000	<30	1000	242000	5000	12500	<100	3686
	2/20/2012	<2000	<20000	<30	<300	73000	5000	13200 J	<100	
MW-3AS	8/19/2009	20000	38000	<10000	6490	368000	14000	12200 J	<1000	NS
	2/16/2010	15000	38000	40 J	7500	435000	19000	NS	<1000	102875
	8/23/2010	9200	44000	50 J	6370	313000	8000	<250000	<1000	72450
	2/21/2011	8200	37000	<10000	6840	423000	12000	6400 J	<1000	176000
	8/24/2011	<2000	27000	<30	3120	159000	7000	<5000	<100	72450
	2/20/2012	11000	<20000	<30	5170	251000	7000	<5000	<100	
MW-3D	8/19/2009	<2000	12000	50 J	<1000	63000	14000	14000 J	<1000	NS
	2/16/2010	<2000	10000	70 J	<1000	63000	9000	12200 J	<1000	240
	8/23/2010	<2000	16000	80 J	1020	66000	8000	8400 J	<1000	<300
	2/21/2011	<2000	16000	80 J	<1000	63000	9000	<250000	<1000	<300
	8/24/2011	<2000	<20000	80 J	<300	64000	7000	10500	<100	96
	2/20/2012	2100	<20000	<30	<300	59000	9000	<5000	<100	
MW-6D	8/19/2009	<2000	11000	<10000	1610	261000	19000	165000	<1000	NS
	2/16/2010	<2000	11000	<10000	2140	269000	23000	21300 J	<1000	911
	8/23/2010	2000	17000	<10000	2080	259000	16000	20400	<1000	589
	2/21/2011	<2000	13000	<10000	1920	259000	22000	14400 J	<1000	888
	8/24/2011	<2000	<20000	<30	1820	234000	22000	12400	<100	796
	2/20/2012*	<2000	<20000	<30	1810	216000	23000	10100 J	<100	
MW-17	8/19/2009	<2000	<10000	90 J	<1000	53000	5000	10300 J	<1000	5745
	2/16/2010	3400	<10000	130 J	<1000	59000	7000	28700 J	<1000	3115
	8/23/2010	<2000	<10000	60 J	<1000	64000	6000	<250000	<1000	2316
	2/21/2011	<2000	<10000	140 J	<1000	59000	6000	5600 J	<1000	3356
	8/24/2011	<2000	<20000	110 J	<300	59000	6000	8900	<100	45140
	2/20/2012	<2000	33000	120	<300	306000	<5000	<5000	<100	
MW-18S	8/19/2009	<2000	19000	<10000	4690	104000	11000	11400 J	<1000	17675
	2/16/2010	2600	13000	<10000	5800	116000	5000	<250000	<1000	20075
	8/23/2010	11000	38000	80 J	8770	81000	8000	<250000	<1000	23420
	2/21/2011	5500	19000	<10000	4740	105000	6000	<250000	<1000	24320
	8/24/2011	<2000	<20000	80 J	5020	96000	8000	<5000	<100	26950
	2/20/2012	<2000	29000	<30	7100	128000	<5000	<5000	<100	
MW-18D	2/16/2010	<2000	11000	<10000	1090	76000	10000	9900 J	<1000	161
	2/21/2011	<2000	<10000	<10000	<1000	74000	5000	7200 J	<1000	452
	2/20/2012	<2000	<2000	60	<300	6700	<5000	<5000	<100	
G-13	8/23/2010	<2000	<10000	250 J	1930	72000	14000	18800	<100	6441
	8/24/2011	<2000	<20000	140 J	1400	47000	10000	16700	<100	5104

NOTE:
*2/21/2011 Microseeps samples for MW-2A was unable to acieve sufficient vial pressure in the field. Additionally samples were diluted two times to achieve results.
* 2/20/2012 Sampe MW-6D was analyzed out of hold for Microseeps parameters

RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES

Table 5: MNA Parameter Summary

Halifax CAER

Date: 5/22/2012
By: MG

	Date	Turbidity (NTU)	Dissolved Oxygen (ug/l)	Carbon Dioxide (ug/l)	ORP (mv)	Dissolved Methane (ug/l)	Ethane (ug/l)	Ethene (ug/l)	Hydrogen (nM)
MW-2A	8/19/2009	105	930	230000	-62.7	6000	<0.010	0.043	1.2
	2/16/2010	190	890	292000	60.6	1500	0.091	0.029	<0.600
	8/23/2010	500	2940	72000	-26.7	5900	0.043	0.13	1.2
	2/21/2011*	15	1660	93000	-48.8	<0.015	<0.010	<0.010	<0.600
	8/24/2011	42	450	60000	-53.6	8800	<0.010	<0.010	3.5
	2/20/2012	70	2210	85000	-39.2	3900	<0.010	<0.010	1.4
MW-2AD	8/19/2009	25	1850	210000	43.1	410	0.098	0.38	1.1
	2/16/2010	45	290	200000	91.1	780	0.12	1	1.1
	8/23/2010	20	580	171000	77.9	340	0.12	0.36	1.3
	2/21/2011	25	920	118000	40.7	340	0.13	0.15	2
	8/24/2011	33	480	95000	34.2	670	0.054	0.1	3.4
	2/20/2012	14	6140	54000	97.3	230	0.03	0.058	0.75
MW-3AS	8/19/2009	600	1480	168000	-18.5	6300	2.2	<0.010	5.3
	2/16/2010	400	610	768000	42.4	5700	0.8	0.12	0.87
	8/23/2010	700	2060	427000	67.3	800	0.57	0.042	1.1
	2/21/2011	380	2690	561000	-35	9000	1.05	<0.010	1.3
	8/24/2011	550	3190	215000	-57.3	1400	0.27	0.14	4.2
	2/20/2012	750	1480	458000	48.3	3000	0.51	0.22	0.63
MW-3D	8/19/2009	<1	1680	112000	504.2	2800	<0.010	<0.010	1
	2/16/2010	17	1190	123000	231.1	3000	<0.010	<0.010	0.67
	8/23/2010	3.2	860	84000	585.3	3400	<0.010	<0.010	1.1
	2/21/2011	4.7	4910	65000	235.6	3300	<0.010	<0.010	0.79
	8/24/2011	1.4	1520	21000	353.6	3000	<0.010	0.03	5.5
	2/20/2012	1	2310	15000	243.1	2500	<0.010	0.069	0.9
MW-6D	8/19/2009	10	1910	390000	86.7	180	0.27	0.036	1.3
	2/16/2010	18	890	421000	95.7	93	0.13	<0.010	<0.600
	8/23/2010	18	1620	314000	92.9	200	0.33	0.049	1
	2/21/2011	13	2680	278000	144.4	120	0.15	0.013	<0.600
	8/24/2011	<1	360	26200	147.1	98	0.46	0.12	4.9
	2/20/2012*	3	700	188000	151.1	38	0.32	0.033	1.2
MW-17	8/19/2009	260	1240	92000	186.8	830	0.012	<0.010	1.1
	2/16/2010	100	360	75000	122.5	730	<0.010	<0.010	<0.600
	8/23/2010	160	600	122000	324.5	1300	<0.010	0.013	1.4
	2/21/2011	150	1400	52000	164.3	1400	<0.010	<0.010	0.79
	8/24/2011	70	740	68000	464.9	2000	<0.010	<0.010	1.5
	2/20/2012	240	2430	25000	217.9	1100	<0.010	<0.010	0.62
MW-18S	8/19/2009	210	1060	124000	12	4100	0.081	0.02	1.6
	2/16/2010	210	3180	82000	56.5	2900	0.018	0.011	<0.600
	8/23/2010	950	8210	75000	10.2	4700	0.26	0.054	1.1
	2/21/2011	150	1110	72000	-36.3	4000	0.062	0.015	1.1
	8/24/2011	190	830	75000	-36	4400	0.05	0.049	4.5
	2/20/2012	1	790	71000	-54.1	3800	<0.010	<0.010	0.87
MW-18D	2/16/2010	3.4	1930	55000	154.4	88	<0.010	<0.010	<0.600
	2/21/2011	2.4	950	43000	106.5	46	<0.010	0.027	1.3
	2/20/2012	340	6600	15000	98	30	<0.010	0.68	0.68
G-13	8/23/2010	14	590	79000	-12.4	1000	<0.010	0.015	1.3
	8/24/2011	21	250	76000	45.4	30	<0.010	0.026	2.7

RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES

Table 5: MNA Parameter Summary

Halifax CAER

Date: 5/22/2012
By: MG

	Date	Lactic Acid (mg/l)	Acetic Acid (mg/l)	Propionic Acid (mg/l)	Butyric Acid (mg/l)	Pyruvic Acid (mg/l)	i-Pentanoic Acid (mg/l)	Pentanoic Acid (mg/l)
MW-2A	8/19/2009	<0.100	<0.070	0.140	<0.070	<0.070	<0.070	<0.070
	2/16/2010	<0.100	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070
	8/23/2010	0.170	<0.070	<0.050	<0.050	<0.150	<0.150	<0.070
	2/21/2011*	<0.100	<0.070	<0.050	<0.050	<0.150	<0.150	<0.070
	8/24/2011	0.260	0.110	0.079	<0.050	<0.15	<0.15	<0.070
	2/20/2012	<0.10	<0.070	<0.050	<0.050	<0.15	<0.15	<0.070
MW-2AD	8/19/2009	0.160	<0.070	0.140	<0.070	<0.070	<0.070	<0.070
	2/16/2010	0.110	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070
	8/23/2010	0.140	<0.070	<0.050	0.054	<0.150	<0.150	<0.070
	2/21/2011	0.260	<0.070	<0.050	<0.050	<0.150	<0.150	<0.070
	8/24/2011	0.160	0.086	0.078	<0.050	<0.15	<0.15	<0.070
	2/20/2012	<0.10	<0.070	<0.050	<0.050	<0.15	<0.15	<0.070
MW-3AS	8/19/2009	<0.100	0.079	0.170	<0.070	<0.070	<0.070	<0.070
	2/16/2010	<0.100	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070
	8/23/2010	0.160	<0.070	<0.050	<0.050	<0.150	<0.150	<0.070
	2/21/2011	<0.100	<0.070	<0.050	0.100	<0.150	<0.150	<0.070
	8/24/2011	0.280	0.100	0.074	<0.050	<0.15	<0.15	<0.070
	2/20/2012	<0.10	<0.070	<0.050	<0.050	<0.15	<0.15	<0.070
MW-3D	8/19/2009	<0.100	<0.070	0.150	<0.070	<0.070	<0.070	<0.070
	2/16/2010	<0.100	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070
	8/23/2010	0.150	<0.070	<0.050	<0.050	<0.150	<0.150	<0.070
	2/21/2011	0.230	<0.070	<0.050	0.100	<0.150	<0.150	<0.070
	8/24/2011	0.220	<0.070	0.054	<0.050	<0.15	<0.15	<0.070
	2/20/2012	0.120	<0.070	<0.050	0.24	<0.15	<0.15	<0.070
MW-6D	8/19/2009	<0.100	<0.070	0.140	<0.070	<0.070	<0.070	<0.070
	2/16/2010	<0.100	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070
	8/23/2010	0.140	<0.070	<0.050	<0.050	<0.150	<0.150	<0.070
	2/21/2011	0.210	<0.070	<0.050	0.110	<0.150	<0.150	<0.070
	8/24/2011	0.110	<0.070	0.062	<0.050	<0.15	<0.15	<0.070
	2/20/2012*	<0.10	<0.070	<0.050	<0.050	<0.15	<0.15	<0.070
MW-17	8/19/2009	0.250	0.072	0.160	<0.070	<0.070	<0.070	<0.070
	2/16/2010	<0.100	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070
	8/23/2010	0.130	<0.070	<0.050	<0.050	<0.150	<0.150	<0.070
	2/21/2011	0.240	<0.070	<0.050	0.100	<0.150	<0.150	<0.070
	8/24/2011	0.220	<0.070	0.067	<0.050	<0.15	<0.15	<0.070
	2/20/2012	<0.10	<0.070	<0.050	<0.050	<0.15	<0.15	<0.070
MW-18S	8/19/2009	0.110	<0.070	0.140	<0.070	<0.070	<0.070	<0.070
	2/16/2010	0.230	0.079	<0.070	<0.070	<0.070	<0.070	<0.070
	8/23/2010	0.210	<0.070	<0.050	<0.050	<0.150	<0.150	<0.070
	2/21/2011	0.350	0.084	<0.050	<0.050	<0.150	<0.150	<0.070
	8/24/2011	0.380	0.11	0.083	<0.050	<0.15	<0.15	<0.070
	2/20/2012	<0.10	0.12	<0.050	0.093	<0.15	<0.15	<0.070
MW-18D	2/16/2010	0.190	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070
	2/21/2011	<0.100	<0.070	<0.050	<0.050	<0.150	<0.150	<0.070
	2/20/2012	0.100	0.26	0.065	0.23	<0.15	<0.15	<0.070
G-13	8/23/2010	<0.100	<0.070	<0.050	<0.050	<0.150	<0.150	<0.070
	8/24/2011	<0.100	<0.070	0.052	<0.050	<0.150	<0.150	<0.070

RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES

Table 5: MNA Parameter Summary

Halifax CAER

Date: 5/22/2012
By: MG

	Date	i-Hexanoic Acid (mg/l)	Hexanoic Acid (mg/l)	pH (std units)	Specific Conductivity (umhos/cm)	Temperature (degrees C)
MW-2A	8/19/2009	<0.100	<0.100	6.00	249	24.00
	2/16/2010	<0.100	<0.100	6.78	278	12.55
	8/23/2010	<0.050	<0.050	6.05	268	20.24
	2/21/2011*	<0.050	<0.050	6.23	212	11.67
	8/24/2011	<0.050	<0.050	6.07	237	21.43
	2/20/2012	<0.050	<0.050	5.84	196	11.71
MW-2AD	8/19/2009	<0.100	<0.100	6.20	526	19.00
	2/16/2010	<0.100	<0.100	6.97	544	16.55
	8/23/2010	<0.050	<0.050	6.27	547	15.98
	2/21/2011	<0.050	<0.050	6.32	478	14.78
	8/24/2011	<0.050	<0.050	6.13	427	16.85
	2/20/2012	<0.050	<0.050	6.42	358	12.66
MW-3AS	8/19/2009	<0.100	<0.100	6.00	601	20.00
	2/16/2010	<0.100	<0.100	6.92	852	13.29
	8/23/2010	<0.050	<0.050	6.20	713	17.33
	2/21/2011	<0.050	<0.050	6.32	660	13.06
	8/24/2011	<0.050	<0.050	6.40	378	20.20
	2/20/2012	<0.050	<0.050	5.72	489	14.09
MW-3D	8/19/2009	<0.100	<0.100	5.70	142	19.00
	2/16/2010	<0.100	<0.100	6.55	154	14.86
	8/23/2010	<0.050	<0.050	5.59	155	16.69
	2/21/2011	<0.050	<0.050	5.95	146	14.02
	8/24/2011	<0.050	<0.050	5.82	166	18.25
	2/20/2012	<0.050	<0.050	5.82	162	15.86
MW-6D	8/19/2009	<0.100	1.100	5.80	442	19.00
	2/16/2010	<0.100	<0.100	6.75	617	14.99
	8/23/2010	<0.050	<0.050	5.95	589	15.99
	2/21/2011	<0.050	<0.050	6.00	546	13.49
	8/24/2011	<0.050	<0.050	5.70	533	16.21
	2/20/2012*	<0.050	<0.050	5.84	504	16.11
MW-17	8/19/2009	<0.100	<0.100	5.70	133	19.00
	2/16/2010	<0.100	<0.100	6.53	131	14.41
	8/23/2010	<0.050	<0.050	5.88	142	17.12
	2/21/2011	<0.050	<0.050	6.03	126	12.80
	8/24/2011	<0.050	<0.050	5.76	142	19.80
	2/20/2012	<0.050	<0.050	5.50	127	11.96
MW-18S	8/19/2009	<0.100	<0.100	6.30	258	21.00
	2/16/2010	<0.100	<0.100	7.04	269	12.96
	8/23/2010	<0.050	<0.050	6.60	248	18.20
	2/21/2011	<0.050	<0.050	6.48	226	12.18
	8/24/2011	<0.050	<0.050	6.58	221	16.49
	2/20/2012	<0.050	<0.050	6.13	241	13.49
MW-18D	2/16/2010	<0.100	<0.100	6.63	166	9.65
	2/21/2011	<0.050	<0.050	6.16	143	13.62
	2/20/2012	<0.050	<0.050	6.16	131	13.36
G-13	8/23/2010	<0.050	<0.050	6.05	18.22	224.00
	8/24/2011	<0.050	<0.050	5.67	127	17.82

Appendix A

Boring Logs

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FIELD BOREHOLE LOG

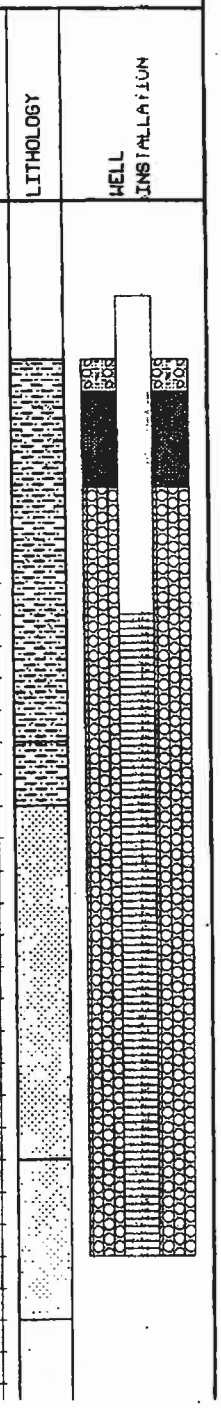
BOREHOLE NUMBER: MW-2A

PROJECT NUMBER HALIFAX-2
PROJECT NAME: HALIFAX COUNTY LANDFILL
LOCATION HALIFAX, NC
DRILLING COMPANY BORE & CORE
RIG TYPE & NUMBER MOBILE B-57 ATV
DRILLING METHOD: HOLLOW STEM AUGER
WEATHER: HOT, HUMID
FIELD PARTY: BILL BROW
GEOLOGIST DAVID GARRETT
DATE BEGUN: 7/25/95 DATE COMPLETED: 7/26/95

TOP OF CASING ELEVATION -
TOTAL DEPTH: 16.0
GROUND SURFACE ELEVATION -
SHEET 1 OF 1

STATIC WATER LEVEL (BLS)		
WD=While Drilling AB=After Boring		
Depth(ft)	7.3 FT	
Time	2:00 PM	
Date	7/25/95	

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
0.0–1.0								SILTY SAND: Loose red-brown very silty clayey coarse-fine SAND; SM-ML; fill pad.
2.0				D				
3.0		Ss	S1					
4.0–5.0	2, 3, 3							SILT: M. stiff black-gray fine sandy clayey SILT; wet; alluvium; ML.
6.0	8, 10, 11	Ss	S2					
7.0–8.0								SAND: Loose light-gray and red-gray slightly silty-clayey fine-coarse SAND; alluvium; very clayey from 9.5' to 10.5'; fine rounded gravel from 10.5' to 12.5'; Water level at 7.3 ft; SW-SM; SC, CL, SW.
9.0	10, 7, 7	Ss	S3	W				
12.0–13.0								SAND: V. dense brown clayey fine SAND w/ scattered coarse sand; SM-ML; residual soil; well developed upon completion by surging and overpumping.
14.0–15.0	26, 50/0	Ss	4'					



FIELD BOREHOLE LOG

BOREHOLE NUMBER: MW-3A-S

PROJECT NUMBER HALIFAX-2
PROJECT NAME: HALIFAX COUNTY LANDFILL
LOCATION HALIFAX, NC
DRILLING COMPANY BORE & CORE
RIG TYPE & NUMBER MOBILE B-57 ATV
DRILLING METHOD: HOLLOW STEM AUGER
WEATHER: HOT, HUMID
FIELD PARTY: BILL BROW
GEOLOGIST DAVID GARRETT
DATE BEGUN: 7/25/95 DATE COMPLETED: 7/25/95

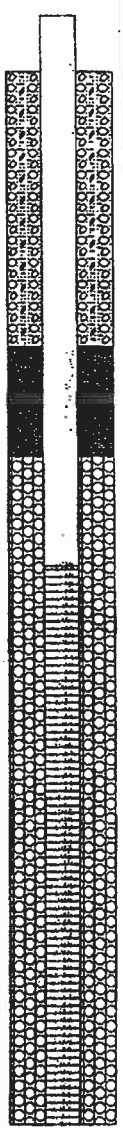
TOP OF CASING ELEVATION -
TOTAL DEPTH 21
GROUND SURFACE ELEVATION: -
SHEET 1 OF 1

STATIC WATER LEVEL (BLS)		
WD=While Drilling AB=After Boring		
Depth(ft)	6.0 FT	
Time	3:45PM	
Date	7/25/95	

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
1.0								
0.0								SILTY SAND: Loose brwon-gray dry silty fine SAND w/ scattered roots, sticks, and inert debris on surface; SM.
1.0								
2.0				D				
3.0	2	Ss	S1					
4.0	1 1							SAND: Soft, dark brown wet clayey silty fine SAND w/ small sticks, rounded pebbles; alluvium; CL/ML.
5.0								
6.0								
7.0								
8.0								
9.0	4	Ss	S2					
10.0	4 6			W				CLAYEY SILT: Stiff orange-yellow clayey SILT w/ coarse sand, scattered mica; relict rock texture; residual soil; ML; saturated below 11'.
11.0								
12.0								
13.0								
14.0	6	Ss	S3					SILTY SAND: Orange-white mottled silty fine-coarse SAND, trace clay, mica; residual soil, weathered granite; SM.
15.0	6 7							
16.0								
17.0								
18.0								
19.0	8	Ss	S4					
20.0	9 13							
21.0								

LITHOLOGY

WELL INSTALLATION



N. C. Department of Human Resources
Division of Health Services

WELL COMPLETION RECORD

MW 6S

COMPLETE ALL INFORMATION REQUESTED BELOW FOR EACH WELL INSTALLED, AND RETURN FORM TO THE N.C. DEPARTMENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRANCH P. O. BOX 2091, RALEIGH, N.C. 27602

SOLID WASTE SECTION JAN 27 1992

NAME OF SITE: Halifax County Landfill

PERMIT NO.: 41-0176-WM-0033

ADDRESS: S.R. 1417 Aurelian Springs, N.C.

OWNER (print): Halifax County

DRILLING CONTRACTOR: Bore and Core, Inc.

REGISTRATION NO.: 763

Casing Type: PVC dia. 2 in.
Casing Depth: from 2'2 to -8'8 ft. - dia. 2 in.
Screen Type: .010 slotted PVC dia. 2 in.
Screen Depth: from -8'8 to -23' ft. - dia. 2 in.

Grout Depth: from 0 to -6' ft. - dia. 7 in
Bentonite Seal: from -6 to -7' ft. - dia. 7 in
Sand/Gravel PK: from -7 to -23 ft. - dia. 7 in
Total Well Depth: from 3 to -23' ft. - dia. 7 in

Static Water Level: 11'4" below ground surface ~~feet from top of casing~~

Date Measured 1 / 6 / 92

Yield (gpm): _____ Method of Testing: _____ Casing is _____ feet above land surface

DRILLING LOG

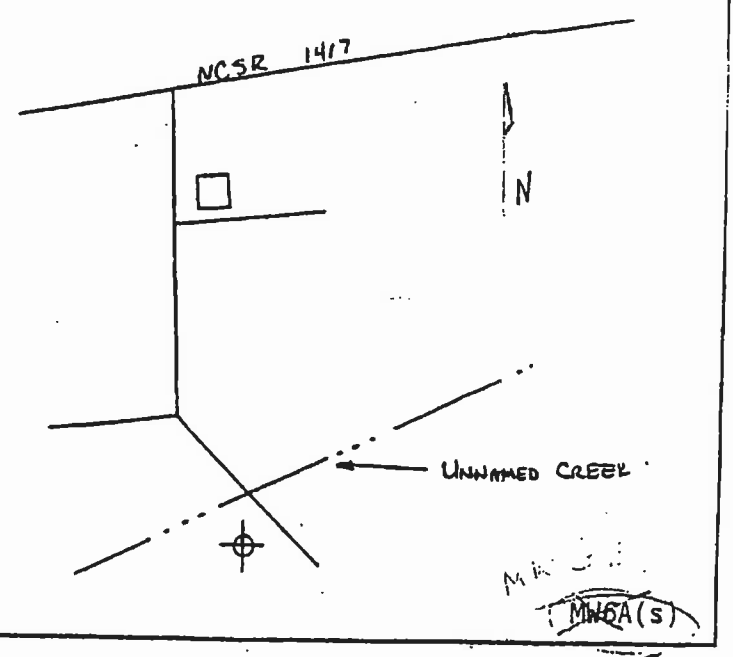
DEPTH FROM	DEPTH TO	FORMATION DESCRIPTION
0.0	8.4	Brown fine sandy silt
8.4	23.0	Wet, brown, silty fine to medium sand

Well numbering scheme changed on 12-13-93 to match scheme used during past sampling episodes.

LK

LOCATION SKETCH

(show distance to numbered roads, or other map reference points)



DATE: 1/6/92 SIGNATURE: John D Barnard

S 3142 (6/85)

MW 65

MW 65

TEST BORING FIELD REPORT

MW-7

Name Halifax County Landfill Aurelian Springs, N.C. Job No. 3720

ield Supervisor Tony Crew Ken Hrs. Drilling ___ Hrs. Moving ___ ~~MW6A(S)~~ Boring # ___

a e 1/6/92 Weather Cool Ground Surface Elevation ___

	Soil Strata		Sampling/Blows per F				
c...	To	Soil Description and Remarks	No.	Depth	1st6"	2nd6"	3r
.0	8.4	Brown fine sandy silt					
..	23.0	Wet brown silty fine to medium sand/gravel B.T. 23.0'					
		Set 2"x 15' screen at 23.0 with 10' riser 4 bags sand					
		½ bucket bentonite, grout to top, 1 2" locking cap 1 4"x 5'					
		protective casing					

Level 11'4" at TOB

Level ___ at ___

t Level ___ at 24 Hours

t r Losses ___

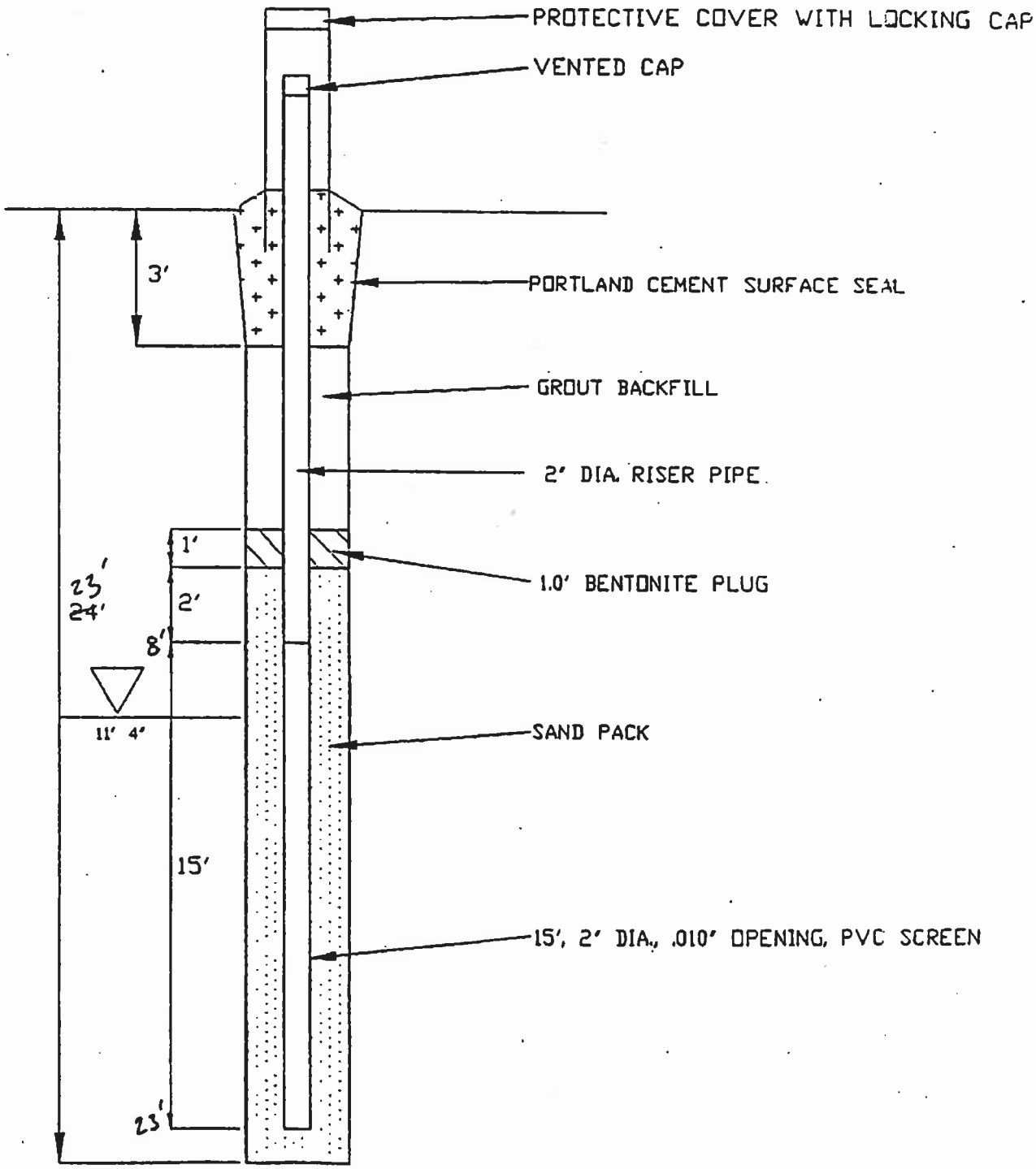
sing Size Length ___

Note: (Record Methods of Drilling & Depths)

CME 450 ATV
4¼" I.D. H.S.A.
0.0' - 23.0'

TYPICAL MONITORING WELL SCHEMATIC

PROJECT HALIFAX COUNTY LANDFILL VERTICAL EXPANSION
WELL NUMBER MW-6a(s)



WELL COMPLETION RECORD

MW-6A MW-6d

'I ETE ALL INFORMATION REQUESTED BELOW FOR EACH WELL INSTALLED, AND RETURN FORM TO THE N.C. ' MENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRANCH, 91, RALEIGH, N.C. 27602

.Of SITE: 1 fax County Sanitary Landfill	PERMIT NO.: 41-0176-WM-0033
.F S: R. 1417 Aurelian Springs, N.C.	OWNER (print): Halifax County
.I G CONTRACTOR: ore & Core, Inc.	REGISTRATION NO.: 763

/pe: PVC dia. 2 in. Grout Depth: from 0' to -21' ft. - dia. 4 in.
epth: from 2' to -25 ft. - dia. 2 in. Bentonite Seal: from -21' to -23 ft. - dia. 4 in.
Type: slotted .010 dia. 2 in. Sand/Gravel PK: from -23 to -40 ft. - dia. 4 in.
. epth: from -25 to -40 ft. - dia. 2 in. Total Well Depth: from 2' to -41 ft. - dia. 4 in.

Water Level: 11' 7" Below ground surface ~~feet from top of casing~~ Date Measured 11 / 26 / 91

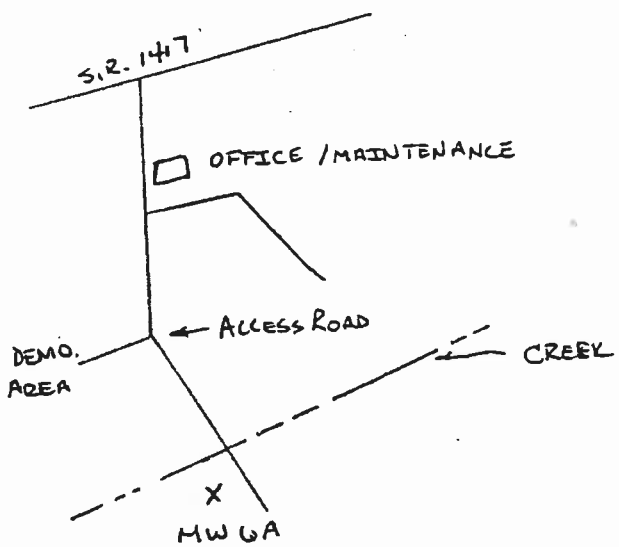
(g m): _____ Method of Testing: _____ Casing is _____ feet above land surface

DRILLING LOG

DEPTH FROM	TO	FORMATION DESCRIPTION
	2.8	Brown fine sandy silt
	10.6	Brown medium to fine silt
.C 6	22.4	Damp DrkBr.Med. sandy silt
2.4	40.0	Wet Br. fine sandy silt

LOCATION SKETCH

(show distance to numbered roads, or other map reference points)



1 RKS: Well screened too deep.
Static water level is above the screen.

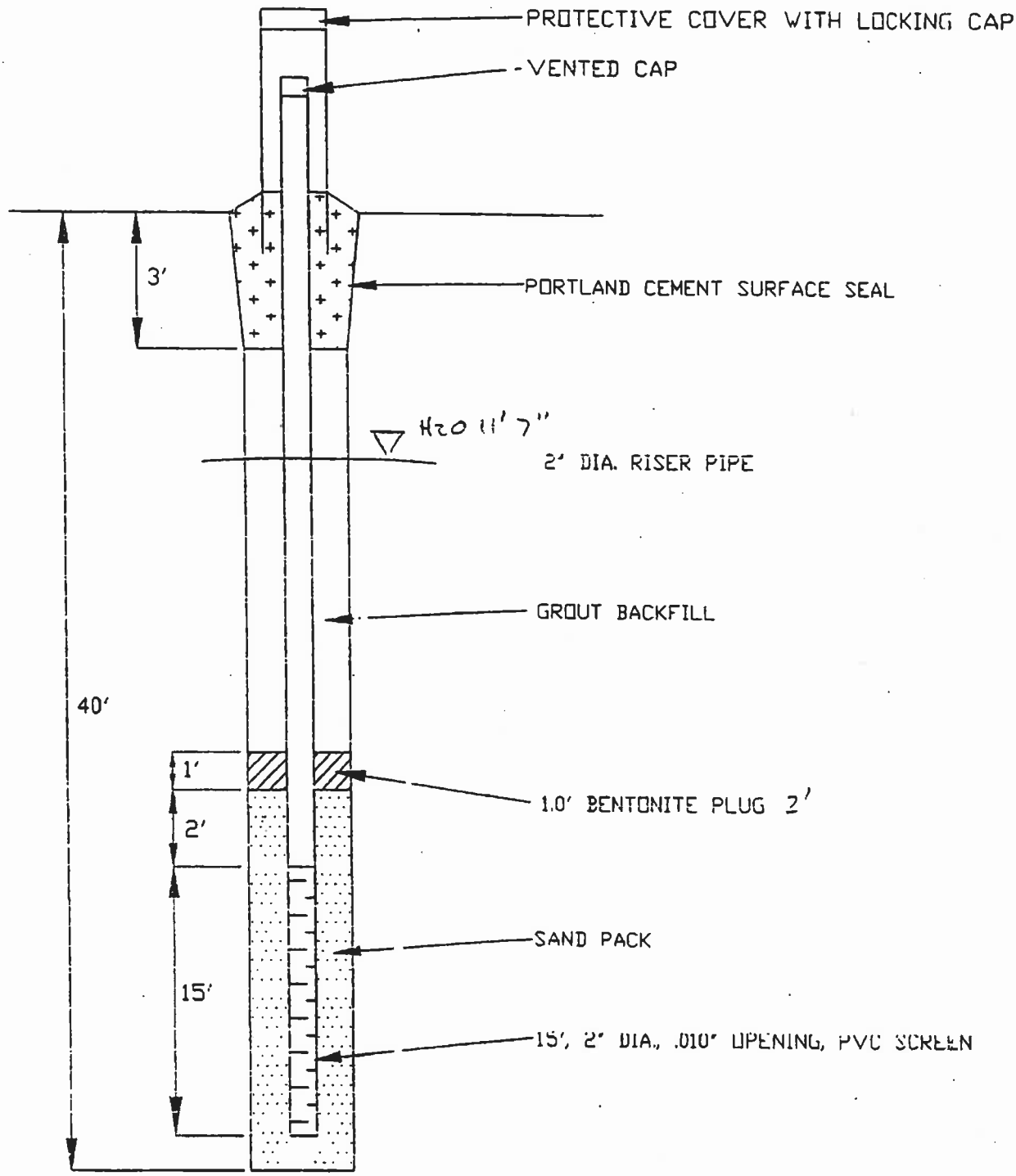
_____ SIGNATURE: _____

3342 (6/85)
& Hazardous Waste Management Branch

TYPICAL MONITORING WELL SCHEMATIC

PROJECT HALIFAX COUNTY LANDFILL VERTICAL EXPANSION
WELL NUMBER MW-6A

6d



TEST BORING FIELD REPORT

MW 6d

Name Halifax County Landfill Vertical Expansion Job No. _____

Supervisor Tony Crew Ben Hrs. Drilling ____ Hrs. Moving ____ Boring # MW6

a e 10/30/91 Weather _____ Ground Surface Elevation _____

Soil Strata			Sampling/Blows per Ft.				
o	To	Soil Description and Remarks	No.	Depth	1st6"	2nd6"	3rd6"
.0	2.8	Brown fine sandy silt w/rocks					
.8	10.6	Brown medium to fine sandy silt					
.6	22.4	Damp dark brown medium sandy silt					
.4	40.0	Wet brown fine sandy silt					
		B.T. 40.0					
		Set 2"x15' PVC screen at 40.0 with 30' PVC riser 4 bags					
		sand, ½ bucket bentonite 1 2" locking cap, 1 4"x5'					
		protective casing					

ter Level _____ at TOB

er Level _____ at _____

er Level _____ at 24 Hours

Losses _____

sing, Size _____ Length _____

Note: (Record Methods of Drilling & Depths)

CME 450 ATV
4¼" ID hollow stem auger
0.0 - 40.0

N. C. Department of Human Resources
Division of Health Services

MW 7s

WELL COMPLETION RECORD

COMPLETE ALL INFORMATION REQUESTED BELOW FOR EACH WELL INSTALLED, AND RETURN FORM TO THE N.C. DEPARTMENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRANCH P. O. BOX 2091, RALEIGH, N.C. 27602

NAME OF SITE: Halifax County Landfill	PERMIT NO.: 41-0176-WW-0033
ADDRESS: S.R. 141/ Aurelian Springs, NC	OWNER (print): Halifax County
DRILLING CONTRACTOR: Bore and Core, Inc.	REGISTRATION NO.: 763

Casing Type: PVC dia. 2 in. Grout Depth: from 0 to -1 ft. - dia. 7 in
Casing Depth: from 2.5 to -2.5 ft. - dia. 2 in. Bentonite Seal: from -1 to -2 ft. - dia. 7 in
Screen Type: .010 slotted PVC dia. 2 in. Sand/Gravel PK: from -2 to -17 ft. - dia. 7 in
Screen Depth: from -2.5 to -17.5 ft. - dia. 2 in. Total Well Depth: from 2.5 to -17.5 ft. - dia. 7 in

Static Water Level: 3'2" below ground surface ~~feet from top of casing~~ Date Measured 1 / 7 / 92

Thin sand pack between bentonite + screen.

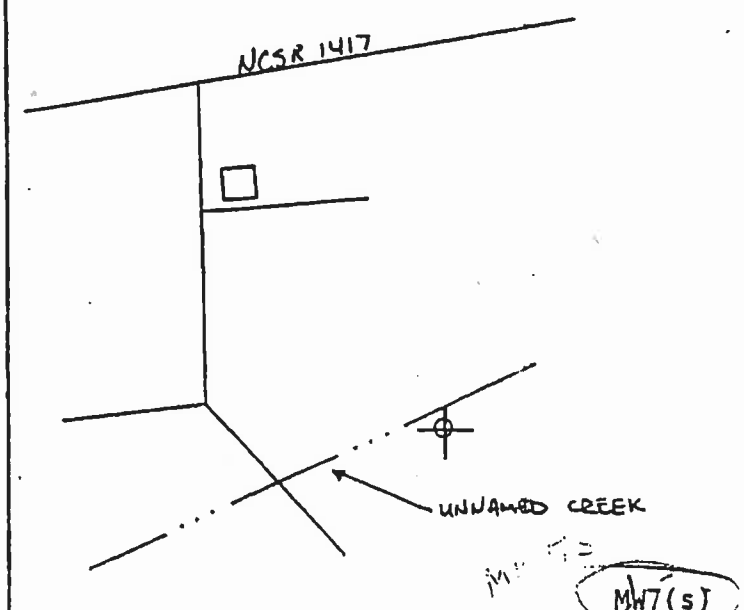
Yield (gpm): _____ Method of Testing: _____ Casing is _____ feet above land surface

DRILLING LOG

DEPTH FROM	TO	FORMATION DESCRIPTION
.0	3.4	Brown fine to medium sandy silt
.4	17.0	Damp brown fine to medium sand/gravel

LOCATION SKETCH

(show distance to numbered roads, or other map reference points)



REMARKS: _____

DATE: 1-7-92 SIGNATURE: John O Barnard

MW 75

TEST BORING FIELD REPORT

Name Halifax County Landfill - Aurelian Springs, N.C. Job No. 3720

Field Supervisor Tony Crew Ken Hrs. Drilling ___ Hrs. Moving ___ Boring # MW-5

Date 1-7-92 Weather Cool Ground Surface Elevation ___

Soil Strata			Sampling/Blows per				
From	To	Soil Description and Remarks	No.	Depth	1st6"	2nd6"	3
0.0	3.4	Brown fine to medium sandy silt					
3.4	17.0	Damp brown fine to medium sand/gravel B.T. 17.0					
		Set 2"x 15' screen at 17.~~0~~5' with 5.0' riser 4 bags					
		sand, ½ bucket bentonite, grout to top. 1, 2" locking cap					
		1, 4"x 5' protective casing.					

Water Level 3'2" at TOB
Water Level ___ at ___
Water Level ___ at 24 Hours

Water Losses ___

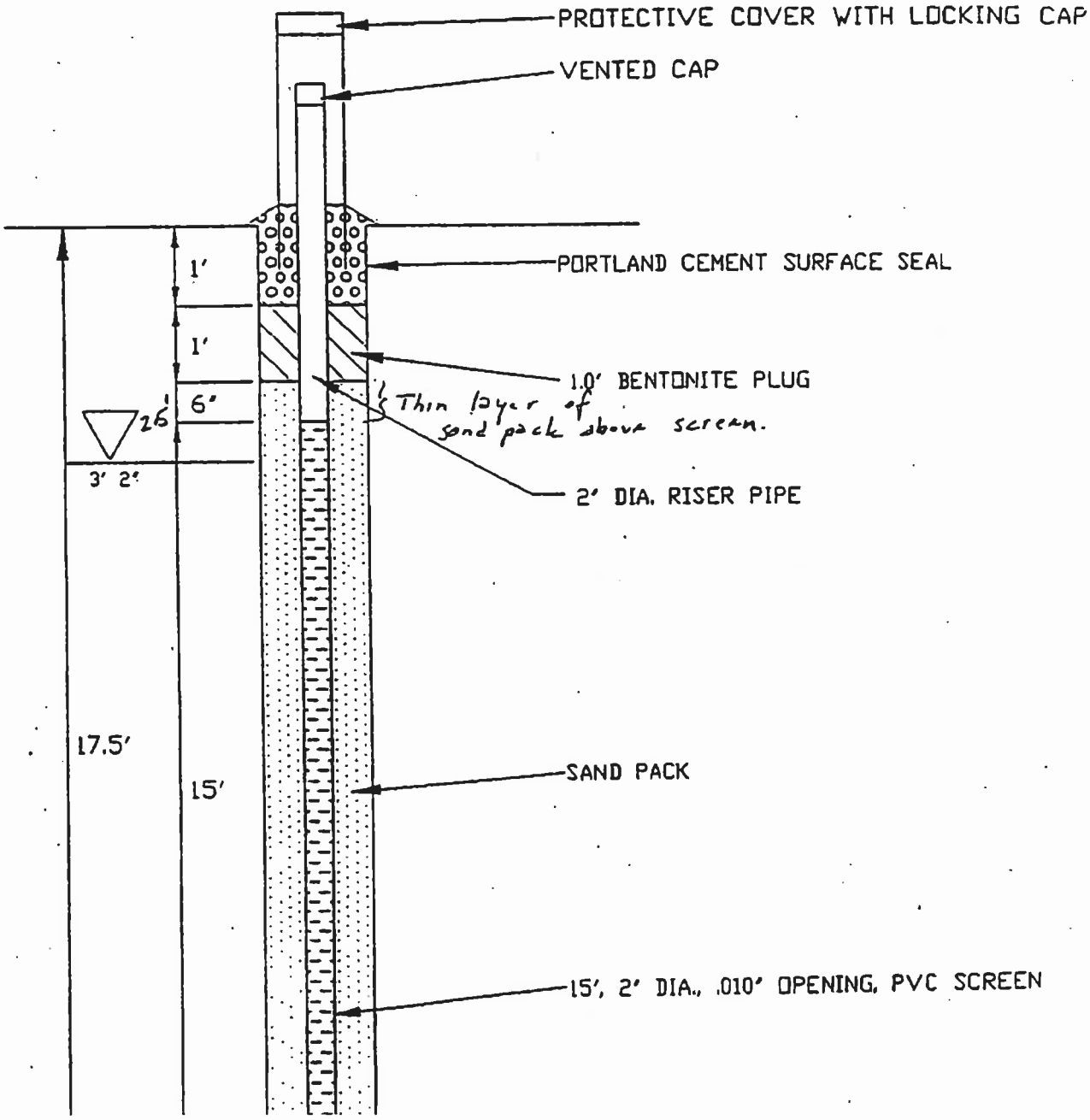
Casing, Size ___ Length ___

Note: (Record Methods of Drilling & Depths)

CME 450 ATV
4¼" I.D. H.S.A.
0.0' - 17.0'

TYPICAL MONITORING WELL SCHEMATIC

PROJECT HALIFAX COUNTY LANDFILL VERTICAL EXPANSION
WELL NUMBER MW-7(s)



WELL COMPLETION RECORD

MW-7 MW-7d

'I ETE ALL INFORMATION REQUESTED BELOW FOR EACH WELL INSTALLED, AND RETURN FORM TO THE N.C. ' MENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRANCH, 091, RALEIGH, N.C. 27602

.C. SITE: ifax County Sanitary Landfill	PERMIT NO.: 41-0176-WM-0033
.E S: .. 1417 Aurelian Springs, N.C.	OWNER (print): Halifax County
.I G CONTRACTOR: 'E & Core, Inc.	REGISTRATION NO.: 763

/pe:	PVC	dia.	2 in.	Grout Depth:	from	0	to	-21'	ft. - dia.	4"	in.
epth:	from 2	to	-25 ft. - dia.	2 in.	Bentonite Seal:	from	-21'	to	-23'	ft. - dia.	4" in.
Type:	slotted PVC	.010	dia.	2 in.	Sand/Gravel PK:	from	-23'	to	40'	ft. - dia.	4" in.
Depth:	from -25	to	-40 ft. - dia.	2 in.	Total Well Depth:	from	2'	to	-40'	ft. - dia.	4" in.

Water Level: 3' 11" Below ground surface feet from top of casing

Date Measured 11 / 26 / 91

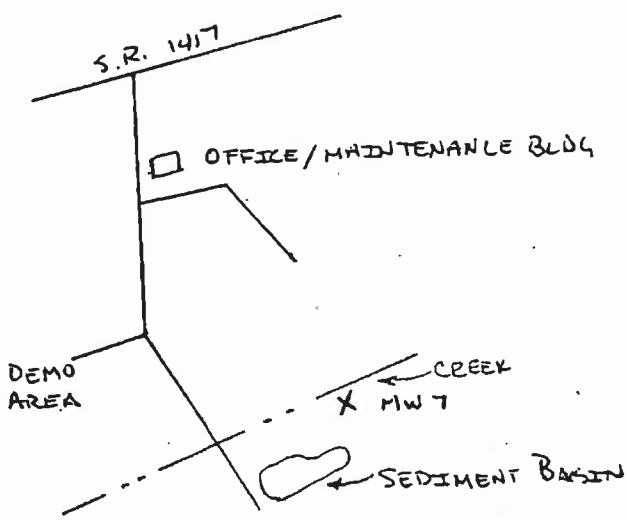
(m): _____ Method of Testing: _____ Casing is _____ feet above land surface

DRILLING LOG

DEPTH FROM	TO	FORMATION DESCRIPTION
	1.4	Brown fine sandy silt
4	6.7	Brown fine sandy silt
.7	14.3	Damp DrkBr. fine very sandy silt.
4 ?	40.0	Wet Brown medium sandy silt/gravel

LOCATION SKETCH

(show distance to numbered roads, or other map reference points)



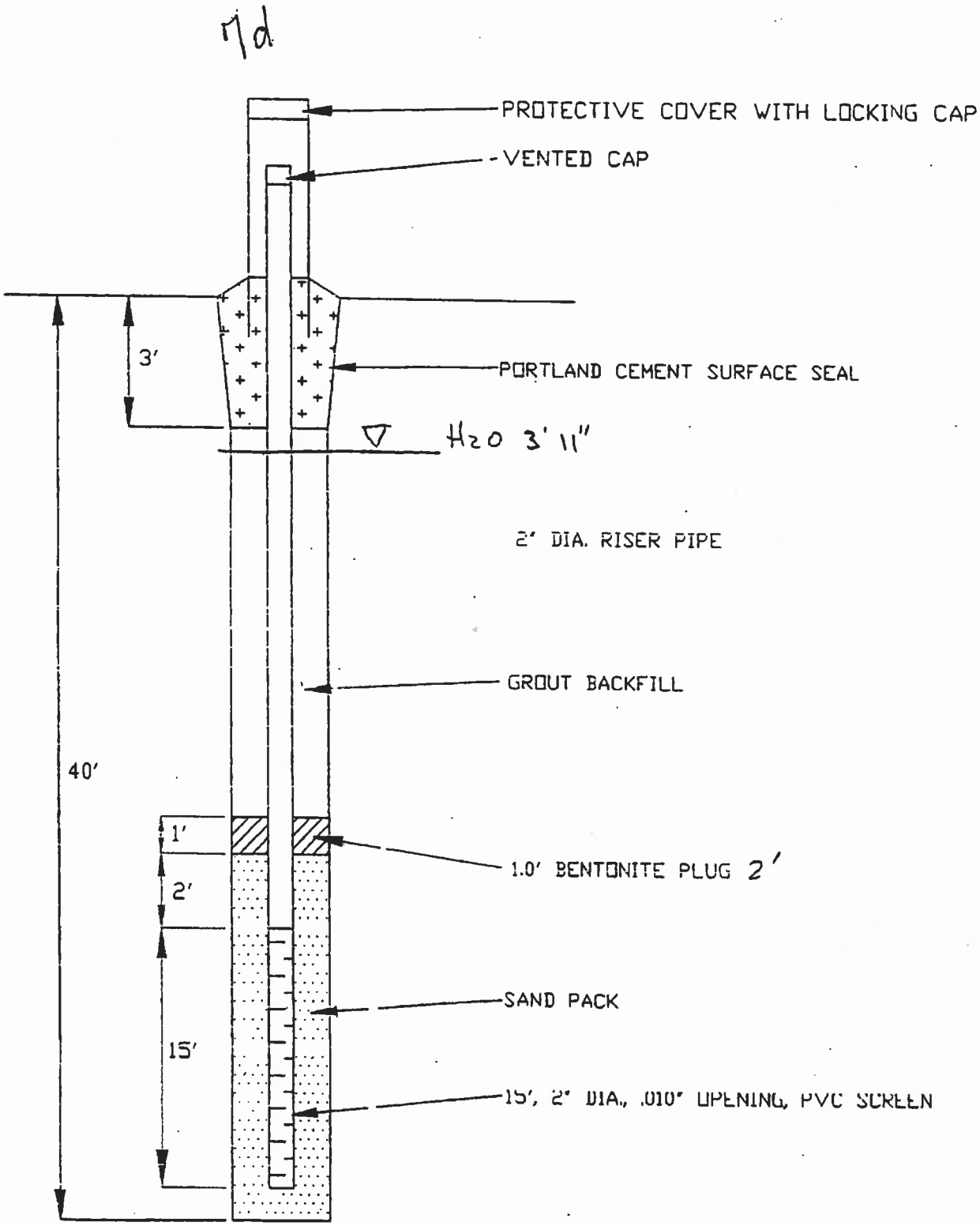
RKS: Well screened too deep.
Static water table is above the screen.

SIGNATURE: _____

3342 (6/85)
& Hazardous Waste Management Branch

TYPICAL MONITORING WELL SCHEMATIC

PROJECT HALIFAX COUNTY LANDFILL VERTICAL EXPANSION
WELL NUMBER MW-7



TEST BORING FIELD REPORT

MW 7d

Name Halifax County Landfill Vertical Expansion Job No. _____

Supervisor Tony Crew Ben Hrs. Drilling ____ Hrs. Moving ____ Boring # MW7

Date 10/31/91 Weather _____ Ground Surface Elevation _____

Soil Strata			Sampling/Blows per Ft				
From	To	Soil Description and Remarks	No.	Depth	1st6"	2nd6"	3rd6
.0	1.4	Brown fine sandy silt with roots					
.4	6.7	Brown fine sandy silt					
.	14.3	Damp dark brown fine very sandy silt					
.3	40.0	Wet brown medium sandy silt with gravel B.T. 40.0					
		Set 2" PVC screen (15') at 40.0 with 30' PVC riser 4 bags					
		sand, ½ bucket Bentonite 1 2" locking cap, 1 4"x5'					
		protective casing					

ater Level _____ at TOB

er Level _____ at _____

Level _____ at 24 Hours

Losses _____

asing, Size _____ Length _____

Note: (Record Methods of Drilling & Depths)

CME 450 ATV
4¼" ID hollow stem auger
0.0 - 40.0

FIELD BOREHOLE LOG

BOREHOLE NUMBER: MW-15R

PROJECT NUMBER: HALIFAX-14
PROJECT NAME: Halifax County Landfill
LOCATION: Aurelian Springs, North Carolina
DRILLING COMPANY: Engineering Tectonics, P.A.
RIG TYPE & NUMBER: MOBILE B-80
DRILLING METHOD: Hollow Stem Auger
WEATHER: Cloudy, 70 degrees
FIELD PARTY: David Barron
GEOLOGIST: Philip May
DATE BEGUN: 8/31/99 DATE COMPLETED: 8/31/99

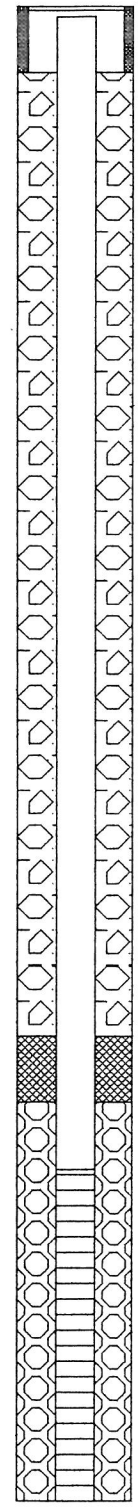
TOP OF CASING ELEVATION: TBD
TOTAL DEPTH: 43.0 FT
GROUND SURFACE ELEVATION: TBD
SHEET: 1 OF: 1

STATIC WATER LEVEL (BLS) WD=While Drilling AB=After Boring		
Depth(ft)	31.5'	31.55'
Time	2:00	12:00
Date:	8/31/99	9/1/99

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
5.0	5 6 8	Ss	81	SM		8"		SANDY CLAYEY SILT: Slightly moist rust-brown F sandy clayey silt, mottled (20%) w/ grey clay & some gravel, lower 1" moist white F sandy silt w/ rust mottling, some Mn & quartz throughout.
10.0	6 10 15	Ss	82	SM		12"		CLAYEY SILTY SAND: Slightly moist tan-pink clayey silty F sand w/ grey, white, yellow, & rust mottles (50%);
15.0	9 12 13	Ss	83	SM		12"		15.0' same as above, grading into rust orange matrix w/ other mottles, some mica & quartz.
20.0	10 14 17	Ss	84	M		12"		SANDY CLAYEY SILT: Moist M-C sandy clayey silt, mottled tan-pink, grey-black, white, & rust, quartz gravel;
25.0	8 11 15	Ss	85	M		6"		25.0' Moist M-C sandy clayey silt, grey-tan-pink, brown-black, grey-tan, & white mottles, quartz, Feldspar, Mn, Mica;
30.0	8 17 25	Ss	86	M		8"		30.0' same as above;
35.0	20 29 11	Ss	87	W		12"		35.0' same as above, very moist;
43.0	11 20 33	Ss	88	W		14"		43.0' same as above, wet, boring terminated at 43.0'.

LITHOLOGY

WELL INSTALLATION



North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section
P.O. Box 29578 - Raleigh, N.C. 27626-0578-Phone (919) 733-3221

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: Engineering Tectonics, P.A.
DRILLER REGISTRATION #: 835
STATE WELL CONSTRUCTION PERMIT#:

Well ID: MW-15r

1. WELL USE (Check Applicable Box): Residential ☐ Municipal ☐ Industrial ☐ Agricultural ☐ Monitoring ☒
Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use:

2. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Aurelian Springs County: Halifax
Liles Road
(Road, Community, or Subdivision and Lot No.)

3. OWNER Halifax County
ADDRESS
(Street or Route No.)
Halifax NC
City or Town State Zip Code

4. DATE DRILLED 8/31/99
5. TOTAL DEPTH 43.0
6. CUTTINGS COLLECTED YES ☐ NO ☒
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
8. STATIC WATER LEVEL Below Top of Casing: 31.55 FT.
(Use "Y" if Above Top of Casing)
9. TOP OF CASING IS 2.5 FT. Above Land Surface *
* Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .01 18
10. YIELD(gpm): METHOD OF TEST
11. WATER ZONES (depth):

DEPTH From	DEPTH To	DRILLING LOG Formation Description
See attached boring log		

If additional space is needed use back of form

12. CHLORINATION: Type Amount

13. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft	Material
From 2.0	TO 33.0	Ft.	2"		PVC
From	TO	Ft.			
From	TO	Ft.			

14. GROUT:

	Depth		Material	Method
From 0	TO 29.0	Ft.	Portland cement	Tremie
From 29.0	To 31.0	Ft.	Bentonite	

15. SCREEN:

	Depth		Diameter	Slot Size	Material
From 33.0	TO 43.0	Ft	2 in.	10 in.	PVC
From	To	Ft.	in.	in.	
From	TO	Ft	in.	in.	

16. SAND/GRAVEL PACK:

	Depth		Size	Material
From 31.0	To 43.0	Ft.	No. 2 Filter Sand	
From	To	Ft.		

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

17. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

FOR OFFICE USE ONLY
Quad No:
Serial No:

SIGNATURE OF CONTRACTOR OR AGENT DATE
Submit original to Division of Water Quality and copy to well owner.

GW-1 REV. 1/98

FIELD BOREHOLE LOG

BOREHOLE NUMBER: MW-2od

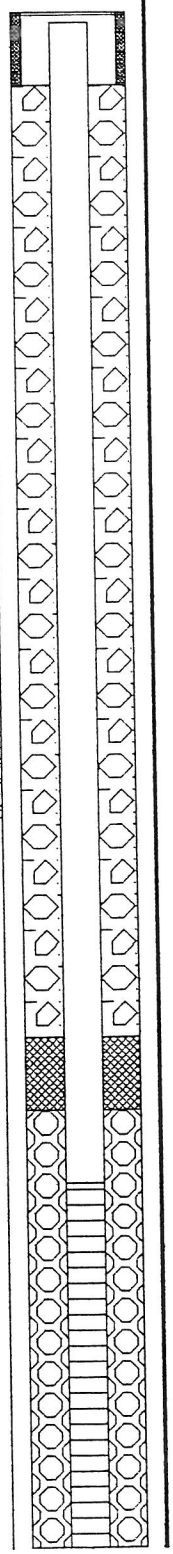
PROJECT NUMBER: HALIFAX-14
PROJECT NAME: Halifax County LandFill
LOCATION: Aurellan Springs, North Carolina
DRILLING COMPANY: Engineering Tectonics, P.A.
RIG TYPE & NUMBER: MOBILE B-80
DRILLING METHOD: Hollow Stem Auger
WEATHER: Cloudy, 70 degrees
FIELD PARTY: David Barron
GEOLOGIST: Philip May
DATE BEGUN: 9/1/99 DATE COMPLETED: 9/1/99

TOP OF CASING ELEVATION: TBD
TOTAL DEPTH: 40.0 FT
GROUND SURFACE ELEVATION: TBD
SHEET: 1 OF: 1

STATIC WATER LEVEL (BLS)		
	WD-While Drilling	AB-After Boring
Depth(ft)	6.0'	5.26'
Time	12:00	9:00
Date:	9/1/99	9/2/99

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
10.0	5 5 6	Ss	61	W		10"		CLAYEY SILTY SAND: Grey clayey silty sand, wet, Fe staining and quartz gravel.
15.0	15 29 34	Ss	82	W		12"		SILTY SAND: Mottled white, tan-pink, grey & rust M-C slightly silty sand, moist, relict rock, quartz, some mica.
20.0	50/4	Ss	63	W		2""		PWR: Wet C sand, partially weathered rock, tan-pink gravel w/ white, brown, & grey mottling, micaceous;
25.0	50/3	Ss	94	W		1"		25.0' same as above;
30.0	50/4	Ss	55	W		2"		30.0' same as above;
35.0	50/2	Ss	86	W		0"		35.0' same as above;
40.0								40.0' Boring terminated at 40'.

See MW-2a boring log.



North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section
P.O. Box 29578 - Raleigh, N.C. 27626-0578-Phone (919) 733-3221

'ELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: Engineering Tectonics, P.A.
DRILLER REGISTRATION #: 835
STATE WELL CONSTRUCTION PERMIT#:

Well ID: MW-2ad

1. WELL USE (Check Applicable Box): Residential ☐ Municipal ☐ Industrial ☐ Agricultural ☐ Monitoring ☒
Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use:

2. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Aurelian Springs County: Halifax
Liles Road
(Road, Community, or Subdivision and Lot No.)

3. OWNER Halifax County
ADDRESS
(Street or Route No.)
Halifax NC
City or Town State Zip Code

4. DATE DRILLED 9/1/99
5. TOTAL DEPTH 40.0
6. CUTTINGS COLLECTED YES ☐ NO ☒
7. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
8. STATIC WATER LEVEL Below Top of Casing: 5.26 FT.
(Use '+' if Above Top of Casing)
9. TOP OF CASING IS 2.5 FT. Above Land Surface *
* Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .01 18
0. YIELD(gpm): METHOD OF TEST
1. WATER ZONES (depth):
12. CHLORINATION: Type Amount
13. CASING:

	Depth From	Depth TO	Diameter	Wall Thickness or Weight/Ft	Material
From	2.0	TO 30.0 Ft.	2"		PVC
From		TO Ft.			
From		TO Ft.			

14. GROUT:

	Depth From	Depth TO	Material	Method
From	0	TO 26.0 Ft.	Portland cement	Tremie
From	26.0	To 28.0 Ft.	Bentonite	

15. SCREEN:

	Depth From	Depth TO	Diameter	Slot Size	Material
From	30.0	TO 40.0 Ft	2 in.	10 in.	PVC
From		To Ft.	in.	in.	
From		TO Ft	in.	in.	

16. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
From	28.0	To 40.0 Ft.	No. 2 Filter Sand	
From		To Ft.		

7. REMARKS:

DEPTH From	DEPTH To	DRILLING LOG Formation Description
See attached boring log		

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

FOR OFFICE USE ONLY
Quad No:
Serial No:

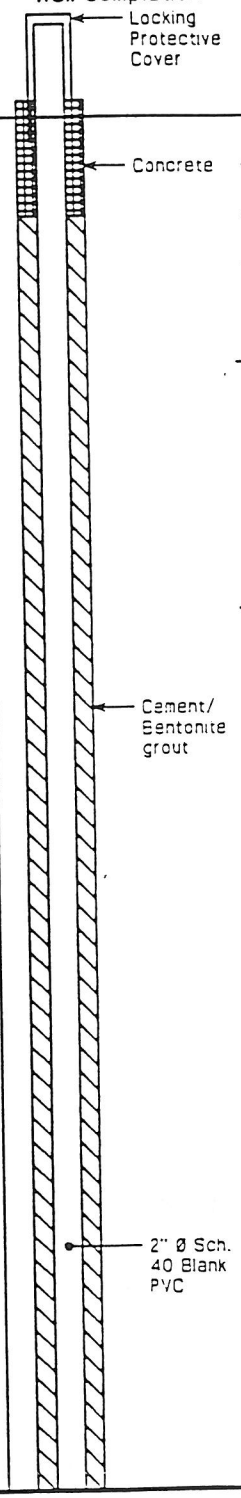
SIGNATURE OF CONTRACTOR OR AGENT DATE
Submit original to Division of Water Quality and copy to well owner.

GW-1 REV. 1/98

CEC Civil & Environmental Consultants, Inc. Cincinnati, OH (513) 469-0200 • (800) 759-5614 Pittsburgh, PA (412) 921-4302 • (800) 365-2324	Hazen & Sawyer Halifax County Landfill Halifax, NC	JOB NO.: 94521 LOG OF MW-15 Sheet 1 of 2
LOGGED BY: J. Barnard	GROUND SURFACE ELEVATION: 307.1 FT. MSL	
DRILLER: Parratt-Wolff	TOP OF CASING ELEVATION: 309.10 FT. MSL	
DATE DRILLED: 9/21/94	INITIAL WATER LEVEL: 41.5 ' BGS	DATE: 9/21/94
DRILL METHOD: 4 1/4" ID Hollow Stem Auger	STATIC WATER LEVEL: 42.15 ' BGS	DATE: 9/28/94

HNu (ppm)	Recovery (in.)	Blow Counts	Elevation MSL	Depth (ft.)	Graphic Log	Materials Description
	NA	NA	305			Orangish-brown, SILT, trace fine to coarse sand, trace clay, sl. moist.
	22	6 8 12 14	300	5		Reddish-brown silty CLAY, trace fine sand, dry to sl. moist.
	17	4 6 7 8	295	10		Reddish-brown clayey SILT. Orangish-brown, trace pink, clayey fine SAND to fine GRAVEL, sl. moist.
	23	4 5 6 7	290	15		Orangish-brown, trace gray, clayey SILT, some fine sand to fine gravel, sl. moist.
	22	7 8 11 19	285	20		Pink, orangish-tan, and white, silty fine to coarse SAND, trace fine gravel, micaceous (Granite Saprolite), sl. moist. Hard drilling beginning at approx. 22'.
	23	24 25 28 25	280	25		Same as above, dry to sl. moist.

Well Completion



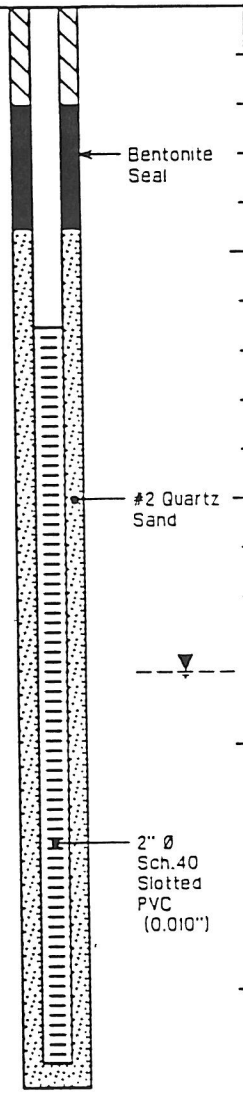
Civil & Environmental Consultants, Inc.
Cincinnati, OH (513) 469-0200 • (800) 759-5814
Pittsburgh, PA (412) 921-4302 • (800) 365-2324

Hazen & Sawyer
Halifax County Landfill
Halifax, NC

JOB NO.: 94521
LOG OF MW-15
Sheet 2 of 2

HNu (ppm)	Recovery (in.)	Blow Counts	Elevation MSL	Depth (ft.)	Graphic Log	Materials Description
	22	14 18 19 24	275	33		Same, dry.
	13	14 16 18 19	270	38		Pink, orangish-tan, and white, silty fine to coarse SAND, high % of pink feldspar crystals, sl. moist.
	21	9 10 7 8	265	43		Same, with increasing clay content, moist.
			260	48		
			255	53		Bottom of boring at 50.0' BGS.
			250	58		

Well Completion



FIELD BOREHOLE LOG

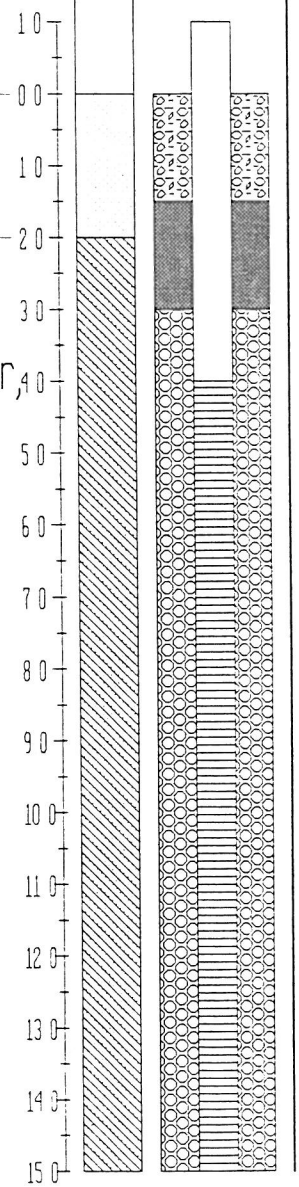
BOREHOLE NUMBER: MW-16A

PROJECT NUMBER HALIFAX-2
PROJECT NAME HALIFAX COUNTY LANDFILL
LOCATION HALIFAX, NC
DRILLING COMPANY BORE & CORE
RIG TYPE & NUMBER MOBILE B-57 ATV
DRILLING METHOD HOLLOW STEM AUGER
WEATHER HOT, HUMID
FIELD PARTY BILL BROW
GEOLOGIST GREG MILLS
DATE BEGUN 7/26/95 DATE COMPLETED 7/26/95

TOP OF CASING ELEVATION -
TOTAL DEPTH 16.0
GROUND SURFACE ELEVATION -
SHEET 1 OF 1

STATIC WATER LEVEL (BLS)		
WD=While Drilling AB=After Boring		
Depth(ft)	7.2 FT	
Time	3:00 PM	
Date	7/26/95	

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
10								
00								SAND: Tan coarse grained SAND w/ some organics.
10								
20				D				CLAYEY SAND: White, pink and orange coarse grained clayey SAND with mica, feldspar, K-feldspar, and some quartz; weathered granite; residual soil; SC.
30								
40	6	Ss	S1					
50	7 9							
60								
70								
80								
90	5	Ss	S2					
100	8 8			W				
110								
120								
130								
140	26	Ss	S3					
150	50/0.4'							



Richardson Smith Gardner and Assoc
14 North Boylan Avenue, Raleigh NC 27603
(919) 828-0577

FIELD BOREHOLE LOG

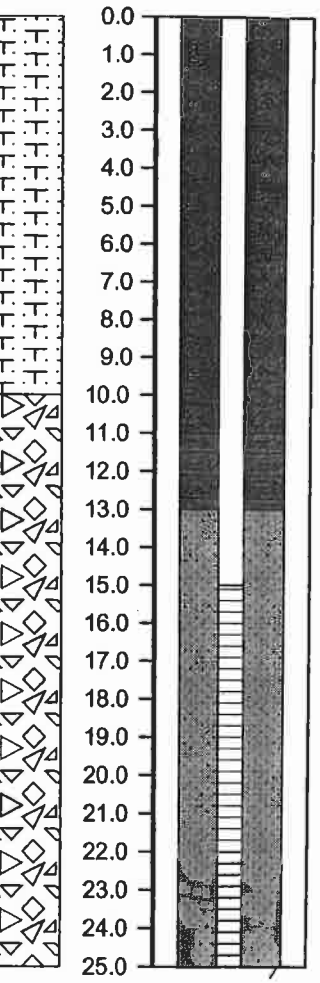
BOREHOLE NUMBER **MW-17**

PROJECT NAME: **Halifax Landfill**
LOCATION: **Halifax Co.**
DRILLING CO: **McCall Bros.**
DRILLING METHOD: **HSA**
FIELD PARTY: **Ken McDonald**
GEOLOGIST: **J. Smyth**
DATE BEGUN: **10/03/07** DATE COMPLETED: **10/03/07**

TOTAL DEPTH: **25**
GROUND SURFACE ELEVATION:
TOP OF CASING ELEVATION:

STATIC WATER LEVEL (TOC)		
Depth (ft)		
Time		
Date		

DEPTH	BLOW COUNT	SAMPLING METHOD	RECOVERY	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH	WELL INSTALLATION
0.0				HSA	SILTY CLAY: Wet, dark brown silty clay with organic matter.			
5.0	2,2,4,6	SS	16"					
10.0	4,6,10,12	SS	14"		SAPROLITE: Wet, very weathered to weathered K-spar granitic saprolite. Boring terminated at 25' below grade.			
15.0	11,16,22,27	SS	8"					
20.0	7,22,29,33	SS	6"					
25.0								



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FIELD BOREHOLE LOG

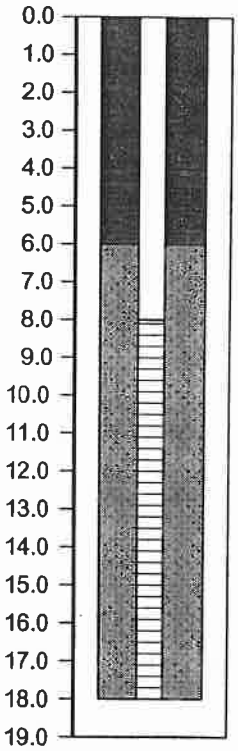
BOREHOLE NUMBER **MW-18s** Page 1 of 1

PROJECT NAME: **Halifax Landfill**
LOCATION: **Halifax Co.**
DRILLING CO: **McCall Bros.**
DRILLING METHOD: **HSA**
FIELD PARTY: **Ken McDonald**
GEOLOGIST: **J. Smyth**
DATE BEGUN: **10/16/07** DATE COMPLETED: **10/16/07**

TOTAL DEPTH: **19**
GROUND SURFACE ELEVATION:
TOP OF CASING ELEVATION:

STATIC WATER LEVEL (TOC)		
Depth (ft)		
Time		
Date		

DEPTH	BLOW COUNT	SAMPLING METHOD	RECOVERY	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH	WELL INSTALLATION
0.0				HSA	SILTY CLAY: Moist to Wet gray green silty clay		0.0	
1.0							1.0	
2.0							2.0	
3.0							3.0	
4.0							4.0	
5.0	2,2,1,2	SS	6"				5.0	
6.0							6.0	
7.0							7.0	
8.0							8.0	
							9.0	
10.0	3,2,3,11	SS	8"		CLAYEY SILTY SAND: Wet, dark gray, clayey silty sand with some partially weathered rock.		10.0	
11.0							11.0	
12.0							12.0	
13.0							13.0	
14.0							14.0	
15.0	18,26,27,26	SS	12"		SAPROLITE: Wet weathered potassium feldspar granite saprolite. Auger Refusal at 19 feet. Running sands backfilled hole to 18' where well was then set.		15.0	
16.0							16.0	
17.0							17.0	
18.0							18.0	
19.0							19.0	



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(919) 828-0577

FIELD BOREHOLE LOG

BOREHOLE NUMBER **MW-18d**

PROJECT NAME: **Halifax Landfill**
LOCATION: **Halifax Co.**
DRILLING CO: **McCall Bros.**
DRILLING METHOD: **HSA**
FIELD PARTY: **Ken McDonald**
GEOLOGIST: **J. Smyth**
DATE BEGUN: **10/16/07** DATE COMPLETED: **10/17/07**

TOTAL DEPTH: **52**
GROUND SURFACE ELEVATION:
TOP OF CASING ELEVATION:

STATIC WATER LEVEL (TOC)		
Depth (ft)		
Time		
Date		

DEPTH	BLOW COUNT	SAMPLING METHOD	RECOVERY	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH	WELL INSTALLATION
0.0				HSA	SILTY CLAY: Moist to Wet gray green silty clay		0.0	
1.0							1.0	
2.0							2.0	
3.0							3.0	
4.0							4.0	
5.0	2,2,1,2	SS	6"				5.0	
6.0							6.0	
7.0							7.0	
8.0							8.0	
							9.0	
10.0	3,2,3,11	SS	8"		CLAYEY SILTY SAND: Wet, dark gray, clayey silty sand with some partially weathered rock.		10.0	
11.0							11.0	
12.0							12.0	
13.0							13.0	
14.0							14.0	
15.0	18,26,27,26	SS	12"		SAPROLITE: Wet weathered potassium feldspar granite saprolite. Auger Refusal at 32 feet.		15.0	
16.0							16.0	
17.0							17.0	
18.0							18.0	
19.0							19.0	
20.0		Grab					20.0	
21.0							21.0	
22.0							22.0	
23.0							23.0	
24.0							24.0	
25.0		Grab					25.0	
26.0							26.0	
27.0							27.0	
28.0							28.0	
29.0							29.0	
		Grab					30.0	

Richardson Smith Gardner and Assoc
14 North Boylan Avenue, Raleigh NC 27603
(919) 828-0577

FIELD BOREHOLE LOG

BOREHOLE NUMBER **MW-18d**

PROJECT NAME: **Halifax Landfill**
LOCATION: **Halifax Co.**
DRILLING CO: **McCall Bros.**
DRILLING METHOD: **HSA**
FIELD PARTY: **Ken McDonald**
GEOLOGIST: **J. Smyth**
DATE BEGUN: **10/16/07** DATE COMPLETED: **10/17/07**

TOTAL DEPTH: **52**
GROUND SURFACE ELEVATION:
TOP OF CASING ELEVATION:

STATIC WATER LEVEL (TOC)		
Depth (ft)		
Time		
Date		

DEPTH	BLOW COUNT	SAMPLING METHOD	RECOVERY	DRILL METHOD	DESCRIPTION	LITHOLOGY	DEPTH	WELL INSTALLATION
31.0							31.0	
32.0				AH	GRANITE: Wet Potassium Feldspar Granite (observed by cuttings). Boring terminated at 52'.		32.0	
33.0							33.0	
34.0							34.0	
35.0		Grab					35.0	
36.0							36.0	
37.0							37.0	
38.0							38.0	
39.0							39.0	
40.0		Grab					40.0	
41.0							41.0	
42.0							42.0	
43.0							43.0	
44.0							44.0	
45.0		Grab					45.0	
46.0							46.0	
47.0							47.0	
48.0							48.0	
49.0							49.0	
50.0		Grab					50.0	
51.0							51.0	
52.0							52.0	

FIELD BOREHOLE LOG

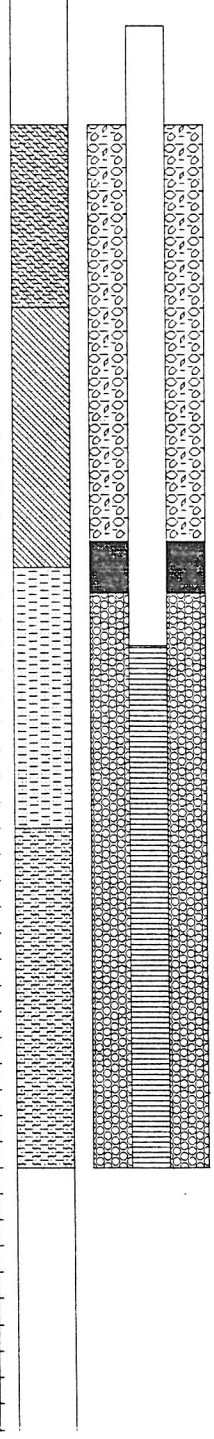
BOREHOLE NUMBER G-13S

PROJECT NUMBER HALIFAX-5
PROJECT NAME HALIFAX COUNTY
LOCATION HALIFAX, NORTH CAROLINA
DRILLING COMPANY BORE AND CORE
RIG TYPE & NUMBER MOBILE B-53
DRILLING METHOD HOLLOW STEM AUGER
WEATHER CLOUDY, 45 DEGREES
FIELD PARTY L. FOSKEY
GEOLOGIST G. MILLS
DATE BEGUN 11/30/95 DATE COMPLETED 11/30/95

TOP OF CASING ELEVATION 252.34
TOTAL DEPTH 20.0 FT
GROUND SURFACE ELEVATION 249.9
SHEET 1 OF 1

STATIC WATER LEVEL (BLS)		
WD=While Drilling AB=After Boring		
Depth(ft)	8.9	8.8
Time	5:00 PM	9:05 AM
Date	11/30/95	12/1/95

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
0.0	4 7 4	Ss	S1					SILTY CLAY: Dark brown silty clay with some sand and organics; fill.
3.0	6 9 6	Ss	S2	D		10"		SANDY CLAY: Orange brown sandy clay; some mica and feldspar and quartz; dry.
8.0	7 10 13	Ss	S3	M		16"		SANDY SILT: Brown-orange slightly plastic sandy silt; some mica; iron stained; moist.
13.0	13 16 18	Ss	S4	M		16"		SILTY SAND: Brown-orange silty sand; iron stained; abundant mica; very moist; relict granite . some quartz; relict granite structure; k-spar abundant from 18.5' to 20'.
18.0	16 23 30	Ss	S5	W				
20.0								Boring Terminated at 20 feet.



FIELD BOREHOLE LOG

BOREHOLE NUMBER
G-13D

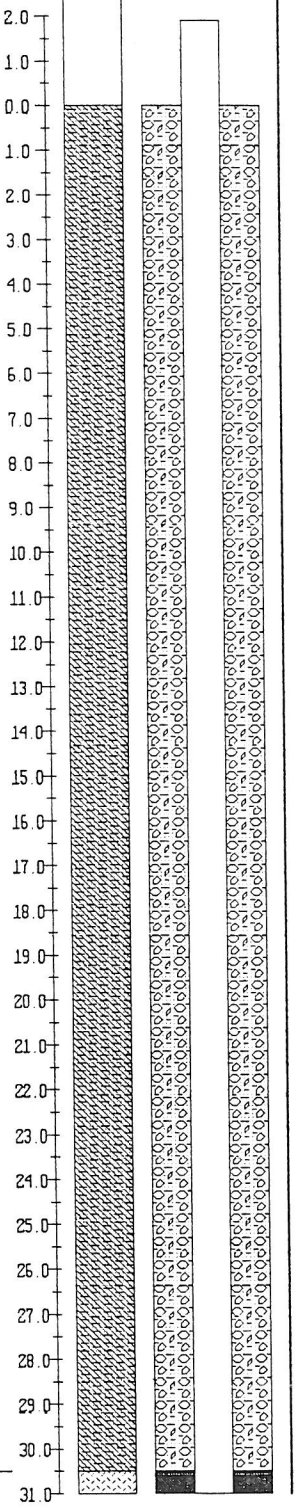
PROJECT NUMBER HALIFAX-5
PROJECT NAME HALIFAX COUNTY
LOCATION HALIFAX, NORTH CAROLINA
DRILLING COMPANY BORE AND CORE
RIG TYPE & NUMBER CME 450
DRILLING METHOD HOLLOW STEM AUGER, NO CORE, ROLLER CONE
WEATHER CLOUDY, 45 DEGREES
FIELD PARTY L. FOSKEY
GEOLOGIST G. MILLS
DATE BEGUN 12/27/95 DATE COMPLETED 12/28/95

TOP OF CASING ELEVATION 252.12
TOTAL DEPTH 54.5 FT
GROUND SURFACE ELEVATION 250.1
SHEET 1 OF 1

STATIC WATER LEVEL (BLS)		
WD=While Drilling AB=After Boring		
Depth(ft)	8.60	8.50
Time	-	-
Date	1-23-95	1-24-95

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
2.0								
1.0								
0.0								CLAYEY SANDY SILT: Probed to auger refusal without sampling; lithology shlould be same as G-13, drilled 5 feet south.
1.0								
2.0								
3.0								
4.0								
5.0								
6.0								
7.0								
8.0								
9.0								
10.0								
11.0								
12.0								
13.0								
14.0								
15.0								
16.0								
17.0								
18.0								
19.0								
20.0								
21.0								
22.0								
23.0								
24.0								
25.0								Auger Refusal at 30.5 feet; boring continued with NQ core.
26.0								
27.0								
28.0								
29.0								
30.0								
31.0								

DEPTH | LITHOLOGY | WELL INSTALLATION



FIELD BOREHOLE LOG

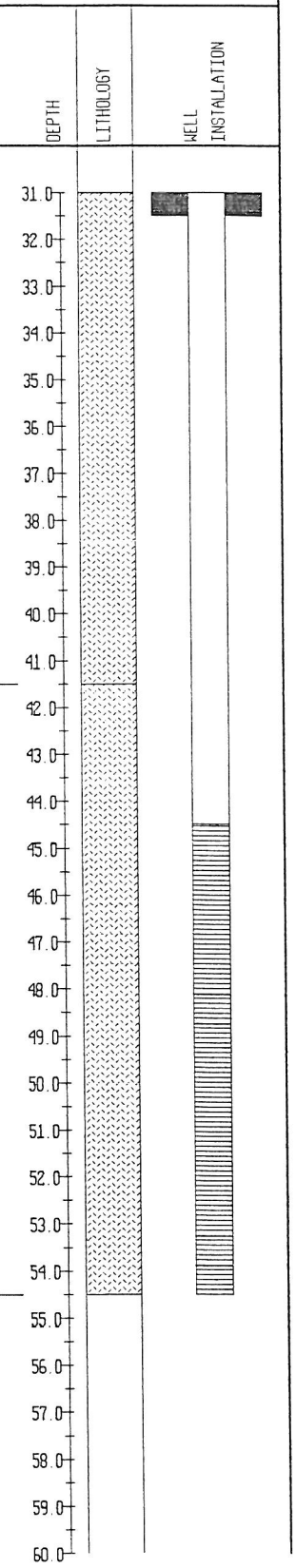
BOREHOLE NUMBER
G-13D

PROJECT NUMBER HALIFAX-5
PROJECT NAME HALIFAX COUNTY
LOCATION HALIFAX, NORTH CAROLINA
DRILLING COMPANY BORE AND CORE
RIG TYPE & NUMBER CME 450
DRILLING METHOD HOLLOW STEM AUGER, NO CORE, ROLLER CONE
WEATHER CLOUDY, 45 DEGREES
FIELD PARTY L. FOSKEY
GEOLOGIST G. MILLS
DATE BEGUN 12/27/95 DATE COMPLETED 12/28/95

TOP OF CASING ELEVATION 252.12
TOTAL DEPTH 54.5 FT
GROUND SURFACE ELEVATION 250.1
SHEET 1 OF 1

STATIC WATER LEVEL (BLS)		
WD=While Drilling AB=After Boring		
Depth(ft)	8.60	8.50
Time	-	-
Date	1-23-95	1-24-95

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
31.0								WEATHERED GRANITE: 11 feet of NO core with no recovery.
32.0								
33.0								
34.0								
35.0								
36.0								
37.0								
38.0								
39.0								
40.0								
41.0								
42.0								WEATHERED GRANITE: Tri-cone roller with 2-15/16 inch bit through weathered rock until refusal.
43.0								
44.0								
45.0								
46.0								
47.0								
48.0								
49.0								
50.0								
51.0								
52.0								
53.0								
54.0								
55.0								Roller refusal at 54.5 feet.
56.0								
57.0								
58.0								
59.0								
60.0								



Appendix B

Biochlor Models

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BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Halifax County
Downgradient Plume
Run Name

Data Input Instructions:

115 → 1. Enter value directly....or
↑ *or* 2. Calculate by filling in gray
0.02 cells. Press Enter, then C
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation

TYPE OF CHLORINATED SOLVENT: Ethenes ◉ Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	66.6	(ft/yr)
or			
Hydraulic Conductivity	K	3.785E-04	(cm/sec)
Hydraulic Gradient	i	0.034	(ft/ft)
Effective Porosity	n	0.2	(-)

2. DISPERSION

Alpha x*	15	(ft)
(Alpha y) / (Alpha x)*	0.1	(-)
(Alpha z) / (Alpha x)*	1.E-99	(-)

Calc.

3. ADSORPTION

Retardation Factor* → R

or

Soil Bulk Density, rho	1.7	(kg/L)		
FractionOrganicCarbon, foc	1.0E-3	(-)		
Partition Coefficient	Koc			
PCE	426	(L/kg)	4.62	(-)
TCE	130	(L/kg)	2.11	(-)
DCE	125	(L/kg)	2.06	(-)
VC	30	(L/kg)	1.25	(-)
ETH	302	(L/kg)	3.57	(-)
Common R (used in model)* =			**2.11**	

4. BIOTRANSFORMATION

-1st Order Decay Coefficient*

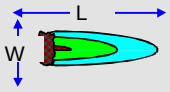
Zone 1	λ (1/yr)	half-life (yrs)	Yield
PCE → TCE	0.578	1.20	0.79
TCE → DCE	0.770	0.90	0.74
DCE → VC	0.210	3.30	0.64
VC → ETH	0.267	2.60	0.45

Zone 2	λ (1/yr)	half-life (yrs)
PCE → TCE	0.000	
TCE → DCE	0.000	
DCE → VC	0.000	
VC → ETH	0.000	

λ HELP

5. GENERAL

Simulation Time*	10	(yr)
Modeled Area Width*	1350	(ft)
Modeled Area Length*	150	(ft)
Zone 1 Length*	150	(ft)
Zone 2 Length*	0	(ft)



Zone 2=

6. SOURCE DATA

TYPE: Decaying
Single Planar

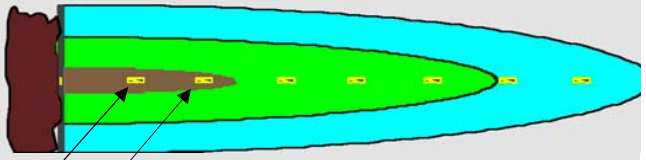
Source Options

Source Thickness in Sat. Zone* 25 (ft)

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations

	Y1
Width* (ft)	1350

Conc. (mg/L)*	C1	k_s* (1/yr)
PCE	.056	0.2
TCE	15.8	0.2
DCE	98.5	0.2
VC	3.08	0.2
ETH	0.03	0.2



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	0.0	0.0	0.0009	0.0012	0.0						
TCE Conc. (mg/L)	0.0	0.001	0.0007	0.0012	0.0						
DCE Conc. (mg/L)	0.0	0.00335	0.00315	0.0024	0.0						
VC Conc. (mg/L)	0.0	0.0012	0.0049	0.0	0.0						
ETH Conc. (mg/L)	3.3E-05	5.8E-05	0.00145	0.0	0.00068						
Distance from Source (ft)	50	95	122	190	205						
Date Data Collected	2012										

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | RUN ARRAY | Help | Restore | RESET | SEE | Paste

Start Here → ◉ PCE
○ TCE
○ DCE
○ VC
○ ETH

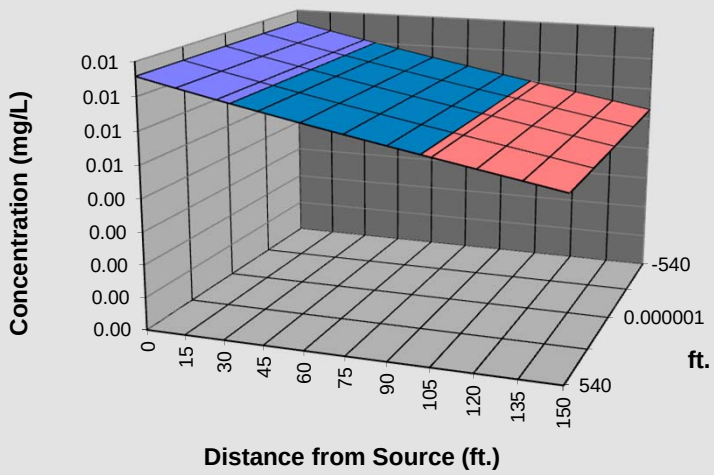
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	0.008	0.007	0.007	0.007	0.007	0.006	0.006	0.006	0.006	0.006	0.005
270	0.008	0.007	0.007	0.007	0.007	0.006	0.006	0.006	0.006	0.006	0.005
0	0.008	0.007	0.007	0.007	0.007	0.006	0.006	0.006	0.006	0.006	0.005
-270	0.008	0.007	0.007	0.007	0.007	0.006	0.006	0.006	0.006	0.006	0.005
-540	0.008	0.007	0.007	0.007	0.007	0.006	0.006	0.006	0.006	0.006	0.005
MASS RATE (mg/day)	2.6E+2	2.6E+2	2.5E+2	2.4E+2	2.3E+2	2.2E+2	2.1E+2	2.1E+2	2.0E+2	1.9E+2	1.8E+2

Show No

Show

Time: 10 yr Target Level: **0.005** mg/L Displayed Model: **Biotransformation** Displayed Compound: **PCE**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	0.8	*(Kg)*
- Plume Mass If Biotransformation/Production	0.4	*(Kg)*
Mass Removed	0.4	*(Kg)*
% Biotransformed =	**+52.5%**	
% Change in Mass Rate =	**30.0 %**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	*MGal*
Flow Rate of Water Through Source Area	0.009	*MGD*

Compare to Pump and Treat

Pumping Rate		*(gpm)*
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		*(yr)*

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ◉ TCE ○ DCE ○ VC ○ ETH

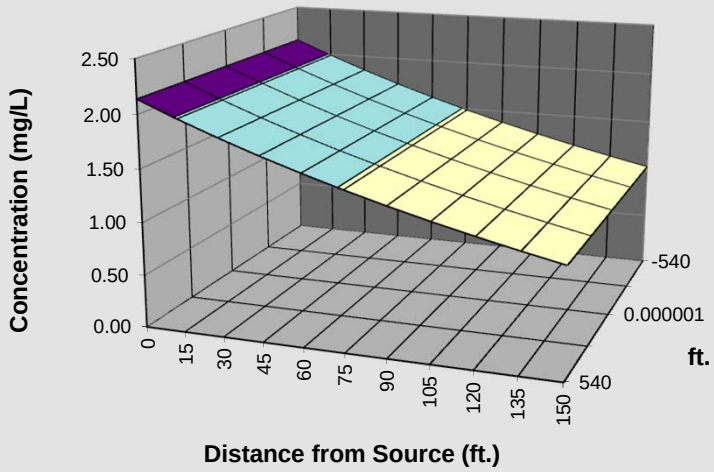
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	2.138	1.988	1.848	1.718	1.597	1.484	1.379	1.282	1.190	1.104	1.024
270	2.138	1.988	1.848	1.718	1.597	1.484	1.379	1.282	1.190	1.104	1.024
0	2.138	1.988	1.848	1.718	1.597	1.484	1.379	1.282	1.190	1.104	1.024
-270	2.138	1.988	1.848	1.718	1.597	1.484	1.379	1.282	1.190	1.104	1.024
-540	2.138	1.988	1.848	1.718	1.597	1.484	1.379	1.282	1.190	1.104	1.024
MASS RATE (mg/day)	7.5E+4	6.9E+4	6.4E+4	6.0E+4	5.6E+4	5.2E+4	4.8E+4	4.5E+4	4.1E+4	3.8E+4	3.6E+4

Show No

Show

Time: 10 yr Target Level: 0.005 mg/L Displayed Model: Biotransformation Displayed Compound: TCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	238.7	(Kg)
- Plume Mass If Biotransformation/Production	94.6	(Kg)
Mass Removed	144.1	(Kg)
% Biotransformed =	+60.4%	
% Change in Mass Rate =	52.1 %	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ○ TCE ◉ DCE ○ VC ○ ETH

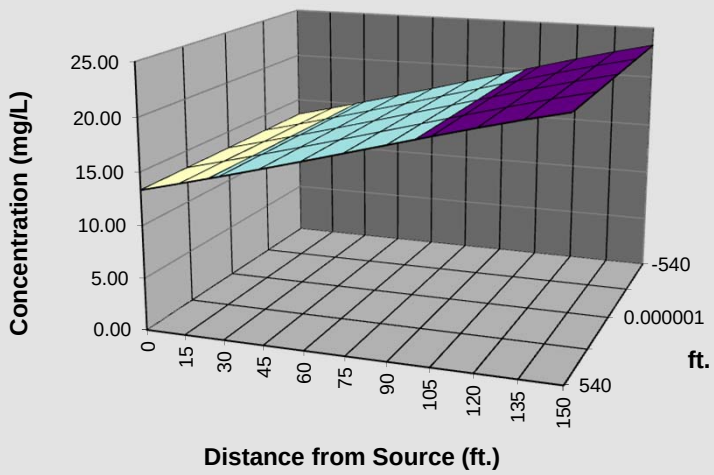
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	13.331	14.275	15.246	16.240	17.257	18.291	19.333	20.369	21.383	22.350	23.241
270	13.331	14.275	15.246	16.240	17.257	18.291	19.333	20.369	21.383	22.350	23.241
0	13.331	14.275	15.246	16.240	17.257	18.291	19.333	20.369	21.383	22.350	23.241
-270	13.331	14.275	15.246	16.240	17.257	18.291	19.333	20.369	21.383	22.350	23.241
-540	13.331	14.275	15.246	16.240	17.257	18.291	19.333	20.369	21.383	22.350	23.241
MASS RATE (mg/day)	4.6E+5	5.0E+5	5.3E+5	5.7E+5	6.0E+5	6.4E+5	6.7E+5	7.1E+5	7.5E+5	7.8E+5	8.1E+5

Show No

Show

Time: 10 yr Target Level: 0.070 mg/L Displayed Model: Biotransformation Displayed Compound: DCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	1488.3	(Kg)
- Plume Mass If Biotransformation/Production	1174.1	(Kg)
Mass Removed	314.2	(Kg)
% Biotransformed =	**+21.1%**	
% Change in Mass Rate =	**-74.3 %**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE
○ TCE
○ DCE
◉ VC
○ ETH

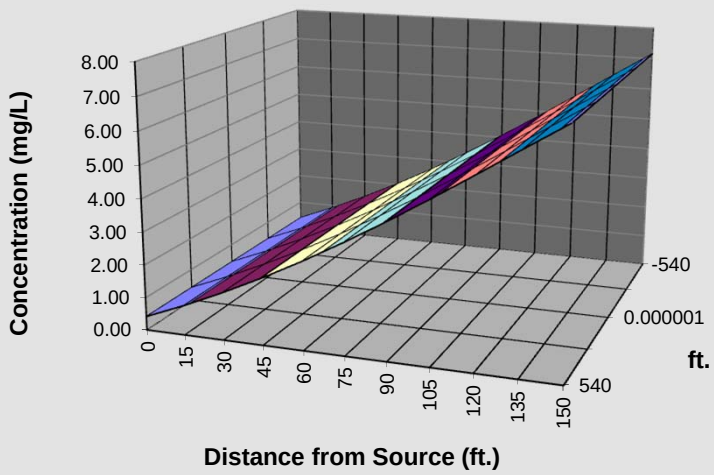
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	0.417	0.907	1.445	2.031	2.664	3.342	4.062	4.816	5.593	6.381	7.161
270	0.417	0.907	1.445	2.031	2.664	3.342	4.062	4.816	5.593	6.381	7.161
0	0.417	0.907	1.445	2.031	2.664	3.342	4.062	4.816	5.593	6.381	7.161
-270	0.417	0.907	1.445	2.031	2.664	3.342	4.062	4.816	5.593	6.381	7.161
-540	0.417	0.907	1.445	2.031	2.664	3.342	4.062	4.816	5.593	6.381	7.161
MASS RATE (mg/day)	1.5E+4	3.2E+4	5.0E+4	7.1E+4	9.3E+4	1.2E+5	1.4E+5	1.7E+5	1.9E+5	2.2E+5	2.5E+5

Show No

Show

Time: 10 yr Target Level: 0.002 mg/L Displayed Model: Biotransformation Displayed Compound: VC



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	46.5	(Kg)
- Plume Mass If Biotransformation/Production	232.9	(Kg)
Mass Removed	-186.4	(Kg)
% Biotransformed =	-400.4 %	
% Change in Mass Rate =	-1618.0 %	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

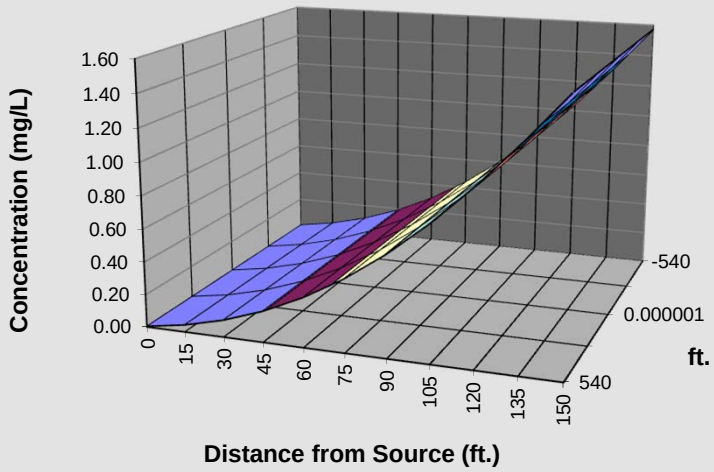
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	0.004	0.043	0.104	0.189	0.300	0.440	0.611	0.812	1.042	1.297	1.574
270	0.004	0.043	0.104	0.189	0.300	0.440	0.611	0.812	1.042	1.297	1.574
0	0.004	0.043	0.104	0.189	0.300	0.440	0.611	0.812	1.042	1.297	1.574
-270	0.004	0.043	0.104	0.189	0.300	0.440	0.611	0.812	1.042	1.297	1.574
-540	0.004	0.043	0.104	0.189	0.300	0.440	0.611	0.812	1.042	1.297	1.574
MASS RATE (mg/day)	1.4E+2	1.5E+3	3.6E+3	6.6E+3	1.0E+4	1.5E+4	2.1E+4	2.8E+4	3.6E+4	4.5E+4	5.5E+4

Show No

Show

Time: 10 yr Target Level: mg/L Displayed Model: Biotransformation Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	0.5	(Kg)
- Plume Mass If Biotransformation/Production	38.7	(Kg)
Mass Removed	-38.2	(Kg)
% Biotransformed =	-8434.4 %	
% Change in Mass Rate =	-38659.1 %	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ◉ PCE
○ TCE
○ DCE
○ VC
○ ETH

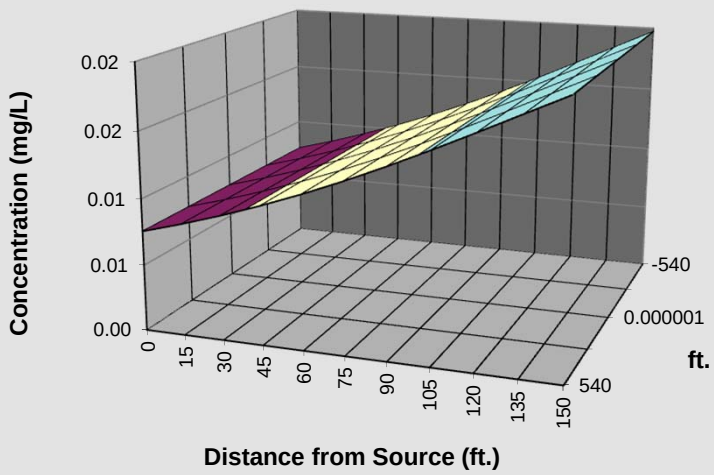
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	0.008	0.008	0.009	0.010	0.011	0.013	0.014	0.015	0.017	0.018	0.020
270	0.008	0.008	0.009	0.010	0.011	0.013	0.014	0.015	0.017	0.018	0.020
0	0.008	0.008	0.009	0.010	0.011	0.013	0.014	0.015	0.017	0.018	0.020
-270	0.008	0.008	0.009	0.010	0.011	0.013	0.014	0.015	0.017	0.018	0.020
-540	0.008	0.008	0.009	0.010	0.011	0.013	0.014	0.015	0.017	0.018	0.020
MASS RATE (mg/day)	2.6E+2	2.9E+2	3.3E+2	3.6E+2	4.0E+2	4.4E+2	4.9E+2	5.4E+2	5.9E+2	6.4E+2	6.9E+2

Show No

Show

Time: 10 yr Target Level: 0.005 mg/L Displayed Model: No Degradation Displayed Compound: PCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	0.8	(Kg)
- Plume Mass If Biotransformation/Production	0.4	(Kg)
Mass Removed	0.4	(Kg)
% Biotransformed =	+52.5%	
% Change in Mass Rate =	-160.3 %	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ◉ TCE ○ DCE ○ VC ○ ETH

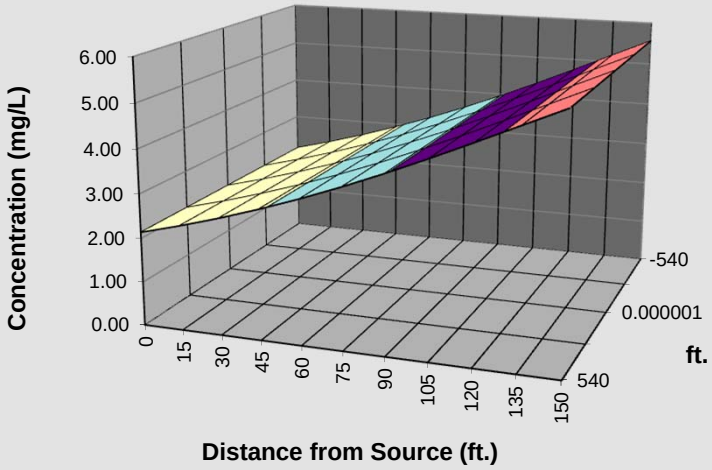
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	2.138	2.376	2.638	2.926	3.241	3.583	3.949	4.337	4.741	5.154	5.565
270	2.138	2.376	2.638	2.926	3.241	3.583	3.949	4.337	4.741	5.154	5.565
0	2.138	2.376	2.638	2.926	3.241	3.583	3.949	4.337	4.741	5.154	5.565
-270	2.138	2.376	2.638	2.926	3.241	3.583	3.949	4.337	4.741	5.154	5.565
-540	2.138	2.376	2.638	2.926	3.241	3.583	3.949	4.337	4.741	5.154	5.565
MASS RATE (mg/day)	7.5E+4	8.3E+4	9.2E+4	1.0E+5	1.1E+5	1.2E+5	1.4E+5	1.5E+5	1.7E+5	1.8E+5	1.9E+5

Show No

Show

Time: 10 yr Target Level: 0.005 mg/L Displayed Model: No Degradation Displayed Compound: TCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	238.7	(Kg)
- Plume Mass If Biotransformation/Production	94.6	(Kg)
Mass Removed	144.1	(Kg)
% Biotransformed =	+60.4%	
% Change in Mass Rate =	-160.3 %	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ○ TCE ◉ DCE ○ VC ○ ETH

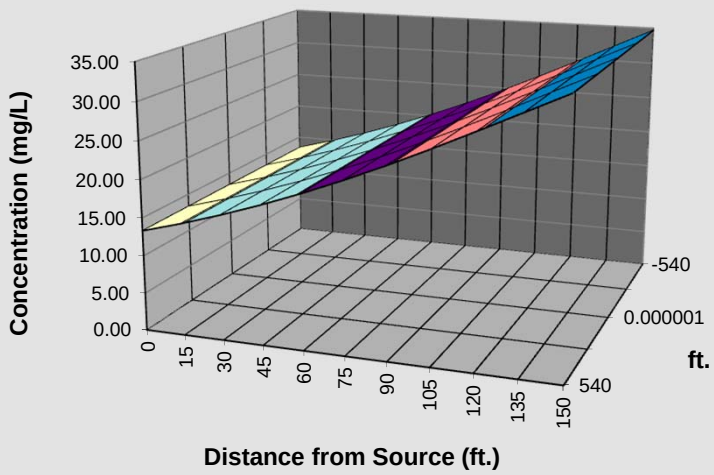
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	13.331	14.812	16.446	18.243	20.206	22.334	24.618	27.037	29.557	32.132	34.695
270	13.331	14.812	16.446	18.243	20.206	22.334	24.618	27.037	29.557	32.132	34.695
0	13.331	14.812	16.446	18.243	20.206	22.334	24.618	27.037	29.557	32.132	34.695
-270	13.331	14.812	16.446	18.243	20.206	22.334	24.618	27.037	29.557	32.132	34.695
-540	13.331	14.812	16.446	18.243	20.206	22.334	24.618	27.037	29.557	32.132	34.695
MASS RATE (mg/day)	4.6E+5	5.2E+5	5.7E+5	6.4E+5	7.0E+5	7.8E+5	8.6E+5	9.4E+5	1.0E+6	1.1E+6	1.2E+6

Show No

Show

Time: 10 yr Target Level: 0.070 mg/L Displayed Model: No Degradation Displayed Compound: DCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	1488.3	(Kg)
- Plume Mass If Biotransformation/Production	1174.1	(Kg)
Mass Removed	314.2	(Kg)
% Biotransformed =	**+21.1%**	
% Change in Mass Rate =	**-160.3 %**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ○ TCE ○ DCE ◉ VC ○ ETH

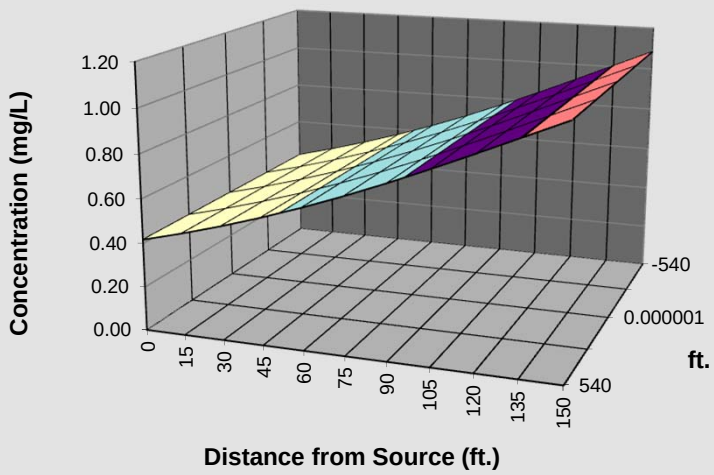
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	0.417	0.463	0.514	0.570	0.632	0.698	0.770	0.845	0.924	1.005	1.085
270	0.417	0.463	0.514	0.570	0.632	0.698	0.770	0.845	0.924	1.005	1.085
0	0.417	0.463	0.514	0.570	0.632	0.698	0.770	0.845	0.924	1.005	1.085
-270	0.417	0.463	0.514	0.570	0.632	0.698	0.770	0.845	0.924	1.005	1.085
-540	0.417	0.463	0.514	0.570	0.632	0.698	0.770	0.845	0.924	1.005	1.085
MASS RATE (mg/day)	1.5E+4	1.6E+4	1.8E+4	2.0E+4	2.2E+4	2.4E+4	2.7E+4	2.9E+4	3.2E+4	3.5E+4	3.8E+4

Show No

Show

Time: 10 yr Target Level: 0.002 mg/L Displayed Model: No Degradation Displayed Compound: VC



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	46.5	(Kg)
- Plume Mass If Biotransformation/Production	232.9	(Kg)
Mass Removed	-186.4	(Kg)
% Biotransformed =	-400.4 %	
% Change in Mass Rate =	-160.3 %	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

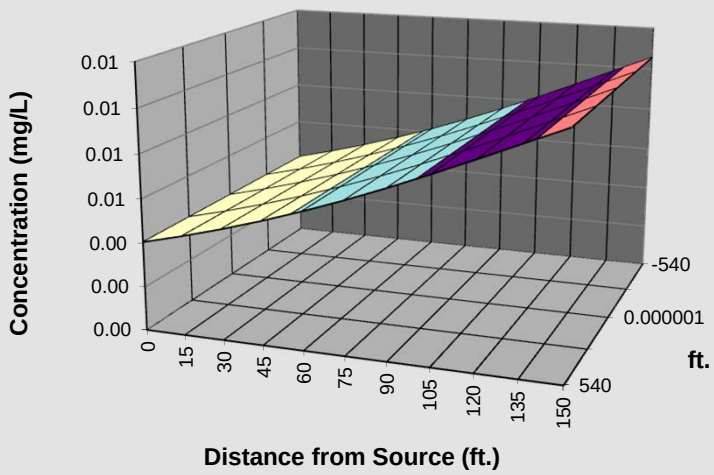
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.008	0.009	0.010	0.011
270	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.008	0.009	0.010	0.011
0	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.008	0.009	0.010	0.011
-270	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.008	0.009	0.010	0.011
-540	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.008	0.009	0.010	0.011
MASS RATE (mg/day)	1.4E+2	1.6E+2	1.7E+2	1.9E+2	2.1E+2	2.4E+2	2.6E+2	2.9E+2	3.1E+2	3.4E+2	3.7E+2

Show No

Show

Time: 10 yr Target Level: mg/L Displayed Model: No Degradation Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	0.5	(Kg)
- Plume Mass If Biotransformation/Production	38.7	(Kg)
Mass Removed	-38.2	(Kg)
% Biotransformed =	-8434.4 %	
% Change in Mass Rate =	-160.3 %	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Halifax County
Downgradient Plume
Run Name

Data Input Instructions:

115 → 1. Enter value directly....or
↑ *or* 2. Calculate by filling in gray
0.02 cells. Press Enter, then C
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation

TYPE OF CHLORINATED SOLVENT: Ethenes ◉ Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	66.6	(ft/yr)
or			
Hydraulic Conductivity	K	3.785E-04	(cm/sec)
Hydraulic Gradient	i	0.034	(ft/ft)
Effective Porosity	n	0.2	(-)

2. DISPERSION

Alpha x*	15	(ft)
(Alpha y) / (Alpha x)*	0.1	(-)
(Alpha z) / (Alpha x)*	1.E-99	(-)

Calc.

3. ADSORPTION

Retardation Factor* → R

or

Soil Bulk Density, rho	1.7	(kg/L)		
FractionOrganicCarbon, foc	1.0E-3	(-)		
Partition Coefficient	Koc			
PCE	426	(L/kg)	4.62	(-)
TCE	130	(L/kg)	2.11	(-)
DCE	125	(L/kg)	2.06	(-)
VC	30	(L/kg)	1.25	(-)
ETH	302	(L/kg)	3.57	(-)
Common R (used in model)* =			**2.11**	

4. BIOTRANSFORMATION

-1st Order Decay Coefficient*

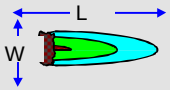
Zone 1	λ (1/yr)	half-life (yrs)	Yield
PCE → TCE	9.900	0.07	0.79
TCE → DCE	13.860	0.05	0.74
DCE → VC	3.850	0.18	0.64
VC → ETH	5.775	0.12	0.45

Zone 2	λ (1/yr)	half-life (yrs)
PCE → TCE	0.000	
TCE → DCE	0.000	
DCE → VC	0.000	
VC → ETH	0.000	

λ HELP

5. GENERAL

Simulation Time*	10	(yr)
Modeled Area Width*	1350	(ft)
Modeled Area Length*	150	(ft)
Zone 1 Length*	150	(ft)
Zone 2 Length*	0	(ft)



Zone 2=

6. SOURCE DATA

TYPE: Decaying
Single Planar

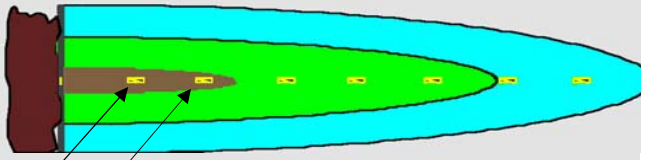
Source Options

Source Thickness in Sat. Zone* 25 (ft)

Width* (ft) Y1 1350

Conc. (mg/L)*	C1	k_s* (1/yr)
PCE	.056	0.2
TCE	15.8	0.2
DCE	98.5	0.2
VC	3.08	0.2
ETH	0.03	0.2

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	0.0	0.0	0.0009	0.0012	0.0						
TCE Conc. (mg/L)	0.0	0.001	0.0007	0.0012	0.0						
DCE Conc. (mg/L)	0.0	0.00335	0.00315	0.0024	0.0						
VC Conc. (mg/L)	0.0	0.0012	0.0049	0.0	0.0						
ETH Conc. (mg/L)	3.3E-05	5.8E-05	0.00145	0.0	0.00068						
Distance from Source (ft)	50	95	122	190	205						
Date Data Collected	2012										

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | RUN ARRAY | *Help* | Restore | RESET | *SEE* | Paste

Start Here → ◉ PCE
○ TCE
○ DCE
○ VC
○ ETH

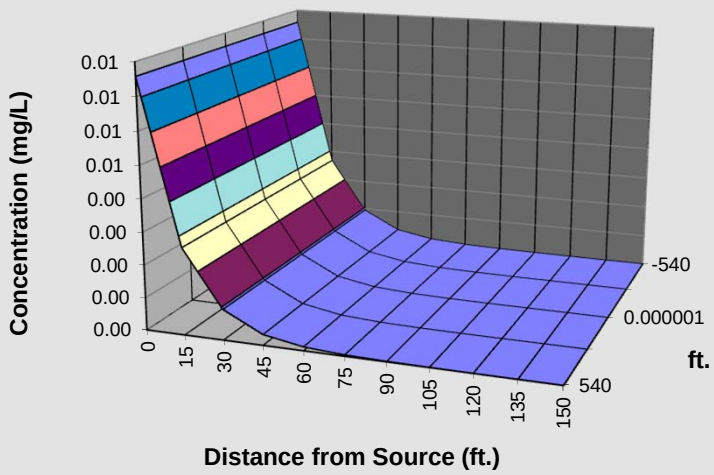
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	0.008	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
270	0.008	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0	0.008	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-270	0.008	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
-540	0.008	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	2.6E+2	9.3E+1	3.3E+1	1.2E+1	4.0E+0	1.4E+0	5.0E-1	1.8E-1	6.2E-2	2.2E-2	7.7E-3

Show No

Show

Time: 10 yr Target Level: 0.005 mg/L Displayed Model: Biotransformation Displayed Compound: PCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	0.8	(Kg)
- Plume Mass If Biotransformation/Production	0.0	(Kg)
Mass Removed	0.8	(Kg)
% Biotransformed =	+94.2%	
% Change in Mass Rate =	100.0 %	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	0.76	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.00	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ◉ TCE ○ DCE ○ VC ○ ETH

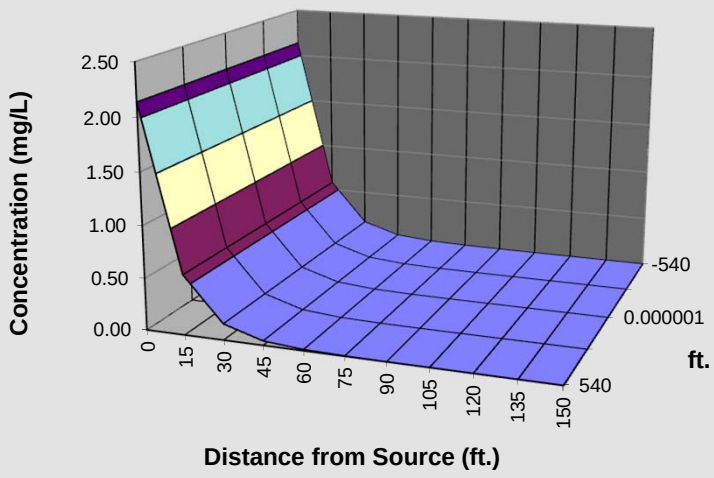
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	2.138	0.578	0.156	0.042	0.011	0.003	0.001	0.000	0.000	0.000	0.000
270	2.138	0.578	0.156	0.042	0.011	0.003	0.001	0.000	0.000	0.000	0.000
0	2.138	0.578	0.156	0.042	0.011	0.003	0.001	0.000	0.000	0.000	0.000
-270	2.138	0.578	0.156	0.042	0.011	0.003	0.001	0.000	0.000	0.000	0.000
-540	2.138	0.578	0.156	0.042	0.011	0.003	0.001	0.000	0.000	0.000	0.000
MASS RATE (mg/day)	7.5E+4	2.0E+4	5.4E+3	1.5E+3	4.0E+2	1.1E+2	2.9E+1	8.0E+0	2.2E+0	6.0E-1	1.7E-1

Show No

Show

Time: 10 yr Target Level: 0.005 mg/L Displayed Model: Biotransformation Displayed Compound: TCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	238.7	(Kg)
- Plume Mass If Biotransformation/Production	11.2	(Kg)
Mass Removed	227.5	(Kg)
% Biotransformed =	**+95.3%**	
% Change in Mass Rate =	**100.0 %**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	3.79	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.	0.00	
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ○ TCE ◉ DCE ○ VC ○ ETH

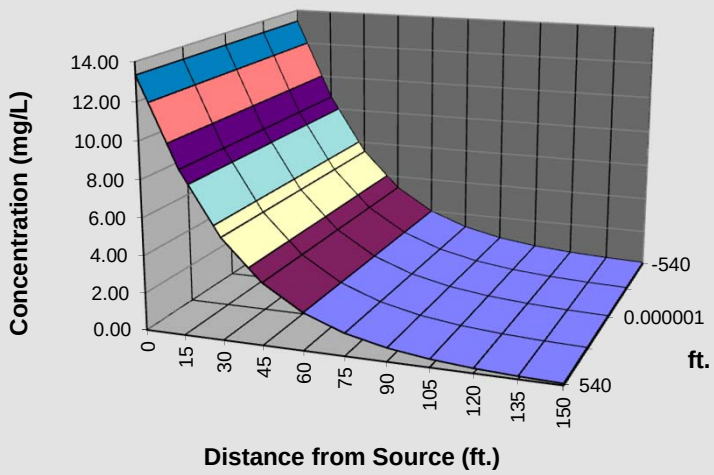
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	13.331	8.717	5.423	3.305	1.997	1.201	0.722	0.433	0.260	0.156	0.093
270	13.331	8.717	5.423	3.305	1.997	1.201	0.722	0.433	0.260	0.156	0.093
0	13.331	8.717	5.423	3.305	1.997	1.201	0.722	0.433	0.260	0.156	0.093
-270	13.331	8.717	5.423	3.305	1.997	1.201	0.722	0.433	0.260	0.156	0.093
-540	13.331	8.717	5.423	3.305	1.997	1.201	0.722	0.433	0.260	0.156	0.093
MASS RATE (mg/day)	4.6E+5	3.0E+5	1.9E+5	1.2E+5	7.0E+4	4.2E+4	2.5E+4	1.5E+4	9.1E+3	5.4E+3	3.3E+3

Show No

Show

Time: 10 yr Target Level: 0.070 mg/L Displayed Model: Biotransformation Displayed Compound: DCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	1488.3	(Kg)
- Plume Mass If Biotransformation/Production	174.8	(Kg)
Mass Removed	1313.5	(Kg)
% Biotransformed =	**+88.3%**	
% Change in Mass Rate =	**99.3 %**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE
○ TCE
○ DCE
◉ VC
○ ETH

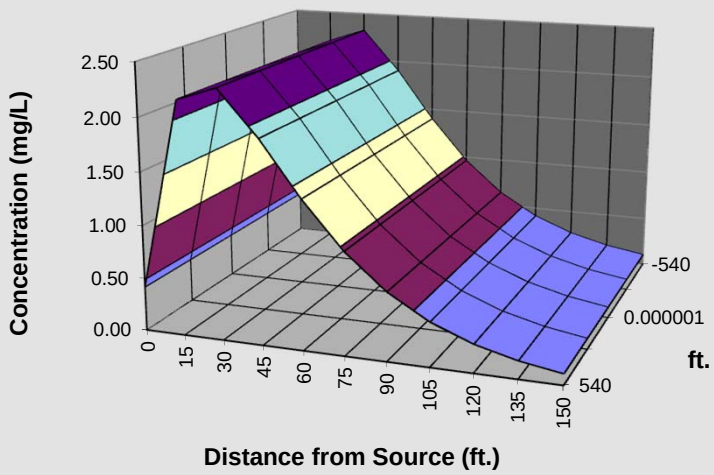
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	0.417	2.188	2.318	1.899	1.394	0.963	0.640	0.415	0.264	0.166	0.103
270	0.417	2.188	2.318	1.899	1.394	0.963	0.640	0.415	0.264	0.166	0.103
0	0.417	2.188	2.318	1.899	1.394	0.963	0.640	0.415	0.264	0.166	0.103
-270	0.417	2.188	2.318	1.899	1.394	0.963	0.640	0.415	0.264	0.166	0.103
-540	0.417	2.188	2.318	1.899	1.394	0.963	0.640	0.415	0.264	0.166	0.103
MASS RATE (mg/day)	1.5E+4	7.6E+4	8.1E+4	6.6E+4	4.9E+4	3.4E+4	2.2E+4	1.4E+4	9.2E+3	5.8E+3	3.6E+3

Show No

Show

Time: 10 yr Target Level: 0.002 mg/L Displayed Model: Biotransformation Displayed Compound: VC



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	46.5	(Kg)
- Plume Mass If Biotransformation/Production	63.7	(Kg)
Mass Removed	-17.1	(Kg)
% Biotransformed =	**-36.9 %**	
% Change in Mass Rate =	**75.2 %**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ○ TCE ○ DCE ○ VC ◉ ETH

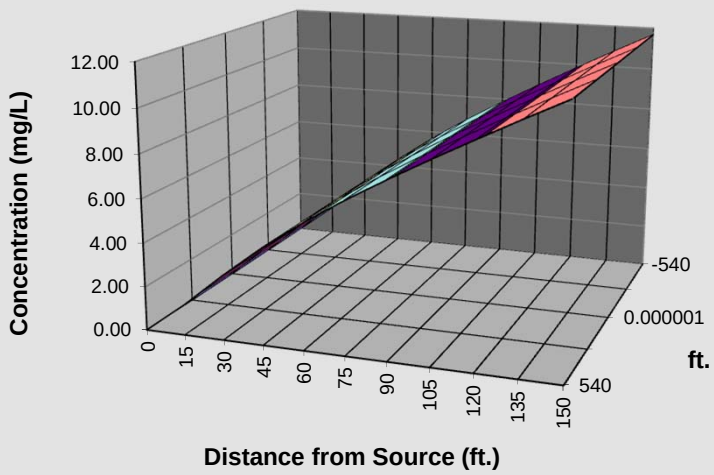
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	0.004	1.382	2.923	4.358	5.637	6.784	7.842	8.846	9.819	10.765	11.679
270	0.004	1.382	2.923	4.358	5.637	6.784	7.842	8.846	9.819	10.765	11.679
0	0.004	1.382	2.923	4.358	5.637	6.784	7.842	8.846	9.819	10.765	11.679
-270	0.004	1.382	2.923	4.358	5.637	6.784	7.842	8.846	9.819	10.765	11.679
-540	0.004	1.382	2.923	4.358	5.637	6.784	7.842	8.846	9.819	10.765	11.679
MASS RATE (mg/day)	1.4E+2	4.8E+4	1.0E+5	1.5E+5	2.0E+5	2.4E+5	2.7E+5	3.1E+5	3.4E+5	3.8E+5	4.1E+5

Show No

Show

Time: 10 yr Target Level: mg/L Displayed Model: **Biotransformation** Displayed Compound: **ETH**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	0.5	(Kg)
- Plume Mass If Biotransformation/Production	422.4	(Kg)
Mass Removed	-422.0	(Kg)

If "Can't Calc.", make model area longer

% Biotransformed = -93095.4 %

% Change in Mass Rate = -287514.3 % (source to edge)

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ◉ PCE
○ TCE
○ DCE
○ VC
○ ETH

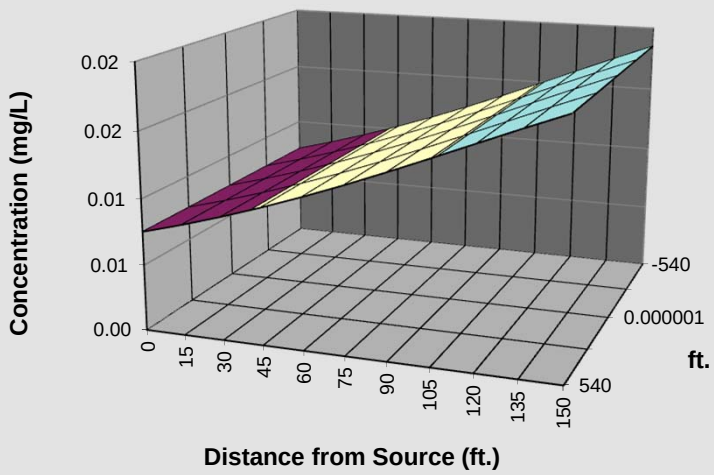
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	0.008	0.008	0.009	0.010	0.011	0.012	0.014	0.015	0.016	0.017	0.019
270	0.008	0.008	0.009	0.010	0.011	0.012	0.014	0.015	0.016	0.017	0.019
0	0.008	0.008	0.009	0.010	0.011	0.012	0.014	0.015	0.016	0.017	0.019
-270	0.008	0.008	0.009	0.010	0.011	0.012	0.014	0.015	0.016	0.017	0.019
-540	0.008	0.008	0.009	0.010	0.011	0.012	0.014	0.015	0.016	0.017	0.019
MASS RATE (mg/day)	2.6E+2	2.9E+2	3.2E+2	3.6E+2	3.9E+2	4.3E+2	4.7E+2	5.2E+2	5.6E+2	6.0E+2	6.5E+2

Show No

Show

Time: 10 yr Target Level: **0.005** mg/L Displayed Model: **No Degradation** Displayed Compound: **PCE**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	0.8	(Kg)
- Plume Mass If Biotransformation/Production	0.0	(Kg)
Mass Removed	0.8	(Kg)
% Biotransformed =	**+94.2%**	
% Change in Mass Rate =	**-145.7 %**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ◉ TCE ○ DCE ○ VC ○ ETH

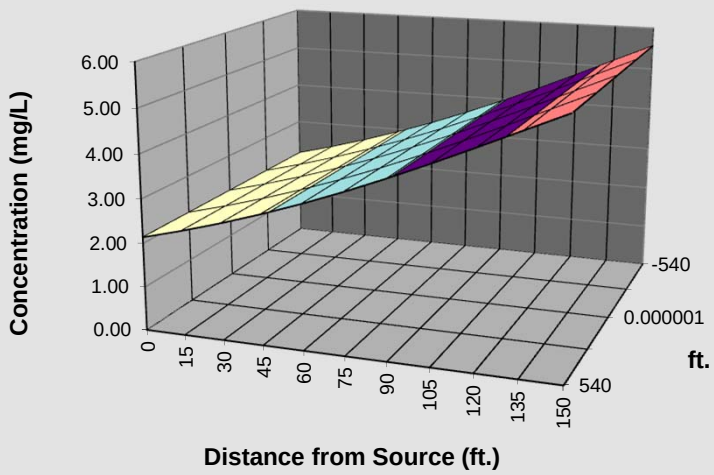
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓	*Distance from Source (ft)* 0	15	30	45	60	75	90	105	120	135	150
540	2.138	2.376	2.638	2.926	3.241	3.583	3.949	4.337	4.741	5.154	5.565
270	2.138	2.376	2.638	2.926	3.241	3.583	3.949	4.337	4.741	5.154	5.565
0	2.138	2.376	2.638	2.926	3.241	3.583	3.949	4.337	4.741	5.154	5.565
-270	2.138	2.376	2.638	2.926	3.241	3.583	3.949	4.337	4.741	5.154	5.565
-540	2.138	2.376	2.638	2.926	3.241	3.583	3.949	4.337	4.741	5.154	5.565
MASS RATE (mg/day)	7.5E+4	8.3E+4	9.2E+4	1.0E+5	1.1E+5	1.2E+5	1.4E+5	1.5E+5	1.7E+5	1.8E+5	1.9E+5

Show No

Show

Time: 10 yr Target Level: **0.005** mg/L Displayed Model: **No Degradation** Displayed Compound: **TCE**



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	238.7	*(Kg)*
- Plume Mass If Biotransformation/Production	11.2	*(Kg)*
Mass Removed	227.5	*(Kg)*
% Biotransformed =	**+95.3%**	
% Change in Mass Rate =	**-160.3 %**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	*MGal*
Flow Rate of Water Through Source Area	0.009	*MGD*

Compare to Pump and Treat

Pumping Rate		*(gpm)*
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		*(yr)*

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE ○ TCE ◉ DCE ○ VC ○ ETH

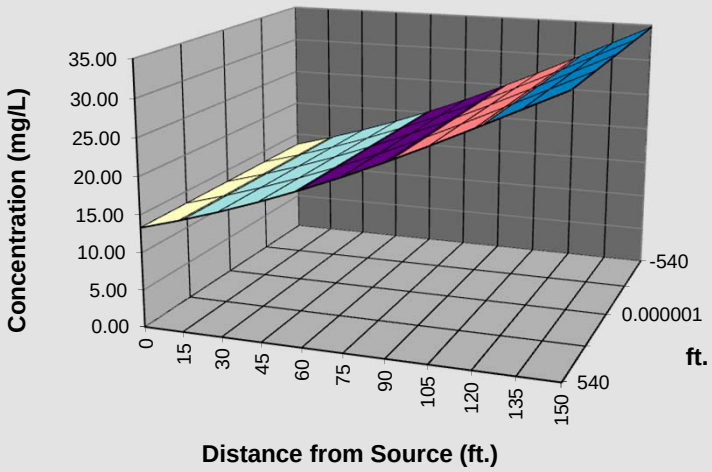
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	13.331	14.812	16.446	18.243	20.206	22.334	24.618	27.037	29.557	32.132	34.695
270	13.331	14.812	16.446	18.243	20.206	22.334	24.618	27.037	29.557	32.132	34.695
0	13.331	14.812	16.446	18.243	20.206	22.334	24.618	27.037	29.557	32.132	34.695
-270	13.331	14.812	16.446	18.243	20.206	22.334	24.618	27.037	29.557	32.132	34.695
-540	13.331	14.812	16.446	18.243	20.206	22.334	24.618	27.037	29.557	32.132	34.695
MASS RATE (mg/day)	4.6E+5	5.2E+5	5.7E+5	6.4E+5	7.0E+5	7.8E+5	8.6E+5	9.4E+5	1.0E+6	1.1E+6	1.2E+6

Show No

Show

Time: 10 yr Target Level: 0.070 mg/L Displayed Model: No Degradation Displayed Compound: DCE



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	1488.3	(Kg)
- Plume Mass If Biotransformation/Production	174.8	(Kg)
Mass Removed	1313.5	(Kg)
% Biotransformed =	**+88.3%**	
% Change in Mass Rate =	**-160.3 %**	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE
○ TCE
○ DCE
◉ VC
○ ETH

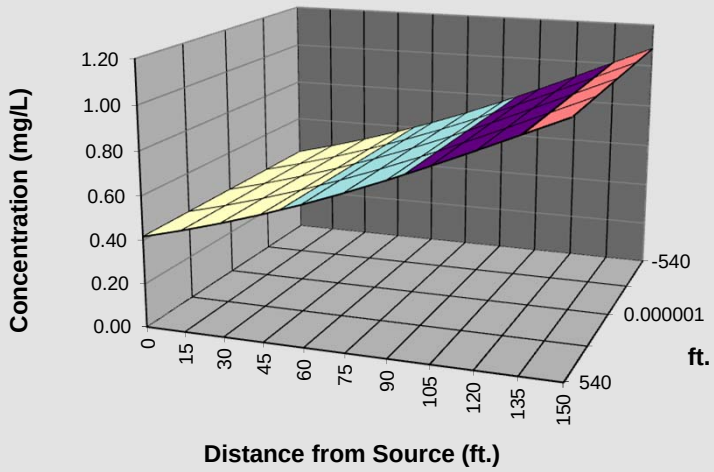
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	0.417	0.463	0.514	0.570	0.632	0.698	0.770	0.845	0.924	1.005	1.085
270	0.417	0.463	0.514	0.570	0.632	0.698	0.770	0.845	0.924	1.005	1.085
0	0.417	0.463	0.514	0.570	0.632	0.698	0.770	0.845	0.924	1.005	1.085
-270	0.417	0.463	0.514	0.570	0.632	0.698	0.770	0.845	0.924	1.005	1.085
-540	0.417	0.463	0.514	0.570	0.632	0.698	0.770	0.845	0.924	1.005	1.085
MASS RATE (mg/day)	1.5E+4	1.6E+4	1.8E+4	2.0E+4	2.2E+4	2.4E+4	2.7E+4	2.9E+4	3.2E+4	3.5E+4	3.8E+4

Show No

Show

Time: 10 yr Target Level: 0.002 mg/L Displayed Model: No Degradation Displayed Compound: VC



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	46.5	(Kg)
- Plume Mass If Biotransformation/Production	63.7	(Kg)
Mass Removed	-17.1	(Kg)
% Biotransformed =	-36.9 %	
% Change in Mass Rate =	-160.3 %	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input

Start Here → ○ PCE
○ TCE
○ DCE
○ VC
◉ ETH

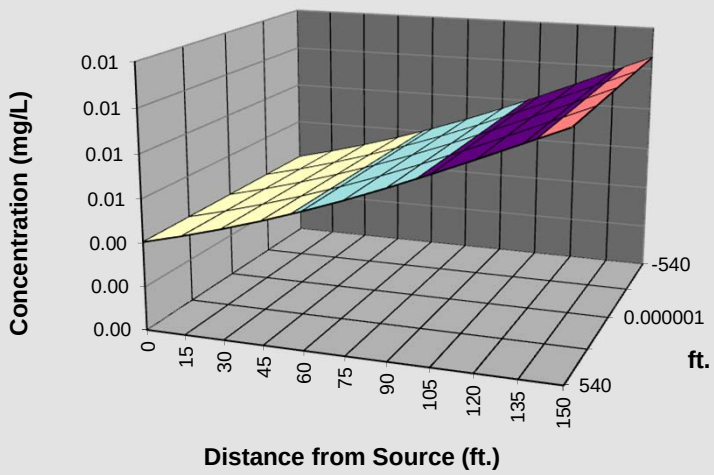
DISSOLVED SOLVENT CONCENTRATIONS IN PLUME

Transverse Distance (ft) ↓ / Distance from Source (ft) →	0	15	30	45	60	75	90	105	120	135	150
540	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.008	0.009	0.010	0.011
270	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.008	0.009	0.010	0.011
0	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.008	0.009	0.010	0.011
-270	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.008	0.009	0.010	0.011
-540	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.008	0.009	0.010	0.011
MASS RATE (mg/day)	1.4E+2	1.6E+2	1.7E+2	1.9E+2	2.1E+2	2.4E+2	2.6E+2	2.9E+2	3.1E+2	3.4E+2	3.7E+2

Show No

Show

Time: 10 yr Target Level: mg/L Displayed Model: No Degradation Displayed Compound: ETH



Plume Mass (Order-of-Magnitude Accuracy)

See Gallon

Plume Mass If No Degradation	0.5	(Kg)
- Plume Mass If Biotransformation/Production	422.4	(Kg)
Mass Removed	-422.0	(Kg)
% Biotransformed =	-93095.4 %	
% Change in Mass Rate =	-160.3 %	(source to edge)

If "Can't Calc.", make model area longer

See acre-ft

Current Volume of Ground Water in Plume	Can't Calc.	MGal
Flow Rate of Water Through Source Area	0.009	MGD

Compare to Pump and Treat

Pumping Rate		(gpm)
# Pore Volumes Removed Per Yr.		
# Pore Volumes to Clean-Up		
Clean-Up Time		(yr)

Plot All Data Plot Data > Target Mass HELP To Centerline Return to Input