



October 14, 1997

Mr. Charles Schwer
Sites Management Section
103 Main Street
Waterbury, Vermont 05676

RE: Confirmatory Sampling Event Summary Report for Brandon Training School
(VDEC #97-2153)

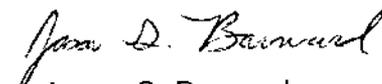
Oct 15 10:03 AM '97

Dear Mr. Schwer:

We are pleased to present the enclosed Confirmatory Sampling Event Summary Report for the above referenced site. Based on data collected during the confirmatory ground water sampling and site monitoring event, it is our opinion that a very limited amount of ground water contamination is present directly beneath the former underground storage tank (UST) area. During the initial environmental investigation it was apparent a small amount of contamination was present in the area of the former UST dispenser island what could be attributed to an 8 year history of very small scale overfills. The initial and confirmatory portions of the investigations continue to support that the extent and magnitude of the contamination is extremely limited; poses no public health risks; and has not impacted any sensitive receptors in the area. The data collected from the confirmatory sampling event is summarized in the following report.

If you have any questions or comments regarding this report please do not hesitate to contact me or Richard Vandenberg at 453-4384.

Sincerely,
Lincoln Applied Geology Inc.


Jason S. Barnard
Geologist

cc: Roger Tetreault
JSB/lr
Enclosures

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Oct 15 10 05 AM '97

Environmental Site Investigation

Brandon Training School
Route 7 Brandon, Vermont 05733
VDEC SMS Site #97-2153

UST Facility Owned By:
Vermont Department of Buildings and General Services
2 Governor Aiken Avenue
Montpelier, Vermont 05633-5801
(802) 828-3314
Contact: Roger Tetreault

Prepared By:
Lincoln Applied Geology, Inc.
Revell Drive
Lincoln, Vermont 05443
(802) 453-4384

October 14, 1997

Prepared By:

Jason D. Barnard
Jason S. Barnard
Geologist

Approved By:

Stephen Revell
Stephen Revell, CPG
Senior Hydrogeologist



Lincoln Applied Geology, Inc
Environmental Consultants

Table of Contents

Executive Summary	i
Brief Site History	1
Ground Water Elevations and Site Hydrogeology	2
Monitor Well Headspace Assay	2
Ground Water Quality	2
Conclusions and Recommendations	3

Table 1,	Ground Water Elevation Data;
Table 2,	Photoionization Results;
Table 3,	Ground Water Quality Results;
Figure 1,	General Location Map;
Figure 2,	Detailed Site Map;
Figure 3,	Ground Water Contour Map for September 5, 1997;
Figure 4,	Water Quality Summary Map for September 5, 1997;
Appendix A,	Water Quality Analytical Laboratory Results.



Lincoln Applied Geology, Inc
Environmental Consultants

Executive Summary

Following the removal of a 1,000 gallon gasoline underground storage tank (UST) from the Brandon Training Facility (BTF) and an initial site investigation conducted by North Country Environmental on January 24, 1997, a request for further investigative work was made by the State of Vermont Department of Environmental Conservation Sites Management Section (SMS). Lincoln Applied Geology, Inc. (LAG) was then contracted to perform a more detailed environmental site investigation. The field work portion of the study was initiated and completed on May 8, 1997. The field investigation consisted of a limited vapor point survey, excavation of four test pits, the installation of three monitoring wells, and the collection of four ground water samples. The initial site investigation work plan called for 4 monitor wells to be constructed (three downgradient wells and one upgradient well), but due to the large cobble fill present in the upgradient test pit a well could not be installed. However, a sufficient volume of ground water accumulated in the test pit, and a sample was obtained. A General Site Map is included as **Figure 1** along with a Detailed Site Map showing test pit locations and other pertinent on-site features (**Figure 2**). All ground water samples were analyzed for petroleum compounds benzene, toluene, ethylbenzene, xylenes (BTEX), and MTBE.

Results obtained from the initial environmental investigation indicated that a limited amount of contamination is associated with the soils directly surrounding the former UST area and the former dispenser island. The extent of ground water contamination appeared to be extremely minimal, with no possible impact to sensitive receptors. It was recommended that no further work be conducted at the site other than one confirmatory sampling round. Assuming contaminant concentrations were noted as stable to decreasing, then a Sites Management Activities Completed (SMAC) status would be recommended for this site.

The confirmatory monitoring and sampling round was performed on September 5, 1997. Ground water samples were collected from three on-site monitor wells and analyzed for the presence of gasoline contaminants, BTEX and MTBE. The data indicates dissolved and vapor phase contaminant levels are stable to decreasing at all monitoring locations (MW-1, 2 and 3). As a result, it is recommended that no further investigative work be performed and we formally request a Sites Management Activity Complete status be granted for the site.



Brief Site History

Brandon Training Center (BTC) is owned by the Vermont Department of Buildings and General Services. The BTC is located at the junction of U.S. Route 7 and Arnold District Road in Brandon, Vermont. The general site location is depicted on **Figure 1**. A detailed site map is included as **Figure 2**. Buildings directly surrounding the former UST area include a maintenance shed and a sand/salt shed.

In July 1989 two 1,000 gallon UST's were removed and replaced with one 1,000 gallon UST. Subsurface investigative work followed on-site and an undefined amount of contaminated soil was removed and polyencapsulated. No additional investigative or remediative work was performed at the site.

On January 24, 1997 the 1,000 gallon UST was removed, and a brief investigation, conducted by North Country Environmental Services. The UST and associated piping were found to be in excellent condition upon removal. Excavated soils from around the tank area and respected piping were screened with a photoionization detector (PID) and a maximum of 105 parts per million (ppm) was noted at a depth of four feet below grade in the excavation.

Based on the data collected from the initial investigation, an additional investigation was requested by the SMS to determine the extent and magnitude of contamination present on-site. LAG was contracted to perform a more detailed environmental investigation that included a limited soil gas survey, test pit excavation, monitor well installation, a sensitive receptor survey, ground water sampling, and preparation of a summary report.

The additional investigation was initiated on May 8, 1997. Four test pits were excavated in the vicinity of the former UST and dispenser island area for the combined purpose of soil screening and the installation of monitor wells so ground water samples could be obtained. Soil excavated from the test pits was descriptively logged and screened for volatile organic compounds using a PID. Locations of test pits are shown on **Figure 2**. Three monitor wells were installed in test pits 2, 3, and 4 to serve as ground water monitor/sampling points. Due to the large boulder fill encountered during the excavation of test pit 1, a monitor well was not able to be installed. Installed wells were properly developed and sampled in accordance with industry accepted standards. Ground water samples were appropriately collected from all monitor wells and TP-1, and analyzed for the presence gasoline constituents, benzene, toluene, ethylbenzene, xylene (BTEX) and methyl-tert-butyl-ethyl (MTBE).

On September 5, 1997 confirmatory/monitoring and sampling round was performed. The site visit included well headspace PID monitoring, ground water level measurement, and ground water sampling of monitor wells MW-1, 2, and 3. The



collected samples were analyzed for the presence of BTEX and MTBE at Green Mountain Laboratories, Inc. (GML) in Montpelier, Vermont. A ground water sample was not able to be obtained from test pit 1, because it was closed immediately following the initial sampling event.

Ground Water Levels and Site Hydrogeology

Ground water levels were measured on September 5, 1997. The collected data is summarized and presented as **Table 1**. Ground water levels slightly declined in MW-1 and MW-2 by 0.44' and 0.12' respectively. The level in MW-3 rose slightly. Ground water flow continues to remain in a general north to south direction along the gentle gradient depicted on **Figure 3**, the Ground Water Contour Map.

Monitor Well Headspace Assay

A PID monitoring round was also performed on the headspace of wells MW-1, 2, and 3. The data indicates the lack of volatile contaminant vapors and clearly suggests that minimal to no vadose zone contamination exists in the subsurface of the site. Monitor wells MW-1, 2, and 3 all demonstrated background (BG) PID readings during the confirmatory site visit.

Ground Water Quality

Ground water quality samples were also collected from wells MW-1, MW-2, and MW-3 using industry accepted methods. A summary of laboratory analytical results are attached as **Table 3**, and **Figure 4** shows the spatial distribution of the water quality results.

The data indicates total BTEX concentrations have decreased in source area well MW-1, and remain below detectable levels in samples collected from down-gradient wells MW-2 and MW-3. Benzene concentrations is present in MW-1 at a concentration of 1.4 parts per billion (ppb). Previously the benzene concentration in MW-1 was 5.4 ppb. The level of dissolved phase contamination is extremely minimal. In the near future, the process of natural attenuation and biodegradation will altogether eliminate it from the subsurface of the site.



Conclusions and Recommendations

Based on the data collected from the initial environmental site investigation and the confirmatory sampling event, the following conclusions can be made:

- Stable to declining very minor levels of dissolved phase gasoline contamination are present beneath the dispenser island and UST areas extending slightly downgradient to MW-1. Based on data collected on September 5, 1997, ground water contamination levels are all below EPA MCLs and Vermont Ground Water Enforcement Standards.
- Minimal to no vadose zone contamination exists in the defined source area and at all points directly downgradient.
- No sensitive receptors are at any significant risk. The nearest possible receptor is located approximately 3,000 feet away.

In light of the conclusions, we believe no further investigative work is needed at the site due to the lack of contamination beneath it. We formally request a Sites Management Activity Complete Status for the Brandon Training School facility (SMS Site #97-2153). Assuming a SMAC is issued we recommend the proper abandonment of monitor wells MW-1, 2, and 3. Prior to abandoning the wells, a cost estimate will be submitted for your approval.

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State of Vermont

AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation
Waste Management Division

103 South Main Street / West Building
Waterbury, Vermont 05671-0404

802-241-3886

Fax 802-241-3296

john.schmeltzer@anrmail.anr.state.vt.us

Department of Fish and Wildlife

Department of Forests, Parks and Recreation

Department of Environmental Conservation

State Geologist

RELAY SERVICE FOR THE HEARING IMPAIRED

1-800-253-0191 TDD>Voice

1-800-253-0195 Voice>TDD

January 28, 1998

MR ROGER TETREULT
VERMONT DEPARTMENT OF BUILDINGS AND GENERAL SERVICES
2 GOVERNOR AIKEN AVENUE
MONTPELIER VERMONT 05633

RE: Sites Management Activity Completed (SMAC) for Brandon Training School
Brandon, Vermont (Site #97-2153)

Dear Tetreault:

The Sites Management Section (SMS) has reviewed the October 14, 1997 report by Lincoln Applied Geology (LAG). Based on this and previous reports, the SMS has the following understanding at the site:

- Soil contamination was found during the removal of a 1,000-gallon underground storage tank (UST) on January 27, 1997.
- On May 8, 1997, Lincoln Applied Geology (LAG) completed a field investigation at the site, which included a soil vapor survey with 38 points, four test pits, and monitoring wells installed in three of the test pits. For each vapor point, soils were screened using a photoionization detector (PID) at depth intervals of 0.5 feet, 1.0 feet, and 2.0 feet. Soil vapor points near the former UST and dispenser area had PID readings that ranged from zero to 2.2 parts per million (ppm).
- Only Test Pit #1 had PID readings above background. This pit, located in the former dispenser island area, had PID readings of 130 ppm between ground surface and a depth of 5 feet and 150 ppm between 5 feet and 7 feet. The other three test pits were located hydraulically downgradient from the former UST and dispenser area. Soils in the test pits are predominately a fine sandy silt.
- Groundwater samples and water level measurements were taken from the three monitoring wells and Test Pit #1 on May 8, 1997. A monitoring well was not placed in Test Pit #1 because boulder fill at this location would likely damage or destroy a monitoring well. Confirmatory samples from the three monitoring wells were collected on September 5, 1997. The samples were analyzed for gasoline compounds using EPA Method 8020. Depth to groundwater ranged from about 4 feet to 6 feet, and groundwater flow was southwesterly.

(Over)

Ground Water Elevation/Product Level (feet)

Data Point	TOC	05/08/97	09/05/97				
MW-1	98.78	93.67	93.23				
MW-2	99.10	92.98	92.86				
MW-3	98.93	92.50	92.78				

Notes:

- 1 - Elevation datum assumed
 - 2 - Reference elevation is elevation of top of PVC well casing
- Light Grey Cell = DRY
Dark Grey Cell = Inaccessible

Project: Brandon Training School
Location: Brandon, Vermont

Table 2
VDEC Site # 97-2153
Sheet 1 of 1

Photoionization Results (PID - ppm)

Data Point	09/05/97					
MW-1	BG					
MW-2	BG					
MW-3	BG					

Notes:
BG - Background
SL - Saturated Lamp

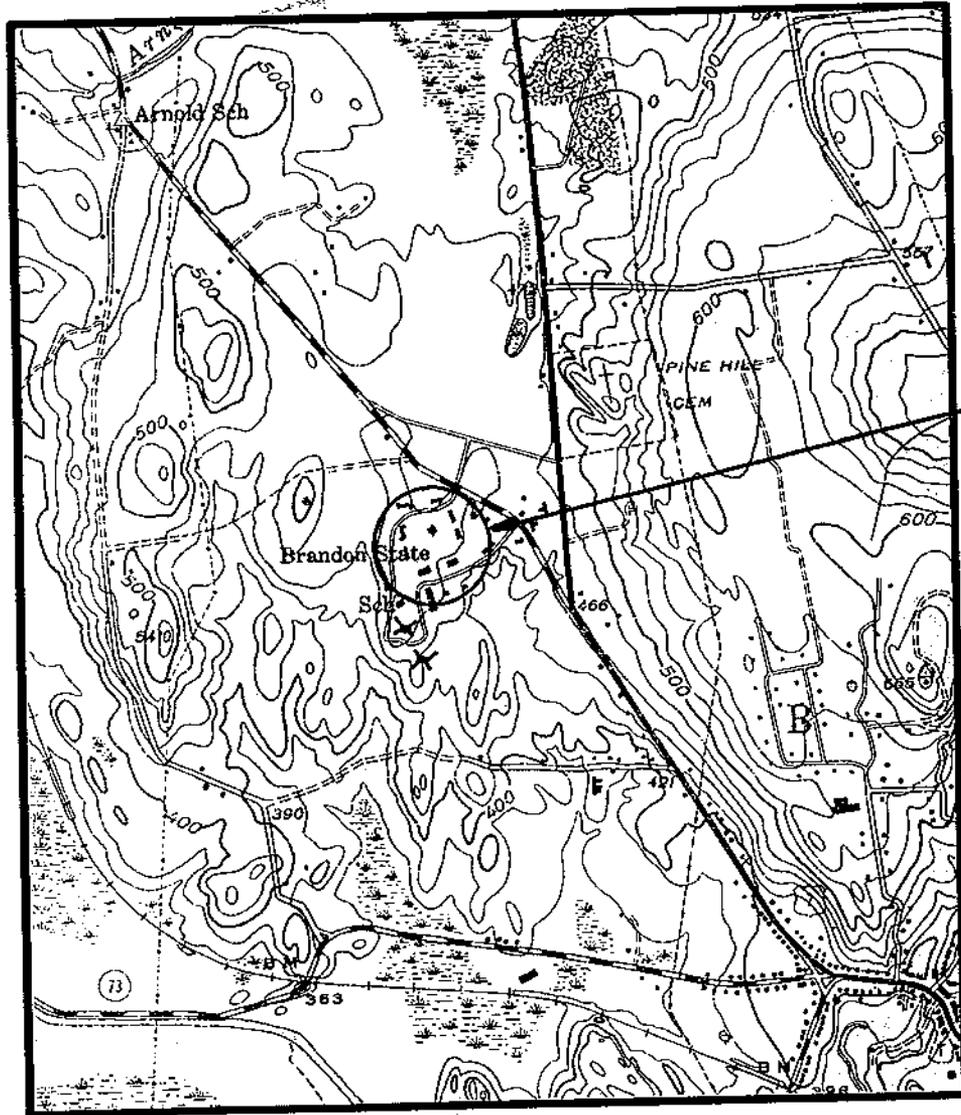
Ground Water Quality Results (ppb)

Data Point	Compound	05/08/97	09/05/97			
Test Pit 1	Benzene	5.4				
	Toluene	81				
	Ethylbenzene	190				
	Xylenes	680				
	MTBE	<5				
	BTEX	956.4				
	BTEX + MTBE	961.4				
MW-1	Benzene	<1	1.4			
	Toluene	<1	<1			
	Ethylbenzene	6.8	2			
	Xylenes	69	<3			
	MTBE	<5	<5			
	BTEX	77.8	7.4			
	BTEX + MTBE	82.8	12.4			
MW-2	Benzene	<1	<1			
	Toluene	<1	<1			
	Ethylbenzene	<1	<1			
	Xylenes	<3	<3			
	MTBE	<5	<5			
	BTEX	<6	<6			
	BTEX + MTBE	<11	<11			
MW-3	Benzene	<1	<1			
	Toluene	<1	<1			
	Ethylbenzene	<1	<1			
	Xylenes	<3	<3			
	MTBE	<5	<5			
	BTEX	<6	<6			
	BTEX + MTBE	<11	<11			

NOTES:
 < - Contaminant not detected at specified detection limit
 Dark Grey Cells - Closed test pit

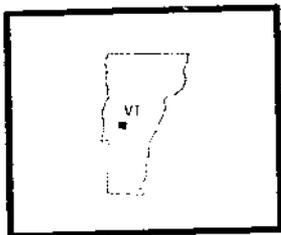
Figure 1

Brandon Training Center Brandon, Vermont GENERAL LOCATION MAP



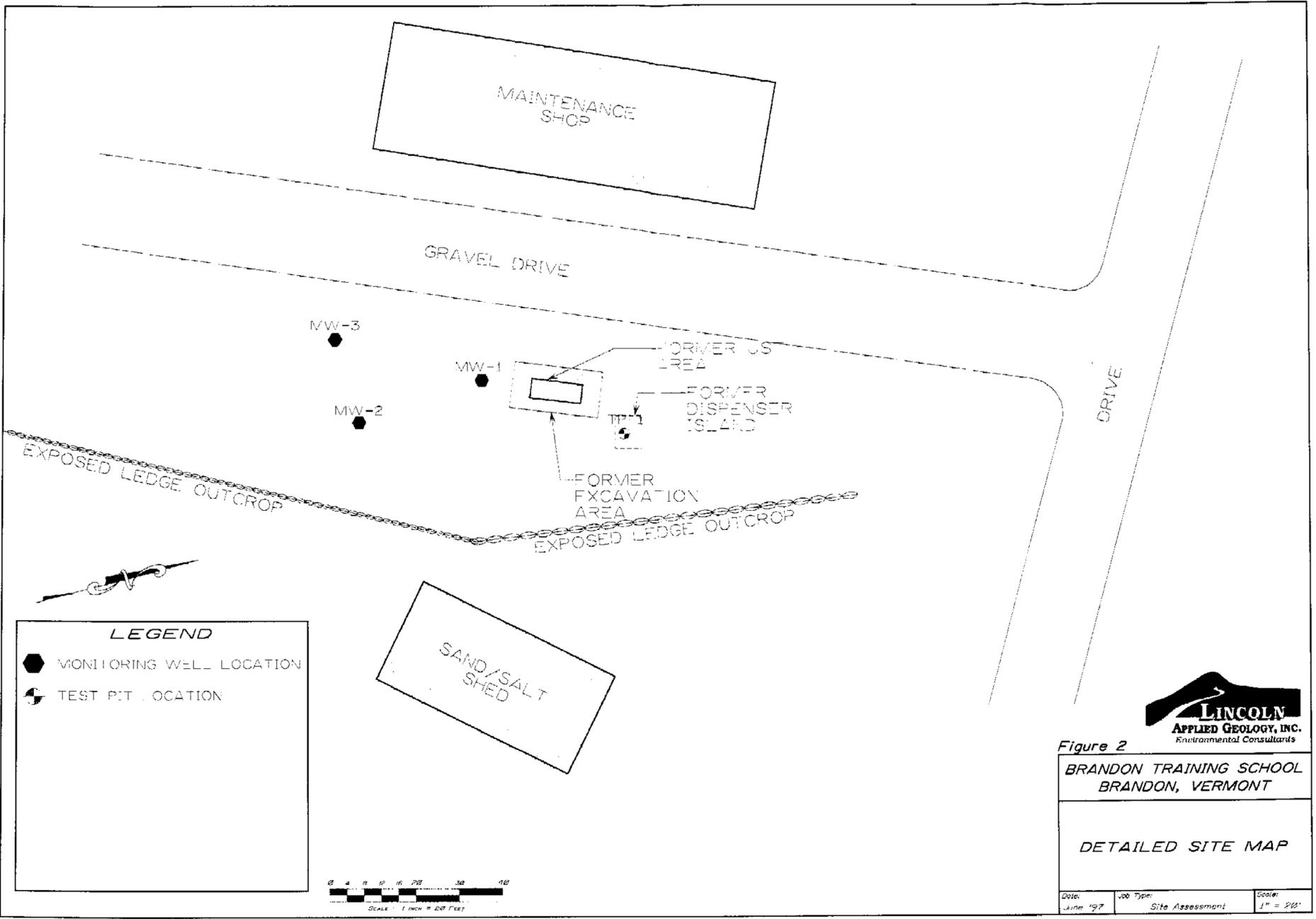
Source: USGS. 7.5 Min. x 15
Topographic Quadrangle of
Brandon, VT. Quad

Scale: 1" = 2,000'

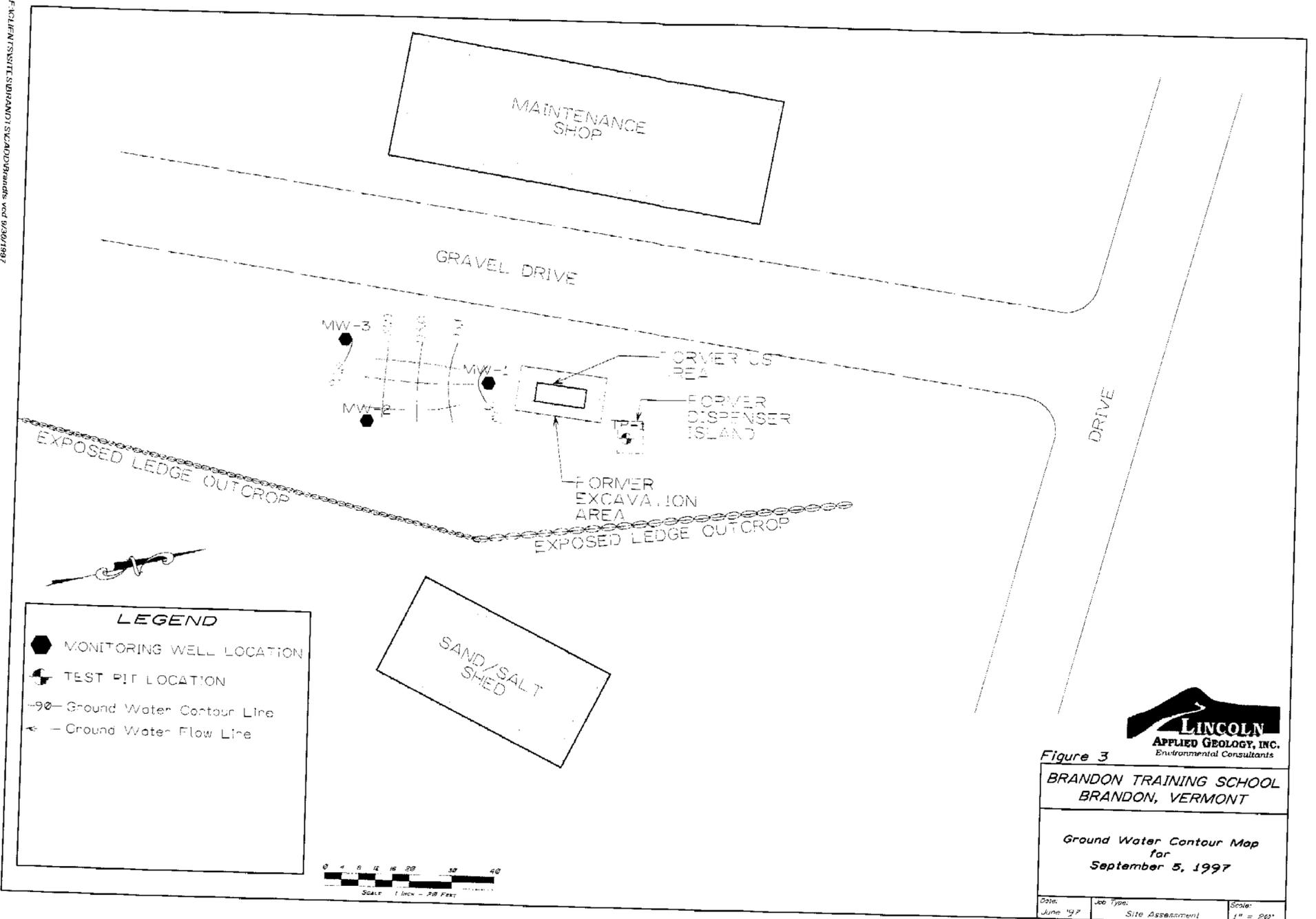


Quadrangle Location

F:\CLINT\SISTE\SBRAND\SICADP\Brandon ver 8/20/1997



FIELD/ISSUE/SUB/AND/SCALE/DATE/REVISED/NOV/1997



Appendix A

**Water Quality Reports
for
September 5, 1997**

SEP 19 1997

GREEN MOUNTAIN LABORATORIES, INC.

RR 3, BOX 5210

Montpelier, Vermont 05602

Phone (802) 223 - 1468

Fax (802) 223 - 8688

LABORATORY RESULTS

CLIENT NAME:	Lincoln Applied Geology	REFERENCE NO:	2678
ADDRESS:	RD 1 Box 710 Bristol, VT 05443	PROJECT NO:	NA
SAMPLE LOCATION:	Brandon Training School	DATE OF SAMPLE:	09/05/97
SAMPLER:	Jeremy Revell	DATE OF RECEIPT:	09/05/97
ATTENTION:	Jason Barnard	DATE OF ANALYSIS:	09/11/97-09/16/97
		DATE OF REPORT:	09/17/97

Pertaining to the analyses of specimens submitted under the accompanying chain of custody form, please note the following:

- Water samples submitted for VOC analysis were preserved with HCl.
- Specimens were processed and examined according to the procedures outlined in the specified method.
- Holding times were honored.
- Instruments were appropriately tuned and calibrations were checked with the frequencies required in the specified method.
- Blank contamination was not observed at levels interfering with the analytical results.
- Continuing Calibration standards were monitored at intervals indicated in the specified method. The resulting analytical precision and accuracy were determined to be within method QA/QC acceptance limits.
- The efficiency of analyte recovery for individual samples was monitored by the addition of surrogate analyte to all samples, standards, and blanks. Surrogate recoveries were found to be within laboratory QA/QC acceptance limits, unless noted otherwise.

Reviewed by:



Raul Sanchez
Chemical Services

SEP 19 1997

GREEN MOUNTAIN LABORATORIES, INC.

Montpelier, Vermont 05602

Phone (802) 223 - 1468

Fax (802) 223 - 8688

LABORATORY RESULTS

GC/MS METHOD - BTEX (BENZENE, TOLUENE, ETHYLBENZENE, XYLENES) + MTBE

GML REF. # : 2678
STATION: TRIP BLANK
ANALYSIS DATE: 09/11/97
DATE SAMPLED: 09/05/97
SAMPLE TYPE: WATER

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	3	ND
MTBE	5	ND

Surrogate % Recovery: 100 %

ND = Not Detected

BPQL = Below Practical Quantitation Limits

SEP 19 1997

GREEN MOUNTAIN LABORATORIES, INC.

Montpelier, Vermont 05602

Phone (802) 223 - 1468

Fax (802) 223 - 8688

LABORATORY RESULTS

GC/MS METHOD - BTEX (BENZENE, TOLUENE, ETHYLBENZENE, XYLENES) + MTBE

GML REF. # : 2678
STATION: MW-3
ANALYSIS DATE: 09/11/97
DATE SAMPLED: 09/05/97
SAMPLE TYPE: WATER

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	3	ND
MTBE	5	ND

Surrogate % Recovery: 94.4 %

ND = Not Detected

BPQL = Below Practical Quantitation Limits



SEP 19 1997

GREEN MOUNTAIN LABORATORIES, INC.

Montpelier, Vermont 05602

Phone (802) 223 - 1468

Fax (802) 223 - 8688

LABORATORY RESULTS

GC/MS METHOD - BTEX (BENZENE, TOLUENE, ETHYLBENZENE, XYLENES) + MTBE

GML REF. # : 2678
STATION: MW-2
ANALYSIS DATE: 09/16/97
DATE SAMPLED: 09/05/97
SAMPLE TYPE: WATER

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
Xylenes	3	ND
MTBE	5	ND

Surrogate % Recovery: 95 %

ND = Not Detected

BPQL = Below Practical Quantitation Limits

SEP 19 1997

GREEN MOUNTAIN LABORATORIES, INC.

Montpelier, Vermont 05602

Phone (802) 223 - 1468

Fax (802) 223 - 8688

LABORATORY RESULTS

GC/MS METHOD - BTEX (BENZENE, TOLUENE, ETHYLBENZENE, XYLENES) + MTBE

GML REF. # : 2678
STATION: MW-1
ANALYSIS DATE: 09/16/97
DATE SAMPLED: 09/05/97
SAMPLE TYPE: WATER

PARAMETER	PQL (µg/L)	Conc. (µg/L)
Benzene	1	1.4
Toluene	1	ND
Ethylbenzene	1	2
Xylenes	3	BPQL
MTBE	5	ND

Surrogate % Recovery: 96 %

ND = Not Detected

BPQL = Below Practical Quantitation Limits

SEP 19 1997

Green Mountain Laboratories, Inc. RR #3, Box 5210 Montpelier, VT 05602 Phone (802) 223-1468 • Fax (802) 223-8688 E-mail : GML@together.net						Analysis Requested						Page						
						MRE+BIEX												1 of 1
Client Name <u>LAR</u>																		GML #
Address <u>RD 1 Box 710 Bristol VT</u>																		2678
Phone / Fax <u>853-4384</u>																		
Project Name <u>Brandon Learning School</u>																		
Project Number																		
Project Manager <u>Jason Bernard</u>																		
Sampler <u>Jeremy Powell</u>																		
Sample Location	Date	Time	# of Cont.	Pres.	Sample Type							Remarks						
<u>Drp Bank</u>	<u>9/5/97</u>	<u>7:30</u>	<u>2</u>	<u>AC</u>	<u>H₂O</u>	<u>X</u>												
<u>MW-3</u>	<u>↓</u>	<u>1:30</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>												
<u>MW-2</u>	<u>↓</u>	<u>1:40</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>												
<u>MW-1</u>	<u>↓</u>	<u>1:50</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>												

CHAIN OF CUSTODY RECORD

1) Relinquished by:	<u>Jeremy Powell</u>	Received by:	<u>ARL 9/5/97</u>	Date/Time:	<u>1500</u>
2) Relinquished by:		Received by:		Date/Time:	
3) Relinquished by:		Received by:		Date/Time:	