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FOSTER WHEELER ENVIRONMENTAL CORPORATION

September 10, 2001
File No.2282-0601-01-0135

Department of the Navy
Engineering Field Activity, Northeast
Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop #82
Lester, Pennsylvania 19113-2090
Attn: Code 18 (Mr. J. Colter)

SUBJECT: U.S. NAVY CONTRACT N62472-99-D-0032
CONTRACT TASK ORDER NO. 0060
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK
PRE-OPERATIONAL GROUNDWATER SAMPLING AND ANALYSIS RESULTS FINAL LETTER REPORT

Dear Mr. Colter:

This letter report has been prepared for the Northern Division of the Naval Facilities Engineering Command under Contract Task Order (CTO) No. 0060 issued to Foster Wheeler Environmental Corporation (Foster Wheeler) under Remedial Action Contract (RAC) No. N62472-99-D-0032. This CTO includes operation and maintenance (O&M) of a Soil Vapor Extraction/Air Sparging System (SVE/AS) at the Naval Weapons Industrial Reserve Plant (NWIRP) located in Bethpage, New York.

1.0 SITE DESCRIPTION

The NWIRP-Bethpage facility is located in Nassau County on Long Island, New York (Figure 1-1) approximately 30 miles east of New York City. The 108-acre site is bordered to the north, west, and south by the former Grumman Aerospace Complex, which covers approximately 605 acres, and to the east by a residential neighborhood. The NWIRP is currently listed by the New York State Department of Environmental Conservation (NYSDEC) as an "inactive hazardous waste site" (#1-30-003B), as is the Northrup Grumman Corporation site (#1-30-300A).

The remediation currently being performed under CTO 0060 involves SVE/AS of contaminated soil at Site 1, the former Drum Marshaling Area (Figure 1-2). This site is located in the middle third of the NWIRP facility, east of Plant 3. The former Drum Marshaling Area occupies approximately four acres and consists of two concrete storage pads and an abandoned cesspool leach field. It is surrounded on three sides by a fence and on the fourth by Plant 3. Site 1 is relatively flat, with the eastern portion covered with bare sandy soils, gravel, grass and a concrete pad. The western portion of the site is predominantly covered with concrete. A vegetated wind row (pine) and fence are present along the eastern edge of the site to reduce community visibility. In addition to

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drum storage, this area has been used to store various types of equipment and heavy materials, including transformers.

GEOLOGY

The NWIRP is underlain by approximately 1,100 feet of unconsolidated sediments that overlie crystalline bedrock. The unconsolidated sediments consist of four distinct geologic units, in descending order: 1) the Upper Glacial Formation; 2) the Magothy Formation; 3) the Raritan Clay Member of the Raritan Formation; and 4) the Lloyd Sand Member of the Raritan Formation. The crystalline bedrock consists primarily of schist, gneiss, and granite, and the regional dip is to the south and southeast. All of the geologic units dip in these directions, although to varying degrees.

The Upper Glacial and Magothy Formations were penetrated and sampled during the remedial investigation activities. The Raritan Formation lies below the total depth of this investigation. The Upper Glacial Formation, which is about 30 to 45 feet thick, consists chiefly of coarse sands and gravels. The Upper Magothy Formation consists chiefly of coarse sands to a depth of about 100 feet, below which finer sands, silts, and clays predominate. Clay deposits are fairly common in the formation, but laterally discontinuous; no individual clay horizon of regional extent underlies the NWIRP.

The shallow soil underlying the site consists of unconsolidated gravels, sands and silts. Several localized clay lenses have been identified in the shallow site soils. A clay lens is located beneath the central and eastern portion of Site 1.

2.0 GROUNDWATER INVESTIGATION

As part of the ongoing remediation, an evaluation of groundwater contamination beneath the site is being conducted to assess its impact on the performance of the SVE/AS being used to remove volatile organic vapors from the site soils. During the week of August 13, 2001, prior to the startup of the system for its final period of operation a round of groundwater samples was collected from three site monitoring wells and 13 vapor extraction wells. Wells were purged and sampled using U.S. Environmental Protection Agency (EPA) recommended low flow techniques with an electrical submersible pump. Collected groundwater samples were shipped to an offsite Navy-approved, NY State certified laboratory for analysis of volatile organic compounds. The sampling procedures used are briefly described in the following sections.

Vapor Monitoring

Prior to collection of groundwater samples, the headspace was monitored in all wells to evaluate the presence of volatile vapors in the well casings. A PhotoVac® photoionization detector (PID) was used for this purpose. As each well was opened, the tip of the instrument was inserted into the casing and the self-contained pump allowed to draw a sample into the PID. An average value from the direct-read instrument was recorded for each well.

Groundwater Level Measurements

Depth to water measurements were made from the top of each well casing using an electrical water level probe. Values were subtracted from the surveyed elevation of the top of the corresponding casing to obtain groundwater elevations for each well. Groundwater elevations were used to produce the potentiometric surface map discussed in Section 3.0.

Sampling Methodology

Wells were purged and sampled using EPA recommended low flow techniques utilizing a Grundfos Rediflo® electrical submersible pump. Each well was pumped at a rate of approximately 0.5 liter per minute to limit agitation of the water column, thereby minimizing turbidity in the sample. Discharge water was monitored regularly for temperature, pH, electrical conductivity, total dissolved solids, dissolved oxygen, and turbidity. Sampling was conducted when readings stabilized to within 10% in three consecutive readings, or upon recovery if the well was purged dry. Samples were collected and transferred directly into sample bottles from the pump discharge.

Sample Shipment

Analysis of groundwater samples collected at the site was performed by Chemtech Laboratories. The laboratory supplied all pre-cleaned, pre-packaged sample bottles and other materials for groundwater sample collection and shipment. Samples for volatile organic analysis (VOA) were collected from each well into 40-milliliter VOA vials and capped with a plastic cap with Teflon® septum such that the samples contained no air bubbles. A sample of collected purge and decon water was also collected at this time for waste characterization. Samples were shipped via overnight carrier, under appropriate chain-of-custody procedures to the Mountainside, New Jersey laboratory.

Sample Analysis

Groundwater samples were analyzed for Target Compound List (TCL) VOCs using EPA Method 8260. In addition, one daily trip blank, one field duplicate, and two field blanks, as well as an internal laboratory matrix spike/matrix spike duplicate (MS/MSD), were analyzed for quality assurance purposes. A 48-hour turn-around for analytical results was requested. The results reporting protocol is New York State "Category B." Waste characterization samples were analyzed for TCL VOCs, TCL semi-VOCs, polychlorinated biphenyls (PCBs), and Target Analyte List (TAL) metals.

3.0 INVESTIGATION RESULTS

VAPOR MONITORING

The results of the PID headspace screening did not correlate with laboratory results of VOCs in groundwater and are likely to be influenced by both groundwater and soil conditions.

GROUNDWATER ELEVATIONS

Water levels measured in site wells were used to generate the potentiometric surface map shown in Figure 3-1. Regionally, groundwater flows to the southeast across the site. Superimposed on the regional flow pattern is a localized groundwater high bisecting the site that serves as a local groundwater divide, separating northerly and southerly groundwater flow components.

VOC DISTRIBUTION IN GROUNDWATER

Detected VOCs in groundwater samples collected at the site are listed on Table 3-1 and shown on Figure 1-2. Although VOCs occur in groundwater throughout most of the southern portion of the site, there is significant variation in the concentrations and spatial distribution of individual compounds. Trichloroethene (TCE) is the most predominant VOC detected in MW 101 and 103; EW-1,2,4,6,7,8,9,11, and 12 at concentrations ranging from 2.4 to 230 ug/liter. Maximum concentrations of TCE occur along the southern margin of the site. 1,1,1-trichloroethane was detected in MW 101 & 103 and EW-1-4,6,7 and 12 at concentrations ranging from 2.2 to 190 ug/liter. The highest level of 1,1,1-trichloroethane was detected near the treatment building. Tetrachloroethylene (PCE) was found in wells MW 101 and EW 1,2,4,6-8,10, and 11 at concentrations ranging from 2.8 to 85 ug/liter. Other compounds (1,1-dichloroethane, cis-1,2dichloroethane, xylenes, and 2-butanone were detected at low concentrations at several locations throughout the site (see Figure 1-2).

A post-operational round of groundwater samples will be collected at the conclusion of O&M. The post-operational sampling results will be compared to the pre-operational sampling results in the Annual Operating Report to be submitted at the close-out of this project.

If you have any questions or comments, please contact me at (973) 630-8413.

Sincerely,

Marlene B. Lindhardt, CHMM
Senior Project Manager

cc: C. Davis, EFA-NE
B. Ingram, EFA-NE ROICC
A. Holcomb, Foster Wheeler
Distribution

Table 3-1 VOCs Detected in Groundwater – August 2001 – NWIRP-Bethpage, NY

	EW01	EW02	EW03	EW04	EW05	EW06	EW07	EW08	EW09	EW10	EW11	EW11D	EW12	EW13	MW101	MW102	MW103
Trichloroethene	230	5.2	ND	36	ND	4.3J	3.1J	8.8	8.7	ND	2.4J	2.4J	4.7J	ND	13	ND	10
1,1,1 Trichloroethane	9.4	4J	2.9J	2.4J	ND	2.9J	190	ND	ND	12	ND	ND	ND	ND	2.2	ND	ND
Tetrachloroethane	85	3.2J	ND	23	ND	30	8.3	8.1	ND	9.5	2.6	2.8J	ND	ND	ND	ND	5.5
1,1-Dichloroethane	2.5	ND	ND	ND	ND	ND	3.6J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis 1,2 Dichloroethane	37	ND	ND	ND	ND	19	2.1J	ND	ND	4.3J	ND	ND	ND	ND	ND	ND	ND
Total Xylenes	ND	ND	ND	ND	ND	ND	2.4J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Note: Concentrations in µg/l
ND: Not Detected
J: Laboratory Estimated Value

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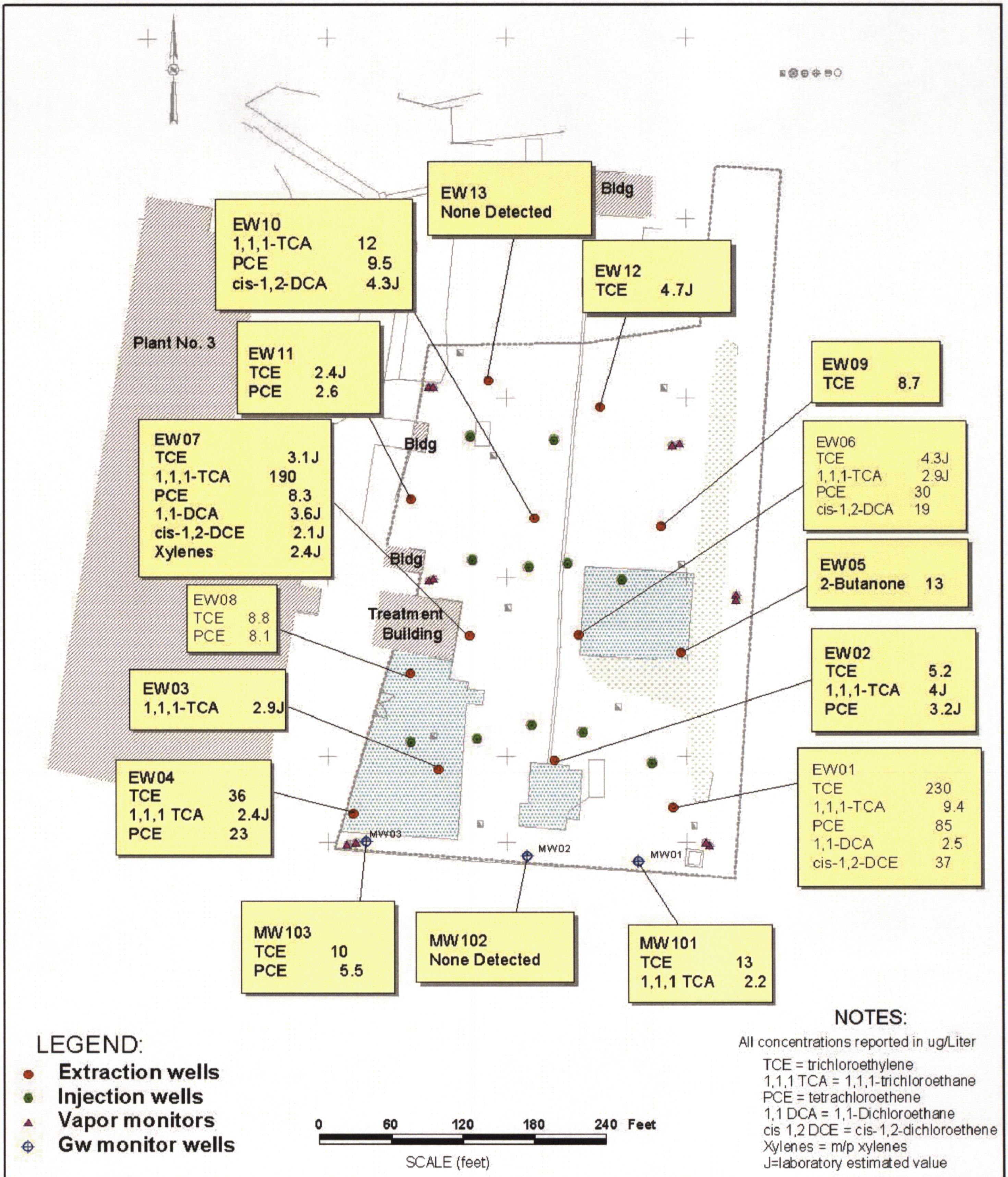
Site Location

Figure 1-1



NOTES:

All concentrations reported in ug/Liter

TCE = trichloroethylene
1,1,1 TCA = 1,1,1-trichloroethane
PCE = tetrachloroethene
1,1 DCA = 1,1-Dichloroethane
cis 1,2 DCE = cis-1,2-dichloroethene
Xylenes = m/p xylenes
J=laboratory estimated value

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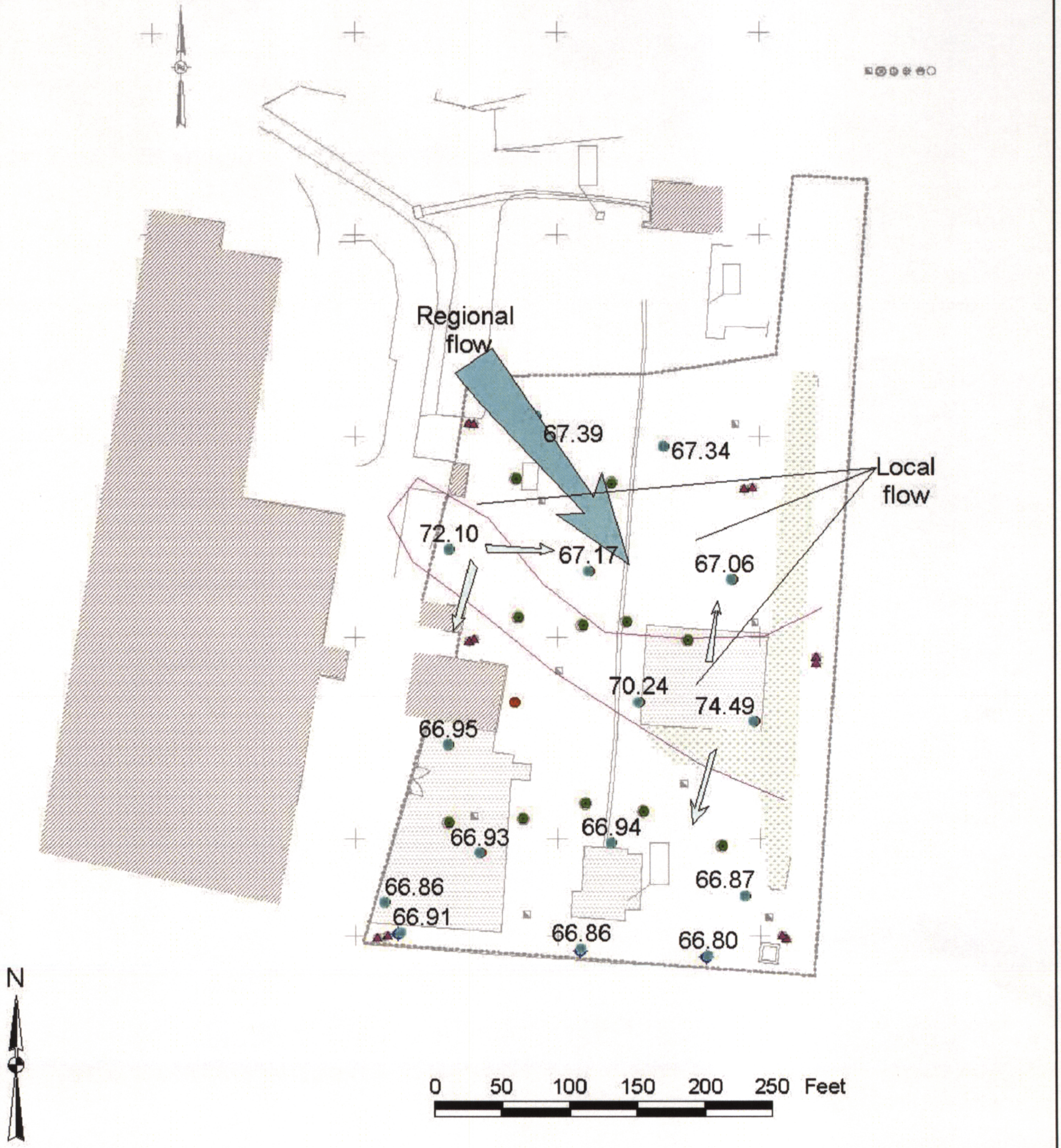
VOC Detections (ug/L) in Groundwater
(August, 2001)

Figure 1-2



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Groundwater Flow Direction

Figure 3-1