

DEC 7 1993



December 6, 1993

Mr. Charles B. Schwer
Petroleum Sites Coordinator
Vermont Department of
Environmental Conservation
103 South Main Street
Waterbury, Vermont 05676

RE: Summary of Environmental Services Completed at the Go Go
Mini Mart, St. Johnsbury, Vt. (Site #93-1445)

Dear Mr. Schwer:

Lincoln Applied Geology Inc. (LAG) has completed the tasks outlined in our October 13, 1993 preliminary Scope of Work (SOW) for the Go Go Mini Mart, St. Johnsbury, Vt. (**Figure 1**)(**Appendix A**, Photograph 1) . The investigation was initiated in response to your September 24, 1993 letter requesting definition of the extent, magnitude, and potential receptors of contamination found during underground storage tank (UST) removal. This letter summarizes the completed tasks along with our recommendation for ground water monitor well locations. The completed tasks include:

1. identification of potential receptors,
2. development of a regional and preliminary detailed site map including pertinent features and other potential sources of contamination,
3. conductance of file reviews at the Vermont Department of Environmental Conservation (VDEC) offices and Town offices to obtain information on past property use of the site and surrounding area, and
4. completion of a detailed soil vapor survey on November 3, 1993 and sampling of the two existing monitor wells on the property.

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Results of our current investigation indicate the presence of two potential sensitive receptors, the Passumpsic River and the on-site drinking water well (Appendix A, Photograph 2). The Passumpsic River is the ultimate receptor of the contamination. The soil gas survey and ground water chemistry results indicate that volatile organic compounds (VOC's) have contaminated both the soil and ground water beneath the site to some degree. LAG's recommendations for future activities include the installation of four monitor wells to establish the extent and magnitude of contamination beneath the site.

A site visit was made by a LAG hydrogeologist on November 1, 1993 to locate potential sensitive receptors, conduct a town file review, and identify pertinent features in the area including roads, buildings, and topography. **Figure 2** depicts the pertinent features identified on the site and in the surrounding area. **Figure 3** illustrates the pertinent features of the site at a more detailed scale. The on-site drinking water well and Passumpsic River are identified as the primary potential receptors of contamination emanating from the site. The Passumpsic River, which is 100 feet downgradient of the site, was checked for active seeps of free floating gasoline and none were located. The on-site drinking water well which is 100 feet up and sidegradient of the former island area, will be sampled during the next site visit.

Town and VDEC files for the area were reviewed to identify past property use and any other potential sources of contamination. The property has been used for retail gasoline sales since the 1970's. The property to the north of the Go Go Mini Mart, formerly Vinton Motors, was identified as a VDEC hazardous waste site (Site #92-1292). Subsurface gasoline contamination was discovered at Vinton Motors during the removal of several UST's. Contaminated soils that were removed from the tank excavation remain stockpiled on-site (**Appendix A**; Photograph 3). Subsurface ground water contamination is currently migrating toward the Passumpsic River.

A second site visit was made by the LAG hydrogeologist and technician on November 3, 1993 to conduct a soil gas survey. A copy of the Health and Safety Plan (HASP) utilized for on-site work is included in **Appendix B**. The soil gas survey was conducted by drilling a small diameter hole to 3 feet below



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the surface. A PID was inserted into the hole and the maximum reading was recorded. Forty-two vapor points were drilled and assayed with the PID. **Figure 4** shows the location of each vapor point and the PID data obtained from each point. Vapor phase contamination is present in both the former UST and island area. The majority of the elevated levels were detected in the former island area. Preliminary data indicate that the subsurface is composed of tan fine sands.

The two existing monitor wells were appropriately sampled for BTEX, MTBE and TPH (**Appendix A**; Photograph 4). The wells were purged prior to sampling using industry accepted methods. Samples were collected and placed in 40 milliliter bottles. The collected samples were acidified, chilled, and brought to Microassays of Vermont in Montpelier along with the proper chain of custody forms and a trip blank.

Results indicate that low concentrations of methyl-tert butyl ether (MTBE) was detected in MW-1 (27 parts per billion (ppb)) and trace concentrations of xylenes were detected in MW-2 (4 ppb). TPH concentrations for both MW-1 and MW-2 were less than 10 parts per million (ppm). Copies of laboratory results are attached as **Appendix C**.

Minor concentrations of BTEX constituents, MTBE, are present in monitor wells MW-1 and MW-2. Soil gas survey results indicate that elevated VOC contamination is also present in the former island area. In order to evaluate this area we recommend the installation of four additional monitor wells to fully evaluate the extent and magnitude of contaminant migration. **Figure 5** shows the locations of these proposed monitor wells. One well will be placed near the building and will serve as the upgradient well to verify ground water quality and flow onto the property. The remaining wells will be located in order to intercept contamination migrating from the former island and UST areas. Once all additional wells are installed they will be developed until the discharge is clear and free of sediment. A stadia survey will be completed to include the existing wells so that ground water flow and gradient can be calculated. All monitor wells will then be sampled along with the on-site drinking water well for BTEX, MTBE and TPH. Upon completion of all work, a summary report



Lincoln Applied Geology, Inc.
Environmental Consultants

RD # 1 Box 710 • Bristol, Vermont 05443 • (802) 453-4384 • FAX (802) 453-5399

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will be generated including a recommendation for a corrective action plan, if warranted.

A cost estimate for the additional work is attached as **Appendix D**. If you have any questions, comments, or concerns about this matter, please do not hesitate to call me or John Amadon, Project Manager, at 453-4384.

Sincerely,


Richard S. Vandenberg
Hydrogeologist

RSV/lr
Enclosure
cc: Bill Sellinger



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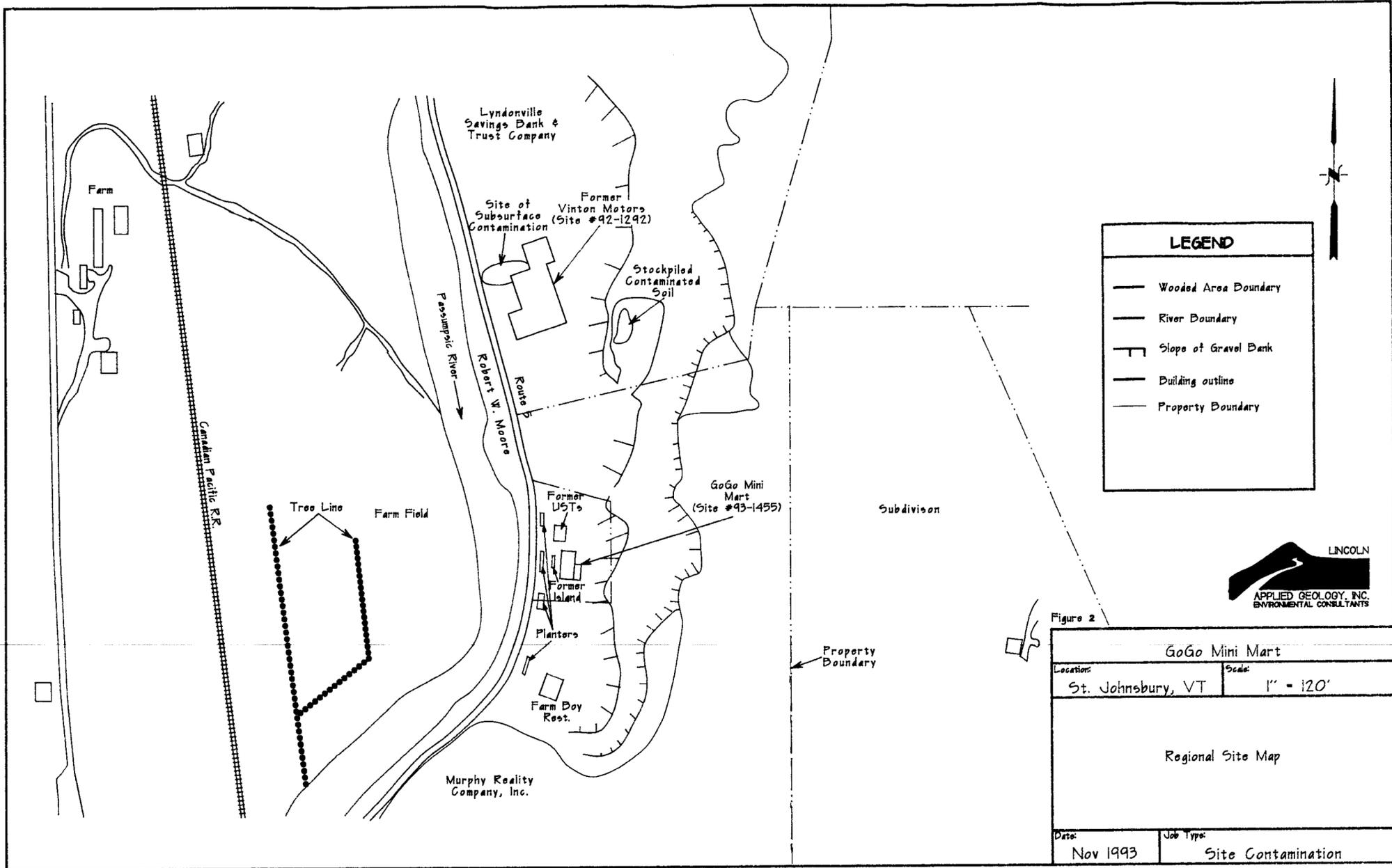
Go Go Mini Mart GENERAL LOCATION MAP

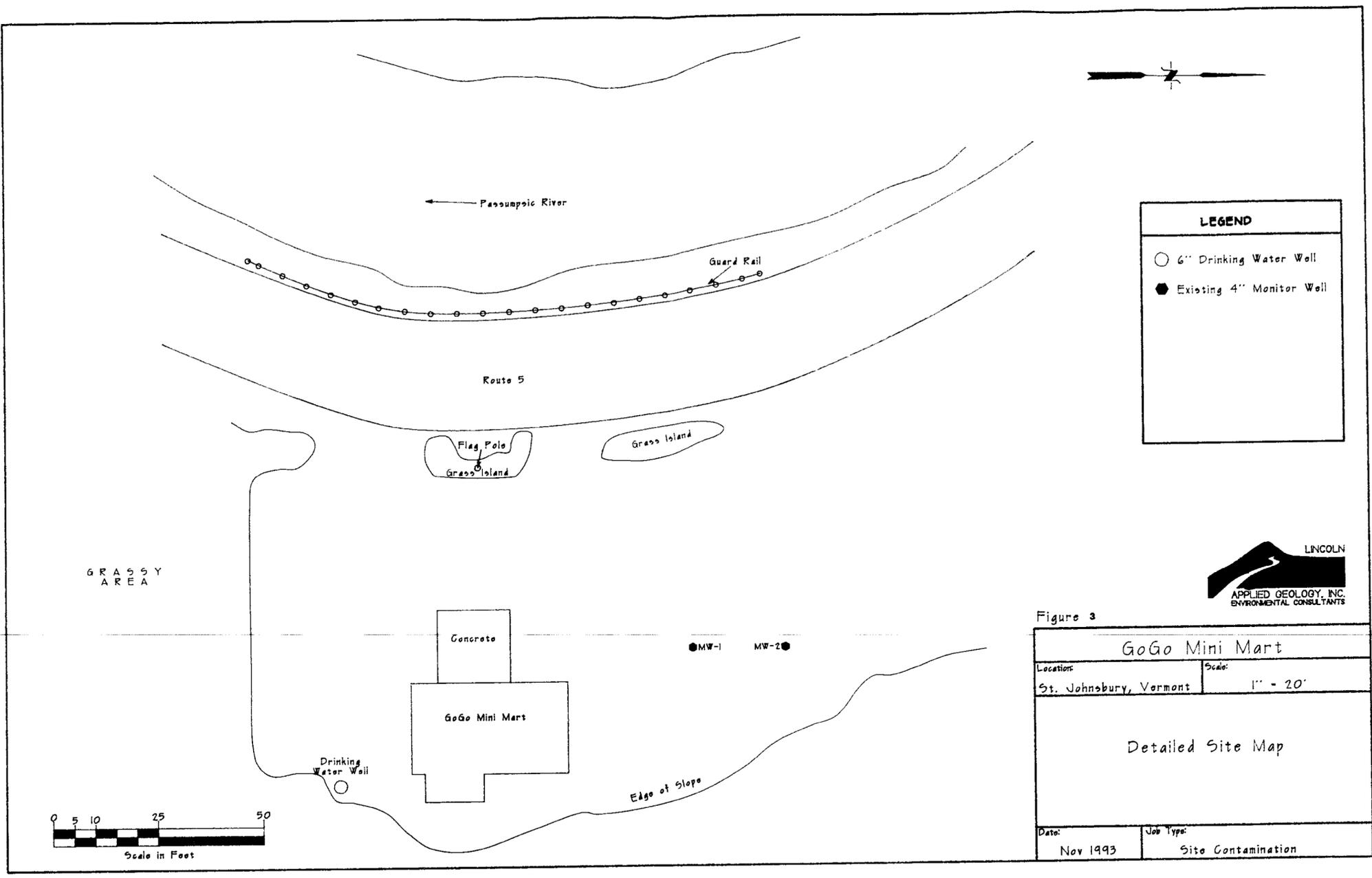


Go Go Mini Mart

Source: U.S.G.S. 7.5 min.
Topo Series
St. Johnsbury, Vt. Quad.

Scale: 1" = 2000'





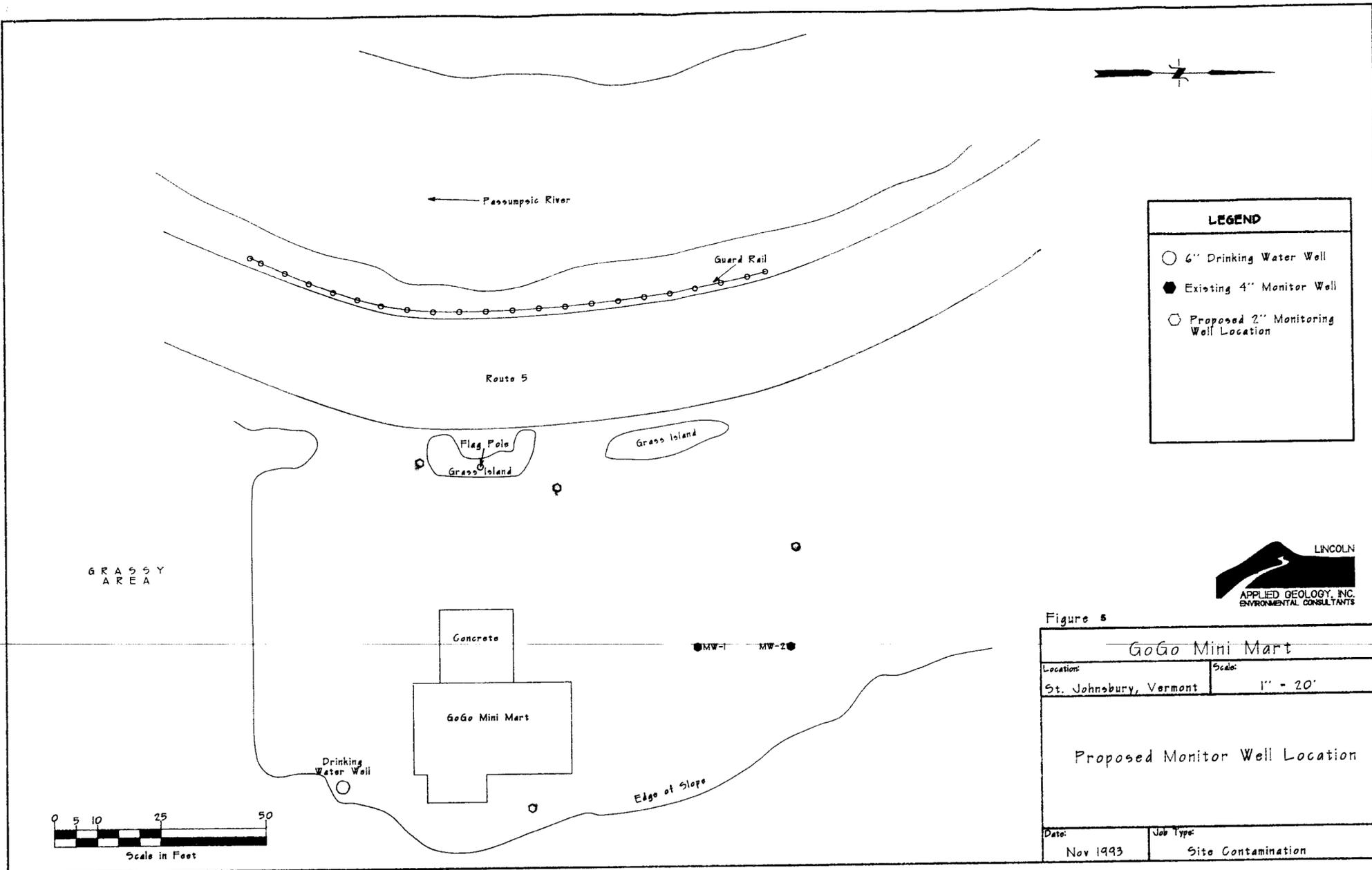
LEGEND	
○	6" Drinking Water Well
●	Existing 4" Monitor Well



Figure 3

GoGo Mini Mart	
Location:	Scale:
St. Johnsbury, Vermont	1" = 20'
Detailed Site Map	
Date:	Job Type:
Nov 1993	Site Contamination





LEGEND	
○	6" Drinking Water Well
●	Existing 4" Monitor Well
⊗	Proposed 2" Monitoring Well Location



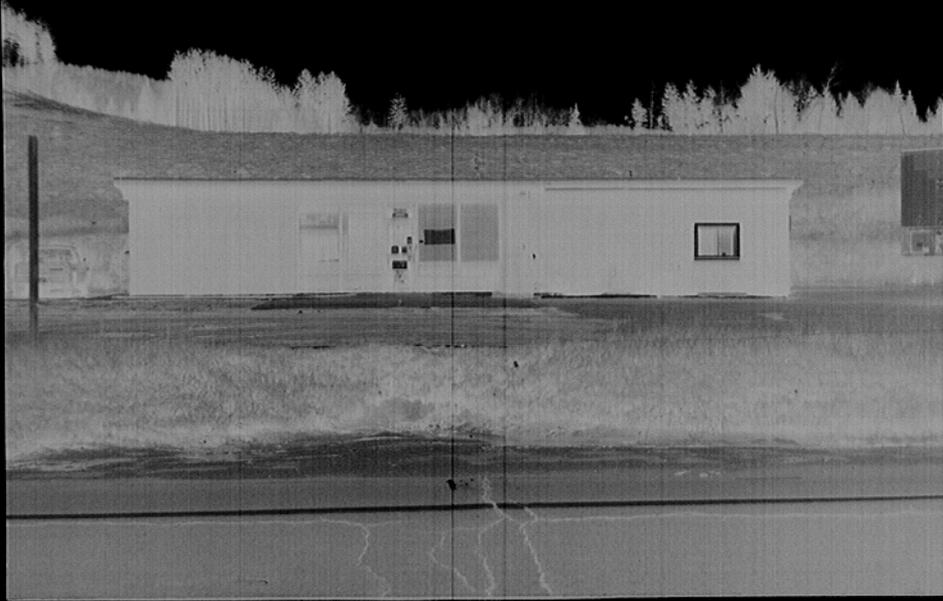
Figure 5

GoGo Mini Mart	
Location:	Scale:
St. Johnsbury, Vermont	1" = 20'
Proposed Monitor Well Location	
Date:	Job Type:
Nov 1993	Site Contamination

APPENDIX A

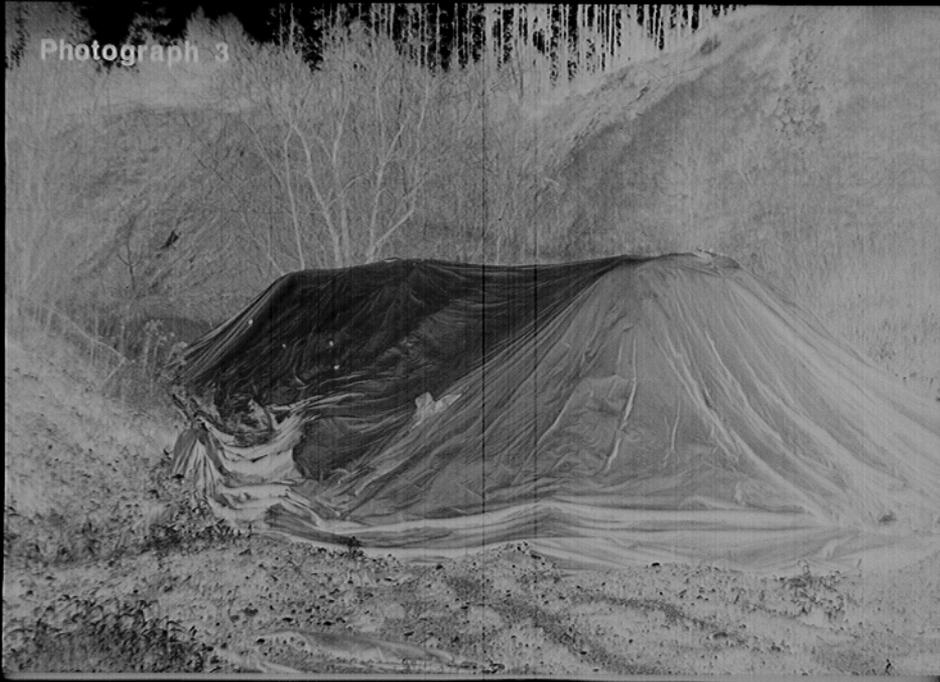
Photographs

Photograph 1

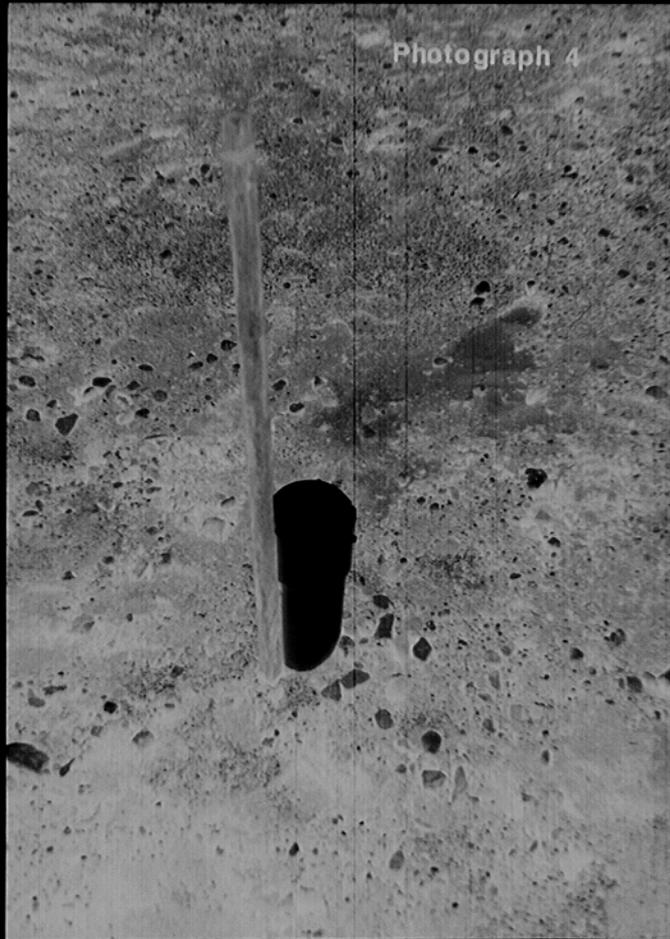


Photograph 2

Photograph 3



Photograph 4



APPENDIX B

Health and Safety Plan

SITE HEALTH AND SAFETY PLAN

Site Name: Go-Go Gas
Date: November 2, 1993
Site Address: Memorial Drive (Route 5) St. Johnsbury, VT.
Project Manager: Richard S. Vandenberg, Lincoln Applied Geology, Inc.
Client Contact: William Sellinger - Bradford Oil

Site and Project Description: Bedard's Mobil has been identified as a potential source of subsurface petroleum contamination. Pursuant to Vermont regulations, a site investigation is being completed. Upon completion of the site investigation, a site monitoring and remediation may be required.

Site Health and Safety Information: Petroleum products of gasoline have been reported to have leaked into the subsurface environment.

Site Personnel Protection Requirements:

Activity	Level of Protection	Special Equipment Requirements
Ground Water Monitor Well Installation, Soil Vapor Study, Sample Collection and Monitoring. Installation of remediation system.	D	Work Clothes, steel toe shank boot; surgical gloves, hard hat

Monitoring: During monitor well installation and installation of any subsurface remedial system monitor every 15 minutes with HNU PID in area of soil boring.

Contingency:

PID	10 - 20 ppm	Monitor Continuously
PID	20 - 100 ppm	Upgrade to level C
PID	>100 ppm	Shut down activities and evacuate

Decontamination: Personnel protective equipment shall be rinsed and washed with Liquinox Soap solution, hands and face shall be washed in the same manner.

IMPORTANT PHONE NUMBERS

Local Police: 748-2314

Fire Department: 748-8924

Ambulance: 748-8141

Local Hospital: 748-8141

State Police: 552-0393

Safety Director: Steve Revell 453-4384 (office) 453-3122 (home)

Safety Officer(s): Richard Vandenberg 453-4384 (office) 453-4764 (home)

Project Manager: John Amadon - Lincoln Applied Geology, Inc. - 453-4384

Client Contact: William Sellinger

Directions to Hospital: Take Route 5 North past to light approximately 1/4 miles, turn right on Hospital Drive, hospital is on top of the hill.

Site Personnel:

<u>James Robideau</u> <i>Richard S. Vandenberg</i>	<u>Bob Hines</u> <i>Bob Hines</i>	<u>James Holman</u> <i>James Holman</i>
Richard Vandenberg	Subcontractor	Subcontractor

Other Comments:

Site Manager *Richard S. Vandenberg*
Safety Officer *Stephen Jewell*

This site does does not require a detailed site safety plan.

APPENDIX C

Laboratory Results



LABORATORY ANALYSIS

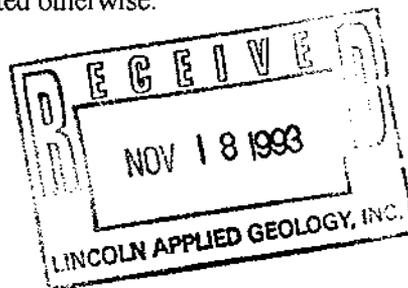
CLIENT NAME:	Lincoln Applied Geology	REF #:	7668
ADDRESS:	RD #1 Box 710 Bristol, VT 05443	PROJECT NO.:	Not Given
SAMPLE LOCATION:	Go-Go Mini Mart	DATE OF SAMPLE:	11/3/93
SAMPLER:	Bob Hines	DATE OF RECEIPT:	11/3/93
		DATE OF ANALYSIS:	11/15/93
ATTENTION:	John Amadon	DATE OF REPORT:	11/17/93

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

- Samples 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.
- Matrix spikes, matrix spike duplicates, and continuing calibration standards were monitored at intervals indicated in the specified method. The resulting analytical precision and accuracy were recorded and determined to be within method QA/QC acceptance limits.
- The inferred efficiency of analyte recovery for individual samples was monitored by the addition of surrogate analytes to all samples, standards, and blanks. Surrogate recoveries were found to be within laboratory QA/QC acceptance limits, unless noted otherwise.

Reviewed by:

Brendan McMahon, Ph.D.
Director, Chemical Services





LABORATORY REPORT

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

CLIENT NAME:	Lincoln Applied Geology	PROJECT CODE:	Not Given
PROJECT NAME:	Go-Go Mini Mart	REF.#:	7,668
REPORT DATE:	November 17, 1993	STATION:	MW-1
DATE SAMPLED:	November 3, 1993	TIME SAMPLED:	13:15
DATE RECEIVED:	November 3, 1993	SAMPLER:	Bob Hines
ANALYSIS DATE:	November 15, 1993	SAMPLE TYPE:	Water

PARAMETER	PQL ($\mu\text{g/L}$)	Concentration ($\mu\text{g/L}$)
Benzene	1	BPQL
Toluene	1	BPQL
Ethylbenzene	1	BPQL
Xylenes	3	BPQL
MTBE	1	27

Surrogate % Recovery: 99%

10. E. G. 11

BPQL = Below Practical Quantitation Limit (PQL).



LABORATORY REPORT

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

CLIENT NAME:	Lincoln Applied Geology	PROJECT CODE:	Not Given
PROJECT NAME:	Go-Go Mini Mart	REF.#:	7,668
REPORT DATE:	November 17, 1993	STATION:	MW-2
DATE SAMPLED:	November 3, 1993	TIME SAMPLED:	13:20
DATE RECEIVED:	November 3, 1993	SAMPLER:	Bob Hines
ANALYSIS DATE:	November 15, 1993	SAMPLE TYPE:	Water

PARAMETER	PQL ($\mu\text{g/L}$)	Concentration ($\mu\text{g/L}$)
Benzene	1	BPQL
Toluene	1	BPQL
Ethylbenzene	1	BPQL
Xylenes	3	4
MTBE	1	BPQL

Surrogate % Recovery: 101%

BPQL = Below Practical Quantitation Limit (PQL).

LINCOLN APPLIED GEOLOGY



LABORATORY REPORT

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

CLIENT NAME:	Lincoln Applied Geology	PROJECT CODE:	Not Given
PROJECT NAME:	Go-Go Mini Mart	REF.#:	7,668
REPORT DATE:	November 17, 1993	STATION:	Trip Blank
DATE SAMPLED:	November 3, 1993	TIME SAMPLED:	07:20
DATE RECEIVED:	November 3, 1993	SAMPLER:	Bob Hines
ANALYSIS DATE:	November 15, 1993	SAMPLE TYPE:	Water

PARAMETER	PQL ($\mu\text{g/L}$)	Concentration ($\mu\text{g/L}$)
Benzene	1	BPQL
Toluene	1	BPQL
Ethylbenzene	1	BPQL
Xylenes	3	BPQL
MTBE	1	BPQL

Surrogate % Recovery: 100%

BPQL = Below Practical Quantitation Limit (PQL).



LABORATORY ANALYSIS

CLIENT NAME:	Lincoln Applied Geology	REF #:	7668
ADDRESS:	RD #1 Box 710 Bristol, VT 05443	PROJECT NO.:	not given
SAMPLE LOCATION:	Go-Go Mini Mart	DATE OF SAMPLE:	11/3/93
SAMPLER:	Bob Hines	DATE OF RECEIPT:	11/3/93
		DATE OF ANALYSIS:	11/15/93
ATTENTION:	John Amadon	DATE OF REPORT:	11/17/93

TOTAL PETROLEUM HYDROCARBONS
by Capillary GC/MS

RESULTS:

The MW-1, MW-2, and Trip Blank samples were all found to contain less than 10 milligrams per liter (PPM) TPH.

Reviewed by:



Brendan McMahon, Ph.D.
Director, Chemical Services



LABORATORY ANALYSIS

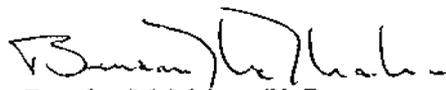
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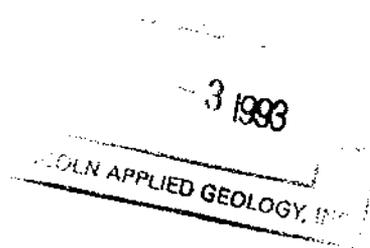
TOTAL PETROLEUM HYDROCARBONS by Capillary GC/MS

RESULTS:

The MW-1, MW-2, and Trip Blank samples were all found to contain less than 10 milligrams per liter (PPM) TPH.

Reviewed by:


Brendan McMahon, Ph.D.
Director, Chemical Services



APPENDIX D

Cost Estimate

**GO GO MINI MART
ST. JOHNSBURY, VT.
COST ESTIMATE FOR ADDITIONAL WORK
NOVEMBER 1993**

A. Monitor Well Installation (all wells will be installed in conformance with generally accepted standards utilized in Vermont and will be developed at the time of installation)

Drillers Charges (4 wells)	\$2030.60
Hydrogeologist 12 hrs. @ \$45/hr	\$ 540.00
PID & Interface Probe @ \$100/day	\$ 100.00
Mileage 200 miles @ \$.30/mile	\$ 60.00
Subtotal	\$2730.60

B. Monitor Well Sampling

Technician 8 hrs. @ \$30/hr	\$ 240.00
Technician OT 1 hr. @\$45/hr	\$ 45.00
PID & Interface Probe @ \$100/day	\$ 100.00
Pump & Generator @ \$110/day	\$ 110.00
Lab Analyses 9 samples EPA Method 8020 + MTBE @ \$62 each	\$ 558.00
9 samples for TPH @ \$100/each	\$ 900.00
Mileage 200 miles @ \$.30/mile	\$ 60.00
Subtotal	\$2013.00

C. Summary Report

Senior Hydrogeologist 1 hr @ \$75/hr	\$ 75.00
Project Manager 3 hrs. @ \$50/hr	\$ 150.00
Hydrogeologist 12 hrs. @ \$45/hr	\$ 540.00
Computer Technician 6 hrs. @ \$30/hr	\$ 180.00
Administrative Assistant 6 hrs. @ \$30/hr	\$ 180.00
Subtotal	\$1125.00
Total A,B,C	\$5868.60