

Type of Submittal	Petroleum Contamination Fund Phase	
<input type="checkbox"/> Workscope/Budget <input checked="" type="checkbox"/> Technical Report <input type="checkbox"/> Reimbursement Request <input type="checkbox"/> Monitoring Result (pre-permit) <input type="checkbox"/> Monitoring Result (Post-Permit)	<input type="checkbox"/> Initial Response <input type="checkbox"/> Free Product Removal <input type="checkbox"/> Initial Site Characterization <input checked="" type="checkbox"/> Site Investigation <input type="checkbox"/> Remedial Action Plan	<input type="checkbox"/> Remedial Design <input type="checkbox"/> Remedial Implementation <input type="checkbox"/> Operations/Maint. <input type="checkbox"/> Groundwater Permit

SITE INVESTIGATION REPORT

Grafton Town Shed Site
Grafton, VT
(DES # 95-0122)

Prepared For:
 Grafton Board of Selectmen
 P.O. Box 180
 Grafton, VT 05146

Prepared By:
STRATEGIC ANALYTICAL SYSTEMS, INC.
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 Bellows Falls, VT 05101
 Phone: (802) 463-0733/Fax: (802) 463-0723

John T. McCarthy, Manager of Operations
Steven L. Brackett, Geologist



January 11, 1996

Recommended Risk Category		
<input type="checkbox"/> Immediate Human Health Risk <input type="checkbox"/> Potential Human Health Risk <input type="checkbox"/> Free Product or Source Hazard	<input type="checkbox"/> Surface Water Impact (actual impact to Class B or Potential impact to class B) <input type="checkbox"/> No Alternate Water Available <input type="checkbox"/> Alternate Water Available/High Level Groundwater Contamination (> 1000 x VGES)	<input checked="" type="checkbox"/> Alternate Water Available/Low Level Groundwater Contamination (<1000 x VGES) <input type="checkbox"/> No VGES Violation/ No Source Remaining

SITE INVESTIGATION REPORT

Grafton Town Garage
Grafton, VT

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1.0 SITE DATA

Site Name: Grafton Town Shed
Site Address: Rt. 121 Grafton, VT 05345
Site Owner: Town of Grafton
Site Phone #: (802) 843-2456
Site Contact: John Gregory
Deed Reference: Grafton Registry of Deeds: Book 24, page 178
Tax Map Reference: Map 8, Lot 25

2.0 BACKGROUND

The Grafton Town Garage (hereinafter referred to as the "site") is located on Rt. 121 in the central portion of the Town of Grafton, VT. The site is approximately .5 miles east of Grafton Village and is abutted by residential and light commercial properties to the west, north and east. The Saxtons River flows across the southern property boundary. The site, and all abutting sites, are served by on site water supply and septic systems.

During August of 1995 one gasoline and one diesel UST were removed from the site. A Site Assessment conducted by ENSA Environmental, in association with the removal action, concluded that a release of both gasoline and diesel had occurred and that soil and groundwater of the site had been impacted by these releases.

Based on the conclusions of the above referenced Site Assessment the Vermont Department of Environmental Conservation requested that a Site Investigation be conducted to determine the degree and extent of contamination at the Grafton Town Shed site.

On Nov. 27, 1995 Strategic Analytical Systems, Inc. ("SAS") was chosen by the Grafton Board of Selectmen to conduct the requested Site Investigation.

3.0 SCOPE

This investigation involved five tasks as defined below:

- Task 1.0 - Site Visit, Collection of Background Information, Work Scope Preparation**
- Task 2.0 - File Review**
- Task 3.0 - Installation of Monitoring Wells**
- Task 4.0 - Collection and Field Screening of Soil Samples**
- Task 5.0 - Collection and Analysis of Groundwater Samples**
- Task 6.0 - Assessment of Potential Receptors**
- Task 7.0 - Report Preparation**

4.0 INSTALLATION OF MONITORING WELLS

On Dec. 6, 1995 SAS installed three monitoring wells at the site employing a Geoprobe system. The wells were drilled to approximately 13' and were completed using .75" Sch. 40 PVC screen and riser. The annulus was filled with coarse sorted sand to 18" below grade and a bentonite seal was placed between 8" and 18" below grade. Complete well logs for each of the three monitoring wells installed are included in the Appendices of this report.

5.0 COLLECTION AND ANALYSIS OF SOIL SAMPLES

Two soil samples were collected from each of the three monitoring wells installed. In each well a sample was collected from 1) above the water table and 2) from as close to the water table as possible. All of the soil samples were screened in the field for the presence of volatile organic compounds ("VOC's") according to SAS's Standard Operating Procedure. Screening was conducted with a Gastech OVM calibrated to 400 ppm hexane. All of the soil samples collected, and analyzed, contained detectable levels of VOC's. The field screening results are contained in the table below:

	MW-1	MW-2	MW-3
4'-6'	310	30	60
8'-10'	15	15	35

6.0 COLLECTION AND ANALYSIS OF GROUNDWATER SAMPLES

The initial round of groundwater samples were collected on Dec. 14, 1995. Prior to collection of samples each well was purged to assure that the groundwater being sampled was representative of ambient conditions. This was accomplished by removing three well volumes of groundwater from the well. Once collected, samples were immediately placed in VO vials (with zero headspace), chilled and forwarded to Eastern Analytical of Concord, NH. All samples were collected, bottled and preserved according to SAS's Standard Operating Procedures and were analyzed for the presence of aromatic VOC's by EPA Method 8020 w/ MTBE.

The results of the groundwater analyses performed indicate that Vermont Groundwater Enforcement Standards ("VGES's") were exceeded for benzene in MW-1. There were no other VGES exceedances in the three samples collected and analyzed. The complete report of analytical results is included in the Appendices of this report. A summary is presented below:

	MW-1	MW-2	MW-3
Benzene	90	3	< 1
Toluene	10	6	< 1
Ethyl Benzene	60	< 1	< 1
Xylene	180	63	< 1
MTBE	< 20	< 20	< 20

Also included in the Appendices are chromatograms for each well. It appears, based on this data, that in addition to the aromatics listed above, relatively high levels of heavier hydrocarbons are also contained in the samples from MW-1 and MW-2.

7.0 GEOLOGIC AND HYDROGEOLOGIC SETTING OF THE SITE

The site is located in the upper portion of the Saxtons River valley of southeastern Vermont. The soils encountered on the site were primarily fine to medium grained sand and gravel. Much of the soil appeared to be fill. There is no record of natural structural barriers to flow in the Saxtons River Valley and groundwater flow through the high hydraulic conductivity sands and gravels should be unrestricted. The general direction of groundwater flow in the valley is sub-parallel to the Saxtons River. In the upper portion of the valley where the Grafton Town Shed is located the groundwater gradient is moderate. The depth to groundwater observed during the installation of the soil borings ranged between 8.0' below grade in MW-2 to 13' below grade in MW-1.

The area is underlain by bedrock of the Waits River Formation (phyllite with interbedded quartzite and marble). Bedrock is exposed in the bed of the Saxton's River at the rear of the site and is estimated to be approximately 15' deep.

Groundwater Elevations Information

	Elevation (TOC)	Water Depth 12/14/95
MW-1	100	86.65
MW-2	95.45	85.8
MW-3	97.3	86.1'

8.0 SUMMARY OF GOVERNMENT FILES REVIEWED

For the purposes of this report SAS conducted reviews of various Federal, State and local files. The Federal and State files reviewed included the CERCLIS list, the Vermont Hazardous Waste Sites list (inclusive of the Vermont National Priorities List sites), the Vermont Spills Database for Grafton and the UST list. No evidence of an offsite source of contamination was found during the file reviews conducted.

9.0 POTENTIAL RECEPTORS

Subsequent to the collection and analysis of soil and groundwater samples SAS conducted a survey of potential receptors of the contamination found. This survey consisted of a visual inspection of the site, and of adjacent sites, as well as a review of the files of the VT DEC - Water Supply Division. The potential receptors that were identified consist of private drinking water wells (the site is served by a well, as are the abutting properties), surface water (the Saxtons River abuts the rear of the site), the soil/groundwater of adjacent sites, and the soil/groundwater of the site itself. In the opinion of SAS impact to the indoor air quality of adjacent buildings is unlikely. The onsite building (the "Town Shed") does not have a basement and the downgradient buildings appear to be beyond the extent of the vapor phase contamination of the vadose zone.

10.0 CONCLUSIONS

10.1 Presence of Soil and Groundwater Contamination

Based on the results of the soil and groundwater analysis discussed above, it is clear that the soil and the groundwater of the site have been impacted by petroleum contamination. In the opinion of SAS, information concerning the site history, site construction and the hydrogeology of the area collected during the Site Assessment conducted by ENSA Environmental and during this Site Investigation indicate clearly that the diesel and gasoline UST's removed in 1995 were the source of the petroleum release.

Both the degree and the extent of contamination seem to be moderate. Of the soil samples collected and analyzed all exceeded the VT DEC- Sites Management Section Treatment Guidelines for petroleum contaminated soil. Only one groundwater sample (from MW-1) exceeded the Vermont Groundwater Enforcement Standards, that exceedance being for benzene. These results indicate that, although it is possible that low level vapor phase contamination of the vadose zone may have occurred on adjacent sites, groundwater exceedances of VGES's are limited to the former tank location.

10.2 Risk Posed to Potential Receptors

In the opinion of SAS, impact to receptors is limited to the soil and groundwater of the site, and perhaps the soil of the Tuttle residence to the northeast. Although it is possible that the onsite, or adjacent drinking water supplies may have been impacted by this contamination the probability is very low.

Due to the lack of direct exposure pathways the risk associated with incidental ingestion-inhalation of, or direct dermal contact with, contaminated soil and/or groundwater from the Grafton Town Shed site is low.

11.0 RECOMMENDATIONS

A groundwater monitoring program should be commenced at the site. This program should initially consist of the collection and analysis of groundwater samples four times per year (March, June, September, December). Analysis of groundwater samples should be conducted using EPA Method 8020 w/MTBE. The results of the groundwater monitoring program should be used as the basis for changes in sampling frequency and analytical methodology. To ensure that private water supplies have not been impacted the first monitoring round should also include samples from the Tuttle Residence, the residence and the site itself.

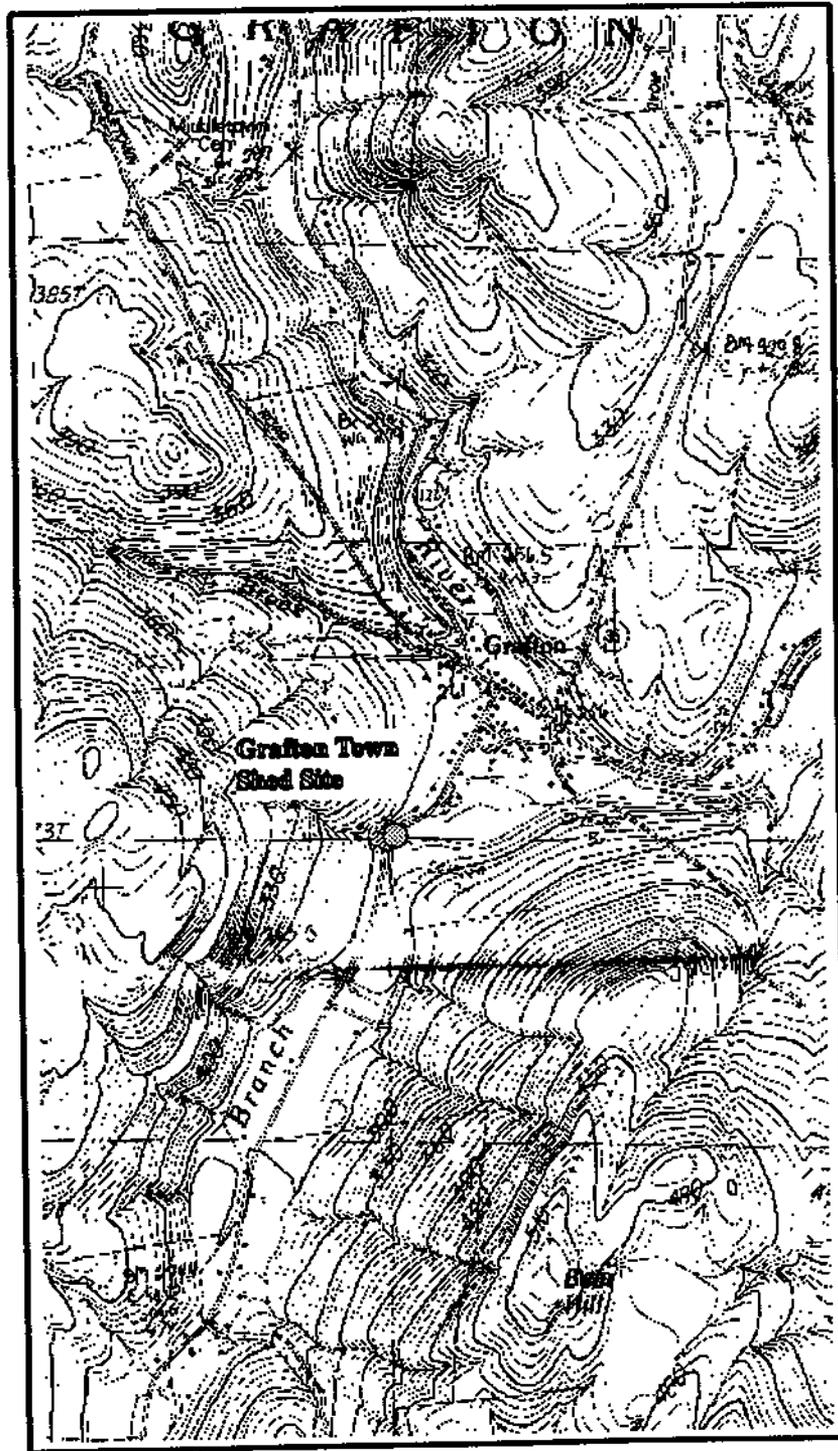
A properly implemented groundwater monitoring program will ensure that any significant contaminant migration which may threaten other potential receptors (thus increasing the risk posed by it) will be identified early and that additional remediation costs will be minimized. Once the results from two consecutive rounds of groundwater analysis show no VGES exceedance then monitoring should cease and the site file should be closed.

12.0 LIMITATIONS AND SERVICE CONSTRAINTS

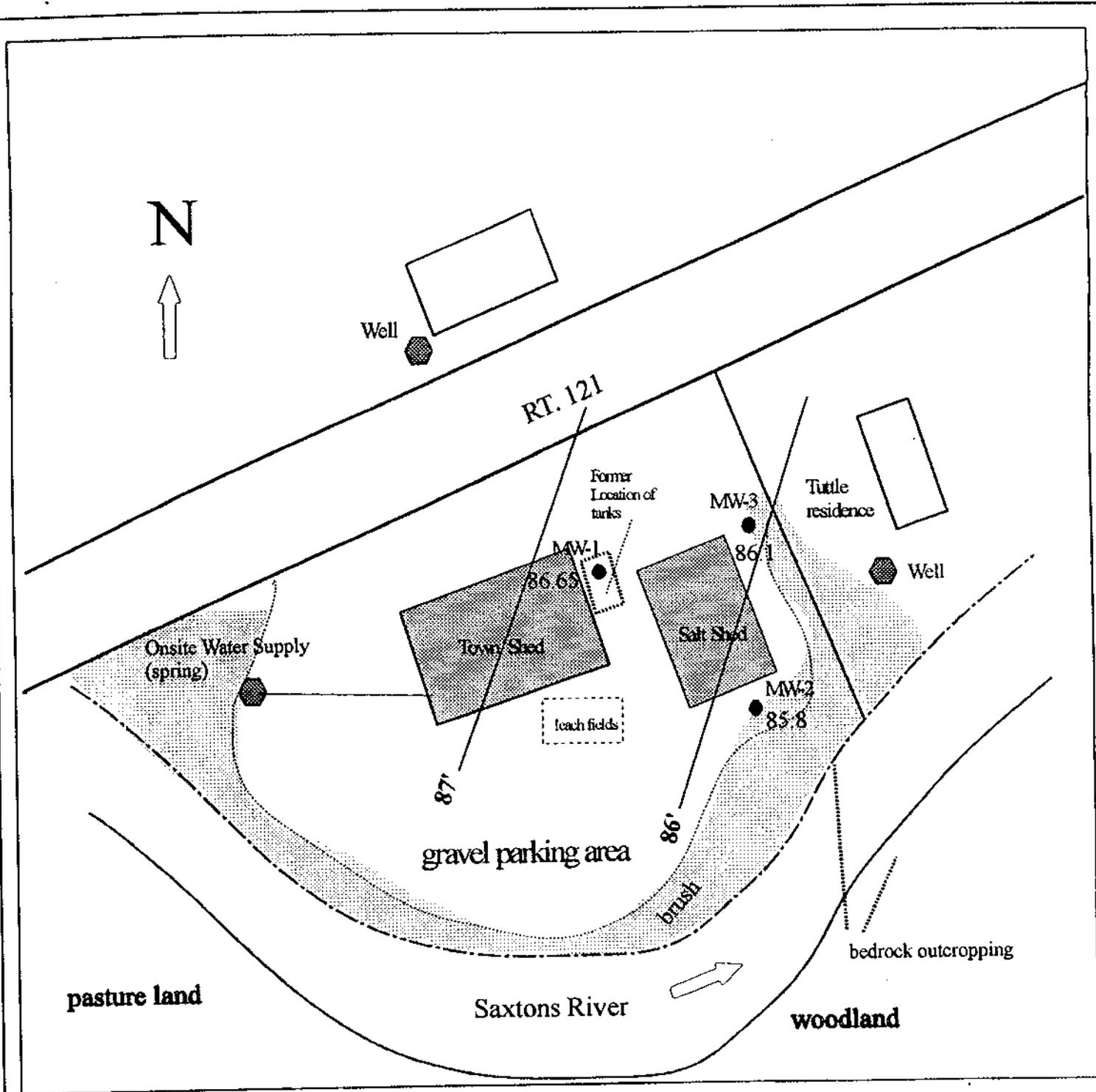
The findings set forth in this report are strictly limited in time and scope to the date of evaluation. The conclusions presented are based solely on the services described herein.

Some of the information provided in this report is based upon personal interviews and research of available documents, records, and maps held by appropriate government and private agencies. Such information is subject to the limitations of historical documentation, availability, and accuracy of pertinent records and the personal recollection of those persons contacted.

GRAFTON TOWN SHED SITE AREA MAP



from USGS Saxtons River 1:25000 Quad, Provisional 1984 Ed.



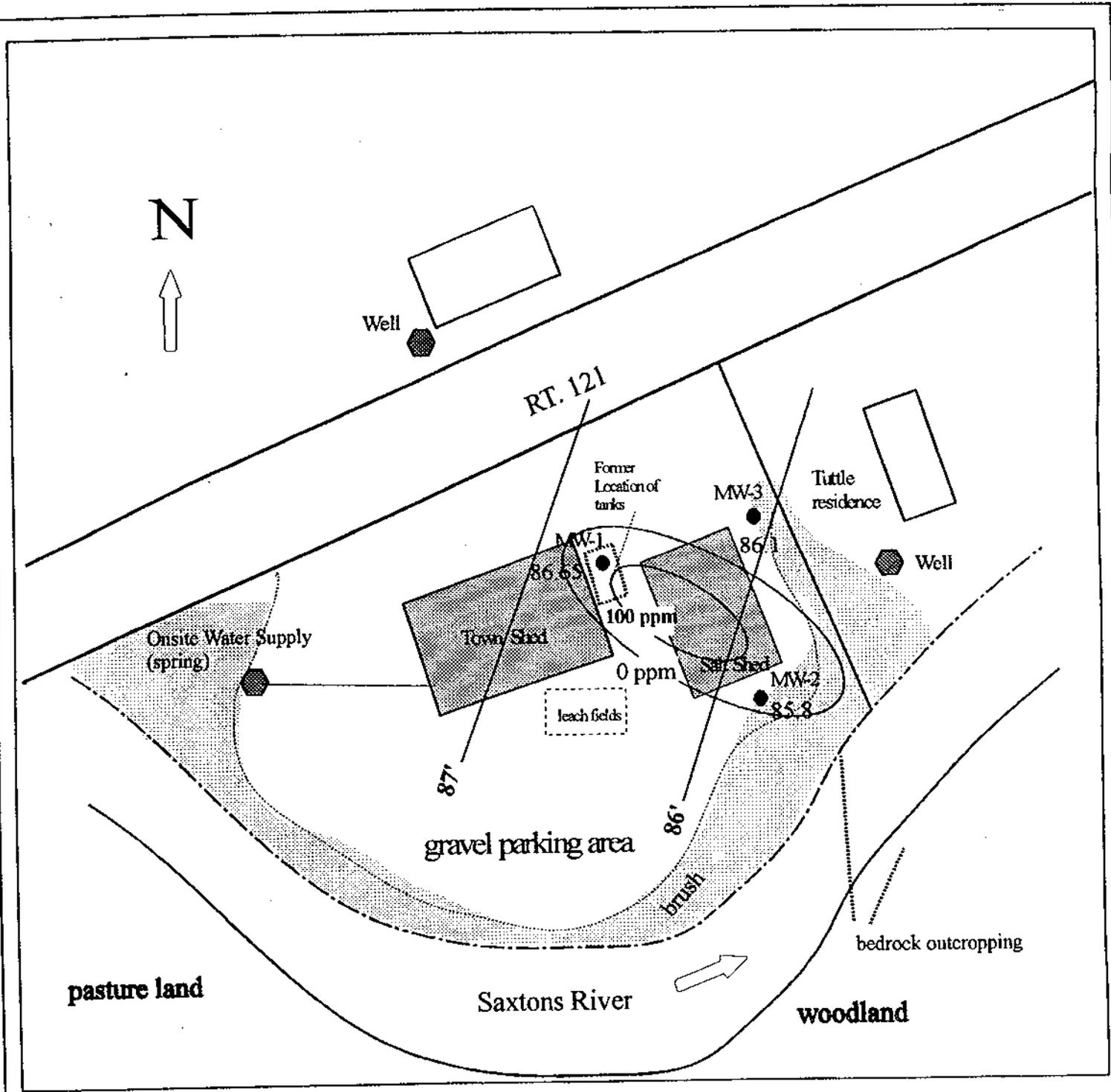
**SITE PLAN
GRAFTON TOWN SHED
GRAFTON, VT**

STRATEGIC ANALYTICAL SYSTEMS, INC.
25 CENTENNIAL SQUARE
BELLOWS FALLS, VT 05101
PHONE: (802) 463-0733 FAX: (802) 463-0723

SCALE: 1" = 60'

DRAWN BY: SLB/Dibe Assoc.

DATE: JANUARY 17, 1996



**BENZENE ISOPLETH MAP
GRAFTON TOWN SHED
GRAFTON, VT**

STRATEGIC ANALYTICAL SYSTEMS, INC.

25 CENTENNIAL SQUARE
BELLOWS FALLS, VT 05101

PHONE: (802) 463-0733 FAX: (802) 463-0723



SCALE: 1" = 60'

DRAWN BY: SLB/Dibe Assoc.

DATE: JANUARY 17, 1996



LABORATORY REPORT

Eastern Analytical, Inc. ID#: 4387 SAS

Client: Strategic Analytical Systems

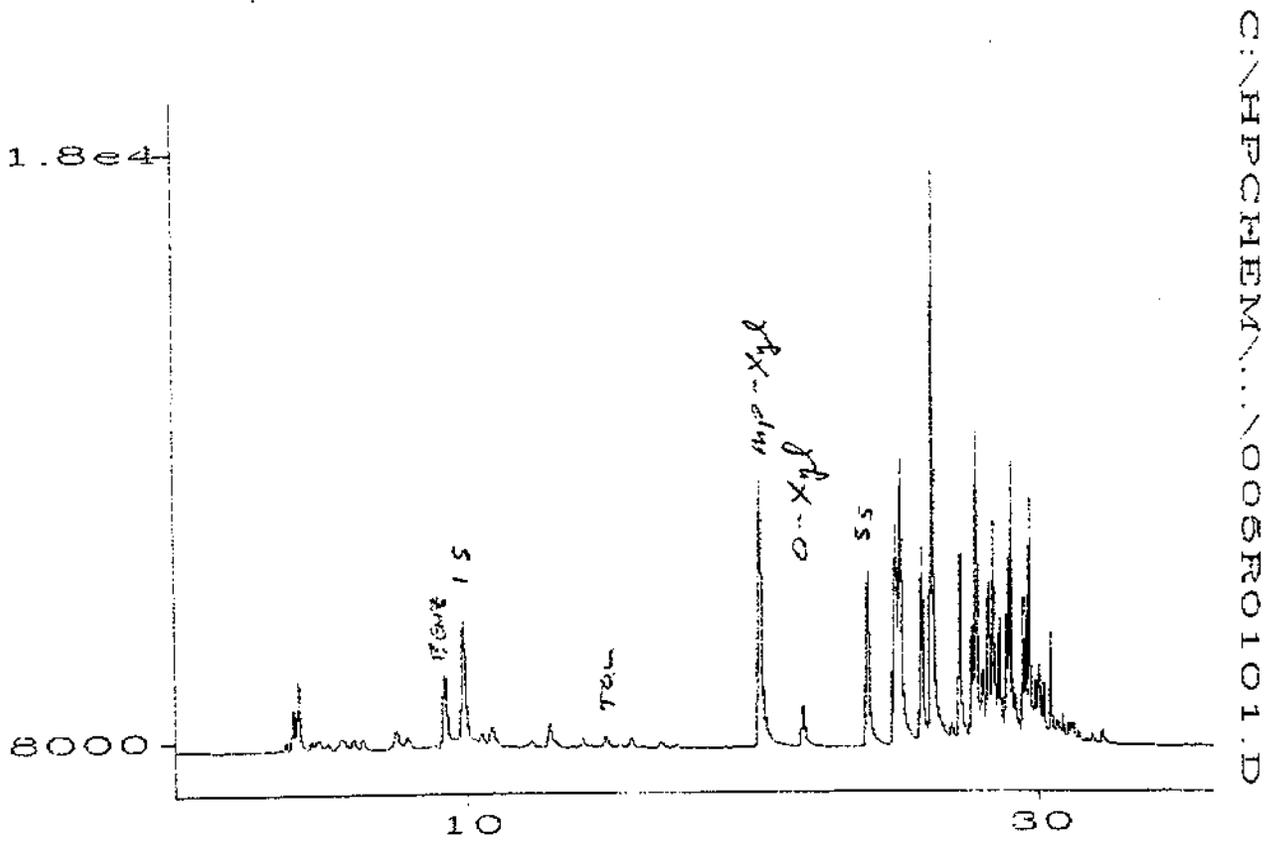
Client Designation: GRA-CM-001/Grafton, Village Twn Garage

Volatile Organic Compounds

Sample ID:	001.1	001.2	001.3
Matrix:	Aqueous	Aqueous	Aqueous
Date Received:	12/20/95	12/20/95	12/20/95
Units:	µg/L	µg/L	µg/L
Date of Analysis:	12/20/95	12/20/95	12/20/95
Analyst:	TML	TML	TML
EPA Method:	8020	8020	8020
Benzene	90	3	< 1
Toluene	10	6	< 1
Ethylbenzene	60	< 1	< 1
Total Xylenes	180	63	< 1
Chlorobenzene	< 1	< 1	< 1
EPA Method:	8015	8015	8015
MTBE	< 20	< 20	< 20

Approved By: Clifford Chase, Volatile Organics Supervisor

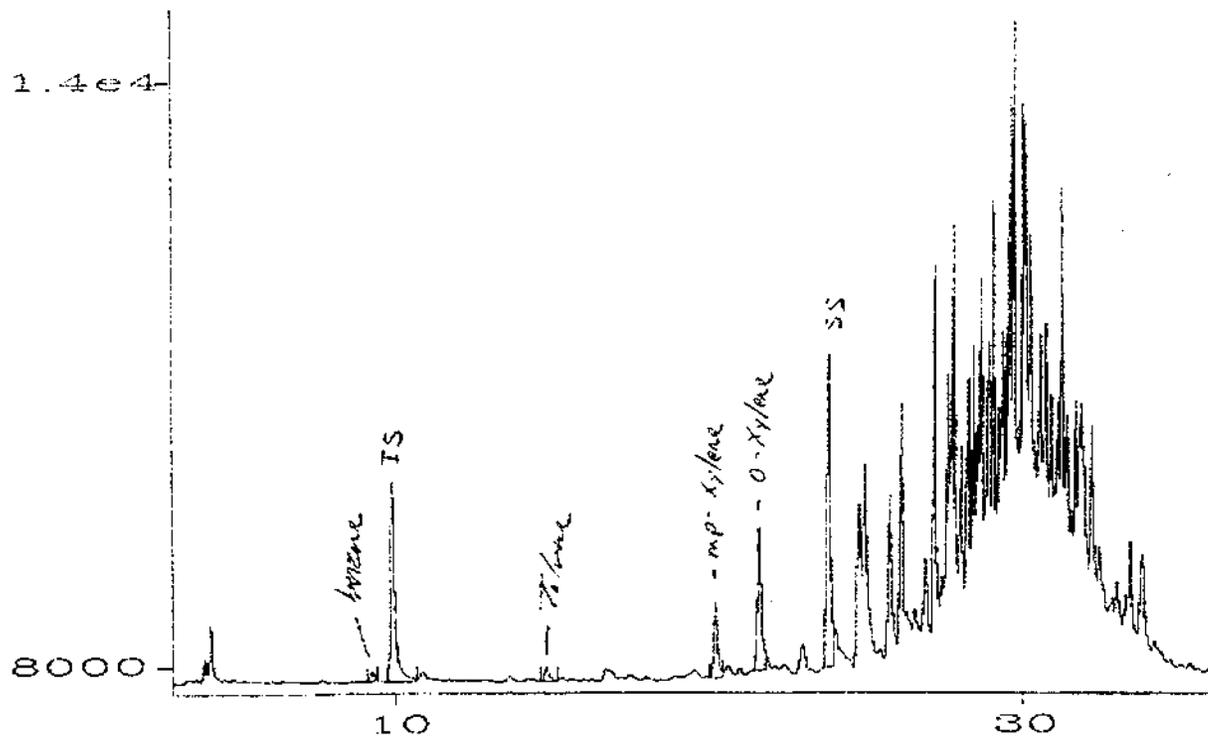
4387 SAS # 1



4387 SAS

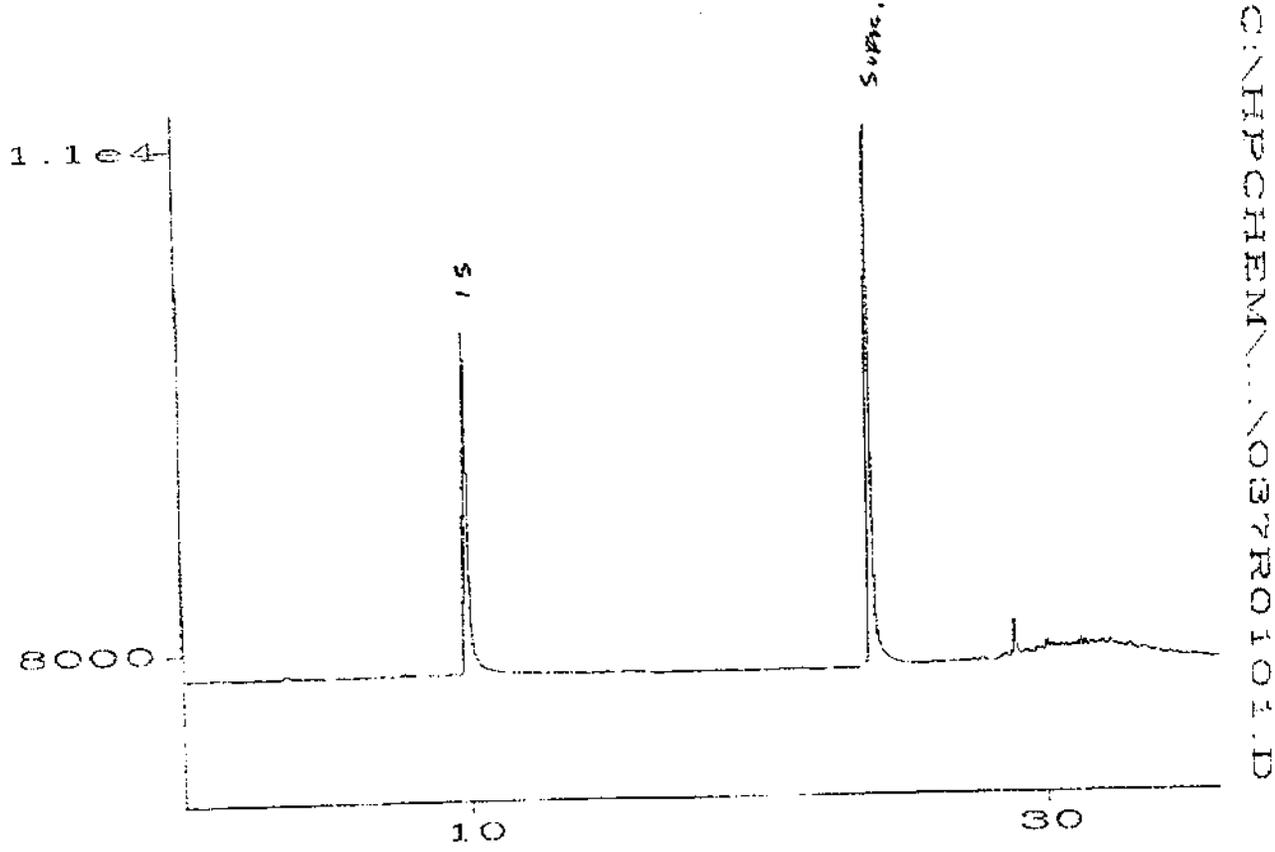
Sample - MW-2, 5ml (non-diluted) analysis.
(The sample was analyzed at 10 dilution also)

user modified



C:\HP\CHEM\...NO42R0101.D

4387 SAS #3



C:\NHP\CHEM\...NO37R0101.D

STRATEGIC ANALYTICAL SYSTEMS, INC.

BORING LOG

PROJECT:	Grafton Town Shed	Hole Diameter:	2.0"
LOCATION:	Grafton, VT	Screen Diameter:	.75"
DATE DRILLED:	12/6/1995	Casing Diameter:	.75"
WELL NUMBER:	MW-1	Slot Size:	.61"
Drilling Company:	SAS	Total Depth:	15'
Driller:	Brackett	Screen Length:	10'
Drilling Method:	Geoprobe	Casing Length:	6'
Logged By:	Brackett	Type:	EYE

DEPTH (feet)	Well Materials	Well Schematic	Blows/6" OVM Readings	Lithology Notes (texture, color, size)	
0					0
	Bentonite				
2.5	Coarse Sorted Sand				2.5
5	.010" Well Screen		310 ppm	dark brown, coarse sand with pebbles	5
7.5					7.5
10			Water Table @ 8' 15 ppm	brown, fine gravel and coarse sand	10
12.5					12.5
15			Total Depth = 15'		15

STRATEGIC ANALYTICAL SYSTEMS, INC.

BORING LOG

PROJECT:	Grafton Town Shed	Hole Diameter:	2.0"
LOCATION:	Grafton, VT	Screen Diameter:	.75"
DATE DRILLED:	12/6/1995	Casing Diameter:	.75"
WELL NUMBER:	MW-2	Slot Size:	.01"
Drilling Company:	SAS	Total Depth:	13'
Driller:	Brackett	Screen Length:	10'
Drilling Method:	Geoprobe	Casing Length:	4'
Logged By:	Brackett	Type:	PVC

DEPTH (feet)	Well Materials	Well Schematic	Blows/6" OVM Readings	Lithology Notes (texture, color, size)	
0					0
	Bentonite				
2.5	Coarse Sorted Sand				2.5
5			30 ppm	very fine, light brown silt slight petroleum odor	5
	.010" Well Screen				
7.5					7.5
			Water Table @ 8' 15 ppm	brown, fine gravel and coarse sand	
10					10
12.5			Total Depth = 13'		12.5
15					15

STRATEGIC ANALYTICAL SYSTEMS, INC.

BORING LOG

PROJECT:	Grafton Town Shed	Hole Diameter:	2.0"
LOCATION:	Grafton, VT	Screen Diameter:	.75"
DATE DRILLED:	12/6/1995	Casing Diameter:	.75"
WELL NUMBER:	MW-3	Slot Size:	.01"
Drilling Company:	SAS	Total Depth:	13'
Driller:	Brackett	Screen Length:	10'
Drilling Method:	Geoprobe	Casing Length:	4'
Logged By:	Brackett	Type:	PVC

DEPTH (feet)	Well Materials	Well Schematic	Blows/ft QVM Readings	Lithology Notes (texture, color, size)	
0					0
	Bentonite				
2.5	Coarse Sorted Sand				2.5
5			60 ppm	brown coarse sand slight petroleum odor	5
7.5	.010" Well Screen				7.5
10			Water Table @ 8' 35 ppm	brown, fine gravel and coarse sand, petroleum odor	10
12.5			Total Depth = 13'		12.5
15					15