

MARIN

ENVIRONMENTAL

Nov 6 10 21 AM '98

SCIENTISTS
ENGINEERS
GIS SPECIALISTS

3 November, 1998

WASTE MANAGEMENT
DIVISION

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COLCHESTER VT 05446
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1.800.520.6065
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Mr. Chuck Schwer
VT DEC Waste Management Division
103 So. Main Street, West Building
Waterbury, VT 05671-0404

116 CONSUMER SQUARE
SUITE 174
PLATTSBURGH NY 12901
1.518.566.8297
1.800.520.6065

Re: *Initial Site Investigation Report,
Hammondsville Store (VT DEC Site # 97-2322)*

7 ISLAND DOCK ROAD
HADDAM CT 06438
1.860.345.4578
1.800.524.9256
FAX 1.860.345.3854

Dear Mr. Schwer:

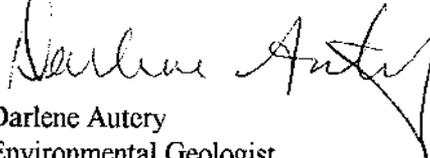
Enclosed for your review is a copy of the Initial Site Investigation Report for work completed at the Hammondsville Store.

600 CHARLTON STREET
SOUTHBRIDGE MA 01550
1.508.764.8755
1.800.676.3707
FAX 1.508.764.4054

Please call me if you have any questions regarding the enclosed information or recommendations.

Sincerely,

Marin Environmental, Inc.


Darlene Autery
Environmental Geologist

114 SOUTH STATE STREET
PO BOX 1414
CONCORD NH 03302
1.603.224.8871
1.800.636.6030
FAX 1.603.224.8688

Enclosure

cc. Harold Allen, Property Owner
Jonathan Springer, Attorney

DMA/Ref: 98040R01.doc

INTERNET
WWW.MARINENV.COM

INITIAL SITE INVESTIGATION REPORT

HAMMONDSVILLE STORE

SMS SITE # 97-2322

Vermont Route 106

Reading, VT

3 November, 1998

Prepared for:

Harold Allen

P.O Box 90

Reading, VT 05062

Contact: Mr. Harold Allen

Phone: 802-484-3325

Prepared by:

Marin Environmental, Inc.

1700 Hegeman Avenue

Colchester, Vermont 05446

Contact: Darlene M. Autery

Phone: 802-655-0011

Marin Project #: VT980040
Marin Document #: 98040R01.doc

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EXECUTIVE SUMMARY

Marin Environmental, Inc. (Marin) has conducted an initial site investigation at the Hammondsville Store, in Hammondsville, Vermont and has concluded the following:

- Petroleum releases from former underground storage tank (UST) systems at the site appear to have resulted in an impact to the overburden ground water in the vicinity of the former UST systems. Benzene was detected at 5.2 and 5.3 parts per billion (ppb) in the duplicate samples collected from MW-3 on 27 August, 1998. These results exceed the Vermont Groundwater enforcement standard (VGES) for benzene of 5 ppb. MW-3 is located within the former UST excavation area. Total BTEX (benzene, toluene, ethylbenzene, and xylenes) concentrations in these samples were 138 and 139 ppb.
- Adsorbed-phase soil contamination in the vicinity of the former USTs may represent a continuing source of ground-water contamination.
- Gasoline compounds were not detected in samples collected from the other monitoring wells at the site. These wells include a monitoring well installed adjacent and immediately downgradient of the former pump-island location; a well installed upgradient of the source area; and a well installed along the southern property boundary and downgradient of the source area.
- No gasoline compounds were detected in the sample collected from the on-site water supply.
- Soils at the site consisted generally of fine to coarse sands with varying amounts of gravel down to apparent bedrock, which was encountered at depths of 10 to 13 feet.
- On 27 August 1998, groundwater in the surficial aquifer at the site was flowing toward the southeast at a gradient of approximately one percent.
- There were no positive background photoionization detector (PID) readings on the first floor of the site building or in the basement.
- A bedrock water supply well that serves the property abutting the site to the south could potentially be impacted by contaminant migration from the site, via bedrock fractures. This well is located approximately 200 feet southwest of the site.
- Visual and olfactory observations suggest that petroleum contamination may have migrated to the Reading Hill Brook, located approximately 75 feet east and downgradient of the former USTs.

EXECUTIVE SUMMARY

On the basis of the results of this investigation, **Marin** recommends the following:

1. Collect a sediment and surface water sample of the Reading Hill Brook, where petroleum-like sheens and rotten-egg-like odors were observed. Submit the sample for laboratory analysis for volatile petroleum hydrocarbons by EPA Method 8020.
2. Resample the existing monitoring wells and the on-site water supply. Submit the samples for laboratory analysis of volatile petroleum hydrocarbons by EPA Method 8020.
3. As a precautionary measure, collect a sample from the bedrock water supply that serves the bed and breakfast to the south. Submit the sample for laboratory analysis of volatile petroleum hydrocarbons by EPA Method 8020.
4. Upon completion of the work described above, evaluate the appropriateness of additional limited sampling or recommending the site for site closure procedures.
5. Submit a brief letter report summarizing the findings of the additional work outlined above.

1.0 INTRODUCTION

This report details the results of an initial site investigation conducted at the Hammondsville Store property located in Reading, Vermont (Figure 1, Appendix A). This report has been prepared by Marin Environmental, Inc. (Marin) under the direction of Mr. Harold Allen, owner of two former underground storage tanks (USTs) at the site. The investigation has been designed to fulfill objectives outlined by the Vermont Department of Environmental Conservation (VT DEC) request for additional work following the discovery of subsurface petroleum contamination encountered during the removal of two USTs from the site on 1 December 1997.

1.1 Site Location and Physical Setting

The Hammondsville Store property, located on the west side of Route 106 in Reading, Vermont ($43^{\circ} 29' 24''$ N / $72^{\circ} 33' 19''$ W), is occupied by a two-story, wood-framed structure, which currently serves as a convenience store and diner. The owners of the property occupy the rear of the first floor and the entire second floor (Figure 2, Appendix A). The majority of the site in front of the building is paved; however, the area of the former USTs and pump-island do not appear to have been re-paved since the excavation. The ground surface is generally flat with an average elevation of about 970 feet above mean sea level (amsl). The Reading Hill Brook, which flows to the south, is located across Route 106 from the site and approximately 75 feet east of the former USTs (USGS, 1983). Bailey's Mill Road borders the site to the north. Across Bailey's Mill Road is a lot apparently used for sand and hay storage and distribution. A real estate office is located approximately 250 feet southeast of the site. Several houses are located south of the site, with the closest being a stone house about 200 feet from the site, which on occasion operates as a bed and breakfast.

Drinking water for the site building and at least three other homes in the area is provided by a spring upgradient of the site. The store itself collects the spring water in a holding tank in the basement. A dug well located east of Reading Hill Brook, serves as the water supply for the real estate office. A drilled bedrock well serves the stone house. Domestic wastewater disposal for the site and surrounding properties is provided by individual on-site septic systems.

Native surficial materials in the vicinity of the Hammondsville Store property are mapped as glacial till (Stewart and MacClintock, 1970). Bedrock in the area is mapped as a rusty weathering, carbonaceous mica schist member of the Missisquoi Formation of Ordovician age (Doll, 1961).

Bedrock outcrops were observed east of Route 106 along Reading Hill Brook, directly opposite of the site, and in a road cut along Bailey's Mill Road, north of the site.

1.2 Site History

According to Mr. Allen, the site building was constructed for the Allen's in 1948. In 1956, the stream channel of the Reading Hill Brook, which had passed through the eastern portion of the site property, was relocated for the construction of Route 106. In 1967, Mrs. Allen began operating the store and diner and had by this time, installed one 1,000-gallon and one 2,000-gallon gasoline underground storage tank (UST) and the pump-island for retail gasoline sales. The two USTs were located off the southeast corner of the store; the pump-island was located north of the tanks and in front of the store as shown on Figure 2, Appendix A. The Allen's discontinued selling gasoline about 1990. The tanks were removed on December 1, 1997.

Evidence of a petroleum release was discovered during the removal of the two gasoline USTs. An UST closure assessment that was conducted at the site by personnel from the Vermont Department of Environmental Protection (VT DEC) Underground Storage Tank Program, indicated that the removed USTs were in fair and poor condition. Associated piping appeared to be in good condition at the time of removal, although residual contamination was present. Photoionization detector (PID) readings of the soils from the UST excavation measured up to 200 parts per million (ppm), with peak readings measured at depths of five to twelve feet below ground surface (bgs). Because the extent of contamination could not be determined, all soils were backfilled into the excavation.

In a letter to Mr. Allen dated 28 April 1998, the VT DEC requested further investigation at the Hammondsville Store site in order to evaluate the degree and extent of soil and ground-water contamination, and the risks posed by any identified contamination to sensitive receptors such as streams, drinking-water supplies, and building indoor air quality. On 12 May 1998, Marin began an initial site investigation at the request of Mr. Harold Allen.

1.3 Objectives and Scope of Work

The objectives of this initial site investigation were to:

- Evaluate the degree and extent of petroleum contamination in soil and ground water;
- Qualitatively assess the risks to environmental and public health via relevant sensitive receptors and potential contaminant migration pathways; and,

- Identify potentially appropriate monitoring and/or remedial actions based on the site conditions.

To accomplish these objectives, **Marin** has:

- Supervised the installation of four soil borings/ground-water monitoring wells, to evaluate the degree and extent of petroleum contamination, and the local ground-water flow direction;
- Collected and submitted ground-water samples from the four on-site monitoring wells, and the on-site water supply for laboratory analysis of volatile petroleum compounds;
- Identified sensitive receptors in the area, and assessed the risk posed by the contamination to these potential receptors; and,
- Prepared this summary report, which details the work performed, qualitatively assesses risks, provides conclusions and offers recommendations for further action.

2.0 INVESTIGATIVE PROCEDURES AND RESULTS

2.1 Soil Boring/Monitoring Well Installation

On 20 August, 1998, **Marin** supervised the installation of four soil borings/monitoring wells (MW-1, MW-2, MW-3 and MW-4), to evaluate the degree and extent of petroleum contamination, and the local ground-water flow direction. MW-1 was installed 45 feet north of the former gasoline tank location and 15 feet north of the former pump island, to function as an upgradient well. MW-2 was installed southeast of the former pump island to evaluate this potential source area. MW-3 was installed at the southeast end of the former UST excavation to evaluate residual soil and ground-water contamination in this area. MW-4 was installed along the southeast property boundary to evaluate the potential for off-site contaminant migration. Approximate monitoring well locations and site features are shown on Figure 2, Appendix A.

Soils encountered in the borings consisted of fine to coarse sands with varying amounts of gravel. According to Mr. Allen a portion of the soils in the front of the site building are non-native, and were transported to the site from a near by talc mine. Each boring encountered refusal presumably on top of bedrock, at depths between 10 and 13 feet below ground surface. Ground water was encountered in each boring at depths ranging from six to seven feet bgs. Slight petroleum odors were detected in the soil sample collected from 8 to 9 feet bgs in the boring for MW-3.

The monitoring wells were installed by M & W Soils Engineering of Charleston, New Hampshire, using hollow-stem auger drilling techniques. Soil samples were collected at five-foot intervals using a two-foot long, stainless steel, split-spoon core barrel. Monitoring wells were developed by means of hand bailing. Monitoring-well construction details are included on the soil-boring and well-construction logs in Appendix B.

2.2 Soil-Screening Results

The highest PID screening result (40 parts per million - ppm) was measured on a sample collected from eight to ten feet bgs from MW-3. All other samples screened measured less than 1 ppm. Soil screening results are summarized on each of the boring logs provided in Appendix B.

The soil samples were screened for the possible presence of volatile organic compounds (VOCs) using a Thermo Environmental Model 580B portable photoionization detector (PID). The PID was field calibrated with an isobutylene standard gas to a benzene reference.

2.3 Determination of Ground-Water Flow Direction and Gradient

Ground water in the unconfined surficial aquifer directly beneath the site appears to be flowing in a southeasterly direction, which is consistent with surface drainage and topography. The average gradient of the local ground-water table on 27 August, 1998 was about one percent. Water-level measurements and elevation calculations for 27 August, 1998 are presented in Table 1. The ground-water contour map in Figure 3 was prepared using this data.

The sand and gravel deposits comprising the shallow soil aquifer at the site typically exhibit effective porosities of about 0.3 to 0.4 and hydraulic conductivities of about .013 to 134 feet per day (Driscoll, 1986). Assuming Darcian flow, these estimates combine with the calculated ground-water gradient of one percent to yield an estimated range of ground-water flow velocities in the surficial aquifer of between 0.038 to 3.8 feet per day.

TABLE 1. Ground-Water Elevation Data

Monitoring Date: 27 August 1998

Well I. D.	Top of Casing Elevation *	Depth to Water (feet, bgs)	Ground Water Elevation
MW-1	100.00	6.22	93.78
MW-2	99.65	6.39	93.26
MW-3	99.04	5.94	93.10
MW-4	98.87	5.79	93.08

*Top of casing (TOC) and ground water elevations are relative to an arbitrary site datum of 100.00 feet

2.4 Ground-Water Sampling and Analysis

The contaminant distribution suggests that the residual contamination in the surficial materials at the site is primarily confined to the former location of the gasoline USTs. Gasoline-related compounds were detected at MW-3; the monitoring well installed within the former UST excavation. No gasoline-related compounds were detected in the other monitoring wells. No evidence was detected of contamination migration off site through the surficial ground-water; no gasoline compounds were detected in MW-4, the downgradient monitoring well.

Benzene was detected at 5.3 and 5.2 parts per billion (ppb) in the duplicate samples collected from MW-3, which exceeds the Vermont Groundwater Enforcement Standard¹ (VGES) of 5 ppb. Total BTEX (benzene, toluene, ethylbenzene and xylenes) concentrations in these samples were 138 and 139 ppb.

Marin collected a sample from the Allen's water supply. Although the source of the water supply is a spring at least 1,500 feet west and upgradient of the store, the spring feeds into a gravel-bottomed holding tank located in the basement of the site building, into which contaminated ground water could potentially migrate. No gasoline compounds were detected in the water supply sample.

Laboratory report forms are included in Appendix C. Ground-water analytical results are summarized below in Table 2. The contamination distribution, which was determined using these analytical results, is shown on Figure 4.

¹ The Vermont DEC has established Groundwater Enforcement Standards (VGESs) for five petroleum related VOCs as follows: benzene - 5 ppb; toluene - 1,000 ppb; ethylbenzene - 700 ppb; xylenes - 10,000 ppb; and MTBE, a gasoline additive - 40 ppb.

Ground-water samples were collected from the four on-site monitoring wells and one supply well on 27 August, 1998. Each monitoring well was purged and then sampled using the dedicated bailer and dropline. Purge water was discharged directly to the ground in the vicinity of each well. A trip blank and a duplicate sample were collected during the sampling event for quality assurance/quality control (QA/QC) purposes. All field procedures were conducted in accordance with Marin standard protocols.

The ground-water samples were submitted to Endyne, Inc. of Williston, Vermont, where they were analyzed for the possible presence of BTEX and methyl-tertiary butyl ether (MTBE) by EPA Method 8020. Analytical results from the QA/QC samples indicate that adequate QA/QC was maintained during sample collection and analysis. Analytical results for the blind field duplicate sample collected from MW-3 were within one percent of the original sample results. QA/QC sample results are summarized on Table 2.

TABLE 2. Ground-Water Analytical Results

Monitoring Date: 27 August 1998

SAMPLE I. D.	Benzene	Ethyl benzene	Toluene	Xylenes	Total BTEX	MTBE
MW-1	ND<1	ND<1	ND<1	ND<1	ND	ND<1
MW-2	ND<1	ND<1	ND<1	ND<1	ND	ND<1
MW-3	5.3	54.8	ND<1	79.3	139.4	ND<1
MW-4	ND<1	ND<1	ND<1	ND<1	ND	ND<1
On-site Supply Well	ND<1	ND<1	ND<1	ND<1	ND	ND<1
VGES	5	700	1,000	10,000	---	40
Dup. MW-3	5.2	53.4	ND<1	79.4	138	ND<1
Trip Blank	ND<1	ND<1	ND<1	ND<1	ND	ND<1

Results reported as parts per billion (ppb)

ND = Compound not detected above indicated detection limit.

VGES = Vermont Groundwater Enforcement Standard.

MTBE = Methyl-tertiary butyl ether

3.0 SENSITIVE RECEPTOR SURVEY AND RISK ASSESSMENT

3.1 Sensitive Receptor Survey

Marin conducted a survey to identify sensitive receptors in the vicinity of the Hammondsville Store property. The following sensitive receptors were identified:

- The Reading Hill Brook is the closest surface water body and is located approximately 75 feet east of the former gasoline USTs.
- The Hammondsville Store building is constructed on a stone foundation, and is located in close proximity to the former USTs.
- A holding tank for the spring-fed water supply is located within the basement of the house and has a gravel bottom.
- The residence abutting the property to the south is served by a bedrock drinking water supply well. The residence has a dirt floor basement. This house is sometimes used as a bed and breakfast.
- The real estate office located approximately 250 feet south of the site, is served by a dug well 100 feet east of the Reading Hill Brook. This building has a partial basement/crawl space with a dirt floor.

3.2 Risk Assessment

Marin assessed the risks that the residual subsurface contamination poses to the receptors identified above. In general, human exposure to petroleum related contamination is possible through inhalation, ingestion, or direct contact; while impacts to environmental receptors are due either to a direct release or contaminant migration through one receptor to another or along a preferential pathway. Based on observations and available information, Marin concludes that the Reading Hill Brook may be impacted by residual contamination at the site. The bedrock water supply well serving the bed and breakfast may be susceptible to contaminant migration from the site. No other receptors identified above were likely to be impacted by residual contamination at the site. Marin's findings are summarized below.

- The Reading Hill Brook is located 75 feet east of the former USTs. Observations of the shallow stream sediments across from the site indicated the presence of a slight sheen and a "rotten egg-like" odor. Available information was insufficient to determine if these observations were due to the natural decomposition of organic matter or hydrocarbon breakdown.

- The residence abutting the property to the south is served by a bedrock well, which is located about 200 feet southwest of the site. Ground-water flow in the shallow aquifer has been determined to be flowing to the southeast, however, groundwater flow in metamorphic bedrock which underlies the site, travels along fractures resulting in a more variable deeper ground water flow. Since bedrock was encountered at shallow depths at the site and in the immediate vicinity of the former USTs contaminant migration could migrate off-site via bedrock fractures and potentially impact the abutter's bedrock water supply.
- Ambient air in the store was measured on 20 August 1998 by **Marin** field personnel for the possible presence of volatile organic compounds (VOCs) using a Thermo Environmental Model 580 portable photoionization detector (PID). There were no readings above background in the first floor of the store or the basement.
- **Marin** collected a sample of the Allens' drinking water. No gasoline constituents were detected.
- The real estate office located southeast of the site is served by a private dug well located approximately 100 feet east of the Reading Hill Brook. Contaminant migration from the site would not likely impact this well. Based on the magnitude of the contamination at the site, it does not appear likely that the ambient air of the building would be impacted by the migration of gasoline vapors.

4.0 CONCLUSIONS

Based on the results of the site investigation described above, **Marin** concludes the following:

- Petroleum releases from former underground storage tank (UST) systems at the site appear to have resulted in an impact to the overburden ground water in the immediate vicinity of the former UST systems. Benzene was detected at 5.2 and 5.3 parts per billion (ppb) in the duplicate samples collected on 27 August 1998 from MW-3, located within the former UST excavation area. These values exceed the Vermont Groundwater enforcement standard (VGES) for benzene of 5 ppb. Total BTEX (benzene, toluene, ethylbenzene, and xylenes) concentrations in these samples were 138 and 139 ppb.
- Adsorbed-phase soil contamination in the vicinity of the former USTs may represent a continuing source of ground-water contamination.
- Gasoline compounds were not detected in samples collected from the other monitoring wells at the site. These wells include a monitoring well installed adjacent and immediately downgradient of the former pump-island location; a well installed upgradient of the source area; and, a well installed along the southern property boundary and downgradient of the source area.
- No gasoline compounds were detected in the sample collected from the on-site water supply sample.
- Soils at the site consisted generally of fine to coarse sands with varying amounts of gravel down to apparent bedrock, which was encountered at depths of 10 to 13 feet.
- On 27 August 1998, groundwater in the surficial aquifer at the site was flowing toward the southeast at a gradient of approximately one percent.
- There were no positive background PID readings in the first floor of the store or in the store's basement.
- A bedrock water supply well that serves the property abutting the site to the south could potentially be impacted by contaminant migration from the site, via bedrock fractures.
- Visual and olfactory observations suggest that petroleum contamination may have migrated to the Reading Hill Brook, located approximately 75 feet east and downgradient of the former USTs.

5.0 RECOMMENDATIONS

On the basis of the results of this investigation, **Marin** recommends the following:

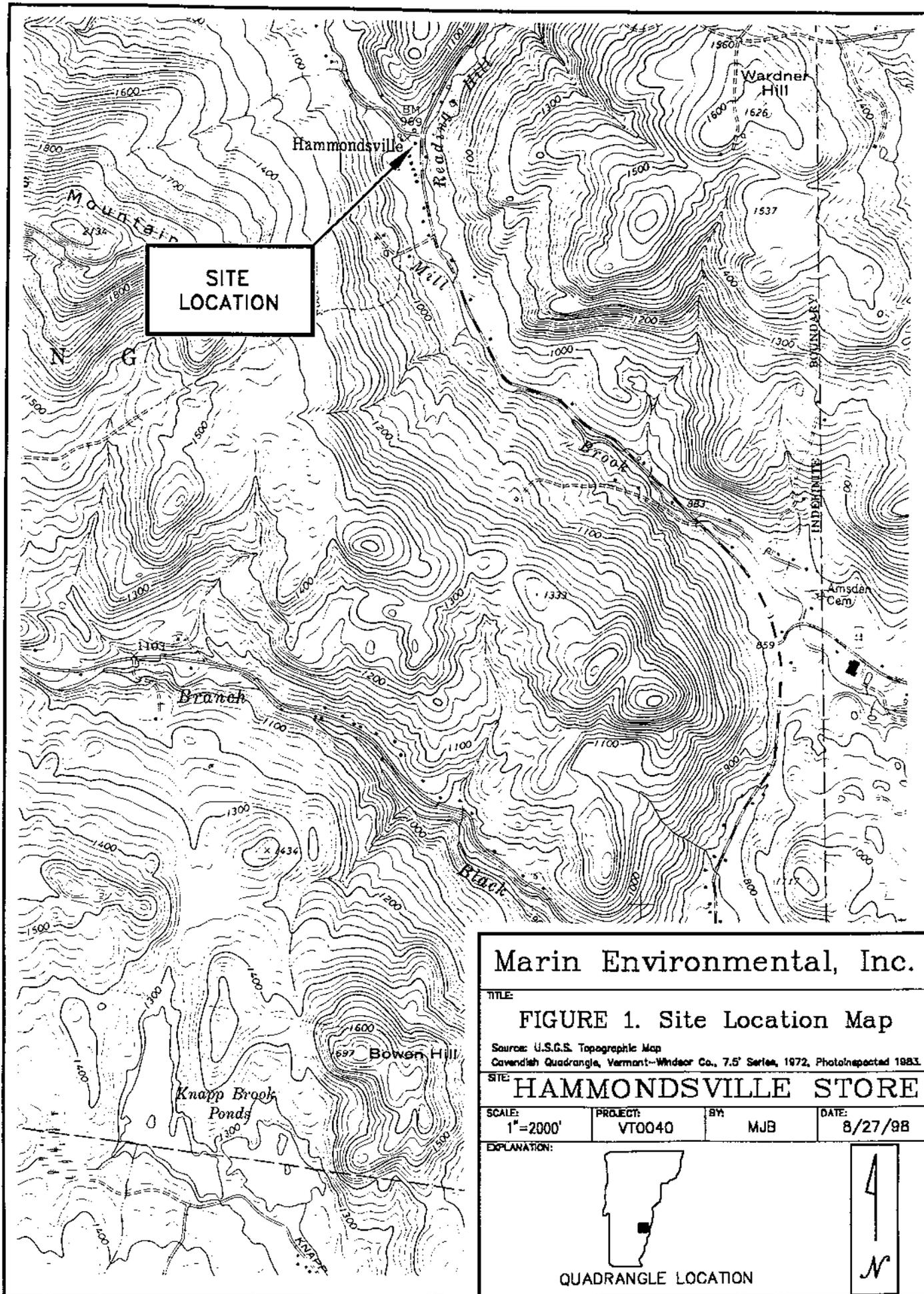
1. Collect sediment and surface water samples from the Reading Hill Brook, where petroleum-like sheens and odors were observed. Submit the sample for laboratory analysis for volatile petroleum hydrocarbons by EPA Method 8020.
2. Resample the existing monitoring wells and the on-site water supply. Submit the samples for laboratory analysis of volatile petroleum hydrocarbons by EPA Method 8020.
3. Collect a sample from the bedrock water supply, that serves the bed and breakfast to the south. Submit the sample for laboratory analysis for volatile petroleum hydrocarbons by EPA Method 8020.
4. Upon completion of the work described above, evaluate the appropriateness of additional limited sampling or recommending the site for site closure procedures.
5. Submit a brief letter report summarizing the findings of the additional work outlined above.

6.0 REFERENCES

- Doll, C.G. and others, 1961. *Centennial Geologic Map of Vermont*, Office of the State Geologist.
- Domenico, P.A., and Schwartz, F.W., 1990. *Physical and Chemical Hydrogeology*, John Wiley and Sons, New York, 824 p.
- Driscoll, Fletcher, G., 1986. *Groundwater and Wells*, Johnson Filtration Systems, Inc., St. Paul, Minnesota, 1089 p.
- Fetter, C.W., 1994. *Applied Hydrogeology, 3rd Ed.*, Prentice Hall, Englewood Cliffs, New Jersey, 691 p.
- Stewart, D.P. and MacClintock, P., 1970. *Surficial Geologic Map of Vermont*, Office of the State Geologist.
- USGS, 1986. Cavendish Quadrangle, Vermont. U.S. Geological Survey. 7.5 minute series (topographic).

APPENDIX A

Figures



**SITE
LOCATION**

Marin Environmental, Inc.

TITLE:
FIGURE 1. Site Location Map

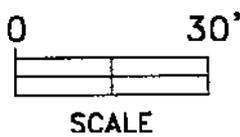
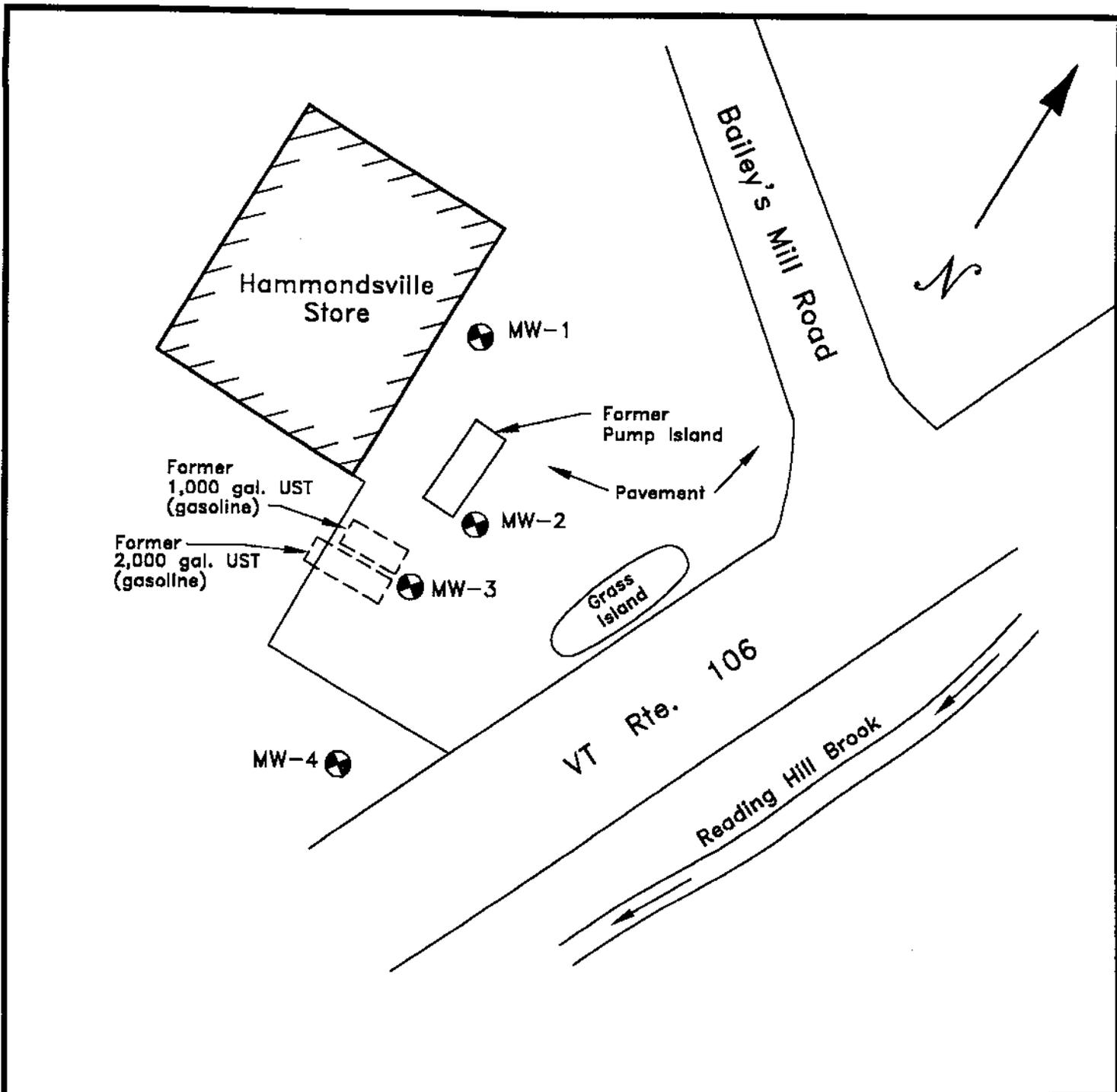
Source: U.S.G.S. Topographic Map
Cavendish Quadrangle, Vermont-Windsor Co., 7.5' Series, 1972, Photoinspected 1983.

SITE: **HAMMONDSVILLE STORE**

SCALE: 1"=2000' PROJECT: VT0040 BY: MJB DATE: 8/27/98

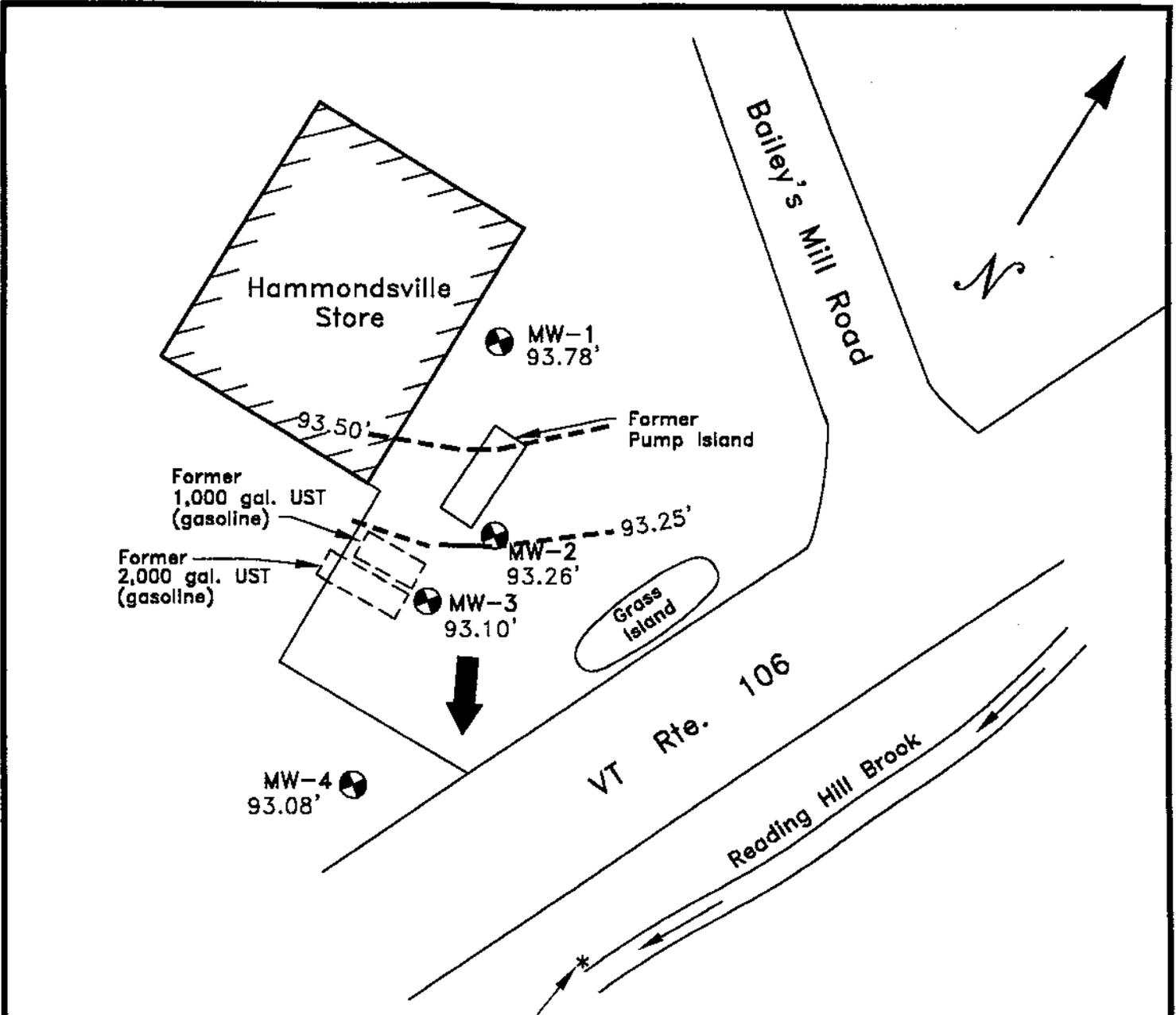
EXPLANATION:

QUADRANGLE LOCATION



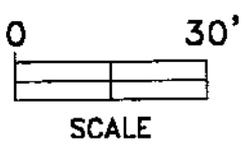
ALL LOCATIONS ARE APPROXIMATE

 Marin Environmental, Inc. 1700 Hegeman Ave. Colchester, VT 05446 (802) 655-0011	
SITE: HAMMONDSVILLE STORE HAMMONDSVILLE, VT	
TITLE: FIGURE 2. SITE MAP With Monitoring Well Locations	
LEGEND: ⊗ Monitoring Well	
DRAWN BY: MJB	DATE: SEPT 98
APPROVED BY: DMA	FILE No.: 98040sp

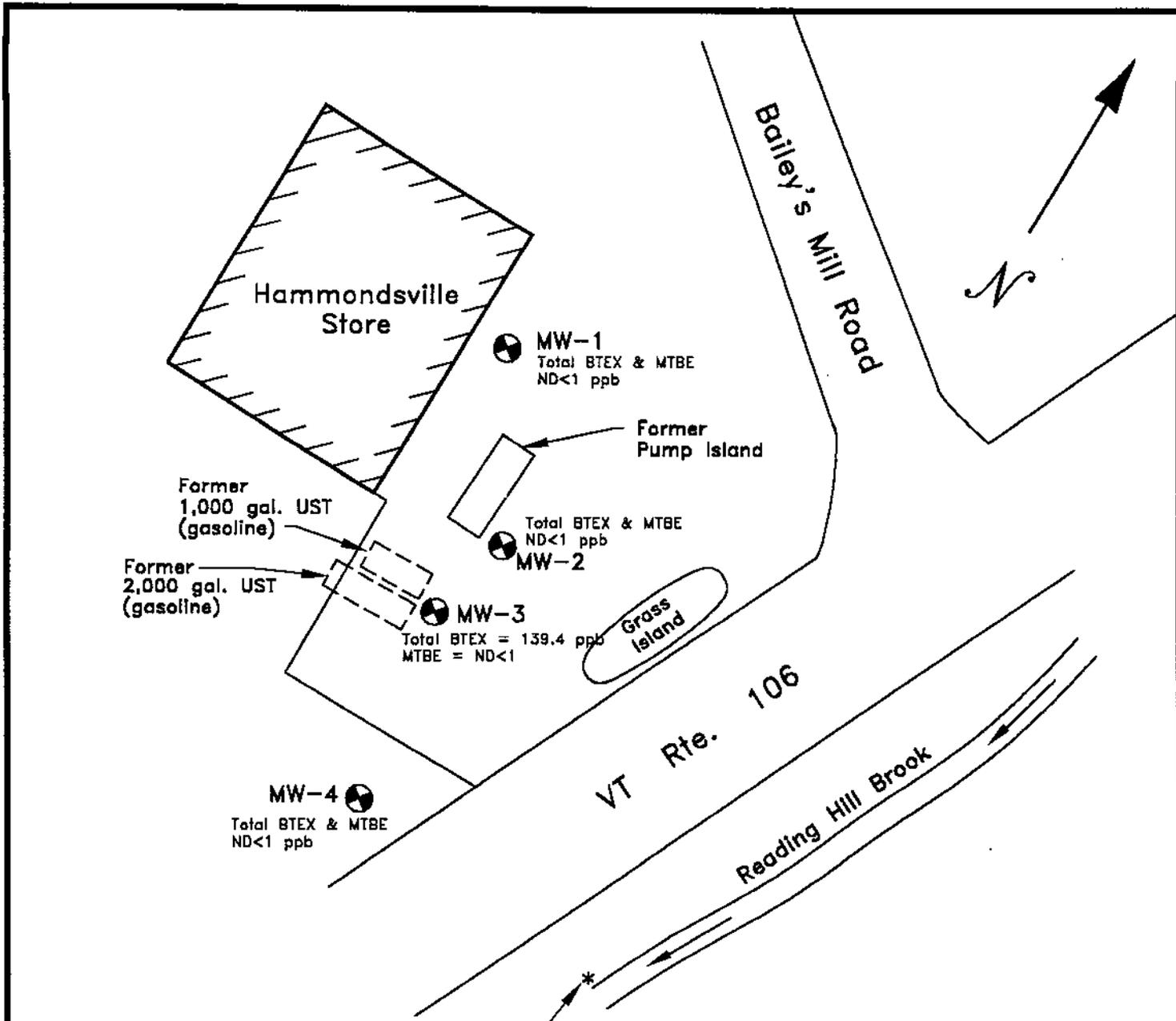


Approximate location of stream observations where sheens and rotten-egg-like odors were noted.

 Marin Environmental, Inc. 1700 Hegeman Ave. Colchester, VT 05446 (802) 655-0011	
SITE: HAMMONDSVILLE STORE HAMMONDSVILLE, VT	
TITLE: FIGURE 3. GROUND-WATER CONTOUR MAP MONITORING DATE: 27 AUGUST 1998	
LEGEND: <ul style="list-style-type: none"> — Groundwater Contour ● Monitoring Well ➔ Approx. Ground Water Flow 	
DRAWN BY: MJB	DATE: SEPT 98
APPROVED BY: DMA	FILE No.: 98040sp



ALL LOCATIONS ARE APPROXIMATE



* Approximate location of stream observations where sheens and rotten-egg-like odors were noted.



ALL LOCATIONS ARE APPROXIMATE

 Marin Environmental, Inc. 1700 Hegeman Ave. Colchester, VT 05446 (802) 655-0011	
SITE: HAMMONDSVILLE STORE HAMMONDSVILLE, VT	
TITLE: FIGURE 4. CONTAMINANT DISTRIBUTION MAP MONITORING DATE: 27 AUGUST 1998	
LEGEND: — None Detected ● Monitoring Well ND None Detected	
DRAWN BY: MJB	DATE: SEPT 98
APPROVED BY: DMA	FILE No.: 98040sp

APPENDIX B

Well Construction Logs

Marin Environmental, Inc.

SITE NAME: Hammondsville store
 LOCATION: Hammondsville, VT
 JOB NO. VT980040-060
 DATE: 8/20/99

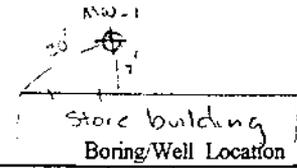
BORING NO: MW-1
 TOTAL DEPTH: 10'
 DEPTH TO WATER: 6'

DRILLING METHOD
 4 1/2 HSA

FIELD SUPERVISOR: Darlene Antony

BORING DIAMETER

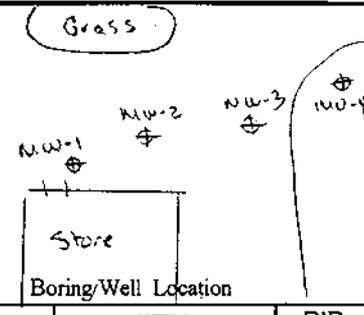
CONTRACTOR: M & W

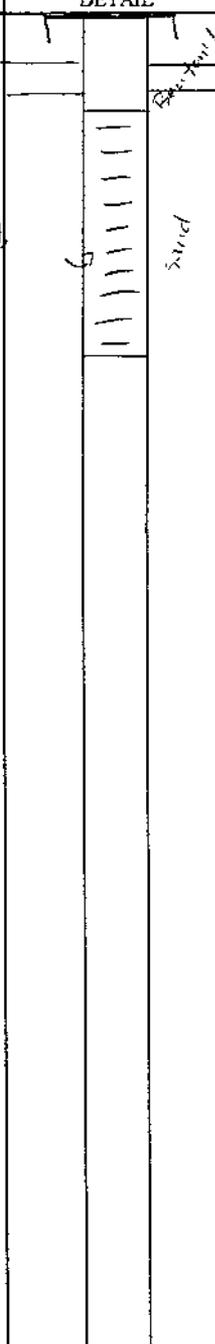


Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
		0-6	6-12	12-18	18-24	24-30				
5-7	SS-1	50	21	22	13	12"	bottom of auger cut when advancing to 5' Dense, brown SAND AND GRAVEL, silt, moist	3'	2.4	
7-9	S-2	16	13	16	44	19"	medium, brown, fine gravel, sandy black w/ mud odor overlying sand and concret overlying weathered rock. Moist.	10'010 slot screen	0.9	
10'							Boring terminated at 10' on refusal			
15'										
20'										
25'										
30'										
35'										
40'										

	BLOW COUNT	MATERIALS USED	SIZE/TYPE	QUANTITY
AND	33-50%	0-4 VERY LOSE	WELL SCREEN	7'
SOME	20-33%	4-10 LOOSE	SLOT SIZE	.010
LITTLE	10-20%	10-30 MEDIUM	RISER	3'
TRACE	0-10%	30-50 DENSE	GRADED SAND	150 #
		> 50 VERY DENSE	BENTONITE PELLETS	25 #
			BENTONITE GROUT	

Marin Environmental, Inc.

SITE NAME: <i>Hammondville store</i>		BORING NO: <i>MW-2</i>		<div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">Grass</div> 	
LOCATION: <i>Reading, VT</i>		TOTAL DEPTH: <i>-10'</i>			
JOB NO. <i>VT 980040-060</i>		DEPTH TO WATER: <i>7'</i>			
DATE: <i>8/20/98</i>		FIELD SUPERVISOR: <i>Darlene Anteny</i>			
DRILLING METHOD <i>4 1/4 HSA</i>		CONTRACTOR: <i>M+W Well drilling</i>			
BORING DIAMETER		DRILLERS: <i>Myron & Mike</i>			

Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
		0-6	6-12	12-18	18-24	24-30				
	<i>SS-1</i>	<i>3</i>	<i>4</i>	<i>6</i>	<i>8</i>	<i>22"</i>	<i>Loose, Brown, SAND some Gravel,</i>		<i>0.9</i>	
<i>5'</i>	<i>SS-2</i>	<i>3</i>	<i>3</i>	<i>24</i>	<i>6</i>	<i>4"</i>	<i>pushed cobb le.</i>		<i>0.3</i>	
	<i>SS-3</i>	<i>3</i>	<i>3</i>	<i>4</i>	<i>18</i>	<i>12"</i>	<i>Loose, Brown, F/C SAND, some Silt, little Gravel,</i>		<i>0.4</i>	
<i>10'</i>							<i>Boring terminated at 10'; HSA refusal</i>			
<i>15'</i>										
<i>20'</i>										
<i>25'</i>										
<i>30'</i>										
<i>35'</i>										
<i>40'</i>										

		BLOW COUNT		MATERIALS USED	SIZE/TYPE	QUANTITY
		0-4	VERY LOSE	WELL SCREEN	<i>2" pvc</i>	<i>7'</i>
AND	33-50%	4-10	LOOSE	SLOT SIZE	<i>.010</i>	<i>11"</i>
SOME	20-33%	10-30	MEDIUM	RISER	<i>2" pvc</i>	<i>3'</i>
LITTLE	10-20%	30-50	DENSE	GRADED SAND		<i>150#</i>
TRACE	0-10%	> 50	VERY DENSE	BENTONITE PELLETS		<i>25#</i>
				BENTONITE GROUT		

Marin Environmental, Inc.

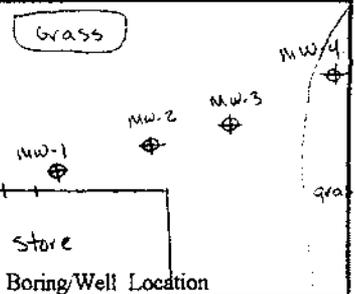
SITE NAME: <u>Hammondsville Store</u> LOCATION: <u>Reading, VT</u> JOB NO. <u>VT980040-01.0</u> DATE: <u>8/20</u>		BORING NO: <u>MW-3</u> TOTAL DEPTH: <u>13'</u> DEPTH TO WATER: <u>~6'</u>		
DRILLING METHOD <u>4 1/4 HSA</u>		FIELD SUPERVISOR: <u>Darlene Aubrey</u>		
BORING DIAMETER		CONTRACTOR: <u>M+W Well Drilling</u>		
		DRILLERS: <u>Myron & Mike</u>		

Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
		0-6	6-12	12-18	18-24	24-30				
	SS-1	3	3	4	7	14"	Loose, Brown, SAND AND Gravel, w/ pebbles. HSA refusal at 4.5' offset + moved 4' North west		0.8	
5'	SS-2	13	9	4	3	8"	Medium, Brown, SAND AND Gravel, dry.		0.9	
	SS-3	4	5	5	7	18"	Loose, Brown, F/c SAND AND Gravel, moist. stained black from ~8'. mod. pebbles		40.0	
10'	SS-4	12	15	20	33	18"	Dense, SAND AND Gravel, Wet		2.4	
15'							Boring terminated at 13'. HSA refusal			
20'										
25'										
30'										
35'										
40'										

		BLOW COUNT		MATERIALS USED	SIZE/TYPE	QUANTITY
AND	33-50%	0-4	VERY LOSE	WELL SCREEN	2" PVC	9
SOME	20-33%	4-10	LOOSE	SLOT SIZE	.010	11
LITTLE	10-20%	10-30	MEDIUM	RISER	2 1/2" PVC	4
TRACE	0-10%	30-50	DENSE	GRADED SAND		200 #
		50	VERY DENSE	BENTONITE PELLETS		25 #
				BENTONITE GROUT		

Marin Environmental, Inc.

SITE NAME: *Hammondsville Stone*
 LOCATION: *Reaching, VT*
 JOB NO. *VT 980010-060*
 DATE: *8/20/99*
 BORING NO: *MW-4*
 TOTAL DEPTH: *11'*
 DEPTH TO WATER: *~6'*



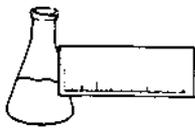
DRILLING METHOD: *4 1/4 HSA*
 BORING DIAMETER:
 FIELD SUPERVISOR: *Darlene Antevy*
 CONTRACTOR: *M+W Well Drilling*
 DRILLERS: *Myron & Mike*

Depth	SN	BLOW COUNTS PER 6"					Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
		0-6	6-12	12-18	18-24	24-30				
	<i>SS-1</i>	<i>3</i>	<i>9</i>	<i>12</i>	<i>20</i>	<i>12"</i>	<i>Medium, brown SAND AND Gravel, little Silt, overlying weathered cobble, dry.</i>		<i>0.8</i>	
<i>5'</i>	<i>SS-2</i>	<i>8</i>	<i>10</i>	<i>-</i>	<i>-</i>	<i>4"</i>	<i>brown SAND AND Gravel. Poor recovery due to piece of cobble stuck in spoon.</i>		<i>1.8</i>	
<i>8'</i>	<i>SS-3</i>	<i>10</i>	<i>11</i>	<i>11</i>	<i>11</i>	<i>12"</i>	<i>medium, brown SAND AND Gravel, wet</i>		<i>1.5</i>	
<i>10'</i>	<i>SS-4</i>	<i>10</i>	<i>6</i>	<i>9</i>	<i>-</i>	<i>12"</i>	<i>medium, brown SAND AND Gravel, overlying 1" of F. SAND, overlying weathered rock, wet.</i>		<i>1.3</i>	
<i>15'</i>							<i>Boring terminated at -11' on refusal</i>			
<i>20'</i>										
<i>25'</i>										
<i>30'</i>										
<i>35'</i>										
<i>40'</i>										

	BLOW COUNT	MATERIALS USED	SIZE/TYPE	QUANTITY	
AND	33-50%	VERY LOSE	WELL SCREEN	<i>2" PVC</i>	<i>7</i>
SOME	20-33%	LOOSE	SLOT SIZE	<i>.010</i>	<i>11</i>
LITTLE	10-20%	MEDIUM	RISER	<i>2" PVC</i>	<i>4</i>
TRACE	0-10%	DENSE	GRADED SAND		<i>150#</i>
		VERY DENSE	BENTONITE PELLETS		<i>25#</i>
			BENTONITE GROUT		

APPENDIX C

Laboratory Report Forms



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: Marin Environmental
PROJECT NAME: Hammondville Store
REPORT DATE: September 9, 1998
DATE SAMPLED: August 27, 1998

PROJECT CODE: MAHS1759
REF.#: 126,247 - 126,253

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times. All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method. Blank contamination was not observed at levels affecting the analytical results.

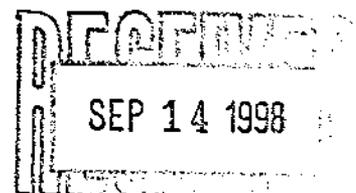
Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

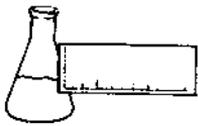
Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures





EPA METHOD 602--PURGEABLE AROMATICS

CLIENT: Marin Environmental

DATE RECEIVED: August 28, 1998

PROJECT NAME: Hammondville Store

REPORT DATE: September 9, 1998

CLIENT PROJ. #: NI

PROJECT CODE: MAHS1759

Ref. #:	126,247	126,248	126,249	126,250	126,251
Site:	MW-1	MW-2	MW-3	MW-4	Duplicate
Date Sampled:	8/27/98	8/27/98	8/27/98	8/27/98	8/27/98
Time Sampled:	10:50	11:15	11:40	11:55	NI
Sampler:	D. Autery				
Date Analyzed:	9/3/98	9/4/98	9/8/98	9/8/98	9/8/98
UIP Count:	0	0	>10	0	>10
Dil. Factor (%):	100	100	100	100	100
Surr % Rec. (%):	92	107	88	106	81
Parameter	Conc. (ug/L)				
MTBE	<1	<1	<1	<1	<1
Benzene	<1	<1	5.3	<1	5.2
Toluene	<1	<1	<1	<1	<1
Ethylbenzene	<1	<1	54.8	<1	53.4
Xylenes	<1	<1	79.3	<1	79.4
Chlorobenzene	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	<1	<1	<1	<1	<1

Ref. #:	126,252	126,253			
Site:	Trip Blank	Supply Well			
Date Sampled:	8/27/98	8/27/98			
Time Sampled:	10:45	12:15			
Sampler:	D. Autery	D. Autery			
Date Analyzed:	9/8/98	9/4/98			
UIP Count:	0	0			
Dil. Factor (%):	100	100			
Surr % Rec. (%):	101	96			
Parameter	Conc. (ug/L)	Conc. (ug/L)			
MTBE	<1	<1			
Benzene	<1	<1			
Toluene	<1	<1			
Ethylbenzene	<1	<1			
Xylenes	<1	<1			
Chlorobenzene	<1	<1			
1,3-Dichlorobenzene	<1	<1			
1,4-Dichlorobenzene	<1	<1			
1,2-Dichlorobenzene	<1	<1			

Note: UIP = Unidentified Peaks TBQ = Trace Below Quantitation NI = Not Indicated

CHAIN-OF-CUSTODY RECORD

27987

Project Name: <u>Hammondville Store</u>	Reporting Address: <u>1700 Hegeman Dr.</u>	Billing Address:
Site Location: <u>Reading, VT</u>	<u>Colchester, VT 05446</u>	<u>same</u>
Endyne Project Number: <u>MAHS1159</u>	Company: <u>Marin Environmental</u>	Sampler Name: <u>Barbara A. ...</u>
	Contact Name/Phone #: <u>Darlene / 655-0011</u>	Phone #: <u>655-0011</u>

Lab #	Sample Location	Matrix	G R A B	C O M P	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				
126247	MW-1	H ₂ O	✓		8/27/98 10:50	2	40 mL glass		19	11CL	
126248	MW-2				11:15						
126249	MW-3				11:40						
126250	MW-4				11:55						
126251	Duplicate				-						
126252	Trip Blank				10:45						
126253	Supply Well	H ₂ O	✓		12:15	✓			19	11CL	
<i>[Large handwritten scribble across the table]</i>											

Relinquished by: Signature <u>[Signature]</u>	Received by: Signature <u>[Signature]</u>	Date/Time <u>8/28/98 11:20</u>
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Relinquished by: Signature <u>[Signature]</u>	Received by: Signature <u>[Signature]</u>	Date/Time <u>8/28 12:00</u>
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 New York State Project: Yes No
Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD ₅	14	Turbidity	19	<u>BTEX + MTBE</u>	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										