AUG 24 1994

Phase (check one)	Type (check one)
☐ Initial Site Investigation ☐ Corrective Action Feasibility Investigation ☐ Corrective Action Plan ☐ Corrective Action Summary Report ☐ Operations & Monitoring Report	☐ Work Scope ☐ Technical Report ☐ PCF Reimbursement Request ☐ General Correspondence

REMEDIAL SITE INVESTIGATION

J.C. STEWART & SON

Main Street
Cuttingsville, Vermont

SMS Site # 94-1601
UST Facility # Not Applicable
Latitude: 43° 29' 09"
Longitude: 72° 52' 48"

Prepared for:

J.C. Stewart & Son, Owner
Main Street
Cuttingsville, Vermont

Prepared by:

THE JOHNSON COMPANY, INC.
100 State Street, Suite 600
Montpelier, Vermont 05602
(802) 229-4600

THE JOHNSON COMPANY, INC.
Environmental Sciences and Engineering

August 23, 1994

Chuck Schwer, Supervisor
Sites Management Section
Hazardous Materials Management Division
Department of Environmental Conservation
Agency of Natural Resources
103 South Main St./West Office
Waterbury, Vermont 05671-0404

Re: JC Stewart Site #94-1601
Report on Remedial Investigation
JCO 1-1016-1

Dear Chuck:

Enclosed please find our report on the JC Stewart Site in Cuttingsville. Should you have any questions or comments please do not hesitate to contact me at 229-4600. Thank you.

Sincerely,

THE JOHNSON COMPANY, INC.

By: James R. Bowes
Senior Scientist

Reviewed by: lrh
I:\PROJECTS\1-1016-1\STEWART.RPT July 29, 1994 10:06 jrb

Civil/Environmental Engineering Hydrogeology Water Supply & Wastewater Disposal Hazardous Waste Remediation Hydrology Contaminant Fate Analysis
Soil & Water Science Geology & Geophysics Rivers and Dams Solid Waste Permitting
100 State Street Montpelier, VT 05602 ■ (802) 229-4600 Fax: (802) 229-5876

EXECUTIVE SUMMARY

The Johnson Company, Inc. Montpelier, Vermont investigated on behalf of J.C. Stewart & Son (Cuttingsville, Vermont) the occurrence of contamination on the J.C. Stewart & Son (Stewart) site that was reported during removal of two (2) underground unleaded gasoline tanks on April 28, 1994. The Stewart site consists of a Ford Motor dealership, and historically has been used as a gasoline service station as far back at the 1900s. The site is located in Cuttingsville along Route 103, and is bound by the Mill River to the east, and Route 103 to the west. The Johnson Company initiated this investigation by a preliminary site walkover, followed by installation of three groundwater monitoring wells on June 30, 1994. The stratigraphy underlying the Stewart site is characterized by a thin veneer of medium to coarse grain sands over boulders. The sandy layer attenuates with proximity to the Mill River. Vapor monitoring using a photoionization detector indicated the presence of headspace vapor readings up to 88 ppm as measured in monitoring well JCO-1. The groundwater flow direction as determined from depth to water readings collected on July 11 proceeds in a northeast direction toward the Mill River, with a hydraulic gradient of 0.016 feet/feet. Water quality sampling to test for volatile organic compounds was performed on July 11, 1994. Results of the water quality sampling using EPA Method 8260 indicated the presence of benzene, toluene, ethylbenzene, and xylenes (BTEX) at concentrations ranging from 1,411 micrograms per liter (μg/L) in JCO-2 to 1,775 μg/L in JCO-3. The upgradient well (JCO-1) indicated BTEX concentrations at 1,732 μg/L. A review of the chromatograms of the analyses performed by Scitest (Randolph, Vermont) suggests the presence of weathered gasoline. The Johnson Company recommends the following action in regard to the Stewart site: 1) try and determine if additional USTs are still present on the site, and if so, remove them, and associated contaminated soils if associated with the USTs. Stock piling of contaminated soils, if concentrations are allowable, could be facilitated in an area of the Stewart property located across from Route 103, however, a letter of permission to stock pile may need to be obtained from the Department of Environmental Conservation due to proximity to the Mill River; 2) perform semi-annual water quality sampling from the existing monitoring wells, including stream water sampling to test for persistence of the indicated BTEX compounds. In the event BTEX compounds in groundwater remain at or below the levels indicated, and no surface water impacts are indicated, then no further action would be recommended for this site.

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1.0 INTRODUCTION

The J.C. Stewart Site (the site) is situated on an approximate one acre parcel of land located on Route 103, Cuttingsville, Vermont (Figure 1).

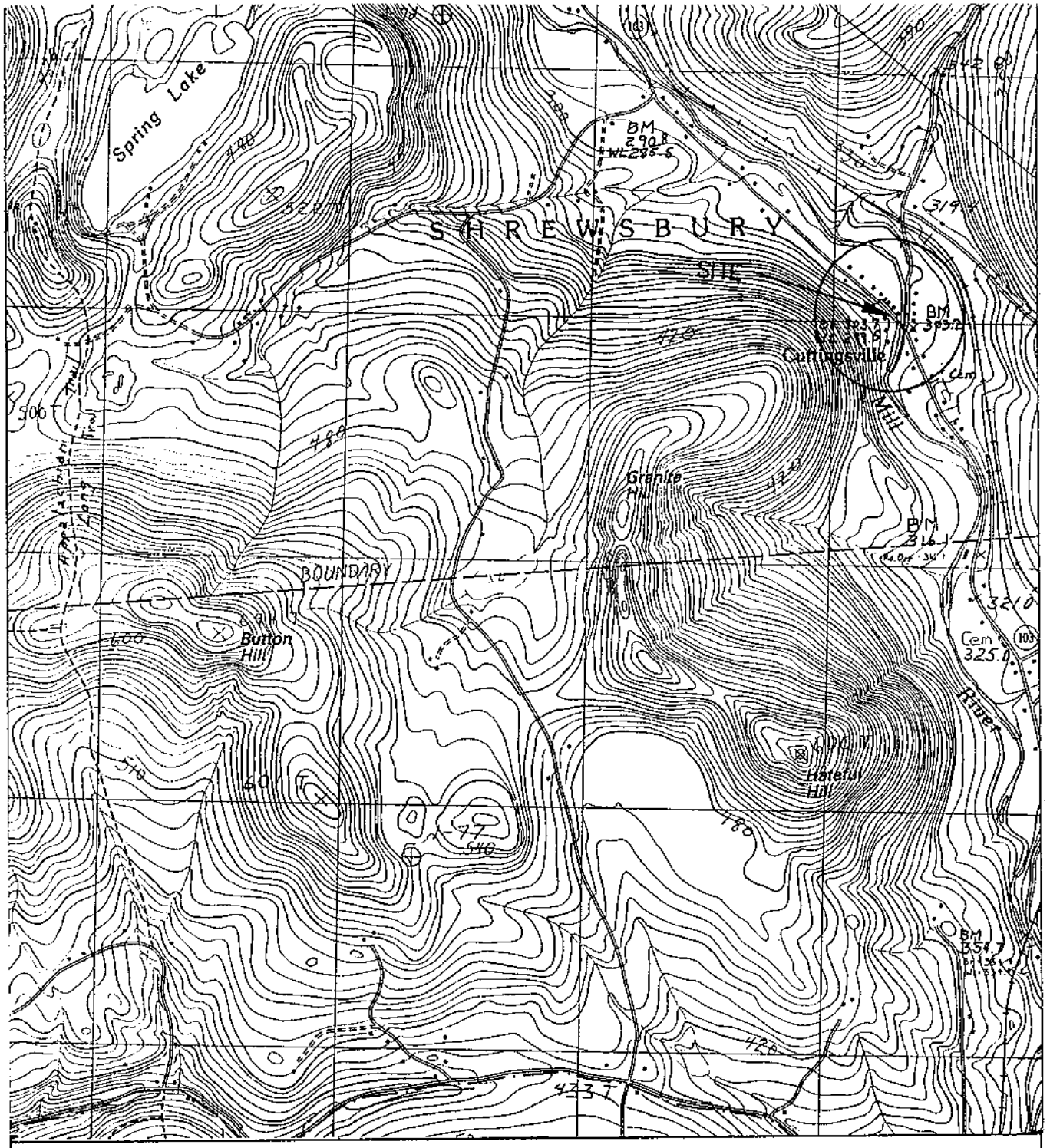
The site is bound to the west by Route 103; to the south and east by the Mill River, and to the north by private residential properties. The site is currently a Ford truck and car dealership, and has been a gas station since the early 1900s (Precision Industrial Maintenance, 1994).

An investigation was performed by The Johnson Company, Inc. (Montpelier, Vermont) for J.C. Stewart & Son (Stewart) in June and July, 1994. The investigation was performed pursuant to a request for work sent to Stewart on June 1, 1994. The Sites Management Section was informed on June 14, 1994 that the investigation would be performed using the new State's new "Expressway" system. The components of this investigation were carried out as follows:

- Perform Regulatory Review for Background Information;
- Performed a Preliminary Site Investigation consisting of:
  - Initial Field Screening with a PID;
  - Monitoring Well Installations;
  - Groundwater Sampling
- Laboratory Analyses

2.0 BACKGROUND

This investigation originated as a result of findings uncovered during a underground storage tank (UST) removal and Site Assessment (ESA) performed on April 29, 1994 by Precision Industrial Maintenance (PIM) Rutland, Vermont. Two unleaded gasoline USTs were taken out of service: one 3,000 and the other 2,000 gallon capacities. PIM reported readings on a photoionization detector (PID) of up to 413 parts per million (PIM, 1994). Due to high water table, the soils were backfilled, and a PVC monitoring well was installed. PIM filed a UST removal form and letter, and based upon this letter, the Sites Management Section of the Vermont Department of Environmental Conservation (DEC) requested an investigation (DEC, 1994).



BASE MAP : USGS 7.5 Minute Topographic Quadrangle: Wallingford, Vermont (1986)

FIGURE 1 : Site Location Map
J.C. Stewart and Sons
Cuttingsville, Vermont

THE JOHNSON COMPANY, INC.
Environmental Sciences and Engineering
100 STATE STREET MONTPELIER, VT 05602

2.1 DEC FILE REVIEW

2.1.1 Underground Storage Tanks

A database prepared by the DEC listing registered underground storage tanks (USTs) was reviewed to determine the existence of USTs on the property and neighboring properties. According to this database, the only USTs to have been registered on the subject property were removed by Precision Industrial Maintenance on April 29, 1994. These are the 2,000 and 3,000 gallon capacity unleaded gasoline tanks which initiated this investigation. No additional registered USTs exist on the site or on neighboring properties.

USTs are registered at four facilities in Shrewsbury: The Shrewsbury Center Garage on Town Highway 21, a residence on Spring Lake Road, The Northam Garage on Town Highway 50, and at the Shrewsbury Mountain School. None of these facilities are located in the vicinity of J.C. Stewart property.

2.1.2 Water Supplies

According to Tim Stewart of J.C. Stewart & Son, the site is served by municipal water, and there are no water supply wells located onsite. The Johnson Company observed a water service connection along the east side of Route 103, immediately northwest of monitoring well JCO-1 (Plate 1.)

The Johnson Company conducted a review the State Water Supply Division's records of private water supply wells in the vicinity of the J.C. Stewart property. Private water supply wells within a one-half mile radius of the site are included in Appendix C. Water Supply Division records also showed that the site is not within any well head or aquifer protection areas.

3.0 INVESTIGATION METHODOLOGY

The site work pertaining to this investigation was performed June 30, 1994. The site work performed on this day included the following:

- vapor monitoring and soil sample field screening;
- depth to water measurements;
- installation of three monitoring wells;location and elevation survey of new and existing monitoring wells.

3.1 VAPOR MONITORING

The vapor monitoring was done by recording total volatile organic compound (VOC) vapor concentrations with an Organic Vapor Meter (OVM) photoionization detector (PID) inserted into the headspace area of soil samples collected, and all the monitoring wells located on the Stewart site.

3.2 MONITORING WELL INSTALLATION AND CONSTRUCTION

Monitoring wells JCO-1, JCO-2, and JCO-3 were installed June 30, 1994 by Tri State Drilling and Boring, Inc. (W. Burke, Vermont). The wells were initially attempted for installation using hollow stem augers. Due to large boulders encountered underlying this site, Tri-State had to implement their auxiliary air hammer and compressor rigging for completion of these wells.

The locations of all existing monitoring wells installed on the Stewart site are shown in the site plan (Plate 1).

The monitoring wells are constructed of schedule 40 PVC riser pipe and factory slotted screen. With the exception of MW-1, the screened section of each monitoring well was sand packed to a height at least 1/2 to 1 foot above the top of the screen. The sandpack in MW-1 was finished inadvertently below the top of the screen, however, since this is well above the water table, the effectiveness of this well for sampling was not compromised. Granular Bennseal bentonite was poured to a thickness of at least 1 foot above the sand pack, to act as a well seal. Construction details of each monitoring well are presented on drilling logs included with this document in Appendix A.

The drilling equipment employed for the installation of each monitoring well was steam cleaned prior to, and between successive location set-ups. Upon installation, each water bearing well was developed by air surge pumping until the discharge water was observed to be clear.

3.3 SOIL SAMPLE COLLECTION

Soil samples were attempted for collection for stratigraphic descriptions and field screening at the time of monitoring well installation. The samples were collected using a 24 inch split spoon sampler driven ahead of the lead auger by a 140 pound hammer and 30 inch drop.

The soil samples were attempted on 5 foot intervals in JCO-1, and at JCO-2. At the time of collection, samples were described for stratigraphy, and field screened for presence of VOCs using the OVM. After description and field screening, samples were stored in plastic "Zip Lock" bags, labeled with the depth increment, date and monitoring well and temporarily set aside for later soil headspace readings.

Due to the nature of the boulders underlying the site, split spoon samples were collected from JCO-1 only.

3.4 SITE SURVEY

The monitoring wells were surveyed for location and relative top of casing (TOC) elevations by triangulating from common points of reference on the Stewart site. TOC elevations were related to an assumed datum located at the southwest corner of the smaller garage structure, on the concrete slab.

3.5 GROUNDWATER LEVEL MEASUREMENTS AND ELEVATION DATA

Depth to groundwater measurements were collected following completion of the monitoring wells. Water levels were recorded by using an ORP interface probe, and were referenced to the relative elevations of the TOCs of the monitoring well.

The interface probe was decontaminated between well readings using liquid detergent and distilled water.

3.6 GROUNDWATER ELEVATIONS

Elevations for the top of the water table were calculated by subtracting the depth to water measurement from the relative TOC elevation. The calculations were done within a relational database Paradox® (v3.5).

3.7 ELEVATION CONTOUR MAPS

A contour map depicting the surface of the water table was generated using the computer program Surfer® (Golden Software, Golden, Co.). This program contours the water table elevations from data sets that consist of the horizontal survey coordinates, and the calculated relative water table elevation associated with each set of coordinates.

3.8 GROUNDWATER SAMPLE COLLECTION

Groundwater samples were collected on July 11, 1994 by The Johnson Company. The samples were collected using PVC disposable bailers that have been dedicated to each well. A total of 3 groundwater samples were collected from the monitoring wells installed June 30. A water level measurement was made in a well that had previously been installed by Precision Industrial during the UST removal, but this well was not sampled.

The sample group was delivered under chain of custody the day of collection to Scitest Laboratories, Inc. (Randolph, Vermont).

4.0 RESULTS

4.1 HEADSPACE VAPOR MONITORING

The results of the vapor monitoring survey are presented in Table 1. All readings were taken with the Model 580B OVM calibrated the day of the site work to 100 ppm isobutylene span gas.

The results indicate that JCO-1 contains the highest vapor concentrations in both soil bag, and monitoring well headspace matrices. JCO-1 is located nearest Route 103, and is the upgradient well for the network of wells at this site. Readings as indicated in Table 1 indicated up to 88 ppm measured in the headspace area of this well, and just below 25 ppm from soil bag measurements. The next highest reading of 21 ppm was collected at JCO-2 from the soil tested at two feet below ground surface (BGS). No well headspace readings were collected in this well (JCO-2). Readings from location JCO-3 exhibited lower concentrations still.

4.2 SUMMARY OF SOIL STRATIGRAPHY

Descriptions of the soils that exist below the site were made based upon observations of split spoon samples where conditions allowed. The split spoon samples were collected during the installation of JCO-1, until boulders were at depth. The boulders demarcate a probable old river bed at location JCO-1. The entire interval below grade at locations JCO-2, and JCO-3 is comprised of the same, which in all likelihood represents fill. The stratigraphy logged in JCO-1 consists of medium to coarse sands down to approximately 6 feet BGS, then boulders.

TABLE 1
VAPOR SUMMARY

Location	Screened Interval (Ft)	Sample Depth Soil (Ft)	PID Reading Soil Bag (ppm)	Well Headspace[1] (ppm)
JCO-1	2-12	1.5 2.5 4-6 5.0 8.5 - 9.8 10.5 11.2	1.1 5.2 4.4 7.2 24.9 17.0 14.0	88.2
JCO-2	2-12	2.0 10.5 11.0 11.2	21.1 4.2 7.1 6.0	N.M.
JCO-3	2-10	1 - 3 9.5 - 11.7	1.1 4.6	0.0

[1] The highest reading was listed in this column if more than one reading was collected.

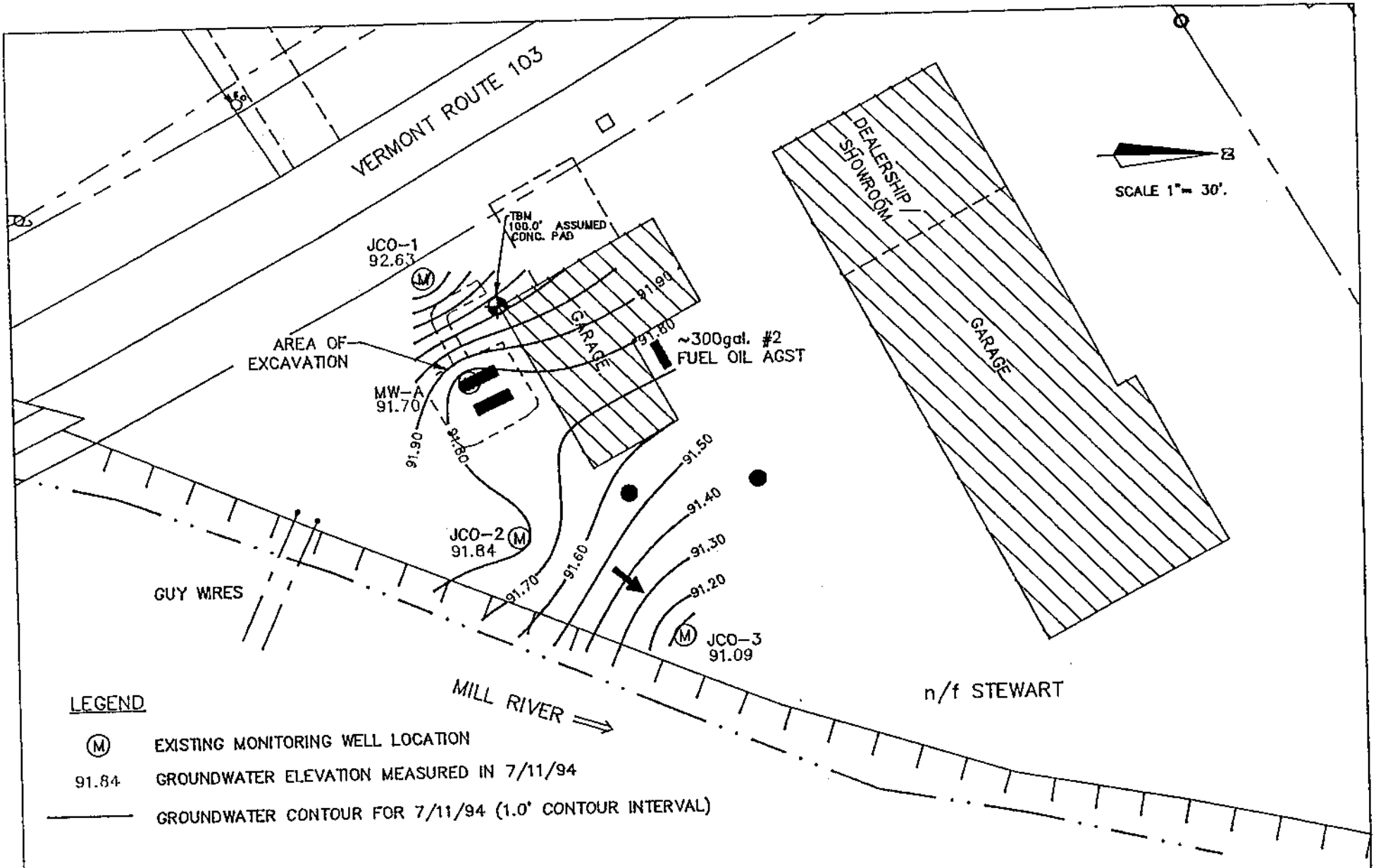
NM = not measured

At JCO-2, sand over boulders was noted within two feet of the ground surface. In this well an interstitial sand matrix was found to be covered with a black, slimy substance, most probably attributed to the adjacent location of the leachfields existing on the site. The black "ooze" exhibited low to moderate PID concentrations when checked (6 to 7.1 ppm). This was encountered 8.5 to 13 feet BGS.

The same material was observed in the cuttings at location JCO-3, at a depth of 9.5 to 14 feet BGS. Boulders were encountered throughout the entire interval of this monitoring well. The described stratigraphy is consistent with glaciofluvial, and post glacial fluvial deposits mapped by Stewart et.al (Doll, 1970).

4.3 GROUNDWATER FLOW DIRECTION AND HYDRAULIC GRADIENT

The surface of the water table is depicted by the elevation contour lines shown in Figure 2. The contours represent the points of equal elevation along the water table surface, or equipotential lines. The direction of flow of groundwater under the Site is normal to the equipotential lines, and for this Site, is



SOURCE
"PLATE 1 – SITE PLAN", PREPARED BY THE JOHNSON CO., REVISED 7/12/94.

1-1016-1\SITE.DWG

FIGURE 2 – GROUNDWATER CONTOUR MAP
J.C. STEWART PROPERTY
CUTTINGSVILLE, VERMONT

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depicted by the arrow on Figure 2. From the measurements collected July 11, 1994 the flow is approximately from JCO-1 to JCO-3. This is consistent with known hydrogeologic settings, whereby groundwater discharges into a surface water body, in this location the Mill River. There is a noticeable depression in the water table at the "MW-A" location (Figure 2). This may be attributed to the fact that this well was emplaced during the removal of the USTs, and the depressed water table reflects the looser stratigraphy at this location, i.e., a localized zone of relative higher hydraulic conductivity (K).

The hydraulic gradient, or slope of the water table is the change in elevation of the water table in respect to horizontal distance. The hydraulic gradient as calculated from the measurements made on July 11 from JCO-1 to JCO-3 is 0.016 feet/feet, or 1.6 percent.

4.4 GROUNDWATER SAMPLING RESULTS

4.4.1 Analytical Results

Groundwater analytical data for the July 11, 1994 samples was received from Scitest on July 19. Scitest's report is presented in Appendix B of this document. Table 2 lists the detected compounds indicated in groundwater by the sampling.

TABLE 2
SUMMARY OF DETECTED COMPOUNDS IN GROUNDWATER
July 11, 1994 (μg/L)

Compounds	JCO-1	JCO-2	JCO-3	State of Vermont Enforcement Standard	Vermont Health Advisory	EPA MCL
Benzene	35	37	20	5	1	5
Toluene	77	237	332	2.42 mg/L	N.E.	1000
Ethylbenzene	355	264	191	680	N.E.	700
Total Xylenes	1265	873	1,232	400	N.E.	10000
Isoproplbenzene	59	12	10	N.E.	N.E.	N.E.
N. Propylbenzene	247	31	29	N.E.	N.E.	N.E.
1,3,5 - Trimethylbenzene	654	83	216	N.E.	4	N.E.
1,2,4 - Trimethylbenzene	1689	362	519	N.E.	5	N.E.
Napthalene	BPQL	50	35	N.E.	20	N.E.
Total BTEX	1,732	1,411	1,775	N.E.	N.E.	N.E.

The chemicals that appear in Table 2 highlighted are those that have concentrations that exceed a regulatory limit, or health advisory. In regard to the Vermont Groundwater Protection Rule and Strategy (GPRS), the groundwater enforcement standard for benzene (5 micrograms per liter (μg/L)), and xylenes (400 μg/L) were exceeded. This was reported to Chuck Schwer at the Department of Environmental Conservation (DEC) via telephone conversation on July 19, 1994. Two of the detected compounds were reported above the State of Vermont's Health Advisory (HA) levels. The compounds 1,3,5-trimethylbenzene, and 1,2,4-trimethylbenzene were reported above their respective HA levels of 4, and 5 μg/L. The Vermont HA is a number based on a one in one million lifetime cancer risk, and the detection limit of the chemical. The advisory is typically used for risk assessment purposes, not regulatory actions.

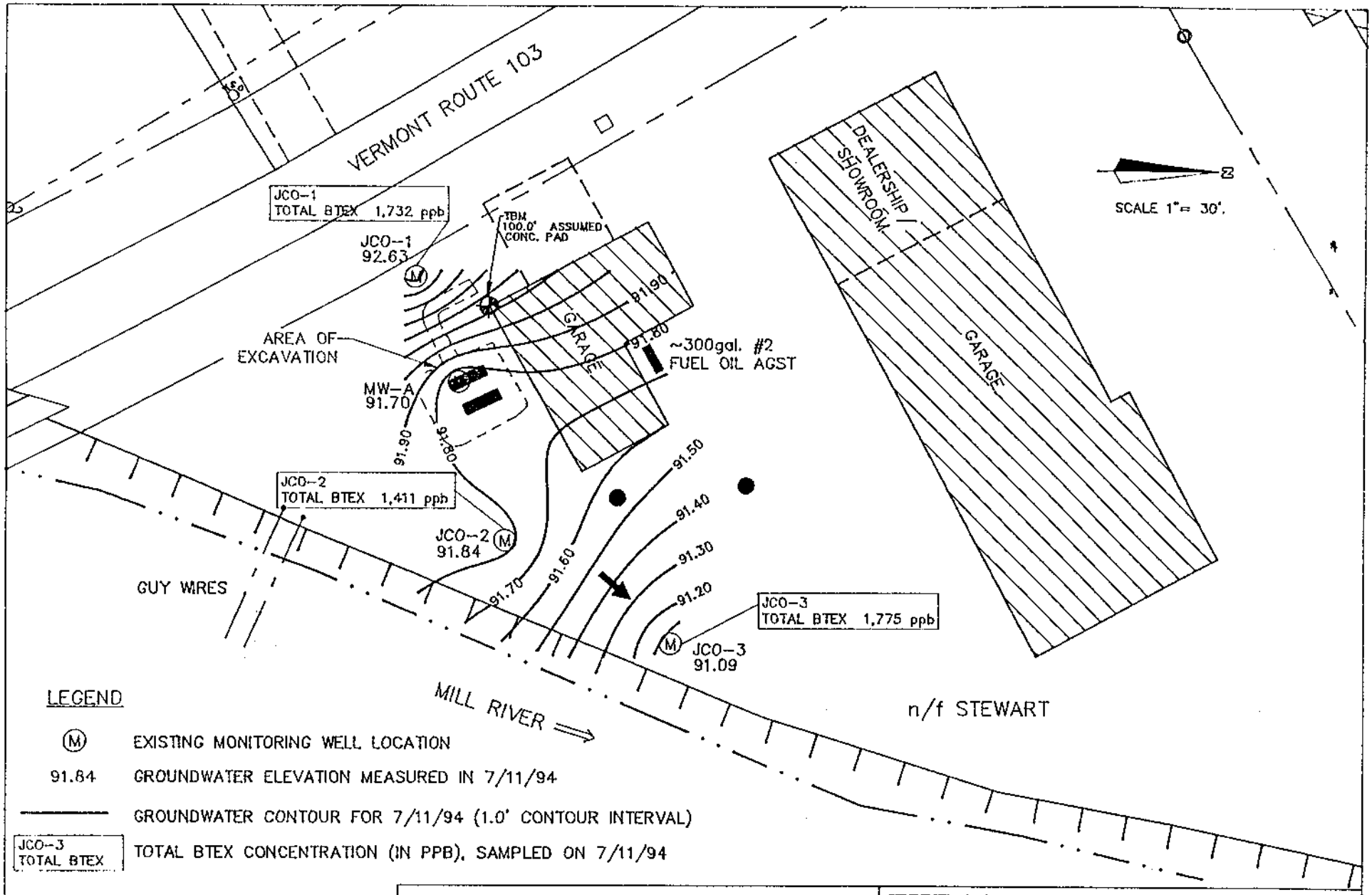
Of the results, groundwater tested at location JCO-3 indicates the highest concentration for the compounds benzene, toluene, ethylbenzene, and xylenes (BTEX). JCO-3 is located furthest downgradient in respect to measured groundwater flow at this site (Figure 2, Figure 3) and is the closest monitoring well to the Mill River. In regard to the proportion of the BTEX constituents, xylenes are indicated as the dominant constituents, comprising 60 to 70 percent of the total BTEX concentration.

5.0 SUMMARY AND CONCLUSIONS

5.1 ASSESSMENT OF GROUNDWATER CONTAMINATION

Dissolved phase BTEX contamination to groundwater under the Stewart site has been indicated by this remedial investigation. The contamination has been indicated in all three of the monitoring wells: JCO-1; JCO-2; and JCO-3, MW-A was not sampled, as there is no information on the well construction details that would assure it is capable of supplying valid groundwater quality information. The limits of the contamination are yet undefined. Given the location of the site next to Mill River, and the known history of the site as a gasoline station, it is likely that spreading from a leaking UST of contaminants has occurred due to cyclic fluctuations in the river stage level. Some gradient reversal is highly likely during runoff periods, thereby providing a mechanism for advective transport of dissolved contaminants away from the river.

Scitest's analyses using EPA Method 8260 suggests the presence of weathered gasoline in groundwater under this site. Interestingly enough, the compound methyl tert-butyl ether (MTBE) which is an oxygenate added to gasoline in replacement of lead, was not detected. MTBE began to appear in lieu of lead in gasoline in the early 1980s. This may support the theory of weathered gasoline residing in the aquifer, or it is quite possible that the MTBE has been flushed out due to the proximity to the river. The location that exhibits the highest level of contamination is at JCO-3 (Figure 3). Of the groundwater locations with detectable concentrations, benzene in groundwater is lowest at JCO-1, and highest at JCO-2.



SOURCE

"PLATE 1 – SITE PLAN", PREPARED BY THE JOHNSON CO., REVISED 7/12/94.

t-1016-1\SITE.DWG

FIGURE 3 – GROUNDWATER QUALITY 7/11/94
J.C. STEWART PROPERTY
CUTTINGSVILLE, VERMONT

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5.2 ASSESSMENT OF FUEL DISTRIBUTION AND UST SYSTEM

Two USTs were removed from the premises on April 29, 1994. The two tanks were noted to be of sound integrity upon their removal (Precision Industrial Maintenance, 1994). In addition, it was reported that the tank distribution piping was in good condition. The long history of use of this site as a gas station presents the possibility that there could still be unregistered USTs remaining on the site, of which if one or more are leaking, could provide the source of the indicated BTEX contamination.

5.3 CONCLUSIONS and RECOMMENDATIONS

A release of petroleum compounds has occurred to the extent that BTEX has been detected in all three monitoring wells installed on June 30, 1994, and sampled July 11, 1994. No delineation of the trend of the BTEX plume is possible, but concentrations appear to increase downgradient in terms of groundwater flow. Groundwater flows generally from Route 103 to Mill River with a measured hydraulic gradient as measured along a flow path from JCO-1 to JCO-3 of 0.016 feet/feet. The stratigraphy underlying the site is dominated by large boulders and cobbles, making exploratory drilling a difficult option to pursue. The coarse stratigraphy also suggests a direct connection between the site groundwater and the Mill River, with the possibility that during high river stage levels, there is a flow reversal.

The Johnson Company recommends that a search of records and other information be initiated, perhaps with a detailed site walkover using a metal detector, to ascertain if any additional USTs still exist on the Stewart site. In the event existing USTs are found, these should be pulled, and if contaminated soils are indicated associated with the USTs, this should be removed, and stockpiled at the best available location on Stewart premises. Given the proximity of the Stewart property to the Mill River, written permission will need to be obtained from the DEC prior to initiating the soils stockpiling, if warranted. Further, The Johnson Company recommends sampling the Mill River from three locations, one upstream, one at a presumed emergence location, and one downstream. Sampling should be performed for BTEX and MTBE using EPA 602.

This, combined with two rounds of water quality monitoring, one in the spring, and one in the fall, should be sufficient to warrant no further action on the Stewart site, should water quality remain equal or below that indicated during the initial sampling round.

6.0 REFERENCES

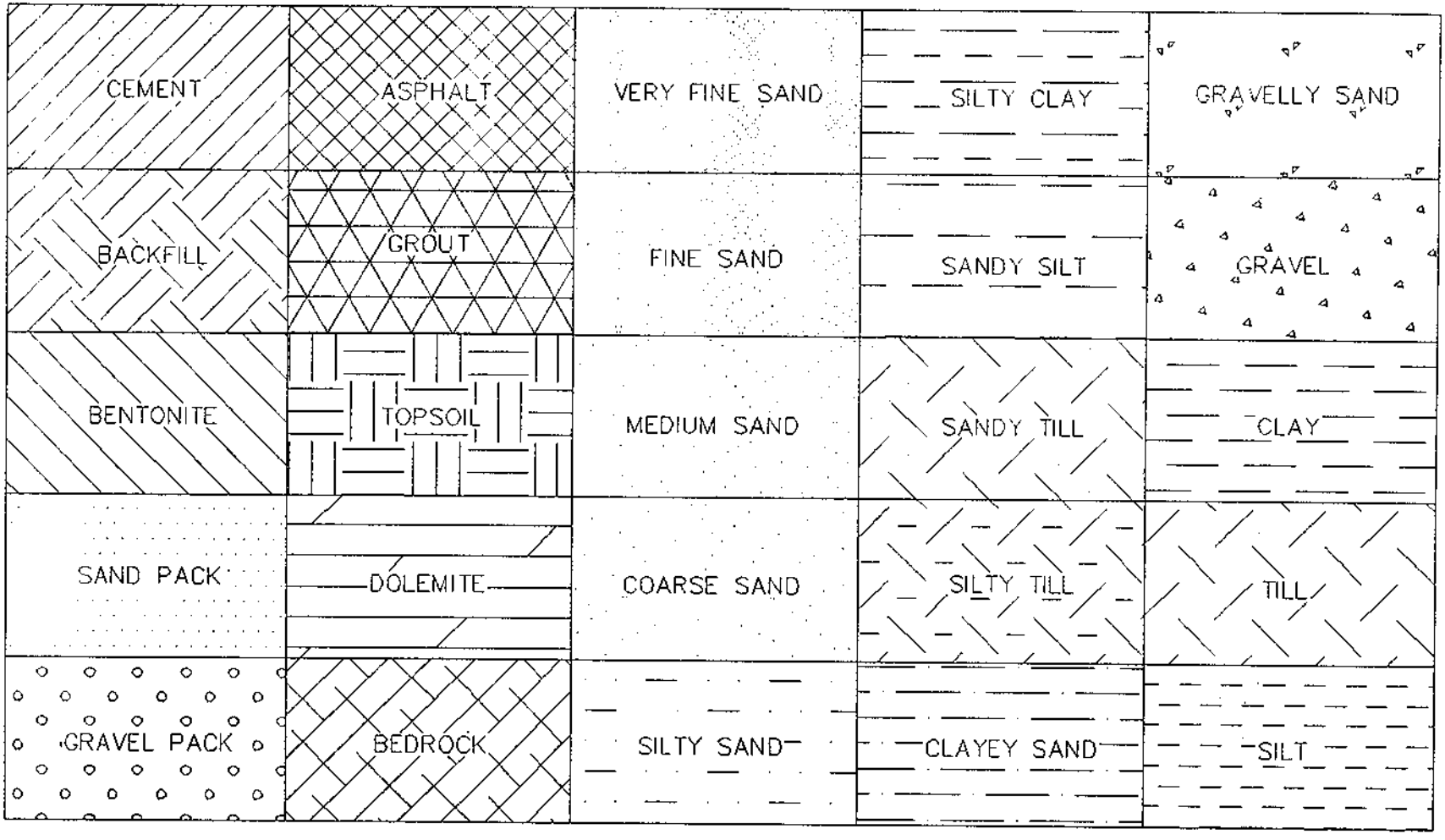
Vermont Department of Environmental Conservation, 1994, Letter dated June 1, 1994 from Chuck Schwer to JC Stewart & Son. RE: request for investigation.

Precision Industrial Maintenance, 1994, Memorandum dated April 29, 1994 to Vermont Department of Environmental Conservation. RE: Tank Removal at JC Stewart & Son.

Doll, 1970, Vermont Geological Survey, Surficial Geologic Map of Vermont.

Appendix A

Monitoring Well Logs



KEY TO GEOLOGY PATTERNS
J.C. STEWART PROPERTY
CUTTINGSVILLE, VERMONT

GEOKEY.DWG

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Environmental Sciences and Engineering
100 STATE STREET MONTPELIER, VT 05602

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Environmental Sciences and Engineering
100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # JCO-1

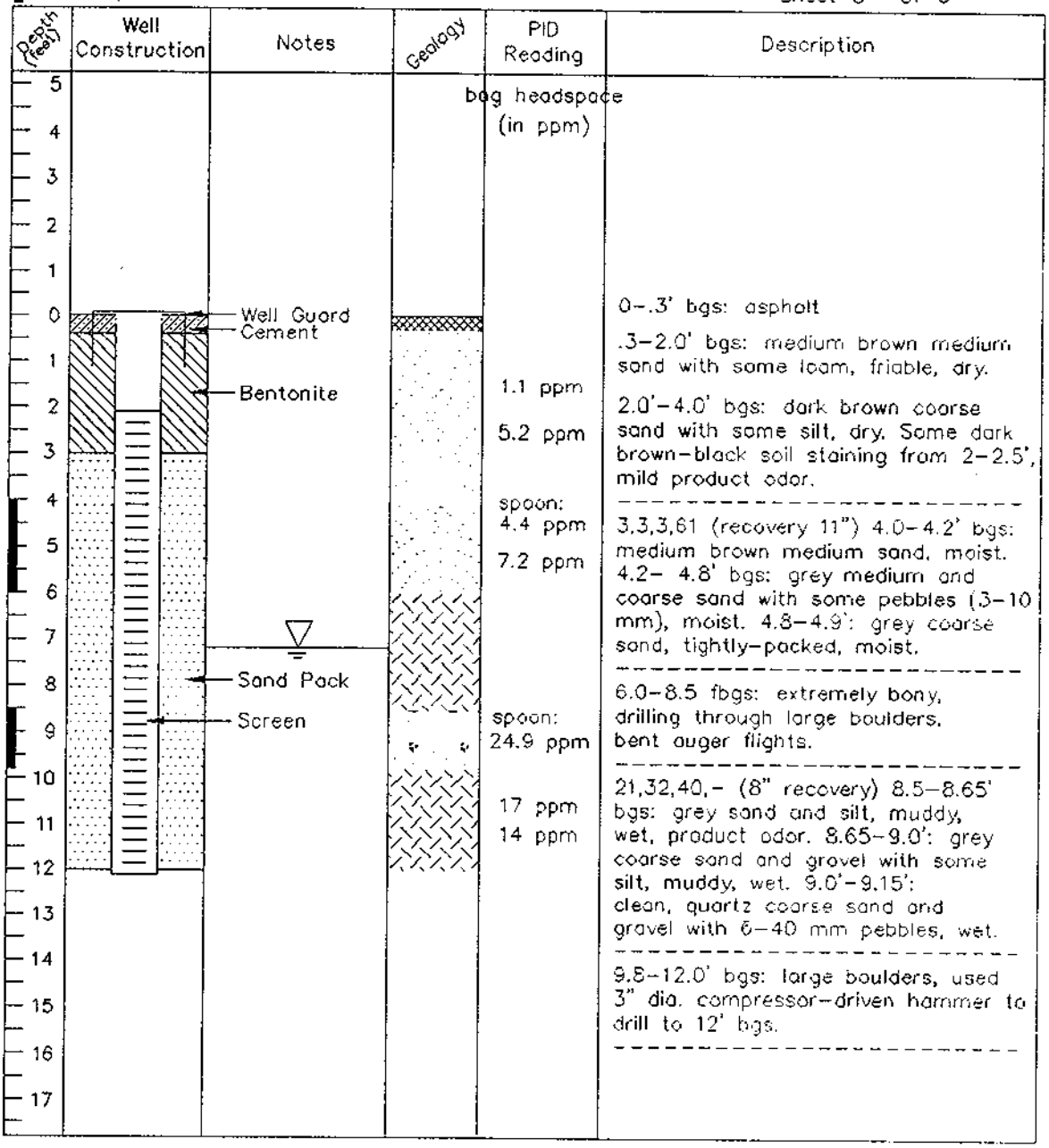
Project: J.C. Stewart
Location: Cuttingsville, Vermont
Job # 1-1016-1
Logged By: LRH
Date Drilled: 6/30/94
Driller: Tri State
Drill Method: Hollow Stem Auger

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 1.9 ft.
Screen Type: Factory slotted
Screen Diameter: 2.0 in.
Screen Length: 10.0 ft.
Slot Size: .01

Total Pipe: 11.9 ft.
Stick Up: -0.2 ft.
Total Hole Depth: 12.0 ft.
Well Guard Length: 1.2 ft.
Initial Water Level: 7.2 ft.
Surface Elevation: -
T.O.C. Elevation: 99.92

▌ = Sampled Interval

Sheet 0 of 0



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DRILLING LOG
WELL # JCO-2

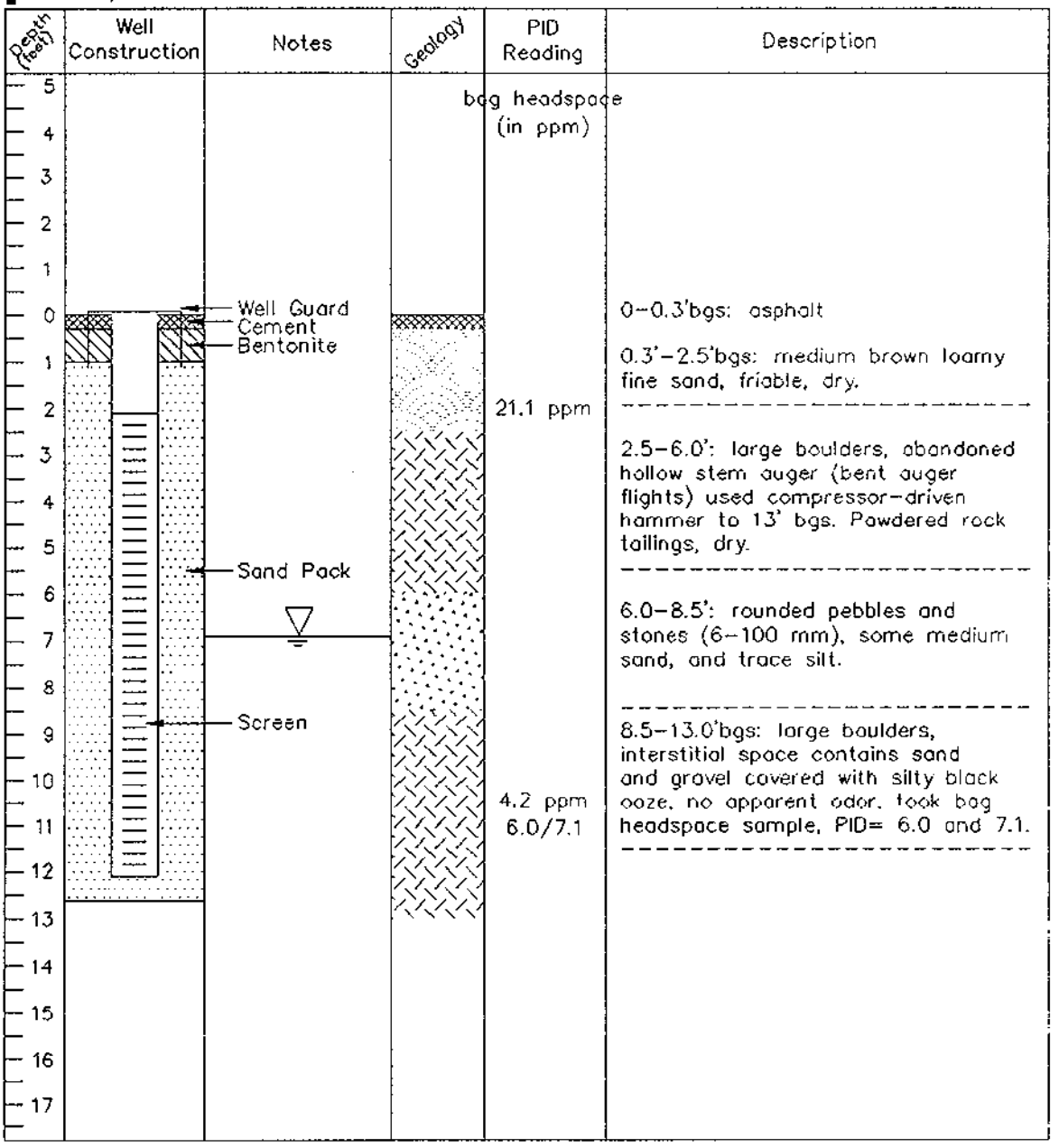
Project: J.C. Stewart
Location: Cuttingsville, Vermont
Job # 1-1016-1
Logged By: LRH
Date Drilled: 6/30/94
Driller: Tri State
Drill Method: Hollow Stem Auger

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 1.9 ft.
Screen Type: Factory slotted
Screen Diameter: 2.0 in.
Screen Length: 10.0 ft.
Slot Size: .01

Total Pipe: 11.9 ft.
Stick Up: -0.2 ft.
Total Hole Depth: 12.0 ft.
Well Guard Length: 1.2 ft.
Initial Water Level: 6.9 ft.
Surface Elevation: -
T.O.C. Elevation: 98.92

▌ = Sampled Interval

Sheet 0 of 0



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100 State Street
Montpelier, Vermont 05602

DRILLING LOG
WELL # JCO-3

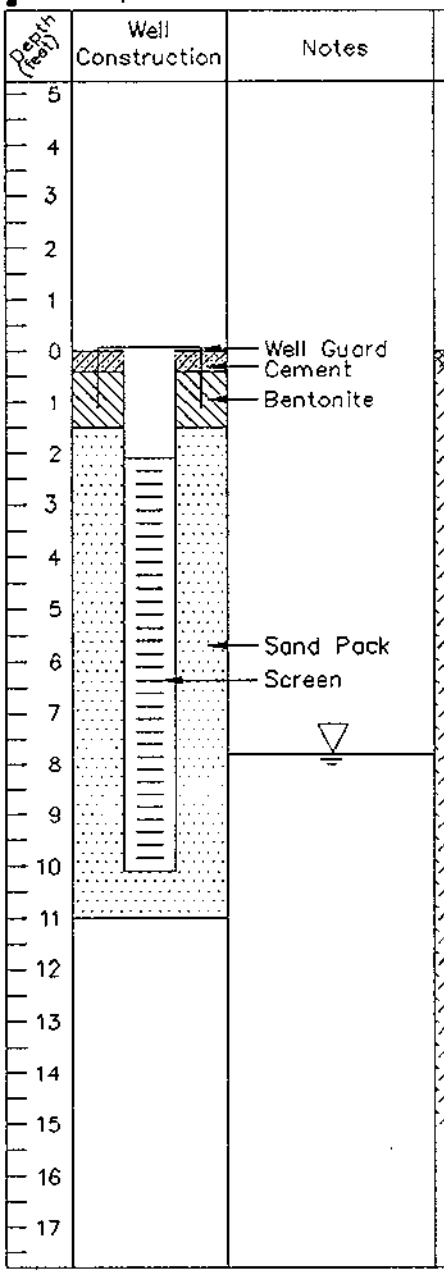
Project: J.C. Stewart
Location: Cuttingsville, Vermont
Job # 1-1016-1
Logged By: LRH
Date Drilled: 6/30/94
Driller: Tri State
Drill Method: 3" Hammer

Casing Type: PVC
Casing Diameter: 2.0 in.
Casing Length: 2.0 ft.
Screen Type: Factory slotted
Screen Diameter: 2.0 in.
Screen Length: 8.0 ft.
Slot Size: .01

Total Pipe: 9.9 ft.
Stick Up: -0.2 ft.
Total Hole Depth: 10.1 ft.
Well Guard Length: 1.2 ft.
Initial Water Level: 7.8 ft.
Surface Elevation: -
T.O.C. Elevation: 99.21

▌ = Sampled Interval

Sheet 1 of 0



PID Reading	Description
	No split spoon samples taken due to extreme drilling conditions.
	0-0.3'bgs: asphalt
1.1 ppm	0.3-9.5'bgs: large boulders, powered rock tailings, took bag headspace sample of 1-3' tailings, PID= 1.1 ppm.
	9.5-~14' bgs: Boulders, spoils from hammer contain wet sand and gravel in dark grey-black silty "ooze" (not a greasy consistency), similiar to the "ooze" described in MW-2. Took bag headspace sample for
4.6 ppm	9.5-11.7' bgs spoils. PID= 4.6 ppm.
	Drilled to 15' bgs, hole caved to ~10' bgs.

Appendix B

Laboratory Reports

LABORATORY REPORT

CLIENT: The Johnson Company
ADDRESS: 100 State Street
Montpelier, VT 05062
SITE: J.C. Stewart and Sons
ATTENTION: Jim Bowes
MATRIX: Groundwater

LABORATORY NO: 4-1450
PROJECT NO: 78611

DATE OF SAMPLE: 7/11/94
DATE OF RECEIPT: 7/11/94
DATE OF REPORT: 7/14/94

SCITEST LABORATORY SERVICES

cc JRB

RECEIVED
JUL 19 1994
THE JOHNSON CO., INC.
MONTPELIER, VERMONT

All results in micrograms per liter (ppb)

PARAMETER	1 MW-1	2 MW-2	3 MW-3	4 Trip Blank	PQL
Dichlorodifluoromethane	BPQL	BPQL	BPQL	BPQL	10
Chloromethane	BPQL	BPQL	BPQL	BPQL	10
Vinyl Chloride	BPQL	BPQL	BPQL	BPQL	10
Bromomethane	BPQL	BPQL	BPQL	BPQL	10
Chloroethane	BPQL	BPQL	BPQL	BPQL	10
Trichlorofluoromethane	BPQL	BPQL	BPQL	BPQL	10
1,1-Dichloroethylene	BPQL	BPQL	BPQL	BPQL	10
Acetone	BPQL	BPQL	BPQL	BPQL	25
Carbon Disulfide	BPQL	BPQL	BPQL	BPQL	25
Methylene Chloride	BPQL	BPQL	BPQL	BPQL	10
Methyl tertiary Butyl Ether	BPQL	BPQL	BPQL	BPQL	10
t-1,2-Dichloroethylene	BPQL	BPQL	BPQL	BPQL	10
1,1-Dichloroethane	BPQL	BPQL	BPQL	BPQL	10
c-1-2,-Dichloroethylene	BPQL	BPQL	BPQL	BPQL	5
2, 2-Dichloropropane	BPQL	BPQL	BPQL	BPQL	5
Methyl Ethyl Ketone (2-But)	BPQL	BPQL	BPQL	BPQL	25
Bromochloromethane	BPQL	BPQL	BPQL	BPQL	5
Chloroform	BPQL	BPQL	BPQL	BPQL	5
1,1,1-Trichloroethane	BPQL	BPQL	BPQL	BPQL	5
Carbon Tetrachloride	BPQL	BPQL	BPQL	BPQL	5
1,1-Dichloropropene	BPQL	BPQL	BPQL	BPQL	5
Benzene	35	37	20	BPQL	5
1,2-Dichloroethane	BPQL	BPQL	BPQL	BPQL	5
Trichloroethylene	BPQL	BPQL	BPQL	BPQL	5
1,2-Dichloropropane	BPQL	BPQL	BPQL	BPQL	5
Dibromomethane	BPQL	BPQL	BPQL	BPQL	5
Bromodichloromethane	BPQL	BPQL	BPQL	BPQL	5
cis-1,3-Dichloropropene	BPQL	BPQL	BPQL	BPQL	5
Methyl Isobutyl Ketone (4M2P)	BPQL	BPQL	BPQL	BPQL	25
Toluene	77	237	332	BPQL	5
trans-1,3-Dichloropropene	BPQL	BPQL	BPQL	BPQL	5
1,1,2-Trichloroethane	BPQL	BPQL	BPQL	BPQL	5
Tetrachloroethylene	BPQL	BPQL	BPQL	BPQL	5

PARAMETER	1 MW-1	2 MW-2	3 MW-3	4 Trip Blank	PQL
1,3-Dichloropropane	BPQL	BPQL	BPQL	BPQL	5
2-Hexanone	BPQL	BPQL	BPQL	BPQL	25
Dibromochloromethane	BPQL	BPQL	BPQL	BPQL	5
1,2-Dibromomethane (EDB)	BPQL	BPQL	BPQL	BPQL	5
Chlorobenzene	BPQL	BPQL	BPQL	BPQL	5
1,1,1,2-Tetrachloroethane	BPQL	BPQL	BPQL	BPQL	5
Ethylbenzene	355	264	191	BPQL	5
m & p-Xylene	1135	723	856	BPQL	10
o-Xylene	130	150	376	BPQL	10
Styrene	BPQL	BPQL	BPQL	BPQL	5
Bromoform	BPQL	BPQL	BPQL	BPQL	5
Isopropylbenzene	59	12	10	BPQL	5
Bromobenzene	BPQL	BPQL	BPQL	BPQL	5
1,2,3-Trichloropropane	BPQL	BPQL	BPQL	BPQL	5
1,1,2,2-Tetrachloroethane	BPQL	BPQL	BPQL	BPQL	5
n-Propylbenzene	247	31	29	BPQL	5
2-Chlorotoluene	BPQL	BPQL	BPQL	BPQL	5
4-Chlorotoluene	BPQL	BPQL	BPQL	BPQL	5
1,3,5-Trimethylbenzene	654	83	216	BPQL	5
tert-Butylbenzene	182	BPQL	57	BPQL	5
1,2,4-Trimethylbenzene	1689	362	519	BPQL	5
sec-Butylbenzene	20	BPQL	BPQL	BPQL	5
1,3-Dichlorobenzene	BPQL	BPQL	BPQL	BPQL	5
1,4-Dichlorobenzene	BPQL	BPQL	BPQL	BPQL	5
p-Isopropyltoluene	34	BPQL	9	BPQL	5
1,2-Dichlorobenzene	BPQL	BPQL	BPQL	BPQL	5
n-Butylbenzene	30	BPQL	BPQL	BPQL	5
1,2-Dibr-3-clpropane (DBCP)	BPQL	BPQL	BPQL	BPQL	10
1,2,4-Trichlorobenzene	BPQL	BPQL	BPQL	BPQL	10
Hexachlorobutadiene	BPQL	BPQL	BPQL	BPQL	25
Naphthalene	BPQL	50	35	BPQL	25
1,2,3-Trichlorobenzene	BPQL	BPQL	BPQL	BPQL	25

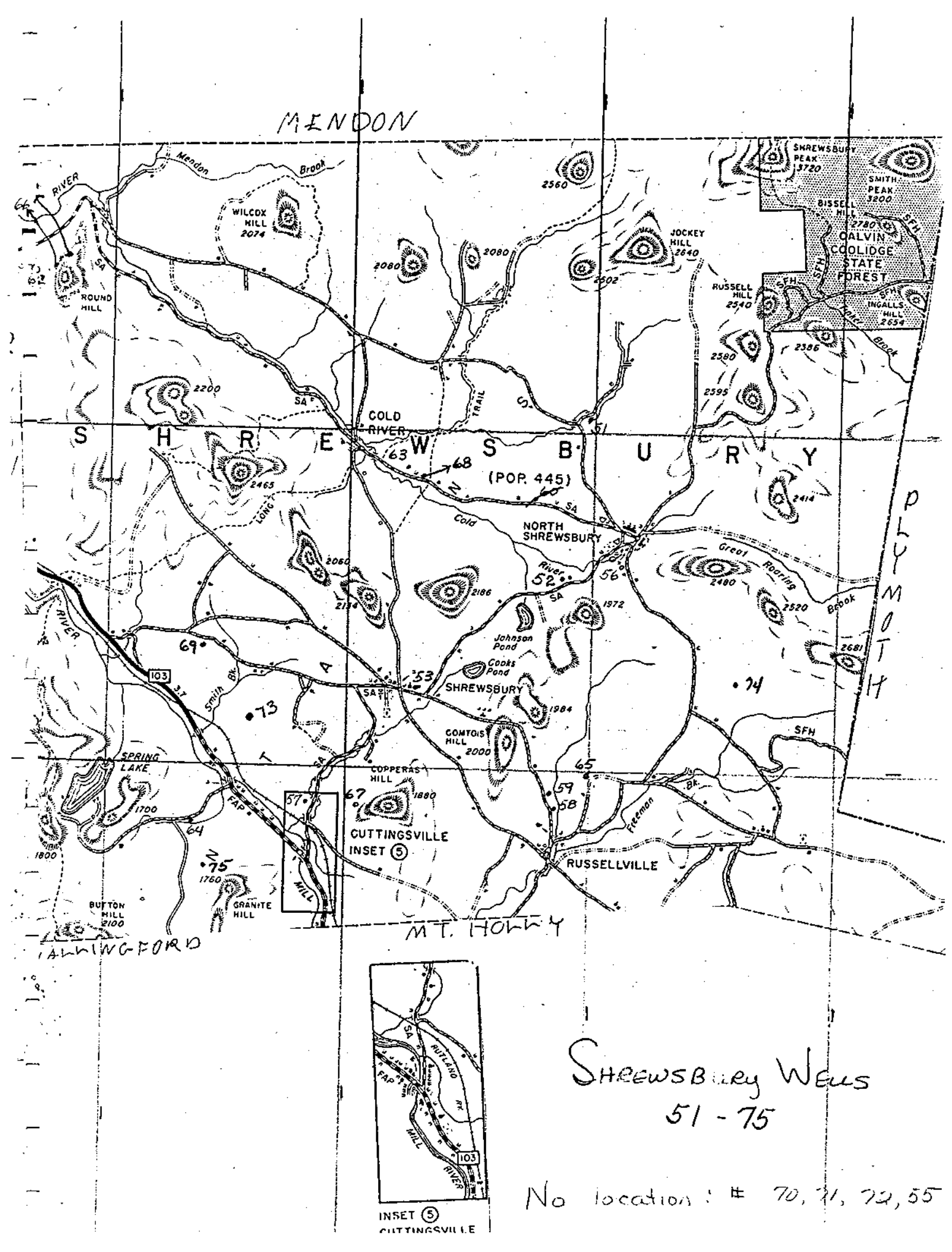
EPA Method 8260, SW-846, 3rd ed., Rev. 1, July, 1992.
BPQL = Below Practical Quantitation Limit (PQL).
Note: Trip Blank was clean--BPQL's actually five times below the PQL.

Respectfully submitted,
SCITEST, INC.

Roderick J. Lamothe
Laboratory Director

Appendix C

Water Supplies



SHREWSBURY WELLS
51 - 75

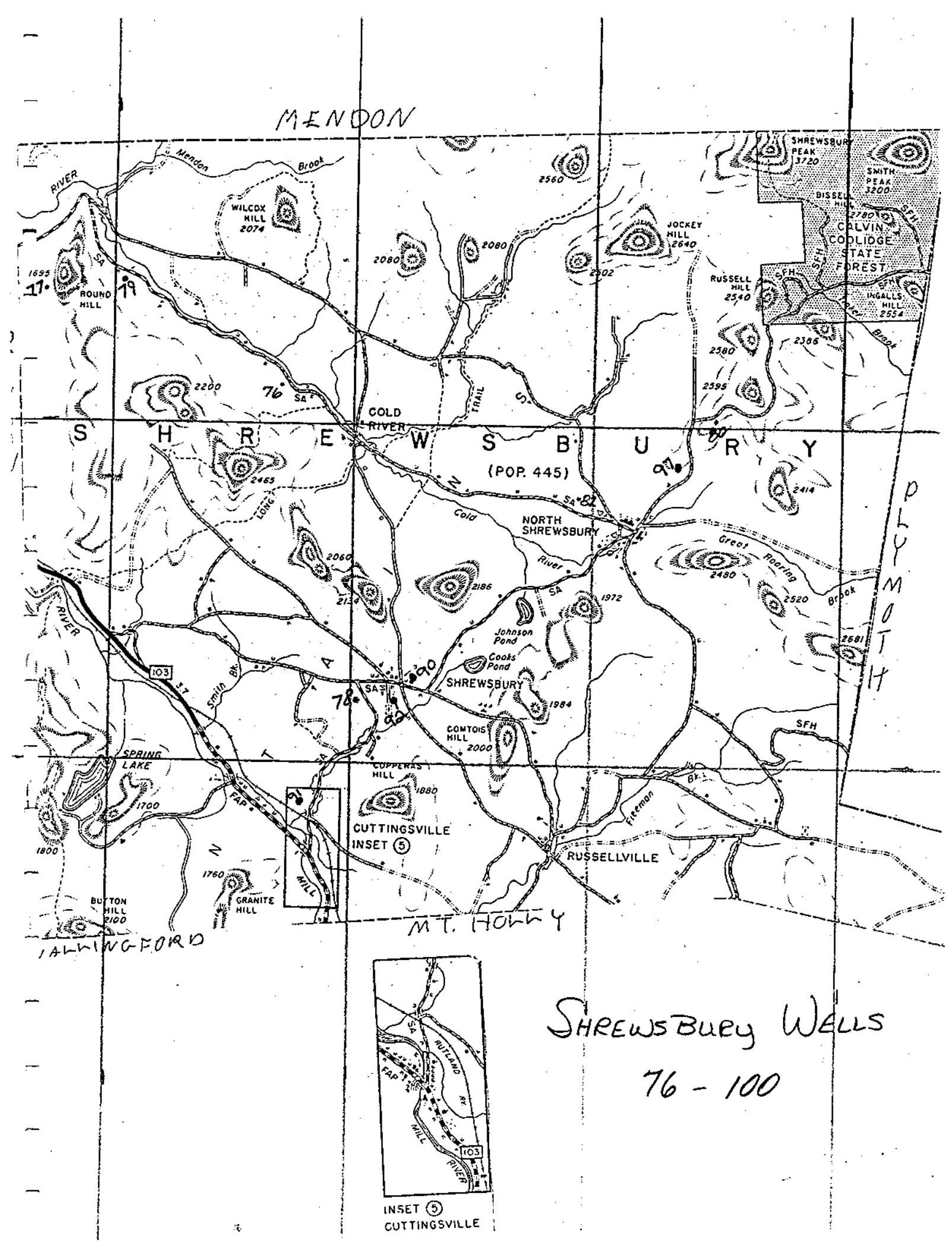
No location : # 70, 71, 72, 55

BASIC WELL DATA

TOWN Shrewsbury

WELLS 51-75

NUMBER WR	NUMBER USGS	NAME OF WELL OWNER or Purchaser (P)	MAP LOC	YIELD GPM	TOTAL DEPTH FEET	DEPTH ROCK FEET	CASING LENGTH FEET	STATIC WATER LEVEL	YR DR	DRILL NO.	REMARKS
51		George Schmit	26D2	3	220	34	42	10	73	53	
52		Thomas Cooper	26D3	5	123	10	31		3	69	
53		Frederick Kaempf	26D3	10	200	144	152	15	3	26	
54		Wayne Cagro	26B5	30	185	28	38		4	121	
55		Sterling Kline		7	295	23	38		3	51	
56		Shrewsbury Elem. Sch.		35+	145	28	115	7	4	51	
57		H. D. Pratt	26D6	5	106	G	106	15	4	6	G
58		Mrs. Ada Cimonette	27a7	20	145	115	131	75	4	51	
59		Alstone Harrington	27C1	6	165	120	148		4	51	
60		Moved to Mt. Holly	27C1								
61		Brinkerhoff & Serra	26B5	1½	775	1	10	5	4	51	
62		Ronald Bristol	26B5	25	220	35	37	22	4	41	
63		Arnold Perry	26D3	5	115	90	100	20	4	112	
64		Ray Sirjane	27a7	12	72	37	45	10	4	6	
65		David Claric Shrewsbuey Farm, Inc.	27C1	2½	225	12	46	5	4	51	
66		Harry Carruth	26B5	2	175	32	36	14	4	41	
67		Alan G. Ridlon Winkler?	27C1	15	65	G	65	15	4	6	G
68		Comille Cyr	26D3	8	73	G	73	8	5	41	G
69		William Patten	26B9	2	398	2	20	150	5	6	
70		Arthur Thorne		4	150	50	64	3	3	26	
71		David Johnston		25	210	65	73	20	3	26	
72		William Olney		6	163	38	41	35	2	41	
73		Arthur Patten James Ingalls	26B9	1	298	2	150	20	5	6	
74		Theodore Lewis	26D6	1	310	5	11		6	51	
75		Vincent Barra	27a7	5	190	26	36	10	6	51	



SHREWSBUEY WELLS

76 - 100

WR #71
1974

TOWN: SHREWSBURY

WELL NOS.: 76-100

BASIC WELL DATA

Well No.	Well Owner	Yield (gpm)	Total Depth (feet)	Depth To Bedrock (feet) / Casing	Static Water Level	# Drill / Other Info
76	T.W. Tourlinson 2688	8	280	59		23
77	David Thomas 2685	20	147	114	125	132
78	Shrewsbury Church 2603	25	225	70	30	58
79	Idarald Hubbard, Jr. 2688	3	310	30		51
80	John Losenty 2605	5	100	5	23	132
81	Angelie Carrera	6	85	55	85	132
82	Ms. Susan Jangraw 2603	1¼	230	20	80	6
83	John Muiska	3	250	26	5	23
84	Duane Carrara	20+	75	28	12	129
85	Donald Sanderson	45	105	40	4	41
86	Tom Munukka	20	105	55	20	129
87	Donald Moore		58	Gravel	30	129
88	Bob Messer	2	98	41	15	129
89	Orvile Woods	20	100	45	30	129
90	Patten, Lyon & McDermott 2603	15	223	20	35	6
91	Ms. Patricia Manheimer 2707	1	272	115	60	6
92	Larry Miller 2603	6	323	80	38	6
93	Robert L. Foster	6	150	84	40	23
94	H.V. Griffin Jr.	15	245	35	7	58
95	Ricky Dorr	3	145	32/32	20	129
96	George Carabeau	10	95	20/20	15	129
97	Joe Frey 2606	15	415	2/20	112	6
98	Patten, Lyon & McDermott, Inc.	6	245	43/60	30	23
99	Cuttingsville Fire Dist.	25	49	Gravel/45.5+	+12.5 Screen	100
100	John Sloan	14	123	14/17	9	132

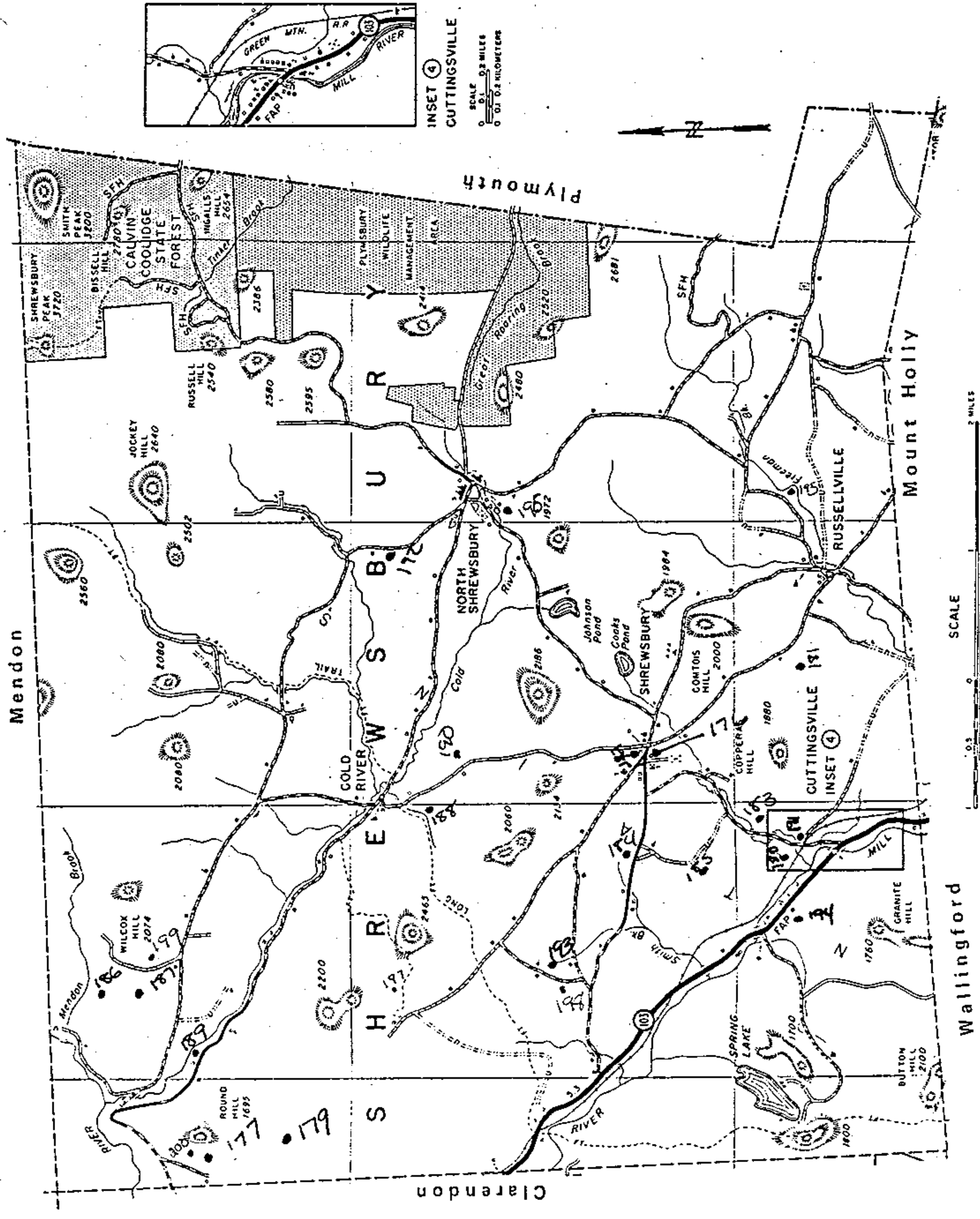
BASIC WELL DATA

TOWN Shrewsbury

WELLS 151-175

NUMBER WR	NUMBER USGS	NAME OF WELL OWNER OR PURCHASER (P)	MAP LOC	YIELD GPM	TOTAL DEPTH FT.	DEPTH ROCK FT.	CASING LENGTH FT.*	STATIC WATER LEVEL	YR DR	DRILL #	REMARK
151		Chris Moreno		4	240	39	41/39	25	84	129	
152		Evelyn Stephens	26D3	7	265	55	55/53	20	84	176	
153		John Wilkes (P)	26D3	12	205	95	95/93	20	84	176	
154		"	26D3	20	225	120	120/118	19	84	176	
155		Howard French	26D5	6	225	42	42/40	10	84	176	
156		Paul Murray	26B9	12	265	10	20/18	7	84	176	
157		Claire Mangine	26B8	20	365	20	20/18		84	176	
158		Barry & Barbara Griffith		8	305	43	45/43	32	84	176	
159		Evelyn Stephens		7	265	53	55/53	48	84	176	
160		John Abrahamson	26D3	4	325	70	70/68	35	84	176	
161		Dick Adams	26D6	40	245	20	20/18	20	84	176	
162		Howard French	26D5	1	365	19	19/17		84	176	
163		Jeff Dixon	26D3	5	265	53	55/53		85	176	
164		John Lorentz	26D6	30	372	D	D		85	6	D
165		Richard Bettelli	26B9	30	497	D	D		85	6	D
166		Roger Landon	26B9	3½	320	77	89		85	51	
167		Allan Shelrey	26B8	2	300	16	33	72	85	51	SN
168		Jane Congdon	26D6	3	120	29	40		85	51	
169		Charles Debnitz	26B8	50	200	16	28	flowing	85	51	
170		Richard Gile	26B5	10	100	19	32		85	51	SN
171		Douglas Earle	26B8	½	665	90	90	100	85	176	
172		Douglas Earle	26B8	1	530	78	78	40	85	176	SN
173		Richard & MaryAnne Lloyd	26B9	15	205	63	63	20	85	176	
174		Vincent Traina	27C1	8	245	78	80	12	85	176	
175		Walter Vining	26B9	6	265	53	55	7	85	176	

*Casing Length a/b a = Total Length b = Length Below L.S.

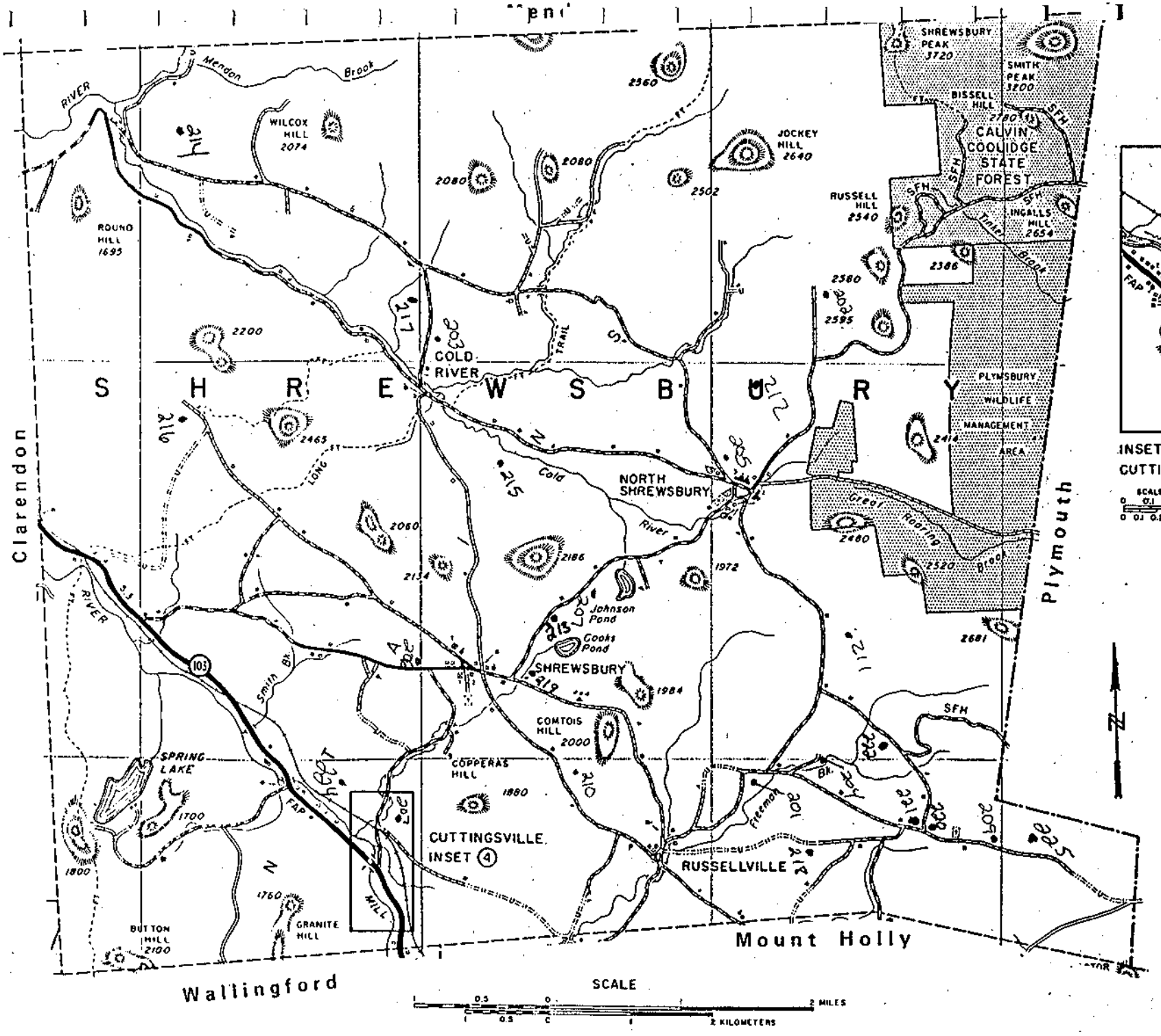

INSET ④ CUTTINGSVILLE
Plymouth
Mendon
Mount Holly
Wallingford
Clarendon
SHREWSBURY
NORTH SHREWSBURY
RUSSELLVILLE
COLD RIVER
CUTTINGSVILLE INSET ④
CALVIN COOLIDGE STATE FOREST
PLYMSBURY WILDLIFE MANAGEMENT AREA
SHREWSBURY PEAK 3720
SMITH PEAK 3200
BISSELL HILL 2780
INGALLS HILL 2654
RUSSELL HILL 2540
JOCKEY HILL 2640
WILCOX HILL 2074
ROUND HILL 1695
COMTOIS HILL 2000
COPPERAS HILL
GRANITE HILL
BUTTON HILL 2100
SPRING LAKE
Johnson Pond
Coaks Pond
Cold River
Great Roaring Brook
Tinker Brook
Mendon Brook
Freeman Brook
Smith Br.
MILL RIVER
LONG TRAIL
SCALE

BASIC WELL DATA

TOWN Shrewsbury

WELLS 176-200

NUMBER WR	NUMBER USGS	NAME OF WELL OWNER or Purchaser (P)	MAP LOC	YIELD GPM	TOTAL DEPTH FEET	DEPTH ROCK FEET	CASING LENGTH FEET	STATIC WATER LEVEL	YR DR	DRILL NO.	REM
176		William Smith	26D3	30	200	8	20		86	51	
177		Robt. Hier	26B5	3½	220	75	75	10	85	23	
178		Mike Bedesem		6	302	5	12	60		41	
179		Kevin Brown	26B5	1	247	26	87	20	86	213	Sr
180		Russell Reay	27a7	12	145	125	130		86	213	
181		Sally Greene	27c1	30	97	22	60	5	86	213	
182		Jonathan Gibson	26D3	20	197	40	64		86	213	Sta-Pu at:
183		Dave Bickford	27A7	5	225	50	80	12	86	176	
184		Constance Stankrauff	26b9	6	205	38	40	19	86	176	
185		Mr. Big Star, Inc. (P)	26b9	8	345	259	280	36	86	176	
186		Steve Lawrence	26b8	5	325	30	40	46	86	176	
187		Jack Perry	26b8	5	245	6	20	20	86	176	
188		Mr. Nelson	26b9	5	405	50	55	20	86	176	
189		William Brooks	26b8	5	225	120	140	40	86	176	
1986 190		Mitch Michaud	26d3	4½	265	24	30	22	86	176	
191		Al Ridlon (P)	27A7	5	285	70	88	16	86	176	
192		Dan Jambos	26d3	3	385	30	100	10	86	176	
193		Taggart Bros	26b9	3	160	13	40	10	87	51	
194		Phil Durrand	27A7	5	148	56	70	5	87	57	
195		Glenn Rossier	27C4	50	200	92	113		87	51	
196		Shrewsbury Mt. School	26d6	50+	280	D	D	7	87	51	D
197		George Lincoln	26b9	6	425	35	40	6	87	176	
198		Nils Ericksen	26b9	1	550	35	41	19	87	176	
199		Joe Duprey (P)	26b8	4	325	24	30	5	87	176	
200		Jona Geary	26b5	8	305	25	32	19	87	176	



MAP SOURCE: VERMONT AGENCY OF TRANSPORTATION

Shrewsbury

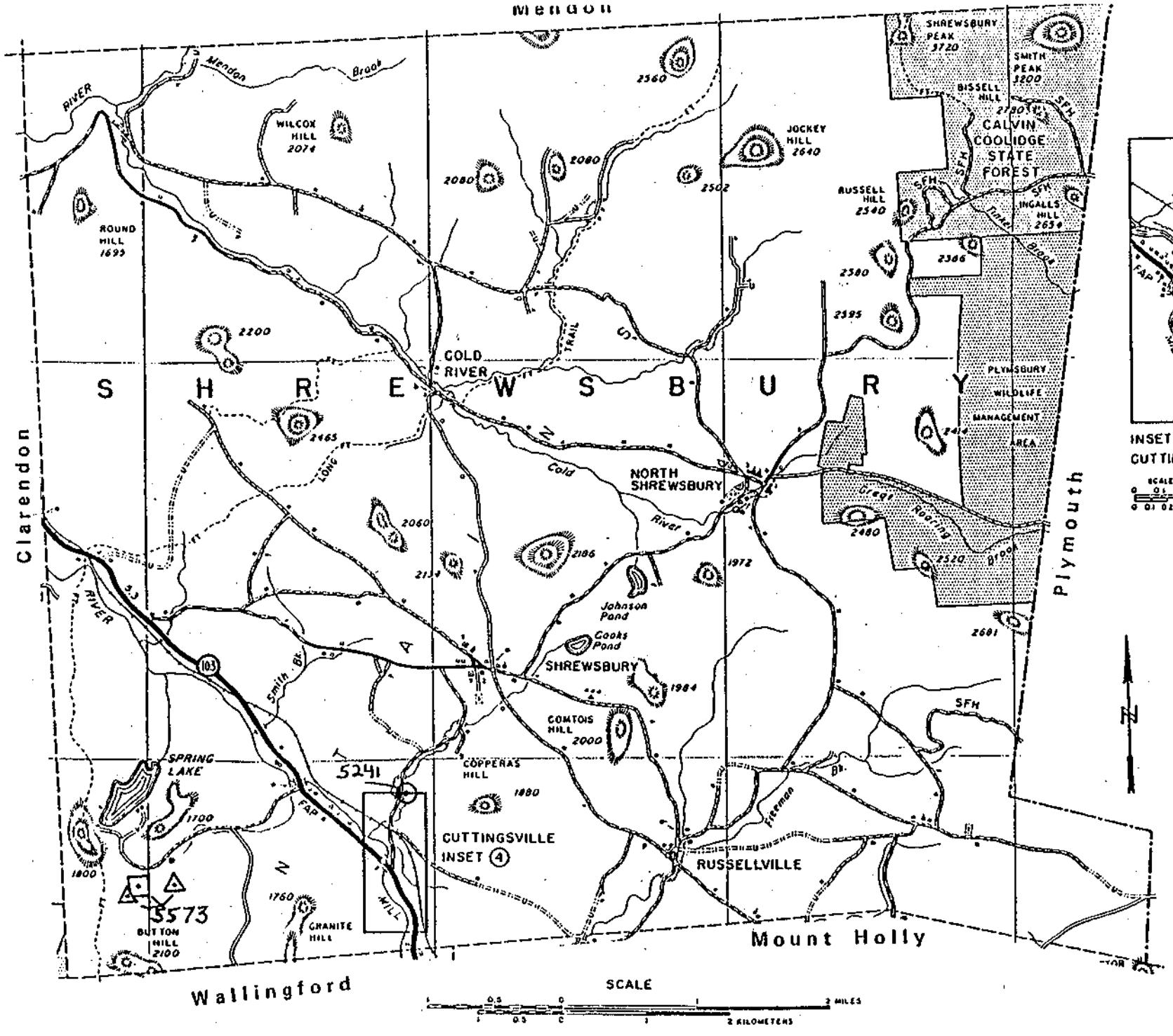
1122

BASIC WELL DATA

TOWN Shrewsbury

WELLS 201 - 225

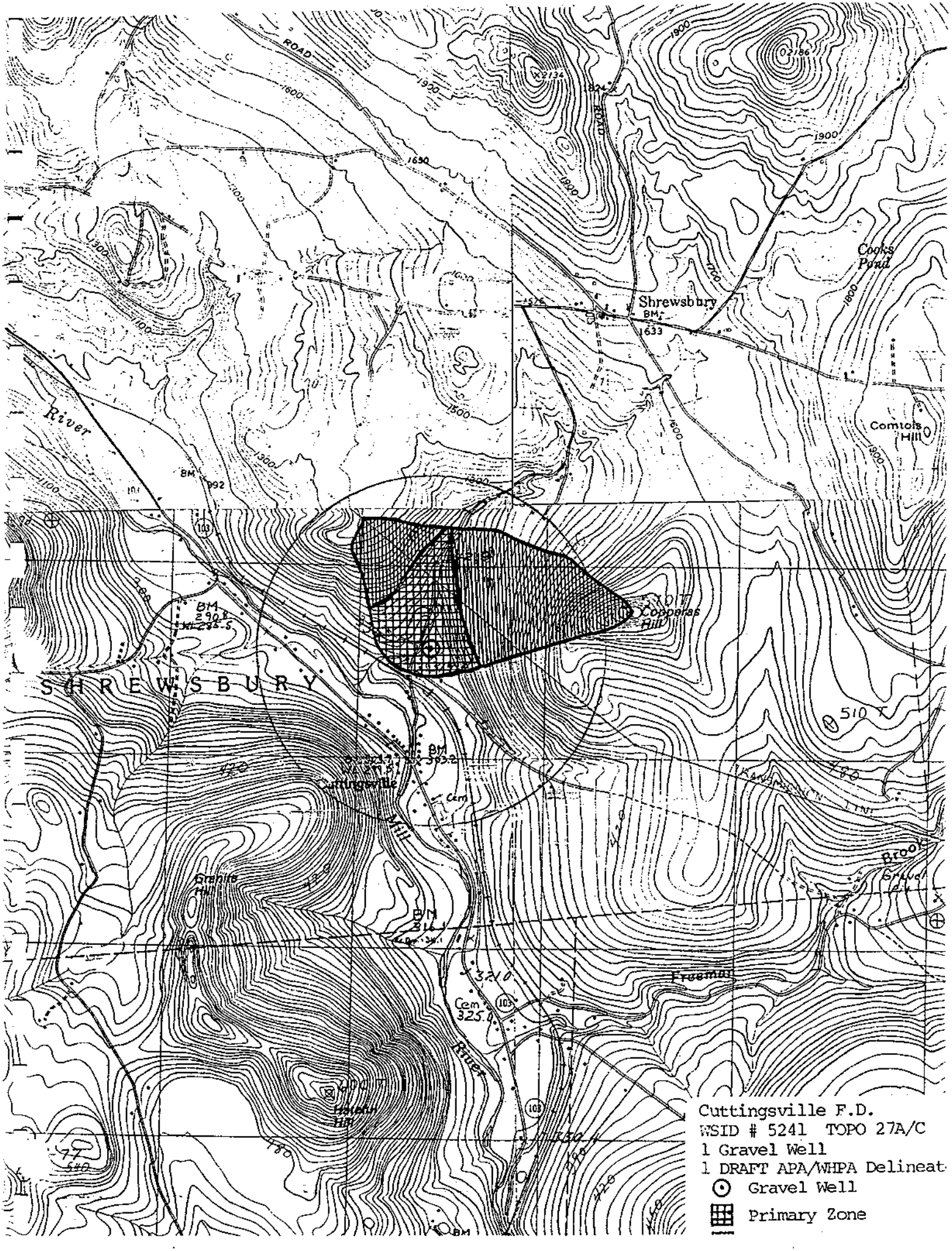
NUMBER WR	NUMBER USGS	NAME OF WELL OWNER or Purchaser (P)	MAP LOC	YIELD GPM	TOTAL DEPTH FEET	DEPTH ROCK FEET	CASING LENGTH FEET	STATIC WATER LEVEL	YR DR	DRILL NO.	REMA
201		Paul Garneau (P)	27C4	6	245	95	100	13	87	176	
202		Jerry Henkel (P)	26d5	15	205	42	50	25	87	176	
203		Sonny Geary	26d2	4	525	31	38	80	87	176	
204		Marcel Molina Randy Wiggin-Bldr. (P)	26d6 or 27C4	30	372	9	20		87	213	
205		Dan Jantos	26d6	20	165	25	33	30	87	176	
206		James Pollack	2669	8	205	10	30	3	87	176	
207		Gordon Flint	27A7	20	200	10	75	0	87	176	
208		Dave Paulsen	26d3	7	225	80	98	0	87	176	
209		Bill Tabor	27C4	2	505	4	20	50	88	176	
210		Arlo Bernell	27C1	5	265	10	20	20	88	176	
211		Paul Anthony	26d6	10	245	50	70	30	88	176	
212		Dan Jantos (P)	26d6	4	305	50	60	20	88	176	
213		mike Coppola	26D3	5	197	4	28	45	88	213	
214		Pat Richardson	26b8	1.5	425	27	32	30	88	176	
215		Rex Corey (P)	26d3	15	205	8	20	18	88	33	
216		Rick Latousky	26B9	25	140	6	140	0	88	176	G
217		Dan Jantos (P)	26B8	5	245	40	100	20	88	176	
218		Mary Filiault	27C4	20	225	50	56	20	88	176	
219		Ed Gaines	26D3	30	125	10	20		88	176	
220		Chris Browning	27C4	15	147	36	54	4	89	213	
221		Gary Martin	27C4	3½	197	74	87		89	213	
222		Guilfette Intermountain Constructors, Inc. (P)	26D6	20	200	24	31		89	51	
223		Dave Blecich	27A7	1	605	120	127	50	89	176	
224		Tom Hubbard	27A7	100	245	120	135	10	89	176	
225		mark Lourag and John Micle (P)	27C7	1½	665	25	32	50	89	176	



MAP SOURCE: VERMONT AGENCY OF TRANSPORTATION

Shrewsbury

1122



Cuttingsville F.D.
WSID # 5241 TOPO 27A/C
1 Gravel Well
1 DRAFT APA/WHPA Delineat

⊙ Gravel Well

▦ Primary Zone

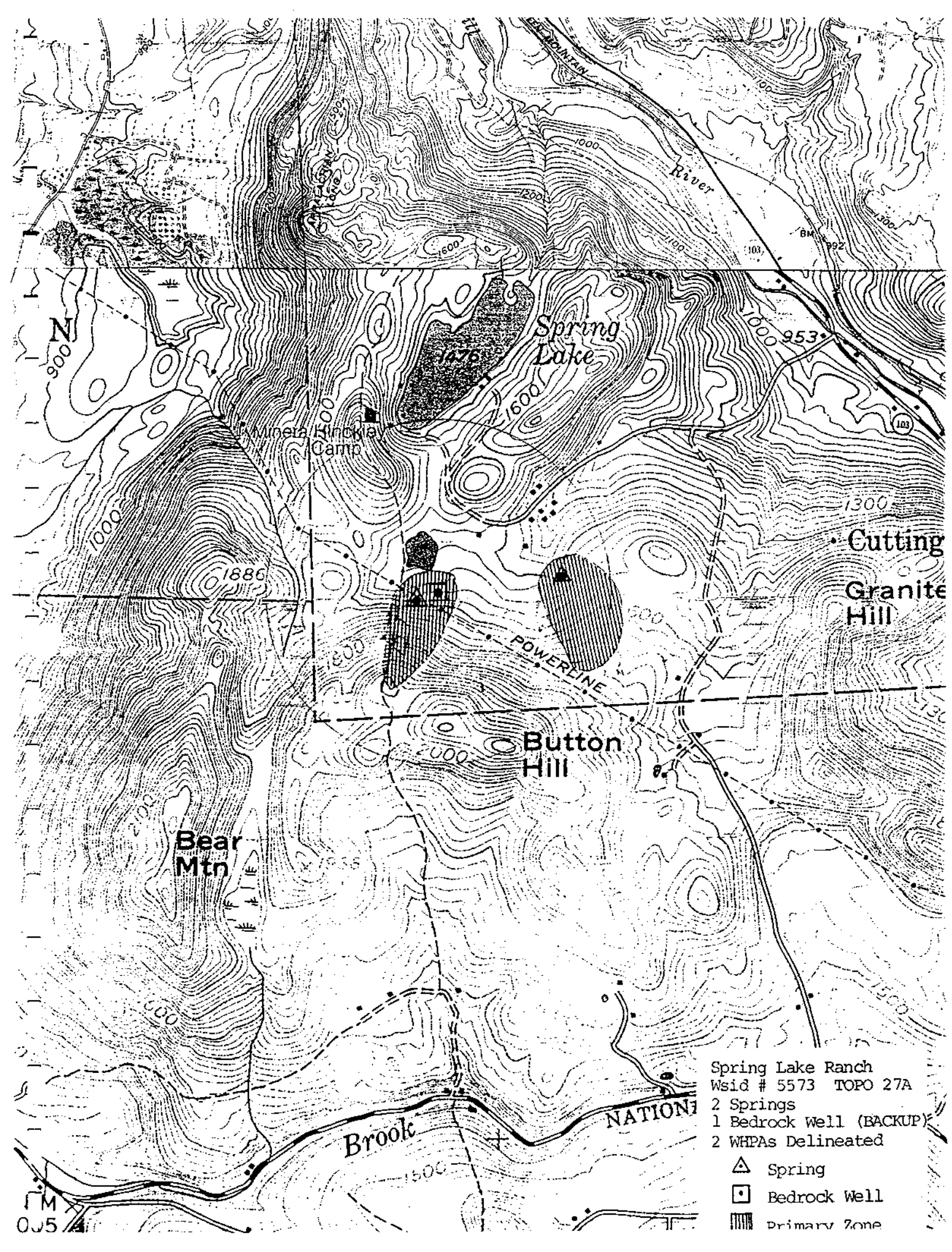
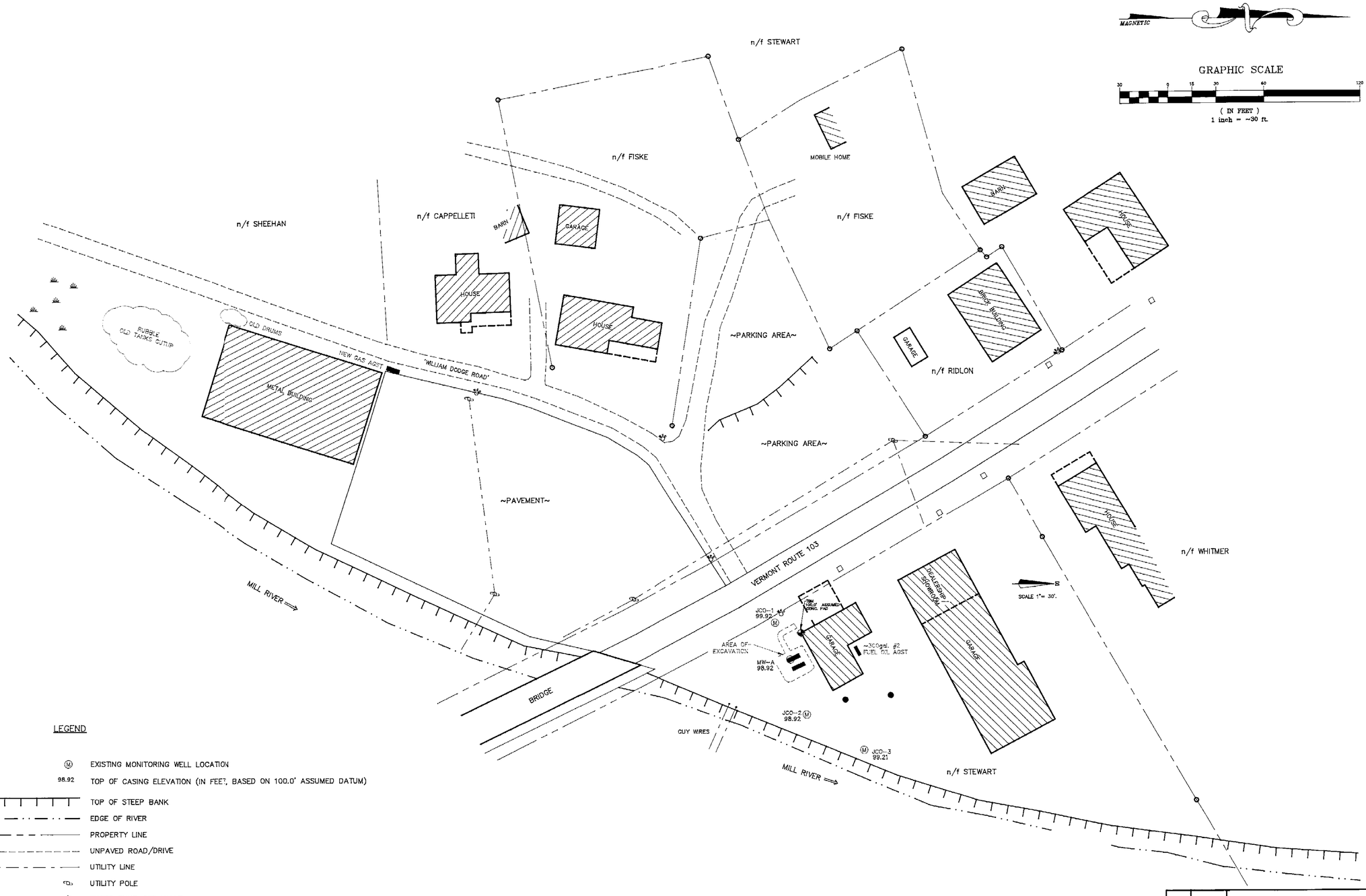

Spring Lake
1476
Mineral Kinckley Camp
953
Cutting
Granite Hill
1886
POWERLINE
Button Hill
Bear Mtn
Brook
NATIONA
River
Spring Lake Ranch
Wsid # 5573 TOPO 27A
2 Springs
1 Bedrock Well (BACKUP)
2 WHPAs Delineated
Spring
Bedrock Well
Primary Zone

Plate 1

Site Plan



LEGEND

- (M) EXISTING MONITORING WELL LOCATION
- 98.92 TOP OF CASING ELEVATION (IN FEET, BASED ON 100.0' ASSUMED DATUM)
- TOP OF STEEP BANK
- EDGE OF RIVER
- PROPERTY LINE
- UNPAVED ROAD/DRIVE
- UTILITY LINE
- UTILITY POLE
- WATER SHUT-OFF VALVE
- STORM WATER DRAIN
- DRY WELL LOCATION
- WET AREA
- SURVEY MONUMENT (IRON PIN TYP.)
- WATER SERVICE CONNECTION

SOURCES

1. "SURVEY OF LANDS OF FISKE, RIDLON, & STEWART" BY TINKER SURVEYS OF RUTLAND, VERMONT DATED JUNE, 1987.
2. SITE WALKOVER BY THE JOHNSON COMPANY, INC. DURING JUNE, 1994.
3. MONITORING WELLS JCO-1,JCO-2, AND JCO-3 INSTALLED ON 6/30/94, SUPERVISED BY THE JOHNSON COMPANY.
ALL MONITORING WELLS LOCATIONS AND RELATIVE ELEVATIONS WERE DETERMINED BY AUTOLEVEL AND HORIZONTAL TAPED DISTANCES.

Rev. No.	Date	Description	Made by	Chk'd by	App'd by
1	7/12/94	Add new monitoring wells, remove proposed	LRH	JRB	JRB

PLATE 1 - SITE PLAN
J.C. STEWART PROPERTY
VT. ROUTE 103 - CUTTINGSVILLE
SHREWSBURY, VERMONT

AUG 23 1994

Sheet 1 of 1
Scale: 1"=~30'
Drawn by: TK/LH
Chk'd by: PTD
Date: 6/13/94
Job: 1-1016-1

THE JOHNSON COMPANY, INC.
Environmental Sciences and Engineering
100 STATE STREET MONTPELIER, VERMONT 05602

SITE.dwg