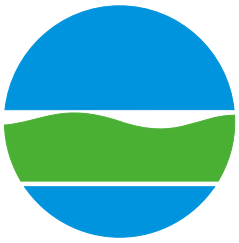
REMEDIAL INVESTIGATION REPORT



FARRAND CONTROLS SITE

Valhalla, Westchester County, New York
(Site Registry No. 3-60-046)

CONTRACT NO. D003600-8

Prepared For

New York State Department of Environmental Conservation

AUGUST 2000

DVIRKA AND BARTILUCCI
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

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REMEDIAL INVESTIGATION REPORT

FARRAND CONTROLS SITE
VALHALLA, NEW YORK

SITE REGISTRY NO. 3-60-046

Prepared for

NEW YORK STATE DEPARTMENT
OF ENVIRONMENTAL CONSERVATION

By

DVIRKA AND BARTILUCCI CONSULTING ENGINEERS
WOODBURY, NEW YORK

AUGUST 2000

REMEDIAL INVESTIGATION REPORT
FARRAND CONTROLS SITE

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1.0 INTRODUCTION AND BACKGROUND

This section presents the overall project objectives of the remedial investigation for the Farrand Controls Site, a description of the site, site history and previous investigations, and an overview of the remedial investigation and report organization.

1.1 Project Objectives

As part of New York State's program to investigate and remediate hazardous waste sites, the New York State Department of Environmental Conservation (NYSDEC) issued a work assignment to Dvirka and Bartilucci Consulting Engineers (D&B) of Woodbury, New York to conduct a remedial investigation and feasibility study (RI/FS) for the Farrand Controls Site located in Valhalla, Westchester County, New York. This work assignment has been issued under the Superfund Standby Contract between D&B and NYSDEC. The registry number for this New York State Class 2 Inactive Hazardous Waste Disposal Site is 3-60-046. The RI/FS for this site is being performed with funds allocated under the New York State Superfund Program.

The objectives of this RI/FS are to determine the nature, source(s) and extent of contamination; identify contaminant migration pathways and potential receptors; determine impacts to human health and the environment; evaluate the need for corrective action; identify and evaluate remedial alternatives; and select a long-term, cost-effective remedial plan.

This document, entitled "Remedial Investigation Report – Farrand Controls Site," addresses the investigation phase of the RI/FS, and is prepared in accordance with the federal Comprehensive Emergency Response, Compensation and Liability Act (CERCLA) and Superfund Amendments and Reauthorization Act (SARA), and the New York State Superfund Program, including the NYSDEC Technical and Administrative Guidance Memorandum (TAGM), *Guidelines for Remedial Investigation/Feasibility Studies*.

1.2 Site Location and Ownership

The Farrand Controls Site is located at 99 Wall Street in Valhalla, Westchester County, New York (see Figure 1-1). The site is currently owned by Farrand Controls, Inc., Division of Ruhle Companies, Inc., and is an active electronic component manufacturing facility.

1.3 Land Use

The Farrand Controls Site is currently used for light industrial purposes. To the northwest of the site is a commercial complex whose adjoining paved parking area is separated from the Farrand Controls parking area by concrete barriers. The commercial complex previously served as an annex to the Farrand Controls main site building, which housed the company's Optical Division. Upslope to the north is the Mount Eden Cemetery. Residential neighborhoods of detached, single-family dwellings border the site to the east and southeast, and extend upslope to the northeast. A wetland/pond complex borders the site to the southwest and west. A long paved driveway extends from Wall Street, separating site buildings from the wetlands. Area residents and workers at Farrand Controls use the Wall Street extension/driveway for walking, jogging, skating, exercising pets and bicycle riding.

1.4 Site Description

The Farrand Controls property is approximately 13.6 acres in size. The northeastern area, approximately 60 percent of the site is a hill, with bedrock outcrop at its base, and is undeveloped. The developed area of the property extends from the bedrock outcrop to the property boundaries to the northwest, west and south, and is hereafter referred to as the site and is illustrated on Figure 1-2. The site currently consists of a 28,255 square foot, one-story block and steel framed manufacturing building constructed in 1958 (see Figure 1-2). The original building of approximately 5,000 square feet was expanded in 1972. There is also an 8,312 square foot, wood frame "Quonset" style building on the site, which was constructed in 1958 as an indoor tennis court. Except for the eastern portion of the site and the bedrock escarpment, the site is primarily grassed and slopes gently to the west.

The site has been served by a municipal public water and sanitary sewer system since 1958, when the facility was constructed. The surrounding residential and commercial/industrial area is also served by public water and municipal sanitary sewers. Storm water is collected by an on-site storm sewer system that discharges to the wetlands located to the south and west of the facility.

The Farrand Controls main site building and most of the property boundaries are situated diagonally with respect to geographic north. To facilitate discussion of site information and evaluation of the remedial investigation findings, areas of the site and site main building will be referenced as southern, central and northern portions as designated in Figure 1-2.

1.5 Site History and Operations

Based on a review of aerial photography of the site, prior to 1958, the Farrand Controls Site was undeveloped with respect to building construction. The photographs indicate that portions of the site before 1958 were heavily disturbed as the result of surface mining, possibly a borrow pit or sand and gravel mine.

Operations at the site included machining of metals, photolithographic processing (including cupric etching), soldering, and electronic and mechanical assembly. In the basement of the original building, a sump was used to collect liquids from various floor drains. When the building was expanded in 1972, this sump was reportedly deactivated and a number of floor drains that emptied into the sump were plugged. Solvents used at the time of the sump deactivation included acetone, 1,1,1-trichloroethane, Freon, methylene chloride and isopropyl alcohol.

Since required by regulations, spent solvents at Farrand Controls Inc. have been drummed and staged on-site pending off-site disposal (personal communication from M. Frenz to A. Jaroszewski, 2/11/00). The drums were staged behind the main site building near the south

central portion of the building. Prior to this period, it is not known how the spent solvents were managed.

In 1993, it was reported that Ruhle Company cleaned out the accumulated sludge from the sump. Tests of the sludge confirmed the presence of 1,1,1-trichloroethane. In 1996, the sump contents, base and underlying shallow soil were removed by Farrand Controls personnel. This activity generated one drum of solids and one drum of liquids. Analysis of the liquids showed the presence of Freon 113, 1,1-dichloroethene, methylene chloride, 1,1-dichloroethane and 1,1,1-trichloroethane in concentrations between 65,000 and 25,000,000 ug/l. The sump was reportedly sealed after the materials were removed and is no longer in use.

1.6 Regional Geology

The Farrand Controls Site and its environs are part of the New England uplands physiographic province. Bedrock consists of Precambrian and Paleozoic sedimentary and igneous rocks that have been highly metamorphosed and complexly folded and faulted. In the vicinity of the site, bedrock is mapped as probably belonging to the Manhattan formation *Geologic Map of New York State, Lower Hudson Sheet* [Fischer, Isachsen and Rickard, 1970]). The Manhattan formation consists of pelitic, garnet-amphibolite schist and gneiss. Near the Valhalla area, the formation is considered to be of Cambrian age.

The moderate relief that characterizes the area is attributed to differences in the relative hardness of the underlying bedrock. Drainages have developed in areas of softer, more easily eroded bedrock and in weathered shear zones where faulting has weakened bedrock. These structural and lithologic controls on drainage produced the area's ridge-and-valley topography. Glacial erosion subsequently modified the landscape. During glacial retreat, deposition of sediments as till, outwash and moraines produced a complicated unconsolidated veneer above low-lying bedrock. The *Surficial Geologic Map of New York State, Lower Hudson Sheet* (Caldwell, 1989) describes this veneer as "poorly sorted, variably textured diamict deposited beneath glacial ice."

1.7 Regional Hydrogeology and Drainage

The shallow water table in the region occurs in unconsolidated deposits overlying bedrock in the lowlands. The shallow groundwater flows from the highlands toward the valley lows. In the site vicinity, this direction is generally southward. Groundwater at depth also occurs in the fractured bedrock.

Drainage from the area surrounding the Farrand Controls Site is primarily to the southeast toward the Bronx River (refer to Figure 1-1). To the south, the Bronx River becomes the Hutchinson River and empties into Long Island Sound at Eastchester Bay. In the vicinity of the site, drainage is partly contained internally in valley floor ponds.

1.8 Water Supply

The Farrand Controls Site has been served by public water since its development in 1958. The source of the potable water is the Kensico Reservoir.

Residences in the vicinity of the site also are served by the municipal water supply. A Water Use Survey conducted in the residential area downgradient of the site between Wall Street and the Taconic State Parkway reported no private wells. (This survey is discussed further in Section 2.3.) Private wells installed into bedrock on Railroad Avenue across the Taconic State Parkway are used for commercial purposes.

1.9 Climate

The climate in the Farrand Controls Site vicinity consists of a humid continental climate with secondary maritime influences from the Long Island Sound and the Atlantic Ocean. In nearby Scarsdale, mean monthly temperatures range from 30°F in January to 70°F in July. Mean maximum temperatures range from 38°F to 86°F and mean low temperatures range from 21°F to 62°F (*Soil Survey of Putnam and Westchester Counties, New York*, United States Department of Agriculture Soil Conservation Service, 1994). Total precipitation in Westchester County

averages between 44 and 47 inches per year. From May through September the average precipitation is 20 to 23 inches and from October through April it is 24 to 25 inches.

The prevailing wind direction, as determined from data (National Climatic Data Center) collected at the nearest recording station in White Plains, is from the west-northwest. Significant gusts occur in the winter; however, significant gusts related to thunderstorms or squalls also occur in the summer. The ridge to the north of the site may locally affect wind direction and speed.

1.10 Previous Investigations

The previous investigations discussed in this section were undertaken by the current facility owner without NYSDEC oversight. The results of the investigations have not been approved by the NYSDEC. The conclusions in this section are not necessarily those of the NYSDEC.

As the result of a Phase I site assessment conducted for the Farrand Controls Site in early 1993, which concluded that hazardous materials or petroleum products were suspected of being present in the soil and groundwater beneath the site, a series of investigations were undertaken. Figure 1-2 shows the groundwater monitoring system and sampling points which existed before the State Superfund remedial investigation was conducted and pertinent site features for reference regarding the below chronology.

In 1993, a Phase II site assessment was performed, which included four soil borings completed as monitoring wells (MW-1, MW-2, MW-3 and MW-4), field-screening of soil samples for volatile organic compounds (VOCs), and screening and analyses of water samples from the four monitoring wells and three sumps (SU-1, SU-2 and SU-3) within the building.

The "Draft Phase II Environmental Site Assessment, 99 Wall Street, Valhalla, New York," prepared by GZA GeoEnvironmental Inc., dated May 1993, presents analytical data on water samples from the four monitoring wells and three sumps that indicated VOCs were present

in all samples except from well MW-2. Elevated VOC concentrations were reported in samples from MW-3 (21,199.1 ug/l), SU-2 (178.1 ug/l) and SU-3 (1,414.9 ug/l).

In October 1993, additional investigation was undertaken at the site by Environmental Management, Ltd. (EML), which included a ground penetrating radar (GPR) survey, installation of four groundwater piezometers and collection of eight groundwater samples from monitoring wells MW-1, MW-2, MW-3 and MW-4, and the newly installed piezometers, P-5S, P-5M, P-5D and P-6. In a report entitled, "Subsurface Investigation, Farrand Controls, Valhalla, New York," dated April 8, 1998, EML presented the results of the investigation summarized as follows.

- The GPR survey allowed for the mapping of subsurface utilities prior to drilling activities and identified a number of shallow targets in a circular area immediately to the southwest of the building.
- The results of the groundwater analysis indicated that VOCs were not detected in MW-1 and MW-2, and that VOCs were detected at varying concentrations in MW-3, MW-4, P-5S, P-5M, P-5D and P-6, with the highest levels reported in MW-3 (6,320 ug/l) and P-5D (4,002 ug/l). Dense nonaqueous phase liquid (DNAPL) comprising methylene chloride, 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane and trichloroethene was present in P-5D.
- Rising and falling head slug tests were performed on MW-1, MW-2, MW-3 and MW-4 in January 1994. Based on the results of the slug tests and the subsequent hydrologic analysis, shallow groundwater flow beneath the site was reported to be to the south and southeast, and not toward the wetlands (southwest). Groundwater flow rates were calculated for the site, with estimated rates of 19.5 ft/yr for the overburden between MW-3 and MW-4. Because of the high hydraulic conductivity determined for the site's subsurface materials, the potential for higher rates of groundwater flow was suspected.

From April through November 1994, EML conducted additional investigation as follows:

- Groundwater elevation measurements at selected wells and piezometers.
- Slug testing of deep piezometer P-5D.
- Refraction-seismic survey to describe the geometry of the bedrock surface.
- Low-frequency (100 MHz) GPR survey to investigate subsurface stratigraphy.

- Soil-vapor screening survey of the sump and its immediate surroundings.
- Core sampling of the sump and underlying sediment (C1, C2, C3, C4 and C5).
- Installation of 10 additional shallow piezometers (P-7, P-8, P-9, P-10, P-11, P-12, P-13, P-14, P-15 and P-16).
- Sampling of 16 groundwater monitoring wells and piezometers (MW-1, MW-2, MW-3, MW-4, P-5S, P-5M, P-5D, P-6, P-7, P-8, P-9, P-10, P-11, P-12, P-13, P-14, P-15 and P-16).
- Collection of Geoprobe groundwater samples at probe refusal at locations identified by the seismic survey (GP-1, GP-2, GP-3 and GP-4).
- Performance of bench-scale tests to evaluate the feasibility of denitrification-based bioremediation of chlorinated VOCs in groundwater.

The results of the soil and groundwater data as reported in a "Remedial Investigation Report," dated April 1995, prepared by EML, indicated that VOCs were at low levels or not detected in MW-2, P-6, P-8, P-9, P-13, P-15 and P-16, and that VOCs were detected at varying concentrations in MW-3, MW-4, P-5S, P-5M, P-5D, P-7, P-10, P-11, P-12, P-14, GP-1, GP-2, GP-3, GP-4, C-1, C-2, C-3, C-4 and C-5, with the highest concentrations in MW-3 (12,916 ug/l), P-5D (26,303 ug/l), GP-2 (4,608 ug/l), and C-3 (3,412 ug/kg).

Additional results presented in the April 1995 report by EML are summarized and paraphrased below.

- Groundwater elevation data for two representative days, June 16 and August 16, 1994, were used to construct groundwater contour diagrams, which depict a consistent pattern of southeasterly groundwater flow over the course of the summer. Although the overall southeasterly groundwater flow pattern is consistent with that previously reported, the groundwater elevation data for the new piezometers suggested a strong southwest component of flow beneath the southeastern portion of the facility. At the approximate location of MW-4, groundwater flow appears to "bend" to the southwest toward the inferred zone of groundwater discharge represented by the adjacent wetlands.
- Based on the seismic-refraction survey, the depth to bedrock at the site was interpreted to range from 9.2 to 63.4 feet below the ground surface (bgs).

- The results of low-frequency GPR survey provided information on the water table and the organic silt stratum beneath the site. Using the stratigraphic and groundwater elevation data for boring P-5 as controls, the depth of the silt layer was inferred to range from 12 feet to 19 feet bgs.

- The organic silt layer was reported to exhibit an irregular "scalloped" surface along the survey lines that were performed perpendicular to the building. The surface of the organic silt stratum as shown on the GPR data records is characterized by small channel-shaped depressions which are offset by cusp-like peaks. With respect to the adjacent "peaks," these "channels" are on the scale of approximately 2 to 10 feet horizontally and 1 to 3 feet vertically. The surface relief of the silty clay stratum appears to be related to the partial erosion of this unit during the deposition of the overlying alluvium, therefore, the "channels" observed may represent relict drainage channels formed during this depositional period. Interpretation of the GPR data suggests that the surface of the organic silt stratum dips towards the wetlands to the southwest. Based on the GPR data, the organic silt stratum also appears to pinch out toward the ground surface to the southeast.

- A much deeper, but much less distinct layer, was observed in the GPR data and was interpreted as the bedrock surface and/or basal till. Using P-5 as a control, the depth to bedrock on the GPR data profiles is inferred to range from 26 to 51 feet bgs. The shape of the bedrock surface suggested by the GPR data compares well to the interpretation of the seismic data in that a similar bowl-shaped depression is suggested. However, the GPR data suggest that this "bowl" may be larger and more elongated in the northern direction.

- Anomalous "drip-like" features were observed in the GPR data immediately below certain areas of the organic silt stratum. These anomalies were particularly evident at locations immediately downgradient of the sump area. Detailed analysis of the GPR characteristics of these "drips" revealed anomalous amplitude and polarity signatures that might be expected from a DNAPL or DNAPL-like target.

- The results of the soil-vapor survey were inconclusive. PID measurements of the soil vapor below the concrete floor surrounding the sump did not exceed background concentrations (0-1.7 ppmv). Similarly, PID measurements of soil-vapor points driven into the soil outside of the building and through the exterior wall of the sump room were also at background concentrations. The headspace screening also indicated background conditions. A reading of 96 ppmv was obtained from the headspace of the steel drum that contained the sludge materials previously removed from the sump by Farrand Controls.

In September 1997, EML conducted additional investigation at the site, including the installation of three well clusters, OC-17, OC-18 and OC-19, to confirm the findings from Geoprobes GP-1, GP-2, GP-3 and GP-4. Each well cluster consisted of two wells, one shallow

and one deep. Based on a memorandum from Geovation Consultants, Inc. to EML, the groundwater sampling of these new wells and other selected wells/piezometers (MW-3, P-5D, P-15, OC-17S, OC-17D, OC-18S, OC-18D, OC-19S and OC-19D) showed VOCs ranging from 10,282 ug/l in MW-3 to 143.5 ug/l in OC-19S. No VOCs were found in P-15.

In an October 1997 Geovation Consultants, Inc. memorandum, it is stated that the previous GPR and hydrological investigation data suggests a "glaciofluvial channel" between OC-18 and OC-17 is "confirmed by the data," that there is a shallow dip of bedrock between P-5D and OC-17D, that the source of the VOCs is the building sump, and that "denitrification-mediated biodegradation" of the parent solvents TCE, TCA and Freon is occurring in site groundwater.

1.11 Overview of the Remedial Investigation and Report Organization

The Farrand Controls Site RI/FS was designed to identify the contaminant source(s), define the vertical and horizontal extent of soil and groundwater contamination, determine the impacts to nearby surface water bodies and indoor air, and provide recommendations for implementation of remedial measures at the site. The approach of the remedial investigation was to utilize existing data obtained from previous investigations and phased data collection during the RI/FS as the basis for its design.

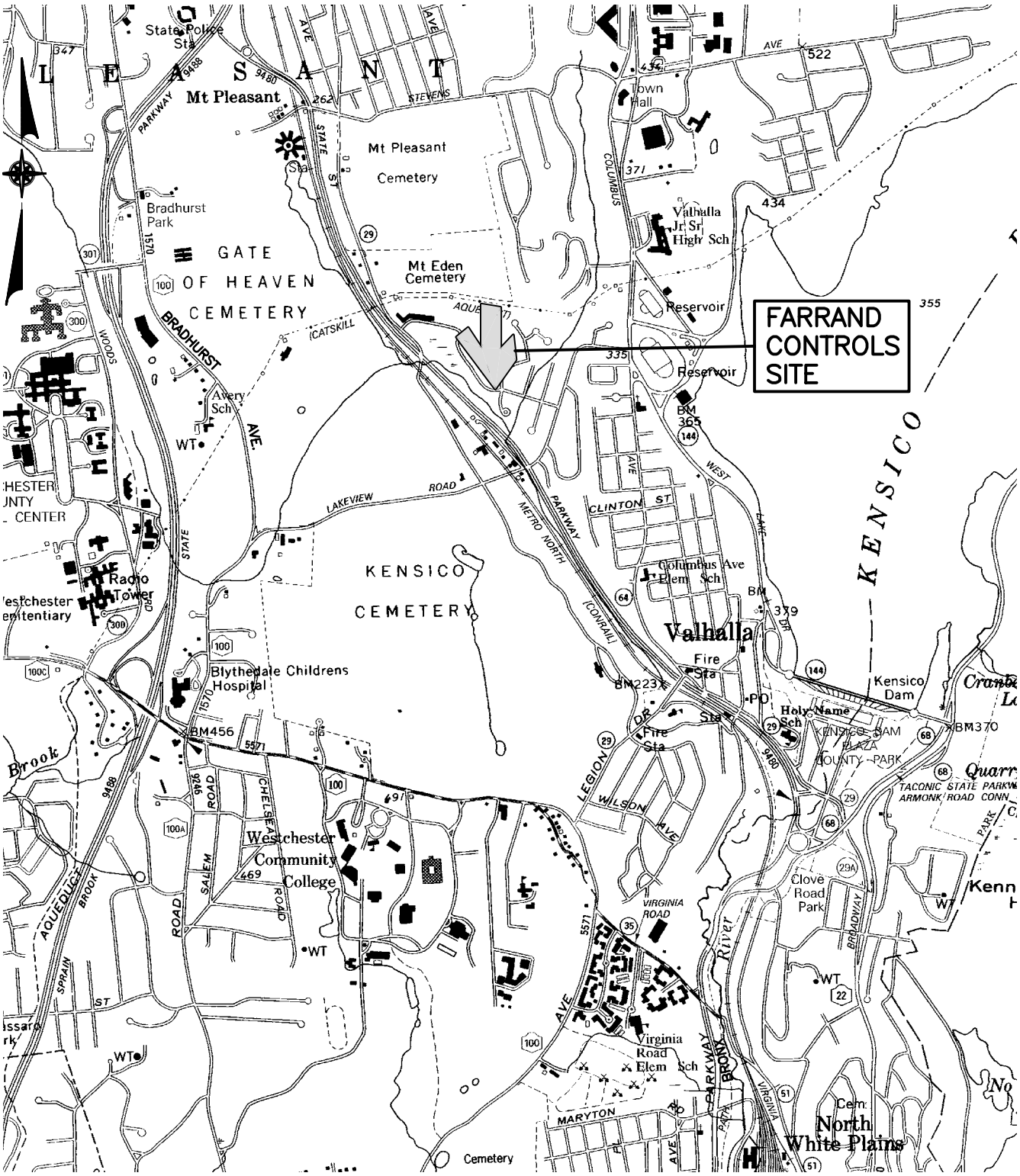
The remainder of this report is organized as follows:

- Section 2.0 – provides the results of well surveys and aerial photograph review, and describes the activities conducted during the remedial investigation;
- Section 3.0 – describes the physical and ecological characteristics of the site and vicinity, including surface features, geology, hydrogeology and wildlife habitat;
- Section 4.0 – discusses the nature and extent of contamination, including a discussion regarding identification of standards, guidelines and criteria for the various media sampled, data validation, analytical results and contaminant migration;

- Section 5.0 – presents the conclusions of the remedial investigation, including a discussion of the source(s) and extent of the soil and groundwater contamination, and impacts on surface waters, sediment and indoor air;

- Section 6.0 – provides the results of a human health risk assessment, and

- Section 7.0 - provides report references.



SOURCE: USGS WHITE PLAINS, QUADRANGLES

FARRAND CONTROLS SITE
VALHALLA, NEW YORK

SITE LOCATION MAP

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

FIGURE 1–1

NORTHERN PORTION
CENTRAL PORTION
SOUTHERN PORTION
SWALE
BEDROCK ESCARPMENT
RETAINING WALL
PAVING
PARKING
PARKING
FARRAND CONTROLS MAIN SITE BUILDING
BASEMENT SUMP
TREES & SHRUBS
OUTDOOR TENNIS COURTS
INDOOR TENNIS COURT
GRASS
GRASS
GRASS
GRASS
WALL STREET
WETLANDS
POND
P-15
P-12
P-5
MW-2
MW-3
GP-1
GP-4
GP-3
OC-18
P-7
P-9
P-13
P-14
P-16
P-11
OC-17
OC-19
GP-2
MW-4
P-8
MW-1
P-6
P-10

LEGEND:

- EXISTING GROUNDWATER MONITORING WELLS/PIEZOMETERS
- PREVIOUS GEOPROBE GROUNDWATER SAMPLE POINT
- APPROXIMATE LOCATION OF SUMP
- WETLANDS
- FIRE HYDRANT (SURVEY ELEVATION BENCHMARK +100 FEET)
- PROPERTY LINE

0 80' 160'
SCALE IN FEET

SOURCE: GZA GEOENVIRONMENTAL, INC. MAY 1993

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

SITE PLAN

FIGURE 1-2

2.0 STUDY AREA INVESTIGATION

2.1 Overview of Field Activities

Presented in the following sections is a description of the activities performed at the Farrand Controls Site as part of the remedial investigation. The activities were performed in accordance with the NYSDEC-approved Remedial Investigation and Feasibility Study (RI/FS) Work Plan, dated December 1998. Initial work plan activities, except for groundwater monitoring well installation, were conducted in January, March and April 1999. Based on the findings of the initial Phase I investigation, a follow-up investigation scope of work was developed and the work was conducted in October and November 1999, and January 2000. These latter investigation activities were designated Phase II of the remedial investigation. The scope of this Phase II investigation was described in the RI/FS Work Plan Amendment No. 1, dated September 1999.

The Phase I and II remedial investigation activities included the following tasks:

- Historical aerial photograph review
- Commercial and private water supply well surveys
- Existing monitoring well survey
- Existing monitoring well sampling
- Site preparation
- Sampling grid network
- Surface soil sampling
- Test trench soil sampling
- Subsurface Geoprobe soil sampling
- Groundwater Geoprobe sampling
- Surface water sampling

- Surface water sediment sampling
- Groundwater monitoring well installation
- Groundwater monitoring well sampling
- Groundwater level measurement
- In situ hydraulic conductivity testing
- Indoor air sampling
- Surveying and mapping
- Ecology and wildlife habitat survey
- Human health risk assessment

Descriptions of these activities are presented below. The locations and designations of the sampling points are shown in Figures 2-1 and 2-2.

2.2 Historical Aerial Photograph Review

A review of a series of aerial photographs for the Farrand Controls Site was conducted starting with the 1920 photograph and progressing through photographs of approximate 5-year intervals. Prior to 1958, the site was undeveloped with respect to building construction. The photographs indicate that eastern portions of the site in the vicinity of the tennis courts, before 1958, were heavily disturbed as the result of surface mining, possibly a borrow pit or sand and gravel mine, that began sometime between 1947 and 1954. The resolution of the small scale aerial photographs did not allow for pertinent detailed site activities to be identified.

2.3 Commercial and Private Water Supply Well Surveys

A commercial water supply well survey was conducted for the vicinity of the Farrand Controls Site to determine if commercial wells were impacted by groundwater contamination that may have migrated from the site. The survey focused on the downgradient area approximately 1/2 mile southeast of the site in the direction of the shallow groundwater flow. A

map showing the site and the approximate locations of downgradient commercial water supply wells is presented in Figure 2-3.

On January 19, 1999, the eight wells were sampled by the New York State Department of Health (NYSDOH) for volatile organic compounds (VOCs). No VOCs associated with the site were detected in any of the samples. NYSDOH informed the property owners of these findings through letters dated February 8, 1999.

During June, July and August 1999, the commercial well owners were surveyed to obtain construction information on the wells. This survey was conducted via telephone calls and facsimiles. The well owners and information obtained from the survey are provided in Table 2-1. In summary, the available information indicates that the commercial wells are fairly deep (between 300 and 400 feet below grade) bedrock wells.

NYSDEC conducted a private well survey during November and December 1999 of all residences south of Wall Street and west of Lakeview Avenue to the Taconic State Parkway. Survey forms were mailed to 54 residents. Twenty-five (25) responses were received, and all reported municipal water use.

2.4 Existing Groundwater Monitoring Well Survey

Twenty-four (24) existing monitoring wells and piezometers were installed at the Farrand Controls Site prior to the remedial investigation. The wells were designated MW-1 through 4, P-5 (S, I and D), P-6 through 16, and OC-17 through 19 (S and D). These wells and piezometers, the locations of which are shown in Figure 1-2, were inventoried and evaluated for sampling. The survey determined that the wells were usable for obtaining groundwater samples. Well and piezometer details, derived from field reconnaissance and the review of existing logs, are provided in Table 2-2. Most of the 0.75 and 1.25-inch diameter piezometers contained Teflon tubing with a check valve for purging and sampling.

The well log review also showed that well clusters OC-17, 18 and 19 (S and D) were each constructed within a single borehole and that the wells may not have annulus seals between the screen zones. Consequently, chemical and water level data collected from these wells may not be representative of separate screen zones, but a combination of influences from both zones.

2.5 Existing Groundwater Monitoring Well Sampling

To initially characterize site groundwater quality, 12 wells/piezometers (MW-3, P-5I and D, 6, 10, 11, 17S and D, 18S and D, and 19S and D) were sampled in April 1999. The samples were analyzed for select volatile organic compounds using EPA methods 8010/8020 by Severn Trent Laboratories (STL) using an on-site laboratory. The wells were sampled by purging three casing volumes of water using either a submersible pump and/or Teflon tubing with a check valve. Samples were collected using a PVC bailer or from the Teflon tubing. All purge water was containerized into 55-gallon drums and staged in a rear storage area.

2.6 Site Preparation

Farrand Controls Division of Ruhle Companies, Inc. operated during the remedial investigation activities. Office space and telephone access was provided by Farrand Controls within the main site building. No temporary on-site facilities (office trailers, equipment trailers, etc.) were established at the site during the investigation. All equipment, materials and supplies were transported to the site as needed.

Temporary decontamination pads for equipment were constructed during the project. The pads were constructed on the asphalt pavement in the rear of the main site building (shown in Figure 1-2). The pads measured approximately 10 feet square and were constructed of a wooden frame of 4-inch by 4-inch lumber and covered with heavy-duty plastic sheeting. Water for the decontamination of equipment for drilling and probing was obtained from the building's potable water supply.

Buried utilities were marked out prior to conducting any subsurface intrusive activity. These subsurface utilities included conduits for water supply, storm water, wastewater, electricity, telephone and gas.

2.7 Sampling Grid Network

Prior to performing sampling at the site, a grid was established on the site to locate sample points, with axes that paralleled the Farrand Controls main building walls. The transects were established every 25 feet. The grid layout is included in the sample location figures discussed in subsequent sections.

2.8 Surface Soil Sampling

To characterize surface soils for human health risk assessment, two surface soil samples were collected. The samples were collected in areas of high employee access or traffic. One sample was collected from the grass area in front of the main site building near the stairway entrance leading to the basement sump, and the other sample was collected in the vicinity of the picnic table along the southeastern side of the building (see Figure 2-1).

The samples were collected of the 0 to 2-inch surface horizon after scraping away grass. The samples were analyzed for Target Compound List + 10 (TCL + 10) VOCs, Freon 113, PCBs, Target Analyte List (TAL) metals and cyanide (CN).

2.9 Test Trench Soil Sampling

To investigate the potential for preferential contaminant flow pathways associated with buried utility trench backfill, five test trenches were excavated at the site. The designations and locations of the trenches are shown in Figure 2-1.

The test trenches were excavated on April 12 and 13, 1999 by Uni-Tech Drilling Co., Inc. The trenches were excavated by a backhoe to depths ranging from approximately 3 to 6 feet

below grade. The trenches were logged for soil characteristics, fill material content, odor and volatile organic vapors using a photoionization detector (PID). The test pit logs are provided in Appendix A.

The targeted utility conduits, also shown on Figure 2-1, were uncovered and the underlying soil was inspected for any evidence of leakage or contamination (i.e., staining, odor). To characterize the soil quality along the utility lines, a sample from each trench from under the utility conduit was collected for laboratory analysis. The samples were analyzed on-site by STL for TCL +10 VOCs, Freon 113, PCBs, TAL metals and CN.

The test trenches were backfilled after sampling. The surface of the former trench was subsequently restored to pre-existing conditions after backfilling.

2.10 Soil Geoprobe Sampling

To characterize the subsurface soils in potential areas of contamination, samples were collected using a portable truck-mounted Geoprobe rig operated by Zebra Environmental, Inc. Approximately 15 probeholes were constructed along the walls of the southern portion of the main site building and through the basement sump.

Samples were collected in a polyethylene 4-foot long core. After each sample was retrieved, the core was removed from the sampler and screened in one-foot intervals for the presence of VOCs using a PID. The sample was then logged for geology and visually inspected. Probehole logs are provided in Appendix A.

The soil samples were collected from probeholes from the following locations and depths:

- Building sump – generally at 3 or 4-foot horizons to 28 feet below the basement floor.
- Building perimeter – just below the base of the building footings at approximately 6 to 10 feet below grade and at the refusal depth of the adjacent groundwater probes.

- Monitoring well borings - at horizons of highest PID readings.

Prior to collecting each sample, the core sampler was decontaminated using high pressure steam. A new polyethylene liner was used for each sample.

The samples were analyzed off-site, also by STL, for TCL +10 VOCs, Freon 113, TAL metals and CN. Approximately 70 percent of these samples were additionally analyzed on-site for selected VOCs and Freon 113.

After sampling, the probeholes were allowed to collapse and the top few feet filled with bentonite powder and hydrated. Probeholes constructed through pavement were patched with asphalt in the upper few inches. Formation material was containerized in drums at the rear site staging area shown in Figure 2-2.

2.11 Groundwater Geoprobe Sampling

To initially investigate the quality of the groundwater at and in the vicinity of the site, approximately 90 probeholes were constructed using the Geoprobe sampling methodology. Sampling horizons were selected to characterize the vertical distribution of groundwater contamination. The findings of this investigation were evaluated to identify permanent monitoring well locations. The probeholes were located on and downgradient of the site at locations shown in Figure 2-2A.

Groundwater samples were generally collected at two intervals: a shallow zone near the water table (shallow overburden groundwater) and a deep zone near probe refusal (deep overburden groundwater). When the depth to the refusal surface was less than 20 feet, one sample was collected near the top of the refusal surface. An intermediate depth sample was generally collected in the off-site probeholes to characterize the thicker aquifer present at this area.

The groundwater samples were collected by hydraulically driving a screen point sampler in the ground to the desired depth, opening and then retracting approximately 2 feet to expose a stainless steel screen. Polyethylene tubing, 3/8 inches in diameter and fitted with a clean stainless steel check valve, was inserted into the probe rods and slowly moved up and down to lift a column of water up to the surface. During purging prior to sampling, each sample was monitored in the field for pH, conductivity, temperature, dissolved oxygen and turbidity.

The samples were additionally screened for volatile organic vapors and tested for the presence of dense nonaqueous phase liquids (DNAPL) using Sudan IV dye.

Prior to sample collection, the sampler and probe rods were decontaminated using high-pressure steam. Dedicated polyethylene tubing was used to collect each sample. Backfilling of probeholes constructed through asphalt were completed with asphalt patch.

All of the groundwater Geoprobe samples collected prior to October 1999 were analyzed by the on-site laboratory for VOCs and Freon 113. Approximately 10 percent of the samples were additionally analyzed off-site for TCL +10 VOCs, Freon 113, PCBs, TAL metals and CN. Some of these samples were also analyzed for natural attenuation parameters including dissolved methane, ferrous iron, nitrate, sulfate, sulfide and total organic carbon (TOC). During the Phase II investigation, all of the samples were analyzed by the off-site laboratory for the parameters noted above, excluding PCBs.

2.12 Surface Water Sampling

Fourteen surface water samples were collected from the following locations (see Figure 2-1):

- One sample from the upgradient stream in the rear of the main site building;
- Five samples at the outfalls of the storm water discharge to the pond;
- Two samples near the center of the pond;

- One sample from the backyard sump at 23 Grand Boulevard;
- One sample in the western wetland area; and
- Four samples at downstream locations east of the pond.

The samples were obtained by collecting the water directly into laboratory-supplied containers. At paired surface water/sediment sampling points, the water sample was collected first.

The samples were analyzed for TCL +10 VOCs, Freon 113, PCBs, TAL metals, CN and TOC.

2.13 Surface Water Sediment Sampling

Six sediment samples were collected from the wetlands, pond and eastern steam (see Figure 2-1).

The samples were collected using a polyethylene scoop or dedicated PVC tubing from the top 6 inches of sediment. The sample locations from the center of the pond were accessed using a raft.

The samples were analyzed for TCL +10 VOCs, Freon 113, PCBs, TAL metals and CN. At two of the locations, TOC was also analyzed.

2.14 Groundwater Monitoring Well Installation

Seven groundwater monitoring wells were installed in the vicinity and downgradient of the site during the remedial investigation. The wells were constructed by Uni-Tech Drilling Co., Inc. The well locations were selected based on the Phase I Geoprobe findings and were installed to monitor the groundwater quality at the eastern edge of the contaminant plume and downgradient of the site source at the property boundary and along the Taconic State Parkway.

Four of the wells were installed in the overburden and three wells were installed into the underlying bedrock. The wells were installed to create clusters at three locations, each with a shallow water table well, a deeper overburden well on top of the bedrock and a well within the upper portion of the bedrock. At well cluster locations MW-8 and 10, the shallow well was existing. The well construction details are provided in Table 2-2. Well construction logs and diagrams are provided in Appendix B.

2.14.1 Monitoring Well Borehole Construction, Sampling and Logging

The overburden wells were installed using the hollow stem auger drilling method. Initially, at each well cluster location, a boring was constructed to determine the overburden geology and bedrock depth. Soil samples were generally collected at 5-foot intervals using a decontaminated stainless steel split-spoon sampler. The samples were collected in accordance with ASTM-1586. Each sample was logged for geology and screened for volatile organic vapors using a PID.

Spilt-spoon samplers were decontaminated in 5-gallon buckets at each of the drilling sites. Decontamination water was containerized in drums and staged onsite.

The bedrock wells were installed using a combination of hollow stem and air rotary drilling methods. A pilot hole was initially augered a few feet into apparent competent bedrock. Rock coring was then conducted up to 15 feet into bedrock. The rock cores were examined for content, competency, fractures, water bearing capacities, mineralogy and structures. Soil boring and rock core descriptions are included in the well logs in Appendix B. Based on the organic vapor screening results, one soil sample was selected for laboratory analysis of TCL +10 VOCs, Freon 113, TAL metals and CN.

Drill cuttings for all wells were containerized in 55-gallon drums and staged in the rear of the building. At the completion of drilling, the drill rig and tools were cleaned with high-pressure steam at the decontamination pad.

2.14.2 Monitoring Well Construction

Groundwater monitoring wells were installed in each borehole. Logs showing the well details are provided in Appendix B. The wells were constructed of 2-inch diameter Schedule 40, flush joint, PVC riser pipe and 10 feet of No. 10-slot, PVC well screen. The shallow well was constructed with 10 feet of screen bridging the water table to monitor the water table zone. The deep overburden wells were constructed on top of the refusal surface with a 10-foot screen. For the bedrock wells, a PVC well with a 10-foot screen was installed in the open rock zone.

For all of the wells, the screen zone, and to approximately 2 feet above the screen, was filled with No. 1 Morie grade sand. A bentonite pellet seal, approximately 2 feet thick, was then placed on top of the sand pack. The remaining annulus was pressure grouted with a cement/bentonite slurry to within 3 feet of grade. The well was finished at grade with a curb box with a bolted lid, cemented into a 2-foot square surface pad. The wells were secured with a locking compression fitting cap.

2.14.3 Monitoring Well Development

The monitoring wells were developed by pumping and surging to remove fine sediment from the well and to provide a good hydraulic connection to the surrounding formation. The quality of the development purge water was regularly monitored for specific conductivity, pH, temperature, dissolved oxygen and turbidity, generally until the field parameters stabilized. Development water associated with the deep and bedrock wells was collected into 55-gallon drums, which were transported to the on-site staging area. Water from the shallow wells was allowed to drain back to the shallow aquifer in the vicinity of the well heads. Well development information is provided in Appendix F.

2.15 Groundwater Monitoring Well Sampling

Groundwater samples were collected on three occasions: early April and November 1999, and late January 2000. The April sampling comprised selected existing wells and piezometers

(MW-3, and P-5I, 5D, 6, 10, 17S, 17D, 18S, 18D, 19S and 19D). The November 1999 and January 2000 sampling comprised selected existing wells and piezometers (MW-1 and 3, and P-8, 9, 10, 12 and 14) and newly installed wells (MW-8D, 8R, 10D, 10R and 20-S, D and R). The samples were analyzed off-site for TCL +10 VOCs, Freon 113, TAL metals and CN.

The monitoring wells and piezometers (wells) were sampled by first measuring the depth to water and well bottom in order to calculate well purging volumes. The wells were then purged a minimum of three to five well volumes either by pumping with a submersible pump or lifting with a dedicated polyethylene tubing with a check valve. The two methods were necessary to address the well diameter variability (as small as 0.75 inches). The purge water was monitored for pH, turbidity, specific conductivity, temperature and dissolved oxygen. The number of well volumes was a function of stabilization of the field parameters. For wells with low yield, the samples were collected after the well recharged.

The groundwater samples were collected into the laboratory containers using a dedicated disposal polyethylene bailer if the well was purged by pumping, or directly from the dedicated tubing for the small diameter wells. The samples were appropriately labeled and stored in a cooler chilled with ice. Chain-of-custody forms were completed prior to shipment of the coolers to the laboratory.

Decontamination of the submersible pump was performed by washing with a solution of Alconox detergent and water, and then rinsing with potable water. During the April 1999 sampling event, all purge water was collected into 55-gallon drums and staged onsite. For the November 1999 sampling event, the purge water from the shallow wells was discharged to a permeable surface near the well head. The purge water from the deeper wells was placed into 55-gallon drums. For the January 2000 sampling, the purge water for the deeper wells was discharged to the site's sanitary system, further discussed in Section 2.19. Well purging information is provided in Appendix F.

2.16 Groundwater Level Measurement

Synoptic rounds of groundwater level measurements were obtained from all accessible wells and piezometers on three occasions: April 15 and November 2, 1999, and January 26, 2000. The static water level measurements were measured to a precision of 0.01 feet using an electronic water level indicator. The levels were measured from a marked point on top of the PVC well casing. The probe was decontaminated between uses.

2.17 In Situ Hydraulic Conductivity Testing

Six slug tests were performed in order to determine the hydraulic conductivity of subsurface materials between the contaminant source area sump and the wetlands. Slug tests were performed in monitoring wells MW-3, 4, 10D and 10R. Rising and falling head slug tests were performed in wells MW-10D and 10R. Because the water table intersected the screen zones in MW-3 and 4, only rising head tests were performed at these locations. These four wells were selected because they are downgradient of the sump and are screened at different formation horizons. MW-3 and 4 are screened at the water table at depths of 8 to 18 feet and 2 to 12 feet, respectively. MW-10D and 10R are screened at 43.5 to 53.5 feet and 61 to 63.5 feet, respectively.

Slug testing consisted of measuring the depth to water and inserting a pre-programmed 1.5-inch diameter, stainless steel transducer (Troll 4,000) into the well that processed data digitally through *Win-Situ*™ software. In shallow wells, the transducer was lowered to just above the bottom of the well. In deeper wells, the transducer was lowered to a depth of approximately 25 feet below the water table. The depth to water was measured using an electronic water level indicator until it was determined that the water level had returned static levels. In the shallow monitoring wells, the slug was a 27-inch long, 1.75 inch-diameter sealed tube, and in the deep and bedrock monitoring wells, the slug length was 54 inches and of the same diameter.

Falling head tests were performed after initial lowering of the slug. During the test, the tip of an electronic water level indicator was periodically lowered to determine whether the water

had reached its original level, after which the falling head slug test was considered complete. Tests were allowed to continue so that the more accurate transducer could continue to record minor changes. When the water elevation was stable, the slug was rapidly removed and the transducer recorded the recharge. Again, recovery estimates were made in the field using the electronic water level indicator. When recovery was complete, the transducer was removed and decontaminated using a soap water wash and deionized water rinse.

The process allowed two slug tests, one recording falling head and the second recording rising head, for each well. However, in monitoring well MW-4, the static water level intersected the screen; therefore, the falling head test would not be valid as water was displaced vertically into the gravel pack. For this well, only the rising head test reflects actual recovery from the aquifer. The digital data was analyzed with *Aquifer Test* (Waterloo Hydrogeologic) software using the Bouwer-Rice slug/bail test. The output graphs are provided in Appendix C.

2.18 Indoor Air Sampling

Indoor air sampling was conducted in the main site building basement in the vicinity of the source area (basement sump) and the adjacent office. Three indoor air samples were attempted, but a valve malfunction on the canister to establish background air quality prevented collection of this sample. Two composite samples were collected using Summa canisters with regulated air intake rates over an 8-hour period. The samples were analyzed for TCL +10 VOCs and Freon 113 by Air Toxics, LTD.

2.19 Drummed Materials Disposal

All drummed formation cuttings, well development and purge water, and the two drums generated from the previous sump cleanout by Farrand Controls personnel were disposed of off-site by Waste Management, Inc.

2.20 Surveying and Mapping

All new and existing monitoring well locations and piezometers were surveyed for horizontal and vertical control by YEC, Inc. The elevations were tied to a site benchmark (fire hydrant near front entrance of the site) set at an arbitrary elevation of 100.00 feet. Horizontal control was tied to the New York State Plane Coordinate System. The surveys were conducted in April and December 1999, after Phases 1 and 2 of the investigation were completed. The surveyed map is provided in Appendix D.

2.21 Health and Safety Program

Prior to performance of the field program and as part of the RI/FS Work Plan, a site-specific Health and Safety Plan was prepared in order to establish occupational health and safety requirements, responsibilities and procedures to protect workers during the field investigation at the Farrand Controls Site. The requirements for worker health and safety were based on the following:

- The Standard Operating Safety Guides, US Environmental Protection Agency (EPA), Office of Emergency and Remedial Response;
- The Occupational Health and Safety Administration (OSHA) Regulations, 29 DFR Parts 1910.120 and 1926;
- NYSDEC Division of Hazardous Waste Remediation Technical and Administrative Memorandums 4016 and 4031;
- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, NIOSH, OSHA, USCG and EPA;
- Superfund Amendments and Reauthorization Act (SARA), Title I, Section 126

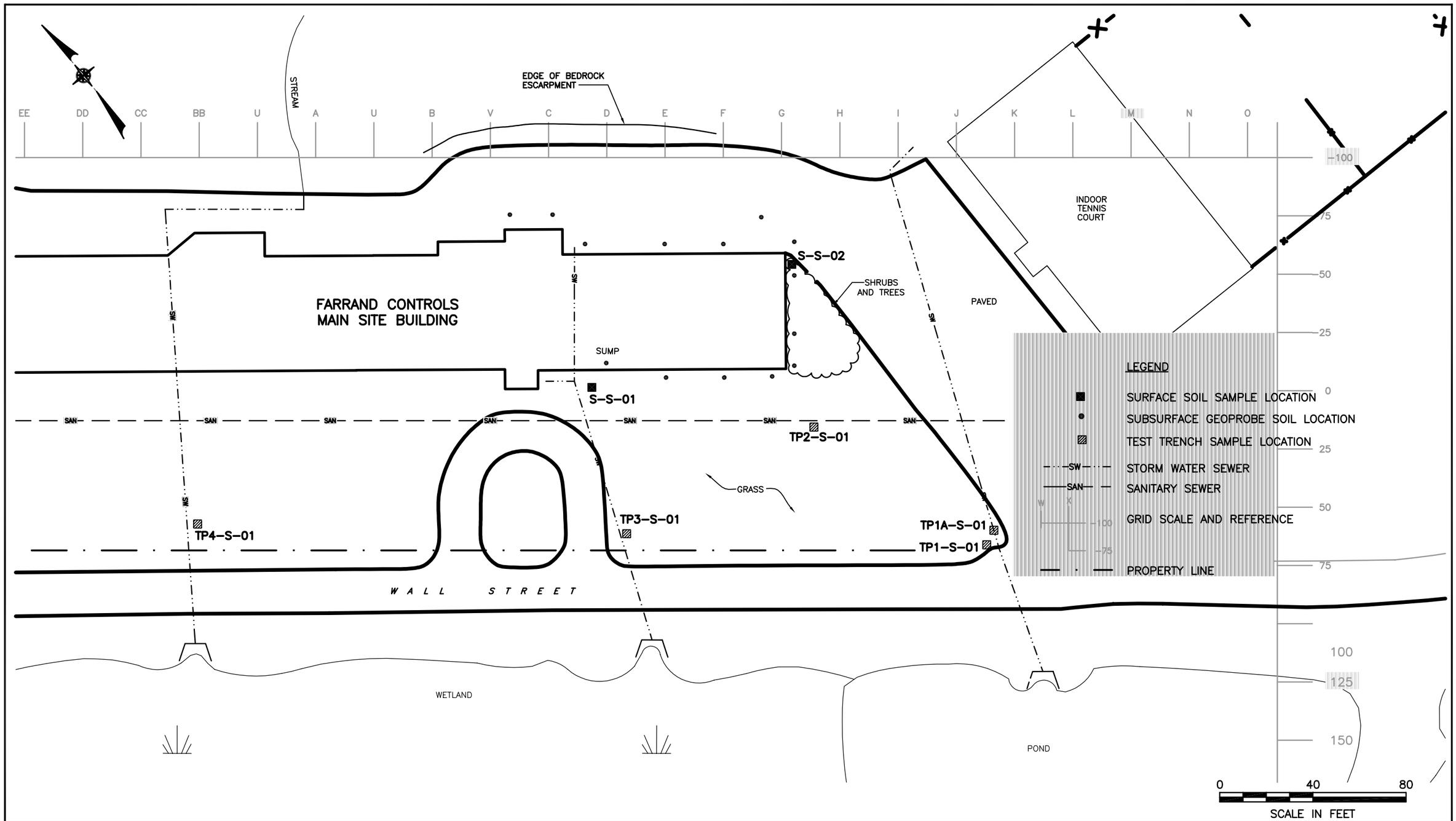
Activities associated with the remedial investigation were performed in accordance with this Health and Safety Plan.

2.22 Quality Assurance/Quality Control Program

As part of the RI/FS Work Plan, a Quality Assurance and Quality Control (QA/QC) Plan was prepared which describes the sample collection and analytical procedures to be used to ensure high quality, valid data. QA/QC samples were collected to assure quality control for the air, soil, surface water, sediment and groundwater samples obtained during the remedial investigation. The results of these samples will enable data evaluation for accuracy and provide support for the development of a remediation plan for the site. Sample collection and analytical procedures utilized during this investigation were performed in accordance with the procedures detailed in the QA/QC Plan.

2.23 Data Validation

Severn Trent Laboratories (STL) was utilized to perform the analyses of all site media sampled, except for the air samples collected during the remedial investigation. The air samples were analyzed by Air Toxics, LTD. STL is a New York State Department of Health (NYSDOH) Environmental Laboratory Approved Program (ELAP) and Contract Laboratory Program (CLP) certified laboratory meeting requirements for performing sample analysis according to NYSDEC 12/95 Analytical Services Protocols (ASP). Air Toxics is a NYSDOH approved laboratory. Summary documentation regarding data validation was completed by the laboratory using NYSDEC forms (Contract Laboratory Sample Information Sheets) and submitted with the data packages as required in the RI/FS Work Plan. The results of the data validation are presented in Section 4.



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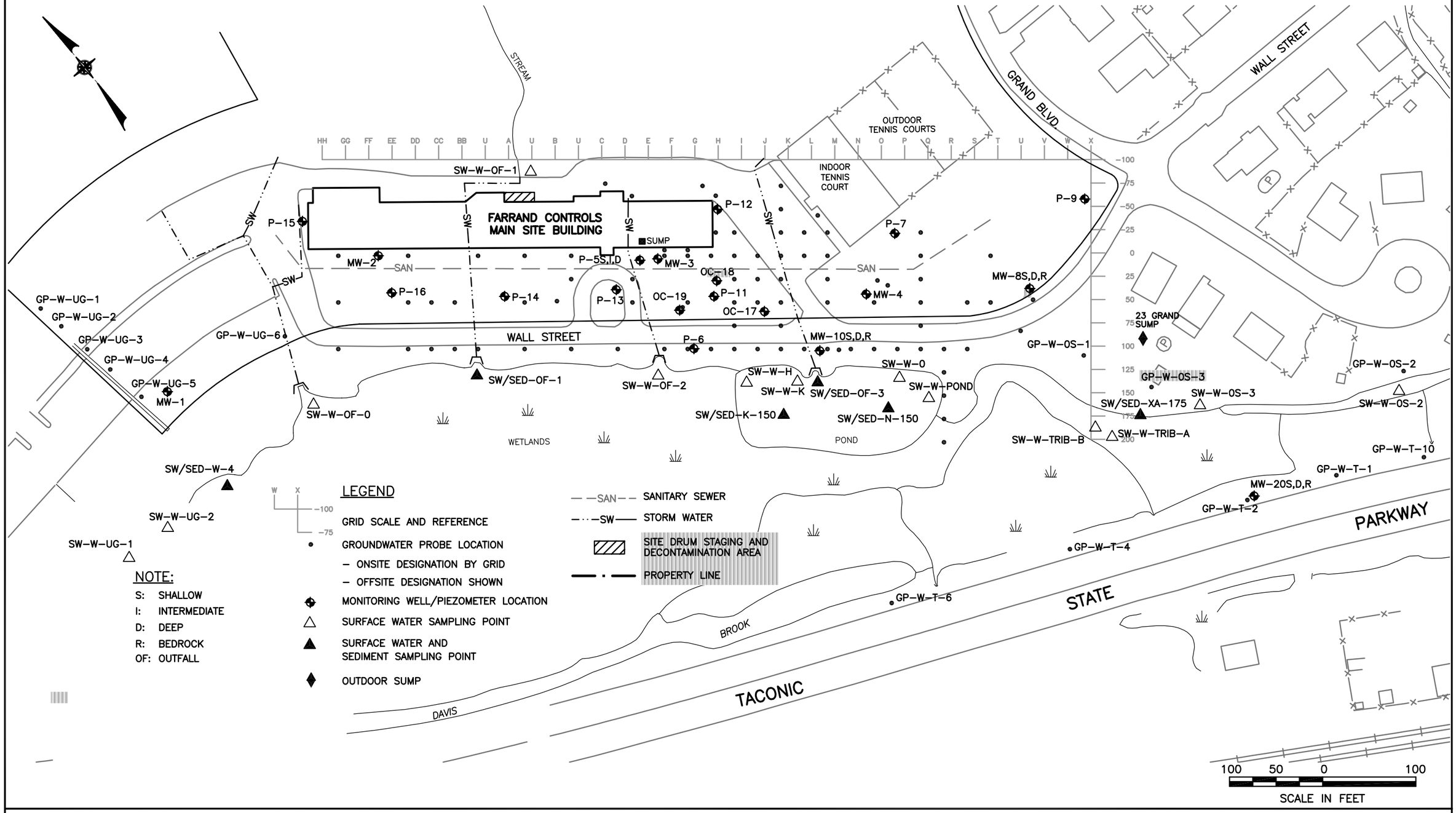
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

SOIL SAMPLING LOCATIONS

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

FIGURE 2-1



FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

Dvirka and Bartilucci
Consulting Engineers
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GROUNDWATER, SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS

FIGURE 2–2

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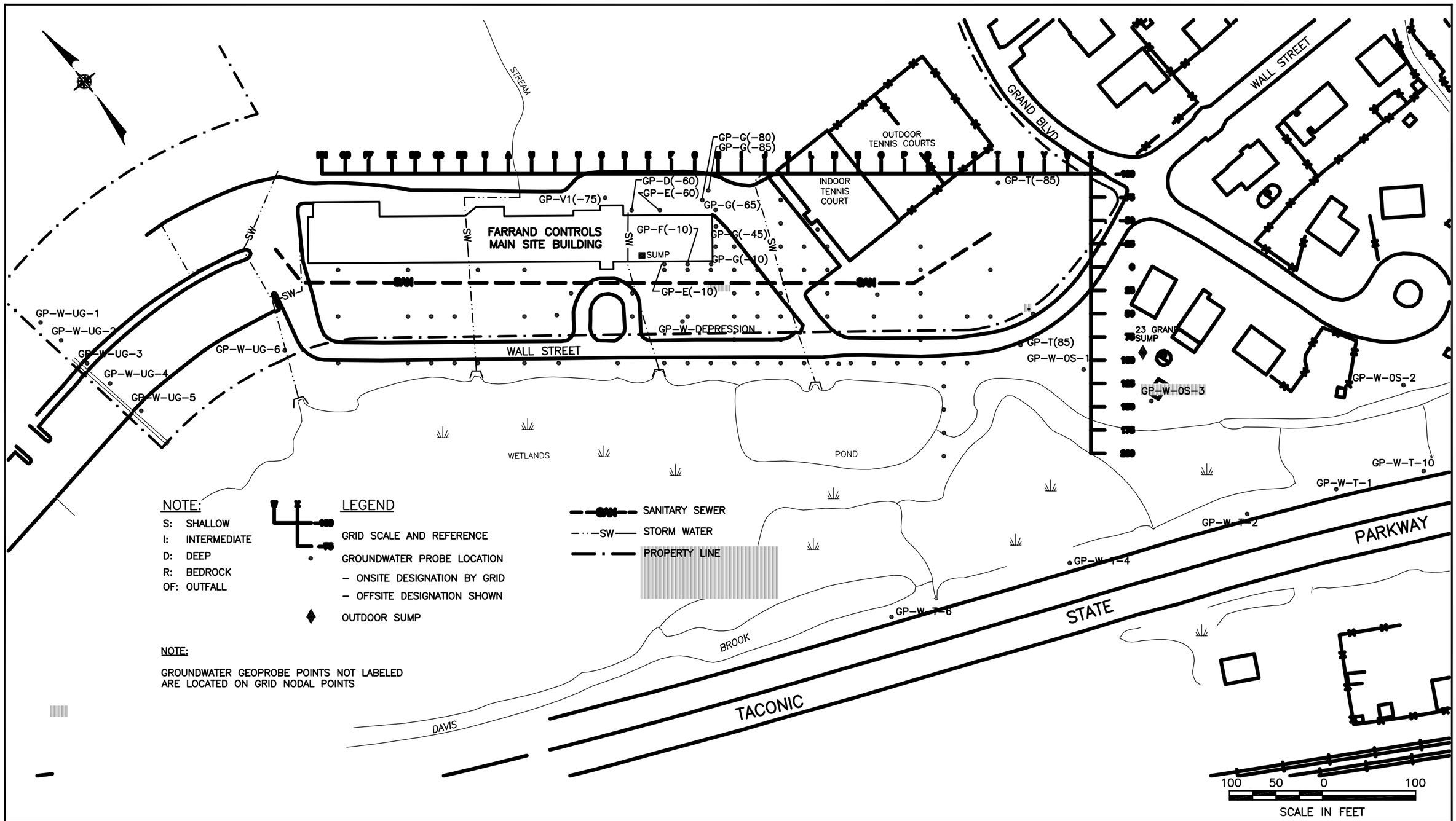

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

Dvirka and Bartilucci
Consulting Engineers
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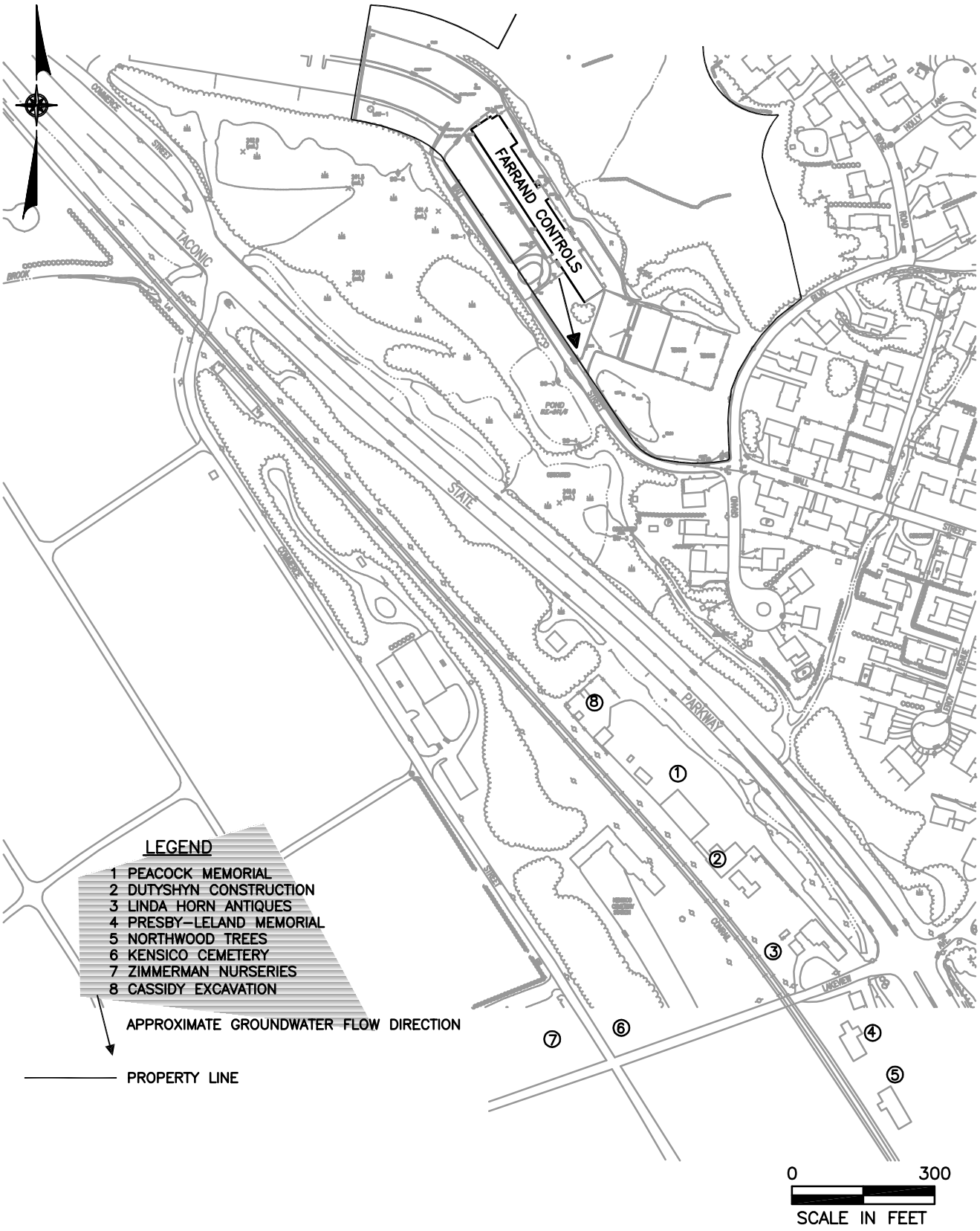
GROUNDWATER GEOPROBE LOCATIONS

FIGURE 2–2A



FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

APPROXIMATE LOCATION OF COMMERCIAL WELLS

Dvirka and Bartilucci
Consulting Engineers
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FIGURE 2–3

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TABLE 2 - 1
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
COMMERCIAL WELL SURVEY FINDINGS

BUSINESS	DATE INSTALLED	INSTALLER	SCREEN ZONE (ft)	DEPTH (ft)	DIAMETER (in)	USAGE	STATUS	NOTES
Cassidy Excavating								No information obtained
Dudyshyn Contracting								Had no information on well
Peacock Memorial								Had no information on well
Linda Horn Antiques	May-86	P.F. Beal & Son, Brewster, NY	?	305	6	Potable	Good working order	
Presby-Leland Memorial								Had no information on well
Northwood Trees								No information obtained
Kensico Cemetery	late 1800s, early 1900s	?	? - open in rock	400 (approx.)	6	?	?	
Zimmerman Nurseries								Had no information on well

TABLE 2-2

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDNE
MONITORING WELL AND PIEZOMETER CONSTRUCTION DETAILS

SITE DESIGNATION	Date Installed	Casing Diameter (in)	Total Depth (ft)	Screen Interval (ft)	Screen Slot Size (in)	Gravel Pack (ft)	Bentonite Seal (ft)
MW-1	4/29/93	2	9	5-9	0.010	1.5-9	0.5-1.5
MW-2	4/29/93	2	17	7-17	0.010	6.5-18	5-6.5
MW-3	4/29/93	2	18	8-18	0.010	5-17	3-5
MW-4	4/29/93	2	12	2-12	0.010	1-12	0.5-1
P-5 S	11/19/93	0.75	13	8-13	0.010	6-13	5-6
P-5 I	11/19/93	0.75	20	18-20	0.010	16.5-20	15.5-16.5
P-5 D	11/19/93	1.25	48	43-48	0.010	42-48	37-42
P-6	11/19/93	0.75	7	3-7	0.010	8-12	5-6 & 7.5-12
P-7	6/2/94	1.25	19	9-19	0.010	8-12 **	7-8 **
MW-8 S (P-8)	6/2/94	1.25	10	6-10	0.010	5-10 **	4-5 **
MW-8 D	10/12/99	2	36	26-36	0.010	23-36	21-23
MW-8 R ***	10/19/99	2	56	41-56	0.010	39-56	37-39
P-9	6/2/97	1.25	10	7-10	0.010	6.5-10 **	5.5-6.5 **
MW-10 S (P-10)	6/2/94	1.25	10	6-10	0.010	5-10 **	4-5 **
MW-10 D	10/12/99	2	53.5	43.5-53.5	0.010	41-53.5	39-41
MW-10 R ***	10/20/99	2	63.5	61-63.5	0.010	59-63.5	57-59
P-11	6/2/94	1.25	15	5-15	0.010	4-15 **	3-4 **
P-12	6/2/94	1.25	18	8-18	0.010	7-18 **	6-7 **
P-13	6/3/94	1.25	15	5-15	0.010	4-15 **	3-4 **
P-14	6/3/94	1.25	15	5-15	0.010	4-15 **	3-4 **
P-15	6/3/94	1.25	8	1.5-8	0.010	1.5-8 **	0.5-1.5 **
P-16	6/3/94	1.25	15	5-15	0.010	4-15 **	3-4 **
P-17S (OC-17)	8/27/97	2	12	3.5-12	0.010	3-12	0-3
P-17D	8/27/97	2	35	30-35	0.020	28-35	0-3 *
P-18S (OC-18)	8/27/97	2	18	8-18	0.010	7-18	0-7
P-18D	8/27/97	2	27	22-27	0.020	20-27	0-7 *
P-19S (OC-19)	8/26/97	2	12	5-12	0.010	4.5-12	0-4.5
P-19D	8/26/97	2	51	46-51	0.020	45-51	0-4.5 *
MW-20 S	10/14/99	2	15	5-15	0.010	3-15	0.5-3
MW-20 D	10/14/99	2	77	67-77	0.010	65-77	63-65
MW-20 R ***	10/14/99	2	98	88-98	0.010	85-98	77-85
MW-21S	4/17/01	2	15	5-15	0.010	3-15	2-3
MW-21R***	4/17/01	2	28.8	18.8-28.8	0.010	15-28.8	10-15
MW-22S	4/12/01	2	15	5-15	0.010	3-15	1-3
MW-22R***	4/16/01	2	35	25-35	0.010	17-35	10-17

Notes
MW: Monitoring well
P: Piezometer
S: Shallow
I: Intermediate
D: Deep
R: Shallow bedrock well
* Well cluster lacking seal between screen zones
** Measurements were estimated from drawings in the logs
*** Bedrock wells have 4" diameter steel protective outer casings enclosing 2" PVC riser pipes in overburden

3.0 PHYSICAL AND ECOLOGICAL CHARACTERISTICS OF THE STUDY AREA

3.1 Surface Features

The predominant surface feature at the Farrand Controls Site is a sub-vertical, approximately 40 to 60 feet high escarpment rising behind the site buildings. Above the sub-vertical escarpment, slopes rise approximately 30 percent toward less steeply inclined upper ridge slopes. The escarpment and upper slopes are vegetated with primarily deciduous trees and shrubs. An ephemeral waterfall, known locally as Farrand Falls, descends a sparsely vegetated rock face at the base of the escarpment behind the main Farrand Controls building. Above the waterfall, drainage follows a well-developed swale eroded into the cliff. The swale originates near the northern part of the Mount Eden Cemetery loop road north of the site. A smaller drainage swale descends the escarpment between the main facility building and the indoor tennis court and appears to host an eroded slump.

A semi-enclosed basin south and southwest of the site supports a pond and surrounding wetlands. Beyond the wetlands to the west, are the Taconic State Parkway and Conrail railroad tracks. The southeast-elongated pond/wetland complex is approximately 1,000 feet long and approximately 300 to 400 feet wide. This is one in a series of local ponds and wetlands along which the parkway and railroad tracks are aligned. Several streams, some discontinuous, trend southeastward through the lowland.

Kensico Reservoir is located approximately 3,000 feet east of the site (Figure 1-1). The reservoir provides water for New York City and parts of lower New York State. The reservoir is upgradient of the Farrand Controls Site at a higher elevation of more than 100 feet.

3.2 Facility Features

Facilities at the Farrand Controls Site include two buildings, two outdoor tennis courts and paved driveways connecting parking areas in the rear, front and sides of the building (see Figure 1-2). Site buildings are accessed from Wall Street and are located northwest of the

intersection of Wall Street and Grand Boulevard. A small visitors parking area in front of the main building forms a circular drive off the Wall Street extension/driveway.

A full basement underlies the central and western portion of the main building and provides office, laboratory, storage and maintenance space. Facility personnel stated that not much information is available on the building construction details.

Three sumps received industrial waste beneath the main site building. All three sumps exhibited contamination with VOCs in 1993, and the sump identified as SU-3 (most eastern), was determined to be a contaminant source. The other two sumps were located in the western part of the building basement. The source sump is constructed in the basement floor, the bottom of which is 8.3 feet below grade. The sump dimensions are three-foot square by 2.6 feet deep. From discussions with Farrand Controls personnel (M. Frenz personal communication to A. Jaroszewski, 1/19/00), pumped fluids from the sump, when it was operational, were discharged to either the storm water pipe immediately to the west or to a drain tile pipe possibly present along the footings of the front building wall.

Buried utilities at the site are comprised of electric, gas, telephone, water supply, storm water and sanitary wastewater sewers. The locations of these utilities are shown in Figure 3-1. Gas and telephone lines parallel the northeast side of the Wall Street extension/driveway. Supply water and sanitary sewers are located along the front of the main building and through the low grassy area between the tennis courts and Wall Street. The sanitary sewer extends toward the site from the former annex beneath asphalt pavement. Electrical power lines reach the main building from a pole located at the base of the cliff behind the main site building's eastern corner. It appears that the utility conduits that may be located in groundwater are the storm water sewer pipes located under the Farrand Controls main site building.

3.3 Soils

Soils at the Farrand Controls Site are mapped as part of the Urban land/Woodbridge soil series, except immediately adjacent to the wetlands where they are mapped as ponded Palm

Carlisle soils (*Ibid*.). Woodbridge soils are deep, moderately drained and generally found in uplands or near the base of upland areas. Water tables in these soils rise to within a few feet of the ground surface. Ponded Palm and Carlisle soils consist of very deep, nearly level, poorly drained soils found in depressions bordering lakes and streams. Throughout most of the year, these soils are inundated, sustaining ponds, freshwater marshes, wetland vegetation, and some shrubs and trees (*Ibid.)*.

3.4 Topography

The Farrand Controls Site is located at an average elevation of approximately 240 feet in a flat to gently southwestward sloping (less than five percent) lowland. The site is situated below, and slightly west of, the southern extent of a southeast-trending ridge. The sub-vertical escarpment, discussed above in Section 3.1, marks the base of this ridge. Above the site, the ridge reaches an elevation of 524 feet. The ridge is part of a broad upland whose eastern slope forms the western shores of Kenisco Reservoir (see Figure 1-1).

Near the site, hummock topography along the base of the ridge suggests slumping of sub-ridge slopes. Most of the slumping appears to originate at the inflection point of the sub-ridge profile where the convex profile of upper slopes changes to a somewhat concave mid-slope profile. Topographic anomalies suggest that slumping may have modified the upper sub-ridge slopes above Farrand Falls in the vicinity of Mount Eden Cemetery's loop road. Topographic anomalies suggestive of slumping also occur northwest of the site above the northern margins of the pond-wetland complex and along the road leading to Mount Eden Cemetery from the Taconic State Parkway. Slumping, possibly associated with reported historic quarrying, appears to have modified basal slopes above the site. A slump is visible on lower sub-ridge slopes east of Farrand Falls above the parking area between the main facility building and the tennis courts. A bowl-shaped depression breaks the cliff face at that location and is drained by a hummocky debris chute that descends to the paved parking area.

The triangularly shaped lowland on whose eastern margin the site is located trends southeastward from Mount Pleasant to just south of the Farrand Controls Site and westward

toward (but not to) Bradhurst Avenue. Several closed basins, ponds and interior-draining streams occur within this lowland. Between the main site building and the wetlands, the terrain slopes less than five percent to the west-southwest.

3.5 Drainage

Site storm water is collected in four storm sewers that discharge to the adjacent southern wetlands. The water is primarily from the site with components of runoff from the highland to the northeast. Paved gutters at the base of the escarpment and catch basins direct runoff to the storm sewers. One storm sewer conveys water from Farrand Falls and the rear parking area, running beneath the main facility building. A second line originates from the catch basin at the bottom of the rear basement receiving ramp and runs under the building east of the main entrance and into the wetlands. This storm water sewer is reported to have received sump discharges as discussed in Section 3.2. East of the main site building, a third storm water sewer runs beneath the parking lot and carries runoff from the parking lot and from behind the tennis courts. The fourth storm sewer line located in the parking lot west of the main building is fed by two shorter sewers that intercept runoff from the parking lot and from the slopes above the escarpment.

It is possible (M. Frenz personal communication to A. Jaroszewski, 1/19/00) that a sub-grade curtain drain is present in the rear of the northern half of the building that may divert shallow groundwater flow around the building. Basement sumps within the main site building are also part of the site drainage. Three active sumps are located in the central portion of the building basement. The sumps are equipped with pumps ranging from ¼ to 1 HP with pumping capacities from 24 to 125 gallons per minute. The sumps are pumped when the groundwater enters the basement interior drain system. This water is treated prior to discharge into the sewer system. The specific pumping rates and frequencies for the sumps are not known. On May 26, 2000, Farrand Controls personnel observed that the pumps operated less than 10 percent of the time for up to 15-minute cycles. The pumped water from each sump is collected in a 4-inch drain line under the basement that discharges to the second sewer line discussed above and ultimately into the wetlands.

Surface water not entering the storm sewers percolates into the ground and/or drains via overland flow into the wetlands.

Following heavy rainfall from tropical autumn storms in 1999, water collected in local depressions forming temporary bogs near the tennis courts and near the main building's northwest corner. At that time, groundwater reportedly rose beneath the site building, flooding its basement (M. Frenz, personal communication to V. Vassil, 10/27/99).

3.6 Geology

The site geology described below was derived by analyzing geological data from the current and previous site investigations, including monitoring well, piezometer and Geoprobe probehole logs, review of results from previous geophysical studies, geomorphologic site reconnaissance, and reviews of aerial photographs and published geological and topographical maps. The site geologic deposits vary from bedrock outcrop to buried bedrock with unconsolidated deposits up to 75 feet thick.

3.6.1 Unconsolidated Deposits

Most of the Farrand Controls Site is immediately underlain by sandy, silty unconsolidated materials, probably deposited as alluvium (sediment deposited by water), glacial till and/or outwash. These deposits occur below approximately 2 to 5 feet of fine sandy silty loam soil. The unconsolidated deposits are of two main types. The primary unit that underlies most of the site consists predominantly of fine to medium-grained sands containing some gravel and silt. A less extensive fine-grained unit overlies the medium-grained sands near the wetlands where it is approximately 25 feet thick at monitoring well cluster MW-10 and pinches out northward between monitoring well MW-3 and the main site building. The fine-grained unit is comprised of interbedded silt, clay, and silty and clayey sands. Two geologic cross sections have been developed for the site: 1) southward across the site from the bedrock escarpment through the contaminant source sump to monitoring well clusters MW-10 and 20; and 2) southeastward

from the sump to bedrock monitoring well cluster MW-8. Locations of the cross sections are shown on Figure 3-2 and the cross section are presented in Figures 3-3 and 3-4.

- Unconsolidated Sand Unit

Subsurface deposits of fine to medium-grained, micacous and quartzo-feldspathic sand with some silts and gravels predominate across the site. These sands continue to a refusal surface (*i.e.,* surface beyond which the Geoprobe drive point could not penetrate because of the hardness of materials encountered) where increased gravels occur with the sand. The gravels may represent the top of the weathered bedrock or may be veneers of semi-consolidated, deeper subsurface deposits, such as till or colluvium that overlie bedrock (discussed below).

The unconsolidated sand unit is brown and reddish brown chromatic tones typical of an oxidizing environment, and probably relates to deposition within an outwash or alluvial regime. The unit ranges in thickness from not being present at the bedrock cliff face and less than 7 feet thick in borings near the tennis courts and at P-15, to approximately 34 feet thick at monitoring well cluster MW-8. At monitoring well cluster MW-10, the sandy unit is approximately 15 feet thick and underlies the locally extensive finer grained unit. Off-site at monitoring well cluster MW-20 (adjacent to the Taconic State Parkway), a predominantly sandy unit extends from the ground surface to a depth of 43 feet.

- Unconsolidated Fine-Grained Unit

Fine-grained materials are most prevalent adjacent to the pond/wetlands. At monitoring well cluster MW-10, fine-grained deposits occur from the ground surface to a depth of 33 feet. The fine-grained unit is absent at monitoring well cluster MW-8. Near the source area sump, a silty clay was reported between depths of approximately 20 to 27 feet at piezometer P-5. Probeholes F-(-10) and E-(-10) located near the sump encountered some silt in a sandy unit. The clay was overlain and underlain by sand. This suggests that the fine-grained unit pinches out in a northerly direction away from the wetlands. Typically, the fine-grained unit ranges in color from gray to gray-brown to green, and locally exhibits organic matter (decomposing vegetation). Gray

and green tones indicate deposition in a reducing environment, such as an oxygen-depleted bog or marsh. These conditions most likely characterize deposition occurring currently in the pond/wetland.

Off-site at monitoring well cluster MW-20, interbedded dark gray-brown and olive toned clay to silty sand were observed between depths of 43 to 58 feet. Most of these materials are soft (based on blow counts below 10 per 6-inch penetration), although a dense clay (yielding blow counts of 48/12 inches penetration) occurs at a depth of 54 to 55 feet.

Between depths of 58 and 78 feet in MW-20, red, yellow and orange sandy deposits are interbedded with brown and darker gray fine-grained sands. This unit was not detected in onsite borings.

- Semi-Consolidated Deep Deposits

Geoprobe probeholes indicate a "refusal surface" of significantly higher relief than exists at the ground surface. Refusal depths identified through probehole sampling were combined with descriptions from soil boring logs to construct a surface map of the refusal surface, which is provided as Figure 3-5. The mapped refusal surface may indicate the depth to bedrock in some locations and the depth to dense, unconsolidated till deposits or landslide deposits.

The refusal surface map indicates that the bedrock escarpment rising above the site probably continues beneath it, under the rear portion of the Farrand Controls main building. Several small, southwest-trending swales cross the refusal surface, particularly beneath the parking area west/northwest of the main site building, and beneath the eastern end of the building where a subsurface swale continues southwestward beneath the lawn (see Figure 3-5).

An anomalous, approximately 100-foot wide, 200-foot long topographic mound marks the refusal surface roughly between the tennis courts and the main site building, descending toward the wetland. This mound is characterized by an irregularly undulating or "hummocky" surface and overlies a bedrock low detected by seismic refraction and ground penetrating radar

surveys conducted in 1994 (figure provided in Appendix D). The refusal surface mound occurs immediately below a scar in the cliff face, interpreted as an ancient landslide scarp. The bedrock depression detected geophysically may be the downslope continuation of the landslide failure surface, which was subsequently buried by colluvium (landslide debris) and then by the glacial till, outwash and/or alluvium that later (or concurrently) filled the lowlands.

Beneath the parking lot, the top of the refusal surface mound is within 7 to 10 feet of the ground surface and is fairly flat. Probehole J-(-50) encountered refusal 14 feet below grade. This suggests that the upper surface of the mound slopes backward or is crossed by a swale. The irregularly undulating, steeply sloping refusal surface extending from below the parking area toward the wetland is consistent with a landslide toe and run-out apron. Colluvium typically incorporates boulders and mud-debris along with vegetation. Boulders and large blocks would impede a Geoprobe, and if sufficiently large, could impede a drill rig. The buried landslide deposit is illustrated on the bedrock refusal surface map (Figure 3-5) and depicted on the geologic cross sections (Figures 3-3 and 3-4) as a colluvial wedge. Because its surface was not penetrated or sampled during Geoprobe probeholes, the composition and relative permeability of the mound is uncertain.

Colluvial run-out may extend to monitoring well MW-10D. MW-10D was installed to a depth of 53.5 feet, when drillers reported encountering hard rock. The rock was augered into for 0.5 feet during which drillers reported that augering became increasingly more difficult and the well was set at what was believed to be the bedrock surface. When monitoring well MW-10R was drilled, the substrate was alternately soft and hard between depths of 54 to 61 feet and speculation was made that the drill had encountered a weathered, steeply dipping fracture zone. At a depth of 63.5 feet, the borehole began collapsing around the augers and no core samples were obtained. The drillers determined that they could not auger further and the bedrock well was set in what was thought to be a fracture zone. Based on the geometry of the subsurface mound, it is not likely that MW-10R terminates in colluvium. More likely, this well is set within a weathered bedrock fracture zone.

Basal till was reported during the installation of piezometer P-5, between depths of 40.5 and 48 feet (Environmental Management, LTD, April 1995), and in the Geoprobe boring through the source area sump. However, informed description of the till is limited, and its characteristics and extent at the site are unknown. P-5 is located approximately 20 feet southwest of the source sump and was installed to just above the bedrock. At P-5, basal glacial till occurs immediately above bedrock. The boring in the sump reached a depth of approximately 40 feet below ground surface and terminated in three feet of coarse gravel interpreted as till. It is likely that several feet of till overlie the bedrock surface at the site, except where scoured away by post-depositional processes, such as stream flow or land sliding.

Off-site at monitoring well MW-20D, dark yellow-brown to red-brown and orange mottled with gray and brown sands and pebbles occur at a depth of 59 feet. Below this to a depth of 77 feet, mottled layers of highly chromatic sand alternate with dark gray sands and olive-gray/brown silty sands, clayey silts and silty clays. These highly chromatic sand units alternating with finer grained gray-brown units were not observed onsite and suggest divergent and locally fluctuating depositional environments.

3.6.2 Bedrock

Geologic materials exposed in the cliff face immediately west of the Farrand Controls Site consist of an intensely folded and jointed, black and white banded gneiss. Narrow, light colored quartzo-feldspathic bands occur between thicker, dark bluish gray-black amphibolite-bearing bands. Observed bedrock is consistent with the Manhattan formation, a pelitic garnet-amphibolite schist and schistose gneiss which is mapped at the site on the *Geologic Map of New York State* (Fischer, Isachsen and Rickard, 1970). Irregularly spaced, mainly steeply dipping joints and localized layers of highly foliated, mica-bearing schistose rock transmit groundwater which was observed "weeping" from the cliff face in October and November 1999. The stream that flows down the bedrock escarpment behind the main site building descends an angularity indented section of the cliff face where intersecting joint patterns have contributed to block failures in the exposed bedrock. Old landslide scars visible on the cliff face and on slopes above the escarpment on and off-site strongly suggest past episodes of slumping and/or block failures.

The deep boring for monitoring well MW-8R penetrated 15 feet of competent, but fractured bedrock. Bedrock consisted of black and white banded gneiss with well developed pink garnet augen surrounded by white, recrystallized quartz in the white bands. The bluish-black bands are composed of amphibolite. Fractures in the core samples were probably rotated, therefore, the fracture orientations were not noted. However, most fractures dipped between 70 and 80 degrees. This is consistent with the steeply dipping fractures noted in similar bedrock exposed on the cliff face behind the main site building.

As discussed above, the deep boring for MW-10R penetrated a zone of alternating hard and soft material that may have been a weathered bedrock fracture zone. Although no samples were retrieved during attempts to collect rock cores from MW-10R, coarse, dark-gray drill slough circulated up the augers to the ground surface and was consistent with a black and white gneissic source.

Off-site at MW-20R, a zone of alternately hard and soft material was penetrated between depths of 77 and 83 feet. Although split-spoon samples were not successfully obtained from those intervals, material retrieved from the sample bit revealed a highly altered foliated rock with white quartz crystals and orange (calcite?) rhombs in a pale, bi-colored clayey groundmass. Some of the groundmass was light grayish beige and some was light blue-green. This material may be an indurated basal till or may be deeply weathered bedrock.

Underlying the clayey material, a 2.5 foot long bedrock core sample was retrieved from a 10-foot rock core sampler. The upper 6 to 10-inches of the core consisted of a fractured, pale silver to pale gray/green, greasy, foliated, platy rock identified in the field as talc-bearing serpentinite. Similar serpentinite bodies probably occur in fracture zones throughout the region, including the lowland adjacent to the site.

Below the serpentinite sample in monitoring well MW-20R, rock core was a fractured, gray, black and white banded gneissic mylonite that contained 0.5-inch wide bands of graphite. The lithology of the bedrock sampled at MW-20R is different from bedrock outcropping at the

Farrand Controls Site and encountered at MW-8R. Samples were unobtainable from the MW-10R boring. Drilling for monitoring wells MW-10R and MW-20R encountered a layer of alternately hard and soft material just below the initially determined refusal surface. Drilling conditions at these wells suggest that underlying materials may be similar, therefore, it is possible that serpentinite underlies MW-10R and that a major structural boundary crosses the lower (southern) portion of the site.

3.7 Hydrogeology

Geologic and hydrogeological properties at the Farrand Controls Site and vicinity produce a complex groundwater flow regime that is hydraulically influenced by subsurface heterogeneities, such as geological features and materials, and by the Farrand Controls facility structures.

3.7.1 Groundwater Flow

Horizontal groundwater flow at the Farrand Controls Site is predominantly southward, with southeast and southwest components in different parts of the site. In April and November 1999, and January 2000, the shallow water table was encountered within approximately 10 feet of the ground surface. Figures 3-6 and 3-7 present water table contour maps for April and November 1999, respectively. Attempts were made to develop potentiometric surface maps for the deep overburden groundwater, but were considered inappropriate because of the varied hydraulic heads and limited data points. The water levels and surveyed measuring point elevations are provided in Table 3-1.

Some water levels from the November 1999 gauging event appear anomalous. The water levels in identical site wells between the April and November 1999 gauging events were generally within approximately a foot of each other. The November 1999 levels in well cluster OC-18 were approximately three feet higher than in nearby wells and in cluster OC-17 were approximately two feet lower than in nearby wells. These differences did not occur in the April 1999 gauging, and because of their magnitude and isolated occurrence, are not used in ground

water flow determinations. It is possible that the anomalous readings represent intense localized flow regimes that reflect subsurface features with associated high recharge and discharge rates that might occur in the vicinity of a landslide "pocket" after a high precipitation event. In the two days prior to the November 2, 1999 water level measurements, significant precipitation occurred in the area with rainfall of approximately 2 inches. It also may be possible that the lack of seals between the shallow and deep screens in the "OC" wells contributes to the erratic groundwater elevations in the wells. As a result, the elevations in the wells are not considered reliable due to the assumed lack of seals.

The April, November 1999 and January 2000 water table maps, provided in Figures 3-6, 3-7 and 3-7A, are fairly similar. A steep hydraulic gradient exists at the northwestern area of the site, where the water table slopes about 4 percent to the south. Between monitoring well MW-2 and the circular driveway in front of the main site building, the water table slopes southward 0.5 percent. Anomalous high groundwater elevation readings at piezometer P-6 were recorded. This anomaly is evident in the water contour maps prepared in May 1993 and June 1994, and may be associated with localized recharge as discussed above. Localized water table flow may also be affected by the intermittent operation of the basement sump pumps under the southern portion of the main site building.

The groundwater levels for the January 2000 monitoring event were generally similar to the April and November 1999 levels. One exception was for MW-8R where the water level was approximately 13 feet deeper than in the November gauging event. This apparent anomalous reading was field confirmed. The water level in the bedrock well may reflect the effects of localized seismic activity. A small earthquake was reported to have occurred in the region within a few days of the January 2000 gauging event.

Groundwater elevations for monitoring wells and piezometers in April and November 1999, and January 2000, are presented in Table 3-1. Differences in head within clustered monitoring wells and piezometers provide evidence that the southern portion of the site is characterized by upwelling of deep overburden groundwater, while downward flow of shallow overburden groundwater occurs near the main building. The hydraulic head differences for the

November 1999 and January 2000 gauging events were similar. Net hydraulic heads and associated vertical gradients for the November 1999 for well clusters MW-5, 8, 10 and 20 are provided in Table 3-2 and are discussed below.

Piezometer cluster P-5 indicates a greater head in the shallow piezometer and a net downward flow. Piezometer P-5 is located just south of the main site building near the source area sump. A net head difference of +0.12 feet exists between the shallow piezometer (screened at 8-13 feet) and the deep piezometer (screened at 43-48 feet) resulting in a downward gradient of 0.003 ft/ft.

All other monitoring well clusters, MW-8, 10 and 20, show upward flow. At cluster MW-8, upward flow occurs between all three screen intervals (6-10 feet, 26-36 feet and 39-56 feet) with a head difference of -0.57 feet between the bedrock and shallow wells, and a resulting upward gradient of 0.013 ft/ft. At cluster MW-10, flow is also upward between all screen intervals (6-10 feet, 41-53.5 feet and 59-63.5 feet) with a head difference of -1.65 feet and an average upward gradient of 0.043 ft/ft. Between MW-10D and MW-10R (screened within 5.5 feet of each other) the head difference is -1.09 feet with an upward gradient 0.073 ft/ft.

Off-site at well cluster MW-20, the head difference between the shallow and deep wells (screened at 5-15 feet and 67-77 feet) is -1.67 feet with an upward gradient of 0.023 ft/ft. Downward flow occurs between MW-20D and MW-20R (screened at 88-98 feet) where the head difference is +0.77 feet with a downward gradient of 0.035 ft/ft. However, net upward flow occurs between the bedrock and overburden wells where the net head difference is -0.9 feet. This implies unusual hydrologic conditions in the substrate or suggests that monitoring well MW-20D may be screened in the top of the bedrock.

Significant (greater than 1.0 feet) negative head differences observed at monitoring well clusters MW-10 and MW-20 are consistent with upwelling of deep groundwater. The net negative head difference between monitoring wells MW-8S and MW-8R was less than half that observed between shallow and deep/bedrock wells MW-10 and MW-20. This may reflect the shallower depth to bedrock at MW-8R or indicate that less upward flow occurs through the

garnet amphibolite gneiss observed there than through materials encountered in well clusters MW-10 and MW-20.

The well clusters and individual well screens discussed above are shown in the hydrogeologic sections in Figures 3-8 and 3-9. The net hydraulic head flow directions are included near the screen zones. Observations are as follows:

- The higher hydraulic heads in deep groundwater observed adjacent to the pond and along the lower/southern portions of the Farrand Controls Site indicates that the wetland/pond complex and the adjacent portion of the shallow overburden groundwater are recharged by deep groundwater rising through discontinuities in the bedrock. Upwelling near the pond may account for the anomalous groundwater high observed in piezometer P-6.

- Downward flowing shallow overburden groundwater near the source area sump and along the front of the main site building could transport dissolved contaminants downward, as well as enhance the downward migration of DNAPL. The change between positive and negative head differences that occurs across the site between piezometer P-5 and on-site monitoring well clusters MW-8 and MW-10 implies a zone exists between the main building and the pond/wetland where shallow groundwater flow is primarily horizontal.

3.7.2 Hydraulic Conductivity and Groundwater Flow Velocity

Slug tests performed in piezometer P-5D in 1994 by EML indicated hydraulic conductivities for unconsolidated sands and silts at the Farrand Controls Site as ranging from 2.74×10^{-2} cm/sec to 3.96×10^{-3} cm/second. These rates are consistent with the range reported for clean sand and gravel by Freeze and Cherry (1979).

Six slug tests were performed in four monitoring wells as part of this investigation to determine the hydraulic conductivity of subsurface materials between the source area sump and the wetlands. Slug tests were performed in wells MW-10R, 10D, 3 and 4. Rising and falling head slug tests were performed in MW-10D and 10R. Because the water table intersected the screen zones in MW-3 and MW-4, only rising head tests were performed at these locations.

Calculated hydraulic conductivities were 8.44 x 10^{-3} cm/sec (23.93 feet per day) for monitoring well MW-3, 3.87 x 10^{-2} cm/sec (109.73 feet per day) for well MW-4 and 5.53 x 10^{-3} cm/sec (15.68 feet/day) for well MW-10D. Although monitoring well MW-10R was placed in bedrock, its screen sits in a highly weathered saprolitic/fracture zone that yielded an average hydraulic conductivity value of 5.38 x 10-4 cm/sec (1.53 feet per day). Table 3-3 provides the hydraulic conductivities determined at the site and includes published hydraulic conductivity ranges for unconsolidated overburden sediments.

Slug test results indicate that hydraulic conductivity of unconsolidated materials at monitoring wells MW-3 and MW-10D are consistent with conductivities typical of silty fine sands, sands, well-sorted sands and glacial outwash. Results for the slug test at well MW-4 indicate hydraulic conductivity consistent with well sorted sands and glacial outwash. Material in the 2.5 foot screen zone in MW-10R has hydraulic conductivity values consistent with silt, sandy silt, clayey sand and glacial till. Hydraulic conductivities of shallow and deep overburden sediments at the site are consistent with conductivity values reported previously.

A groundwater flow rate was calculated for the shallow fine to medium-grained unit using the hydraulic conductivity values described above as follows:

$$Vx = \frac{1}{Ne}\frac{dh}{dl}K$$

where: Ne = porosity of 0.23 (Fetter, 1988)

$\frac{dh}{dl}$ = gradient of .003 ft/ft (between MW - 3 and MW - 4)

K = hydraulic conductivity of 66.83 ft/day (average of MW-3 and MW-4)

The resultant groundwater flow velocity in the overburden sand unit is 1.04 ft/day. An actual flow velocity for the deep zone was difficult to calculate because of limited data points and varied vertical hydraulic heads. The lower K value derived from the slug test in MW-10D, screened in the lower deep zone, suggests a slightly lower flow rate for this finer sand unit.

3.7.3 Subsurface Effects On Groundwater and DNAPL Flow

Several surface and subsurface features apparently influence groundwater flow at the site and vicinity, and can potentially influence dissolved contaminant flow and DNAPL migration. These features are identified on Figure 3-10 and discussed below.

Shallow overburden groundwater flow is influenced by features such as:

- The regional and on-site escarpment resulting in downward flow components near the escarpment and upwelling at lowlands.
- The poorly draining adjacent lowland with its series of ponds and interconnected drainages, including the pond/wetlands which may result in localized recharge.
- The artificial features related to site development, such as:
  - The building basement walls and reported curtain sub-drain located along the back of the building resulting in diverted flow around the building.
  - The basement sump system that pumps groundwater under the southern portion of the basement.
  - The pavement and building rendering much of the upper portion of the site impermeable to infiltration of runoff and precipitation.
  - The storm water sewers below the central and north central portions of the building.

Complex subsurface structures are also influencing groundwater and DNAPL migration. At the site, irregularities in the sub-surface may be countering the tendency of some contaminants to move in the direction of groundwater flow. DNAPL could be migrating under the influence of gravity and not necessarily in the direction of groundwater flow. Where the bedrock surface or other surface of low permeability slopes away from groundwater flow, DNAPL may follow the sloping surface and concentrate in subsurface depressions. Steeply dipping bedrock fractures and plunging faults may provide pathways for contaminants to sink into the bedrock aquifer. The structures and potential contaminant migration effects are as follows:

- Large-scale swales in the refusal surface can, if of low permeability, influence DNAPL migration in a southwest flow.

- The buried colluvial wedge surface can concentrate DNAPL migration because of its low permeability; its hummocky surface has localized irregular swales in which DNAPL can pool.

- The geophysically identified bedrock depression beneath the parking area could serve as a drain for DNAPL migration and accumulation.

- Localized silt and clay layers in the vadose and phreatic zones can influence DNAPL migration; near the source area at P-5, a reported clay layer at a 20 to 27-foot depth horizon can direct the movement of DNAPL; the extent and attitude of this clay layer is not well defined by existing geologic data.

Other unmapped subsurface features that may exist to influence contaminant migration include the following:

- Ancient faults may be present, as suggested by a suite of linearly aligned features, such as the bedrock cliff and nearby streams, ponds and wetlands, lithologic contrasts between bedrock observed on site and across the pond and upwelling deep groundwater.

- Typically, anomalous groundwater flow is observed in fault zones, and on and below landslide scarps. Linearly aligned depressions are common in fault zones where gouged and fractured rock in and adjacent to faults is more easily weathered than surrounding rock. Faulting increases rock permeability by increasing fractures; as a result, faults often serve as conduits whereby groundwater (sometimes originating from significant depths) rises to the surface and recharges shallow aquifers.

- Landslides, common in fault zones, interrupt shallow groundwater flow. The scars left behind by an evacuated slide mass generally seep groundwater, which may also seep from the toe areas of slide deposits. The presence of seeps on the cliff face above the main site building suggests that seeps also occur in the subsurface along the buried portion of the cliff face and in the buried portion of the landslide scar.

3.8 Ecology and Wildlife Habitat Survey

This section provides an overall habitat based assessment of the Farrand Controls Site and vicinity. This assessment conforms to FWIA Step I guidelines of the NYSDEC Technical and Administrative Guidance Memorandum entitled, "*Fish and Wildlife Impact Analysis for*

Inactive Hazardous Waste Sites" (October, 1994). The purpose of this section is to provide a description of the existing ecology of the site and vicinity, including a site specific description of major habitat types with associated fish and wildlife populations, and identify any other significant on-site resources. The information contained in this section was obtained during the Phase I remedial field investigation and supplemented with data from outside sources, including the NYSDEC and U.S. Fish and Wildlife Service. The field survey for this assessment was conducted in November 1998.

3.8.1 Major Habitat Types

The Farrand Control Site consists of a main site building, approximately 50' x 400', oriented northwest to southeast parallel to Wall Street. The rear of the building has a variable 30 to 50 foot paved driveway/parking area that abuts a rock outcrop which rises above the property towards the northeast. The front of the building has a maintained lawn with some ornamental shrubbery that spans 80 feet sloping gradually toward Wall Street to the southwest. Beyond Wall Street is a forested wetland that is approximately 450' by 250' stretching between Wall Street and the Taconic State Parkway. This wetland interfaces with Davis Brook which runs parallel to the parkway at this location. The areas surrounding the site are largely residential or undeveloped depending on the slope of the property. A forested bedrock outcrop rises adjacent to the rear parking area at an 80 degree slope over a 15 foot rise and then decreases grade to 40 degrees with a rise of over 100 feet. An intermittent stream is carved in the bedrock and tracks directly to the center of the main site building where a culvert conveys it beneath the building to the forested wetland by Wall Street. The major habitat types for the Farrand Control Site and the wetland immediately southwest of the site (see Figure 3-11) include:

- Forested Wetland (65%): Wetland with standing water year round which includes both undergrowth, such as catbrier, and woody vegetation, such as red maples;
- Maintained Lawn (20%): Regularly mowed and watered grass with some ornamental shrubs included; and
- Impervious Surfaces (15%): Includes the building, and paved parking and road ways.

The forested outcrop is not included for further discussion, since groundwater flow in the area is toward the wetland and no impact would be anticipated in this area.

Habitat types bordering the site include residential development to the northeast, southwest and east beyond the steep sloping rock outcrop approximately 0.7 miles. East of the Taconic State Parkway is sparsely developed grassland, residential areas and the watershed of Kensico Reservoir which lies approximately 0.3 miles east of the site. A list of the vegetation found in and around the site is provided in Table 3-4.

3.8.1.1 - Forested Wetland

The wetlands are downgradient of the building and receive surface water discharges and groundwater flow that traverse the site. The edges of the wetland where it slopes away from Wall Street are gradual and possess heavy ground vegetation such as catbrier and various sedges. The area also has a well developed canopy provided by red maples. In areas where standing water is more persistent the low vegetation is replaced by rooted aquatics and the tree canopy is thinned. Soils within this wetland are very poorly drained with a moderate buildup of organic material. The area immediately downgradient from outfalls has some stumps of trees that have died within the last 10 years.

3.8.1.2 - Maintained Lawn

This cover type represents approximately 20% of the Farrand Controls Site and includes the area between the main site building and Wall Street. The grass is routinely cut and maintained consistent with other residential lands in the immediate vicinity of the site. The grass is a planted lawn with some ornamental shrubs present, mostly near the building facade. The deep green color of the lawn suggests that it received adequate water and nutrient support. There is no indication in the lawn area of stress related to contamination.

3.8.1.3 - Impervious Surfaces

This habitat encompasses the roadways and parking areas both behind and in front of the main site building. A macadam material has been utilized and all runoff from the impervious areas is directed to discharge points into the wetlands. Except for water from Wall Street, which flows into culverts that direct discharge to the wetlands, other storm water filters through vegetation prior to wetlands area discharge.

3.8.2 Wetlands

Forested wetlands represent a substantial portion of the area under evaluation. This forested wetlands contains year round standing water and maintains surface water connection to Davis Brook. This waterway is classified by the New York State Department of Environmental Conservation as "Class C" which would make it suitable for contact recreation and the support of a fish population excluding trout. The wetlands receives discharges from the Farrand Controls Site and the adjacent residential community. The wetlands would also hold flood waters during the spring runoff and rainy season for the area. The wetlands would also afford flood water storage to Davis Brook. Flash flooding is possible during heavy rainfall events because of the large area that has generally steep slopes east of Davis Brook. The wetlands supports both facultative and obligate wetlands species on its northwest and southeast edges where poorly drained soils are seasonally saturated. The center of the wetlands contains standing water up to two feet deep and supports rooted aquatic vegetation and trees. Some trees have died, but it is not clear if this is due to continuous saturation or contaminant influences. This wetlands is regulated by both federal and New York State wetland legislation because of the connection to Davis Brook.

3.8.3 Mammals

The rural setting around the site and the presence of both forested upland and wetlands provides permits the site to host a variety of mammals which are generally tolerant of human activity. White-tailed deer (Odocoileus virginianus) were observed moving between the forested

rock outcrop and the wetlands during daylight hours. Eastern chipmunks (Tamias striatus) and cottontail rabbit (Sylvilagus floridanus) were also noted at the rock outcrop edge beyond the paved areas and rabbits were also observed feeding in the lawn areas. Tracks at the wetlands soft edge suggests the presence of feeding and bathing raccoons (Procyon lotor). The area also likely plays host to many common small mammals, including the gray squirrel (Sciurus carolinensis) and several species of rodents. Probable mammal inhabitants are listed in Table 3-5.

3.8.4 Birds

The rising rock outcrop with mature trees and the forested wetland overlooking open land afford an excellent opportunity for feeding hawks. Although no hawks were observed during the site visit, the red-tailed hawk is likely a common visitor to this area for feeding and resting. The forested area on the outcrop overlooking the site contains less than 50% low ground cover. Song birds and birds seeking grubbing opportunities in the soft earth abound in this area. The supply of fresh water in the wetland also adds to the attractiveness of this area to a wide variety of songbirds, including several species of finches and sparrows. Some dabbling ducks, including mallards, were observed in the wetlands. Wood duck sounds were also verbalized. No wading birds or other percivorous avifauna was observed suggesting that feeding opportunities for these species may be better in the nearby waterways at the Kensico Reservoir and the cemetery pond upstream of the site along Davis Brook. Most birds, excluding ducks that frequent the Atlantic Flyway, have the potential to rest at the site given the presence of the Hudson River 15 miles to the west. No breeding was observed although breeding indications would be limited at the time of the field survey. A subset of the New York State Bird Atlas listing for Westchester County, New York is presented in Table 3-6 providing species observed or expected to utilize the Farrand Controls Site.

3.8.5 Fish

As indicated earlier, Davis Brook is a Class C waterway capable of supporting a viable fish population. The connections to ponds both upstream and down stream of the site provide opportunity for both moving and stagnant water species to inhabit the brook. No fish activity

was observed in the standing water of the forested wetland. While seasonal connection between the brook and wetland would permit fish to enter the wetland, the shallow water and high summer temperatures would minimize year round fish viability. Longnose dace (Rhinichthys cataractae), other daces and common warm water fish, including largemouth bass (Micropterus salmoides), bluegill (Lepomis macrochirus) and creek chub (Semotilus atromaculatus), have been observed throughout Davis Brook A partial list of finfish species which likely frequent this area on a seasonal basis are provided in Table 3-7.

3.8.6 Reptiles and Amphibians

No reptiles or amphibians were observed on the site; however, the presence of both is expected to be common. The rock outcrop, paved parking area with limited traffic and nearby wetlands provides good habitat for both insect and small rodent eating snakes. Rocks and parking areas provide sunning opportunities. Ample cover is available. Employees of Farrand Controls described several snake sitings around the building that likely include the Eastern Garter Snake, ribbon snakes and black racers. The wetlands also provide breeding opportunities for many local amphibians including a variety of frogs. No frogs were observed during the time of the site review likely due to hibernation. Since there does not appear to be a sustained fish population in the wetland area it is likely that several species of frogs, salamanders and possibly newts occupy the wetland. Table 3-8 contains a list of reptiles and amphibians common to the area that could likely inhabit the site and/or surrounding areas.

3.8.7 Rare Species and Critical Habitats

Based on a review of the New York Natural Heritage files by the NYSDEC Wildlife Resources Center, there are no rare species or critical habitats known to occur on or adjacent to the Farrand Control Site. Except for occasional transient individuals, no federally listed or proposed endangered or threatened species exist within a two mile radius of the site according to the U.S. Department of the Interior, Fish and Wildlife Service. Table 3-9 provides a list of all federally listed and proposed threatened or endangered species in New York State.

3.8.8 Biological Associations Found in the Project Vicinity

The area surrounding the site within a 2.5-mile radius varies greatly. East of the site includes steep slopes on forested bedrock exposed hills, residential development and open water associated with reservoirs. The Farrand Controls facility fits the residential and rural nature of the area. The forested wetland of the site is one of several along the course of Davis Brook and along the Taconic State Parkway corridor. An association of cover types with common dominant species is presented in Table 3-10. The biological associations observed are common for this general area.

3.8.9 Observations of Stress Potentially Related to Site Contaminants

The wetlands adjacent to the Farrand Controls Site appear vibrant and support of a rich and diverse ecological community. Evaluations conducted on the wetlands and other sites along Davis Brook found the ecology and diversity of these wetlands comparable to others in the area. Despite this, there is one area of the wetland which raises concern. There is an area in the wetlands in the vicinity of the former sump outfall (shown on Figure 3-11) where biological activity and plant growth is sparse and several trees in this path are dead, which is not common throughout the wetlands and in areas of storm water discharge to the wetlands. This area also coincides with high volatile organic compound concentrations in surface water found in outfall sample SW-W-OF2.

The area of apparent vegetative stress also includes sediment sample point SW-K-150 which exceeded NYSDEC aquatic sediment guidance values for surface water sediment's lowest effect levels for antimony, barium, chromium, copper, iron, lead, magnesium, manganese, mercury, nickel and zinc. The VOC concentrations in surface waters would appear to be more of an influential factor since other areas such as SW-N-150 had similar sediment profiles, but does not visually illustrate vegetative impact. A conclusive determination cannot be derived from evaluation of the available information whether this vegetative anomaly is the result of chemical contamination or environmental hydrologic fluctuations in the wetlands. Focused floral and faunal chemical sampling of body burden levels coupled with environmental sampling would determine the reason for these apparent environmental impacts.

3.8.10 Habitat Values of Vegetative Zones Within the Project Site

The assessment of habitat value provides for assessments of primary functions, such as food chain production, specialized habitat and hydrologic interactions. As part of the analysis, cultural values concerning recreation, aesthetics or other special features must be taken into consideration.

The information gathered as part of this remedial investigation can provide for a hierarchy of habitat values for the cover types found at the Farrand Control Site. It should be noted that this approach is highly subjective. Those functions assumed to be valuable in relative efficiency or importance are ranked as 3 (high), 2 (moderate) or 1 (low). Specific factors and brief descriptions which were utilized in the habitat value analysis of the site's qualitative evaluation are as follows:

- Nutrient Transport Function - Transport of nutrients in detrital-based food chains is strongly dependent on the hydrologic characteristics of the particular ecosystem. For example, wetlands located in lower lying areas export more detrital material than do the higher marsh areas infrequently affected by creek/river overflow. Similarly, detrital transport in the riverine systems is dependent on the river flow regime, especially during periods of peak discharge. In contrast, very little detrital material is exported from isolated ponds and marshes, except during periods of episodic overflow resulting from exceptionally high precipitation.

- Food Chain Support - This function refers to the secondary productivity values of consumer species that a particular ecosystem can support. Secondary productivity is an overall measure of the efficiency of the habitat in terms of nutrient to transfer higher trophic levels.

- Hydroperiod - This factor refers to the frequency of inundation either by river flow runoff or direct precipitation. Areas of good hydrologic linkage help maintain a regular interchange of nutrients and other materials necessary to support diverse flora and fauna.

- Elevational Location - From the above, it is apparent that hydrologic relationships will progressively deteriorate as the depth of flooding decreases. The weakest hydrologic linkages exist in those areas physically isolated from other areas in the system.

- Cultural Evaluation - This particular factor is difficult to assess in detail because of the number of socio-economic considerations which may be involved. Hence, the evaluation in relation to local residential, commercial, or industrial development is largely left to the professional judgement of the project personnel on a specific case-by-case basis.

- Recreation - Recreation is a vital personal and social need which provides opportunity for self-expression, physical exercise, and a change of pace from normal or routine activities. Outdoor recreation is a major leisure activity and is growing in national importance with a trend towards a higher standard of living. A significant portion of the total recreational output is water based or water related. As such, greater weight is given to those types of habitats.

- Socio-Economic - This factor pertains to benefits which can be attributed directly to renewable resources, recreational enjoyment, or other features associated with a particular habitat.

- Aesthetics - Selected types of habitats are distinctive landscape features which can please the aesthetic sense through the intrinsic appreciation of natural beauty. Wetlands, or any other type of natural landscape, can also be offensive if their features have been adversely modified by incompatible human activities. Aesthetic value can be largely determined by the degree of visual diversity and contrast between the physical elements, such as landforms, water bodies, vegetation types and land use types.

- Food Chain Production - This factor determines the growth of vegetation in a habitat and influences the populations and secondary productivity of animals that feed on the plants, or that feed at high trophic levels in the community.

- Primary Productivity - Primary productivity is a measure of the stored food potential of the vegetation in excess of that used by the plants in metabolism. This determination provides an overall measure of the energy input directly available to the consumer species. It should be noted that the possible range of productivity values, both within and between particular environments, is extremely variable and dependent on a number of local conditions. For the present analysis, literature values for primary productivity as a function of biomass were utilized.

- Water Purification Factor - Through a variety of physical, biological, and chemical processes, some habitats function to naturally purify water by removing organic and mineral particulate matter from runoff and/or rivers and streams. For example, wetlands may be significant in minimizing some of the harmful effects of pollutants introduced into natural ecological systems by the activities of man. Thus, wetlands, especially when part of riverine or estuarine systems, can be an integral part of water quality and pollution control objectives.

Based on the above factors, a qualitative analysis of the habitat value of the vegetative and aquatic communities at the Farrand Controls Site are presented in Table 3-11. These results show that the open water and forested wetland areas represent high value habitats. These habitats are prominent in primary productivity, nutrient transport and food chain support, while also providing aesthetic and recreational opportunities that would likely not otherwise be available in this location. The remainder of the habitat types do not possess any remarkable properties although in a rural and residential setting they represent conduits for wildlife between high value resource areas. On the site, the lawn is a conduit between the forested outcrop and the freshwater wetland. This property, presuming any identified contaminant concerns are remediated, will likely continue to provide a high quality habitat consistent with undevelopable property in a rural setting. Passive recreational opportunities for bird watching and wildlife observation should continue to be available in this region.

3.9 Contaminant Pathways and Impact Analysis

Past practices at the Farrand Controls site have resulted in the discharge of volatile organic compounds into the ground as a subsurface discharge. These chemicals had the potential to migrate through groundwater and storm sewers that exist on-site. Groundwater flow in the site vicinity provides much of the hydrologic make-up of the forested wetland adjacent to the site. Groundwater in the vicinity of the main site building discharges to the wetland area. Site storm water runoff and discharges from the basement sump were also directed to the wetland.

With the exception of one small area of stressed vegetation in the wetland, there is limited indication that an ecological impact related to chemical contamination has occurred at the Farrand Controls site. The area of stressed vegetation probably shows more an effect of discharge from sewer Outfall No. 2 beneath the building that culverts a stream and received discharges from the basement sump. A review of file information on the Farrand Controls manufacturing processes gave no indication that metals such as seen in the wetland sediments were generated by the manufacturing processes at Farrand Controls. The detected metals in the area of the stressed vegetation are common elements and are likely from runoff. The cause of

the stressed vegetation may be from the elevated VOCs detected in Outfall No. 2 sample and in the ponded surface water.

Based upon the soil and water sample analytical results, it would suggest that the potential pathways of concern for potential contaminant migration and exposure would be groundwater (VOCs), surface water (VOCs) and wetland sediments (metals). As indicated in section 3.8.9, environmental studies of the surrounding wetland found no indications of systems in stress related to environmental contamination. Within the wetland area in the vicinity of storm water discharge there exists several dead trees and the sediments are relatively void of vegetation. However, given the localized indication of impact, this circumstance is most likely a response to the former Outfall No. 2 discharges. Beyond this area the wetland vegetation appears normal and vibrant.

3' PAVED
DRAINAGE GUTTER

STREAM

BEDROCK
ESCARPMENT

ASPHALT

FARRAND CONTROLS
MAIN SITE BUILDING

SUMP

OUTDOOR
TENNIS COURTS

INDOOR
TENNIS
COURT

GRASS

WALL STREET

WETLANDS

POND

LEGEND

- STORM SEWER CATCH BASIN
- STORM SEWER OUTFALL
- W — WATER SUPPLY LINE
- G — GAS LINE
- SW — STORM WATER SEWER
- T — TELEPHONE LINE
- SAN — SANITARY SEWER
- E — ELECTRICAL LINE
- APPROXIMATE LOCATION OF REPORTED CURTAIN SUB-DRAIN
- PROPERTY LINE

0 60 120

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

SITE DRAINAGE AND SUBSURFACE UTILITY MAP

FIGURE 3-1

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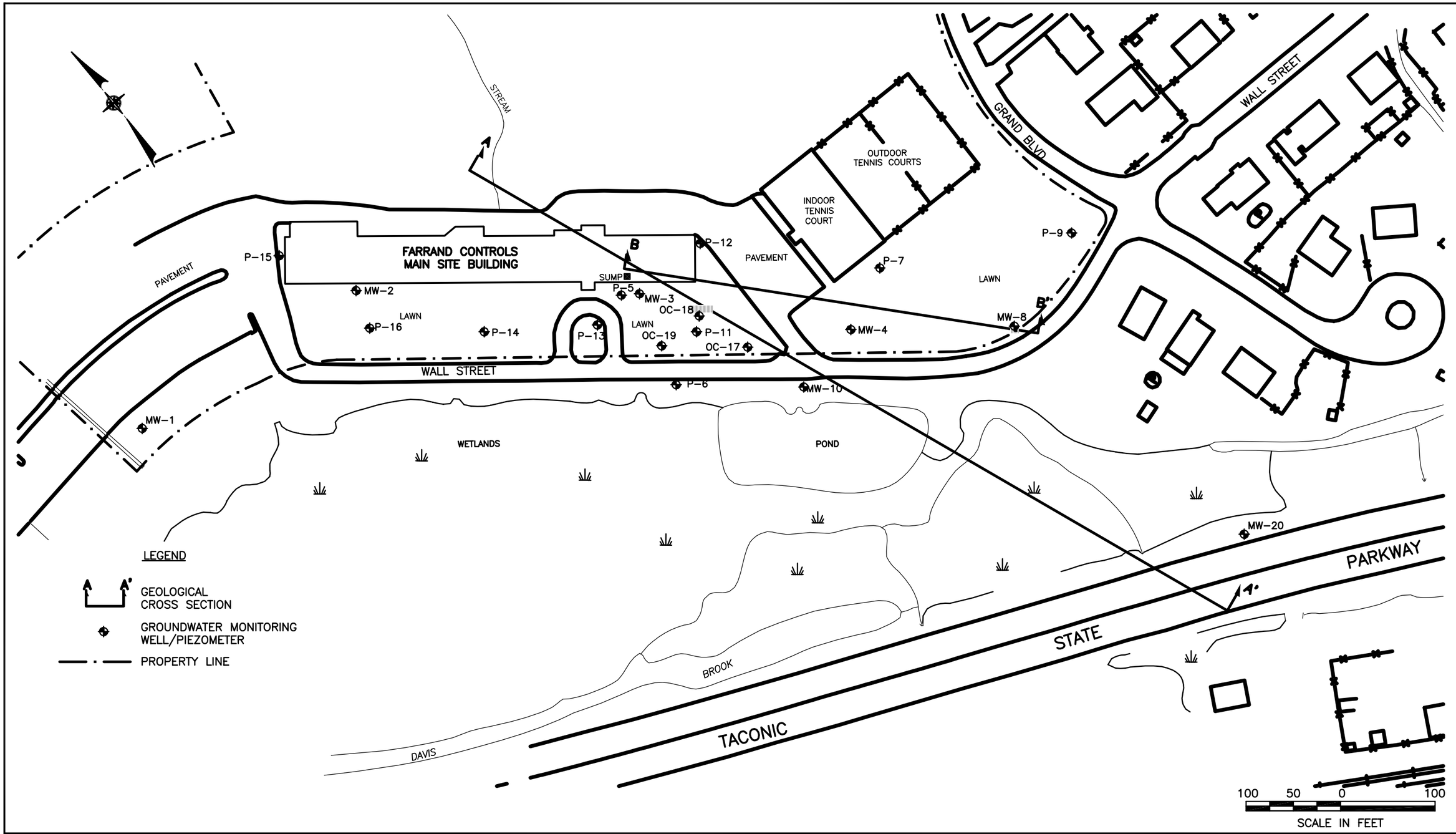
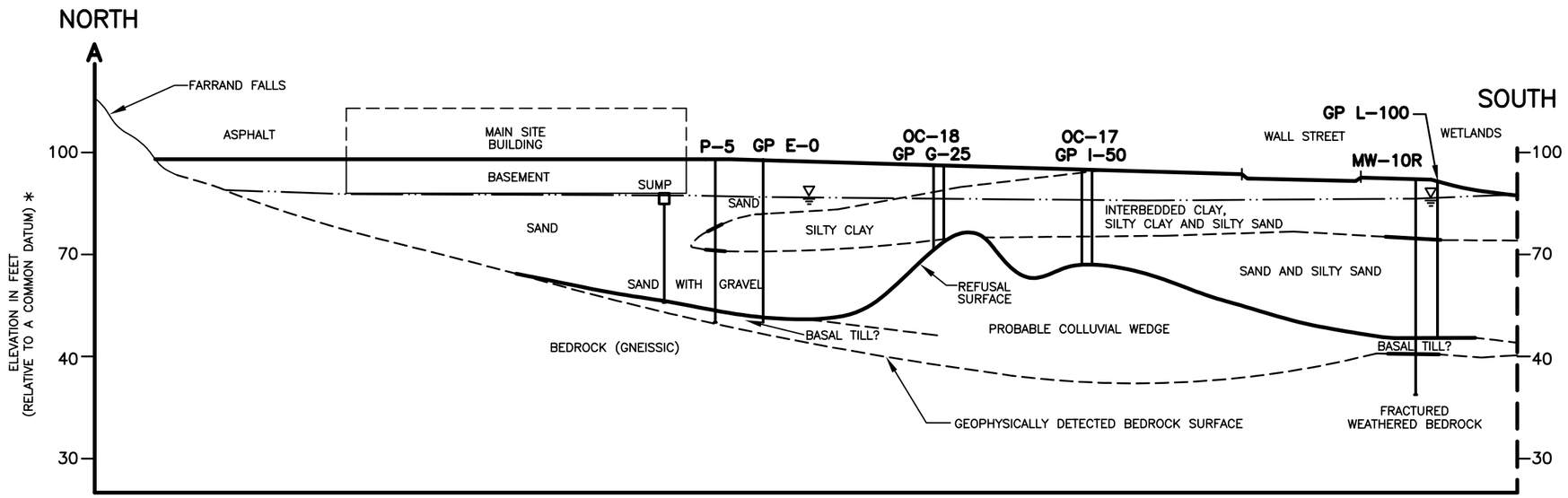


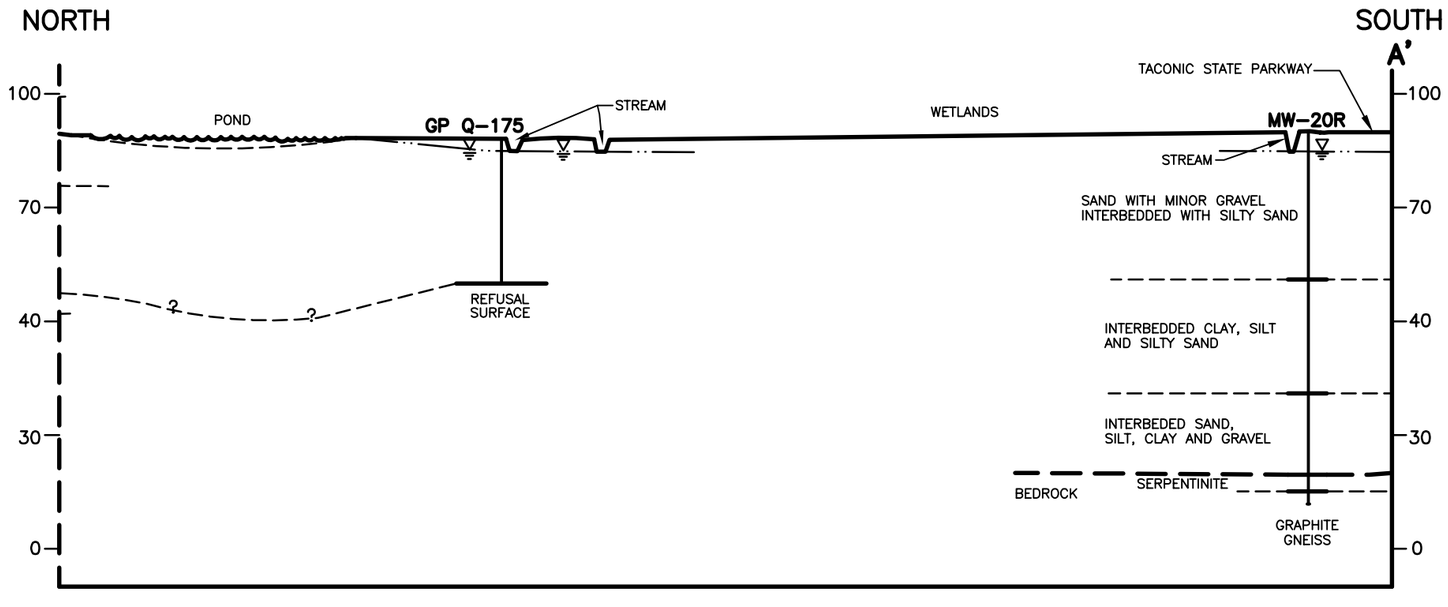
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

LOCATIONS OF GEOLOGIC CROSS SECTIONS

FIGURE 3–2





LEGEND

WATER TABLE NOV. 2, 1999

MW-5 MONITORING WELL

GP G-25 GEOPROBE LOCATION

* SITE HYDRANT BENCHMARK OF +100.00 FEET

NOTE:

SECTION LOCATION SHOWN ON FIGURE 3-2

0' 40'

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

GEOLOGIC CROSS SECTION A-A'

FIGURE 3-3

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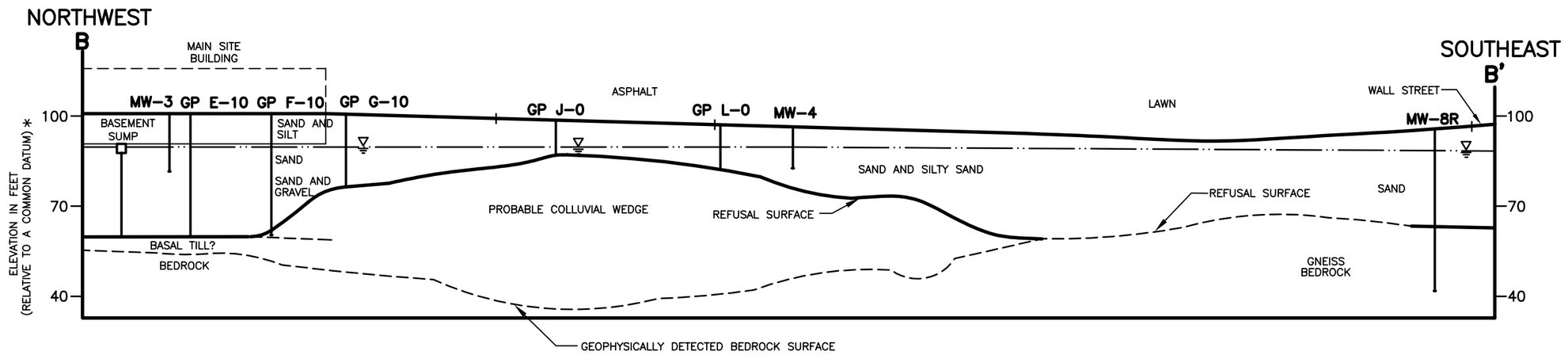

LEGEND

▽	WATER TABLE
MW-3	MONITORING WELL
GP E-10	GEOPROBE SOIL LOCATION
*	SITE HYDRANT BENCHMARK OF +100.00 FEET

NOTE:

SECTION LOCATION SHOWN ON FIGURE 3-2

0 20 40 80

SCALE IN FEET

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

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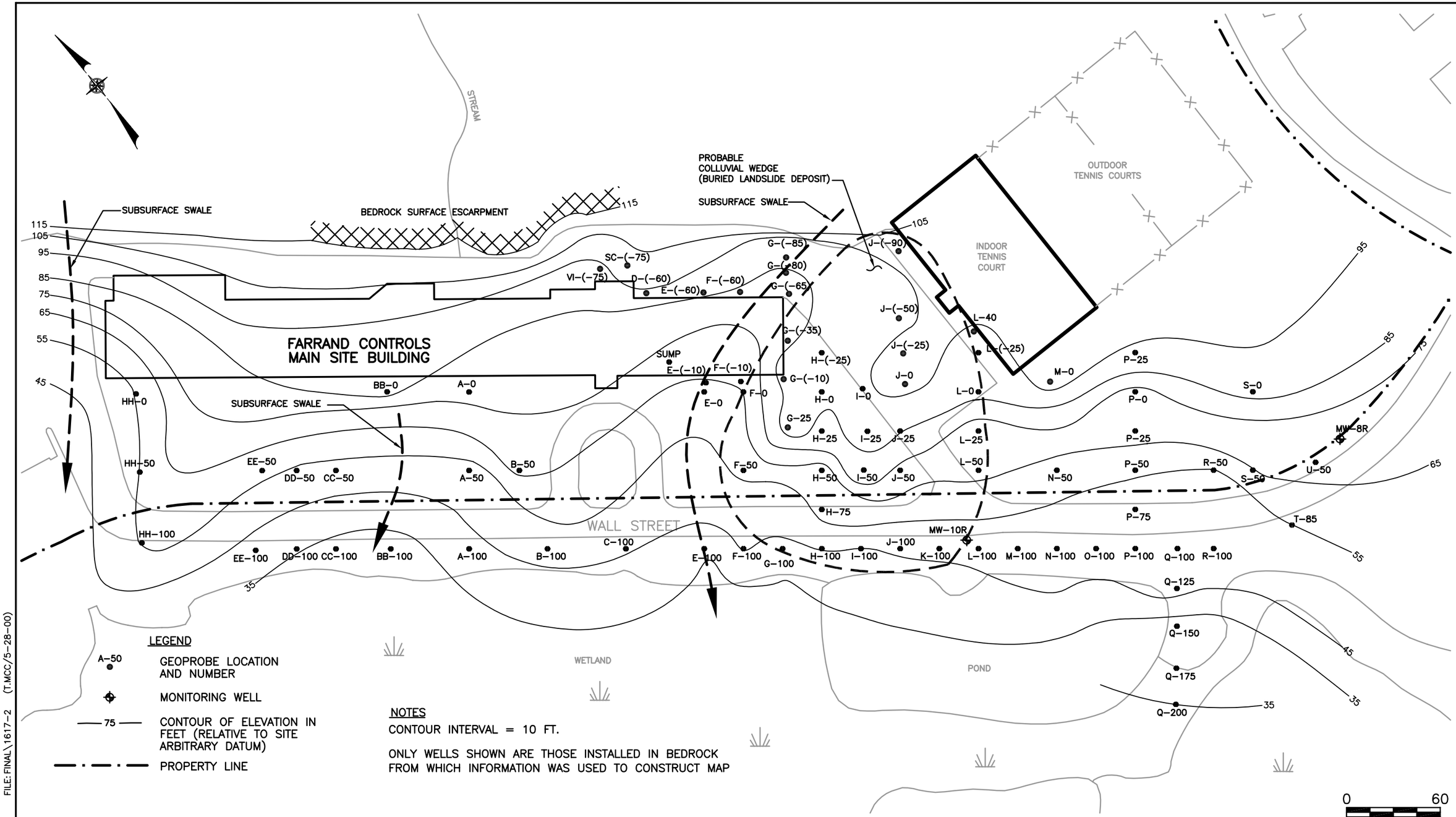
GEOLOGIC CROSS SECTION B-B'

FIGURE 3-4



FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

TOP OF REFUSAL SURFACE

FIGURE 3-5

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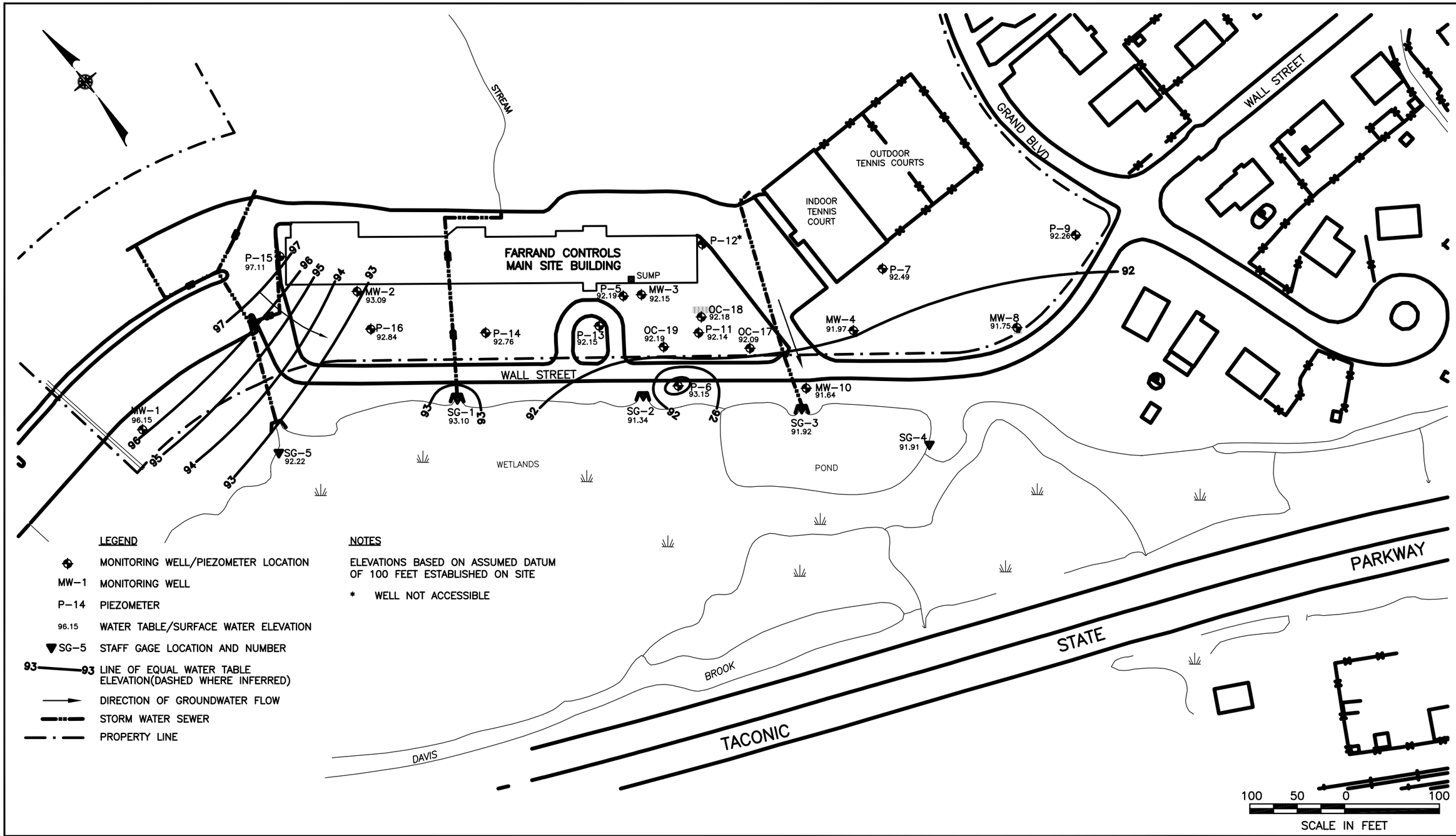

LEGEND

- ⊕ MONITORING WELL/PIEZOMETER LOCATION
- MW-1 MONITORING WELL
- P-14 PIEZOMETER
- 96.15 WATER TABLE/SURFACE WATER ELEVATION
- ▼SG-5 STAFF GAGE LOCATION AND NUMBER
- 93—93 LINE OF EQUAL WATER TABLE ELEVATION(DASHED WHERE INFERRED)
- → DIRECTION OF GROUNDWATER FLOW
- STORM WATER SEWER
- PROPERTY LINE

NOTES

ELEVATIONS BASED ON ASSUMED DATUM OF 100 FEET ESTABLISHED ON SITE

* WELL NOT ACCESSIBLE

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

WATER TABLE CONTOUR MAP
APRIL 15, 1999

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FIGURE 3-6

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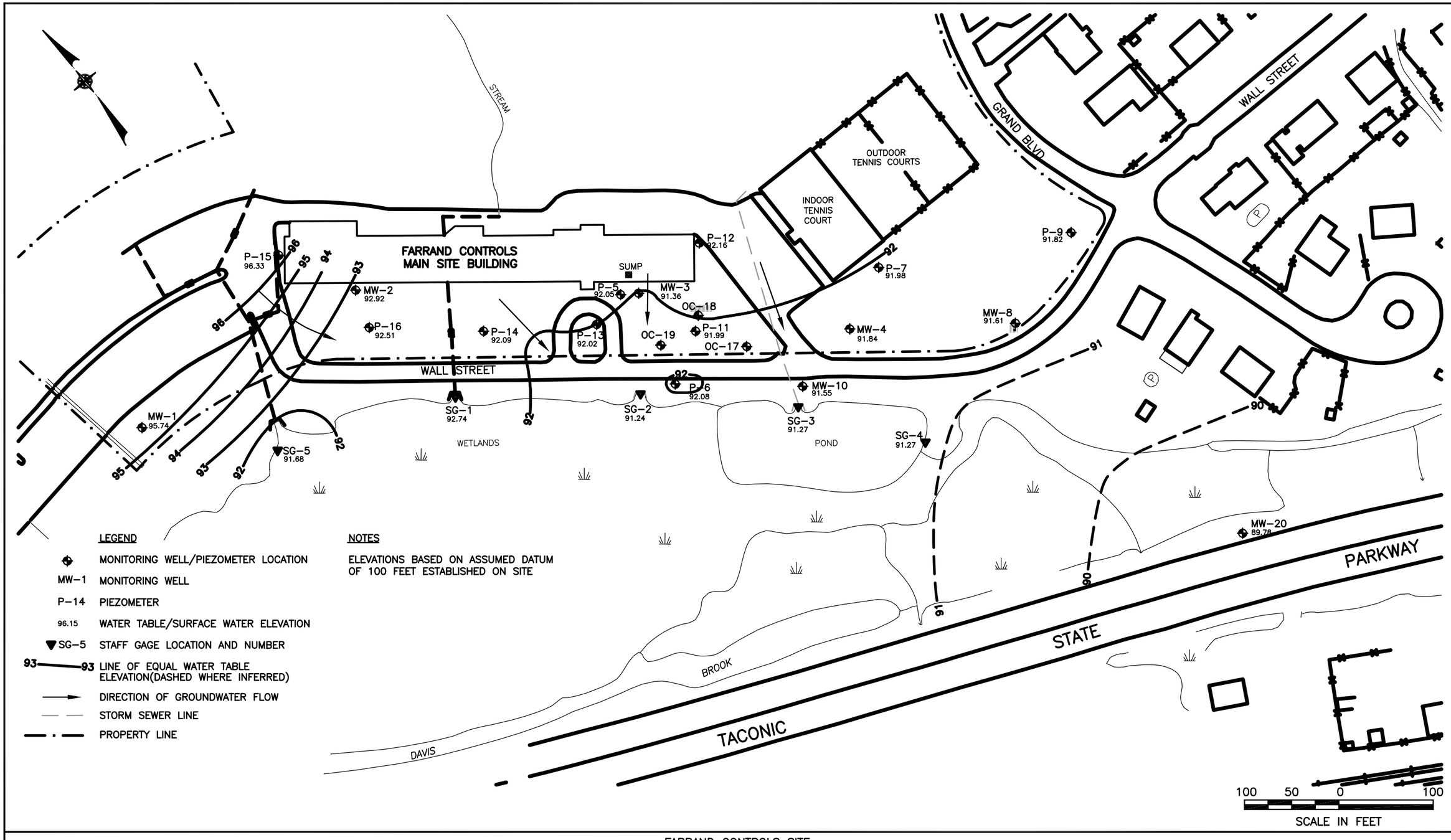

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

WATER TABLE CONTOUR MAP
NOVEMBER 2, 1999

Dvirka and Bartilucci
Consulting Engineers
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FIGURE 3-7

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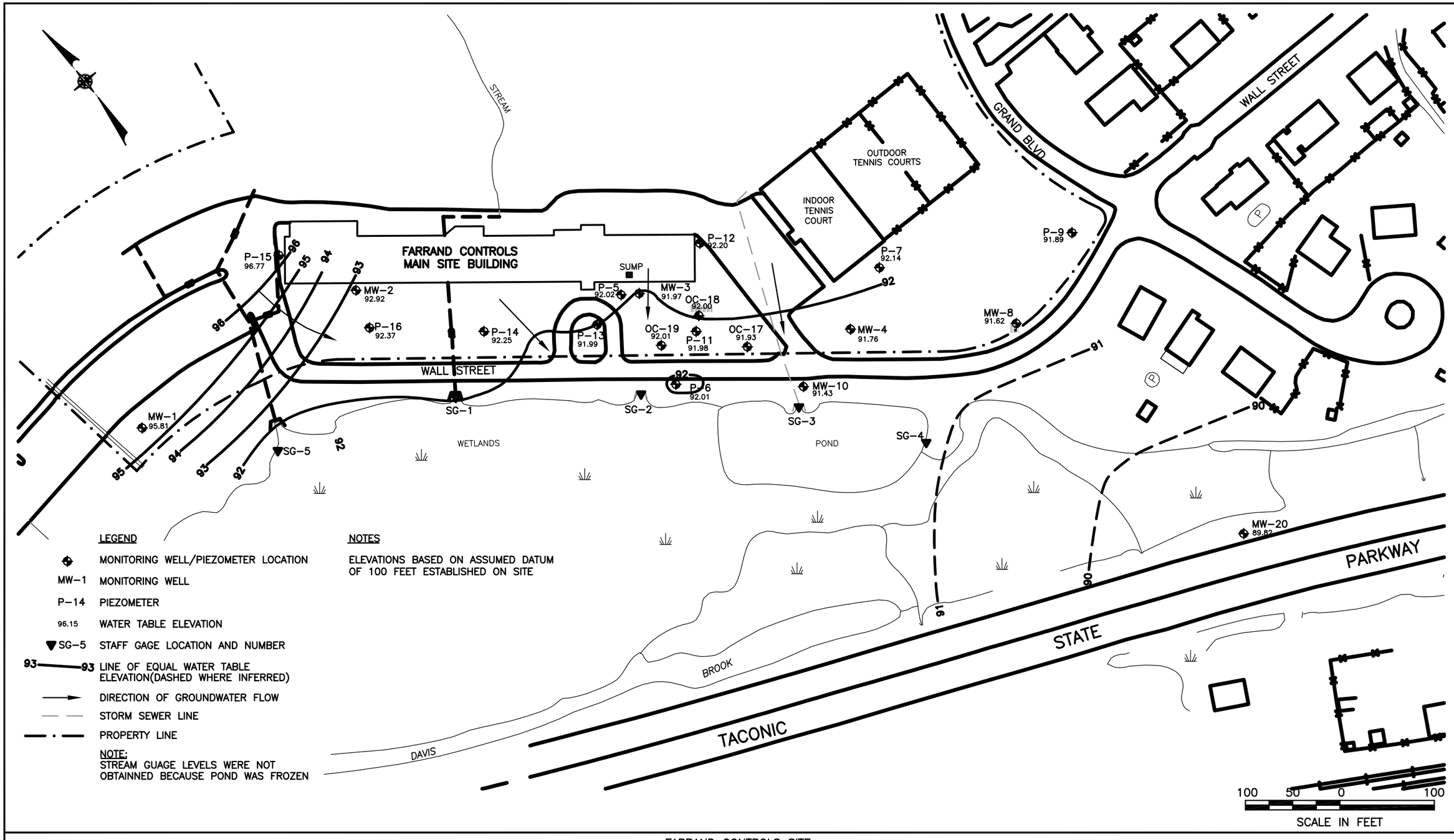

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

WATER TABLE CONTOUR MAP
JANUARY 26, 2000

FIGURE 3-7A

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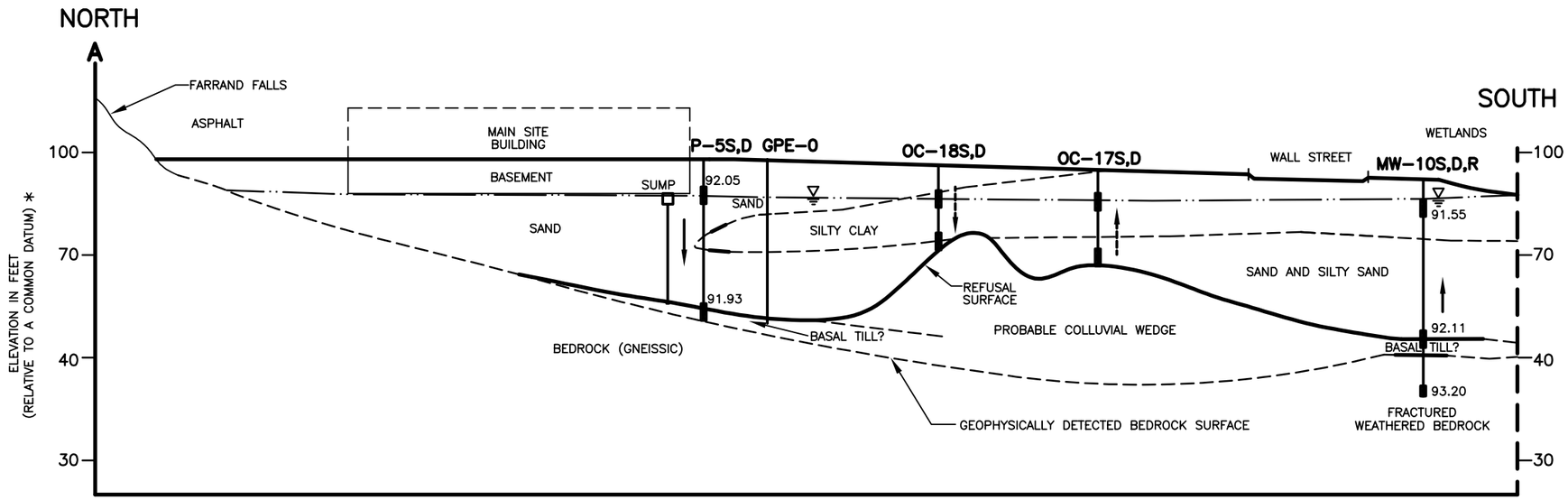

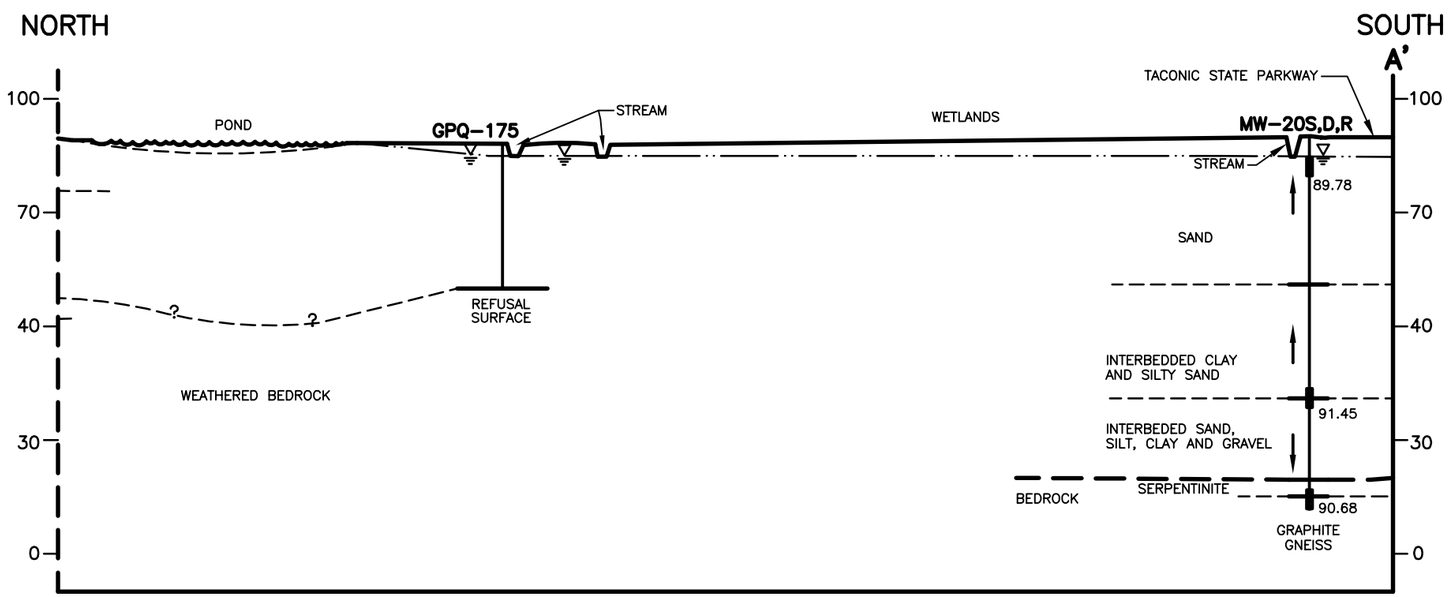

LEGEND

MW-5S,D,R

SCREEN ZONE

92.05 HYDRAULIC HEAD ELEVATION (RELATIVE TO SITE BENCHMARK OF +100')

VERTICAL COMPONENT OF GROUNDWATER FLOW

WATER TABLE NOV. 2, 1999

MW-5 MONITORING WELL

G-25 GEOPROBE LOCATION

* SITE HYDRANT BENCHMARK OF +100.00 FEET

NOTE:

SECTION LOCATION SHOWN ON FIGURE 3-2

0' 40'

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

HYDROGEOLOGIC CROSS SECTION A-A'

FIGURE 3-8

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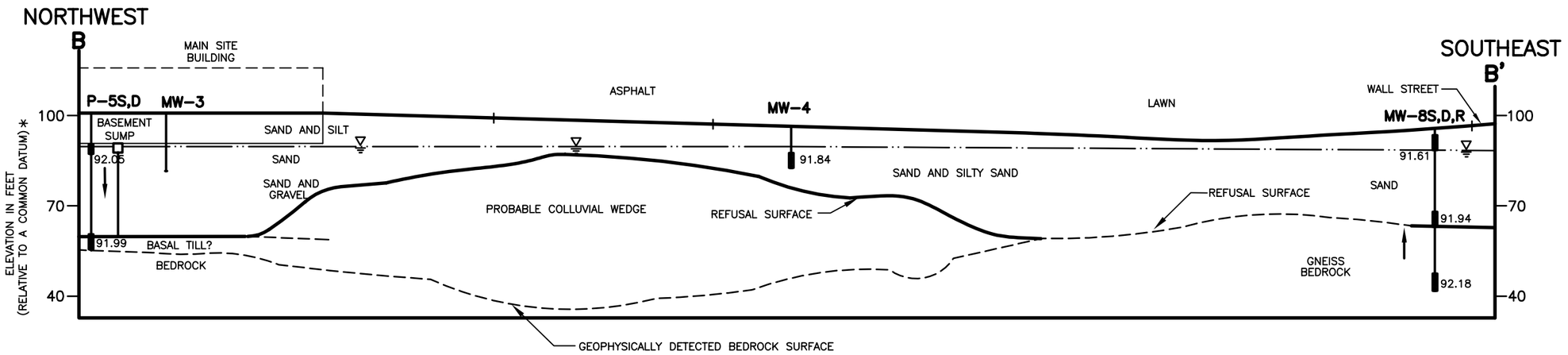

LEGEND

MW-5S,D,R — SCREEN ZONE

92.05 — HYDRAULIC HEAD ELEVATION (RELATIVE TO SITE BENCHMARK OF +100')

EQUIPOTENTIAL LINE OF HYDRAULIC HEAD

VERTICAL COMPONENT OF GROUNDWATER FLOW

WATER TABLE

MW-3 — MONITORING WELL

GPE-10 — GEOPROBE SOIL LOCATION

* — SITE HYDRANT BENCHMARK OF +100.00 FEET

NOTE:

SECTION LOCATIONS SHOWN ON FIGURE 3-2

0 20 40 80

SCALE IN FEET

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

HYDROGEOLOGIC CROSS SECTION B-B'

FIGURE 3-9

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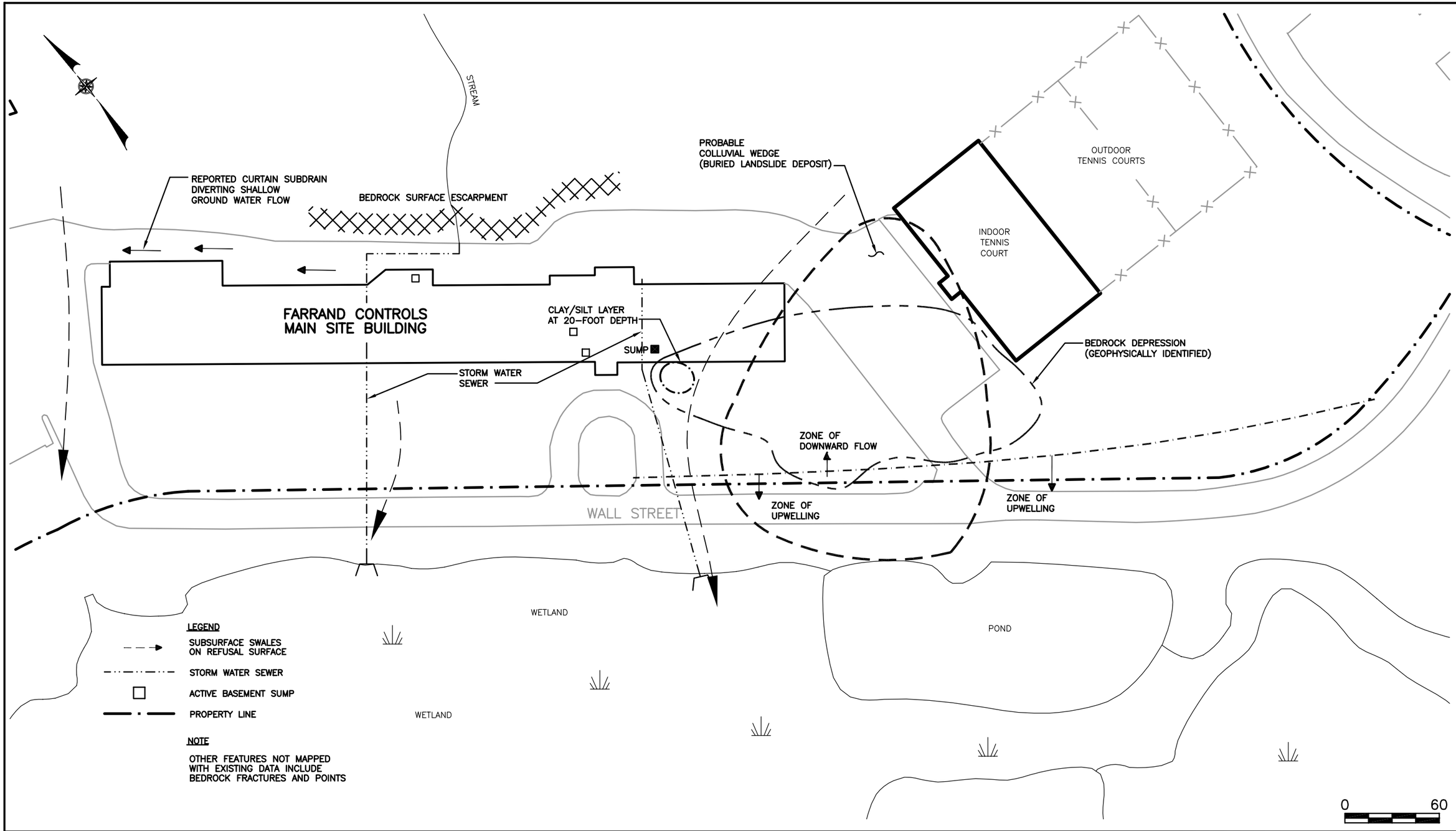

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

Dvirka and Bartilucci
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FEATURES POTENTIALLY IMPACTING GROUNDWATER FLOW AND DNAPL MIGRATION

FIGURE 3-10

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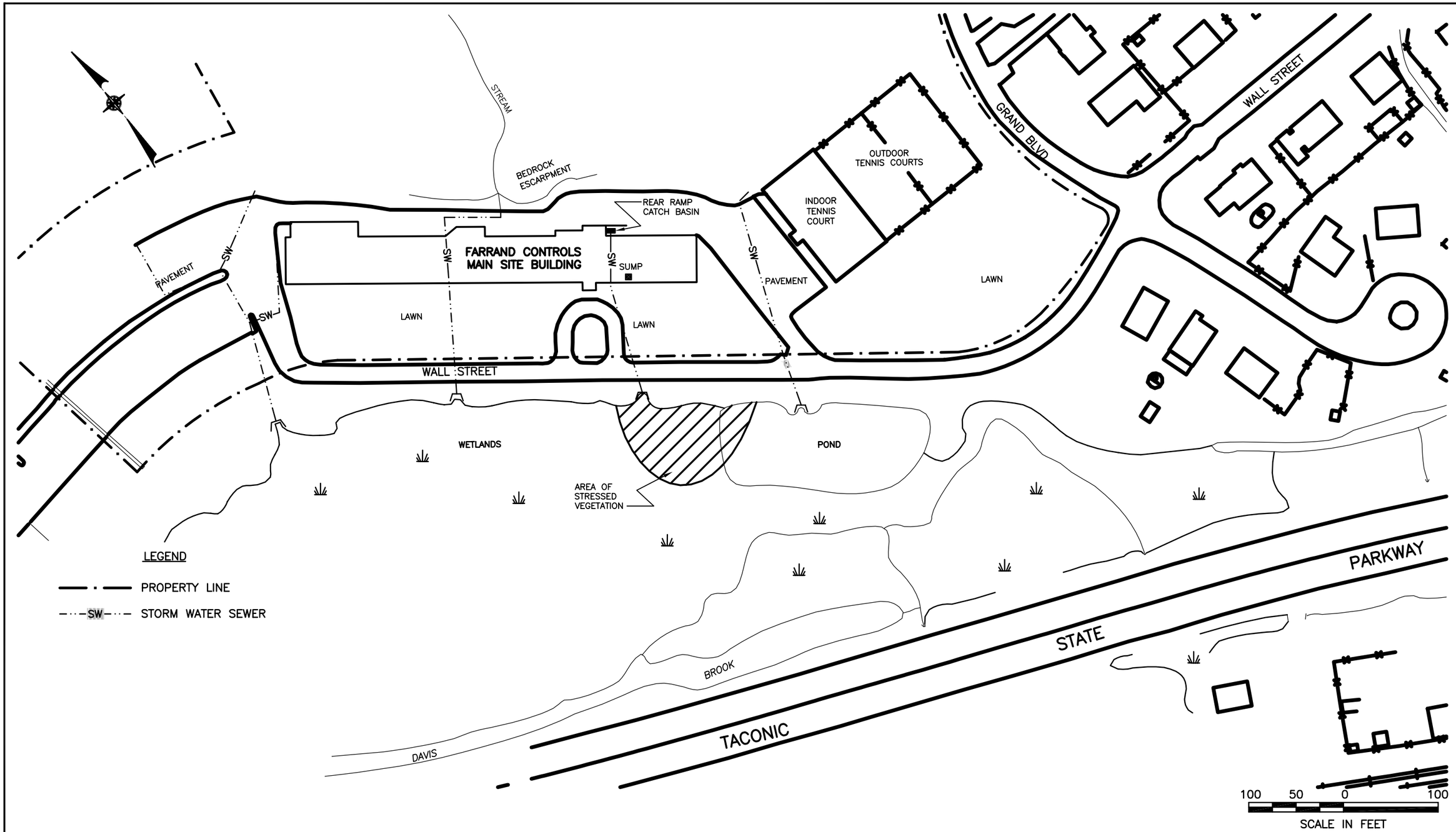

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBLITY STUDY

MAJOR HABITAT TYPES OF THE SITE AND VICINITY AND AREA OF STRESSED VEGETATION

FIGURE 3–11

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TABLE 3 - 1
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
GROUNDWATER AND SURFACE WATER ELEVATION DATA

		4/15/99		11/2/99		1/26/00	
Well Piezometer/Staff Gauge Number	**Measuring Point Elevation (feet)**	**Depth To Water (feet)**	**Groundwater Elevation (feet)**	**Depth To Water (feet)**	**Groundwater Elevation (feet)**	**Depth To Water (feet)**	**Groundwater Elevation (feet)**
MW-1	98.26	2.11	96.15	2.52	95.74	2.45	95.81
MW-2	103.73	10.64	93.09	10.81	92.92	10.81	92.92
MW-3	103.07	10.92	92.15	11.71	91.36	11.10	91.97
MW-4	97.45	5.48	91.97	5.61	91.84	5.69	91.76
P-5S	102.65	10.46	92.19	10.60	92.05	10.63	92.02
P-5I	102.72	NR	--	NR	--	10.71	92.01
P-5D	102.6	10.48	92.12	10.67	91.93	10.56	92.04
P-6	95.2	2.05	93.15	3.12	92.08	3.19	92.01
P-7	103.14	10.65	92.49	11.16	91.98	11.00	92.14
MW-8S (P-8)	98.96	7.21	91.75	7.35	91.61	7.34	91.62
MW-8 D	97.25	wn	--	5.31	91.94	5.29	91.96
MW-8R	97.44	wn	--	5.26	92.18	18.49	78.95
P-9	100.24	7.98	92.26	8.42	91.82	8.35	91.89
MW-10 S (P-10)	98.19	6.55	91.64	6.64	91.55	6.76	91.43
MS-10 D	95.89	wn	--	3.78	92.11	3.81	92.08
MW-10 R	96.48	wn	--	3.28	93.2	4.30	92.18
P-11	99.13	6.99	92.14	7.14	91.99	7.15	91.98
P-12	104.1	not accessible	--	11.94	92.16	11.90	92.20
P-13	100.84	8.69	92.15	8.82	92.02	8.85	91.99
P-14	99.4	6.64	92.76	7.31	92.09	7.15	92.25
P-15	104.18	7.07	97.11	7.85	96.33	7.41	96.77
P-16	100.42	7.58	92.84	7.91	92.51	8.05	92.37
P-17S (OC-17)	97.86	5.77	92.09	8.20	89.66	5.93	91.93
P-17D	98.07	5.98	92.09	8.22	89.85	6.11	91.96
P-18S (OC-18)	100.23	8.05	92.18	5.91	94.32	8.23	92.00
P-18D	100.24	8.02	92.22	6.10	94.14	8.21	92.03
P-19S (OC-19)	98.48	6.29	92.19	6.45	92.03	6.47	92.01
P-19D	98.67	6.43	92.24	6.59	92.08	6.60	92.07
MW-20 S	94.31	wn	--	4.53	89.78	4.49	89.82
MW-20 D	94.3	wn	--	2.85	91.45	2.92	91.38
MW-20R	94.19	wn	--	3.51	90.68	2.87	91.32
SG-1	94.97	1.87	93.10	2.23	92.74	NM	-
SG-2	93.15	1.81	91.34	1.91	91.24	NM	-
SG-3	93.53	1.61	91.92	2.26	91.27	NM	-
SG-4	93.3	1.39	91.91	2.03	91.27	NM	-
SG-5	94.65	2.43	92.22	2.97	91.68	NM	-

Notes

MW: Monitoring well
P: Piezometer
SG: Staff Gauge
S: Shallow
I: Intermediate
D: Deep
P-5I: Sampling tube blocked access
P-12: Broken lock could not be removed
OC: Existing groundwater monitoring wells/piezometers
wn: Well not yet installed
--: Not available
NM: Not measurable; frozen

TABLE 3-2

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
MONITORING WELL HYDRAULIC HEAD DATA
APRIL 23, 2001

WELL	Total Depth (ft)	Screen Interval (ft)	Screen Mid-Point (ft)	Hydraulic Head (ft)	Hydraulic Head Difference (ft)	Hydraulic Gradient (ft)
P-5 S	13	8-13	10.5	92.30	-0.12	0.003
P-5 I*	20	18-20	21	92.42		
P-5 D	48	43-48	45.5	92.21	0.21	
MW-8 S (P-8)	10	6-10	8	92.00		
					-0.45	0.032
MW-8 D	36	26-36	31	92.45		
					-0.39	0.020
MW-8 R	56	41-56	48.5	92.84		
MW-10 S (P-10)	10	6-10	8	91.68		
					-0.66	0.016
MW-10 D	53.5	43.5-53.5	48.5	92.34		
					-0.09	0.006
MW-10 R	63.5	61-63.5	62.75	92.43		
MW-20 S	15	5-15	10	90.09		
					-1.71	0.027
MW-20 D	77	67-77	72	91.80		
					-0.21	0.010
MW-20 R	98	88-98	93	92.01		
MW-20S	15	5-15	10	92.70		
					0.01	0.001
MW-20R	33	18-28	23	92.69		
MW-22S	15	5-15	10	92.51		
					-0.05	0.003
MW-22R	35	25-35	30	92.56		

NOTES:
Depths are from grade
* Inaccessible
D: Deep
I: Intermediate
MW: Monitoring well
P: Piezometer
R: Bedrock
S: Shallow

TABLE 3- 3
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
HYDRAULIC CONDUCTIVITY DATA SUMMARY

Monitoring Well MW-03	Hydraulic Conductivity (K) Determined From Slug Tests		
	Rising Head	Falling Head	Average
feet/second	2.77E-04	n.a.	n.a.
feet/day	23.93	n.a	n.a
cm/second	8.44E-03	n.a	n.a.

Monitoring Well MW-04	Hydraulic Conductivity (K) Determined From Slug Tests		
	Rising Head	Falling Head	Average
feet/second	1.27E-03	n.a.	n.a.
feet/day	109.73	n.a	n.a
cm/second	3.87E-02	n.a	n.a

Monitoring Well MW-10D	Hydraulic Conductivity (K) Determined From Slug Tests		
	Rising Head	Falling Head	Average
feet/second	1.63E-04	2.00E-04	1.82E-04
feet/day	14.08	17.28	15.68
cm/second	4.97E-03	6.10E-03	5.53E-03

Monitoring Well MW-10R	Hydraulic Conductivity (K) Determined From Slug Tests		
	Rising Head	Falling Head	Average
feet/second	7.71E-06	2.76E-05	1.77E-05
feet/day	0.67	2.38	1.53
cm/second	2.35E-04	8.41E-04	5.38E-04

n.a. Not applicable as only rising head test is valid for wells where water table intersects screen zone.

Hydraulic conductivity ranges for unconsolidated sediments in centimeters per second (Fetter, 1980)	
Clay	10^{-9} - 10^{-6}
Silt, sandy silts, clayey sands, glacial till	10^{-6} - 10^{-4}
Silty sands, fine sands	10^{-5} - 10^{-3}
Well sorted sands, glacial outwash	10^{-3} - 10^{-1}
Well-sorted gravel	10^{-2} - 1

Table 3-4

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
VEGETATIVE SPECIES OBSERVED ON THE SITE

Common Name	Scientific Name
Herbaceous Plants	
Yarrow	Achillea millefolium
Aster	Aster spectabilis
Aster	Aster undulatus
Daisy	Chrysanthemum sp.
Chicory	Cichorium intybus
Bull thistle	Cirsium vulgare
Crown vetch	Coronilla varia
Lady's slipper	Cypripedium acaule
Crabgrass	Digitaria sp.
Strawberry	Fragaria virginiana
Narrow-leafed bush clover	Lespedeza augustifolia
Bush clover	Lespedeza virginiana
Butter and eggs	Linaria vulgaris
Evening primrose	Oenothera biennis
Yellow woodsorrel	Oxalis stricta
Ground cherry	Physalis heterophylla
Pokeweed	Phytolacca americana
Broadleaf plantain	Plantago major
Nightshade	Solanum dulcamara
Common mullein	Verbascum thapsus
Vetch	Vicia sp.
Shrubs and Vines	
Alder	Alnus rugosa
Barberry	Berberis thunbergii
Leatherleaf	Chamaedaphne calyculata
Forsythia	Forsythia sp.
Japanese honeysuckle	Lonicera japonica
Virginia creeper	Parthenocissus quinquefolia
Poison ivy	Rhus radicans
Multiflora rose	Rosa multiflora
Catbrier	Smilax

Table 3-4 (continued)

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
VEGETATIVE SPECIES OBSERVED ON THE SITE

Common Name	Scientific Name
Trees	
Red maple	Acer rubrum
Gray birch	Betula populifolia
Flowering dogwood	Cornus florida
Black gum	Nyassa sylvatica
Large-toothed aspen	Populus grandidentata
Quaking aspen	Populus tremuloides
Poplar	Populus deltoides
Black cherry	Prunus serotina
White oak	Quercus alba
Black oak	Quercus velutina

Table 3-5

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
MAMMALS LIKELY TO INHABIT THE SITE

Common Name	Scientific Name
Eastern chipmunk	Tamias striatus
Gray Squirrel	Sciurus carolinensis
Cottontail rabbit	Sylvilagus floridanus
White-footed mouse	Peromyscus leucopus
House mouse	Mus musculus
Raccoon	Procyon lotor
White-tailed Deer	Odocoileus virginianus

Table 3-6

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
AVIFAUNA LIKELY TO INHABIT THE SITE

Common Name	Scientific Name
Winter wren	Troglodytes troglodytes
Carolina wren	Thryothorus ludovicianus
Gray catbird	Dumetella carolinensis
Northern mockingbird	Mimus Polyglottis
Eastern bluebird	Stalia sialis
American robin	Turdus migratorius
Wood thrush	Hyocichla mustelina
Cedar waxwing	Bonbycilla cedrorum
Solitary vireo	Vireo solitarius
Yellow warbler	Dendroica petechia
Yellow-rumped warbler	Dendroica coronata
Bay-breasted warbler	Dendroica castanea
Blackpoll warbler	Dendroica striata
Pine warbler	Dendroica pinus
Ovenbird	Seirus aurocapillus
Common yellow-throat	Geothlypis trichas
Eastern meadowlark	Sturnella magna
Common grackle	Quiscalus quiscula
European starling	Sturnus vulgaris
House sparrow	Passer domesticus
Northern cardinal	Cardinalis cardinalis
Indigo bunting	Passerina cyanea
Brown-headed cowbird	Molothrus ater
Scarlet tanager	Piranga olivacea
House finch	Carpodacus mexicanus
Purple finch	Carpodacus purpureus
American goldfinch	Carduelis tristis
Northern junco	Junco hyemalis
Rufous-sided towhee	Pipilo erythrophthalmus
Chipping sparrow	Spizella passerina
Field sparrow	Spizella pusilla
Song sparrow	Melospiza melodia
White-throated sparrow	Zonotrichia albicollis
Great blue heron	Ardea herodias
Black-crowned night heron	Nycticorax nycticorax
Canada goose	Branta canadensis
Mallard	Anas platyrhynchos

Table 3-6 (continued)

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
AVIFAUNA LIKELY TO INHABIT THE SITE

Common Name	Scientific Name
Black duck	Anas rubripes
Sharp-shinned hawk	Accipiter striatus
Broad-winged hawk	Buteo platypterus
Red-tailed hawk	Buteo jamaicensis
Kestrel	Falco sparverius
Ring-necked pheasant	Phasianus colchicus
Killdeer	Charadrius vociferus
Herring gull	Larus argentatus
Mourning dove	Zenaida macroura
Yellow-bellied sapsucker	Sphyrapicus varius
Red-bellied woodpecker	Melanerpes carolinus
Downy woodpecker	Picoides pubescens
Hairy woodpecker	Picoides villosus
Eastern kingbird	Tyrannus tyrannus
American crow	Corvus brachyrhynchos
Blue jay	Cyanocitta cristata
Black-capped chickadee	Parus atricapillus
Tufted titmouse	Parus bicolor
White-breasted nuthatch	Sitta carolinensis
Red-breasted nuthatch	Sitta canadensis
Brown creeper	Certhia americana
House wren	Troglodytes aedon

Table 3-7

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
FINFISH LIKELY TO SEASONALLY INHABIT THE SITE

Common Name	Scientific Name
Fallfish	Semotilus corporalis
Creek chub	Semotilus atromaculatus
Golden shiner	Notemigonus crysoleucas
Blacknose dace	Rhinichthys atratulus
Longnose dace	Rhinichthys cataractae
Cutlips minnow	Exoglossum maxillingua
Common shiner	Luxilus cornutus
Fathead minnow	Pimephales promelas
Largemouth bass	Micropterus salmoides
Bluegill	Lepomis macrochirus
Pumpkinseed	Lepomis gibbosus
Brown bullhead	Ictalurus nebulosus

Table 3-8

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
REPTILES AND AMPHIBIANS LIKELY TO INHABIT THE SITE

Common Name	Scientific Name
Box turtle	Terrapene carolina
Eastern garter snake	Thamnophis sirtalis
Eastern ribbon snake	Thamnophis sauritis
Eastern milk snake	Lampropeltis triangulum
Northern black racer	Coluber constrictor
Red-backed salamander	Plethodon cinereus
Red-spotted newt	Notophthalmus viridescens
Northern spring peeper	Hyla crucifer
Green frog	Rana clamitans
Pickerel frog	Rana palustris
Fowler's toad	Bufo woodhousei fowleri

Table 3-9

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
FEDERALLY LISTED OR PROPOSED THREATENED
OR ENDANGERED SPECIES IN NEW YORK STATE

Common Name	Scientific Name	Status	Distribution
Fishes			
Sturgeon, shortnose	Asipenser brevirostrum	E	Hudson River and other Atlantic coastal rivers
Reptiles			
Turtle, bog	Clemmys muhlenbergii	PT	Albany, Columbia, Dutchess, Genesee, Orange, Oswego, Putnam, Seneca, Ulster, Wayne and Westchester Counties
Turtle, green	Chelonia mydas	T	Oceanic summer visitor coastal waters
Turtle, hawksbill	Eretmochelys imbricata	E	Oceanic summer visitor coastal waters
Turtle, leatherback	Dermochelys coriacea	E	Oceanic summer visitor coastal waters
Turtle, loggerhead	Caretta caretta	T	Oceanic summer visitor coastal waters
Turtle, Atlantic ridley	Lepidochelys kempii	E	Oceanic summer visitor coastal waters
Birds			
Eagle, bald	Haliaeetus leucocephalus	T	Entire state
Falcon, peregrine	Falco peregrinus	E	Entire state - re-establishment to former breeding range in progress

Table 3-9 (continued)

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
FEDERALLY LISTED OR PROPOSED THREATENED
OR ENDANGERED SPECIES IN NEW YORK STATE

Common Name	Scientific Name	Status	Distribution
Plover, piping	Charadrius melodus	E T	Great Lakes Watershed Remainder of coastal New York
Tern, roseate	Sterna dougallii dougallii	E	Southeastern coastal portions of state
Mammals			
Bat, Indiana	Myotis sodalis	E	Entire state
Cougar, eastern	Felis concolor cougar	E	Entire state - probably extinct
Whale, blue	Balaenoptera musculus	E	Oceanic
Whale, finback	Balaenoptera physalus	E	Oceanic
Whale, humpback	Megaptera novaeangliae	E	Oceanic
Whale, right	Eubalaena glacialis	E	Oceanic
Whale, sei	Balaenoptera borealis	E	Oceanic
Whale, sperm	Physeter catodon	E	Oceanic
Mollusks			
Snail, Chittenango ovate amber	Succinea chittenangoensis	T	Madison County
Mussel, dwarf wedge	Alasmidonta heterodon	E	Orange County - lower Neversink River

Table 3-9 (continued)

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
FEDERALLY LISTED OR PROPOSED THREATENED
OR ENDANGERED SPECIES IN NEW YORK STATE

Common Name	Scientific Name	Status	Distribution
Butterflies			
Butterfly, Karner blue	Lycaeides melissa samuelis	E	Albany, Saratoga, Warren and Schenectady Counties
Plants			
Monkshood, northern wild	Aconitum noveboracense	T	Ulster, Sullivan and Delaware Counties
Pogonia, small whorled	Isotria medeoloides	T	Entire state
Swamp pink	Helonias bullata	T	Staten Island - presumed extirpated
Gerardia, sandplain	Agalinis acuta	E	Nassau and Suffolk Counties
Fern, American hart's-tongue	Asplenium scolopendrium var. Americana	T	Counties
Orchid, eastern prairie fringed	Platanthera leucophea	T	Not relocated in New York
Bulrush, northeastern	Scirpus ancistrochaetus	E	Not relocated in New York
Roseroot, Leedy's ssp. Leedyi	Sedum integrifolium	T	West shore of Seneca Lake
Amaranth, seabeach	Amaranthus pumilus	T	Atlantic coastal plain beaches
Goldenrod, Houghton's	Solidago houghtonii	T	Genesee County

Table 3-10

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
FLORAL AND FAUNAL ASSOCIATIONS OBSERVED WITHIN 2.5 MILES OF THE SITE

Species	Grassland/ Field	Forested/ Grassland/ Field	Open Water	Developed/ Paved	Forested Wetland	Forested
Plants						
Crown vetch	X	X				
Fescue						
Virginia Creeper		X				X
Multiflora rose	X	X				
Red maple					X	X
Flowering Dogwood		X				X
Poplar		X				X
Animals						
Gray Squirrel		X				X
Rodents	X	X				X
Mallard			X		X	
Hawks	X	X	X		X	X
Finches		X			X	X
Sparrows	X	X			X	X
Amphibians			X		X	
Longnose dace			X		X	

Table 3-11

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
QUALITATIVE HABITAT VALUE ANALYSIS WITHIN
THE SITE AND SURROUNDING AREA

Evaluation Factor	Maintained Lawn	Forested/ Grassland/ Field	Open Water	Developed/ Paved	Forested Wetland	Forested
Food Chain Production	2	2	2	1	3	2
Primary Productivity	2	2	2	1	3	2
Nutrient Transport	1	1	3	1	2	1
Food Chain Support	2	2	3	1	3	2
Hydroperiod	1	1	3	1	3	1
Elevational Location	2	2	2	2	2	2
Cultural Location	1	1	2	1	2	2
Recreation	2	2	3	2	2	2
Socio-Economic	1	1	2	2	2	2
Aesthetics	2	2	3	1	3	3
Water Purification Factor	2	2	1	1	2	2
Totals	*18*	*18*	*27*	*14*	*27*	*21*

4.0 NATURE AND EXTENT OF CONTAMINATION

This section presents the analytical results for the samples collected during the remedial investigation, and discusses the location, nature and significance of contamination found at and downgradient of the Farrand Controls Site. The significance of contamination is based on a comparison of contaminant concentrations to standards, criteria and guidelines (SCGs) selected for the site which are described below.

4.1 Identification of Standards, Criteria and Guidelines

This section provides the standards, criteria and guidelines that are used to identify the contaminants, media and areas of concern, and on a preliminary basis, the potential threat to human health and the environment. The media for which SCGs apply for this investigation are surface and subsurface soil, groundwater, surface water, surface water sediment and indoor air.

4.1.1 Surface and Subsurface Soil

The SCGs used to evaluate the degree and extent of surface and subsurface soil contamination are based on the NYSDEC Technical and Administration Guidance Memorandum (TAGM) No. 4046, *Determination of Soil Cleanup Objective and Cleanup Levels (1994*), and are contained in the respective data tables. The Recommended Soil Cleanup Objectives are developed to protect human health resulting from ingestion of soil and groundwater as a potable water supply.

4.1.2 Groundwater

For review and interpretation of groundwater sample analytical results, the SCGs selected for the site are based on NYSDEC Technical and Operational Guidance Series (TOGS) (1.1.1), *Ambient Water Quality Standards And Guidance Values and Groundwater Effluent Limitations (1998).* The water quality standards and guidance values provide ambient contaminant concentrations developed to protect New York State groundwater and refer to their best-

classified usage. Analytical results obtained for groundwater samples are compared to Class GA standards/guidelines for which the use is potable water supply and are contained in the respective data tables.

4.1.3 Surface Water

The SCGs used to evaluate the degree and extent of surface water contamination and fresh water fish survival are based the NYSDEC Technical and Operational Guidance Series (TOGS) (1.1.1), *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (1998)*. The analytical results obtained for surface samples are compared to Class C standards/guidelines which is the classification of the surface waters adjacent to the Farrand Controls Site.

4.1.4 Surface Water Sediment

Sediment quality criteria were derived for non-polar volatile organic compounds using equilibrium partitioning as per NYSDEC Division of Fish, Wildlife and Marine Resources *Technical Guidance for Screening Contaminated Sediment* (January 1999). Table 1 of this document was utilized to determine water quality criteria for Benthic Aquatic Life Chronic Toxicity and sediment octanol/water partitioning coefficients (Kow). Kow is approximately equal to sediment organic carbon/water partitioning coefficients (Koc). Sediment criteria were normalized for site specific organic carbon found in sediment samples SED-OF3 (1.08%) and SED-OF1 (5.63%), and were normalized to a default organic carbon content of 1% for sediment samples for which total organic content was not analyzed. Appendix J presents the calculations used to determine organic carbon normalized sediment criteria. Criteria are summarized in Table A-11 of Appendix J. Benthic Aquatic Life Chronic Toxicity Water Quality Criteria are comparable to water quality standards for fresh water fish survival in Class C surface waters [NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1), *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (1998)]*.

Sediment criteria for metals were obtained from Table 2 in *Technical Guidance for Screening Contaminated Sediments.* Metal exceedance determinations were based on the Lowest Effect Levels and Severe Effect Levels.

4.1.5 Indoor Air

Indoor air criteria are based on two sources, which include Occupational Safety and Health Administration (OSHA) Recommended Exposure Limits (REL), and National Institute for Occupational Safety and Health Administration (NIOSH) Permissible Exposure Limits (PEL). Because air quality measurements were made in a commercial facility, OSHA and/or NIOSH standards were used for determining exceedances. Laboratory data was reported in both parts per billion by volume (ppbv) and micrograms per cubic meter (ug/m^3). In order to be consistent with guidance value units, data summary table results are reported in ug/m^3.

4.2 Analytical Results

Presented below as a function of media sampled are the results of the chemical characterization of the site. Media include surface soil, subsurface soil, groundwater, surface water, surface water sediment and indoor air. Complete analytical data tables, including results for all constituents analyzed, are provided by media in Appendixes G through K. In order to focus on the contaminants, media and areas of the site and study area which are of concern, primarily those sample results that exceed the SCGs described above are presented and discussed in this section. For soil and surface water, VOC concentrations below SCGs are discussed for source evaluation purposes. For reference in the following sections, the analyses for all sampled media during the remedial investigation are summarized in Table 4-1.

Primary analysis was for volatile organic compounds because they were identified as the contaminants of concern in the previous site investigations. Metals and PCB analyses were conducted on many of the investigation samples to provide for a comprehensive program. A few metals were detected above SCGs, but generally within an order of magnitude of the exceedance. These metals primarily included iron and zinc at concentrations that do not pose any significant

concerns, and are not related to the site. PCBs were not detected, or detected in very low concentrations, and also do not pose a concern.

The VOCs detected in the previous, as wells as current investigation, constitute a suite of eight chlorinated compounds including:

- trichloroethene (TCE)
- 1,1-dichloroethene (DCE)
- trans 1,2-dichloroethene (t-DCE)
- cis-1,2-dichloroethene (c-DCE)
- vinyl chloride (VC)
- 1,1,1-trichloroethane (TCA)
- 1,1-dichloroethane (DCA)
- 1,1,2-trichlorotrifluoroethane (Freon 113)

These compounds are referenced as the Total Targeted Volatile Organic Compounds (TVOCs) for the site.

4.2.1 Surface Soil

Two surface soil samples were collected at the site in areas accessible by Farrand Controls personnel to assess the potential for direct contact to soil contamination. The sample locations are shown on Figure 4-1. Although VOC concentrations did not exceed SCGs, TVOC concentrations for soil are included in Figure 4-1 for source evaluation purposes.

Neither surface soil sample contained any VOCs or PCBs above SCGs. Both soil samples exceeded SCGs for five metals with the following maximum concentrations: arsenic (14.7 mg/kg), copper (71.3 mg/kg), iron (10,800 mg/kg), mercury (0.28 mg/kg) and zinc (139

mg/kg). The concentrations were within approximately an order of magnitude of their SCGs (Table 4-2).

4.2.2 Subsurface Soil

Subsurface soil samples were collected from test trenches, Geoprobe probeholes and groundwater monitoring well borings. The test trench and probehole locations are shown on Figure 4-1 and the well boring locations for the new installed monitoring well clusters (MW-8, 10 and 20) are shown on Figure 2-2.

4.2.2.1 - Test Trenches

Five test trenches were excavated along buried utility lines (storm water and sanitary sewers) in the front of the building to investigate utility backfill as a preferential contaminant pathway. The trench locations and targeted utilities are shown on Figure 4-1.

There were no VOC or PCB exceedances of SCGs in any of the test trench samples (Table 4-3).

Metal exceedances occurred in all of the test trench samples and were all within an order of magnitude of their SCGs. Two to four exceedances occurred in test trench TP-1, 1A, 2 and 3, and seven exceedances occurred in TP-4.

In test trench TP-3, which was excavated along the storm water sewer passing near the sump source area, iron and zinc exceeded SCGs at 10,400 and 31.2 mg/kg, respectively. In TP-1, 1A and 2, beryllium, iron, nickel and zinc exceedances occurred with maximum concentrations of 0.36, 15,100, 17.3 and 81.4 mg/kg, respectively. In TP-4, in addition to the metal exceedances found in the other test trenches, copper, magnesium and selenium exceedances were detected at 48.3, 11,400 and 2.4 mg/kg, respectively.

4.2.2.2 - Geoprobe Probeholes

One probehole was constructed through the main building basement sump and thirteen probeholes were constructed along the walls of the southern portion of the building (Figure 4-1). The probeholes were constructed to refusal and samples were generally collected from the shallow zone (approximately 6 to 8 feet below grade) above the water table, and from the zone immediately overlying the refusal surface. PCBs were analyzed in three soil samples near the main site building and the results were below SCGs. VOC contamination at the sump, and metals and VOC exceedances along the building perimeter (Table 4-4) are discussed below.

- Sump

Samples were collected from the source area sump base (approximately 3 feet below the building basement floor) to 28 feet below at refusal. The water table was present near the sump base at the time of sampling as indicated by "wet" samples. The sample descriptions did not indicate any sensory identified impacts (i.e. staining, odor) pertaining to the soil under the sump.

No VOC exceedances of SCGs were associated with the sump samples (Table 4-4); however, VOCs are discussed below for source area evaluation purposes. Total targeted VOCs (TVOCs) were highest in the deepest sump sample (25 to 28 feet below the sump base) where the TVOC concentration was 326 ug/kg (Table G-7 of Appendix G). The primary chlorinated compounds present in this sample were TCE (97 ug/kg), TCA (71 ug/kg), c-DCE (57 ug/kg) and Freon 113 (53 ug/kg). The second highest TVOC concentration in the sump probehole was 93 ug/kg in the shallowest sample near the water table where only TCE and TCA were detected at 49 and 44 ug/kg, respectively.

- Building Perimeter

The perimeter building probehole VOC results were varied (Table 4-4). VOCs were not present in any of the samples obtained from the vadose zone (generally 6 to 8 feet below ground surface) near the water table. The only VOC concentrations in exceedance of SCGs in the soil

probehole samples were in GP-S-G(-10) near the southern building corner: TCA at 1,300 and TCE at 840 ug/kg. The sample was collected on top of the refusal surface at 18 to 20 feet below grade, which is shallower than most of the perimeter building probeholes to either side. Sporadic VOCs were present in the front of and along side of the building at varying depths on top of the refusal surface (see Figure 4-1).

All of the perimeter building probehole results showed exceedances of metals generally within one order of magnitude of their SCGs (Table 4-4). Beryllium, copper, iron, nickel and zinc exceedances occurred in most of the probeholes with maximum concentrations of 0.36, 45.1, 39,100, 44.9 and 109 mg/kg, respectively. The exceedances generally increased with depth, both with respect to number of constituents and concentration.

In the deeper samples, exceedances of the SCG for copper occurred with a maximum concentration of 45.1 mg/kg. Additional exceedances were detected in probeholes GP-S-G(-10) and GP-S-F(-10) located near the sump and at GP-S-V1(-75) located behind the building. Some of the exceedances at GP-S-V1(-75) were unique to that location, and included arsenic and barium at concentrations of 9.6 and 529 mg/kg, respectively.

Probehole sample GP-S-C(-75) was obtained from behind the main site building, upgradient of known site facilities and operations. The metal results from this probehole may be an indication of site background levels. Most metals that exceeded SCGs on the site also occurred in this probehole and at similar concentrations (see Table 4-4) indicating that the detected exceedances on-site reflect background levels and are not related to the release of contaminants from the site.

- Monitoring Well Borings

One soil sample from each of the new well cluster locations was collected from near the top of the refusal zone at MW-8 and 10, and at intermediate depth at MW-20.

No exceedances of SCGs for VOCs were detected in these samples. Metals exceedances of SCGs occurred in all three well locations for iron and zinc with maximum concentrations of 14,400 and 44.7 mg/kg, respectively (Table 4-5). Nickel exceeded its SCG at MW-8 at 22.1 mg/kg. Magnesium and mercury exceedances also occurred at MW-20 above their SCGs at 7,520 and 0.16 mg/kg, respectively. All exceedances were within an order of magnitude of the SCGs.

4.2.3 Groundwater

Characterization of the groundwater during the remedial investigation was conducted through Geoprobe probehole, and groundwater monitoring well and piezometer sampling as described in Section 2. Existing information and initial sampling of monitoring wells and piezometers aided in targeting areas for Geoprobe investigation.

4.2.3.1 - Geoprobe Probeholes

The Geoprobe groundwater sample on-site analyses targeted VOC contamination with confirmatory samples analyzed by the off-site laboratory. Approximately 10 percent of the samples were analyzed off-site for TCL VOCs, TAL metals and PCBs. As a conservative approach, the higher of the two results (on-site and off-site laboratory) was used for characterization and evaluation in this report. Field parameters were also measured for most samples and consisted of temperature, pH, conductivity, dissolved oxygen (DO), turbidity and Eh. The samples were also screened for the potential presence of DNAPL using Sudan IV dye. The field data is provided in Appendix L.

PCBs were not detected in any of the probehole samples. Exceedances of SCGs for metals (Table 4-6) were ubiquitous and primarily were comprised of iron and manganese. These exceedances did not occur in the off-site probeholes, but occurred in both the upgradient and downgradient on-site sampling points. Sodium exceeded its SCG at probehole GP-W-I0 at 158,000 ug/l. Off-site SCG exceedances for metals were comprised of chromium, copper,

magnesium and thallium at concentrations of 190, 268, 61,500 and 16.5 ug/l, respectively. These exceedances occurred at GP-W-T-6 near the Taconic State Parkway.

The horizontal distribution of TVOCs in the overburden groundwater is shown on Figures 4-2 and 4-3 for the shallow overburden groundwater (near the water table) and for the deep overburden groundwater (top of refusal surface), respectively. For perspective, the SCG for most of the VOCs is 5 ug/l (vinyl chloride is 2 ug/l) and the figures include a minimum concentration contour of 100 ug/l and a maximum of 10,000 ug/l for TVOC concentrations. For data collected from one horizon because of shallow refusal, generally associated with an aquifer thickness of less than 10 feet, the sample result is included in the refusal surface TVOC concentration map (Figure 4-3). The TVOC concentration contours on Figures 4-1 and 4-2 were prepared taking into account groundwater flow direction. Vertical profiles of TVOCs across the site showing sample locations and the refusal surface are shown in the chemical cross sections illustrated on Figures 4-5 and 4-6. The locations of the sections are shown on Figure 4-4. The VOC exceedances are included in Table 4-6 and are discussed below. The contoured TVOC concentrations on Figures 4-1 and 4-2 indicate two separate areas of VOC contamination: in the northwestern area of the site and the southern area of the main site building.

- Northwestern Area of Property

TVOC data was derived from five probeholes constructed along the northwestern property line and from approximately five probeholes constructed in the northern portion of the main site building's front lawn. Samples were collected from shallow and deep horizons at each probehole.

No VOCs were detected in shallow overburden groundwater samples in the front lawn of the northern part of the building. TVOC concentrations were detected in deep overburden groundwater on top of the refusal surface adjacent to the northwestern site boundary ranging from 25 to 1,345 ug/l (GP-W-UG-4). The primary compounds detected at GP-W-UG-4 were c-DCE and VC at 920 and 250 ug/l, respectively. At probehole GP-W-UG-6 located between the northern front lawn and the northwestern property boundary, TVOC was detected at 2,058 ug/l in

the deep sample. The most prevalent compounds identified in this probehole consisted of TCE, c-DCE and DCA at concentrations of 870, 740 and 230 ug/l, respectively.

- Area South of Main Building

The contoured TVOC concentration map for the shallow overburden groundwater (Figure 4-2) shows a shallow plume emanating from the southwest side of the main site building. The plume appears to be originating from a location near the basement sump, which is a suspected source area. The maximum TVOC concentrations were 3,620 ug/l at the sump and 5,500 ug/l near the sump outside the building wall. The primary VOCs present were TCE, TCA and Freon 113 in the sump and TCE and TCA outside of the building wall. The shallow overburden plume trends in a southerly direction in the direction of groundwater flow towards the pond (probeholes GP-W-L100 and GP-W-0100) where it appears to migrate off-site.

The TVOC concentration map for the deep overburden groundwater (Figure 4-3) indicates a plume emanating from the southwestern (area of the sump) and eastern (adjacent to the machine shop) corner of the site building. In the sump area, the TVOC concentration was 17,150 ug/l immediately outside the building wall and 5,090 ug/l at the eastern building corner. The VOCs present at the eastern building corner were TCE, TCA and Freon 113 at similar relative concentrations as in the sump probeholes. These apparent source plumes appear to coalesce and trend in a southerly direction toward the pond (concentration of 10,430 ug/l at GP-W-K100) and migrate off-site. The on-site plume has a maximum TVOC concentration of 150,000 ug/l at GP-W-I0 in the center of the paved area southeast of the building.

Screening for the presence of DNAPL was conducted on the probehole groundwater samples using Sudan IV dye. The screening results are provided in the Table H-7 of Appendix H. This screening indicated the possible presence of DNAPL in probehole GP-W-I0, where the highest TVOC concentration was detected at a depth of 14 to 18 feet.

Because of the elevated levels of chlorinated VOCs detected in the groundwater samples at the Farrand Controls Site, an evaluation was performed to determine if DNAPL could be

present in the high concentration plume area near the southern building corner. The United States Environmental Protection Agency (USEPA) has prepared a fact sheet entitled "Estimating Potential for Occurrence of DNAPL at Superfund Fact Sheet Sites," dated January 1992. In this reference, USEPA provides a calculation to determine if DNAPL exists at a site. The reference indicates that for DNAPLs comprised of a mixture of chemicals, the effective solubility concept should be employed, utilizing the following equation:

$Si^e = Xi\ Si$ where Si^e is the effective solubility
Xi is the mole fraction of component I in the DNAPL mixture
Si is the free-phase solubility of compound in mg/l

DNAPL compounds are generally detected at concentrations much less than 10 percent of their effective solubility limit in groundwater. The USEPA has identified dissolved phase concentrations of 10 percent of the effective solubility as an indicator of DNAPL at a site, and typically, dissolved contaminant concentrations greater than 1 percent of the aqueous solubility are highly suggestive of the presence of residual DNAPL.

As an indicator of the presence of DNAPL in the deep overburden groundwater (top of refusal surface), the dissolved concentrations of the constituents were compared to 1 percent of each compound's solubility. Freon 113 exceeded this value in approximately 20 locations. Four of these exceedances were located along the building wall near the sump and around the building to the southeast (Figure 4-3). The remaining Freon 113 exceedances were located in the center of the plume, southeast of the building's southern corner, in the area of the 10,000 ug/l TVOC concentration contour on Figure 4-3. The only other compounds that exceeded DNAPL indicator levels were TCE and TCA in one sample, GP-W-I0, at the center of the southern plume described above.

- Off-site

Off-site Geoprobe investigation consisted of four probeholes constructed adjacent to the southeastern edge of the pond, three on the residential properties further downstream to the

southeast and five along the Taconic State Parkway. At most of these locations, an intermediate depth sample was collected in addition to a shallow and deep overburden groundwater sample, to better characterize the thicker off-site aquifer.

TVOC concentrations indicate that most of the shallow overburden plume terminates at and likely discharges to the pond (Figure 4-2). Concentrations along the downgradient pond (transect Q) were non-detectable. TVOC concentrations were present in probeholes along the Taconic State Parkway between 10 and 144 ug/l. This could be a continuation of the shallow plume or result from upwelling of contamination from the deeper overburden groundwater.

The intermediate depth (approximate center between the shallow and deep sampling horizons) TVOC concentrations are shown on Figure 4-3. Along the downgradient edge of the pond, a maximum concentration of 4,340 ug/l was present, and off-site at the residential properties to the east, a maximum concentration of 1,477 ug/l was detected. Along the Taconic State Parkway, the maximum TVOC concentration in the intermediate zone was 288 ug/l.

The deep off-site TVOC concentrations (Figure 4-3) along the downgradient pond edge indicate that the plume is present at depth, ranging from 25 to 1,007 ug/l, however, the concentrations are less than in the intermediate or shallow zone. At the residential properties, the maximum TVOC concentration was 738 ug/l, which is lower than in the intermediate zone. The deep plume extends to the Taconic State Parkway with a maximum detected TVOC concentration of 240 ug/l.

4.2.3.2 - Groundwater Monitoring Wells and Piezometers

Groundwater was sampled from permanent monitoring wells and piezometers on three occasions. Existing wells were initially sampled in April 1999. The seven wells installed as part of this remedial investigation (located based on the findings of the April 1999 well and piezometer sampling, and the Geoprobe program) and seven existing wells and piezometers were sampled in November 1999 and January 2000. The new monitoring wells were installed downgradient of the sump at the site boundary (well cluster MW-10), further downgradient

off-site adjacent to the Taconic State Parkway (well cluster MW-20), and at the eastern lateral edge of the site plume between the site and the residential area to the east (well cluster MW-8). The locations of all Geoprobe probeholes, monitoring wells and piezometers are shown on Figure 2-3.

The VOC and metal exceedances for the groundwater monitoring wells and piezometers are provided in Table 4-7. A second round of sampling of the 14 wells was conducted in late January 2000. In the subsequent discussions of groundwater quality, referenced maps include the data from the wells and piezometers that were sampled during the particular event.

- April 1999 Sampling

Metals were not analyzed in the April 1999 samples. The April 1999 TVOC exceedances in the shallow and deep overburden groundwater are provided in Table 4-7, and the results are illustrated on Figures 4-7 and 4-8, respectively.

The shallow overburden well TVOC data is similar to the Geoprobe results in that the data indicate that contamination is emanating from the area of the basement sump. A maximum TVOC concentration of 8,660 ug/l was present in MW-3 near the sump. The VOC composition was similar to that of the probehole samples. On-site, the shallow overburden plume appears limited to the vicinity of Wall Street.

The TVOC concentrations in deep overburden groundwater are higher than in shallow overburden groundwater with a maximum concentration of 14,220 ug/l in OC-19D. The limited monitoring network indicated that the deep plume extends at least to Wall Street.

- November 1999 Sampling

The water levels during the November 1999 sampling event averaged approximately 0.5 foot lower than the April 1999 levels. This may be a factor in the increased VOC

contamination observed during the November 1999 sampling. The higher concentrations may be associated with residual product that may be entrapped in the soils below the water table.

A few metals exceeded SCGs, these being iron, magnesium, manganese and sodium (Table 4-7). Iron was mainly associated with the deep unconsolidated and bedrock wells, ranging from 368 to 1,300 ug/l. Manganese exceedances occurred mainly in the shallow and intermediate wells and ranged between 307 and 8,590 ug/l. Sodium exceedances were sporadic in all monitored zones with a maximum concentration of 62,000 ug/l detected off-site at MW-20R.

The on-site November 1999 VOC plume configuration for the shallow overburden groundwater was similar to the April 1999 plume (Figure 4-9). The TVOC concentration near the sump increased from 8,660 to 16,120 ug/l. The shallow overburden groundwater downgradient at the property boundary at MW-10S contained TVOCs at 42 ug/l indicating that this is the downgradient edge of the shallow plume. The TVOC concentration of 109 ug/l at MW-20S shows that contamination has reached the water table zone at the Taconic State Parkway and was probably transported to this area, in part, due to upwelling from the deeper overburden plume under the wetlands area.

A comparison of the on-site results for the April and November 1999 sampling rounds is not possible because the sampling events comprised, for the most part, different wells. The concentrations for the deep groundwater and bedrock wells for November 1999 are provided on Figure 4-10. The TVOC concentrations at well cluster MW-10 indicates that contamination has migrated to this location at depth and, in fact, is present within the bedrock at MW-10R where the TVOC concentration is highest at 1,753 ug/l. The TVOC concentration at MW-8 was 8 ug/l and was non-detectable in the deep overburden groundwater and bedrock groundwater monitoring wells. This indicates that bedrock in this area is not impacted and that this area defines the eastern edge of the site plume. Along the Taconic State Parkway, the TVOC concentration was detected in the deep overburden groundwater at 42 ug/l and was non-detectable in the bedrock well.

- January 2000 Sampling

The January 2000 groundwater monitoring results were similar to the November 1999 results described above. The volatile organic compounds and metals detected in January 2000 were those detected in November 1999, and at concentrations within the same order of magnitude. The January 2000 results are included in Table H5 in Appendix H and exceedances are included in Table 4-7.

4.2.4 Surface Water

Surface water samples were collected in March, April and October 1999 (Table 4-8). An SCG is established for one of the targeted VOCs in the surface water at the site, TCE. TVOC concentrations are provided on Figure 4-11 and discussed below for off-site migration purposes. The maximum March/April TVOC concentrations in the wetlands were in outfall SW-W-0F2 at 1,720 ug/l and the downstream location, SW-W-0S2, at 29 ug/l.

The organic compound that exceeded its SCG for Class C Surface Water was trichloroethene (TCE). This occurred in March and October 1999 when TCE was detected at 280 and 370 ug/l, respectively, at SW-W-OF2. SW-W-OF2 is located at the outfall of the conduit that was once connected to the basement sump. Potential residual product and/or contaminated sediment in the conduit could be a source of elevated contaminants in OF2 discharges.

The four surface water samples collected in October 1999 confirm off-site migration of VOCs to the surface water adjacent to the Farrand Controls Site. Concentrations of TVOCs from April to November 1999 increased from 1,720 to 3,648 ug/l at SW-W-OF2, consistent with the observed increases in TVOCs in groundwater. The conduit of Outfall 2 (OF2) was connected to the basement sump in the past. Potential residual product and/or contaminated sediment in the conduit could be a source of elevated contaminants in OF2 discharges.

The samples collected in the center of the pond show TVOCs at a maximum concentration of 328 ug/l. VOC impacts extended downstream approximately 400 feet where TVOCs were present at a concentration of 7.7 ug/l. Although surface water contaminant concentrations were elevated at SW-W-OF2, concentrations are significantly lower in the pond. Also, data obtained from samples taken in the stream indicate that surface water contaminants are not migrating out of the pond along the stream.

Four metals exceeded SCGs (copper, iron, lead and zinc), except at sample point SW-W-W4 located in the wetlands near the northwestern site boundary. The exceedances in the pond and at the outfalls were within an order of magnitude of SCGs (see Table 408) with maximum concentrations of 36.2 ug/l for copper, 7230 ug/l for iron, 16.8 ug/l for lead and 188 ug/l for zinc. Approximately 200 feet downgradient of the pond in the stream at SW-XA-175, only iron exceeded SCGs and was detected at 620 ug/l.

At SW-W-W4, one of the northernmost surface water sampling points, exceedances were unlike those for the other surface water samples. Thirteen metals exceeded SCGs, which comprised arsenic, cadmium, chromium, cobalt, copper, iron, lead, mercury, nickel, selenium, thallium, vanadium and zinc (Table 4-8). The concentrations of these exceedances were up to three orders of magnitude higher than SCGs. It is noted in the sample log that sample SW-W-W4 was collected of ponded water when there was no flow fro the nearby outfall.

PCBs were not detected in any of the surface water samples.

4.2.5 Surface Water Sediment

No exceedances of SCGs for VOCs and PCBs were detected in the surface water sediment samples.

Six surface water sediment samples were collected: three at storm water outfall points in the wetlands and pond, two from the center of the pond and one at a downstream location. Seven metals exceeded Lowest Effect Levels (LEL), which included arsenic, cadmium, copper, iron,

manganese, nickel and zinc. Arsenic exceeded its LEL in one pond sample at the northern upgradient edge of the wetlands and downstream. Cadmium marginally exceeded its LEL in two samples. Copper exceeded its LEL in all sediment samples. Iron and manganese exceed its LEL in most samples. Nickel exceeded its LEL in the pond and downstream.

Five metals exceeded Severe Effect Levels (SEL) (copper, iron, manganese, nickel and zinc) were detected in the sediment samples, generally within an order of magnitude of their SCGs (Table 4-9). Three metals (copper, iron and zinc) exceeded SELs in the pond. Nickel exceedances occurred in the central and northwestern portion of the wetlands (SED OF-1 and SED 4, respectively) slightly above its SCG (Figure 4-11). Manganese exceedances were sporadic and occurred in one wetland and one stream location.

4.2.6 Indoor Air

Two indoor air samples were collected from the Farrand Controls main site building: one adjacent to the sump and the other from the adjacent basement office. No VOCs exceeded the SCGs for indoor air (Table 4-10).

4.2.7 Natural Attenuation

Natural attenuation processes in soil and groundwater environments act to reduce the mass, toxicity, mobility, volume and/or concentration of contaminants. Evidence of natural attenuation are:

- Reduction in contaminant concentrations along the downgradient flow paths
- Loss of contaminant mass
- Generated compounds that indicate compound transformations

The primary in situ processes of natural attenuation consist of the following biological and physical mechanisms:

Biological mechanisms

- Biodegradation
- Chemical or biological stabilization or destruction of contaminants

Physical mechanisms

- Dispersion
- Dilution
- Adsorption
- Volatilization

The physical natural attenuation mechanisms are considered secondary and primarily involve transfer of contaminant mass. The effectiveness of chemical and biological degradation mechanisms (ITRC, 1999, *Natural Attenuation of Chlorinated Solvents in Groundwater: Principles and Practices*) for the site chlorinated VOCs are summarized as follows:

PROCESS	TCE	c-DCE	VC	TCA	DCA
Co-metabolic (w/CH4)	Y	Y	Y	Y&N	N
Direct Anaerobic	N	N	Y	N	N
Anaerobic/Denitification	Y&N	N	N	N	N
Anaerobic/Sulfate Reduction	Y	Y	Y	Y	Y
Anaerobic Methanogenic	Y	Y	Y	Y	Y

TCE: Trichloroethene
c-DCE: cis- 1,2-Dichloroethene
VC: Vinyl Chloride
TCA: 1,1,1-Trichloroethane
DCA: 1,1-Dichloroethane

The co-metabolic process is considered a minor natural attenuation process (ITRC, 1999). In the other metabolic processes, a VOC is converted to another chemical by replacing chlorine atoms. The carbon chloride bond is typically used as an electron acceptor for growth. Some bacteria in anaerobic systems use nitrate or sulfate as electron acceptors.

The occurrence of biodegradation and natural attenuation of the chlorinated VOC contamination present at the Farrand Controls Site can be evaluated by comparing the percentages of individual VOC constituent concentrations to TVOC concentrations, as well as evaluation of the concentrations and distribution of natural attenuation monitoring parameter results.

The primary degradation pathways for the site chlorinated VOCs, from "parent" to "daughter" compounds, are as follows:

1. TCE > c-DCE > VC > ethenes
2. TCA > c-DCE or DCA > VC or chloroethane
3. Freon > halogenated methanes > chlorine

The chlorinated VOC (TCE, DCE, VC, TCA, DCA and Freon 113) constituent percentages in the groundwater for selected areas of the site are provided in Table 4-11. The table includes groundwater monitoring well, piezometer and Geoprobe groundwater analytical data collected during the remedial investigation. Transformations of chlorinated VOCs to "daughter" products and their percentages relative to TVOC in various areas of the plume indicate that biodegradation may be occurring to some degree at and downgradient of the Farrand Controls Site.

In MW-3, which is located near the basement sump and monitors shallow overburden groundwater, TCA percentages in the shallow groundwater were between 77 and 81%, and total DCE was less than 1%. In the deep groundwater monitoring well in this area, P-5D, the TCA percentage was 24%. At deep overburden downgradient wells and piezometers OC-17D and MW-10D, the TCA percentage decreased to 24 and 15% and the total DCE percentage increased to 6 and 22%, respectively. VC which was 0% at MW-3 was 33% at MW-10D, but 0% in OC-17D and MW-10R. Further downgradient from the source at the Taconic State Parkway in MW-20S, TCA was 0 % and total DCE was 58%. The sporadic distribution of the constituent

percentages do not produce substantial conclusive trends but indicate that biodegradation may be occurring at the site to a limited degree.

Dissolved oxygen levels in the groundwater in the site vicinity generally were below 2.0 mg/l. In a low oxygen groundwater system such as this, the following characteristics for natural attenuation indicator parameters may occur:

- Dissolved oxygen is highest in background areas and decreases at the source and downgradient
- With the depletion of oxygen, alternate electron receptors can be sulfate and nitrate
- Chloride and methane increases downgradient of the plume
- Dissolved iron increases downgradient of the plume and at lateral plume fringes
- Sulfate reduction to sulfide can cause higher ferrous iron within the plume

Indicator natural attenuation parameters were measured in approximately 20 deep and 10 shallow Geoprobe groundwater samples to help evaluate the occurrence and degree of natural attenuation of the chlorinated VOC contaminants at the site. These parameters included dissolved oxygen and methane, ferrous iron, nitrate, sulfate and sulfide. The concentrations of these concentrations are summarized in the table in Appendix L and the distribution of these concentrations in the shallow and deep overburden groundwater samples are shown on Figures 4-12 and 4-13, respectively.

The concentrations and the distribution of the natural attenuation parameter results varied between and within the shallow and the deep overburden groundwater. Dissolved oxygen concentrations were sporadic in both the shallow and deep groundwater. The highest oxygen concentration was 5.46 mg/l near the northern building corner (Figure 4-12) within the TVOC plume. Downgradient oxygen levels ranged from 0.48 to 2.48 mg/l. Methane concentrations were highest (82 ug/l) near the downgradient edge of the plume. No definitive patterns for the remaining parameters were apparent. Natural attenuation monitoring results were generally sporadic and did not produce definitive patterns illustrative of significant natural attenuation.

4.2.8 Data Validation/Usability

Soil, groundwater, surface water, sediment and air samples were collected during the field investigation at the Farrand Controls Site. During the field program, a majority of the groundwater and soil samples were analyzed for selected VOCs (chlorinated and aromatic) utilizing a gas chromatograph equipped with an electron capture liquid detector (ECLD) and photoionization detector (PID) in an on-site mobile laboratory operated by Severn Trent Laboratories (STL). Other samples were sent to STL's off-site laboratory and analyzed for a variety of parameters, including Target Compound List + 10 (TCL + 10) VOCs, PCBs, Target Analyte List (TAL) metals, cyanide (CN) and natural attenuation parameters comprising dissolved methane, ferrous iron, nitrate, sulfate and sulfide.

The samples analyzed at the off-site laboratory were in accordance with New York State Department of Environmental Conservation (NYSDEC) 10/95 Analytical Services Protocol (ASP) methods.

The data packages submitted by both the STL mobile laboratory and the off-site STL laboratory have been reviewed to determine the usability of the data and if the sample analysis was contractually compliant.

Sample analyses (on and off-site) were performed within the method specified holding times. All quality assurance/quality control (QA/QC) requirements (i.e., surrogate recoveries, matrix spike/matrix spike duplicate recoveries, calibrations, blanks, etc.) meet NYSDEC 10/95 ASP contract criteria.

The methylene chloride, acetone and 2-butanone results for the samples analyzed at the off-site laboratory have been qualified as nondetect due to laboratory contamination. That is, the method blanks associated with the samples also contained these compounds and the sample concentrations were less than five times the concentration found in the corresponding method blank.

All but one sediment sample had a percent solids content of less than 50 percent, therefore, the metals results for those samples have been qualified as estimated possibly biased high.

All sample results have been deemed valid and usable for environmental assessment purposes as qualified above.

In addition to on-site analysis of the environmental samples collected as part of the field investigation, 35 of the samples were sent to an off-site laboratory for confirmatory analysis. The on-site analysis consisted of analyzing the samples for select chlorinated volatile organic compounds by gas chromatograph (GC). The off-site analysis was performed by gas chromatograph/mass spectrometer (GC/MS) for target compound list (TCL) volatile organic compounds. The total results for the chlorinated compounds vinyl chloride, Freon 113, 1,1-dichloroethene, 1,2-dichloroethene (total), 1,1-dichloroethane, 1,1,1-trichloroethane and tetrachloroethene for the on-site and off-site analysis were compared to determine the reliability of the on-site results.

In general, all of the on-site and off-site results were comparable with only one of the samples having an on-site total chlorinated volatile result being more than double that reported from the off-site laboratory. The total chlorinated volatile concentrations for sample GP-W-H-O (14 to 18 feet) were 18,000 and 59,000 ug/l for the off-site and on-site lab, respectively; however, the same compounds were detected in both sets of analyses. The discrepancy in concentration could be due to the loss of volatile organic compounds during shipment or in the preparation of the sample for analysis. Overall, the data from the on-site laboratory is comparable to the off-site laboratory and should be considered reliable and accurate.

5.0 CONCLUSIONS

The objectives of the remedial investigation portion of the RI/FS for the Farrand Controls Site were to determine the nature, source and extent of contamination, and to identify on a preliminary basis, the media and areas of the site of potential concern. The investigation findings evaluation is primarily based on comparison to standards, criteria and guidelines (SCGs) selected for the site. Exceedance of the SCGs is considered potentially significant contamination. VOC impacts below SCGs are discussed for source evaluation purposes in soil and surface water. Final determination regarding the threat to human health and the environment, and the need for remediation will be based on the risk assessment. Conclusions regarding the investigation results are provided below as a function of media.

5.1 Surface Soil

Based on the results of the remedial investigation, surface soil at the Farrand Controls Site does not appear to be contaminated and warrants no further action.

5.2 Subsurface Soil

The investigation results indicate that soils in the vadose and saturated zones beneath the basement sump are not significantly contaminated, which indicates that prior removal of contaminated sediment in the sump and underlying soil was effective in remediating this source of contamination in the immediate area of the sump. However, contaminated subsurface soil was detected in deep Geoprobe samples in the area of the building's eastern corner, southern corner and along the southwestern building wall near the sump. Soil SCGs were exceeded only by two compounds (Freon 113 and DCE) in one sample which was located at the building's southern corner.

5.3 Groundwater

- Groundwater at the site is significantly contaminated with volatile organic compounds, and DNAPL may be present in the subsurface overlying bedrock and the Geoprobe refusal surface. The VOCs detected in groundwater are TCE and its breakdown products c-DCE, t-DCE and VC; TCA and its breakdown products c-DCE, DCA, chloroethane and vinyl chloride; and Freon 113. The primary contaminants are TCE, TCA and Freon. These solvents were used and disposed at the site in the basement sump in the southern portion of the building.

- Based on the investigation results, there are shallow and deep overburden plumes of contaminated groundwater that migrate from the southern portion of the building. The shallow plume extends off-site in a southerly direction and appears to discharge to the adjacent surface waters. The deep plume appears to migrate also in a southerly direction beneath the pond and wetlands, and discharges, at least in part, also to the pond and wetlands, and shallow groundwater beyond the surface water system and in the vicinity of the Taconic State Parkway. The discharge to the wetlands and pond significantly impacts surface water quality. The downward flow of groundwater in the vicinity of the building and DNAPL are likely factors for the migration of contaminants to the underlying bedrock and Geoprobe refusal surface. Based on the sample results, contaminated groundwater was detected in bedrock south of the main site building.

- Although the deep overburden plume is primarily located south of the main site building, contamination is also present in the deep overburden groundwater west of the building, between the building and wetlands. The VOC concentrations in this area are sporadic and are not as high as in the narrower plume south of the main site building. The occurrence of this contamination may likely be associated with varied localized groundwater flow components, preferential flow pathways, the drain tile along the front of the building (if it is present), and the storm water sewer pipes, in particular, the pipe that runs adjacent to the sump, that run from beneath the building to the wetlands.

- In addition to the plumes originating from the area of the sump and southern portion of the building, groundwater contamination was also detected along the northwestern site boundary, which appears to be the result of an off-site source. In addition, the VOC fingerprint found in this area (primarily DCA and VC) is different from that found in the above areas of the site.

- Since the sump was effectively remediated, the source of groundwater contamination south of the building, at least in the shallow overburden groundwater, may result from: 1) significant contamination and possible DNAPL being retained in the capillary zone and soil pore space beneath the building and downgradient of the sump, or 2) residual contamination in the drain tile along the front of the building (if it does exist). The source of contaminated groundwater in the deep overburden is likely due to continuing migration of contamination from the shallow overburden and

also from highly contaminated groundwater and likely DNAPL overlying bedrock and the dense surface defined by Geoprobe refusal.

- The preferential pathways for migration of highly contaminated groundwater and possible DNAPL appear to be along surfaces of localized clay and silt layers; highly permeable material along reported subsurface drains, building footings and bedrock; and Geoprobe refusal surfaces.

- In addition to the sources described above, a source of contamination may exist in subsurface soil in the vadose zone near the building's eastern corner, near the machine shop. This source, if it exists, may have resulted from disposal and/or spills of solvents to ground surface or perhaps to a pit.

5.4 Surface Water

Surface water in the wetlands and pond adjacent to the site appears to be significantly contaminated with VOCs, primarily TCE and TCA, resulting from discharges of contaminated groundwater to the surface water and possibly discharges from the storm water outfall that runs beneath the site and adjacent to the basement sump. It is believed that this outfall was once connected to the source sump.

5.5 Surface Water Sediment

Based on the results of the investigation, sediments in the wetlands and pond adjacent to the site are not significantly contaminated and warrant no further action.

5.6 Indoor Air

Based on the sampling results and comparison to recommended occupational exposure levels, concentrations of volatile organic compounds in air in the main site building basement are within established limits and no further action is warranted with regard to indoor air under present conditions.

6.0 HUMAN HEALTH RISK ASSESSMENT

The purpose of this section is to evaluate the potential risks to human health associated with the Farrand Controls Site. Risks are evaluated on the basis of the site environmental setting and information on the nature and extent of contamination presented in previous chapters of this remedial investigation report. The relevant information is condensed here, in brief, and discussed within the context of current and potential human contact with contaminants of concern at potential locations where human exposure could occur.

As with any human health risk assessment conducted within the RI/FS process, this assessment is not intended to predict disease outcome, but rather, is meant to be used as a tool to make decisions regarding remediation. Given the available information for this site, and keeping the purpose of the assessment in mind, the following assessment for the Farrand Controls Site is qualitative, with an emphasis on exposure assessment.

6.1 Site Location and Environmental Setting

Information regarding the site location, setting and history is presented in detail in Sections 1 and 3 of this report. A detailed description of the remedial investigation is presented in Section 2, and details of the nature and extent of the contamination are discussed in Section 4. Portions of these sections relevant to the risk assessment are summarized in brief in the following paragraphs.

The Farrand Controls Site is located on a 13.6-acre parcel, of which approximately 60 percent is undeveloped. The developed portion of the site is occupied by a 28,255-square foot building, a 8,312-square foot indoor tennis court, and two outdoor tennis courts (east). Except for the eastern portion of the site and the bedrock escarpment to the north, the site is primarily grassy and slopes gently to the west.

To the northwest of the site is a paved parking lot for a commercial complex. Up-slope and to the north is a bedrock escarpment and the Mount Eden Cemetery. Residential

neighborhoods primarily composed of single-family dwellings border the site to the east and southeast, and extend up-slope to the northeast. A wetland/pond complex borders the site to the southwest and west. A long paved driveway extends from Wall Street (immediate southern border), separating site buildings from the wetlands. Area residents and workers use the Wall Street extension driveway for walking, jogging, skating, exercising pets and riding bicycles.

A full basement underlies the central and western portion of the main building and provides office, laboratory, storage and maintenance space. One sump received industrial waste beneath the main site building. The liquids in all three basement sumps were contaminated with volatile organic compounds, and the main sump designated SU-3 (most eastern) was identified as a contaminant source. The other two sumps may have been contaminated by groundwater during pumpage of the sumps.

There are buried utilities on site (see Figure 3-1). Gas and telephone lines run parallel to the northeast side of the Wall Street extension driveway. Water supply pipes and sanitary sewers run along the south (front) of the building. The storm sewer pipes which run underneath the main building appear to be located in groundwater. Site storm water is collected in four storm sewers which discharge to the adjacent southern wetlands. Surface water which does not enter storm sewers percolates into the ground and/or drains via overland flow into the wetlands.

Horizontal groundwater flow at the site is predominantly southward, with southeast and southwest components in different parts of the site. In April 1999, November 1999 and January 2000, the shallow water table was encountered within approximately 7 feet of the ground surface. There are also both upward and downward components of groundwater flow. The investigation determined that: 1) the wetland/pond complex and the adjacent portion of the shallow, unconsolidated aquifer are recharged by deep groundwater rising through discontinuities in the bedrock; and 2) downward flowing shallow groundwater near the source area sump and along the front (south) of the main building could transport dissolved contaminants downward, as well as enhance the downward migration of DNAPL. The buildings, pavement and storm water sewers may also influence the direction of shallow groundwater flow.

The wetlands are downgradient of the main building and receive surface water flow and groundwater discharge from the site. There is standing water year round, and the wetland system is connected to Davis Brook. NYSDEC classifies Davis Brook as a "Class C" waterway, suitable for contact recreation and the support of a fish population exclusive of trout. While fish species, such as largemouth bass, bluegills and creek chub, have been observed in Davis Brook, it is unlikely that conditions in the wetland (shallow water and high summer temperatures) would support a year-round population of fish.

There is an area in the wetlands in the vicinity of the former sump outfall (Figure 3-11) where stressed vegetation was observed. High VOC concentrations were found in the outfall sample associated with this location (SW-W-OF2).

The Farrand Controls Site is served by a public water supply, and residences and commercial complexes in the vicinity of the site are also serviced by public water. The public water supply is derived from the Kensico Reservoir, which is located approximately 3,000 feet east of the site. The reservoir is upgradient of the site at a higher elevation of more than 100 feet, and is thus, not impacted by overland flow or groundwater discharge from the site. Bedrock wells are also used for commercial purposes in the nearby vicinity. Based on the results of a private water well survey (see Section 2.3 of this report), there are no nearby potable private wells. In addition, sampling of the downgradient commercial wells determined that no site-related contaminants were detected in those wells. The well survey, well sampling and potential impacts to human health associated with ingestion of groundwater are discussed further in the exposure assessment below.

6.2 Exposure Assessment

The purpose of this exposure assessment is to determine how and when an individual might be exposed to contaminants of potential concern associated with the site. A contaminant of potential concern (COPC) is any chemical detected in a medium which could produce adverse health effects under the right conditions of dose and exposure. For exposure to occur, there must be a complete "pathway of exposure" where a person can come into contact with contaminants

of potential concern. For a pathway to be complete, there must be: 1) a source or medium containing COPC; 2) a location where human contact could take place (i.e. an exposure point); and 3) a feasible means for the COPC to enter into the person's body. The person who could come into contact with COPC at an exposure point is called a "receptor." The ways in which COPC can enter the body are called "routes of exposure." Oral (by mouth), dermal (contact with skin) and inhalation (breathing into the lungs) are the routes of exposure considered in this and other human health risk assessments. Consistent with the New York State Department of Health (NYSDOH) and other regulatory agencies, this assessment considers both current and hypothetical future exposures.

For ease of consideration, the exposure assessment is presented by medium of interest.

6.2.1 Surface Soil

Two surface soil samples were taken from grassy areas off the eastern and southern ends of the main building (Figure 4-1). No site-specific background samples were obtained. No VOC or PCB concentrations in these samples exceeded SCGs. However, there were several metals with maximum concentrations in excess of SCGs, including arsenic (14.7 mg/kg), copper (71.3 mg/kg), iron (10,800 mg/kg), mercury (0.28 mg/kg) and zinc (139 mg/kg). Given that large uncertainty factors associated with the toxicity of these metals (generally on the order of 100 to 1000), and the fact that exceedances are approximately within a factor of 10, the appearance of these metals in the surface soil is not of concern. It is also possible that area-wide distribution of these metals apart from site activities could account for some of the contamination on site.

Workers could be exposed to surface soils on site, as could recreational users of the site (joggers, walkers, pet walkers, rollerbladers and skateboarders), but the presence of grass would tend to mitigate such exposures. The primary routes of exposure for these receptors would be oral and dermal. However, overall, the absence of VOC and PCB concentrations above SCGs, the low duration and frequency of exposure, and the low levels of metals present, suggest that such exposures do not warrant concern from the perspective of unacceptable health risk.

6.2.2 Subsurface Soil

Subsurface soil samples were collected from test trenches, Geoprobe boreholes and groundwater monitoring well borings. The locations of these samples are shown in Figure 4-1.

None of the VOCs or PCBs detected in any of the test trench or monitoring well boring samples exceeded their respective SCGs. Metal exceedances (iron, nickel, beryllium, zinc, copper, magnesium and selenium) occurred in all of the test trench samples, and were all within an order of magnitude of their SCGs. All three well locations yielded borings with iron and zinc in excess of their respective SCGs.

With regard to probehole samples taken along the building perimeter, VOCs were not present in any of the samples taken from the vadose zone near the water table (generally 6 to 8 feet below ground surface). The only VOC concentrations in excess of SCGs in the soil probehole samples were in GP-S-G (10) near the southern corner of the building (TCA at 1,300 ug/kg, and TCE at 840 ug/kg). This sample was collected at a depth of 18 to 20 feet below grade on top of the refusal surface. Based on groundwater elevations obtained from a nearby monitoring well and piezometer (MW-3 and P-5S: see Table 3-1), this sample is well below the water table. All of the building perimeter probehole samples had metal concentrations in excess of their SCGs (generally, beryllium, copper, iron, nickel and zinc), but the exceedances were generally within one order of magnitude of the SCGs.

Samples were collected from the source area sump base (approximately 3 feet below the basement floor of the main building) to refusal (28 feet). VOCs were detected in these samples, but not at concentrations in excess of their respective SCGs. The VOCs primarily detected were TCE, TCA, cis-DCE and Freon 113.

Given that subsurface contamination is not readily accessible, future construction workers or workers servicing subsurface utilities, particularly along the southern portion of the building, would be the only receptors who could potentially be exposed to COPCs in subsurface soil (oral, dermal and inhalation routes). However, exposure for these receptors is unlikely due to

the fact that contamination above SCGs was only detected in a sample which is well below the water table. Most construction is likely to occur at depths above the water table, and not at a depth of 18 to 20 feet where the contaminated sample was obtained. Hypothetically, the high VOC concentrations in subsurface soil near GP-S-G(10) could adversely impact utility workers servicing the water and sanitary sewer lines which run along the southern portion of the building. Any worker involved with subsurface construction could be exposed to COPCs in the soil. However, these exposures are likely to be mitigated by; 1) the use of personal protective equipment; and 2) the fact that most of the work is likely to be done at shallower depths and in locations where the VOC concentrations fell below their respective SCGs. As with surface soil, the relatively small exceedances of the inorganics are not cause for concern from the perspective of adverse health impacts.

6.2.3 Groundwater

Groundwater at the site is significantly contaminated with VOCs which were used and disposed of at the site in the basement sump in the southern portion of the building (primarily TCE, TCA and Freon 113). The investigation results indicate that there are shallow and deep plumes migrating from the southern portion of the building. The shallow plume extends off site in a southerly direction and appears to discharge to the adjacent surface waters. The deep plume appears to migrate in a southerly direction beneath and upwards to the pond and wetlands in the vicinity of the Taconic State Parkway. There is also significant contamination in deep groundwater west of the building (concentrations lower than in the main plume). Contamination was also detected in groundwater at the northwestern site boundary, but this contamination appears to originate from an off-site source (different fingerprint from previously mentioned contamination).

There is no current human exposure to contaminated groundwater. As discussed in Section 2.3, a commercial water supply survey was conducted over a 1/2-half mile area downgradient (southeast) of the site. Eight wells were located on Railroad Avenue (Figure 2-3). Construction information, available for only two of these wells, indicates that the wells are deep

bedrock wells (300 to 400 feet below grade). NYSDOH sampled all eight wells on January 19, 1999. No VOCs associated with the site were detected in any of the samples.

NYSDEC conducted a private well survey during November and December of 1999. All residences south of Wall Street and west of Lakeview Avenue to the Taconic State Parkway were contacted. Of the 54 residences contacted, only 25 responded. All of these residents reported municipal water use. As mentioned previously, the municipal water supply is derived from the Kensico Reservoir, which is unimpacted by the site.

Although there is no current exposure to groundwater, the potential for groundwater exposure exists. Construction workers engaged in subsurface activities could be exposed via dermal and inhalation routes to COPCs in groundwater. In addition, downgradient well users (either current commercial wells or hypothetically developed private wells) could be exposed via COPCs migrating off site. These receptors could be exposed by oral and dermal routes.

6.2.4 Surface Water

VOCs and inorganics are present in surface waters migrating off site. Except for TCE, there are no SCGs for the VOCs detected in surface water samples. The SCG for TCE (40 ug/l) was exceeded in the outfall sample (SW-W-OF2) that was once connected to the basement sump. Only one metal, iron, exceeded SCGs in the downstream samples. A number of metals exceeded their respective SCGs in an upstream sample (SW-W-W4), suggesting that inorganic contamination in surface water is not site related (see Section 4.2.4 and Table 4-8). Exposure to surface waters in the wetlands is possible, but not likely. Access to the wetland area is difficult and it is not an attractive area for recreational pursuits. Swimming is not an option due to the nature of the area, but wading is theoretically possible. Ingestion of contaminated fish is not an issue due to the nature of the site-related contamination (VOCs do not bioaccumulate and biomagnify).

6.2.5 Surface Water Sediment

Six surface water sediment samples were collected: three at storm water outfall points in the wetlands and pond, two from the center of the pond and one at a downstream location. There were no exceedances of SCGs for VOCs or PCBs. Two levels of SCGs were used for metals in surface water sediment, these being Lowest Effect level (LEL) and Severe Effect Level (SEL). Metals were detected above SCGs for both LEL and SEL; however, the SCGs exceeded are for the protection of benthic organisms, not human health. All of the exceedances were generally within an order of magnitude of their SCGs. In addition, as with surface water, exposure through contact with sediment is possible, though not likely. In addition to the inaccessible nature of the wetland area, most sediments are overlain by water, making contact even less likely.

6.2.6 Air

Exposure to COPCs released to air from either groundwater (volatilization) or soil (volatilization and emission of particulates) is a consideration. There is a potential for inhalation exposure to VOCs released from both soil and groundwater. Two indoor air samples were collected from the Farrand Controls main site building: one adjacent to the sump and the other from an adjacent office. No VOCs detected in either sample exceeded recommended occupational exposure levels. The negative air samples and the lack of COPCs in the top 6 to 8 feet of soil with concentrations above SCGs, suggest that inhalation exposures are unlikely to be of concern.

Exposures for current on-site workers is possible, although current exposure is not of concern (Section 2.18 - Air Sampling Results). VOC-contaminated water seeps into the basement from time-to-time, and individuals working in the basement or occupying the basement office are potentially at risk of exposure. Inhalation exposure for hypothetical excavation workers is also possible due to the presence of VOC contamination in subsurface soil and groundwater.

Exposure via inhalation is also possible for individuals engaged in recreational activities on site (tennis courts and Wall Street driveway extension) through exposure to COPCs released to air from subsurface soil, groundwater and surface water. However, such exposures are likely to be negligible due to: 1) the mitigating effect soil and grass or pavement above the subsurface contamination; 2) the relatively low concentrations of VOCs in areas where recreational activity or trespassing is likely to occur; and 3) the inaccessibility of the wetland area, and the relatively low concentrations of VOCs detected in surface water samples taken from the wetlands.

6.3 Conclusion

There are currently no complete pathways for human exposure associated with contamination in media on the Farrand Controls Site or migrating from the site.

There are inorganic COPCs present in all media sampled at the site. However, the concentrations of these COPCs are generally within an order of magnitude of their SCGs, and exposure to these COPCs would be limited. Therefore, exposure to inorganic COPCs present in site-related media are not of concern from the perspective of human health risk.

The following exposure pathways involving volatile organic COPCs are currently not complete, but could potentially become complete for the following receptors:

<u>On-site Farrand Controls workers</u>

- Inhalation of VOCs released to air from groundwater in the basement of the main building
- Dermal contact with VOC-contaminated groundwater in the basement of the main building
- Inhalation exposure to VOCs released to air from soil and groundwater from a hypothetical open subsurface construction near the sump source area

On-site workers engaged in subsurface utility repairs or subsurface construction

- Oral, dermal and inhalation exposure to VOCs in subsurface soil at the southern corner of the building
- Dermal and inhalation exposure to VOCs in shallow groundwater which may be present in an excavation near the sump source area, or near the secondary plume on the western side of the main building

On-site trespassers or recreationists

- Dermal exposure to VOCs in surface water or discharging groundwater (remote possibility)

Nearby downgradient residents and commercial establishments

- Oral and dermal exposure to VOCs in groundwater

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APPENDIX A

SOIL GEOPROBE LOGS

GEOPROBE SOIL SAMPLE LOGS
FARAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

Location	Date	Depth Interval	Sample I.D.	PID (ppm)	Description
GP-S-VI	10/4/99	0 – 3"		0.0	Asphalt and concrete.
		3" – 3'		0.0	Dark brown-red fine to medium SAND, some crushed gravel, broken rock.
		3' – 4'		0.0	Brown, well sorted, fine SAND, dry, trace silt.
		4' –8'		0.0	Brown, medium SAND, mixed with some gray-white crushed rock fragments at 6'), dry.
		8' – 12'		0.0	Brown gray, fine SAND, some silt, well sorted, moist to wet. Water table at ~ 11'.
		12' – 14'		0.0	Light reddish brown SILTY SAND, trace clay, trace gray silt.
		14' – 15'		0.0	Brown - light reddish-brown coarse SAND and fine GRAVEL, trace crushed rock some silt. Difficult drilling.
		15' – 18'	GP-S-VI-(-75) (14-16')	0.0	Reddish orange brown, coarse to medium, poorly sorted SAND, trace to little silt, trace clay.
		18' – 18.5'		0.0	Weathered ROCK and coarse SAND, wet to saturated. REFUSAL.

SUMP GEOPROBE LOG
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

DEPTH INTERVAL *	DESCRIPTION
O – 4'	Brown fine SAND, little silt, trace fine to medium sub-angular gravel.
7 – 10'	Brown to black fine SAND, trace silt. No odor, wet.
10 – 13'	Same
13 – 17'	Same
17 – 21'	Same
21 – 25'	Same, with trace fine gravel.
25 – 28'	Same, coarse GRAVEL with more "till."

* Depth given from bottom of sump

BUILDING PERIMETER SOIL SAMPLE LOGS
FARRAND CONTROLS SITE
REMEDIAL INVESIGATION/FEASIBILITY STUDY

Sample Location	Date	Depth Interval	Sample Description
GP-S-G(-10)	3/17/99	6-8'	Tan, gray, black and white fine SAND, little silt. Damp. No odor.
		18'	No odor, no reaction with dye.
GP-S-F(-10)	3/17/99	6-8'	Tan, brown gray, fine SAND, little to some silt, dry to Damp. No odor.
		28-30'	Brown to dark brown/gray fine SAND, trace sub-round to sub-angular gravel, trace to little silt. No odor. Slight to questionable reaction with dye.
GP-S-E(-10)	3/17/99	6-8'	Tan, gray-brown fine SAND, little silt, no reaction with dye.
		33-37'	Brown fine SAND little silt, little fine angular to sub-angular gravel wet. Possible reaction with dye.
GP-S-G(-25)	3/18/99	5-8'	Gray, brown/black and white fine SAND, trace fine sub-angular to sub-round gravel, trace silt. No reaction with dye.
		18-20'	No reaction with dye.
GP-S-G(-45)	3/18/99	6-8'	Tan, gray, brown fine SAND, little silt, trace fine sub-angular gravel. No reaction with dye.
		25-27'	No reaction with dye.
GP-S-G(-65)	3/19/99	6-8	Brown tan, gray fine SAND little silt. No reaction with dye.
		25-27'	
GP-S-G(-85)	3/19/99	6-7'	Brown tan SILT to CLAYEY SILT.
		7-8'	Brown, black, tan fine SAND.
		20-22'	Brown gray TILL. Fine to medium SAND little subround medium gravel, little silt. Wet. No reaction with dye.

TEST PIT LOGS
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILIY STUDY

Location	Date	Depth Interval	Sample I.D.	Description
TP-1	4/12/99	0 – 3' 3' – 4'	TP1-S-01	Brown fine SAND some clayey silt, trace to little fine gravel. Dark brown fine SAND, little silt, trace fine gravel.
TP-1A	4/12/99	0 – 0.5' 0.5' – 4+'	TP1A-S-01	Brown topsoil, brown fine SAND some clayey silt. Orange brown fine SAND, little clayey silt, trace fine grave; Boulder. Wet at 3.5'. Dark gray soil beneath pipe.
TP-2	4/12/99	0 – 3'	TP2-S-01	Brownish tan clayey SILT and fine SAND with trace gravel. Damp.
TP-3	4/12/99	0 – 1' 1' – 3' 3' – 6'	TP3-S-01	Brown top soil. Brownish tan, fine SAND, little clay and silt, trace gravel **fill.** Tan fine SAND, trace silt, pipe at 4-5 feet deep. Sample collected at 6', below base of pipe.
TP-4	4/12/99	0 – 0.5" 0.5" – 3' 3' – 5'	TP-4-S-01	Topsoil, grass roots. Dark brown, silty fine SAND, trace clay occasional boulders and cobbles. Dark gray silty fine SAND, trace fine gravel, moist to wet. 36" concrete pipe and 30" diameter steel pipe discharging water in test pit.

APPENDIX B

GROUNDWATER MONITORING WELL CONSTRUCTION LOGS

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Project No.: 1617
Project Name: Farrand Controls

Boring No.: MW-8D
Sheet 1 **of** 2
By: V. Vassil

Drilling Contractor: UniTech/AmeriDrill
Driller: Tom Brown
Drill Rig: Cantera CT-350
Date Started: 10/12/99

Geologist: A. Jaroszewski
Drilling Method: HSA
Drive Hammer Weight:
Date Completed: 10/12/99

Boring Completion Depth: 36 feet
Ground Surface Elevation:
Boring Diameter: 6 7/8 inches

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec	VOC field screening FID ppm	PID ppm	CH4 ppm	Sample Description
-0-								
-1-								
-2-								
-3-		SS	7 7	24"		0.0		Well sorted, light brown, fine sand. Weakly stratified.
-4-			8 9					
-5-								
-6-								
-7-								
-8-		SS	6 3	24"		0.0		Poorly sorted, brown, fine to medium sand, trace pebbles
-9-			4 5					
-10-								
-11-								
-12-								
-13-		SS	2 2	24"		0.0		Same as above -- micaceous sand -- problem with running sand at 13 feet.
-14-			3 5					
-15-								
-16-								
-17-								
-18-								
-19-		SS	2 3	24"		0.0		Same
-20-			3 2					

Sample Types:
SS = Split Spoon
UC = Undisturbed Core

NOTES:

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Project No.: 1617
Project Name: Farrand Controls

Boring No.: MW-8D
Sheet 2 **of** 2 .
By: V. Vassil

Drilling Contractor: UniTech/AmeriDrill
Driller: Tom Brown
Drill Rig: Cantera CT-350
Date Started: 10/12/99

Geologist: A. Jaroszewski
Drilling Method: HSA
Drive Hammer Weight:
Date Completed: 10/13/99

Boring Completion Depth: 36'
Ground Surface Elevation:
Boring Diameter: 6 7/8 "

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec	VOC field screening FID ppm	PID ppm	CH4 ppm	Sample Description
-21-								
-22-								
-23-		SS	3 4	24"		0.0		Same; still problems with running sand.
-24-			3 2					
-25-								
-26-								
-27-								
-28-		SS	10 8	24"		0.0		Same; sands heaving 2 to 3 feet in augers
-29-			7 12					
-30-								
-31-								Harder augering
-32-								
-33-								
-34-	MW-8D-	SS	4 4	24"				Brown, poorly sorted fine – medium sand with trace gravel.
-35-	34 – 36 '		4 50					Weathered schist, quartz.
-36-								_____ base of boring at 36 ft. _____
-37-								
-38-								
-39-								
-40-								
-41-								

Sample Types:
SS = Split Spoon
UC = Undisturbed Core

NOTES:
Set 2" PVC well at 36 feet, screened 26-36 feet.

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Project No.: 1617
Project Name: Farrand Controls

Boring No.: MW-8R
Sheet 1 **of** 2
By: V. Vassil

Drilling Contractor: UniTech/AmeriDrill
Driller: Tom Brown
Drill Rig: Cantera CT-350
Date Started: 10/14/99

Geologist: V. Vassil
Drilling Method: Rotary
Drive Hammer Weight:
Date Completed: 10/19/99

Boring Completion Depth: 56 feet
Ground Surface Elevation:
Boring Diameter: 10 "

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec	VOC field screening FID ppm	PID ppm	CH4 ppm	Sample Description	Graph
-0-								Unconsolidated sandy, silty overburden. See log for MW-8D for depth to 35 feet.	
-35-								Gneissic regolith to depth of 41 feet.	
-36-									
-37-									
-38-									
-39-									
-40-									
-41-		UC		48 "		0.0		Foliated, black and white gneiss with pale pink porphyroblasts and vertically-dipping schistosity; crenulation cleavage between fine bands of white quartz/feldspar and black biotite. Tightly folded.	
-42-									
-43-								Same gneiss with quartz bands up to 0.5" thick.	
-44-								4" fracture zone with wet silt, sand and gravel-sized clasts and alteration products in steeply dipping fracture. Crenulated slickensides on rock surrounding fracture.	
-45-									
-46-		UC		48"		0.0		Solid black, white and pale pink gneiss, vertical to sub-vertical schistosity.	
-47-								4" fracture zone with rock fractured in 1.0 - 2.5" clasts -- underlain by competent rock alternating with rock exhibiting thin, weakly altered fractures.	
-48-									
-49-								Horizontal crack cutting foliation exhibiting soft white alteration mineral tentatively identified as talc	
-50-									

Sample Types:
SS = Split Spoon
UC = Undisturbed Core

NOTES:

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Project No.: 1617
Project Name: Farrand Controls

Boring No.: - MW 8R
Sheet 2 **of** 2 .
By: V. Vassil

Drilling Contractor: UniTech/AmeriDrill
Driller: Tom Brown
Drill Rig: Cantera CT-350
Date Started: 10/14/99

Geologist: V. Vassil
Drilling Method: Rotary
Drive Hammer Weight:
Date Completed: 10/19 /99

Boring Completion Depth: 56 feet
Ground Surface Elevation:
Boring Diameter: 10"

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec	VOC field screening FID ppm	PID ppm	CH4 ppm	Sample Description	Graph
-51-		UC		48"		0.0		Same gneiss- upper third of core fractured longitudinally. Slickensides line fracture as does pale green alteration mineral (talc? serpentine?).	
-52-									
-53-								Cross fractures producing 2-3" clasts.	
-54-								Hairline fractures on folded gneiss with vertical schistocity.	
-55-								Black and white gneiss with pink augen (2-5 cm) and hairline fractures around augen.	
-56-								Base of boring at 56 feet	

Sample Types:
SS = Split Spoon
UC = Undisturbed Core

NOTES:
2" PVC well set at 56 feet; screened 41-56 feet. Well double cased (2" PVC inside 4" steel) above bedrock.

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Project No.: 1617
Project Name: Farrand Controls

Boring No.: MW-10D
Sheet 1 **of** 3 .
By: V. Vassil

Drilling Contractor: UniTech/AmeriDrill
Driller: Tom Brown
Drill Rig: Cantera CT-350
Date Started: 10/12/99

Geologist: A. Jaroszewski
Drilling Method: HSA
Drive Hammer Weight:
Date Completed: 10/12/99

Boring Completion Depth: 53.5 feet
Ground Surface Elevation:
Boring Diameter: 6 7/8 "

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec	VOC field screening FID ppm	PID ppm	CH4 ppm	Sample Description
-0-								
-1-								
-2-								
-3-		SS	4 5	24"		0.0		Mottled gray/brown silt and fine sand. Trace pebbles.
-4-			6 4					
-5-								
-6-								
-7-								
-8-			3 5	24"		3.5		Gray clay with pieces of wood.
-9-			7 8					Light grey clayey sand. Dark gray, fine to medium sand, well-sorted.
-10-								
-11-								
-12-								
-13-		SS	5 8	24"		0.3		Light greenish-brown silt; trace clay.
-14-			9 10					
-15-								
-16-								
-17-								
-18-		SS	4 7	24"		0.0		Poorly sorted, silty clayey sand, trace pebbles.
-19-			5 4					Brown silt with quartz and mica.
-20-								

Sample Types:
SS = Split Spoon
UC = Undisturbed Core

NOTES:

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Project No.: 1617
Project Name: Farrand Controls

Boring No.: MW-10D
Sheet 2 **of** 3 .
By: V. Vassil

Drilling Contractor: Unitech/AmeriDrill
Driller: Tom Brown
Drill Rig: Cantera CT-350
Date Started: 10/12/99

Geologist: A. Jaroszewski / V. Vassil
Drilling Method: HSA
Drive Hammer Weight:
Date Completed: 10/13/99

Boring Completion Depth: 53.5'
Ground Surface Elevation:
Boring Diameter: 6 7/8 "

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec	VOC field screening FID ppm	PID ppm	CH4 ppm	Sample Description
-21-								
-22-								
-23-		SS	4 5	24"		0.0		Brown medium sand to silty, clayey sand; Micaceous.
-24-			5 5					
-25-								
-26-								
-27-								
-28-		SS	13 12	24"		0.0		Brown, medium sand and fine clayey sand, micaceous.
-29-			10 10					Brown, well-sorted, fine sand.
-30-								
-31-								
-32-								
-33-		SS	7 8	24"		0.0		Olive brown, fine sandy silt.
-34-			9 10					Brown micaceous, fine sand with mafics.
-35-								
-36-								
-37-								
-38-		SS	14 10	24"		0.0		Olive brown fine sand. Brown silty very fine sand.
-39-			10 12					Dark gray-brown, medium sand with mafics and minor fine gravel.
-40-								
-41-								

Sample Types:
SS = Split Spoon
UC = Undisturbed Core

NOTES:

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Project No.: 1617
Project Name: Farrand Controls

Boring No.: MW-10D
Sheet 3 **of** 3 .
By: V. Vassil

Drilling Contractor: UniTech/AmeriDrill
Driller: Tom Brown
Drill Rig: Cantera CT-350
Date Started: 10/12/99

Geologist: V. Vassil
Drilling Method: HSA
Drive Hammer Weight:
Date Completed: 10/13/99

Boring Completion Depth: 53.5 feet
Ground Surface Elevation:
Boring Diameter: 6 7/8 inches

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec	VOC field screening FID ppm	PID ppm	CH4 ppm	Sample Description
-42-								
-43-		SS	7 8	24"		0.0		Olive brown, fine sand.
-44-			12					
-45-			17					
-46-								
-47-								
-48-	MW-10D	SS	12 12	24"		0.5		Brown, medium fine sand with mafics.
-49-	48-50'		15 14					Problem with running sand, sample may have been drilling wash.
-50-								
-51-								
-52-								
-53-								Drillers encountered hard surface, drilled into it 0.5 ' _____ base of boring at 53.5 feet _____
-54-								
-55-								
-56-								
-57-								
-58-								
-59-								
-60-								
-61-								
-62-								

Sample Types:
SS = Split Spoon
UC = Undisturbed Core

NOTES:
2" PVC well set at 53.5 feet; screened 43.5-53.5 feet.

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Project No.: 1617
Project Name: Farrand Controls

Boring No.: MW-10R
Sheet 1 **of** 1 .
By: V. Vassil

Drilling Contractor: UniTech/AmeriDrill
Driller: Tom Brown
Drill Rig: Cantera CT-350
Date Started: 10/18/99

Geologist: V. Vassil
Drilling Method: HSA
Drive Hammer Weight:
Date Completed: 10/20/99

Boring Completion Depth: 63.5 feet
Ground Surface Elevation:
Boring Diameter: 10 inches

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec	VOC field screening FID ppm	PID ppm	CH4 ppm	Sample Description
-0-								Unconsolidated sandy, silty overburden. See log for MW-10D for depth to 53.5 feet
-53-								
-54-								
-55-								Drilling conditions suggestive of drilling through weathered fractured zone, alternating hard and soft substrate.
-56-								
-57-								
-58-								
-59-								
-60-								Soft incoherent material, no sample obtained. Material surfacing from drill rods consisting of gritty, black and gray decomposed metamorphic rock fragments (presumed gneiss) clast size consistent with coarse sand.
-61-		UC		O"				
-62-								
-63-								Bore hole caving in above drill bit.
-64-								boring terminated at 63.5 feet
-65-								
-66-								
-67-								
-68-								
-69-								
-70-								

Sample Types:
UC = Undisturbed Core

NOTES:
2" PVC well set at 63.5 feet; screened 61-63.5 feet. Well double cased (2" PVC inside 4" steel) above bedrock.

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Project No.: 1617
Project Name: Farrand Controls

Boring No.: MW-20D
Sheet 1 **of** 4
By: V. Vassil

Drilling Contractor: UniTech/AmeriDrill
Driller: Tom Brown
Drill Rig: Cantera CT-350
Date Started: 10/14/99

Geologist: V. Vassil
Drilling Method: HSA
Drive Hammer Weight: 140 lb.
Date Completed: 10/14/99

Boring Completion Depth: 77 feet
Ground Surface Elevation:
Boring Diameter: 6 7/8 "

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec	VOC field screening FID ppm	PID ppm	CH4 ppm	Sample Description
-0-								Dark brown sandy loam soil.
-1-								
-2-								
-3-		SS	3 4	15"		0.0		Dark brown clayey, silty fine sand with rootlets. Damp.
-4-			5 4					Dark gray-brown medium sand with trace clay. Wet.
-5-								
-6-								
-7-								
-8-		SS	4 3	9"		0.1		Dark gray-brown coarse sand with minor sub-round quartz and sub-angular gneissic gravels (1/4 – 3/8").
-9-			2 2					
-10-								
-11-								
-12-								
-13-		SS	3 2	20"		0.2		Dark grey-brown clayey fine sand.
-14-			3 8			0.2 0.1		Dark brown silty fine sand. Dark brown medium fine sand, trace silt.
-15-								
-16-								
-17-								
-18-	MW-20D	SS	4 4	20"		0.2		Dark gray-brown fine sand.
-19-	18-20'		5 7			0.2		
-20-								

Sample Types:
SS = Split Spoon
UC= Undisturbed Core

NOTES:

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Project No.: 1617
Project Name: Farrand Controls

Boring No.: MW-20D
Sheet 2 **of** 4 .
By: V. Vassil

Drilling Contractor: UniTech/AmeriDrill
Driller: Tom Brown
Drill Rig: Cantera CT-350
Date Started: 10/14 /99

Geologist: V. Vassil
Drilling Method: HSA
Drive Hammer Weight: 140 lb.
Date Completed: 10/ 14/99

Boring Completion Depth: 77 feet
Ground Surface Elevation:
Boring Diameter: 6 7/8"

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec	VOC field screening FID ppm	PID ppm	CH4 ppm	Sample Description
-21-								
-22-								
-23-		SS	3 5	24"		0.0		Dark gray-brown fine sand (drill slough?) Dark brown-gray, silty very fine sand, laminated.
-24-			11 13					
-25-								
-26-								
-27-								
-28-		SS	10 11	16"		0.0		Dark gray-brown fine sand. Dark gray-brown silty very fine silicous sand with mafics.
-29-			15 20					
-30-								
-31-								
-32-								
-33-		SS	7 11	24"		0.0		Medium gray-brown silty very fine sand. Laminated.
-34-			13 15					
-35-								
-36-								
-37-								
-38-		SS	5 7	24"		0.0		Medium gray-brown, micacous, silty fine sand with biotite flakes up to 0.25 inches long/wide.
-39-			8 10					Gray-brown, laminated, clayey silt grading into clay (gray, silty clay in sampler shoe).
-40-								
-41-								

Sample Types:
SS = Split Spoon
UC = Undisturbed Core

NOTES:

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Project No.: 1617
Project Name: Farrand Controls

Boring No.: MW-20D
Sheet 3 **of** 4
By: V. Vassil

Drilling Contractor: UniTech/AmeriDrill
Driller: Tom Brown
Drill Rig: Cantera CT-350
Date Started: 10/ /99

Geologist: V. Vassil
Drilling Method: HSA
Drive Hammer Weight: 140 lb.
Date Completed: 10/ /99

Boring Completion Depth:
Ground Surface Elevation: 77 feet
Boring Diameter: 6 7/8"

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec	VOC field screening FID ppm	PID ppm	CH4 ppm	Sample Description
-42-								
-43-		SS	4 5	24"		0.0		Loose, gray-brown silty clay and sand (drill slough?)
-44-			8 8					Olive-gray, laminated highly plastic clay with minor silt and trace fine sand.
-45-								
-46-								
-47-								
-48-		SS	5 7	24"		0.0		Olive-gray, laminated fine sandy, clayey silt.
-49-			8 8					Interlaminated hairline layers of gray brown micacous sand and olive gray clayey silt.
-50-								
-51-								
-52-								
-53-		SS	12 15	24"		0.0		Olive gray-brown clayey, silty fine sand.
-54-			21 27					Olive green/gray-brown laminated clay with gray, fine sand lamellae at ¼" spacings. Dense.
-55-								
-56-								
-57-								
-58-		SS	12 10	24"		0.0		Gray, silty, medium-fine sand
-59-			8 10					Dark yellow-brown, laminated, fine sandy clay. Red-brown to orange/dark grey/brown medium sand with pebbles and trace clay.
-60-								
-61-								
-62-								

Sample Types:
SS = Split Spoon
UC = Undisturbed Core

NOTES:

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Project No.: 1617
Project Name: Farrand Controls

Boring No.: MW-20D
Sheet 4 **of** 4 .
By: V. Vassil

Drilling Contractor: UniTech/AmeriDrill
Driller: Tom Brown
Drill Rig: Cantera CT-350
Date Started: 10/14/99

Geologist: V. Vassil
Drilling Method: HSA
Drive Hammer Weight: 140 lb.
Date Completed: 10/14/99

Boring Completion Depth: 77 feet
Ground Surface Elevation:
Boring Diameter: 6 7/8 inches

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec	VOC field screening FID ppm	PID ppm	CH4 ppm	Sample Description
-63-		SS	10 12	11"		0.0		Gray, micacous fine sand. Orange-brown-gray medium sand with 1.5-inch clast of quartz-veined, biotite schist/gneiss.
-64-			14 14					
65-								
-66-								
-67-								
-68-		SS	10 11	13 "		0.0		Dark gray, medium-fine sand. Olive brown, micacous, silty very fine sand.
-69-			13 14					
-70-								
-71-								
-72-								
-73-		SS	5 7	24"		0.0		Dark gray-brown medium sand. Olive-gray, thinly laminated, fine sandy, clayey silt.. Olive brown, thinly laminated silty clay trace very fine sand.
-74-			7 9					
-75-								
-76-		In rods		10"		0.0		Mottled, orange/olive-gray/olive-brown, decomposed metamorphic rock in micacous, sandy Silty clayey groundmass with sub-round quartz and angular to sub-angular rock fragments. _____ base of boring at 77 feet _____
-77-								
-78-								
-79-								
-80-								
-81-								
-82-								
-83-								

Sample Types:
SS = Split Spoon
UC = Undisturbed Core

NOTES:
1. Auger refusal at 77 feet.
2. Set 2" PVC well at 77 feet; screened 67-77 feet.

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Project No.: 1617
Project Name: Farrand Controls

Boring No.: MW-20R
Sheet 1 **of** 1
By: V. Vassil

Drilling Contractor: UniTech/AmeriDrill
Driller: Tom Brown
Drill Rig: Cantera CT-350
Date Started: 10/19/99

Geologist: V. Vassil
Drilling Method: Rotary
Drive Hammer Weight:.
Date Completed: 10/20/99

Boring Completion Depth: 98 feet
Ground Surface Elevation:
Boring Diameter: 6 7/8 "

Depth (ft.)	Soil Sample No.	Type	Blows Per 6"	Rec	VOC field screening FID ppm	PID ppm	CH4 ppm	Sample Description	Graph
								Unconsolidated sandy, silty, clayey overburden. See log for MW-20D for depth to 77 feet.	
-78-									
-79-								Drillers reported intermittently soft and hard drilling Between 77 and 83' – hollow-stem augered to 83' and set outer casing.	
-80-									
-81-									
-82-									
-83-									
-84-								Sample in bit revealed highly altered, foliated rock With some white qtz and orange calcite crystals (rhombs) in clayey groundmass consisting of pale gray/beige clay and blue green clay (chlorite?).	
-85-									
-86-									
-87-									
-88-		UC		2.5' of 10'core		0.0		Pale silver gray/green, greasy, foliated, platy rock, possibly soapstone/talc, fractured in 2-4" pieces.	
-89-									
-90-						0.0		Gray, black and white banded, fractured gneissic mylonite with 0.5 inch thick bands of a greasy, black, sub-metallic mineral tentatively identified as graphite (streaks paper black, soils hands, hardness <2). Frequently fractured along boundary between graphite bands and gneissic mylonite.	
-91-									
-92-									
-93-									
-94-									
-95-									
-96-									
-97-									
-98								_____ base of boring at 98 feet _____	

Sample Types:
SS = Split Spoon
UC = Undisturbed Core

NOTES:
2" PVC well set at 98 feet; screened 88-98 feet. Well double cased (2" PVC inside 4" steel) above bedrock.

GEOPROBE SOIL SAMPLE LOGS
FARAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

Location	Date	Depth Interval	Sample I.D.	PID (ppm)	Description
GP-S-C	10/5/99	0 – 2"		0.0	Asphalt.
		2" – 4'		0.0	Light brown, fine to medium, well sorted dry SAND, trace fine, sub-round gravel.
		4' – 7'		0.0	Light brown to brown fine, well sorted dry SAND.
		7' – 8'		0.0	Light red-brown very fine SAND, some silt, trace fine gravel.
		8' – 9.5'		0.0	Light brown to light gray fine Sand, dry, little silt.
		9' – 11'	GP-S-C-(-75) (9-11')	0.0	Light brown-gray SILT, wet.
		11' – 11.5'		0.0	Decomposed rock, wet. REFUSAL.
GP-S-D	10/4/99	0 – 3'		0.0	Asphalt.
		3" – 4'		0.0	Brown fine SAND, well sorted, wet, little medium to fine gravel, some to little silt.
		4' – 8'		0.0	Light red-brown fine to medium SAND, wet to saturated, trace flat, sub-round gravel.
		8' – 12'	GP-S-D-(-60) (7-9')	0.0	Brown medium SAND, wet, some fine sub-round gravel, trace fine sand and silt.
		13'			REFUSAL.
GP-S-E	10/4/99	0 – 3"		0.0	Asphalt.
		3" – 4'		0.0	Brown, medium fine SAND, little gravel, trace silt, dry to damp
		4' – 7.5'		0.0	Brown, well-sorted fine to medium SAND, wet at 5-6'.
		7.5' – 8'		0.0	Brown, coarse SAND and sub-round GRAVEL.
		8' – 12'		0.0	Light reddish brown, poorly sorted, coarse to medium SAND with fine to medium sub-round gravel, rock fragments at sample base.
			GP-S-E-(-60) (10-12')		
		12' – 14'		0.0	Saturated, fine to medium GRAVEL with sandy gravel, coarse sand and rock fragments at sample base.
		14.5'			REFUSAL.
GP-S-F	10/4/99	0 – 3"		0.0	Broken concrete/asphalt.
		3" – 4'		0.0	Brown SILT, some sand with dry, medium sand at 4'.
		4' – 4.5'		0.0	Brown-orange fine to medium SAND, trace fine gravel, trace black sand lens.
		4.5' – 5'		0.0	Brown Silt and fine SAND.
		5' – 8'		0.0	Brown, very fine well sorted SAND, damp.
		8' – 10'		0.0	Brown fine SAND, damp to moist.
		10' – 10.5'		0.0	Crushed rock/(till?)
		10.5' – 12'		0.0	Brown silty, clayey SAND, some gravel, wet.
		12' –16'	GP-S-F-(-60) (14-16')	0.0	Brown clayey, silty GRAVEL and fine to medium, poorly sorted GRAVEL, trace fine sand and silt.
		16' – 19'		0.0	Brown clayey silty SAND and sub-round GRAVEL, poorly sorted, trace silt and rock fragments. REFUSAL.

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CONSULTING ENGINEERS

WELL CONSTRUCTION LOG

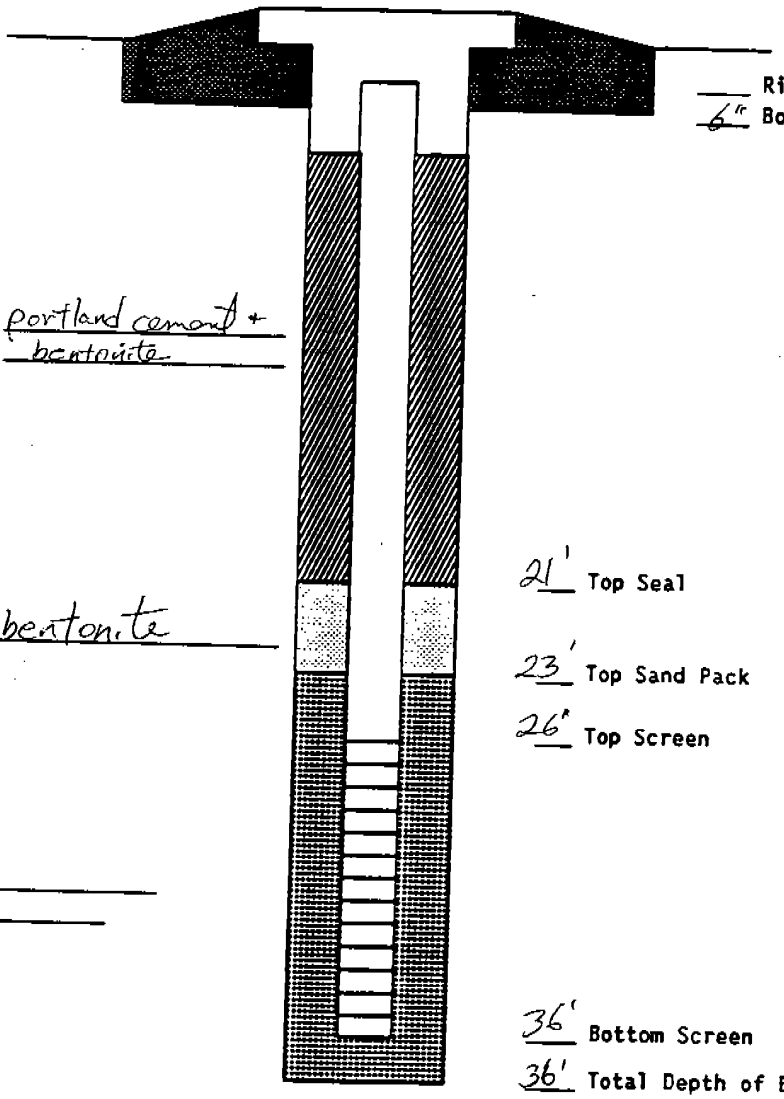
SITE Farrand Controls JOB NO. 1617 WELL NO. MW-8D

TOTAL DEPTH 36' SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) 5.31' 11/1/99 DATE INSTALLED 10/12/99

RISER DIA 2" MATERIAL PVC LENGTH 26'
SCREEN DIA 2" MATERIAL PVC LENGTH 10' SLOT SIZE# 10

SCHEMATIC



Surface Seal Type: Concrete

Grout Type: portland cement + bentonite

Seal Type: bentonite

Sand Pack Type _____
Size _____

Ground Surface
___ Riser Elevation
6" Bottom Surface Seal

21' Top Seal

23' Top Sand Pack

26' Top Screen

36' Bottom Screen

36' Total Depth of Boring

Dvirka and Bartlucci CONSULTING ENGINEERS

WELL CONSTRUCTION LOG

SITE Farrand Controls JOB NO. 1617 WELL NO. MW-8R

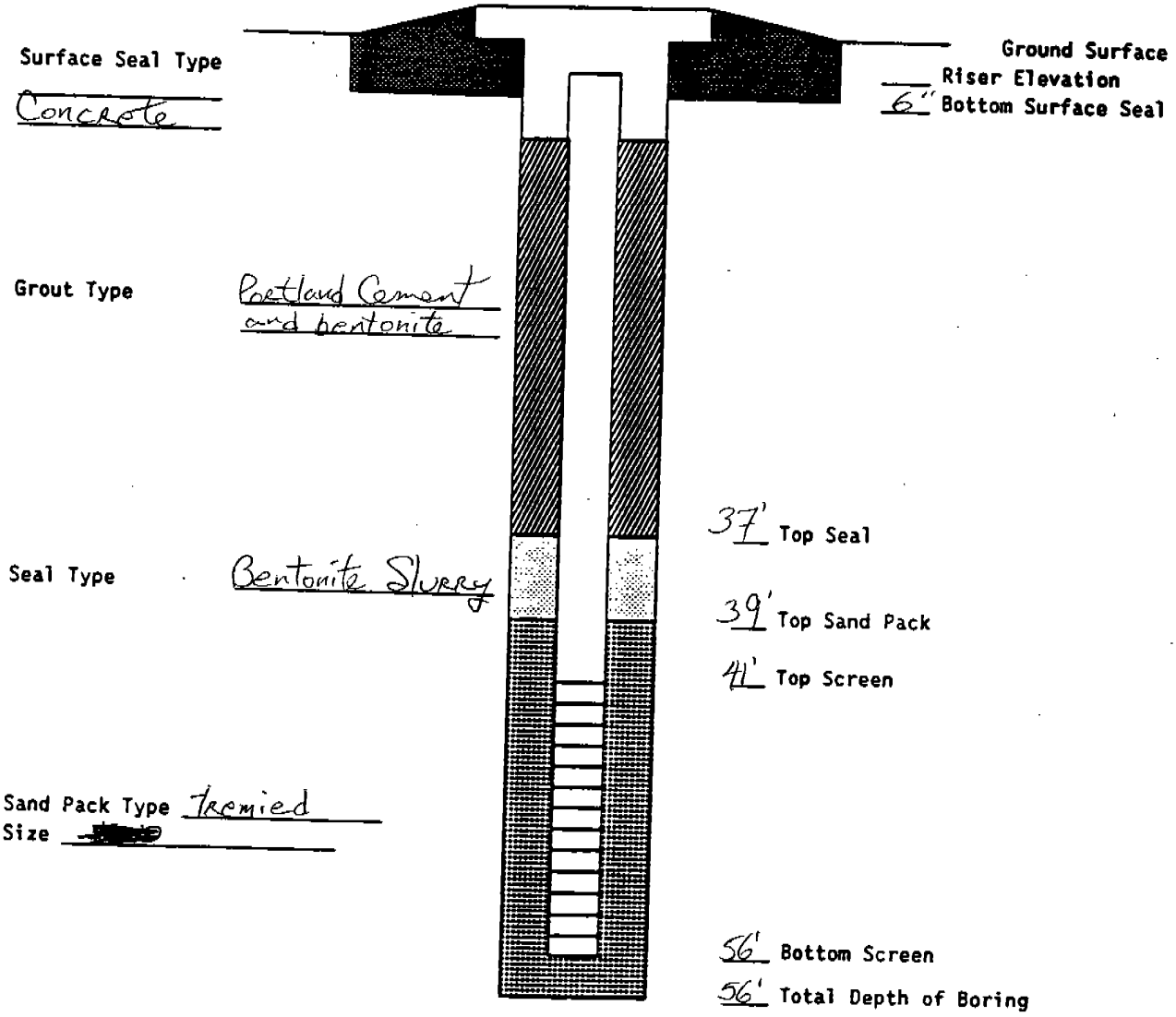
TOTAL DEPTH 56' SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) 5.26' on 11/1/99 DATE INSTALLED 10/19/99

RISER * DIA 2" MATERIAL PVC LENGTH 41'

SCREEN DIA 2" MATERIAL PVC LENGTH 15' SLOT SIZE #10

SCHEMATIC



* Riser double-cased above bedrock with 4" steel casing set in concrete at 41' depth and 2" PVC riser installed inside steel casing.

Dvirka and Bartlucci
CONSULTING ENGINEERS

WELL CONSTRUCTION LOG

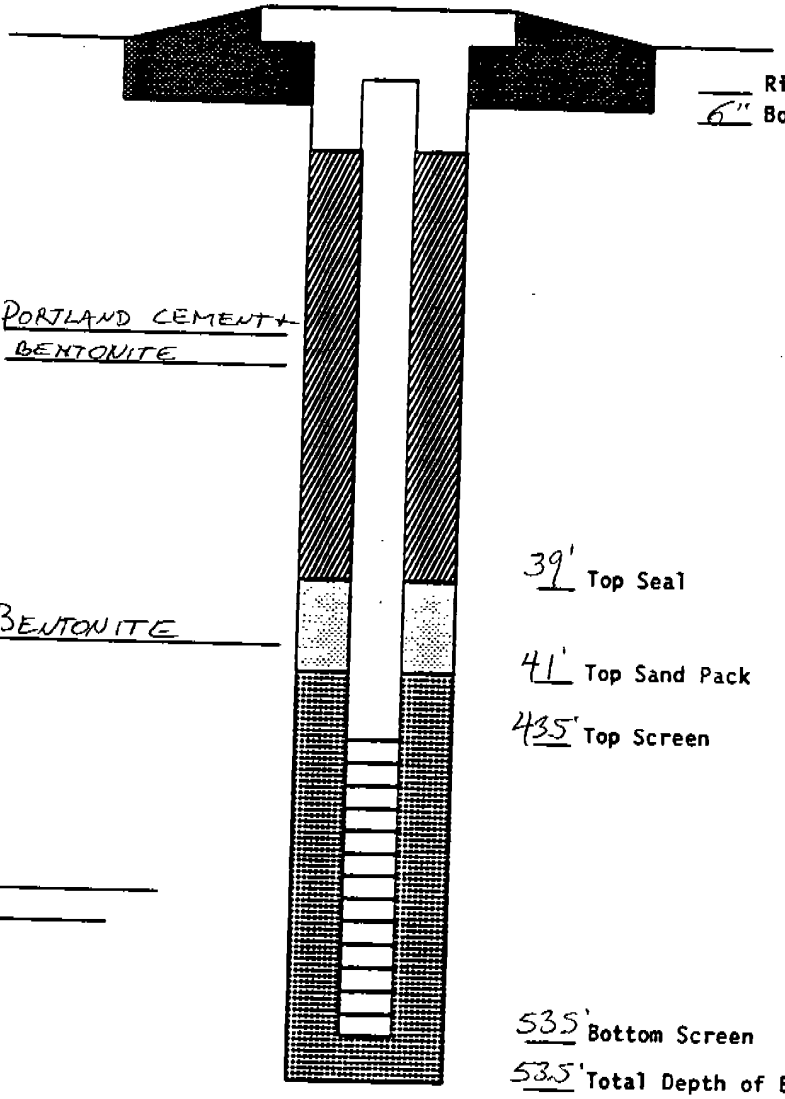
SITE Farrand Controls JOB NO. 1617 WELL NO. MW-10D

TOTAL DEPTH 53.5' SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) 37.8' 11/1/99 DATE INSTALLED 10/12/99

RISER DIA 2" MATERIAL PVC LENGTH 43.5'
SCREEN DIA 2" MATERIAL PVC LENGTH 10' SLOT SIZE #10

SCHEMATIC



Surface Seal Type
CONCRETE

Grout Type
PORTLAND CEMENT + BENTONITE

Seal Type
BENTONITE

Sand Pack Type _____
Size _____

Ground Surface
___ Riser Elevation
6" Bottom Surface Seal

39' Top Seal

41' Top Sand Pack

43.5' Top Screen

53.5' Bottom Screen

53.5' Total Depth of Boring

Dvirka and Bartilucci
CONSULTING ENGINEERS

WELL CONSTRUCTION LOG

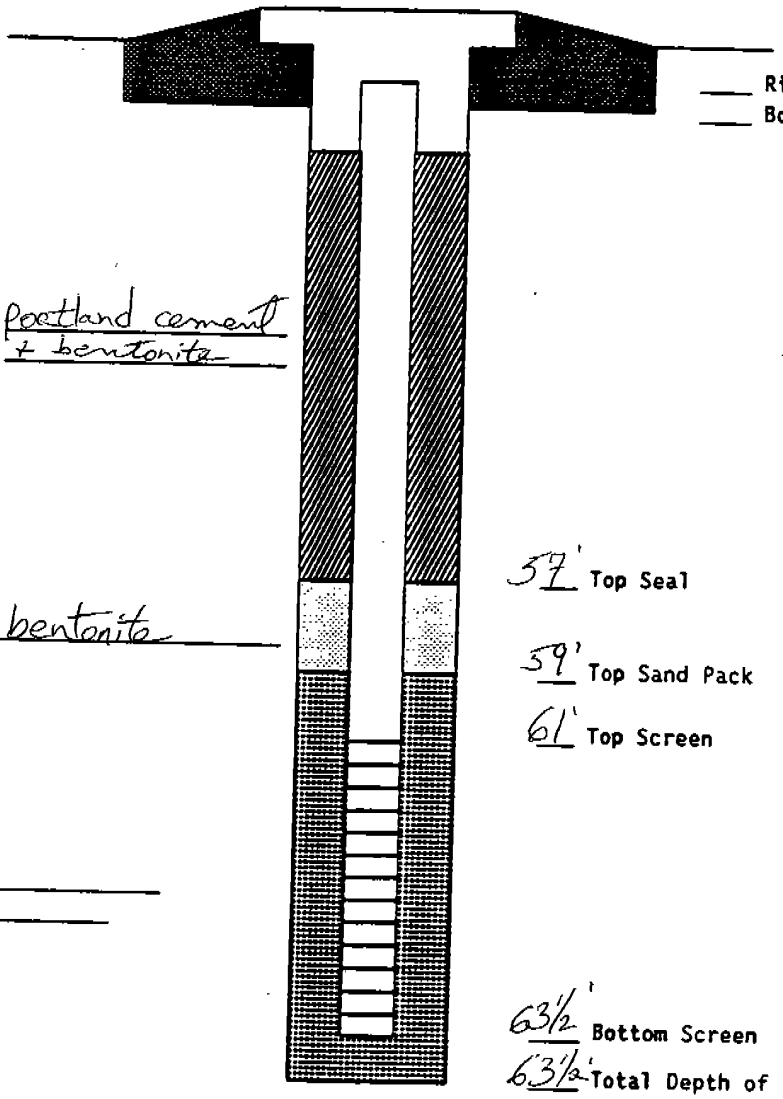
SITE Farrand Controls JOB NO. 1617 WELL NO. MW-10R

TOTAL DEPTH 63½' SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) 3.28' 11/1/99 DATE INSTALLED 10/20/99

RISER * DIA 2" MATERIAL PVC LENGTH 61'
SCREEN DIA 2" MATERIAL PVC LENGTH 2½" SLOT SIZE #10

SCHEMATIC



*-2" PVC Riser set inside ~~#~~ protective, 4" steel casing from surface to depth of 61'

Dvirka and Bartilucci
CONSULTING ENGINEERS

WELL CONSTRUCTION LOG

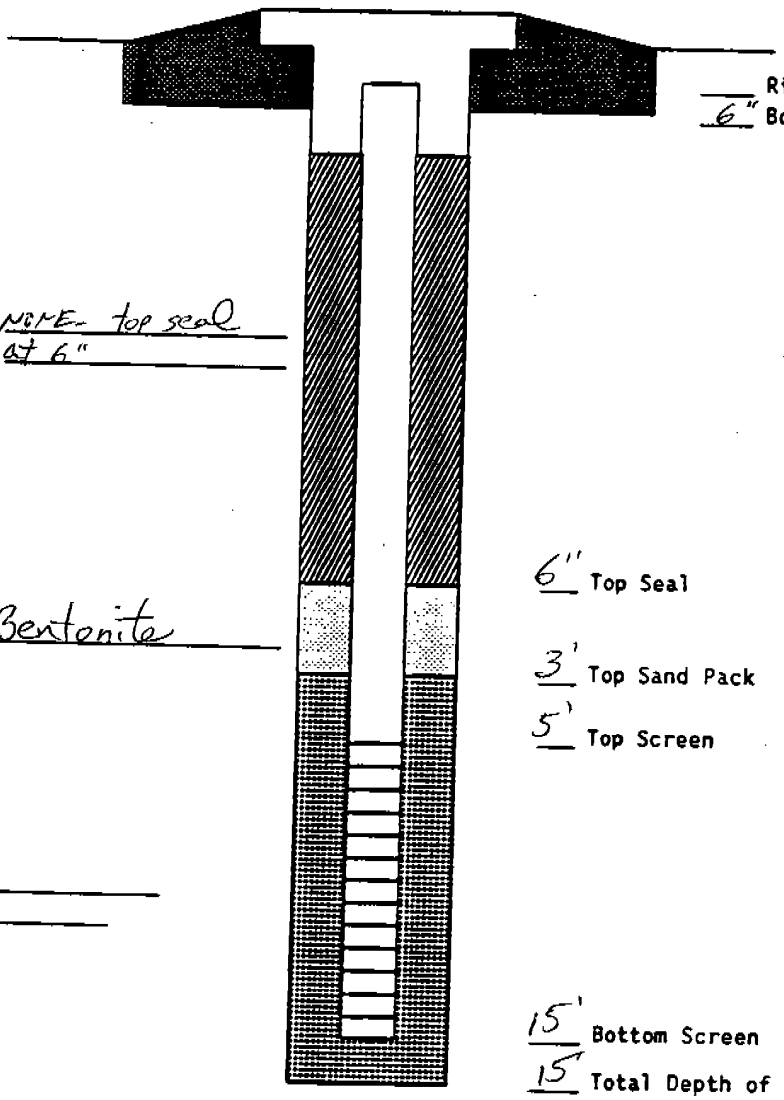
SITE Farrand Controls JOB NO. 1617 WELL NO. MW-20S

TOTAL DEPTH 15' SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) 4.53' on 11/1/99 DATE INSTALLED 10/14/99

RISER DIA 2" MATERIAL PVC LENGTH 5'
SCREEN DIA 2" MATERIAL PVC LENGTH 10' SLOT SIZE #10

SCHEMATIC



Surface Seal Type: Concrete

Grout Type: NONE- top seal at 6"

Seal Type: Bentonite

Sand Pack Type _____
Size _____

Ground Surface
___ Riser Elevation
6" Bottom Surface Seal

6" Top Seal
3' Top Sand Pack
5' Top Screen

15' Bottom Screen
15' Total Depth of Boring

Dvirka and Bartilucci CONSULTING ENGINEERS

WELL CONSTRUCTION LOG

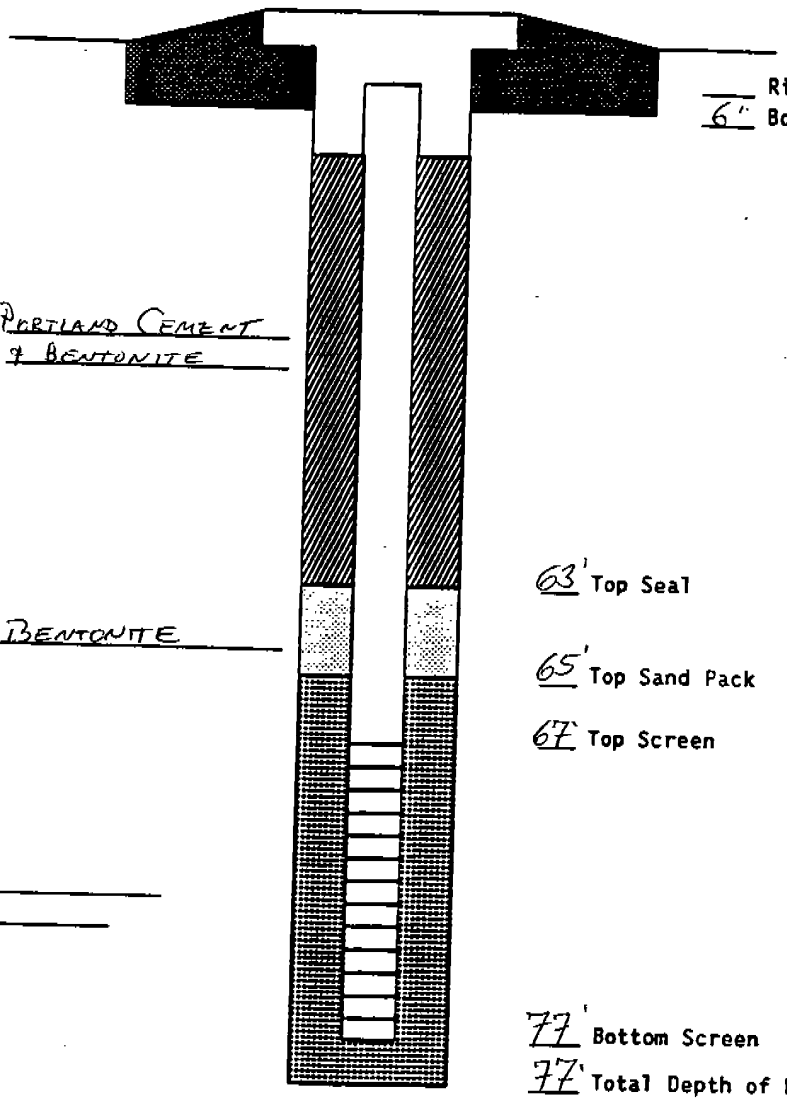
SITE Farrand Controls JOB NO. 1617 WELL NO. MW-20D

TOTAL DEPTH 77' SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) 2.85' 1/11/99 DATE INSTALLED 10/14/99

RISER DIA 2" MATERIAL PVC LENGTH 67'
SCREEN DIA 2" MATERIAL PVC LENGTH 10' SLOT SIZE #10

SCHEMATIC



Surface Seal Type: Concrete

Grout Type: Portland Cement & Bentonite

Seal Type: Bentonite

Sand Pack Type _____
Size _____

Ground Surface
Riser Elevation
6" Bottom Surface Seal

63' Top Seal

65' Top Sand Pack

67' Top Screen

77' Bottom Screen

77' Total Depth of Boring

Dvirka and Bartilucci
CONSULTING ENGINEERS

WELL CONSTRUCTION LOG

SITE FABRAND CONTROLS JOB NO. 1617 WELL NO. MW-20R

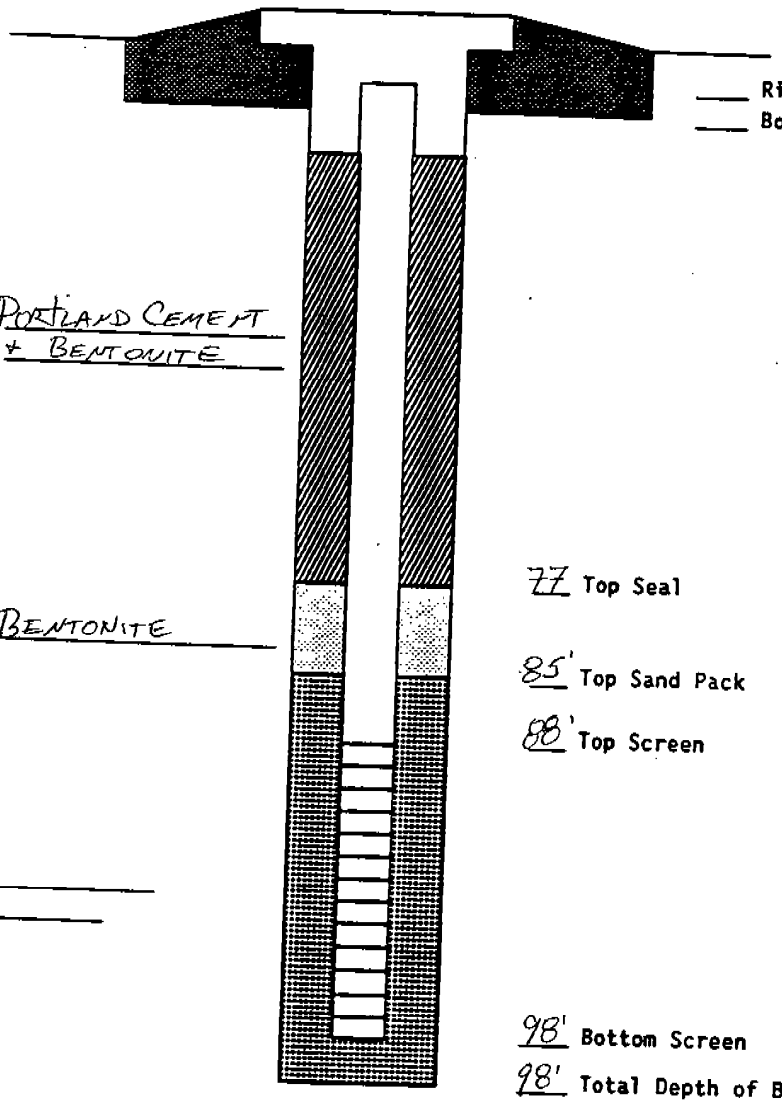
TOTAL DEPTH 98' SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) 3.51' 11/1/99 DATE INSTALLED 10/20/99

RISER * DIA 2" MATERIAL PVC LENGTH 88'

SCREEN DIA 2" MATERIAL PVC LENGTH 10' SLOT SIZE #10

SCHEMATIC



Surface Seal Type CONCRETE

Grout Type PORTLAND CEMENT + BENTONITE

Seal Type BENTONITE

Sand Pack Type _____

Size _____

Ground Surface

___ Riser Elevation

___ Bottom Surface Seal

77 Top Seal

85' Top Sand Pack

88' Top Screen

98' Bottom Screen

98' Total Depth of Boring

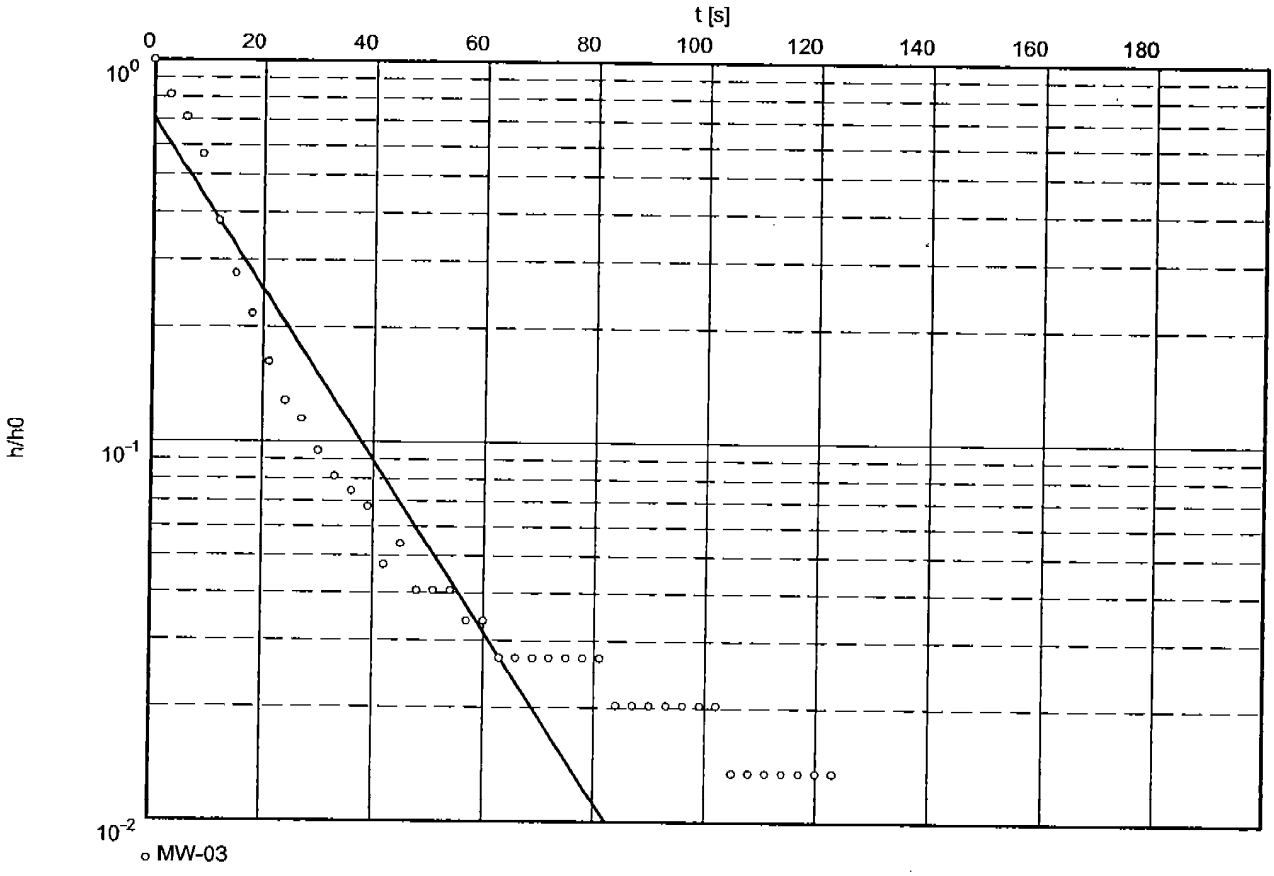
* 2" PVC CASING INSTALLED INSIDE PROTECTIVE, 4" STEEL OUTER CASING TO DEPTH OF 77'

APPENDIX C

SLUG TEST GRAPHS

Dvirka and Bartilucci Consulting Engineers Slug Test Results November 3, 1999	slug/bail test analysis BOUWER-RICE's method	Date: 19.01.2000	REPORT APPENDIX, Pa
		Project: FARRAND CONTROLS SITE	
		Evaluated by: V. V.	

Slug Test No. 4B	Test conducted on: November 3, 1999
MW-03 RISING HEAD	



Hydraulic conductivity [ft/s]: 2.77×10^{-4}

Screen zone spanned water table, therefore second straight line was used to determine K

Dvirka and Bartilucci Consulting Engineers Slug Test Results November 3, 1999	slug/bail test analysis BOUWER-RICE's method	Date: 19.01.2000	REPORT APPENDIX, Pa
		Project: FARRAND CONTROLS SITE	
		Evaluated by: V. V.	

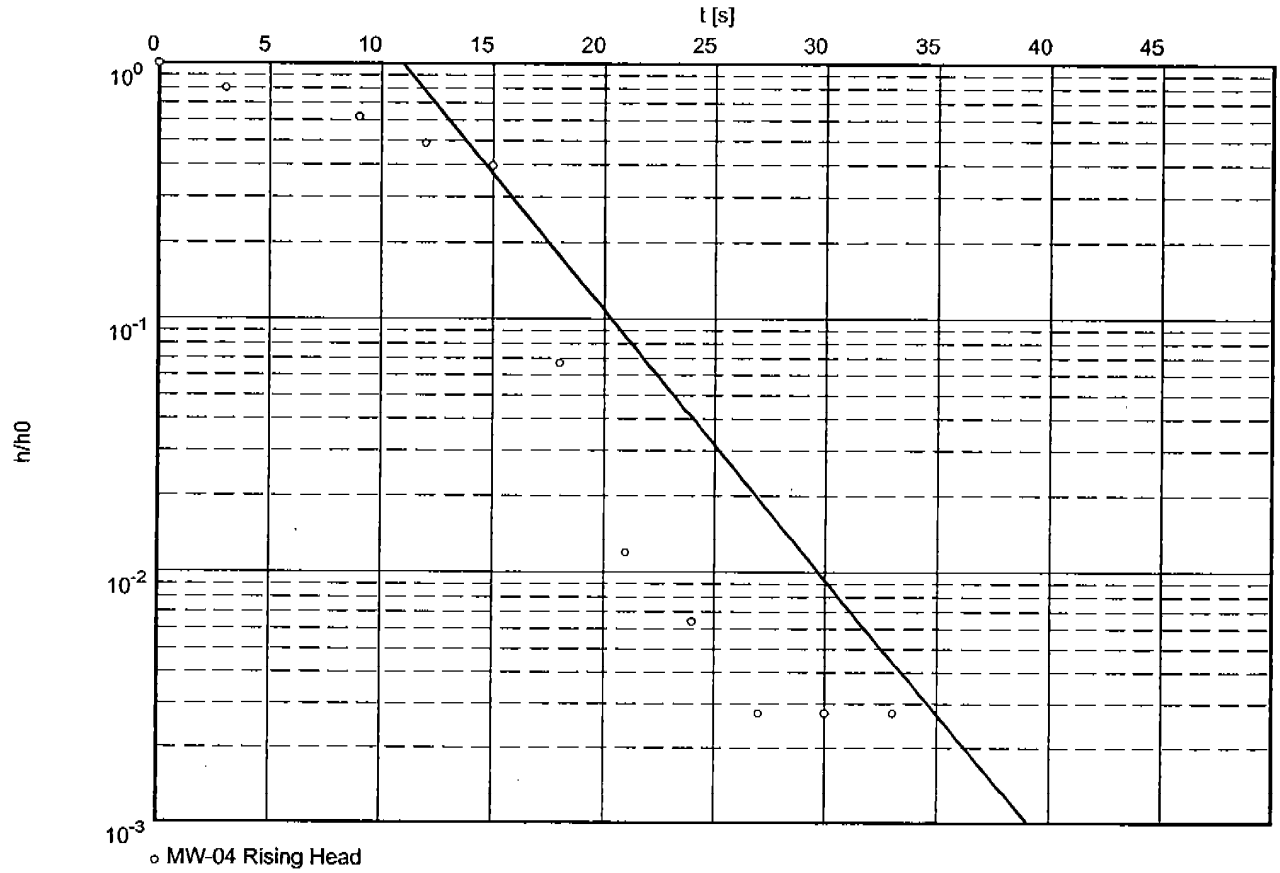
Slug Test No. 4B	Test conducted on: November 3, 1999
MW-03 RISING HEAD	MW-03

Static water level: 6.79 ft below datum

	Pumping test duration [s]	Water level [ft]	Drawdown [ft]
1	0	5.31	-1.48
2	3	5.59	-1.20
3	6	5.74	-1.05
4	9	5.95	-0.84
5	12	6.23	-0.56
6	15	6.38	-0.41
7	18	6.47	-0.32
8	21	6.55	-0.24
9	24	6.60	-0.19
10	27	6.62	-0.17
11	30	6.65	-0.14
12	33	6.67	-0.12
13	36	6.68	-0.11
14	39	6.69	-0.10
15	42	6.72	-0.07
16	45	6.71	-0.08
17	48	6.73	-0.06
18	51	6.73	-0.06
19	54	6.73	-0.06
20	57	6.74	-0.05
21	60	6.74	-0.05
22	63	6.75	-0.04
23	66	6.75	-0.04
24	69	6.75	-0.04
25	72	6.75	-0.04
26	75	6.75	-0.04
27	78	6.75	-0.04
28	81	6.75	-0.04
29	84	6.76	-0.03
30	87	6.76	-0.03
31	90	6.76	-0.03
32	93	6.76	-0.03
33	96	6.76	-0.03
34	99	6.76	-0.03
35	102	6.76	-0.03
36	105	6.77	-0.02
37	108	6.77	-0.02
38	111	6.77	-0.02
39	114	6.77	-0.02
40	117	6.77	-0.02
41	120	6.77	-0.02
42	123	6.77	-0.02

Dvirka and Bartilucci Consulting Engineers Slug Test Results November 3, 1999	slug/bail test analysis BOUWER-RICE's method	Date: 18.01.2000	Report Appendix, Page 1
		Project: Farrand Controls	
		Evaluated by: V. V.	

Slug Test No. 3B	Test conducted on: November 3, 1999
MW-04 Rising Head	



Hydraulic conductivity [ft/s]: 1.27×10^{-3}

Screen zone spanned water table, therefore second straight line was used to determine K

Dvirka and Bartilucci Consulting Engineers Slug Test Results November 3, 1999	slug/bail test analysis BOUWER-RICE's method	Date: 18.01.2000	Report Appendix, Page 2
		Project: Farrand Controls	
		Evaluated by: V. V.	

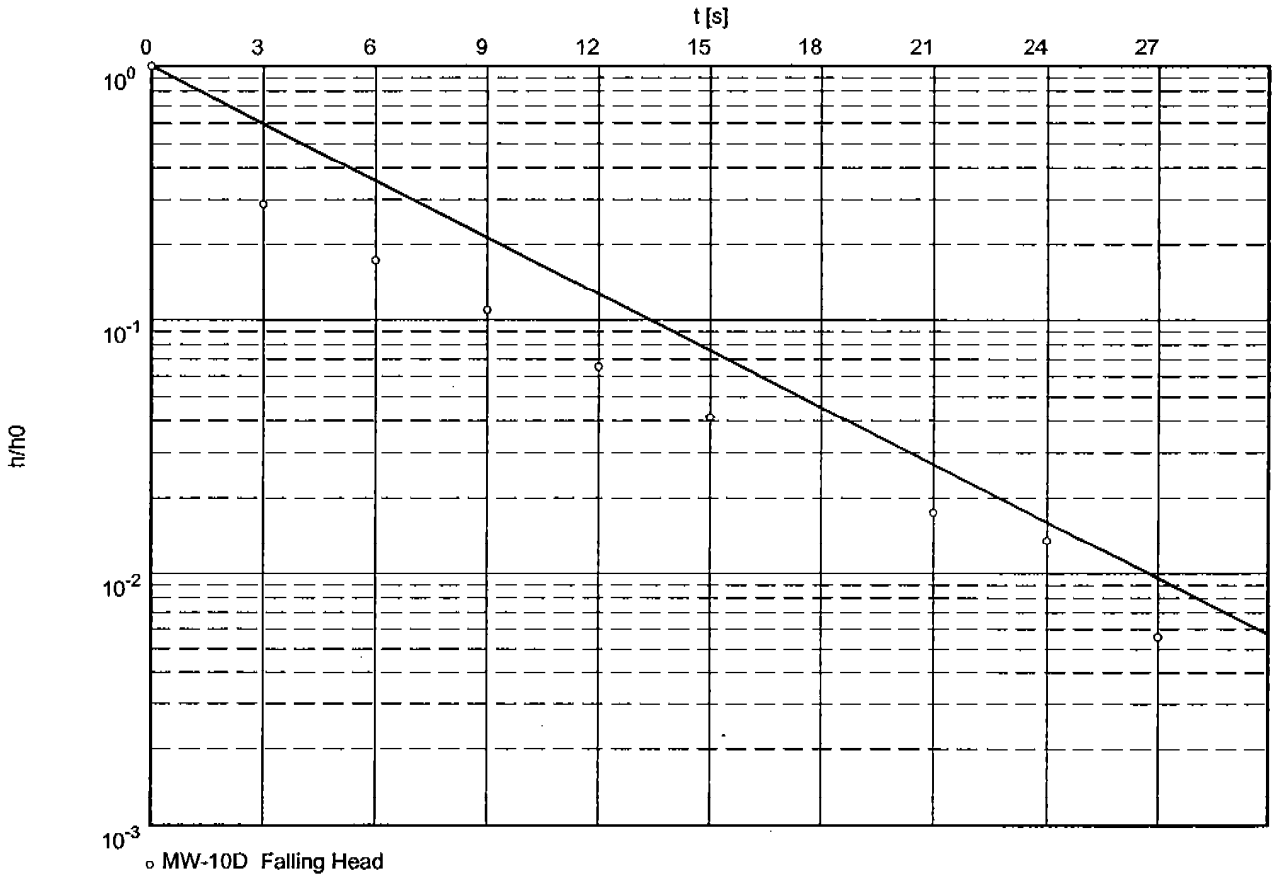
Slug Test No. 3B	Test conducted on: November 3, 1999
MW-04 Rising Head	MW-04 Rising Head

Static water level: 8.37 ft below datum

	Pumping test duration [s]	Water level [ft]	Drawdown [ft]	
1	0	7.28	-1.09	
2	3	7.50	-0.87	
3	6	5.53	-2.84	
4	9	7.70	-0.67	
5	12	7.84	-0.53	
6	15	7.94	-0.43	
7	18	8.30	-0.07	
8	21	8.36	-0.01	
9	24	8.38	0.01	
10	27	8.37	-0.00	
11	30	8.37	-0.00	
12	33	8.37	-0.00	

Dvirka and Bartilucci Consulting Engineers Slug Test Results November 3, 1999	slug/bail test analysis BOUWER-RICE's method	Date: 17.01.2000	Report Appendix, Page 1
		Project: Farrand Controls Site	
		Evaluated by: V. V.	

Slug Test No. 1A Falling Head	Test conducted on: November 3, 1999
MW-10D	



Hydraulic conductivity [ft/s]: 2.00×10^{-4}

Dvirka and Bartilucci Consulting Engineers Slug Test Results November 3, 1999	slug/bail test analysis BOUWER-RICE's method	Date: 17.01.2000	Report Appendix, Page 2
		Project: Farrand Controls Site	
		Evaluated by: V. V.	

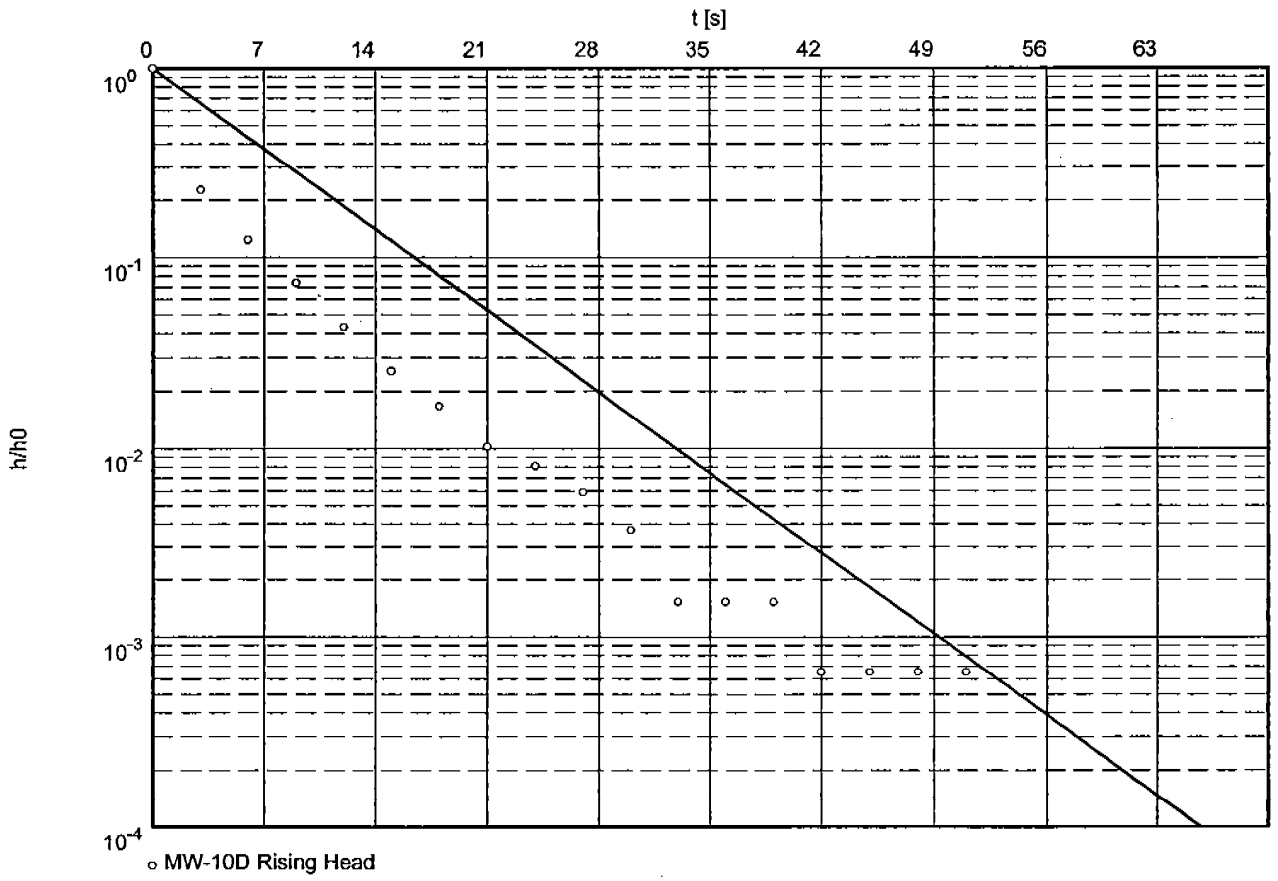
Slug Test No. 1A Falling Head	Test conducted on: November 3, 1999
MW-10D	MW-10D Falling Head

Static water level: 16.79 ft below datum

	Pumping test duration [s]	Water level [ft]	Drawdown [ft]	
1	0	19.30	2.51	
2	3	17.51	0.72	
3	6	17.22	0.43	
4	9	17.06	0.27	
5	12	16.95	0.16	
6	15	16.89	0.10	
7	21	16.83	0.04	
8	24	16.82	0.03	
9	27	16.80	0.01	

Dvirka and Bartilucci Consulting Engineers Slug Test Results November 3, 1999	slug/bail test analysis BOUWER-RICE's method	Date: 17.01.2000	Report Appendix, Page 1
		Project: Farrand Controls Site	
		Evaluated by: V.V.	

Slug Test No. 1-B Rising Head	Test conducted on: November 3, 1999
MW-10D	



Hydraulic conductivity [ft/s]: 1.63×10^{-4}

Dvirka and Bartilucci Consulting Engineers Slug Test Results November 3, 1999	slug/bail test analysis BOUWER-RICE's method	Date: 17.01.2000	Report Appendix, Page 2
		Project: Farrand Controls Site	
		Evaluated by: V.V.	

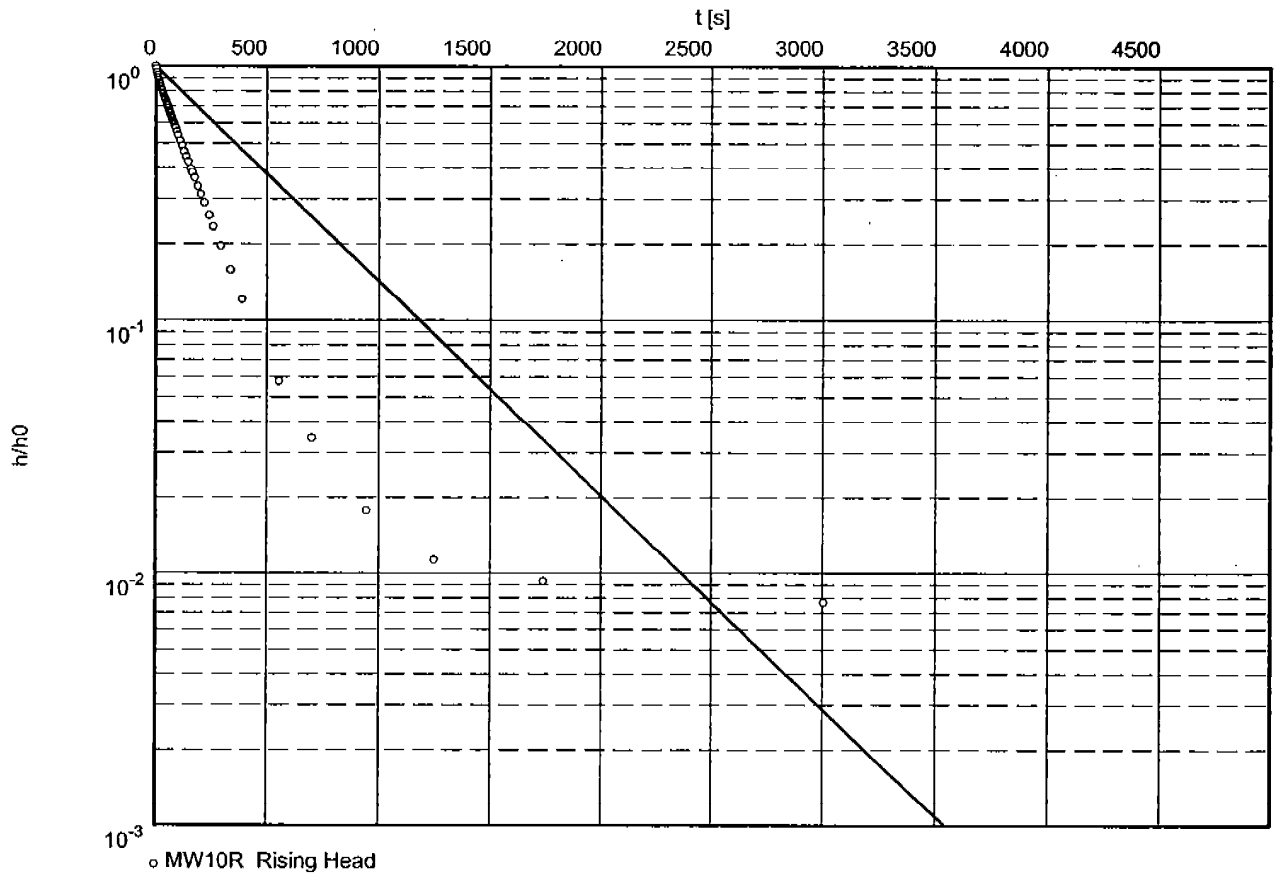
Slug Test No. 1-B Rising Head	Test conducted on: November 3, 1999
MW-10D	MW-10D Rising Head

Static water level: 16.77 ft below datum

	Pumping test duration [s]	Water level [ft]	Drawdown [ft]	
1	0	12.18	-4.59	
2	3	15.73	-1.04	
3	6	16.20	-0.57	
4	9	16.43	-0.34	
5	12	16.57	-0.20	
6	15	16.65	-0.12	
7	18	16.69	-0.08	
8	21	16.72	-0.05	
9	24	16.73	-0.04	
10	27	16.74	-0.03	
11	30	16.75	-0.02	
12	33	16.76	-0.01	
13	36	16.76	-0.01	
14	39	16.76	-0.01	
15	42	16.77	0.00	
16	45	16.77	0.00	
17	48	16.77	0.00	
18	51	16.77	0.00	

Dvirka and Bartilucci Consulting Engineers Slug Test Results November 3, 1999	slug/bail test analysis BOUWER-RICE's method	Date: 19.01.2000	Report Appendix, Page 1
		Project: Farrand Controls Site	
		Evaluated by: V. V.	

Slug Test No. 5b	Test conducted on: November 3, 1999
MW-10R Rising Head	



Hydraulic conductivity [ft/s]: 7.71×10^{-6}

Dvirka and Bartilucci Consulting Engineers Slug Test Results November 3, 1999	slug/bail test analysis BOUWER-RICE's method	Date: 19.01.2000	Report Appendix, Page 2
		Project: Farrand Controls Site	
		Evaluated by: V. V.	

Slug Test No. 5b	Test conducted on: November 3, 1999
MW-10R Rising Head	MW10R Rising Head

Static water level: 16.22 ft below datum

	Pumping test duration [s]	Water level [ft]	Drawdown [ft]	
1	0	13.73	-2.48	
2	3	13.80	-2.42	
3	6	13.88	-2.34	
4	9	13.94	-2.27	
5	12	13.99	-2.22	
6	15	14.04	-2.18	
7	18	14.08	-2.13	
8	21	14.12	-2.09	
9	24	14.16	-2.05	
10	27	14.20	-2.02	
11	30	14.23	-1.98	
12	33	14.27	-1.94	
13	36	14.30	-1.91	
14	39	14.33	-1.88	
15	42	14.36	-1.85	
16	45	14.40	-1.82	
17	48	14.43	-1.79	
18	51	14.46	-1.76	
19	54	14.49	-1.72	
20	57	14.52	-1.70	
21	60	14.55	-1.67	
22	63	14.57	-1.64	
23	66	14.60	-1.62	
24	69	14.63	-1.59	
25	72	14.65	-1.56	
26	75	14.68	-1.54	
27	78	14.70	-1.51	
28	81	14.73	-1.49	
29	84	14.75	-1.46	
30	87	14.77	-1.44	
31	90	14.80	-1.42	
32	96	14.84	-1.37	
33	102	14.89	-1.33	
34	111	14.95	-1.27	
35	120	15.01	-1.21	
36	129	15.07	-1.15	
37	138	15.12	-1.10	
38	147	15.17	-1.04	
39	159	15.24	-0.98	
40	165	15.27	-0.95	
41	174	15.31	-0.90	
42	189	15.38	-0.83	
43	204	15.44	-0.77	
44	219	15.50	-0.72	
45	240	15.57	-0.64	
46	258	15.63	-0.58	
47	294	15.73	-0.49	
48	336	15.82	-0.39	
49	390	15.92	-0.30	
50	555	16.07	-0.14	

Dvirka and Bartilucci Consulting Engineers Slug Test Results November 3, 1999	slug/bail test analysis BOUWER-RICE's method	Date: 19.01.2000	Report Appendix, Page 3
		Project: Farrand Controls Site	
		Evaluated by: V. V.	

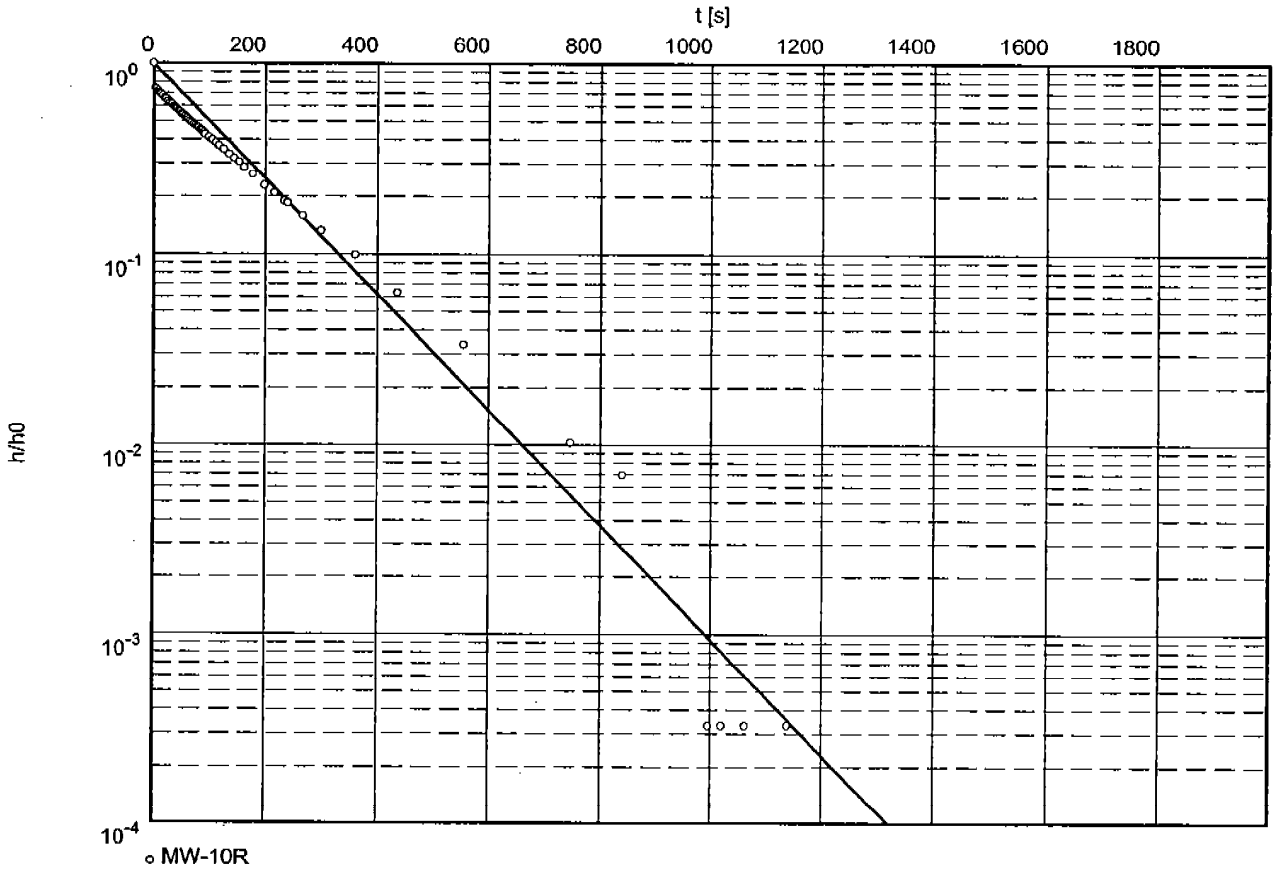
Slug Test No. 5b	Test conducted on: November 3, 1999
MW-10R Rising Head	MW10R Rising Head

Static water level: 16.22 ft below datum

	Pumping test duration [s]	Water level [ft]	Drawdown [ft]	
51	702	16.13	-0.08	
52	945	16.17	-0.04	
53	1248	16.19	-0.03	
54	1740	16.19	-0.02	
55	3006	16.20	-0.02	
56	3066	16.22	0.00	

Dvirka and Bartilucci Consulting Engineers Slug Test Results November 3, 1999	slug/bail test analysis BOUWER-RICE's method	Date: 19.01.2000	Report Appendix, Page 1
		Project: Farrand Controls Site	
		Evaluated by: V. V.	

Slug Test No. 5a	Test conducted on: November 3, 1999
MW-10R Falling Head	



Hydraulic conductivity [ft/s]: 2.76×10^{-5}

Dvirka and Bartilucci Consulting Engineers Slug Test Results November 3, 1999	slug/bail test analysis BOUWER-RICE's method	Date: 19.01.2000	Report Appendix, Page 2
		Project: Farrand Controls Site	
		Evaluated by: V. V.	

Slug Test No. 5a	Test conducted on: November 3, 1999
MW-10R Falling Head	MW-10R

Static water level: 16.21 ft below datum

	Pumping test duration [s]	Water level [ft]	Drawdown [ft]	
1	0	19.24	3.03	
2	3	18.46	2.25	
3	6	18.43	2.22	
4	9	18.38	2.17	
5	12	18.33	2.12	
6	15	18.29	2.08	
7	18	18.25	2.04	
8	21	18.20	1.99	
9	24	18.17	1.96	
10	27	18.12	1.91	
11	30	18.08	1.87	
12	33	18.05	1.84	
13	36	18.01	1.80	
14	39	17.98	1.77	
15	42	17.95	1.74	
16	45	17.92	1.71	
17	48	17.89	1.68	
18	51	17.85	1.64	
19	54	17.83	1.62	
20	57	17.80	1.59	
21	60	17.77	1.56	
22	63	17.74	1.53	
23	66	17.71	1.50	
24	69	17.69	1.48	
25	72	17.66	1.45	
26	75	17.64	1.43	
27	78	17.62	1.41	
28	81	17.60	1.39	
29	84	17.57	1.36	
30	87	17.55	1.34	
31	90	17.52	1.31	
32	93	17.49	1.28	
33	99	17.45	1.24	
34	105	17.41	1.20	
35	111	17.37	1.16	
36	117	17.33	1.12	
37	126	17.28	1.07	
38	135	17.22	1.01	
39	144	17.17	0.96	
40	153	17.13	0.92	
41	162	17.07	0.86	
42	177	17.00	0.79	
43	198	16.90	0.69	
44	216	16.84	0.63	
45	234	16.78	0.57	
46	240	16.77	0.56	
47	267	16.69	0.48	
48	300	16.61	0.40	
49	360	16.51	0.30	
50	435	16.40	0.19	

Dvirka and Bartilucci Consulting Engineers Slug Test Results November 3, 1999	slug/bail test analysis BOUWER-RICE's method	Date: 19.01.2000	Report Appendix, Page 3
		Project: Farrand Controls Site	
		Evaluated by: V. V.	

Slug Test No. 5a	Test conducted on: November 3, 1999
MW-10R Falling Head	MW-10R

Static water level: 16.21 ft below datum

	Pumping test duration [s]	Water level [ft]	Drawdown [ft]	
51	555	16.31	0.10	
52	747	16.24	0.03	
53	840	16.23	0.02	
54	996	16.21	0.00	
55	1020	16.21	0.00	
56	1062	16.21	0.00	
57	1138	16.21	0.00	

APPENDIX D

SURVEY REPORTS

JOB: 99015
Crew: FD,HS,GD
Material: FIELD DATA
Notes:
YEC/FARRAND CONTROLS;99 WALL STREET,VALHALLA,NY
DATE BEGUN: 04-07-99 08:12:31
DATE ENDED: 04-08-99 12:38:21

UNIT:
Distance unit: FEET
Angle unit: D.M.S.
Azimuth system: NORTH
Angle direction: RIGHT
Vertical system: ZENITH

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
OCC. STA.	1	5.17				04-07-99 08:20:24 SPIKE
REF. DIR.: Occupy station: 1 Backsight: 4 Azimuth: 339.00000						
BACKSIGHT	4		0.00000	90.04550	567.7251	MAG PK
SIDESHOT	2	5.02	47.22350	88.53300	213.7100	MAG PK
SIDESHOT	2	5.02	227.22350	271.06300	213.7100	MAG PK
BACKSIGHT	4		180.00000	269.55050	567.7251	MAG PK
NOTE: B/S HGT=5.05						
SIDESHOT	21	5.13	149.34400	89.35400	279.9951	MW-9
SIDESHOT	22	5.13	167.42000	89.47500	186.5851	MW-8
SIDESHOT	23	5.13	110.57450	87.57450	110.1152	MW-7
SIDESHOT	24	5.13	103.15450	91.53350	38.5251	MW-4
SIDESHOT	25	5.13	10.21500	90.02350	101.8000	MW-OC17
SIDESHOT	26	1.88	12.28250	90.48050	158.1851	MW-11
SIDESHOT	27	5.13	18.43550	89.14000	159.9649	MW-18
SIDESHOT	28	5.13	5.36100	89.58000	192.1500	MW-19
SIDESHOT	29	5.13	8.19050	89.27200	520.9251	MW-2
SIDESHOT	30	5.13	18.42200	88.50450	228.0151	MW-3
SIDESHOT	31	5.13	4.06500	89.45450	501.9100	MW-P16
SIDESHOT	32	5.13	17.19200	88.57500	244.2395	MW-P5
SIDESHOT	33	5.13	5.02100	89.47100	380.9400	MW-P14
SIDESHOT	34	5.13	9.03500	89.30450	261.8400	MW-P13
SIDESHOT	35	5.13	352.58100	90.26150	176.8500	MW-P6
NOTE: FLUSH MOUNT						
SIDESHOT	36	5.13	330.48400	90.28400	46.4200	MW-P10
SIDESHOT	37	5.13	40.14150	88.25400	198.2700	MW-12
SIDESHOT	38	5.13	40.36500	88.33500	205.3751	BLDG COR
NOTE: @ END RMC(RMC=ROLLED MAC CURB)						

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
SIDESHOT	39	5.13	16.02150	88.57350	273.4200	BLDG COR
NOTE: @ COR CONC						
SIDESHOT	40	5.13	15.13550	89.03100	286.8300	BLDG COR
NOTE: DITTO						
SIDESHOT	41	1.20	108.48300	89.33300	133.7500	BLDG COR
SIDESHOT	42	1.75	83.28200	89.23250	85.6100	BLDG COR
SIDESHOT	43	6.88	67.51300	87.26000	132.9251	BLDG COR
SIDESHOT	44	6.88	66.28250	87.39150	144.9800	BLDG COR
OCC. STA.	1	5.17				04-07-99 10:01:04 SPIKE
BACKSIGHT	4		0.00000	0.00000	0.0000	MAG PK
SIDESHOT	45	5.13	157.27450	89.32350	329.0051	BL*RMC1
NOTE: RMC=FACE ROLLED MAC CURB						
SIDESHOT	46	5.13	151.26250	89.32550	329.3651	BL*RMC2
SIDESHOT	47	5.13	150.59300	89.19200	326.7500	SMH
SIDESHOT	48	5.13	150.49450	89.18200	310.1000	UP
SIDESHOT	49	5.13	157.28500	89.32350	323.5851	RMC1
SIDESHOT	50	5.13	151.08400	89.30500	296.9600	ANC
NOTE: ANC=ANCHOR						
SIDESHOT	51	5.13	151.22400	89.29350	298.1851	ANC
SIDESHOT	52	5.13	153.03200	89.25400	312.4651	ANC
SIDESHOT	53	5.13	157.56000	89.29500	313.0600	RMC1
SIDESHOT	54	5.13	155.15400	89.30150	302.9051	RMC2
SIDESHOT	55	5.13	162.56450	89.27050	282.8251	PC*RMC1
SIDESHOT	56	5.13	155.22450	89.27400	290.3500	WV
SIDESHOT	57	5.13	154.56300	89.31276	289.7751	HYD'T
SIDESHOT	58	5.13	169.12050	89.25350	248.8800	RMC1
SIDESHOT	59	5.13	162.14550	89.27250	258.2600	PC*RMC2
SIDESHOT	60	5.13	169.41450	89.22000	212.5800	RMC2
SIDESHOT	61	5.13	173.55000	89.26050	221.4000	RMC1
SIDESHOT	62	5.13	176.08000	89.27300	162.6300	RMC2
SIDESHOT	63	5.13	181.55550	89.32350	169.8051	RMC1
SIDESHOT	64	5.13	179.01450	89.28450	113.1400	RMC2
SIDESHOT	65	5.13	190.18500	89.31500	98.6500	PT*RMC1
SIDESHOT	66	5.13	179.54000	89.34300	92.9151	PT*RMC2
SIDESHOT	67	5.13	200.35300	89.52100	51.9600	RMC1
SIDESHOT	68	5.39	270.00000	90.00000	0.3500	PC*RMC2
SIDESHOT	69	5.13	274.51250	91.26350	18.1100	RMC1
SIDESHOT	70	5.13	16.03050	90.46400	26.0300	RMC2
NOTE: @ GPM(GPM=GAS PAINT MARK/TPM=TELEPHONE/WPM=WATER/EPM=ELECTRIC/SPM=SEWER)						
SIDESHOT	71	5.13	30.55450	90.01500	49.6300	PT*RMC2
SIDESHOT	72	5.13	334.28400	91.27450	59.9551	EL*RMC1
SIDESHOT	73	5.13	335.07550	90.58250	61.8600	CBCP
NOTE:						

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
1.85'X 5.0'						
SIDESHOT	74	5.13	38.46400	89.26150	70.8751	PC*RMC2
SIDESHOT	75	5.13	40.32050	89.21300	73.6951	RMC2
SIDESHOT	76	5.13	42.30100	89.15300	74.1600	PT*RMC2
SIDESHOT	77	5.13	75.29150	87.39200	80.1200	RMC2
SIDESHOT	78	5.13	344.48050	90.53500	75.4400	RMC1
SIDESHOT	79	5.13	83.58400	87.15550	84.1351	RMC2
SIDESHOT	80	5.13	349.37550	90.38450	107.8451	RMC1
SIDESHOT	81	5.13	99.39450	87.30450	105.7000	RMC2
SIDESHOT	82	5.13	109.49450	87.53550	133.9951	EL*RMC2
SIDESHOT	83	5.13	354.41000	90.36050	217.8200	RMC1
SIDESHOT	84	5.13	355.43550	90.35350	276.9700	RMC1
SIDESHOT	85	5.13	70.19100	87.48200	131.6000	BL*RMC2
SIDESHOT	86	5.13	73.45100	87.30500	112.4551	RMC2
SIDESHOT	87	5.13	356.20150	90.32250	328.4100	RMC1
SIDESHOT	88	5.13	81.29450	87.12100	85.0400	RMC2
SIDESHOT	89	5.13	75.03400	87.40000	82.0700	RMC2
SIDESHOT	90	5.13	356.46000	90.25550	379.0100	RMC1
SIDESHOT	91	5.13	69.24550	88.07450	106.0751	RMC2
SIDESHOT	92	5.13	357.04400	90.22200	427.8500	RMC1
SIDESHOT	93	5.13	66.15250	88.22550	129.0100	CL*RMC2
SIDESHOT	94	5.13	357.20400	90.18450	480.2800	RMC1
SIDESHOT	95	5.13	357.30300	90.15400	519.5600	RMC1
SIDESHOT	96	5.13	40.45350	88.37150	197.9000	BL*RMC2
NOTE:						
FROM BLDG COR						
SIDESHOT	97	5.13	357.45300	90.09500	570.7200	PC*RMC1
SIDESHOT	98	5.13	37.27150	89.00100	151.9200	RMC2
SIDESHOT	99	5.13	358.16250	90.09150	588.6000	RMC1
SIDESHOT	100	5.13	0.14300	90.07450	604.1300	PT*RMC1
SIDESHOT	101	5.13	35.15050	89.08200	131.5400	RMC2
SIDESHOT	102	5.13	32.11500	89.22250	112.6651	RMC2
NOTE:						
@ WPM						
SIDESHOT	103	5.13	359.32200	90.31550	276.2200	BL*,PC*RMC3
SIDESHOT	104	5.13	23.59000	90.25200	81.0551	RMC2
SIDESHOT	105	5.13	24.46200	90.26250	80.2700	CBF1
NOTE:						
2.1'SQUARE						
SIDESHOT	106	5.13	0.18000	90.31100	283.5851	RMC3
SIDESHOT	107	5.13	15.02050	90.52000	63.3900	PC*RMC2
SIDESHOT	108	5.13	1.59050	90.26550	287.6200	PT*RMC3
SIDESHOT	109	5.13	9.58400	91.00200	61.8051	RMC2
SIDESHOT	110	5.13	5.59100	89.56100	289.2400	PC*RMC3
SIDESHOT	111	5.13	8.05500	89.39400	287.1151	RMC3
SIDESHOT	112	5.13	5.21450	91.08400	63.8700	PT*,EL*RMC2
SIDESHOT	113	5.13	5.24550	90.41400	66.0051	CBCP
NOTE:						
1.8'X 4.1'						

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
SIDESHOT	114	5.13	9.58550	89.25150	277.4900	RMC3
SIDESHOT	115	5.13	9.42050	89.34000	261.0351	RMC3
SIDESHOT	116	5.13	7.46050	89.50300	253.8900	PT*RMC3
SIDESHOT	117	5.13	5.13250	91.05500	68.2200	BL*,PC*RMC2
SIDESHOT	118	5.13	2.23550	90.26450	250.6400	RMC3
SIDESHOT	119	5.13	1.13400	90.47350	73.0951	RMC2
SIDESHOT	120	5.13	359.22500	90.40000	84.7851	PT*RMC2
SIDESHOT	121	5.13	359.22250	90.33400	134.3100	RMC2
SIDESHOT	122	5.13	359.29050	90.34450	222.1400	PC*RMC2
SIDESHOT	123	5.13	359.59200	90.35150	229.4400	RMC2
SIDESHOT	124	5.13	1.34350	90.30350	232.8751	PT*RMC2
SIDESHOT	125	5.13	8.13250	89.57100	236.9951	PC*RMC2
SIDESHOT	126	5.13	12.07150	89.29150	247.2500	RMC2
SIDESHOT	127	5.13	13.58450	89.05250	270.8751	PT*,EL*RMC2
NOTE: @ COR CONC						
SIDESHOT	128	5.13	13.15100	89.08350	284.3500	BL*,PC*RMC2
NOTE: DITTO						
SIDESHOT	129	5.13	1.07200	90.31100	252.9251	RMC3
SIDESHOT	130	5.13	10.14450	89.28250	300.0100	RMC2
SIDESHOT	131	5.13	359.45450	90.33150	259.9700	CL*RMC3
SIDESHOT	132	5.13	5.59300	89.57300	306.0300	PT*RMC2
SIDESHOT	133	5.13	3.35350	90.15550	269.2451	FP
NOTE: FP=FLAG POLE ON 4'SQUARE CONC BASE						
SIDESHOT	134	5.13	1.46150	90.25300	304.4700	PC*RMC2
SIDESHOT	135	5.13	0.23550	90.30150	307.0651	RMC2
SIDESHOT	136	5.13	359.33050	90.30400	314.1551	PT*RMC2
-SIDESHOT	137	5.13	359.32050	90.21000	403.0851	RMC2
SIDESHOT	138	5.13	359.31450	90.14500	492.1000	RMC2
SIDESHOT	139	5.13	359.32550	90.09450	555.0451	PC*RMC2
SIDESHOT	140	5.13	359.57100	90.08300	567.6851	RMC2
SIDESHOT	141	5.13	1.36050	90.04300	578.1800	PT*RMC2
SIDESHOT	142	5.13	144.21150	89.14400	336.8100	BL*GPM
SIDESHOT	143	5.13	151.40400	89.41400	359.4651	GPM(GV)
SIDESHOT	144	5.13	152.29500	89.44250	362.3800	GPM(GV)
SIDESHOT	145	5.13	155.12050	89.36100	335.2151	GV
SIDESHOT	146	5.13	154.44200	89.34450	331.9000	GPM(GV)
SIDESHOT	147	5.13	157.06450	89.28050	288.2800	WV
SIDESHOT	148	5.13	157.36250	89.30150	290.1300	WPM
SIDESHOT	149	5.13	158.43400	89.28450	282.7900	WPM
SIDESHOT	150	5.13	158.06000	89.28500	294.5451	GPM
SIDESHOT	151	5.13	155.39250	89.24200	294.7551	BL*TPM
NOTE: FROM UP						
SIDESHOT	152	5.13	164.13200	89.25350	246.8200	GPM
SIDESHOT	153	5.13	171.31200	89.21050	193.4100	TPM
SIDESHOT	154	5.13	168.59000	89.18500	213.6600	GPM

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
SIDESHOT	155	5.13	175.13150	89.57150	100.0651	TPM
SIDESHOT	156	5.13	176.33300	89.23050	143.2100	GPM
SIDESHOT	157	5.13	177.30000	89.39250	61.2600	GPM
SIDESHOT	158	5.13	135.37550	90.49300	91.5900	WMH
NOTE:						
24"						
SIDESHOT	159	5.13	136.43100	92.10400	69.6851	CBFI
NOTE:						
2.0'SQUARE						
SIDESHOT	160	5.13	155.10150	90.55250	7.9800	GPM
SIDESHOT	161	5.13	152.21050	90.18400	9.9600	TPM
SIDESHOT	162	5.13	157.30150	89.58500	185.1300	SMH
SIDESHOT	163	5.13	16.03450	90.21100	21.7351	GPM,TPM
SIDESHOT	164	5.13	7.22150	90.52550	65.9400	GPM,TPM
SIDESHOT	165	5.13	1.59450	90.23450	100.2100	TPM
SIDESHOT	166	5.13	2.59350	90.38100	80.1351	GPM
SIDESHOT	167	5.13	0.53350	90.22150	151.7300	TPM
SIDESHOT	168	5.13	0.46550	90.23100	167.2451	GPM
SIDESHOT	169	5.13	1.00000	90.25000	208.1751	TPM
SIDESHOT	170	5.13	0.30150	90.30050	225.4600	GPM,BL*GSPM
SIDESHOT	171	5.13	3.24100	90.20150	228.5951	GSPM,BL*GSPM1
NOTE:						
@ GV						
SIDESHOT	172	5.13	358.42150	90.34050	226.4851	GPM
SIDESHOT	173	5.13	8.34450	89.53550	232.5151	GSPM
SIDESHOT	174	5.13	354.39100	90.34400	228.7551	GPM
SIDESHOT	175	5.13	19.12400	89.02550	246.5851	EL*GSPM
NOTE:						
TO BLDG						
SIDESHOT	176	5.13	4.09350	90.15350	232.2751	GSPM1
SIDESHOT	177	15.60	354.31450	88.02050	236.8151	GPM
SIDESHOT	178	5.13	10.14400	89.24000	268.9500	GSPM1
SIDESHOT	179	5.13	12.36100	89.08500	296.3651	GSPM1
SIDESHOT	180	5.13	355.15000	90.37500	288.5800	GPM
SIDESHOT	181	5.13	13.36550	89.05400	303.2100	EL*GSPM1
NOTE:						
TO BLDG						
SIDESHOT	182	5.13	356.08150	90.29400	367.1600	GPM
SIDESHOT	183	5.13	356.33250	90.23100	427.7451	GPM
SIDESHOT	184	5.13	0.51450	90.23450	308.9100	TPM,BL*TSPM
SIDESHOT	185	5.13	6.24050	89.54400	311.6351	TSPM
SIDESHOT	186	5.13	357.06100	90.15000	518.6500	GPM
SIDESHOT	187	5.13	12.32150	89.10550	320.4700	EL*TSPM
NOTE:						
TO BLDG						
SIDESHOT	188	5.13	358.22050	90.11500	597.7351	GPM
SIDESHOT	189	5.13	0.52200	90.20400	340.4151	TPM
SIDESHOT	190	5.13	1.39300	90.04100	618.5051	GPM
SIDESHOT	191	5.13	0.31400	90.16500	379.9951	TPM

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
SIDESHOT	192	5.13	0.40450	90.04150	653.7551	GPM
SIDESHOT	193	5.13	0.09050	90.11400	474.4051	TPM
SIDESHOT	194	5.13	358.29350	90.03150	699.0900	GPM
SIDESHOT	195	5.13	359.55300	90.06550	560.6351	TPM
SIDESHOT	196	7.80	357.08350	89.49150	723.6100	GPM
SIDESHOT	197	5.13	357.57100	90.13000	596.0500	TPM
SIDESHOT	198	5.13	356.06250	90.25500	466.2351	EE-100
SIDESHOT	199	5.13	355.50150	90.32100	362.8551	A-100
SIDESHOT	200	5.13	3.05400	89.52250	463.9700	EE-50
NOTE: HOLE						
SIDESHOT	201	8.20	9.01200	89.04400	471.2700	EE-0
SIDESHOT	202	5.13	354.11450	90.31000	266.7851	C-100
SIDESHOT	203	5.13	352.46150	90.31550	215.8751	E-100
SIDESHOT	204	5.13	352.18450	90.25000	191.7800	F-100
SIDESHOT	205	5.13	350.02200	90.19350	143.3400	H-100
SIDESHOT	206	5.13	0.04200	90.15150	140.2700	H-75
SIDESHOT	207	5.13	10.11300	89.44250	141.8351	H-50
SIDESHOT	208	5.13	18.49350	89.21300	146.4651	H-25
SIDESHOT	209	5.13	348.33100	90.19150	121.6500	I-100
SIDESHOT	210	5.13	342.30350	90.34400	73.4400	K-100
SIDESHOT	211	5.13	333.23450	90.35450	50.8351	L-100
SIDESHOT	212	5.13	315.00550	90.02350	29.3300	M-100
SIDESHOT	213	5.13	261.11550	88.38450	21.0300	N-100
SIDESHOT	214	5.13	216.15050	89.13100	37.2500	O-100
SIDESHOT	215	5.13	200.52000	89.08450	58.2200	P-100
SIDESHOT	216	5.13	178.07050	89.29500	57.2400	P-75
NOTE: HOLE						
SIDESHOT	217	5.13	153.26300	91.24550	63.4000	P-50
NOTE: DITTO						
SIDESHOT	218	5.13	137.54300	91.35300	78.5251	P-25
NOTE: DITTO						
SIDESHOT	219	5.13	128.30250	90.39350	97.4200	P-0
NOTE: DITTO						
SIDESHOT	220	5.13	120.59500	89.09450	122.4951	P-(-25)
SIDESHOT	221	5.13	195.21400	89.05550	80.1351	Q-100
SIDESHOT	222	5.13	190.59200	89.09050	107.1851	R-100
SIDESHOT	223	5.13	188.15450	89.26500	127.8400	S-100
SIDESHOT	224	5.13	207.15050	92.23200	121.7751	Q-125
SIDESHOT	225	5.13	222.10150	92.00050	135.3200	Q-150
SIDESHOT	226	5.13	231.56550	92.02150	149.2900	Q-175
SIDESHOT	227	5.13	238.34200	91.53350	163.3100	Q-200
SIDESHOT	228	11.80	191.18000	89.33400	245.9195	OS-1
SIDESHOT	229	5.13	8.21050	89.28150	412.2200	HYD'T
SIDESHOT	230	5.13	8.28400	89.27500	408.2800	WV

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
SIDESHOT	231	5.13	11.55000	89.14450	345.4051	SMH
SIDESHOT	232	8.20	9.26000	89.15400	320.4100	HYD'T
SIDESHOT	233	8.20	9.46200	89.07200	321.0451	WV
SIDESHOT	234	5.13	14.36150	89.15550	240.6151	WV
SIDESHOT	235	5.13	35.17250	89.27550	102.6400	WPM
SIDESHOT	236	5.13	51.42100	88.58000	76.2951	WPM
SIDESHOT	237	5.13	53.59350	88.50450	112.0551	GSPM
SIDESHOT	238	5.13	66.18150	88.15550	144.3551	EL*GSPM
OCC. STA.	2	5.34				04-08-99 06:12:17
						MAG PK
BACKSIGHT	1		0.00000	91.12100	213.7151	SPIKE
SIDESHOT	3	5.18	132.05400	89.55250	534.8100	MAG PK
SIDESHOT	3	5.18	312.05450	270.04300	534.8151	MAG PK
BACKSIGHT	1		180.00050	268.47250	213.7151	SPIKE
NOTE:						
B/S HGT=5.17						
SIDESHOT	239	5.13	290.50000	89.25400	63.9700	BLDG COR
SIDESHOT	240	6.13	282.29050	88.52500	83.5500	BLDG COR
SIDESHOT	241	5.73	280.51350	89.05300	104.7300	BLDG COR
SIDESHOT	242	5.13	125.01100	88.25450	108.3000	BLDG COR
NOTE:						
@ TOP FACE BLK & CONC RET WALL(B&CRW)/2.4'TALL						
SIDESHOT	243	5.13	126.24350	89.46550	133.3800	BLDG COR
NOTE:						
@ COR MAC						
SIDESHOT	244	5.13	128.59250	89.48500	235.5951	BLDG COR
NOTE:						
@ BEG CLF(CLF=CHAIN LINK FENCE)						
SIDESHOT	245	9.90	129.22550	88.48300	265.8951	BLDG COR
NOTE:						
@ COR CONC/EMAC						
SIDESHOT	246	5.13	131.09050	89.56250	369.4951	BLDG COR
NOTE:						
@ COR MAC						
SIDESHOT	247	9.63	131.20500	89.20300	441.0151	BLDG COR
OCC. STA.	2	5.34				04-08-99 06:34:06
						MAG PK
BACKSIGHT	1		0.00000	0.00000	0.0000	SPIKE
SIDESHOT	248	5.13	131.28200	89.55500	402.9800	COR CONC
SIDESHOT	249	5.13	131.27100	89.56000	396.5851	COR CONC
SIDESHOT	250	5.13	132.44500	90.03300	333.4000	DMH
NOTE:						
DRAIN MAN HOLE IN 4.9'(N-S)X 4.4'(E-W)CONC PAD						
SIDESHOT	251	5.13	132.38400	90.00000	269.9251	DMH
NOTE:						
IN 4.9'(E-W)X 5.2'(N-S) CONC PAD						
SIDESHOT	252	5.13	132.31550	89.57300	226.6500	DMH
NOTE:						
IN 5.1'(N-S)X 4.6'(E-W)CONC PAD						

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
SIDESHOT	253	5.13	129.33500	89.51350	279.8100	COR CONC
NOTE: BM#2						
SIDESHOT	254	5.13	129.55150	89.53150	253.9151	COR CONC
SIDESHOT	255	5.13	129.52300	89.53450	249.8700	COR CONC
SIDESHOT	256	5.13	128.26100	89.43150	161.1600	COR CLF
SIDESHOT	257	5.13	128.00400	89.43150	144.1200	COR CLF
SIDESHOT	258	5.13	127.40400	89.50100	132.1800	COR CONC
SIDESHOT	259	5.13	127.19200	89.54050	122.4951	COR CONC
SIDESHOT	260	5.13	126.59000	89.52300	115.4200	COR CONC
SIDESHOT	261	5.13	126.44300	89.53550	109.1000	COR CONC
SIDESHOT	262	5.13	126.24050	89.54500	109.0500	COR CONC
NOTE: @ COR B&CRW						
SIDESHOT	263	5.13	116.29350	89.22550	40.7800	COR B&CRW
SIDESHOT	264	5.13	115.03200	90.23200	40.8551	COR B&CRW
SIDESHOT	265	5.13	96.11450	88.09000	28.7600	COR HL
NOTE: HL=HYDRAULIC LIFT						
SIDESHOT	266	5.13	82.28100	87.37150	22.2551	COR HL
SIDESHOT	267	5.13	120.34250	90.36550	108.5251	<RECORD DELETED>
SIDESHOT	268	11.80	120.33200	90.36550	108.5000	CBFI
NOTE: 1.7'SQUARE						
SIDESHOT	267	8.20	297.40250	88.52500	38.7751	CBFI
NOTE: 2.0'SQUARE						
SIDESHOT	269	5.13	104.19300	89.38500	38.3151	BL*EPM
NOTE: FROM BLDG						
SIDESHOT	270	5.13	122.57150	89.21050	35.3251	EPM,BL*EPM1
SIDESHOT	271	5.13	126.32050	89.35500	45.8300	EL*EPM1
SIDESHOT	272	5.13	162.47550	90.14300	42.4751	EPM
SIDESHOT	273	5.13	328.00550	90.13100	86.7851	BL*RMC3
SIDESHOT	274	5.13	324.41000	89.38250	91.0251	RMC3
SIDESHOT	275	5.13	295.37200	89.34000	62.5551	PC*RMC3
SIDESHOT	276	5.13	292.24500	90.00100	58.5951	RMC3
SIDESHOT	277	5.13	293.18550	90.52100	51.5700	PT*RMC3
SIDESHOT	278	5.13	319.08350	90.28550	68.1300	RMC3
SIDESHOT	279	5.13	328.17300	90.32000	82.5051	EL*RMC3
SIDESHOT	280	5.13	224.48000	72.36200	67.5100	UP
NOTE: NO WIRES						
SIDESHOT	281	5.13	232.04350	74.34400	72.2300	EL*EMP,UP
SIDESHOT	282	5.13	230.01250	70.28100	49.2800	ANCHOR
SIDESHOT	283	6.80	279.03400	88.37300	105.4151	BL*EM
NOTE: EM=EDGE MAC						
SIDESHOT	284	5.13	283.08400	89.46500	66.5500	EM

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
SIDESHOT	285	15.60	234.10300	69.52400	202.1168	UP
SIDESHOT	286	6.80	298.19550	90.52450	36.2000	EM
SIDESHOT	287	6.80	298.49100	89.46200	28.4300	EL*EM,BL*RMC3
SIDESHOT	288	5.13	272.16000	93.28450	15.4000	PC*RMC3
SIDESHOT	289	5.13	251.19550	93.09050	13.2851	RMC3
SIDESHOT	290	5.13	221.29550	92.42050	15.4651	PC*RMC3
SIDESHOT	291	6.42	178.22500	88.24100	30.6651	RMC3
SIDESHOT	292	5.13	165.43300	90.24500	41.9500	PT*RMC3
SIDESHOT	293	6.42	147.52150	89.04250	84.5951	RMC3
SIDESHOT	294	5.13	142.32350	89.52450	131.7000	EL*RMC3
SIDESHOT	295	6.42	141.20000	89.19050	141.1400	BL*TC
NOTE: TC=TIE CURB						
SIDESHOT	296	6.42	139.16300	89.16500	154.8151	TC
SIDESHOT	297	5.13	134.46250	89.43300	166.6651	EL*TC,BL*EM
SIDESHOT	298	5.13	134.15250	89.42100	168.8600	EM
SIDESHOT	299	5.13	133.10000	89.49450	177.8100	EM
SIDESHOT	300	5.13	133.05150	89.57300	224.1351	EM
NOTE: @ COR CONC(DMH)						
SIDESHOT	301	5.13	133.08450	90.00150	263.1000	EM
SIDESHOT	302	5.13	133.03100	90.00100	263.1051	CLF(GATE)
SIDESHOT	303	5.13	133.06300	90.02550	330.9600	EM
SIDESHOT	304	8.20	133.22550	89.33000	346.3700	PC*EM
SIDESHOT	305	5.13	33.18350	91.11200	78.6051	H-0
NOTE: HOLE						
SIDESHOT	306	5.13	55.08100	89.42300	41.6151	H-(-50)
NOTE: DITTO						
SIDESHOT	307	5.13	33.55150	90.39300	67.2000	<RECORD DELETED>
NOTE: 67.2000						<RECORD DELETED>
SIDESHOT	308	5.13	34.21300	90.52300	69.0000	CL END CP
NOTE: CP=CONC PAD/1.3'WIDE						
SIDESHOT	307	5.13	32.21200	90.49300	65.8751	CL BEG CP
NOTE: DITTO						
TRAVERSE	3	5.13	0.00000	0.00000	0.0000	MAG PK
OCC. STA.	3	5.28				04-08-99 08:08:42
						MAG PK
BACKSIGHT	2		0.00000	90.06050	534.8151	MAG PK
SIDESHOT	4	4.96	54.15350	91.51150	189.0251	MAG PK
SIDESHOT	4	4.96	234.15350	268.09000	189.0251	MAG PK
BACKSIGHT	2		180.00000	269.54150	534.8151	MAG PK
NOTE: B/S HGT=5.25						
SIDESHOT	309	5.13	13.48350	90.01050	91.1351	BLDG COR

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
SIDESHOT	310	5.13	38.53500	90.21500	113.2500	BLDG COR
SIDESHOT	311	5.13	27.03500	89.40400	91.7000	MW-15
OCC. STA.	3	5.28				04-08-99 08:14:58
						MAG PK
BACKSIGHT	2		0.00000	0.00000	0.0000	MAG PK
SIDESHOT	312	5.13	8.07300	90.16100	83.0300	HYD'T
SIDESHOT	313	5.13	9.00350	90.06000	82.3800	WV
SIDESHOT	314	5.13	358.19300	90.16150	312.7351	WF
NOTE:						
WF=BOT EDGE WATER FALLS						
SIDESHOT	315	5.13	357.47250	89.46100	272.3200	BEG CLF
NOTE:						
TO GATE @ EMAC						
SIDESHOT	316	5.13	351.31300	90.28400	95.6351	PT*EM
SIDESHOT	317	5.13	351.44000	90.28400	95.6351	CLF(GATE)
SIDESHOT	318	5.13	345.51550	89.30150	98.4700	BEG CLF
SIDESHOT	319	5.13	3.08300	90.12050	94.6951	CLF(GATE)
NOTE:						
@ BLDG LINE(+/-)						
SIDESHOT	320	5.90	347.11300	89.45050	76.8451	BL*RMC3
SIDESHOT	321	5.13	339.09100	90.29450	60.1600	RMC3
NOTE:						
@ COR CONC						
SIDESHOT	322	5.13	337.02450	90.12500	58.4051	DMH
NOTE:						
IN 5'SQUARE CONC PAD						
SIDESHOT	323	5.13	333.39400	91.05450	36.1700	PC*RMC3
SIDESHOT	324	5.13	164.11250	89.33150	38.8400	RMC3
SIDESHOT	325	5.13	156.49200	89.28100	90.4651	RMC3
SIDESHOT	326	5.13	155.40200	89.13000	118.2600	DMH
NOTE:						
IN 5'SQUARE CONC PAD						
SIDESHOT	327	15.60	146.59050	87.00300	242.1251	EL*RMC3
SIDESHOT	328	15.60	148.18550	86.52550	245.6851	BL*CW
NOTE:						
CW=FACE CONC WALL/3.0'WIDE						
SIDESHOT	329	15.60	147.48050	86.59550	240.5500	UG-1
SIDESHOT	330	15.60	146.54050	87.04150	243.3151	CW
NOTE:						
@ COR MAC						
SIDESHOT	331	8.20	131.21400	89.05400	236.1800	CW,BL*RMC3
NOTE:						
@ COR MAC						
SIDESHOT	332	15.60	143.12050	87.07500	238.9100	WV
SIDESHOT	333	15.60	140.29250	87.08400	231.7900	UG-2
SIDESHOT	334	15.60	130.31150	89.17450	224.5851	<RECORD DELETED>
SIDESHOT	335	8.20	130.32400	89.17450	224.5551	UG-3
SIDESHOT	334	8.20	119.52250	90.15150	235.4000	UG-4
SIDESHOT	336	14.40	107.43150	89.10550	243.8400	UG-5

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
NOTE:						
@ WATER ELEV						
SIDESHOT	337	15.60	105.55500	89.04100	232.8787	MW-1
SIDESHOT	338	5.13	112.11300	91.11500	251.4951	EL*GPM
SIDESHOT	339	5.13	129.25000	89.55150	176.3351	RMC3
SIDESHOT	340	8.20	74.24350	91.22250	190.1751	EL*TPM
SIDESHOT	341	5.13	124.47150	89.50000	131.5051	RMC3,CBCP
NOTE:						
CBCP=1.9'X 4.0'						
SIDESHOT	342	5.13	116.12200	90.22400	97.6051	RMC3
SIDESHOT	343	5.13	74.52550	90.48500	59.7100	RMC3,CBCP
NOTE:						
CBCP=1.9'X 4.0'						
SIDESHOT	344	5.13	68.35550	91.32050	59.3000	PC*RMC3
SIDESHOT	345	5.13	65.24300	91.34250	65.9000	RMC3
SIDESHOT	346	5.13	69.44500	91.43450	69.5151	PC*RMC3
SIDESHOT	347	8.20	99.28450	89.58350	83.0451	RMC3
SIDESHOT	348	5.13	111.30400	91.45500	101.6151	RMC3
SIDESHOT	349	5.13	122.57400	91.04450	148.0700	RMC3
SIDESHOT	350	5.13	129.01550	90.39000	236.7547	EL*RMC3,CW
SIDESHOT	351	5.13	62.47550	92.01500	116.4951	PC*RMC1
SIDESHOT	352	5.13	63.49150	92.01150	114.4400	RMC1
SIDESHOT	353	5.13	64.50150	92.03250	116.9800	PT*RMC1
SIDESHOT	354	5.13	64.39300	92.12100	133.4800	RMC1
SIDESHOT	355	5.13	65.49200	91.55550	133.6751	RMC1,CBCP
NOTE:						
CBCP=1.9'X 4.0'						
SIDESHOT	356	5.13	89.49400	91.58200	148.3351	PC*RMC1
SIDESHOT	357	5.13	95.58000	91.44050	159.1051	RMC1
SIDESHOT	358	6.00	99.49000	91.19500	170.1200	EL*RMC1
SIDESHOT	359	6.00	100.22150	91.16350	171.8551	BL*,PC*RMC1
SIDESHOT	360	8.20	94.41300	90.56350	188.3751	CL END MS
NOTE:						
MS=MAC SWALE/3'WIDE(+/-)						
SIDESHOT	361	11.80	107.52550	89.25350	201.6200	RMC1
SIDESHOT	362	5.13	113.50150	91.06350	248.5251	EL*RMC1
SIDESHOT	363	5.13	113.54350	91.07450	249.5200	CW
NOTE:						
@ COR MAC						
SIDESHOT	364	15.60	103.30500	89.10500	270.6451	EL*CW
SIDESHOT	365	5.13	35.21300	91.12450	19.2300	SMH
SIDESHOT	366	5.13	49.29050	91.36300	143.9200	RMC2,CBCP
NOTE:						
CBCP=1.9'X 4.0'						
SIDESHOT	367	5.13	45.54050	90.58250	126.8251	EL*RMC2
NOTE:						
@ COR CONC WLK						
SIDESHOT	368	5.13	44.50500	90.58250	123.1051	BL*RMC2
NOTE:						

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
DITTO						
SIDESHOT	369	5.13	40.27300	90.35350	110.0151	RMC2
SIDESHOT	370	5.13	33.48250	90.17250	97.3251	EL*RMC2
NOTE:						
@ COR CONC						
SIDESHOT	371	5.13	31.26450	90.10550	94.2700	BL*RMC2
NOTE:						
DITTO						
SIDESHOT	372	5.13	26.55050	90.08500	87.8200	EL*RMC2
NOTE:						
DITTO						
SIDESHOT	373	5.13	19.27550	90.05300	83.3400	BL*RMC2
NOTE:						
DITTO						
SIDESHOT	374	5.13	8.50200	90.19500	78.6600	PC*RMC2
SIDESHOT	375	5.13	6.02400	90.15500	79.2000	RMC2
SIDESHOT	376	5.13	3.56100	90.12200	84.7300	PT*RMC2
SIDESHOT	377	5.13	3.29350	90.10050	94.0600	EL*RMC2
TRAVERSE	4	5.13	0.00000	0.00000	0.0000	MAG PK
OCC. STA.	4	5.06				04-08-99 09:59:41
						MAG PK
BACKSIGHT	3		0.00000	88.12100	189.0100	MAG PK
SIDESHOT	1	4.98	126.16000	89.57350	567.7200	SPIKE
SIDESHOT	1	4.98	306.15550	270.02300	567.7200	SPIKE
BACKSIGHT	3		179.59550	271.47400	189.0051	MAG PK
SIDESHOT	378	5.13	245.03200	92.54350	73.4100	CL BEG CHD
NOTE:						
CHD=CONC HEADWALL/1.1'WIDE						
SIDESHOT	379	5.13	239.21350	92.29450	68.2700	CL END CHD
SIDESHOT	380	5.13	240.14400	93.36100	74.3600	OF-0
NOTE:						
OF-0=INV(ON SILT) 24"CMP						
SIDESHOT	381	5.13	71.00450	86.23500	91.8243	MW-2
SIDESHOT	382	5.13	98.01100	87.49300	76.1704	MW-16
SIDESHOT	383	5.13	116.10350	89.20100	191.1151	MW-14
SIDESHOT	384	5.13	118.39000	89.26500	312.0100	MW-13
SIDESHOT	385	5.13	139.28100	91.25050	162.4100	OF-1
NOTE:						
OF-1=INV(ON SILT) 24"CMP						
SIDESHOT	386	5.13	114.00350	89.07500	342.5351	MW-5
SIDESHOT	387	5.13	114.32400	89.09150	359.6251	MW-3
SIDESHOT	388	5.13	123.25000	89.52400	377.0651	MW-19
SIDESHOT	389	5.13	121.32200	89.45200	414.6600	MW-11
SIDESHOT	390	5.13	119.13100	89.36400	419.2800	MW-18
SIDESHOT	391	5.13	124.01250	89.55100	468.0551	MW-17
NOTE:						
MW'S SHOT FROM STA#4 ARE FOR TRIANGULATION PURPOSES ONLY/PREVIOUSLY LOCATE						
FROM STA#1!						
SIDESHOT	392	15.60	132.02100	89.01350	356.7951	OF-2

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
NOTE:						
NO PIPE VISIBLE						
SIDESHOT	393	5.13	114.43050	89.17550	420.8200	BLDG COR
SIDESHOT	394	5.13	140.46250	91.21000	163.5500	SG-1
NOTE:						
SG=STAFF GAUGE						
OCC. STA.	4	5.06				04-08-99 10:36:23
						MAG PK
BACKSIGHT	3		0.00000	0.00000	0.0000	MAG PK
SIDESHOT	395	5.13	28.50150	85.40450	66.7900	SMH
SIDESHOT	396	5.13	27.33000	85.38100	65.6451	BL*ECW
NOTE:						
FROM EL*RMC1 @ COR WLK						
SIDESHOT	397	5.13	80.19300	86.50400	90.7200	ECW
SIDESHOT	398	5.13	100.25100	88.03250	150.1500	ECW
SIDESHOT	399	5.13	106.32150	88.29100	194.4700	ECW
SIDESHOT	400	5.13	111.19150	88.48500	255.3951	ECW
SIDESHOT	401	5.13	113.27050	88.59000	296.8651	EL*ECW
NOTE:						
TO COR CONC						
SIDESHOT	402	5.13	112.46200	88.56550	299.3651	BL*ECW
NOTE:						
@ EDGE CONC						
SIDESHOT	403	5.13	109.11400	88.44000	237.4051	ECW
SIDESHOT	404	5.13	102.29400	88.18150	172.2000	ECW
SIDESHOT	405	5.13	87.54200	87.21550	110.9951	ECW
SIDESHOT	406	5.13	28.04350	85.46400	69.4400	EL*ECW
NOTE:						
TO BL*RMC1 @ COR CONC WLK						
OCC. STA.	1	5.08				04-08-99 11:18:49
						SPIKE
BACKSIGHT	4		0.00000	90.04300	567.7200	MAG PK
NOTE:						
B/S HGT=4.96						
SIDESHOT	407	14.10	185.24350	89.35450	572.6251	OS-2
SIDESHOT	408	15.60	186.11300	89.47250	583.0400	SW-2
OCC. STA.	1	5.08				04-08-99 11:28:44
						SPIKE
BACKSIGHT	4		0.00000	0.00000	0.0000	MAG PK
SIDESHOT	409	5.13	327.09350	94.24000	66.1500	OF-3
NOTE:						
NO PIPE VISIBLE						
SIDESHOT	410	15.60	226.57000	88.43350	327.5351	T-4
SIDESHOT	411	15.60	311.28250	94.43550	70.3200	<RECORD DELETED>
SIDESHOT	412	5.13	311.28250	94.50100	70.3200	SG-3
SIDESHOT	411	14.30	244.39400	88.49150	294.2200	T-5
SIDESHOT	413	15.60	264.20050	88.33200	297.4000	T-6
SIDESHOT	414	11.80	281.16400	89.15550	334.8300	T-7
SIDESHOT	415	14.30	294.32250	88.55150	390.6351	T-8

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
SIDESHOT	416	17.50	304.43000	88.36250	456.1500	T-9
OCC. STA.	1	5.08				04-08-99 11:53:03
						SPIKE
BACKSIGHT	4		0.00000	90.04400	567.7251	MAG PK
TRAVERSE	5	5.18	173.09400	89.18050	187.8351	MAG PK
TRAVERSE	5	5.18	353.09350	270.42000	187.8351	MAG PK
BACKSIGHT	4		179.59550	269.55300	567.7200	MAG PK
NOTE:						
B/S HGT=4.96						
OCC. STA.	5	5.27				04-08-99 11:59:04
						MAG PK
BACKSIGHT	1		0.00000	90.45250	187.8351	SPIKE
NOTE:						
B/S HGT=4.99						
SIDESHOT	417	15.60	67.03250	270.13550	270.3151	<RECORD DELETED>
SIDESHOT	418	11.80	247.04500	89.46050	270.1551	T-3
SIDESHOT	417	8.20	228.51250	90.26400	307.7551	T-2
SIDESHOT	419	15.60	215.32350	89.24500	370.4451	T-1
SIDESHOT	420	8.20	234.50500	91.53350	146.1900	OS-3
SIDESHOT	421	8.20	239.31050	92.20300	171.8000	SW-3
SIDESHOT	422	5.13	83.54300	89.28150	190.0200	COR CLF
NOTE:						
@ TENNIS COURT						
SIDESHOT	423	5.13	74.06150	89.26400	303.4300	COR CLF
NOTE:						
DITTO						
SIDESHOT	424	5.13	317.36050	93.12000	147.1851	SG-4
OCC. STA.	4	5.13				04-08-99 12:36:40
						MAG PK
BACKSIGHT	1		0.00000	89.57050	567.7200	SPIKE
NOTE:						
B/S HGT=4.99						
SIDESHOT	425	15.60	107.00500	86.51400	101.6251	SG-5

Y.E.C. INC./FARRAND CONTROLS DATE OF SURVEY APRIL 12, 1999

Pt.No.	Code	North	East	Elevation	Desc.
21		2130.9120	2121.0260	98.630	MW-P9
22		2125.7945	2003.2083	97.300	MW-P8
23		2280.1641	1979.3297	100.580	MW-P7
24		2270.7353	1907.8755	95.380	MW-4
25		2352.2352	1833.0423	96.590	MW-OC17
26		2406.5213	1817.1558	97.690	MW-P11
27		2413.2938	1833.2445	98.830	MW-OC18
28		2429.2302	1784.3609	96.780	MW-OC19
29		2732.8727	1657.4609	101.700	MW-2
30		2479.3087	1816.8575	101.300	MW-3
31		2699.2019	1632.2788	98.810	MW-P16
32		2493.5824	1807.2582	101.130	MW-P5
33		2595.7426	1695.3583	98.120	MW-P14
34		2498.0723	1767.0497	98.950	MW-P13
35		2394.2272	1758.7795	95.220	MW-P6
36		2279.9495	1830.6417	96.260	MW-P10
37		2454.4252	1897.9349	102.140	MW-P12
311		2821.3650	1643.6186	102.460	MW-P15
337		2843.7788	1411.5009	96.420	MW-1

ELEVATIONS

WELL I.D.	GROUND	TOP OF CASING	TOP OF RISER(PVC)
MW-1	96.42	98.25	98.26
MW-2	101.70	103.89	103.73
MW-3	101.30	103.32	103.07
MW-4	95.38	97.66	97.45
MW-P5	101.13	102.89	102.60 3" 102.72 2" 102.65 1"S
MW-P6	95.22	95.29 (FLUSH MOUNT)	95.20
MW-P7	100.58	103.23	103.14
MW-P8	97.30	99.08	98.96
MW-P9	98.63	100.60	100.24
MW-P10	96.26	98.26	98.19
MW-P11	97.69	99.38	99.13
MW-P12	102.14	104.14	104.10
MW-P13	98.95	100.89	100.84
MW-P14	98.12	99.62	99.40
MW-P15	102.46	104.46	104.18
MW-P16	98.81	100.44	100.42
MW-OC17	96.59	98.61	97.86 S 98.07 D
MW-OC18	98.83	100.66	100.23 S 100.24 D

ELEVATIONS

WELL I.D.	GROUND	TOP OF CASING	TOP OF RISER(PVC)
MW-OC19	96.78	98.90	98.48 S 98.67 D

JOB: 99015
Crew: FD,HS
Material: FIELD DATA
Notes:
YEC/FARRAND CONTROLS;NEW WELL LOC'S
DATE BEGUN: 12-13-99 06:26:13
DATE ENDED: 12-13-99 09:54:51

UNIT:
Distance unit: FEET
Angle unit: D.M.S.
Azimuth system: NORTH
Angle direction: RIGHT
Vertical system: ZENITH

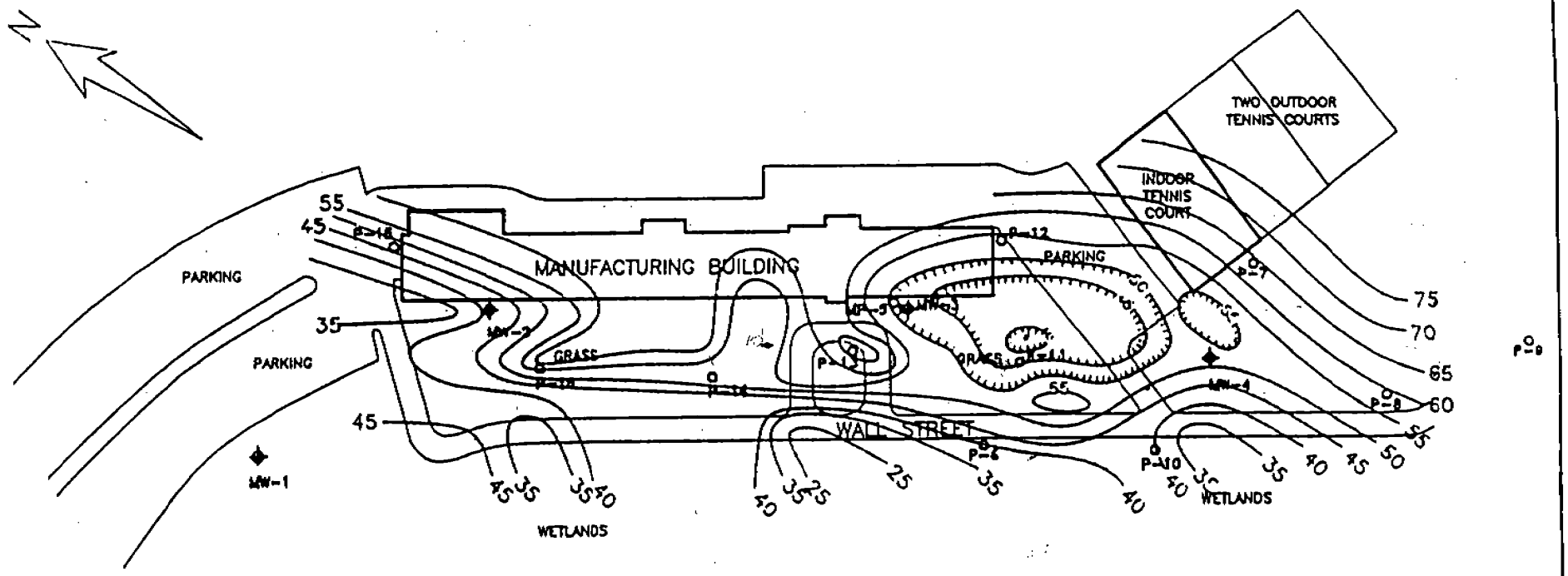
ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
OCC. STA.	2	0.00				12-13-99 08:38:35
						MAG PK
BACKSIGHT	1		0.00000	91.12300	213.7100	SPIKE
SIDESHOT	501	0.00	122.20000	90.34500	106.1700	GP-D
SIDESHOT	502	0.00	118.02450	90.55050	73.0400	GP-E
SIDESHOT	503	0.00	101.49400	88.36350	33.5700	GP-F
SIDESHOT	504	0.00	132.53300	89.47000	132.5100	GP-VI
SIDESHOT	505	0.00	133.21400	89.49350	109.0300	GP-SC
SIDESHOT	506	0.00	95.50350	87.45500	24.3200	S-5-2(?)
SIDESHOT	507	0.00	75.38050	87.43050	22.7951	S-5-2(?)
NOTE:						
S-5-2 LOCATIONS=CENTER OF CONC PATCHED DRILL HOLES/THERE ARE TWO SUCH CLUST						
ERS @ APPROX LOC OF S-5-2						
SIDESHOT	508	0.00	334.04050	89.56150	104.3251	W-6
OCC. STA.	1	0.00				12-13-99 09:11:07
						SPIKE
BACKSIGHT	2		0.00000	88.49550	213.7200	MAG PK
SIDESHOT	509	0.00	302.31000	90.23100	215.4200	SG-2
SIDESHOT	510	0.00	302.52450	90.26000	216.6251	OF-2
NOTE:						
NO PIPE VISIBLE/SHOULD BE SAME AS SIDESHOT#392						
SIDESHOT	511	0.00	330.26300	89.00250	259.4400	S-5-1
SIDESHOT	512	0.00	283.12250	90.48300	51.9751	MW-10D
SIDESHOT	513	0.00	278.46300	90.13350	39.6051	MW-10R
SIDESHOT	514	0.00	119.53450	89.49150	193.1151	MW-8D
SIDESHOT	515	0.00	119.04450	89.46150	199.6400	MW-8R

UNIT:
Distance unit: FEET
Angle unit: D.M.S.
Azimuth system: NORTH
Angle direction: RIGHT
Vertical system: VERT DIST
UNIT:
Distance unit: FEET

ACTIVITY	POINT	HEIGHT	HORIZONTAL	VERTICAL	DISTANCE	CREATED TIME/DESC
Angle unit: D.M.S.						
Azimuth system: NORTH						
Angle direction: RIGHT						
Vertical system: ZENITH						
OCC. STA.	5	0.00				12-13-99 09:25:23
						MAG PK
BACKSIGHT	1		0.00050	90.38450	187.8400	SPIKE
SIDESHOT	516	0.00	231.07350	89.48250	308.9400	MW-20R
SIDESHOT	517	0.00	229.54550	89.48350	313.1551	MW-20D
SIDESHOT	518	0.00	228.52450	89.48400	316.6200	MW-20S
SIDESHOT	519	0.00	11.03250	92.14350	77.7800	W-N-25(?)

APPENDIX E

GPR FIGURE



LEGEND

- MW-4 — Ground-Water Monitoring Well Designation and Location
- P-6 — Ground-Water Peizometer Designation and Location
- Fire Hydrant (Assumed Bench-Mark +100 Feet)
- 25 — bedrock Contour Line Contour Interval = 5 Feet

Source: "Sump and Monitor Well Location Plan" GZA Geoenvironmental, Inc. May, 1993

FARRAND CONTROLS Inc.
99 Wall Street
Valhalla, NY

BEDROCK ELEVATION MAP

DATE: 11-17-94 | SCALE: 1"=75' | FIGURE

Environmental Management LTD.
33 Orangeburg Rd. - Orangeburg, N.Y.
(914) 359-4434

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APPENDIX F

WELL DEVELOPMENT AND PURGING LOGS

MONITORING WELL DEVELOPMENT LOG
FARRAND CONTROLS RI/FS

Well	Date	Pumping Rate	Time	pH	Conductivity	Turbidity	Dissolved Oxygen	Temperature	Comments/ Observations
8D	10/18/99	4 l/min.	1612	5.37	0.179	999	0.21	14.5	
			1625	5.49	0.157	10	0.06	12.4	Slightly cloudy
			1635	5.44	0.158	10	0.75	12.2	Cloudy after surging
			1700	5.51	0.158	10	1.16	12.3	Surged
			1724	5.52	0.158	10	1.26	12.8	
	10/19/99	4 l/min.	0833	5.39	0.191	468	0.03	11.2	Surged at 0853
			0900	5.78	0.165	16	0.16	12.1	Surged at 0906
			0930	5.16	0.165	24	0.07	12..2	
			1000	5.79	0.166	999	0.18	12.5	Surged at 0958
			1030	5.84	0.166	34	0.29	12.3	
8R	10/20/99	4l/min.	1530	8.86	0.140	275	0.82	15.5	
			1600	8.46	0.118	200	0.84	15.4	
10D	10/19/99	4l/min.	1308	6.22	0.387	999	0.93	13.1	Surged at 1321
			1331	6.29	0.448	169	0.91	12.7	Surged at 1338
			1402	6.23	0.456	606	1.19	12.8	
			1435	6.28	0.459	999	1.01	12.9	
			1631	6.24	0.475	79	1.31	13.1	Surged at 1610
			1701	6.47	0.478	51	1.34	12.9	
	10/20/99	4 l/min.	1030	6.21	0.489	733	0.21	13.4	
			1130	6.48	0.485	22	0.90	13.0	
10R	10/20/99	4l/min.	1400	8.84	0.284	17	0.50	14.5	
			1420	8.59	0.279	9	0.25	14.8	
20S	10/20/99	4l/min.	1717			999			Surged 4 times
			1731			300			
			1757			400			
	10/21/99	4 l/min.	1121	7.90	0.653	999	0.02	17.0	
			1448	6.58	0.751	999	0.02	16.9	Surged 1446 to 1447
			1504	6.95	0.655	62	0.03	16.9	Surged
20D	10/21/99	4 l/min.	1103	8.33	1.980	999	0.03	13.3	
			1132	7.48	1.990	611	0.29	12.6	
			1432	6.89	2.000	823	2.31	14.3	Surged 1432 to 1463
			1531		2.070	92	0.07	13.0	Surged 1515 to 1522
			1401	7.57	2.510	386		12.3	Surged 1531 to 1537
			1413			161			

UNITS
pH: Standard units
Conductivity: mS/cm
Temperature: C degrees
Turbidity: NTU
Dissolved Oxygen: mg/l

MONITORING WELL
SAMPLING LOG
FARRAND CONTROLS RI/FS

Well	Date	Time	Depth to Water	Total Depth	Gallons Removed	pH	Conductivity	Turbidity	Dissolved Oxygen	Temperature	Comments/ Observations
8D	11/1/99	9:45	5.31	36	0	6.25	0.222	1	6.11	16.2	
					3	6.31	0.170	218	5.13	13.9	
					6	6.10	0.177	301	5.13	12.8	
					9	6.11	0.178	138	5.15	12.8	
					12	6.12	0.183	68	5.33	13.2	
		1100			15	6.16	0.173	48	5.32	13.0	
8R	11/1/99	1040	5.26	61	0	12.18	2.230	190	--	13.1	
					10	11.34	0.645	25	--	15.3	Pumped dry
8S	11/1/99	1130	7.35	11	0	6.28	0.200	895	7.29	16.3	
					1	6.42	0.202	344	8.53	15.9	
					2	6.49	0.202	556	7.70	15.9	
					3	6.50	0.204	298	7.69	15.9	
20R	11/1/99	1325	3.5	98	0	12.24	4.950	28	2.97	14.1	
					15	12.40	4.050	150	1.51	13.4	
					30	12.52	6.120	37	1.46	13.6	
					45	11.84	4.840	20	1.59	14.5	
					60	11.66	2.360	17	1.51	15.2	
	11/1/99	1545			80	1.66	1.980	20	1.51	14.8	Water slightly gray
20D	11/2/99	1005	2.85	75	0	5.76	1.680	5	1.80	15.6	
					5	6.22	2.190	6	0.44	14.0	
					10	6.38	2.200	26	1.06	13.7	
					15	6.46	2.790	4	0.41	13.0	
					20	6.62	2.760	4	0.44	13.1	
					25	6.67	2.720	6	0.30	13.2	
20S	11/1/99	1535	4.53	15.6	0	8.15	0.757	172	2.23	15.9	
					1	7.64	0.817	>999	2.37	15.9	
					2	7.20	0.750	>999	2.22	16.0	
					3	7.36	0.702	>999	3.20	16.0	
					4	7.25	0.699	>999	3.31	16.0	
		1600			5	7.31	0.699	>999	3.38	16.0	Water slightly gray
10S	11/2/99		7	12	0	5.64	1.000	230	4.87	15.8	
					0.25	5.76	2.030	233	6.15	15.7	
					0.5	5.81	1.040	206	6.79	15.6	
					0.75	5.87	1.080	131	6.64	15.8	
					1	5.74	1.090	163	4.48	15.6	
					1.25	5.60	1.080	85	2.70	15.3	
		1315			1.5	5.64	1.080	58	2.81	15.5	Water slightly gray
3	11/2/99		12	20	0	5.32	0.357	531	2.50	16.6	
					1	5.27	0.346	556	2.27	`6.4	
					3	5.28	0.344	624	2.14	16.4	
					4	5.22	0.344	218	2.29	16.3	
		1520			6	5.32	0.344	84	2.36	16.3	
10D	11/2/99		3.78	52	0	6.22	1.690	2			
					10	6.22	2.480	8			
					20	6.34	2.560	1			
					30	6.45	2.650	2			
		1320			40	6.48	2.770	1			
1	11/3/99		11	20	0	6.25	0.490	999	2.65	15.1	
					2	6.25	0.426	837	3.32	13.7	
					4	6.26	0.451	892	3.32	15.1	
					6	6.29	0.456	651	3.27	15.1	

MONITORING WELL
SAMPLING LOG
FARRAND CONTROLS RI/FS

Well	Date	Time	Depth to Water	Total Depth	Gallons Removed	pH	Conductivity	Turbidity	Dissolved Oxygen	Temperature	Comments/ Observations
		1130			8	6.24	0.458	672	3.32	15.1	
10R	11/2/99	1500	3.28	63	0	8.69	0.214	68		16.2	
					10	9.80	0.231	25		14.2	
					20	9.00	0.282	14		13.9	
		1530			30	9.03	0.283	8		13.3	
P12	11/3/99	1035	11.94	19.75	0	5.15	0.160	>999		16.6	
					2	5.21	0.155	>999		16.8	
					4	5.24	0.155	>999		17.0	
		1035			6	5.24	0.154	>999		17.0	
P9	11/4/99	1250	8.4	11.15	0	5.66	0.105	999		13.9	
					1	5.78	0.102	625		13.5	
					2	5.77	0.102	323		13.9	
		1300			3	5.78	0.102	289		13.5	
P14	11/4/99	1400	7	16.15	0	6.27	0.645	>999		15.1	
					2	6.47	0.656	>999		15.3	
					4	6.48	0.678	>999		15.2	
		1410			6	6.48	0.645	>999		15.2	
8S	1/27/00	1240	7.3	10	0	5.87	0.209	999	6.57	4.9	
					1	6.94	0.184	302	8.26	5.6	
		1245			2	7.96	0.215	288	7.25	4.7	
8R	1/27/00	1130	18.5	56	0	11.60	1.020	0.1	5.23	6.8	
					5	10.52	0.275	3	1.72	8.6	
		1200			10	11.05	0.425	34	2.57	9.7	Well went dry
8D	1/27/00	1330	5.3	36	0	6.68	0.119	1	4.33	8.1	
					5	6.31	0.161	3	4.85	10.5	
					10	6.28	0.162	4	5.33	10.9	
					15	6.27	0.160	7	4.82	10.9	
10D	1/27/00	1400	3	53	0	6.66	0.504	1	3.10	10.6	
					14	6.48	0.522	4	0.68	11.3	
					21	6.41	0.518	5	0.42	11.1	
		1430			28	6.51	0.517	3	0.68	10.6	
10S	1/27/00	1430	5.3	10	0	6.60	0.889	441	2.21	5.1	
					1	6.89	0.920	278	6.27	6.4	
		1445			2	6.91	0.970	150	7.07	7.7	Green/gray with sulfur odo
10R	1/27/00	1325	4.3	63.5	0	9.17	0.293	4	0.24	9.2	
					10	8.08	0.350	6	0.75	10.8	
					20	8.13	0.357	7	0.51	11.1	
					30	8.04	0.385	7	0.38	10.8	
		1415			50	7.87	0.387	7	0.05	10.8	
20R	1/28/00	1220	4	98	0	11.42	2.490	>999	1.42	8.4	
					20	11.92	2.770	3	1.16	10.7	
					40	11.96	2.100	1	2.20	11.2	
					60	12.08	2.410	63	1.51	11.6	
		1330			70	12.40	2.700	238	3.84	12.0	
20D	1/28/00	1330	3	77	0	9.77	2.110	0	3.41	8.2	
					20	8.72	3.720	4	2.30	10.5	
					40	7.92	2.890	4	2.14	9.2	
		1430			60	7.86	3.040	6	1.35	9.0	
20S	1/28/00	1200	4.49	15	0	6.97	0.717	449	1.63	8.9	

MONITORING WELL
SAMPLING LOG
FARRAND CONTROLS RI/FS

Well	Date	Time	Depth to Water	Total Depth	Gallons Removed	pH	Conductivity	Turbidity	Dissolved Oxygen	Temperature	Comments/ Observations
					2	7.01	0.738	726	1.43	9.9	
					6	7.01	0.712	712	1.72	10.1	
		1245			10	7.05	0.705	354	1.87	10.6	
P12	1/28/00	1500	12	19	0	6.38	1.990	>999	6.83	9.6	
					4	5.73	1.530	>999	7.03	10.8	
					8	5.50	1.520	>999	7.76	11.6	
		1545			12	5.53	1.540	>999	7.96	11.8	
P9	1/28/00	1625	9	11	0	5.60	0.110	267	11.27	4.7	
					1	5.66	0.109	253	11.15	5.1	
					2	5.65	0.108	247	10.53	5.4	
					3	5.70	0.107	247	10.68	5.6	
					4	5.80	0.105	385	10.75	5.7	
		1630			5	5.80	0.105	353	10.40	5.6	
1	1/28/00	1710	12	20	0	6.28	0.358	>999	4.04	3.9	
					1	6.27	0.360	>999	3.42	3.7	
					2	6.30	0.359	>999	3.80	3.6	
					3	6.35	0.359	>999	4.05	3.6	
					4	6.38	0.355	>999	4.28	3.6	
		1715			5	6.30	0.354	>999	4.14	3.6	
3	1/28/00	1510	13	18	0	6.24	0.362	990	1.78	9.2	
					1	6.04	0.372	990	1.44	9.1	
					2	5.98	0.341	211	2.86	11.8	
					3	5.93	0.338	238	2.54	12.2	
					4	5.93	0.330	204	3.53	11.7	
		1515			5	5.91	0.329	261	3.38	12.1	
P14	1/28/00	1550	8	16	0	6.40	0.864	>999	1.35	8.0	
					2	6.32	0.854	>999	1.16	9.1	
					4	6.36	0.864	>999	0.96	9.4	
		1600			6	6.42	0.817	>999	2.42	9.1	

UNITS
pH: Standard units
Conductivity: mS/cm
Temperature: C degrees
Turbidity: NTU
Dissolved Oxygen: mg/l

APPENDIX G

ANALYTICAL DATA TABLES - SOIL

TABLE G - 1
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
SURFACE SOIL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			S-S-01	S-S-02
SAMPLE DEPTH			0-2"	0-2"
DATE OF COLLECTION			11/11/99	11/11/99
DILUTION FACTOR			1	1
PERCENT SOLIDS			88	88
Targeted Compounds	NYSDEC Recommended Soil Cleanup Objective	CRDL	(ug / kg)	(ug / kg)
Vinyl Chloride	200	10	U	U
Freon 113	6000	10	U	U
1,1-Dichloroethene	400	10	U	U
t-1,2-Dichloroethene	300	10	NA	NA
1,1-Dichloroethane	200	10	U	U
c-1,2-Dichloroethene	250	10	NA	NA
1,1,1-Trichloroethane	800	10	1 J	0.6 J
Trichloroethene	700	10	8 J	1 J
1,2 Dichloroethene(total)	---	10	U	U
TOTAL TARGETED VOCs			9	1.6
Additional Compounds				
Acetone	200	10	17 B	28 B
Methylene Chloride	100	10	U	3 J
Carbon Tetrachloride	600	10	U	U
1,2-Dichloroethane	100	10	U	U
Tetrachloroethene	1400	10	11 J	U
Benzene	60	10	0.4 J	3 J
Toluene	1500	10	0.7 J	U
Chlorobenzene	1700	10	U	U
Ethylbenzene	5500	10	0.3 J	U
M&P-Xylene	---	10	NA	U
O-Xylene	---	10	NA	U
Xylenes	1200	10	0.3 J	U
2 - Butanone	300	10	U	U
Carbon Disulfide	2700	10	U	U
TOTAL NON-TARGETED VOCs			28.17	34

QUALIFIERS/ABBREVIATIONS:
B: Compound also found in the method blank.
U: Compound analyzed for but not detected.
CRDL: Contract Required Detection Limit.
ug/kg: Micrograms per kilogram.
NA: Not analyzed for.
J: Compound found at level below CRDL value estimated.
---: Not established.

TABLE G - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
SURFACE SOIL SAMPLE RESULTS
PCBs

SAMPLE IDENTIFICATION			S-S-01	S-S-02
SAMPLE DEPTH			(0-2")	(0-2")
DATE OF COLLECTION			11/11/99	11/11/99
DILUTION FACTOR			1	1
PERCENT SOLIDS			88	88
PCBs	NYSDEC Recommended Soil Cleanup Objective	CRDL	(ug / kg)	(ug / kg)
Aroclor-1016	*	33	U	U
Aroclor 1221	*	66	U	U
Aroclor-1232	*	33	U	U
Aroclor-1242	*	33	U	U
Aroclor-1248	*	33	U	U
Aroclor-1254	*	33	53 P	93 P
Aroclor-1260	*	33	44 P	86 P
TOTAL PCBs	1000		97	179

QUALIFIERS/ABBREVIATIONS:
ug/kg: Micrograms per kilogram.
CRDL: Contract Required Detection Limit.
U: Compound analyzed for but not detected.
P: Concentrations between two columns had a % difference greater than 25%, lower value reported.
*: Cleanup Objective not provided for individual constituents.

TABLE G - 3
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
SURFACE SOIL SAMPLE RESULTS
METALS

SAMPLE IDENTIFICATION			S-S-01	S-S-02
SAMPLE DEPTH			0-2"	0-2"
DATE OF COLLECTION			11/11/99	11/11/99
PERCENT SOLIDS			82	82
Metals	NYSDEC Recommended Soil Cleanup Objective	IDL	(mg / kg)	(mg / kg)
Aluminum	33000 *	22	8100	5900
Antimony	-	10	U	U
Arsenic	7.5	6	14.7	9.4
Barium	300	1	81.3	62
Beryllium	0.16	1	U	U
Cadmium	10**	1	.52 B	.71 B
Calcium	35000 *	70	1950	5840
Chromium	50**	1	25.2	24.3
Cobalt	30	2	6.4 B	4.7 B
Copper	25	1	38.4	71.3
Iron	2000	50	10800	8060
Lead	500 *	2	79.3	94.9
Magnesium	5000 *	30	2790	2910
Manganese	5000	1	362	320
Mercury	0.1	0.1	0.28	0.24
Nickel	13	3	12	8.8
Potassium	43000 *	66	878 B	554 B
Selenium	2	4	U	U
Silver	-	2	.58 B	1.1 B
Sodium	8000*	32	143 B	107 B
Thallium	-	7	U	U
Vanadium	150	2	17.5	13.3
Zinc	20	8	84.5	139
Cyanide	-	10	U	U

QUALIFIERS/ABBREVIATIONS:

mg / kg: Milligrams per kilogram.

IDL: Instrument Detection Limit.

* Objective is site background, value is upper end of range.

**Proposed Cleanup Objective in TAGM 4046 dated 1/24/94

- : Not established.

U: Compound analyzed for but not detected.

B: Concentration is < CRDL > IDL.

[ ]: Concentration exceeds NYSDEC Recommended Soil Cleanup Objective.

TABLE G - 4
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
TEST TRENCH SOIL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			TP1-S0-1	TP1A-S-01	TP2-S-01	TP3-S-01	TP4- S-01
SAMPLE DEPTH (ft)			4	4	3	6	5
DATE OF COLLECTION			4/12/99	4/12/99	4/12/99	4/12/99	4/12/99
DILUTION FACTOR			1	1	1	1	1
PERCENT SOLIDS			81	100	89	100	81
Targeted Compounds	NYSDEC Recommended Soil Cleanup Objective	CRDL	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)
Vinyl Chloride	200	10	U	U	U	U	U
Freon 113	6000	10	U	U	U	U	U
1,1-Dichloroethene	400	10	U	U	U	U	U
t-1,2-Dichloroethene	300	10	NA	NA	NA	NA	NA
1,1-Dichloroethane	200	10	U	U	U	U	U
c-1,2-Dichloroethene	250	10	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	800	10	4 J	2 J	2 J	U	U
Trichloroethene	700	10	U	U	U	U	U
1,2 Dichloroethene(total)	---	10	U	U	U	U	U
TOTAL TARGETED VOCs			4	2	2	U	U
Additional Compounds							
Acetone	200	10	11 J	36	13	U	22
Methylene Chloride	100	10	3 JB	2 JB	2 JB	2 JB	2 JB
Carbon Tetrachloride	600	10	U	U	U	U	U
1,2-Dichloroethane	100	10	U	U	U	U	U
Tetrachloroethene	1400	10	U	U	U	U	U
Benzene	60	10	U	U	U	U	U
Toluene	1500	10	1 J	O.8 J	1 J	U	U
Chlorobenzene	1700	10	U	2 J	U	U	U
Ethylbenzene	5500	10	U	U	U	U	U
M&P-Xylene	---	10	U	U	U	U	U
O-Xylene	---	10	U	U	U	U	U
Xylenes	1200	10	U	U	U	U	U
2 - Butanone	300	10	U	U	U	U	U
Carbon Disulfide	2700	10	U	U	1 J	U	U
TOTAL NON-TARGETED VOCs			15	40.8	17	2	24

QUALIFIERS/ABBREVIATIONS:

J: Compound found at or below CRDL, value estimated.
U: Compound analyzed for but not detected.
CRDL: Contract Required Detection Limit.
B: Compound also found in method blank.

ug/kg: Micrograms per kilogram.
NA: Not analyzed.
---: Not established.

TABLE G - 5
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
TEST TRENCH SAMPLE RESULTS
PCBs

SAMPLE IDENTIFICATION			TP1-S-01	TP1A-S-01	TP2-S-01	TP3-S-01	TP4-S-01
SAMPLE DEPTH (ft)			4	4	3	6	5
DATE OF COLLECTION			4/12/99	4/12/99	4/12/99	4/12/99	4/12/99
DILUTION FACTOR			1	1	1	1	1
PERCENT SOLIDS			83	87	89	91	86
PCBs	NYSDEC Recommended Soil Cleanup Objective	CRDL	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)
Aroclor-1016	*	33	U	U	U	U	U
Aroclor 1221	*	66	U	U	U	U	U
Aroclor-1232	*	33	U	U	U	U	U
Aroclor-1242	*	33	U	U	U	U	U
Aroclor-1248	*	33	U	U	U	U	U
Aroclor-1254	*	33	3.7 J	U	U	U	U
Aroclor-1260	*	33	3.9 JB	U	U	U	U
TOTAL PCBs	1000	160	7.6	U	U	U	U

QUALIFIERS/ABBREVIATIONS:

ug/kg: Micrograms per kilogram.

CRDL: Contract Required Detection Limit.

U: Compound analyzed for but not detected.

J: Compound found at or below CRDL, value estimated.

B: Compound also found in method blank.

*: Cleanup Objective not provided for individual constituents.

TABLE G - 6
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
TEST TRENCH SAMPLE RESULTS
METALS

SAMPLE IDENTIFICATION			TP1-S0-1	TP1A-S-01	TP2-S-01	TP3-S-01	TP4-S-01
SAMPLE DEPTH (ft)			4	4	3	6	5
DATE OF COLLECTION			4/12/99	4/12/99	4/12/99	4/12/99	4/12/99
PERCENT SOLIDS			83	87	89	91	96
Metals	NYSDEC Recommended Soil Cleanup Objective	ID	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)
Aluminum	33000 *	22	12800	10800	10700	4190	25300
Antimony	-	10	U	U	U	U	1.5 B
Arsenic	7.5	6	3.5	U	2.4	1.4 B	2
Barium	300	1	54.3	40.4 B	87.1	48.1	217
Beryllium	0.16	1	0.36 B	0.30 B	0.32 B	U	0.39 B
Cadmium	10**	1	0.82	0.46 B	0.63 B	0.28 B	1.9
Calcium	35000 *	70	1110	830 B	2290	2010	2800
Chromium	50**	1	18.9	19	20.6	9.8	43.6
Cobalt	30	2	5.8 B	5.2 B	7.2 B	4.8 B	15.9
Copper	25	1	13.8	8.2	22.3	11.7	48.3
Iron	2000	50	15100	14900	18100	10400	37000
Lead	500 *	2	14.1	4.9	48	3.2	14
Magnesium	5000 *	30	3390	3580	4570	2250	11400
Manganese	5000	1	106	88.4	246	117	446
Mercury	0.1	0.1	U	U	0.047	U	U
Nickel	13	3	14.9	11.7	17.3	9.6	34.1
Potassium	43000 *	66	610 B	628 B	1680	1360	9010
Selenium	2	4	1.1	U	U	0.89 B	2.4
Silver	-	2	U	U	U	U	U
Sodium	8000*	32	69.3 B	83.3 B	81.4 B	121 B	430 B
Thallium	-	7	U	U	U	U	2.8
Vanadium	150	2	20.8	19.7	23.1	11.1	63.3
Zinc	20	8	57.4	33.2	81.4	31.2	86.9
Cyanide	-	10	U	U	U	U	U

QUALIFIERS/ABBREVIATIONS:

mg / kg: Milligrams per kilogram.

CRDL: Contract Required Detection Limit.

IDL: Instrument Detection Limit.

* Objective is site background, value is upper end of range.

- : Not established.

U: Compound analyzed for but not detected.

B: Compound is > IDL but < CRDL.

**Proposed Cleanup Objectives in TAGM 4046 dated 1/24/94

: Concentration exceeds NYSDEC Recommended Soil Cleanup Objective.

TABLE G-7
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
GEOPROBE SOIL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			GPS-C(-75)	GP-SD(-60)	GPS-E(-10)	GPS-E(-10)	GPS-E(-60)	GPS-E(-60)	GPS-F(-10)	GPS-F(-10)
SAMPLE DEPTH			(9-11')	(7-9')	(6-8')	(33-35')	(10-12')	(10-12')	(6-8')	(28-30')
DATE OF COLLECTION			10/04/99	10/04/99	03/18/99	03/18/99	10/04/99	10/04/99	03/17/99	03/17/99
DILUTION FACTOR			1	1	1	25	1	1	1	1
PERCENT SOLIDS			80	81	90	88	85	85	85	87
LABORATORY LOCATION (ON / OFF) SITE			OFF	OFF	ON	ON	OFF	OFF	ON	ON
Targeted Compounds	NYSDEC Recommended Soil Cleanup Objective	CDRL	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)
Vinyl Chloride	200	10	U	U	U	U	U	U	U	U
Freon 113	6000	10	U	U	U	110	U	U	U	U
1,1-Dichloroethene	400	10	U	U	U	37	U	U	U	U
t-1,2-Dichloroethene	300	10	NA	NA	U	U	U	U	U	U
1,1-Dichloroethane	200	10	U	U	U	U	U	U	U	1.7
c-1,2-Dichloroethene	--	10	NA	NA	U	U	U	U	U	U
1,1,1-Trichloroethane	800	10	U	U	U	150	U	U	U	4.3
Trichloroethene	700	10	U	0.6 J	U	150	U	U	U	12
1,2 Dichloroethene(total)	--	10	U	U	NA	NA	NA	NA	NA	NA
TOTAL TARGETED VOCs			U	0.6	U	447	U	U	U	18
Additional Compounds										
Acetone	200	10	9 JB	26 B				10 JB		
Methylene Chloride	100	10	3 J	2 J	U	J	U	2 J	U	U
Carbon Tetrachloride	600	10	U	U	U	U	U	U	U	U
1,2-Dichloroethane	100	10	U	U	U	U	U	U	U	U
Tetrachloroethene	1400	10	0.8 J	U	U	U	U	U	U	U
Benzene	60	10	U	U	U	U	U	U	U	U
Toluene	1500	10	U	U	U	U	U	U	U	U
Chlorobenzene	1700	10	U	U	U	U	U	U	U	U
Ethylbenzene	5500	10	U	U	U	U	U	U	U	U
M&P-Xylene	--	10	U	U	U	U	U	U	U	U
O-Xylene	--	10	U	U	U	U	U	U	U	U
Xylenes	1200	10	U	U	U	U	U	U	U	U
2 - Butanone	300	10	U	4 J	NA	NA	NA	U	NA	NA
Carbon Disulfide	2700	10	U	NA	NA	NA	NA	NA	NA	NA
TOTAL NON-TARGETED VOCs			12.8	32	U	U	U	12	U	U

QUALIFIERS/ABBREVIATIONS:

B: Compound also found in method blank
U: Compound analyzed for but not detected
CRDL: Contract Required Detection Limit
J: Compound found at or below CRDL, value estimated
NA: Not analyzed
ug/kg: Micrograms per kilogram
--: Not established

: Concentration exceeds NYSDEC Recommended Soil Cleanup Objective

TABLE G-7
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
GEOPROBE SOIL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			GPS-F(-60)	GP-S G(-10)	GP-S G(-10)	GP-S G(-25)	GP-S G(-25)	GP-S G(-45)	GP-S G(-45)	GP-S G(-65)
SAMPLE DEPTH			(14-16')	(5-8')	(18-20')	(6-8')	(16-18')	(6-8')	(25-27')	(6-8')
DATE OF COLLECTION			10/04/99	03/17/99	03/17/99	03/18/99	03/18/99	03/18/99	03/18/99	03/19/99
DILUTION FACTOR			1	1	50	5	5	5	5	5
PERCENT SOLIDS			81	93		78	78	89	88	87
LABORATORY LOCATION (ON / OFF) SITE			OFF	ON	ON	ON	ON	ON	ON	ON
Targeted Compounds	NYSDEC Recommended Soil Cleanup Objective	CDRL	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)
Vinyl Chloride	200	10	U	U	U	U	U	U	U	U
Freon 113	6000	10	U	U	860	U	20	U	U	U
1,1-Dichloroethene	400	10	U	U	180	U	U	U	U	U
t-1,2-Dichloroethene	300	10	NA	U	U	U	U	U	U	U
1,1-Dichloroethane	200	10	U	U	U	U	U	U	U	U
c-1,2-Dichloroethene	--	10	NA	U	U	U	U	U	U	U
1,1,1-Trichloroethane	800	10	U	U	1300	U	11	U	U	U
Trichloroethene	700	10	U	U	840	U	U	U	17	U
1,2 Dichloroethene(total)	--	10	U	NA	NA	NA	NA	NA	NA	NA
TOTAL TARGETED VOCs			U	U	3180	U	31	U	17	U
Additional Compounds										
Acetone	200	10								
Methylene Chloride	100	10	2	U	U	U	U	U	U	U
Carbon Tetrachloride	600	10	U	U	U	U	U	U	U	U
1,2-Dichloroethane	100	10	U	U	U	U	U	U	U	U
Tetrachloroethene	1400	10	U	U	U	U	U	U	U	U
Benzene	60	10	U	U	U	U	U	U	U	U
Toluene	1500	10	U	U	U	U	U	U	U	U
Chlorobenzene	1700	10	U	U	U	U	U	U	U	U
Ethylbenzene	5500	10	U	U	U	U	U	U	U	U
M&P-Xylene	--	10	U	U	U	U	U	U	U	U
O-Xylene	--	10	U	U	U	U	U	U	U	U
Xylenes	1200	10	U	U	U	U	U	U	U	U
2 - Butanone	300	10	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide	2700	10	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL NON-TARGETED VOCs			2	U	U	U	U	U	U	U

QUALIFIERS/ABBREVIATIONS:

B: Compound also found in method blank
U: Compound analyzed for but not detected
CRDL: Contract Required Detection Limit
J: Compound found at or below CRDL, value estimated
NA: Not analyzed

ug/kg: Micrograms per kilogram
--: Not established

: Concentration exceeds NYSDEC Recommended Soil Cleanup Objective

TABLE G-7

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
GEOPROBE SOIL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			GP-S G(-65)	GP-S G(-80)	GP-S G(-80)	GP-S G(-85)	GP-S G(-85)	GP-S V1(-75)	GP-S V1(-75)	GP-S SUMP
SAMPLE DEPTH			(25-27')	(6-8')	(22-24')	(6-8')	(20-22')	(1-16')	(12-16')	(0-4')
DATE OF COLLECTION			03/19/99	03/19/99	03/19/99	03/22/99	03/22/99	10/04/99	10/04/99	04/08/99
DILUTION FACTOR			5	5	5	5	5	1	1	10
PERCENT SOLIDS			100	88	85	75	95	83	83	100
LABORATORY LOCATION (ON / OFF) SITE			ON	ON	ON	ON	ON	OFF	OFF	ON
Targeted Compounds	NYSDEC Recommended Soil Cleanup Objective	CDRL	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)
Vinyl Chloride	200	10	U	U	U	U	U	U	U	U
Freon 113	6000	10	79	U	8.8	U	52	U	U	U
1,1-Dichloroethene	400	10	25	U	U	U	J	U	U	U
t-1,2-Dichloroethene	300	10	U	U	U	U	U	NA	NA	U
1,1-Dichloroethane	200	10	24	U	U	U	U	U	U	U
c-1,2-Dichloroethene	--	10	U	U	U	U	U	NA	NA	U
1,1,1-Trichloroethane	800	10	190	U	19	U	71	U	U	44
Trichloroethene	700	10	140	U	J	U	13	U	2 J	49
1,2 Dichloroethene(total)	--	10	NA	NA	NA	NA	NA	NA	U	NA
TOTAL TARGETED VOCs			458	U	27.8	U	136	U	2	93
Additional Compounds										
Acetone	200	10						19	19 B	
Methylene Chloride	100	10	U	U	U	U	U	U	2 J	J
Carbon Tetrachloride	600	10	U	U	U	U	U	U	NA	U
1,2-Dichloroethane	100	10	U	U	U	U	U	U	NA	U
Tetrachloroethene	1400	10	U	U	U	U	U	U	NA	11
Benzene	60	10	U	U	U	U	U	U	NA	U
Toluene	1500	10	U	U	U	U	U	U	NA	U
Chlorobenzene	1700	10	J	U	U	U	U	U	NA	U
Ethylbenzene	5500	10	U	U	U	U	U	U	NA	U
M&P-Xylene	--	10	U	U	U	U	U	U	NA	U
O-Xylene	--	10	U	U	U	U	U	U	NA	U
Xylenes	1200	10	U	U	U	U	U	U	NA	U
2 - Butanone	300	10	NA	NA	NA	NA	NA	NA	4 J	NA
Carbon Disulfide	2700	10	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL NON-TARGETED VOCs			U	U	U	U	U	19	25	11

QUALIFIERS/ABBREVIATIONS:

B: Compound also found in method blank
U: Compound analyzed for but not detected
CRDL: Contract Required Detection Limit
J: Compound found at or below CRDL, value estimated
NA: Not analyzed

ug/kg: Micrograms per kilogram
--: Not established

: Concentration exceeds NYSDEC Recommended Soil Cleanup Objective

TABLE G-7
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
GEOPROBE SOIL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			GP-S SUMP	GP-S SUMP	GP-S SUMP	GP-S SUMP	GP-S SUMP	GP-S SUMP
SAMPLE DEPTH			(7-10')	(10-13')	(13-17')	(17-20')	(21-25')	(25-28')
DATE OF COLLECTION			04/09/99	04/09/99	04/09/99	04/09/99	04/09/99	04/09/99
DILUTION FACTOR			10	10	5	5	5	5
PERCENT SOLIDS			100	100	100	100	100	100
LABORATORY LOCATION (ON / OFF) SITE			ON	ON	ON	ON	ON	ON
Targeted Compounds	NYSDEC Recommended Soil Cleanup Objective	CDRL	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)
Vinyl Chloride	200	10	U	U	U	U	U	6
Freon 113	6000	10	U	J	J	J	U	53
1,1-Dichloroethene	400	10	U	U	U	U	U	19
t-1,2-Dichloroethene	300	10	U	U	U	U	U	U
1,1-Dichloroethane	200	10	U	U	U	U	U	23
c-1,2-Dichloroethene	--	10	U	U	U	U	U	57
1,1,1-Trichloroethane	800	10	22	U	5.7	J	J	71
Trichloroethene	700	10	27	U	J	5.4	7.4	97
1,2 Dichloroethene(total)	--	10	NA	NA	NA	NA	NA	NA
TOTAL TARGETED VOCs			49	U	5.7	5.4	7.4	326
Additional Compounds								
Acetone	200	10						
Methylene Chloride	100	10	J	J	J	J	J	J
Carbon Tetrachloride	600	10	U	U	U	U	U	U
1,2-Dichloroethane	100	10	U	U	U	U	U	U
Tetrachloroethene	1400	10	U	U	U	U	U	U
Benzene	60	10	U	U	U	U	U	U
Toluene	1500	10	U	U	U	U	U	U
Chlorobenzene	1700	10	U	U	U	U	U	U
Ethylbenzene	5500	10	U	U	U	U	U	U
M&P-Xylene	--	10	U	U	U	U	U	U
O-Xylene	--	10	U	U	U	U	U	U
Xylenes	1200	10	U	U	U	U	U	U
2 - Butanone	300	10	NA	NA	NA	NA	NA	NA
Carbon Disulfide	2700	10	NA	NA	NA	NA	NA	NA
TOTAL NON-TARGETED VOCs			U	U	U	U	U	U

QUALIFIERS/ABBREVIATIONS:

B: Compound also found in method blank
U: Compound analyzed for but not detected
CRDL: Contract Required Detection Limit
J: Compound found at or below CRDL, value estimated
NA: Not analyzed

ug/kg: Micrograms per kilogram
--: Not established

: Concentration exceeds NYSDEC Recommended Soil Cleanup Objective

TABLE G-8
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/ FEASIBILITY STUDY
GEOPROBE SOIL SAMPLE RESULTS
PCBs

SAMPLE IDENTIFICATION			GPS-D(-60)	GPS-F(-60)	GPSV1(-75)
SAMPLE DEPTH			(7-9')	(14-16')	(12-16')
DATE OF COLLECTION			10/4/99	10/4/99	10/4/99
DILUTION FACTOR			1	1	1
PERCENT SOLIDS			70	86	70
PCBs	NYSDEC Recommended Soil Cleanup Objective	CRDL	(ug / kg)	(ug / kg)	(ug / kg)
Aroclor-1016	*	33	U	U	U
Aroclor 1221	*	66	U	U	U
Aroclor-1232	*	33	U	U	U
Aroclor-1242	*	33	U	U	U
Aroclor-1248	*	33	U	U	U
Aroclor-1254	*	33	U	16 JB	U
Aroclor-1260	*	33	U	U	U
TOTAL PCBs	10000		U	16	U

QUALIFIERS/ABBREVIATIONS:
ug/kg: Micrograms per kilogram.
CRDL: Contract Required Detection Limit.
U: Compound analyzed for but not detected.
J: Compound found at or below CRDL, value estimated.
B: Compound also found in method blank.
*: Cleanup Objective not provided for individual constituents.

TABLE G-9
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
GEOPROBE SOIL SAMPLE RESULTS
METALS

SAMPLE IDENTIFICATION			GP-S-C(-75)	GP-S-D(-60)	GP-S-E(-10)	GP-S-E(-10)	GP-S-E(-60)	GP-S-F(-10)	GP-S-F(-10)	GP-S-F(-60)	GP-S-G(-10)
SAMPLE DEPTH			(9-11')	(7-9')	(6-8')	(33-35')	(10-12')	(6-8')	(28-30')	(14-16')	(6-8')
DATE OF COLLECTION			10/4/99	10/4/99	3/18/99	3/18/99	10/4/99	3/17/99	3/17/99	10/4/99	3/17/99
PERCENT SOLIDS			80	81	85.4	81.6	85	90.5	81.9	80.8	93
Metals	NYSDEC Recommended Soil Cleanup Objective	Ug/L	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)
Aluminum	33000 *	22	7770	7370	15700	5830	10800	6240	19100	11400	3910
Antimony	-	10	1.8 B	U	U	U	3.1 B	U	U	2.4B	U
Arsenic	7.5	6	1.2 B	1.3 B	7.8	U	1 B	U	U	1.4B	U
Barium	300	1	37.3 B	48.6	94.2	36.8 B	65.8	35 B	210	82.7	34.4 B
Beryllium	0.16	1	U	U	0.36 B	U	U	U	0.23 B	U	U
Cadmium	10**	1	U	U	1.2	0.45 B	U	0.39 B	1.4	U	0.39 B
Calcium	35000 *	70	2610	8220	2140	683 B	3010	1260	1700	1420	1850
Chromium	50**	1	15.9	14.6	43.8	13.8	15.2	10.3	34.7	30.9	9.4
Cobalt	30	2	14.6	5.5 B	8.4	3.3 B	7 B	5.3 B	19.3	9.7 B	5.1 B
Copper	25	1	31.5	18.2	21.8	18.2	29.4	13.2	45.1	30.5	14.8
Iron	2000	50	14200	14100	22300	10400	17800	10800	39100	21100	10900
Lead	500 *	2	2.9	3.1	42.2	2.9	3	3.5	6	4.2	3
Magnesium	5000 *	30	3280	3160	5310	3170	5480	2310	7430	5280	1580
Manganese	5000	1	357	250	378	176	355	119	468	352	66
Mercury	0.1	0.1	0.01	U	0.068	U	.0024 B	U	U	0.005	U
Nickel	13	3	35.1	17.9	25.2	19.9	32.2	12.5	40.6	44.9	11.1
Potassium	43000 *	66	1110	1320	2380	1110	2170	1130	10000	2640	612 B
Selenium	2	4	U	U	U	U	U	U	1.7	U	U
Silver	-	2	U	U	U	U	U	U	U	U	U
Sodium	8000*	32	105 B	162 B	397 B	76.3 B	227 B	67.4 B	204 B	134 B	82.1 B
Thallium	-	7	U	U	U	U	U	U	U	U	U
Vanadium	150	2	16.6	16.5	27.7	12	25.1	11.6	37.3	26.2	12
Zinc	20	8	50	41	86.5	27.6	72.2	29.9	109	76.4	20.9
Cyanide	-	10	U	U	NA	NA	U	NA	NA	U	NA

QUALIFIERS/ABBREVIATIONS:

mg/kg: Milligrams per kilogram.

IDL: Instrument Detection Limit.

* Objective is site background. Value is upper end of range.

** Proposed cleanup level

- : Not established.

U: Compound analyzed for but not detected.

B: Compound also found in the method blank.

: Concentration exceeds NYSDEC Soil Cleanup Objective.

TABLE G-9
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
GEOPROBE SOIL SAMPLE RESULTS
METALS

SAMPLE IDENTIFICATION			GP-S-G(-10)	GP-S-G(-25)	GP-S-G(-25)	GP-S-G(-45)	GP-S-G(-45)	GP-S-G(-65)	GP-S-G(-65)	GP-S-G(-80)	GP-S-G(-80)
SAMPLE DEPTH			(18-20')	(6-8')	(16-18')	(6-8')	(25-27')	(6-8')	(25-27')	(6-8')	(22-24')
DATE OF COLLECTION			3/17/99	3/18/99	3/18/99	3/18/99	3/18/99	3/19/99	3/19/99	3/19/99	3/19/99
PERCENT SOLIDS			84.2	91.1	81.9	88.4	86.2	90.5	83.3	91	78.3
Metals	NYSDEC Recommended Soil Cleanup Objective	Ug/L	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)
Aluminum	33000 *	22	9660	11600	10600	4550	15500	5370	12200	5890	13300
Antimony	-	10	1.3 B	U	U	U	1.7 B	U	U	U	U
Arsenic	7.5	6	U	2.2	U	U	U	U	U	1.6 B	U
Barium	300	1	93.2	102	89.1	38.8	156	47	117	44.9	123
Beryllium	0.16	1	0.22 B	0.14 B	0.2 B	U	0.16 B	U	U	U	0.18 B
Cadmium	10**	1	0.68	0.8	0.56 B	0.37 B	1	0.36 B	0.7 B	0.39 B	0.71 B
Calcium	35000 *	70	2080	1450	2180	2030	1500	2510	1600	1270	1560
Chromium	50**	1	19	23.7	23.1	10.1	28	12.8	23.8	12.4	23.5
Cobalt	30	2	13.6	6.9	10.4	3.7 B	16.2	5 B	19.6	5.1 B	9.4
Copper	25	1	38.2	18.1	27.9	11	29.5	14.5	28.6	13.8	31.4
Iron	2000	50	26300	19800	21000	9480	31000	12000	25000	12400	25300
Lead	500 *	2	4.4	28.1	5.1	2.8	4.8	2.6	4.8	2.9	4.2
Magnesium	5000 *	30	3350	4360	7160	2280	6520	2810	5700	2520	5210
Manganese	5000	1	321	255	328	119	236	167	296	256	461
Mercury	0.1	0.1	U	0.035 B	U	U	U	U	U	U	U
Nickel	13	3	32.3	18.3	39.4	8.6	27.4	10.9	26.7	10.5	33.8
Potassium	43000 *	66	3690	3630	3280	1180	7690	1470	5440	1100	4940
Selenium	2	4	1.9	1.3	1.1	U	2	U	1.1	U	0.63 B
Silver	-	2	U	U	U	U	U	U	U	U	U
Sodium	8000*	32	108 B	115 B	145 B	144 B	176 B	146 B	155 B	119 B	154 B
Thallium	-	7	U	U	U	U	U	U	U	U	U
Vanadium	150	2	20.7	20.7	25.4	10.6	29.4	13.8	24.9	13	28.2
Zinc	20	8	55.7	72.4	73.7	23.6	77.1	30.3	68.3	25.1	59.4
Cyanide	-	10	NA	NA	NA	NA	NA	NA	NA	NA	NA

QUALIFIERS/ABBREVIATIONS:

mg/kg: Milligrams per kilogram.

IDL: Instrument Detection Limit.

* Objective is site background. Value is upper end of range.

** Proposed cleanup level

- : Not established.

U: Compound analyzed for but not detected.

B: Compound also found in the method blank.

: Concentration exceeds NYSDEC Soil Cleanup Objective.

TABLE G-9
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
GEOPROBE SOIL SAMPLE RESULTS
METALS

SAMPLE IDENTIFICATION			GP-S(-85)	GP-S(-85)	GPS1V(-75)
SAMPLE DEPTH			(6-8')	(20-22')	(1-16')
DATE OF COLLECTION			3/22/99	3/22/99	10/4/99
PERCENT SOLIDS			93.9	83.3	83
Metals	NYSDEC Recommended Soil Cleanup Objective	Ug/L	(mg / kg)	(mg / kg)	(mg / kg)
Aluminum	33000 *	22	6100	13000	14000
Antimony	-	10	U	U	58.5
Arsenic	7.5	6	U	U	9.6
Barium	300	1	43.6	112	529
Beryllium	0.16	1	U	0.2 B	9.8
Cadmium	10**	1	0.37 B	0.74 B	0.24 B
Calcium	35000 *	70	1350	1050	5560
Chromium	50**	1	12	20.6	69.3
Cobalt	30	2	4.8 B	10.2	114
Copper	25	1	13.8	42.9	81.2
Iron	2000	50	12100	24400	23600
Lead	500 *	2	2.9	4.8	8.8
Magnesium	5000 *	30	2620	4730	9500
Manganese	5000	1	265	554	456
Mercury	0.1	0.1	NR	U	0.0044
Nickel	13	3	12.2	40.2	143
Potassium	43000 *	66	1050	4430	8350
Selenium	2	4	0.96	1	2.3
Silver	-	2	U	U	5.9
Sodium	8000*	32	138 B	138 B	4950
Thallium	-	7	U	U	12.6
Vanadium	150	2	13.5	23.7	131
Zinc	20	8	27.2	65.9	187
Cyanide	-	10	NA	NA	U

QUALIFIERS/ABBREVIATIONS:

mg/kg: Milligrams per kilogram.

IDL: Instrument Detection Limit.

* Objective is site background. Value is upper end of range.

** Proposed cleanup level

- : Not established.

U: Compound analyzed for but not detected.

B: Compound also found in the method blank.

: Concentration exceeds NYSDEC Soil Cleanup Objective.

TABLE G - 10
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
MONITORING WELL SOIL BORING SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			MW-8D	MW-10D	MW-20D
SAMPLE DEPTH			(34-36')	(48-50')	(18-20')
DATE OF COLLECTION			10/12/99	10/13/99	10/14/99
DILUTION FACTOR			1	1	1
PRECENT SOLIDS			100	82	100
Targeted Compounds	NYSDEC Recommended Soil Cleanup Objective	CRDL	(ug /kg)	(ug /kg)	(ug /kg)
Vinyl Chloride	200	10	U	U	U
Freon 113	6000	10	U	U	U
1,1-Dichloroethene	400	10	U	U	U
t-1,2-Dichloroethene	300	10	NA	NA	NA
1,1-Dichloroethane	200	10	U	U	2J
c-1,2-Dichloroethene	250	10	NA	NA	NA
1,1,1-Trichloroethane	800	10	U	U	U
Trichloroethene	700	10	U	2J	9J
1,2-Dichloroethene(total)	---	10	U	U	U
TOTAL TARGETED VOCs			U	2	12
Additional Compounds					
Acetone	200	10	7 JB	38 B	9 JB
Methylene Chloride	100	10	U	2 J	1 J
Carbon Tetrachloride	600	10	U	U	U
1,2-Dichloroethane	100	10	U	U	U
Tetrachloroethene	1400	10	U	3 J	U
Benzene	60	10	U	U	U
Toluene	1500	10	U	1 J	0.6 J
Chlorobenzene	1700	10	U	U	U
Ethylbenzene	5500	10	U	U	U
M&P-Xylene	---	10	U	U	U
O-Xylene	---	10	U	U	U
Xylenes (Total)	1200	10	U	U	U
2-Butanone	300	10	U	13	5 J
Carbon Disulfide	2700	10	U	U	1 J
TOTAL NON-TARGETED VOCs			7	57	16.6

QUALIFIERS/ABBREVIATIONS:

B: Compound also found in the method blank.

U: Compound analyzed for but not detected.

CRDL: Contract Required Detection Limit

J: Compound found at level below CRDL value estimated.

---: Not established.

NA: Not analyzed.

ug/kg: Micrograms per kilogram.

TABLE G-11
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
MONITORING WELL BORING SAMPLE RESULTS
METALS

SAMPLE IDENTIFICATION			MW-8D	MW-10D	MW-20D
SAMPLE DEPTH			(34-36')	(48-50')	(18-20')
DATE OF COLLECTION			10/13/1999	10/14/1999	10/14/1999
PERCENT SOLIDS			80.4	82.7	80.9
Metals	NYSDEC Recommended Soil Cleanup Objective	IDL	(mg / kg)	(mg / kg)	(mg / kg)
Aluminum	33000 *	22	6770	4650	7560
Antimony	-	10	2.7 B	1.6 B	3.3 B
Arsenic	7.5	6	U	U	1.8 B
Barium	300	1	51.8	32.3 B	69.8
Beryllium	0.16	1	U	U	U
Cadmium	10**	1	U	U	U
Calcium	35000 *	70	2060	6520	10800
Chromium	50**	1	14.9	11.9	16.6
Cobalt	30	2	6 B	4 B	5.9 B
Copper	25	1	14.2	9.9	14.8
Iron	2000	50	14000	10400	14400
Lead	500 *	2	1.9	1.9	3.4
Magnesium	5000 *	30	2790	4470	7520
Manganese	5000	1	292	156	202
Mercury	0.1	0.1	.0058 B	.006 B	0.16
Nickel	13	3	22.1	8.2 B	12.4
Potassium	43000 *	66	1420	927 B	2720
Selenium	2	4	U	U	1.3
Silver	-	2	U	U	U
Sodium	8000*	32	157 B	249 B	265 B
Thallium	-	7	U	U	U
Vanadium	150	2	16	12.3	17.6
Zinc	20	8	37.3	40	44.7
Cyanide	-	10	0.71	U	U

QUALIFIERS/ABBREVIATIONS:

mg/kg: Milligrams per kilogram.

IDL: Instrument Detection Limit.

* Objective is site background. Value is upper end of range.

- : Not established.

U: Compound analyzed for but not detected.

B: Concentration is above IDL but < CRDL.

**Proposed Cleanup Objectives in TAGM 4046 dated 1/24/94.

: Concentration exceeds NYSDEC Recommended Soil Cleanup Guideline

APPENDIX H

ANALYTICAL DATA TABLES - GROUNDWATER

REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
OFF-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W B-50	GP-W B-50	GP-W B-100	GP-W B-100	GP-W BBO	GP-W D25	GP-W D(-60)	GP-W G-(-10)	GP-W G-(-25)	GP-W G-(-65)
SAMPLE DEPTH			(8-12')	(36-40')	(12-16')	(46-50')	18-22	(42-46')	(4-8')	(12-16')	(12-16')	23-27
DATE COLLECTED			1/7/99	1/7/99	1/7/99	1/7/99	4/6/99	4/7/99	10/4/99	3/19/99	3/19/99	3/19/99
DILUTION FACTOR			1	2	1	5	1	5	1	1	1	20
Targeted Compounds	NYSDEC Class GA Ground-water Standard/Guideline	CRDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Vinyl Chloride	2 ST	10	U	9 J	U	23 J	U	40 J	U	U	U	U
Freon 113	5 ST	10	U	7 J	U	16 J	U	U	U	48	61	1000
1,1-Dichloroethene	5 ST	10	U	6 J	U	U	U	32 J	U	2 J	1 J	110 J
1,2-Dichloroethene (total)	5 ST *	10	11	250	U	520	U	400	U	U	2 J	U
1,1-Dichloroethane	5 ST	10	2 J	55	3 J	100	U	93	U	2 J	3 J	89 J
1,1,1-Trichloroethane	5 ST	10	2 J	13 J	5 J	27 J	15	47 J	1 J	40	44	1800
Trichloroethene	5 ST	10	17	360	4 J	660	U	430	0.7 J	16	19	330
Total Targeted VOCs			32	700	12	1346	15	1042	1.7	108	130	3329
Additional Compounds												
Methylene Chloride	5 ST	10	U	U	U	U	U	U	1 J	U	1 J	U
Carbon Tetrachloride	5 ST	10	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	0.6 ST	10	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Benzene	1 ST	10	U	U	U	U	U	U	U	U	U	U
Toluene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	5 ST	10	U	U	U	U	U	U	U	U	0.3 J	U
Ethylbenzene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Styrene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Xylene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Chloromethane	5 ST	10	U	U	U	U	U	U	U	U	U	U
Bromomethane	5 ST	10	U	U	U	U	U	U	U	U	U	U
Chloroethane	5 ST	10	U	U	U	U	U	U	U	U	U	U
Acetone	50 ST	10	U	U	U	U	9 JB	U	8 JB	U	U	U
Carbon Disulfide	-	10	U	U	U	U	U	U	U	U	U	U
Chloroform	7 ST	10	U	U	U	U	U	U	U	U	U	U
2-Butanone	50 GV	10	U	U	U	U	U	U	3 JB	U	U	U
Bromodichloromethane	50 ST	10	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	1 ST	10	U	U	U	U	U	U	U	U	U	U
c-1,3-Dichloropropene	0.4 ST **	10	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	50 ST	10	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	1 ST	10	U	U	U	U	U	U	U	U	U	U
t-1,3-Dichloropropene	0.4 ST **	10	U	U	U	U	U	U	U	U	U	U
Bromoform	50 ST	10	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	-	10	U	U	U	U	U	U	U	U	U	U
2-Hexanone	50 ST	10	U	U	U	U	U	U	U	U	U	U
1,1,2,2,-Tetrachloroethane	5 ST	10	U	U	U	U	U	U	U	U	U	U
Total Non-Targeted VOCs			U	U	U	U	9	U	12	U	1.3	U

QUALIFIERS/ABBREVIATIONS:

ug/l= Micrograms per liter.
ST: Standard.
GV: Guidance Value.
CRDL: Contract Required Detection Limit.
U: Compound analyzed for but not detected.
B: Compound also found in the method blank.
J: Compound found at level below CRDL, value estimated.
-:Not established

: Concentration exceeds NYSDEC Standard / Guideline
* Total of cis- and trans- DCE
** : Value given for sum of -cis and -trans isomers

REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
OFF-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W H-0	GP-W H-50	GP-W H-100	GP-W IO	GP-W J-25	GP-W J-50	GP-W K-100	GP-W M-100	GP-W L(-40)	GP-W N(25)
SAMPLE DEPTH			(14-18')	(36-40')	(51-55')	14-18	(12-16')	(12-16')	(48-52')	(44-48')	(12-16')	(6-10')
DATE COLLECTED			1/25/99	1/20/99	1/8/99	4/5/99	1/13/99	1/21/99	1/9/99	1/13/99	10/4/99	10/4/99
DILUTION FACTOR			50	20	2	200	20	5	50	10	4	1
Targeted Compounds	NYSDEC Class GA Ground-water Standard/Guideline	CRDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Vinyl Chloride	2 ST	10	U	U	20	U	U	22 J	U	U	U	U
Freon 113	5 ST	10	5600	2900	93	U	2300	31 J	3700	900	U	16
1,1-Dichloroethene	5 ST	10	1600	160 J	15 J	5800	160 J	30 J	280 J	100	12 J	2 J
1,2-Dichloroethene (total)	5 ST *	10	U	210	220	U	U	260	U	170	U	0.6 J
1,1-Dichloroethane	5 ST	10	2400	200	58	2800	67 J	86	240 J	120	23 J	6 J
1,1,1-Trichloroethane	5 ST	10	950	1600	67	18000	770	220	2200	690	350	U
Trichloroethene	5 ST	10	7300	780	180	33000	490	480	1400	520	140	13
Total Targeted VOCs			17850	5850	653	59600	3787	1129	7820	2500	525	37.6
Additional Compounds												
Methylene Chloride	5 ST	10	360 J	32 J	U	U	U	4 J	U	U	17 JB	1 J
Carbon Tetrachloride	5 ST	10	U	U	11 J	U	U	U	U	120	U	U
1,2-Dichloroethane	0.6 ST	10	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Benzene	1 ST	10	U	U	U	U	U	U	U	U	U	U
Toluene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	5 ST	10	U	U	U	690 J	U	U	U	U	U	U
Ethylbenzene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Styrene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Xylene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Chloromethane	5 ST	10	U	U	U	U	U	U	U	U	U	U
Bromomethane	5 ST	10	U	U	U	U	U	U	U	U	U	U
Chloroethane	5 ST	10	U	U	U	U	U	U	U	U	U	U
Acetone	50 ST	10	540 B	220 B	U	U	U	11 J	U	U	U	U
Carbon Disulfide	-	10	U	U	U	U	U	23 JB	U	U	49 B	3 JB
Chloroform	7 ST	10	U	U	U	U	U	U	U	U	U	U
2-Butanone	50 GV	10	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	50 ST	10	U	U	U	U	U	12 JB	1500	U	11 JB	1 JB
1,2-Dichloropropane	1 ST	10	U	U	U	U	U	U	U	U	U	U
c-1,3-Dichloropropene	0.4 ST **	10	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	50 ST	10	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	1 ST	10	U	U	U	U	U	U	U	U	U	U
t-1,3-Dichloropropene	0.4 ST **	10	U	U	U	U	U	U	U	U	U	U
Bromoform	50 ST	10	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	-	10	U	57 J	U	U	U	U	U	U	U	U
2-Hexanone	50 ST	10	U	U	U	U	U	U	U	U	U	U
1,1,2,2,-Tetrachloroethane	5 ST	10	U	27 J	U	U	U	U	U	U	U	U
Total Non-Targeted VOCs			900	336	11	U	U	50	1500	120	77	5

QUALIFIERS/ABBREVIATIONS:

ug/l= Micrograms per liter.
ST: Standard.
GV: Guidance Value.
CRDL: Contract Required Detection Limit.
U: Compound analyzed for but not detected.
B: Compound also found in the method blank.
J: Compound found at level below CRDL, value estimated.
-:Not established

: Concentration exceeds NYSDEC Standard / Guideline
* Total of cis- and trans- DCE
** : Value given for sum of -cis and -trans isomers

REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
OFF-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W P-0	GP-P Q-(150)	GP-W-T6	GP-W R-100	GP-W T-85	GP-W EE-0	GP-W EE-100	GP-W OS-1	GP-W OS-2	GP-W OS-3
SAMPLE DEPTH			(26-30')	(68-72')	(12-16')	(48-52')	(44-48')	(6-10')	(60-64')	(51-55')	(35-39')	51-55
DATE COLLECTED			1/15/99	3/24/99	4/13/99	1/14/99	1/20/99	4/2/99	3/31/99	3/23/99	3/25/99	3/26/99
DILUTION FACTOR			1	4	1	20	1	1	5	10	1	2
Targeted Compounds	NYSDEC Class GA Ground-water Standard/Guideline	CRDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Vinyl Chloride	2 ST	10	U	U	U	U	U	U	16 J	U	U	U
Freon 113	5 ST	10	24	U	U	2600	48	U	U	U	10	260
1,1-Dichloroethene	5 ST	10	U	32 J	U	250	28	U	12 J	2 J	8 J	76
1,2-Dichloroethene (total)	5 ST *	10	U	22 J	U	110 J	1 J	U	490	U	1 J	16 J
1,1-Dichloroethane	5 ST	10	8 J	70	U	140 J	45	1 J	110	4 J	10	78
1,1,1-Trichloroethane	5 ST	10	9 J	U	U	1000	2 J	6 J	53	6 J	11	71
Trichloroethene	5 ST	10	19	330	U	860	18	U	570	9 J	18	250
Total Targeted VOCs			60	454	U	4960	142	7	1251	21	58	751
Additional Compounds												
Methylene Chloride	5 ST	10	U	U	U	U	U	3 J	13 J	U	U	U
Carbon Tetrachloride	5 ST	10	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	0.6 ST	10	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Benzene	1 ST	10	U	U	U	U	U	U	U	U	U	U
Toluene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Styrene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Xylene	5 ST	10	U	U	U	U	U	U	U	U	U	U
Chloromethane	5 ST	10	U	U	U	U	U	U	U	U	U	U
Bromomethane	5 ST	10	U	U	U	U	U	U	U	U	U	U
Chloroethane	5 ST	10	U	U	U	U	U	U	U	U	U	U
Acetone	50 ST	10	U	32 JB	U	U	4 JB	U	26 J	U	U	U
Carbon Disulfide	-	10	U	U	U	U	U	U	65 B	U	10 B	U
Chloroform	7 ST	10	U	U	U	U	U	U	U	U	U	U
2-Butanone	50 GV	10	U	U	U	U	U	U	U	U	U	U
Bromodichloromethane	50 ST	10	U	U	U	U	U	U	U	U	3 J	U
1,2-Dichloropropane	1 ST	10	U	U	U	U	U	U	U	U	U	U
c-1,3-Dichloropropene	0.4 ST **	10	U	U	U	U	U	U	U	U	U	U
Dibromochloromethane	50 ST	10	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	1 ST	10	U	U	U	U	U	U	U	U	U	U
t-1,3-Dichloropropene	0.4 ST **	10	U	U	U	U	U	U	U	U	U	U
Bromoform	50 ST	10	U	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	-	10	U	U	U	U	U	U	U	U	U	U
2-Hexanone	50 ST	10	U	U	U	U	U	U	U	U	U	U
1,1,2,2,-Tetrachloroethane	5 ST	10	U	U	U	U	U	U	U	U	1 J	U
Total Non-Targeted VOCs			U	32	U	U	4	3	104	U	14	U

QUALIFIERS/ABBREVIATIONS:

ug/l= Micrograms per liter.
ST: Standard.
GV: Guidance Value.
CRDL: Contract Required Detection Limit.
U: Compound analyzed for but not detected.
B: Compound also found in the method blank.
J: Compound found at level below CRDL, value estimated.
-:Not established

: Concentration exceeds NYSDEC Standard / Guideline.
* Total of cis- and trans- DCE
** : Value given for sum of -cis and -trans isomers

REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
OFF-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W 0100	GP-W-SUMP	GP-W UG1	GP-W V1(-75)	HP-W-L125(3-5)
SAMPLE DEPTH			(23-27')	(27-31')	(12-16')	(12-16')	
DATE COLLECTED			3/29/99	1/22/99	3/30/99	10/4/99	3/25/99
DILUTION FACTOR			5	20	1	1	10
Targeted Compounds	NYSDEC Class GA Ground-water Standard/Guideline	CRDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Vinyl Chloride	2 ST	10	U	U	U	U	270
Freon 113	5 ST	10	400	1100	U	U	5.9
1,1-Dichloroethene	5 ST	10	73	100 J	U	U	U
1,2-Dichloroethene (total)	5 ST *	10	36 J	150 J	U	U	480
1,1-Dichloroethane	5 ST	10	55	140 J	U	U	56
1,1,1-Trichloroethane	5 ST	10	570	2400	U	U	U
Trichloroethene	5 ST	10	280	910	U	U	U
Total Targeted VOCs			1414	4800	U	U	811.9
Additional Compounds							
Methylene Chloride	5 ST	10	64	10 J	3 J	1 JB	U
Carbon Tetrachloride	5 ST	10	U	U	U	U	U
1,2-Dichloroethane	0.6 ST	10	U	U	U	U	U
Tetrachloroethene	5 ST	10	U	54 J	U	U	U
Benzene	1 ST	10	U	U	U	U	U
Toluene	5 ST	10	U	17 J	U	0.2 J	U
Chlorobenzene	5 ST	10	U	U	U	U	U
Ethylbenzene	5 ST	10	U	U	U	U	U
Styrene	5 ST	10	U	U	U	U	U
Xylene	5 ST	10	U	U	U	U	U
Chloromethane	5 ST	10	U	U	U	U	U
Bromomethane	5 ST	10	U	U	U	U	U
Chloroethane	5 ST	10	U	U	U	U	U
Acetone	50 ST	10	140 B	U	U	5 JB	U
Carbon Disulfide	-	10	U	U	U	U	U
Chloroform	7 ST	10	U	U	U	U	U
2-Butanone	50 GV	10	U	U	U	4 JB	U
Bromodichloromethane	50 ST	10	U	U	U	U	U
1,2-Dichloropropane	1 ST	10	U	U	U	U	U
c-1,3-Dichloropropene	0.4 ST **	10	U	U	U	U	U
Dibromochloromethane	50 ST	10	U	U	U	U	U
1,1,2-Trichloroethane	1 ST	10	U	U	U	U	U
t-1,3-Dichloropropene	0.4 ST **	10	U	U	U	U	U
Bromoform	50 ST	10	U	U	U	U	U
4-Methyl-2-Pentanone	-	10	U	U	U	2 J	U
2-Hexanone	50 ST	10	U	U	U	3 J	U
1,1,2,2,-Tetrachloroethane	5 ST	10	U	U	U	1 J	U
Total Non-Targeted VOCs			204	81	3	16.2	U

QUALIFIERS/ABBREVIATIONS:

ug/l= Micrograms per liter.
ST: Standard.
GV: Guidance Value.
CRDL: Contract Required Detection Limit.
U: Compound analyzed for but not detected.
B: Compound also found in the method blank.
J: Compound found at level below CRDL, value estimated.
-:Not established

: Concentration exceeds NYSDEC Standard / Guideline.
* Total of cis- and trans- DCE
** : Value given for sum of -cis and -trans isomers

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W A-0	GP-W A-0	GP-W A-50	GP-W A-50	GP-W A-100	GP-W A-100	GP-W B-0	GP-W B-0	GP-W B-25
SAMPLE DEPTH IN FEET			(8-12')	(23-27')	(10-14')	(45-49')	(4-8')	(51-55')	(12-16')	(22-26')	(12-16')
DATE OF COLLECTION			01/04/99	01/04/99	01/04/99	01/04/99	01/05/99	01/05/99	04/06/99	04/06/99	04/05/99
DILUTION FACTOR			1	1	1	10	1	10	5	10	5
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL									
Vinyl Chloride	2 ST	1	U	U	U	U	U	30	U	14	U
Freon 113	5 ST	1	U	U	U	17	U	35	U	13	U
1,1-Dichloroethene	5 ST	1	U	U	U	U	U	18	U	U	U
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	U	6.2	2.9	U	U	160	U	61	U
c-1,2-Dichloroethene	5 ST	1	U	21	11	U	U	450	U	240	U
1,1,1-Trichloroethane	5 ST	1	U	1.3	1.4	16	U	59	U	19	U
Trichloroethene	5 ST	1	U	27	16	U	U	400	U	310	U
TOTAL TARGETED VOCs			U	55.5	31.3	33	U	1152	U	657	U

QUALIFIERS/ABBREVIATIONS:
U: Compound analyzed for but not detected
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CRDL: Contract Required Detection Limit
ST: Standard
VOCs: Volatile Organic Compounds
Values in ug/l (Micrograms per liter)

Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W B-25	GP-W B-50	GP-W B-50	GP-W B-100	GP-W B-100	GP-W C-100	GP-W C-100	GP-W D-25
SAMPLE DEPTH IN FEET			(33-37')	(8-12')	(36-40')	(12-16')	(46-50')	(12-16')	(48-52')	(12-16')
DATE OF COLLECTION			04/05/99	01/06/99	01/06/99	01/06/99	01/06/99	01/06/99	01/06/99	04/07/99
DILUTION FACTOR			10	5	10	5	10	5	100	5
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	12	U	U	U	36	12	U	U
Freon 113	5 ST	1	12	U	U	U	25	U	U	U
1,1-Dichloroethene	5 ST	1	U	U	U	U	12	U	U	U
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	62	U	60	U	130	24	U	U
c-1,2-Dichloroethene	5 ST	1	260	12	250	U	440	110	410	U
1,1,1-Trichloroethane	5 ST	1	13	U	13	U	42	9.5	U	U
Trichloroethene	5 ST	1	300	19	290	U	400	140	140	U
TOTAL TARGETED VOCs			659	31	613	U	1085	295.5	550	U

QUALIFIERS/ABBREVIATIONS:
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B: Compound also found in the method blank
CRDL: Contract Required Detection Limit
ST: Standard
VOCs: Volatile Organic Compounds
Values in ug/l (Micrograms per liter)

Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W D-25	GP-W E-(-10)	GP-W E-(-10)	GP-W E-0	GP-W E-0	GP-W E-65	GP-W E-65	GP-W E-100
SAMPLE DEPTH IN FEET			(42-46')	(12-16')	(33-37')	(16-20')	(39-43')	(12-16')	(24-28')	(12-16')
DATE OF COLLECTION			04/07/99	03/17/99	03/17/99	01/21/99	01/21/99	04/06/99	04/06/99	01/06/99
DILUTION FACTOR			20	10	100	500	50	20	20	10
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	47	U	U	U	U	U	38	U
Freon 113	5 ST	1	24	88	4900	U	550	U	22	U
1,1-Dichloroethene	5 ST	1	26	36	1600	U	69	U	26	U
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	100	U	1000	U	110	U	93	280
c-1,2-Dichloroethene	5 ST	1	400	U	150	U	400	26	320	160
1,1,1-Trichloroethane	5 ST	1	56	270	5200	4000	330	U	54	18
Trichloroethene	5 ST	1	410	110	4300	1500	520	40	450	170
TOTAL TARGETED VOCs			1063	504	17150	5500	1979	66	1003	628

QUALIFIERS/ABBREVIATIONS:
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ST: Standard
VOCs: Volatile Organic Compounds
Values in ug/l (Micrograms per liter)

Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W E-100	GP-W F-(-10)	GP-W F-(-10)	GP-W F-0	GP-W F-0	GP-W F-50	GP-W F-50	GP-W F-100
SAMPLE DEPTH IN FEET			(58-62')	(12-16')	(26-30')	(16-20')	(36-40')	(12-16')	(41-45')	(12-16')
DATE OF COLLECTION			01/06/99	03/17/99	03/17/99	01/21/99	01/21/99	01/22/99	01/22/99	01/07/99
DILUTION FACTOR			5	10	100	5	50	10	50	10
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	12.6	U	U	U	U	U	U	U
Freon 113	5 ST	1	U	70	2500	78	430	140	1800	U
1,1-Dichloroethene	5 ST	1	U	12	650	22	120	22	190	U
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	20	U	210	U	100	49	100	57
c-1,2-Dichloroethene	5 ST	1	120	U	U	U	270	170	210	150
1,1,1-Trichloroethane	5 ST	1	U	62	2600	70	390	100	990	25
Trichloroethene	5 ST	1	110	31	2000	61	550	200	660	220
TOTAL TARGETED VOCs			262.6	175	7960	231	1860	681	3950	452

QUALIFIERS/ABBREVIATIONS:
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CRDL: Contract Required Detection Limit
ST: Standard
VOCs: Volatile Organic Compounds
Values in ug/l (Micrograms per liter)

Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W F-100	GP-W G-(-10)	GP-W G-(-10)	GP-W G-(-25)	GP-W G-(-45)	GP-W G-(-45)	GP-W G-(-65)	GP-W G-(-65)
SAMPLE DEPTH IN FEET			(53-57')	(12-16')	(16-20')	(14-18')	(12-16')	(23-27')	(12-16')	(23-27')
DATE OF COLLECTION			01/07/99	03/17/99	03/17/99	03/18/99	03/18/99	03/18/99	03/19/99	03/19/99
DILUTION FACTOR			50	10	10	5	5	100	5	100
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	U	U	U	U	U	U	U
Freon 113	5 ST	1	U	76	190	150	130	3200	150	1600
1,1-Dichloroethene	5 ST	1	U	U	38	16	U	600	U	240
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	U	U	U	6	U	270	U	U
c-1,2-Dichloroethene	5 ST	1	160	U	U	U	U	U	U	U
1,1,1-Trichloroethane	5 ST	1	U	42	230	150	82	4200	85	2100
Trichloroethene	5 ST	1	120	16	150	44	23	1500	21	490
TOTAL TARGETED VOCs			280	134	608	366	235	9770	256	4430

QUALIFIERS/ABBREVIATIONS:
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CRDL: Contract Required Detection Limit
ST: Standard
VOCs: Volatile Organic Compounds
Values in ug/l (Micrograms per liter)

Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W G-(-80)	GP-W G-(-80)	GP-W G-(-85)	GP-W G-(-85)	GP-W G-100	GP-W G-100	GP-W H-(-25)	GP-W H-0
SAMPLE DEPTH IN FEET			(12-16')	(20-24')	(12-16')	(18-22')	(12-16')	(58-62')	(9-13')	(14-18')
DATE OF COLLECTION			03/19/99	03/19/99	03/22/99	03/22/99	01/07/99	01/07/99	01/22/99	01/22/99
DILUTION FACTOR			5	50	5	50	10	50	1000	2500
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	U	U	U	10	U	U	U
Freon 113	5 ST	1	36	2100	31	920	U	U	5500	23000
1,1-Dichloroethene	5 ST	1	U	230	U	77	U	U	2100	4200
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	U	140	U	U	28	U	U	U
c-1,2-Dichloroethene	5 ST	1	U	U	U	U	110	170	U	U
1,1,1-Trichloroethane	5 ST	1	52	2100	23	970	17	U	8800	12000
Trichloroethene	5 ST	1	9.1	520	U	190	190	130	6500	20000
TOTAL TARGETED VOCs			97.1	5090	54	2157	355	300	22900	59200

QUALIFIERS/ABBREVIATIONS:
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VOCs: Volatile Organic Compounds
Values in ug/l (Micrograms per liter)

Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W H-25	GP-W H-50	GP-W H-50	GP-W H-75	GP-W H-75	GP-W H-100	GP-W H-100	GP-W I-0	GP-W I-25
SAMPLE DEPTH IN FEET			(12-16')	(12-16')	(36-40')	(12-16')	(40-44')	(12-16')	(51-55')	(14-18')	(13-17')
DATE OF COLLECTION			01/20/99	01/19/99	01/19/99	01/13/99	01/13/99	01/07/99	01/07/99	04/05/99	04/05/99
DILUTION FACTOR			100	10	200	5	50	10	20	2500	500
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL									
Vinyl Chloride	2 ST	1	U	U	U	22	U	18	44	U	U
Freon 113	5 ST	1	2200	130	3300	7.2	970	U	270	48000	6900
1,1-Dichloroethene	5 ST	1	440	120	250	12	100	10	36	13000	1300
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	U	U	U	63	90	60	95	4000	U
c-1,2-Dichloroethene	5 ST	1	U	U	U	140	280	180	310	U	U
1,1,1-Trichloroethane	5 ST	1	1300	420	1700	44	500	36	170	32000	3500
Trichloroethene	5 ST	1	1100	230	1000	150	480	290	300	53000	3900
TOTAL TARGETED VOCs			5040	900	6250	438.2	2420	594	1225	150000	15600

QUALIFIERS/ABBREVIATIONS:
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CRDL: Contract Required Detection Limit
ST: Standard
VOCs: Volatile Organic Compounds
Values in ug/l (Micrograms per liter)

Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W I-50	GP-W I-50	GP-W I-100	GP-W I-100	GP-W -J(-25)	GP-W J-(-50)	GP-W J-(-75)	GP-W J-0	GP-W J-25
SAMPLE DEPTH IN FEET			(12-16')	(25-29')	(12-16')	(51-55')	(6-10')	(10-14')	(5-9')	(6-10')	(12-16')
DATE OF COLLECTION			04/05/99	04/05/99	01/07/99	01/07/99	04/05/99	04/02/99	04/02/99	04/02/99	01/12/99
DILUTION FACTOR			50	200	10	20	1	200	10	100	50
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL									
Vinyl Chloride	2 ST	1	U	U	U	36	2.1	U	U	U	U
Freon 113	5 ST	1	960	6200	U	120	140	3900	120	2100	2000
1,1-Dichloroethene	5 ST	1	110	720	U	24	7.1	U	U	250	260
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	U	230	22	79	7.9	U	U	U	U
c-1,2-Dichloroethene	5 ST	1	U	U	100	290	3.2	U	U	120	U
1,1,1-Trichloroethane	5 ST	1	530	3300	15	91	11	1900	37	1000	660
Trichloroethene	5 ST	1	380	2500	220	260	7.5	600	10	620	460
TOTAL TARGETED VOCs			1980	12950	357	900	178.8	6400	167	4090	3380

QUALIFIERS/ABBREVIATIONS:
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B: Compound also found in the method blank
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VOCs: Volatile Organic Compounds
Values in ug/l (Micrograms per liter)

Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W J-50	GP-W J-50	GP-W J-75	GP-W J-75	GP-W J-75	GP-W J-100	GP-W J-100	GP-W K-(-25)
SAMPLE DEPTH IN FEET			(12-16')	(26-30')	(12-16')	(17-21')	(42-46')	(12-16')	(48-52')	(5-9')
DATE OF COLLECTION			01/20/99	01/20/99	04/01/99	04/01/99	04/01/99	01/08/99	01/08/99	04/07/99
DILUTION FACTOR			50	50	10	50	500	10	20	100
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	U	36	U	U	U	37	U
Freon 113	5 ST	1	U	2000	35	730	5700	U	27	1700
1,1-Dichloroethene	5 ST	1	U	330	34	200	750	U	U	240
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	88	160	89	120	U	22	100	150
c-1,2-Dichloroethene	5 ST	1	300	210	300	300	U	110	320	U
1,1,1-Trichloroethane	5 ST	1	340	1100	220	770	2900	11	46	1200
Trichloroethene	5 ST	1	530	920	390	900	1700	210	260	720
TOTAL TARGETED VOCs			1258	4720	1104	3020	11050	353	790	4010

QUALIFIERS/ABBREVIATIONS:
U: Compound analyzed for but not detected
B: Compound also found in the method blank
CRDL: Contract Required Detection Limit
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VOCs: Volatile Organic Compounds
Values in ug/l (Micrograms per liter)

Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W K-0	GP-W K-100	GP-W K-100	GP-W L-(-25)	GP-W L-0	GP-W L-25	GP-W L-25	GP-W L-50
SAMPLE DEPTH IN FEET			(6-10')	(12-16')	(48-52')	(13-17')	(10.5-14.5')	(12-16')	(30-34')	(12-16')
DATE OF COLLECTION			04/07/99	01/08/99	01/08/99	01/22/99	01/12/99	01/12/99	01/12/99	01/12/99
DILUTION FACTOR			10	5	500	100	25	50	100	5
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	21	U	U	U	U	U	11
Freon 113	5 ST	1	180	6.9	5200	850	1100	1900	3900	210
1,1-Dichloroethene	5 ST	1	25	13	830	140	140	290	610	160
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	13	61	U	U	40	61	160	47
c-1,2-Dichloroethene	5 ST	1	U	170	U	U	U	U	U	98
1,1,1-Trichloroethane	5 ST	1	100	40	2800	510	360	760	1600	240
Trichloroethene	5 ST	1	40	190	1600	280	280	800	1400	170
TOTAL TARGETED VOCs			358	501.9	10430	1780	1920	3811	7670	936

QUALIFIERS/ABBREVIATIONS:
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ST: Standard
VOCs: Volatile Organic Compounds
Values in ug/l (Micrograms per liter)

Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W L-50	GP-W L-100	GP-W L-100	GP-W M-100	GP-W M-100	GP-W N-50	GP-W N-50	GP-W N-100
SAMPLE DEPTH IN FEET			(30-34')	(12-16')	(48-52')	(12-16')	(44-48')	(12-16')	(36-40')	(12-16')
DATE OF COLLECTION			01/12/99	01/08/99	01/08/99	01/11/99	01/11/99	01/20/99	01/20/99	01/11/99
DILUTION FACTOR			200	10	50	5	100	5	200	10
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	U	U	U	U	U	U	U
Freon 113	5 ST	1	4800	73	680	18	2600	24	4500	29
1,1-Dichloroethene	5 ST	1	870	120	97	32	290	15	570	U
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	U	37	110	32	120	13	U	U
c-1,2-Dichloroethene	5 ST	1	U	100	200	48	150	7.5	U	U
1,1,1-Trichloroethane	5 ST	1	2300	390	510	140	1300	130	1800	U
Trichloroethene	5 ST	1	1500	300	510	120	880	91	1400	U
TOTAL TARGETED VOCs			9470	1020	2107	390	5340	280.5	8270	29

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TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W N-100	GP-W O-100	GP-W O-100	GP-W P-(-25)	GP-W P-0	GP-W P-0	GP-W P-25	GP-W P-25
SAMPLE DEPTH IN FEET			(44-48')	(12-16')	(51-55')	(6-10')	(12-16')	(26-30')	(16-20')	(32-36')
DATE OF COLLECTION			01/12/99	01/12/99	01/12/99	01/18/99	01/14/99	01/14/99	01/14/99	01/14/99
DILUTION FACTOR			100	5	200	5	5	10	10	5
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	16	U	U	U	U	U	U
Freon 113	5 ST	1	3500	170	850	U	11	31	68	25
1,1-Dichloroethene	5 ST	1	350	64	U	U	U	U	U	U
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	150	53	U	U	6.8	U	U	8.2
c-1,2-Dichloroethene	5 ST	1	200	140	U	U	U	U	U	U
1,1,1-Trichloroethane	5 ST	1	1500	140	390	U	U	U	20	7.1
Trichloroethene	5 ST	1	1100	220	350	U	20	24	19	20
TOTAL TARGETED VOCs			6800	803	1590	U	37.8	55	107	60.3

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Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W P-50	GP-W P-50	GP-W P-75	GP-W P-75	GP-W P-100	GP-W P-100	GP-W Q-100	GP-W Q-100
SAMPLE DEPTH IN FEET			(12-16')	(40-44')	(12-16')	(44-48')	(12-16')	(44-48')	(12-16')	(47-51')
DATE OF COLLECTION			01/13/99	01/13/99	01/13/99	01/13/99	01/13/99	01/13/99	3/23//99	03/23/99
DILUTION FACTOR			10	50	5	50	5	100	5	10
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	U	U	U	U	U	U	U
Freon 113	5 ST	1	U	440	U	1500	54	2600	24	180
1,1-Dichloroethene	5 ST	1	U	55	U	150	25	510	U	210
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	U	U	6.3	U	56	U	U	240
c-1,2-Dichloroethene	5 ST	1	U	U	U	U	45	U	U	15
1,1,1-Trichloroethane	5 ST	1	U	180	U	540	98	1000	9.8	U
Trichloroethene	5 ST	1	U	150	7.5	450	98	1000	4.4	290
TOTAL TARGETED VOCs			U	825	13.8	2640	376	5110	38.2	935

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Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W Q-125	GP-W Q-125	GP-W Q-125	GP-W Q-150	GP-W Q-150	GP-W Q-150	GP-W Q-175	GP-W Q-175
SAMPLE DEPTH IN FEET			(6-10')	(32-36)	(56-60')	(6-10')	(32-36')	(68-72')	(6-10')	(32-36')
DATE OF COLLECTION			03/23/99	03/25/99	03/23/99	03/23/99	03/24/99	03/23/99	03/23/99	03/24/99
DILUTION FACTOR			5	50	10	1	5	5	1	1
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	U	U	U	U	U	U	U
Freon 113	5 ST	1	U	1700	300	U	140	U	U	U
1,1-Dichloroethene	5 ST	1	U	400	70	U	65	54	U	U
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	U	U	84	U	35	82	U	U
c-1,2-Dichloroethene	5 ST	1	U	U	93	U	85	25	U	U
1,1,1-Trichloroethane	5 ST	1	U	940	170	U	230	U	U	U
Trichloroethene	5 ST	1	U	1300	290	U	220	220	U	U
TOTAL TARGETED VOCs			U	4340	1007	U	775	381	U	U

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TABLE H - 2
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REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W Q-175	GP-W Q-200	GP-W Q-200	GP-W Q-200	GP-W R-50	GP-W R-50	GP-W R-100	GP-W R-100
SAMPLE DEPTH IN FEET			(66-70')	(6-10')	(32-36')	(68-72')	(12-16')	(42-46')	(12-16')	(48-52')
DATE OF COLLECTION			03/23/99	03/25/99	03/26/99	03/25/99	01/18/99	01/18/99	01/13/99	01/13/99
DILUTION FACTOR			5	5	5	1	5	10	5	100
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	U	U	U	U	U	U	U
Freon 113	5 ST	1	U	U	U	U	8.6	230	32	1800
1,1-Dichloroethene	5 ST	1	U	U	17	U	U	35	U	270
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	U	U	23	U	U	55	12	U
c-1,2-Dichloroethene	5 ST	1	U	U	13	2.2	U	U	6.7	U
1,1,1-Trichloroethane	5 ST	1	U	U	26	U	U	84	27	710
Trichloroethene	5 ST	1	41	U	130	22	U	73	25	660
TOTAL TARGETED VOCs			41	U	209	24.2	8.6	477	102.7	3440

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REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W S-0	GP-W S-50	GP-W S-50	GP-W T-1	GP-W T-1	GP-W T-1	GP-W T-2	GP-W T-2
SAMPLE DEPTH IN FEET			(9-13')	(12-16')	(30-34')	(12-16')	(26-30')	(57-61')	(12-16')	(31-35')
DATE OF COLLECTION			01/22/99	01/18/99	01/18/99	04/14/99	04/14/99	04/14/99	04/14/99	04/14/99
DILUTION FACTOR			5	1	10	5	5	10	5	5
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	U	U	U	U	U	U	U
Freon 113	5 ST	1	U	18	20	11	10	U	U	30
1,1-Dichloroethene	5 ST	1	U	1.6	U	14	19	U	28	11
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	U	3	12	12	15	U	33	U
c-1,2-Dichloroethene	5 ST	1	U	U	U	11	39	U	8.9	U
1,1,1-Trichloroethane	5 ST	1	U	6.3	U	36	65	11	9.1	23
Trichloroethene	5 ST	1	U	3.8	U	60	140	20	32	32
TOTAL TARGETED VOCs			U	32.7	32	144	288	31	111	96

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REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W T-2	GP-W T-4	GP-W T-4	GP-W T-4	GP-W T-6	GP-W T-6	GP-W T-10	GP-W T-10
SAMPLE DEPTH IN FEET			(70-74')	(12-16')	(28-32')	(56-60')	(12-16')	(36-40')	(12-16')	(52-56')
DATE OF COLLECTION			04/14/99	04/14/99	04/14/99	04/14/99	04/14/99	04/14/99	04/14/99	04/14/99
DILUTION FACTOR			5	5	5	5	5	5	5	5
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	U	U	U	U	U	U	U
Freon 113	5 ST	1	34	U	U	U	U	U	U	U
1,1-Dichloroethene	5 ST	1	21	U	U	U	U	U	U	U
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	10	U	U	U	U	U	9.9	U
c-1,2-Dichloroethene	5 ST	1	20	U	U	U	U	U	U	U
1,1,1-Trichloroethane	5 ST	1	68	U	U	U	U	U	U	9.2
Trichloroethene	5 ST	1	87	14	56	U	U	U	U	U
TOTAL TARGETED VOCs			240	14	56	U	U	U	9.9	9.2

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GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W T-85	GP-W T-85	GP-W U-50	GP-W U-50	GP-W BB-0	GP-W BB-0	GP-W BB-100	GP-W BB-100
SAMPLE DEPTH IN FEET			(12-16')	(44-48')	(12-16')	(29-33')	(10-14')	(18-22')	(12-16')	(64-68')
DATE OF COLLECTION			01/18/99	01/18/99	01/18/99	01/19/99	04/06/99	04/06/99	01/19/99	01/19/99
DILUTION FACTOR			1	10	1	5	5	10	5	10
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	U	U	U	U	U	U	U
Freon 113	5 ST	1	23	42	6.7	U	U	U	U	17
1,1-Dichloroethene	5 ST	1	3.1	21	U	U	U	U	U	12
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	5.1	40	1.5	U	U	U	U	110
c-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	280
1,1,1-Trichloroethane	5 ST	1	10	U	2.3	U	24	11	U	61
Trichloroethene	5 ST	1	11	13	U	U	U	U	U	260
TOTAL TARGETED VOCs			52.2	116	10.5	U	24	11	U	740

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GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W CC-50	GP-W CC-50	GP-W CC-100	GP-W CC-100	GP-W DD-50	GP-W DD-50	GP-W DD-100	GP-W DD-100
SAMPLE DEPTH IN FEET			(12-16')	(44-48')	(12-16')	(62-66')	(12-16')	(44-48')	(12-16')	(59-63')
DATE OF COLLECTION			01/19/99	01/19/99	01/19/99	01/19/99	01/20/99	01/20/99	01/20/99	01/20/99
DILUTION FACTOR			1	5	1	5	1	10	1	5
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	U	U	21	U	U	U	19
Freon 113	5 ST	1	U	U	U	19	U	U	U	18
1,1-Dichloroethene	5 ST	1	U	U	U	19	U	U	U	16
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	U	25	U	100	U	U	U	100
c-1,2-Dichloroethene	5 ST	1	1.9	110	U	180	U	60	U	180
1,1,1-Trichloroethane	5 ST	1	U	5.1	U	80	U	U	U	64
Trichloroethene	5 ST	1	U	98	U	160	U	70	U	160
TOTAL TARGETED VOCs			1.9	238.1	U	579	U	130	U	557

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GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W EE-0	GP-W EE-0	GP-W EE-50	GP-W EE-50	GP-W EE-100	GP-W EE-100	GP-W HH-0	GP-W HH-0
SAMPLE DEPTH IN FEET			(6-10')	(16-20')	(12-16')	(49-53')	(12-16')	(60-64')	(12-16')	(40-44')
DATE OF COLLECTION			03/31/99	03/31/99	03/31/99	03/31/99	03/29/99	03/29/99	03/30/99	03/30/99
DILUTION FACTOR			1	1	1	1	5	10	5	5
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	U	U	U	U	34	U	U
Freon 113	5 ST	1	U	U	U	U	U	30	U	U
1,1-Dichloroethene	5 ST	1	U	U	U	U	U	24	U	U
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	U	1.1	U	U	U	150	U	U
c-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	460	U	U
1,1,1-Trichloroethane	5 ST	1	U	6.3	U	U	U	83	U	U
Trichloroethene	5 ST	1	U	U	U	U	U	440	U	U
TOTAL TARGETED VOCs			U	7.4	U	U	U	1221	U	U

QUALIFIERS/ABBREVIATIONS:
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GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W HH-50	GP-W HH-50	GP-W HH-100	GP-W HH-100	GP-W OS-1	GP-W OS-1	GP-W OS-1	GP-W OS-2
SAMPLE DEPTH IN FEET			(16-20')	(48-52')	(12-16')	(46-50')	(6-10')	(24-28')	(51-55')	(12-16')
DATE OF COLLECTION			03/31/99	03/29/99	03/29/99	03/29/99	03/22/99	03/26/99	03/22/99	03/24/99
DILUTION FACTOR			1	1	5	10	5	25	1	1
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	U	U	90	U	U	U	U
Freon 113	5 ST	1	U	U	U	U	U	780	16	U
1,1-Dichloroethene	5 ST	1	U	U	U	10	12	87	3.5	U
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	U	2.7	U	52	U	U	3.4	U
c-1,2-Dichloroethene	5 ST	1	U	10	U	450	U	U	U	U
1,1,1-Trichloroethane	5 ST	1	U	U	U	U	8.6	390	5.6	U
Trichloroethene	5 ST	1	U	9.6	U	70	6.2	220	10	U
TOTAL TARGETED VOCs			U	22.3	U	672	26.8	1477	38.5	U

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VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W OS-2	GP-W OS-3	GP-W OS-3	GP-W OS-3	GP-W UG-1	GP-W UG-1	GP-W UG-2	GP-W UG-2
SAMPLE DEPTH IN FEET			(35-39')	(6-10')	(24-28')	(51-55')	(12-16')	(48-52')	(12-16')	(28-32')
DATE OF COLLECTION			03/24/99	03/25/99	03/25/99	03/25/99	03/30/99	03/30/99	03/30/99	03/30/99
DILUTION FACTOR			1	5	50	10	1	1	5	10
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	U	U	U	U	U	U	U
Freon 113	5 ST	1	8.6	16	330	270	U	U	U	U
1,1-Dichloroethene	5 ST	1	7.1	U	100	96	U	U	U	U
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	8.8	U	U	72	U	U	U	U
c-1,2-Dichloroethene	5 ST	1	U	U	U	11	U	U	U	U
1,1,1-Trichloroethane	5 ST	1	9.3	U	300	69	U	U	U	U
Trichloroethene	5 ST	1	15	U	390	220	U	U	U	U
TOTAL TARGETED VOCs			48.8	16	1120	738	U	U	U	U

QUALIFIERS/ABBREVIATIONS:
U: Compound analyzed for but not detected
B: Compound also found in the method blank
CRDL: Contract Required Detection Limit
ST: Standard
VOCs: Volatile Organic Compounds
Values in ug/l (Micrograms per liter)

Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			GP-W UG-3	GP-W UG-3	GP-W UG-4	GP-W UG-4	GP-W UG-5	GP-W UG-5	GP-W UG-6	GP-W UG-6
SAMPLE DEPTH IN FEET			(12-16')	(54-58')	(12-16')	(50-54')	(12-16')	(53-57')	(12-16')	(42-46')
DATE OF COLLECTION			03/30/99	03/30/99	04/01/99	03/31/99	04/01/99	04/01/99	04/02/99	04/02/99
DILUTION FACTOR			5	5	5	1	5	5	5	20
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL								
Vinyl Chloride	2 ST	1	U	12	U	250	U	U	U	38
Freon 113	5 ST	1	U	U	U	U	U	U	U	52
1,1-Dichloroethene	5 ST	1	U	17	U	U	U	U	U	38
t-1,2-Dichloroethene	5 ST	1	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5 ST	1	U	60	U	120	U	U	U	230
c-1,2-Dichloroethene	5 ST	1	U	160	U	920	U	6.7	U	740
1,1,1-Trichloroethane	5 ST	1	U	87	U	U	U	U	U	90
Trichloroethene	5 ST	1	U	76	U	55	U	18	U	870
TOTAL TARGETED VOCs			U	412	U	1345	U	24.7	U	2058

QUALIFIERS/ABBREVIATIONS:
U: Compound analyzed for but not detected
B: Compound also found in the method blank
CRDL: Contract Required Detection Limit
ST: Standard
VOCs: Volatile Organic Compounds
Values in ug/l (Micrograms per liter)

Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
VOLATILE ORGANIC COMPOUNDS
ON-SITE LABORATORY

SAMPLE IDENTIFICATION			SUMP	SUMP	GP-W-DEPRS.	GP-W-DEPRS.
SAMPLE DEPTH IN FEET			(27-31')	(12-16')	(12-16')	(38-42')
DATE OF COLLECTION			01/21/99	01/21/99	04/13/99	04/13/99
DILUTION FACTOR			50	50	20	100
Targeted Compounds	NYSDEC Class GA Groundwater Standard	CRDL				
Vinyl Chloride	2 ST	1	U	U	U	U
Freon 113	5 ST	1	1100	75	U	740
1,1-Dichloroethene	5 ST	1	180	U	U	130
t-1,2-Dichloroethene	5 ST	1	U	U	U	U
1,1-Dichloroethane	5 ST	1	100	100	U	100
c-1,2-Dichloroethene	5 ST	1	170	410	U	340
1,1,1-Trichloroethane	5 ST	1	1300	250	110	400
Trichloroethene	5 ST	1	770	510	37	470
TOTAL TARGETED VOCs			3620	1345	147	2180

QUALIFIERS/ABBREVIATIONS:
U: Compound analyzed for but not detected
B: Compound also found in the method blank
CRDL: Contract Required Detection Limit
ST: Standard
VOCs: Volatile Organic Compounds
Values in ug/l (Micrograms per liter)

Concentration exceeds NYSDEC Standard/Guideline.

TABLE H - 3
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GROUNDWATER GEOPROBE SAMPLES
PCBs

SAMPLE IDENTIFICATION			GP-W-B50	GP-W-B50	GP-W-B100	GP-W-B100	GP-W-BB0	GP-W-D25	GP-W-G(-10)	GP-W-G(-25)
SAMPLE DEPTH (ft)			8-12	36-40	12-16	46-50	18-22	42-46	12-16	12-16
DATE COLLECTED			1/7/99	1/7/99	1/7/99	1/7/99	4/6/99	4/7/99	3/19/99	3/19/99
DILUTION FACTOR			1	1	1	1	1	1	1	1
UNITS			(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
PCBs	NYSDEC Class GA Ground-water Standard/Guideline	CRDL								
Aroclor-1016	*	1	U	U	U	U	U	U	U	U
Aroclor 1221	*	2	U	U	U	U	U	U	U	U
Aroclor-1232	*	1	U	U	U	U	U	U	U	U
Aroclor-1242	*	1	U	U	U	U	U	U	U	U
Aroclor-1248	*	1	U	U	U	U	U	U	U	U
Aroclor-1254	*	1	U	U	U	U	U	U	U	U
Aroclor-1260	*	1	U	U	U	U	U	U	U	U
Total PCBs	0.09 ST		ND	ND	ND	ND	ND	ND	ND	ND

QUALIFIERS/ABBREVIATIONS:
ug / l: Micrograms per liter.
*: Standard applies to the sum of these constituents.
CRDL: Contract Required Detection Limit.
U: Compound analyzed for but not detected.
ND: Not Detected

TABLE H - 3
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GROUNDWATER GEOPROBE SAMPLES
PCBs

SAMPLE IDENTIFICATION			GP-W-G(-65)	GP-W-H0	GP-W-H50	GP-W-H100	GP-W-I0	GP-W-J25	GP-W J-50
SAMPLE DEPTH (ft)			23-27	14-18	36-40	51-55	14-18	12-16	12-16
DATE COLLECTED			3/18/99	1/25/99	1/20/99	1/8/99	4/5/99	1/13/99	1/21/99
DILUTION FACTOR			1	1	1	1	1	1	1
UNITS			(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
PCBs	NYSDEC Class GA Ground-water Standard/Guideline	CRDL							
Aroclor-1016	*	1	U	U	U	U	U	U	U
Aroclor 1221	*	2	U	U	U	U	U	U	U
Aroclor-1232	*	1	U	U	U	U	U	U	U
Aroclor-1242	*	1	U	U	U	U	U	U	U
Aroclor-1248	*	1	U	U	U	U	U	U	U
Aroclor-1254	*	1	U	U	U	U	U	U	U
Aroclor-1260	*	1	U	U	U	U	U	U	U
Total PCBs	0.09 ST		ND	ND	ND	ND	ND	ND	ND

QUALIFIERS/ABBREVIATIONS:
ug / l: Micrograms per liter.
*: Standard applies to the sum of these constituents.
CRDL: Contract Required Detection Limit.
U: Compound analyzed for but not detected.
ND: Not Detected

TABLE H - 3
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GROUNDWATER GEOPROBE SAMPLES
PCBs

SAMPLE IDENTIFICATION			GP-W-K100	GP-W-M100	GP-W-P0	GP-P-Q(150)	GP-W-R100	GP-W T-85	GP-W-EE0
SAMPLE DEPTH (ft)			48-52	44-48	26-30	68-72	48-52	44-48	10-Jun
DATE COLLECTED			1/9/99	1/13/99	1/15/99	3/24/99	1/14/99	1/20/99	4/2/99
DILUTION FACTOR			1	1	1	1	1	1	1
UNITS			(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
PCBs	NYSDEC Class GA Ground-water Standard/Guideline	CRDL							
Aroclor-1016	*	1	U	U	U	U	U	U	U
Aroclor 1221	*	2	U	U	U	U	U	U	U
Aroclor-1232	*	1	U	U	U	U	U	U	U
Aroclor-1242	*	1	U	U	U	U	U	U	U
Aroclor-1248	*	1	U	U	U	U	U	U	U
Aroclor-1254	*	1	U	U	U	U	U	U	U
Aroclor-1260	*	1	U	U	U	U	U	U	U
Total PCBs	0.09 ST		ND	ND	ND	ND	ND	ND	ND

QUALIFIERS/ABBREVIATIONS:
ug / l: Micrograms per liter.
*: Standard applies to the sum of these constituents.
CRDL: Contract Required Detection Limit.
U: Compound analyzed for but not detected.
ND: Not Detected

TABLE H - 3
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GROUNDWATER GEOPROBE SAMPLES
PCBs

SAMPLE IDENTIFICATION			GP-W-EE100	GP-W-OS1	GP-W-OS2	GP-W-OS-3	GP-W-UG1	GP-W-0100	GP-W-SUMP	GP-W-T6
SAMPLE DEPTH (ft)			60-64	51-55	35-39	51-55	12-16	23-27	27-31	12-16
DATE COLLECTED			3/31/99	3/23/99	3/25/99	3/25/99	03/27/99	3/29/99	1/22/99	4/13/99
DILUTION FACTOR			1	1	1	1	1	1	1	1
UNITS			(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
PCBs	NYSDEC Class GA Ground-water Standard/Guideline	CRDL								
Aroclor-1016	*	1	U	U	U	U	U	U	U	U
Aroclor 1221	*	2	U	U	U	U	U	U	U	U
Aroclor-1232	*	1	U	U	U	U	U	U	U	U
Aroclor-1242	*	1	U	U	U	U	U	U	U	U
Aroclor-1248	*	1	U	U	U	U	U	U	U	U
Aroclor-1254	*	1	U	U	U	U	U	U	U	U
Aroclor-1260	*	1	U	U	U	U	U	U	U	U
Total PCBs	0.09 ST		ND	ND	ND	ND	ND	ND	ND	ND

QUALIFIERS/ABBREVIATIONS:
ug / l: Micrograms per liter.
*: Standard applies to the sum of these constituents.
CRDL: Contract Required Detection Limit.
U: Compound analyzed for but not detected.
ND: Not Detected

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
METALS

SAMPLE IDENTIFICATION			GP-W-B50	GP-W-B50	GP-W- B100	GP-W-B100	GP-W-BB0	GP-W-D(25)	GPWD(-60)	GP-W-EE0
SAMPLE DEPTH (ft)			8-12	36-40	12-16	46-50	18-22	42-46	4-8	- -
DATE COLLECTED			01/07/1999	01/07/1999	01/07/1999	01/07/1999	04/16/1999	04/07/1999	10/04/1999	04/02/1999
Metals	NYSDEC Class GA Ground-water Standard/Guideline	IDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Aluminum	-	22	108 B	92.3 B	149 B	103 B	211	235	1370	215
Antimony	3 ST	10	U	U	U	4.3 B	U	U	7 B	U
Arsenic	25 ST	6	U	3.7 B	U	U	U	U	U	U
Barium	1000 ST	1	49.4 B	59.2 B	43 B	95.8 B	24.6 B	28.1 B	9.2 B	49.2 B
Beryllium	3 GV	1	U	U	U	U	U	U	1	U
Cadmium	5 ST	1	U	U	U	U	1.7 B	1.4 B	U	1.7 B
Calcium	-	70	51100	57000	64100	80400	15900	76500	18700	12900
Chromium	50 ST	1	U	U	U	U	U	U	2.1 B	U
Cobalt	-	2	6.6 B	3.6 B	2.2 B	2.7 B	U	U	U	U
Copper	200 ST	1	U	U	U	U	1.5 B	1.6 B	2.7 B	5.5 B
Iron	300 ST*	50	165	190	221	156	394	429	1590	414
Lead	25 ST	2	U	U	U	U	2.2 B	2.2 B	U	3
Magnesium	35000 GV	30	19900	19000	28800	25200	5520	21600	1640 B	4970 B
Manganese	300 ST*	1	584	1300	305	590	73.3	443	62.4	110
Mercury	0.7 ST	0.1	U	U	0.3	U	0.17 B	U	U	U
Nickel	100 ST	3	8.8 B	U	U	U	6 B	4.7 B	U	5.5 B
Potassium	-	66	2670 B	3530 B	4320 B	3180 B	2090 B	2530 B	1700 B	2070 B
Selenium	10 ST	4	U	U	2 B	1.6 B	U	U	U	U
Silver	50 ST	2	U	U	U	U	U	U	U	U
Sodium	20000	32	9920	10500	9310	8680	10600	9100	17700	5310
Thallium	0.5 GV	7	U	U	U	U	U	U	U	U
Vanadium	-	2	U	U	U	U	U	U	U	U
Zinc	2000 GV	8	9.9 B	2.8 B	5 B	1.3 B	U	U	174	U
Cyanide	200 ST	10	U	U	U	U	U	U	U	U

QUALIFIERS/ABBREVIATIONS:

ug/l= Micrograms per Liter.

ST: Standard.

GV: Guidance Value.

- : Standard/guidance value not established.

IDL: Instrument Detection Limit.

U: Compound analyzed for but not detected.

B: Concentration is > IDL but < CRDL.

J: Compound found at level below CRDL, value estimated

ST*: Standard for the sum of Iron and Manganese is 500 ug/l.

CRDL: Contract Required Detection Limit.

: Concentration exceeds NYSDEC Standard/Guideline.

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
METALS

SAMPLE IDENTIFICATION			GP-W-EE100	GP-W-G(-10)	GP-W-G(-25)	GP-W-G(-65)	GP-W-H0	GP-W-H50	GP-W-H100
SAMPLE DEPTH (ft)			60-64	12-16	12-16	23-27	14-18	36-40	51-55
DATE COLLECTED			03/31/1999	03/19/1999	03/19/1999	03/18/1999	01/25/1999	01/20/1999	01/08/1999
Metals	NYSDEC Class GA Ground-water Standard/Guideline	IDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Aluminum	-	22	24.7 B	4370	6700	4940	1150	719	87.6 B
Antimony	3 ST	10	U	U	U	U	U	U	U
Arsenic	25 ST	6	U	U	6.7 B	U	U	U	U
Barium	1000 ST	1	67.9 B	93.7 B	64.4 B	56.6 B	73.6 B	70.2 B	50.7 B
Beryllium	3 GV	1	U	U	U	U	U	U	U
Cadmium	5 ST	1	1.4 B	1.4 B	1.6 B	1.7 B	U	U	U
Calcium	-	70	42800	40500	23400	15000	70200	59800	90300
Chromium	50 ST	1	U	7.1 B	13.9	10.3	4.9 B	2 B	U
Cobalt	-	2	8.7 B	5.2 B	6.8 B	13.4 B	21.8 B	24.7 B	4.2 B
Copper	200 ST	1	1.3 B	10.8 B	11.2 B	20.1 B	3.7 B	5.4 B	U
Iron	300 ST*	50	U	9480	12100	12400	2160	2120	106
Lead	25 ST	2	U	4.1	5.6	7.4	U	U	U
Magnesium	35000 GV	30	15400	9470	8060	5410	29100	19600	30300
Manganese	300 ST*	1	888	1030	757	1600	537	3230	750
Mercury	0.7 ST	0.1	U	U	U	U	U	0.23	U
Nickel	100 ST	3	13.8 B	25.8 B	35.7 B	27.9 B	18.9 B	20.4 B B	U
Potassium	-	66	2860 B	2940 B	2680 B	2590 B	4780 B	3460 B B	3100 B
Selenium	10 ST	4	U	U	U	U	U	U	4.4 B
Silver	50 ST	2	U	U	U	U	U	U	U
Sodium	20000	32	8260	19600	17500	6380	12800	9850	11700
Thallium	0.5 GV	7	U	U	U	U	U	U	U
Vanadium	-	2	U	6.2 B B	7.9 B	8.8 B	U	U	U
Zinc	2000 GV	8	U	11.7 B B	33.8	30.2	33.9	71.2	4.6 B
Cyanide	200 ST	10	U	U	U	U	U	U	U

QUALIFIERS/ABBREVIATIONS:

ug/l= Micrograms per Liter.
ST: Standard.
GV: Guidance Value.
- : Standard/guidance value not established.
IDL: Instrument Detection Limit.
U: Compound analyzed for but not detected.
B: Concentration is > IDL but < CRDL.
J: Compound found at level below CRDL, value estimated
ST*: Standard for the sum of Iron and Manganese is 500 ug/l.
CRDL: Contract Required Detection Limit.

: Concentration exceeds NYSDEC Standard/Guideline.

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
METALS

SAMPLE IDENTIFICATION			GP-W-I0	GP-W-J25	GP-W-J50	GP-W-K100	GP-W-M100	GPWL(-40)	GPWN(-25)
SAMPLE DEPTH (ft)			14-18	12-16	12-16	48-52	44-48	12-16	6-10
DATE COLLECTED			04/05/1999	01/13/1999	01/21/1999	01/09/1999	01/13/1999	10/04/1999	10/04/1999
Metals	NYSDEC Class GA Ground-water Standard/Guideline	IDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Aluminum	-	22	201	113 B	96.4 B	3290	106 B	2240	1180
Antimony	3 ST	10	U	U	U	U	U	U	U
Arsenic	25 ST	6	U	U	U	U	U	U	U
Barium	1000 ST	1	5 B	33.2 B	34.4 B	73.8 B	35.8 B	54.9 B	86.6 B
Beryllium	3 GV	1	U	U	U	U	U	U	U
Cadmium	5 ST	1	1.5 B	U	U	U	U	U	U
Calcium	-	70	8350	5100	40100	40900	50600	17000	42500
Chromium	50 ST	1	1.3 B	U	U	8.1 B	U	5.6 B	3.8 B
Cobalt	-	2	U	4.1 B	U	30.4 B	6.6 B	5.5 B	5.4 B
Copper	200 ST	1	1.8 B	U	U	13.4 B	U	10.3 B	11.2 B
Iron	300 ST*	50	343	206	177	6830	907	5280	2690
Lead	25 ST	2	3	2.2 B	U	3.1	U	U	U
Magnesium	35000 GV	30	438 B	148000	10600	12200	16600	5750	13500
Manganese	300 ST*	1	4 B	1900	2320	4440	1640	546	2010
Mercury	0.7 ST	0.1	U	0.12 B	U	0.33	U	U	U
Nickel	100 ST	3	3.4 B	7.3 B	12 B	32.1 B	10.5 B	13.7 B	10.6 B
Potassium	-	66	6900	2760 B	2390 B	3340 B	3230 B	2270 B	1880 B
Selenium	10 ST	4	4.7 B	1.2 B	U	1.5 B	U	U	U
Silver	50 ST	2	U	U	U	U	U	U	U
Sodium	20000	32	158000	16600	8100	8340	9220	5180	4560 B
Thallium	0.5 GV	7	U	U	U	U	U	U	U
Vanadium	-	2	10 B	U	U	6.3 B	U	4.6 B	3 B
Zinc	2000 GV	8	28.9	3.5 B	U	21.3	7.5 B	39.7	17.4 B
Cyanide	200 ST	10	U	U	U	U	U	U	U

QUALIFIERS/ABBREVIATIONS:

ug/l= Micrograms per Liter.
ST: Standard.
GV: Guidance Value.
- : Standard/guidance value not established.
IDL: Instrument Detection Limit.
U: Compound analyzed for but not detected.
B: Concentration is > IDL but < CRDL.
J: Compound found at level below CRDL, value estimated
ST*: Standard for the sum of Iron and Manganese is 500 ug/l.
CRDL: Contract Required Detection Limit.

: Concentration exceeds NYSDEC Standard/Guidline.

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GEOPROBE GROUNDWATER SAMPLES
METALS

SAMPLE IDENTIFICATION			GP-W-P0	GP-W-OS1	GP-W-OS2	GP-W-OS3	GP-W-0100	GP-P-Q(150)
SAMPLE DEPTH (ft)			26-30	51-55	35-39	51-55	23-27	68-72
DATE COLLECTED			01/15/1999	03/23/1999	03/25/1999	03/25/1999	03/29/1999	03/24/1999
Metals	NYSDEC Class GA Groundwater Standard/Guideline	IDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Aluminum	-	22	116 B	U	33.2 B	U	45.4 B	U
Antimony	3 ST	10	U	U	U	U	U	U
Arsenic	25 ST	6	U	U	U	U	U	U
Barium	1000 ST	1	20.3 B	52.4 B	37 B	36.9 B	119 B	127 B
Beryllium	3 GV	1	U	U	U	U	U	U
Cadmium	5 ST	1	U	1 B	U	1.3 B	1.1 B	1.1 B
Calcium	-	70	18800	19300	39800	35400	10800	51600
Chromium	50 ST	1	U	U	U	U	U	2.2 B
Cobalt	-	2	4.5 B	5.1 B	5.1 B	5.1 B	6.6 B	U
Copper	200 ST	1	U	U	1.1 B	U	1.4 B	U
Iron	300 ST*	50	258	U	U	U	139	U
Lead	25 ST	2	U	2.2 B	U	2.7 B	2.1 B	U
Magnesium	35000 GV	30	5560	5950	13400	11900	30200	19900
Manganese	300 ST*	1	851	673	909	857	2410	97.1
Mercury	0.7 ST	0.1	U	U	U	U	0.25	0.13 B
Nickel	100 ST	3	6.6 B	12.4 B	5.6 B	6.2 B	12.4 B	6.4 B
Potassium	-	66	2060 B	2380 B	2630 B	2300 B	4090 B	5950
Selenium	10 ST	4	U	U	U	U	U	U
Silver	50 ST	2	U	U	U	U	U	U
Sodium	20000	32	5000 B	4380 B	7630	6310	10800	9110
Thallium	0.5 GV	7	U	U	U	U	U	U
Vanadium	-	2	U	U	U	U	U	U
Zinc	2000 GV	8	9.9 B	94.6	U	U	U	U
Cyanide	200 ST	10	U	U	U	U	U	U

QUALIFIERS/ABBREVIATIONS:

ug/l= Micrograms per Liter.
ST: Standard.
GV: Guidance Value.
- : Standard/guidance value not established.
IDL: Instrument Detection Limit.
U: Compound analyzed for but not detected.
B: Concentration is > IDL but < CRDL.
J: Compound found at level below CRDL, value estimated
ST*: Standard for the sum of Iron and Manganese is 500 ug/l.
CRDL: Contract Required Detection Limit.

: Concentration exceeds NYSDEC Standard/Guideline.

FARRAND CONTROLS SITE

REMEDIAL INVESTIGATION / FEASIBILITY STUDY

GEOPROBE GROUNDWATER SAMPLES

METALS

SAMPLE IDENTIFICATION			GR-W-R(100)	GP-W-SUMP	GP-W-T6	GP-W-T(85)	GP-W-UG-1	GPWV1(-75)
SAMPLE DEPTH (ft)			48-52	27-31	12-16	44-48	12-16	12-16
DATE COLLECTED			01/13/1999	01/22/1999	04/14/1999	01/20/1999	04/01/99	10/04/1999
Metals	NYSDEC Class GA Ground-water Standard/Guideline	IDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Aluminum	-	22	101 B	67.1 B	51400	U	U	1500
Antimony	3 ST	10	U	U	U	U	U	U
Arsenic	25 ST	6	U	U	17.6	U	U	U
Barium	1000 ST	1	81.8 B	48.4 B	965	33.4 B	31.4 B	9.2 B
Beryllium	3 GV	1	U	U	1.11 B	U	1	U
Cadmium	5 ST	1	U	U	9.6	U	1.2 B	U
Calcium	-	70	88800	43600	83600	40200	20700	16500
Chromium	50 ST	1	U	U	190	U	U	3.1 B
Cobalt	-	2	4.9 B	17.2 B	83.9	6.3 B	3.9 B	U
Copper	200 ST	1	U	2 B	268	U	1.2 B	3.2 B
Iron	300 ST*	50	198	176	144000	70.4 B	U	1790
Lead	25 ST	2	U	U	65.3	U	U	U
Magnesium	35000 GV	30	26000	12500	61500	11200 B	7220	1570 B
Manganese	300 ST*	1	216	1630	3080	1750	523	78
Mercury	0.7 ST	0.1	U	U	0.12 B	U	0.17 B	U
Nickel	100 ST	3	U	15.5 B	150	9.1 B	10 B	U
Potassium	-	66	2940 B	2820 B	21100	2340 B	2510 B	1580 B
Selenium	10 ST	4	U	U	8.3	U	U	U
Silver	50 ST	2	U	U	U	U	U	U
Sodium	20000	32	12800	15300	15600	6010	6040	15800
Thallium	0.5 GV	7	5.2 B	U	16.5	U	U	U
Vanadium	-	2	U	U	143	U	U	U
Zinc	2000 GV	8	3.4 B	42.8	300	8.7 B	29.5	22.5
Cyanide	200 ST	10	U	U	U	U	U	U

QUALIFIERS/ABBREVIATIONS:

ug/l= Micrograms per Liter.

ST: Standard.

GV: Guidance Value.

- : Standard/guidance value not established.

IDL: Instrument Detection Limit.

U: Compound analyzed for but not detected.

B: Concentration is > IDL but < CRDL.

J: Compound found at level below CRDL, value estimated

ST*: Standard for the sum of Iron and Manganese is 500 ug/l.

CRDL: Contract Required Detection Limit.

: Concentration exceeds NYSDEC Standard/Guideline.

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GROUNDWATER MONITORING WELL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			MW-1	MW-1	MW-3	MW-3	MW-3	P-5D	P-5I	P-6
DATE OF COLLECTION			11/2/99	1/28/00	4/9/99	11/2/99	1/28/00	4/9/99	4/9/99	4/12/99
DILUTION FACTOR			1	1	200	100	100	250	200	1
UNITS			(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
LABORATORY LOCATION (ON/OFF) SITE			OFF	OFF	ON	OFF	OFF	ON	ON	ON
Targeted Compounds:	NYSDEC Class GA Ground-water Standard/Guidance Value	CRDL								
Vinyl Chloride	2 ST	10	U	U	U	U	280 J	U	U	U
Freon 113	5 ST	10	U	U	640	440 J	U	1800	U	U
1,1-Dichloroethene	5 ST	10	U	U	490	670 J	360 J	310	U	U
t-1,2-Dichloroethene	5 ST	10	NA	NA	U	NA	NA	U	U	U
1,1-Dichloroethane	5 ST	10	U	U	U	110 J	U	U	U	U
c-1,2-Dichloroethene	5 ST	10	NA	NA	U	NA	NA	U	390	U
1,2-Dichloroethene (total)	5 ST*	10	1 J	1 J	NA	200 J	U	NA	NA	NA
1,1,1-Trichloroethane	5 ST	10	U	U	6700	13000	9800	900	U	U
Trichloroethene	5 ST	10	2 J	U	830	1700	930 J	750	680	U
Total Targeted VOCs			3	U	8660	16120	11370	3760	1070	U
Additional Compounds:										
Chloroethane	5 ST	10	U	U	NA	U	U	NA	NA	NA
Chloroform	7 ST	10	U	U	NA	U	U	NA	NA	NA
Acetone	50 ST	10	U	U	NA	U	659 JB	NA	NA	NA
Methylene Chloride	5 ST	10	U	U	BQL	U	U	BQL	BQL	BQL
Carbon Tetrachloride	5 ST	10	U	U	U	U	U	U	U	U
1,2-Dichloroethane	0.6 ST	10	U	U	U	U	U	U	U	U
Tetrachloroethene	5 ST	10	U	U	U	U	U	U	U	U
Benzene	1 ST	10	2 J	1 J	U	U	U	U	U	U
Toluene	5 ST	10	U	U	U	U	U	U	U	U
Chlorobenzene	5 ST	10	U	U	U	U	U	U	U	U
Ethylbenzene	5 ST	10	U	U	U	U	U	U	U	U
M&P-Xylene	5 ST	10	U	U	U	U	U	U	U	U
O-Xylene	5 ST	10	U	U	U	U	U	U	U	U
Total Non-Targeted VOCs			2	1	U	U	659	U	U	U

QUALIFIERS/ABBREVIATIONS:

ug / l: Micrograms per liter.

U: Compound analyzed for but not detected.

B: Compound also found in the method blank.

J: Compound found at level below CRDL, value estimated.

CRDL: Contract Required Detection Limit.

BQL: Detected below the minimum quantitation limit.

NA : Compound not analyzed for.

: Exceeds NYSDEC groundwater Standard/Guidance Value.

ST: Standard

ST*: Applies to the sum of the cis and trans isomers.

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GROUNDWATER MONITORING WELL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			MW-8S	MW-8S	MW-8D	MW-8D	MW-8R	MW-8R	P-9	P-9
DATE OF COLLECTION			11/2/99	1/27/00	11/1/99	1/27/00	11/2/99	1/27/00	11/4/99	1/28/00
DILUTION FACTOR			1	1	1	1	1	1	1	1
UNITS			(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
LABORATORY LOCATION (ON/OFF) SITE			OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Targeted Compounds:	NYSDEC Class GA Ground-water Standard/Guidance Value	CRDL								
Vinyl Chloride	2 ST	10	U	U	U	U	U	U	U	U
Freon 113	5 ST	10	0.8 J	U	5 J	U	U	U	U	U
1,1-Dichloroethene	5 ST	10	U	U	U	U	U	U	U	U
t-1,2-Dichloroethene	5 ST	10	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	5 ST	10	U	U	U	U	U	1 J	U	U
c-1,2-Dichloroethene	5 ST	10	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	5 ST*	10	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	5 ST	10	U	U	U	U	U	U	U	U
Trichloroethene	5 ST	10	1 J	U	3 J	U	U	U	U	U
Total Targeted VOCs			1.8	U	8	U	U	1	U	U
Additional Compounds:										
Chloroethane	5 ST	10	U	U	U	U	U	U	U	U
Chloroform	7 ST	10	U	U	U	U	3 J	U	U	U
Acetone	50 ST	10	U	U	U	U	15	U	U	U
Methylene Chloride	5 ST	10	U	U	U	U	U	U	U	U
Carbon Tetrachloride	5 ST	10	U	U	U	U	U	U	U	U
1,2-Dichloroethane	0.6 ST	10	U	U	U	U	U	U	U	U
Tetrachloroethene	5 ST	10	U	U	U	U	U	U	U	U
Benzene	1 ST	10	U	U	U	1 J	U	0.5 J	U	U
Toluene	5 ST	10	U	U	U	U	2 J	U	U	U
Chlorobenzene	5 ST	10	U	U	U	U	U	U	U	U
Ethylbenzene	5 ST	10	U	U	U	U	U	U	U	U
M&P-Xylene	5 ST	10	U	U	U	U	U	U	U	U
O-Xylene	5 ST	10	U	U	U	U	U	U	U	U
Total Non-Targeted VOCs			U	U	U	U	20	0.5	U	U

QUALIFIERS/ABBREVIATIONS:

ug / l: Micrograms per liter.

U: Compound analyzed for but not detected.

B: Compound also found in the method blank.

J: Compound found at level below CRDL, value estimated.

CRDL: Contract Required Detection Limit.

BQL: Detected below the minimum quantitation limit.

NA : Compound not analyzed for.

: Exceeds NYSDEC groundwater Standard/Guidance Value.

ST: Standard

ST*: Applies to the sum of the cis and trans isomers.

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GROUNDWATER MONITORING WELL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			P-10	MW-10S	MW-10S	MW-10D	MW-10D	MW-10R	MW-10R	P-11
DATE OF COLLECTION			4/12/99	11/2/99	1/27/00	11/2/99	1/27/00	11/2/99	1/27/00	4/12/99
DILUTION FACTOR			1	1	1	2	2	5	10	20
UNITS			(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
LABORATORY LOCATION (ON/OFF) SITE			ON	OFF	OFF	OFF	OFF	OFF	OFF	ON
Targeted Compounds:	NYSDEC Class GA Ground-water Standard/Guidance Value	CRDL								
Vinyl Chloride	2 ST	10	3.9	5 J	14	33	27	U	U	U
Freon 113	5 ST	10	1.4	1 J	4 J	200	390	470	780	98
1,1-Dichloroethene	5 ST	10	3.5	2 J	11	30	40	200	230	72
t-1,2-Dichloroethene	5 ST	10	U	NA	NA	NA	NA	NA	NA	U
1,1-Dichloroethane	5 ST	10	9.8	12	26	65	75	270	350	U
c-1,2-Dichloroethene	5 ST	10	11	NA	NA	NA	NA	NA	NA	U
1,2-Dichloroethene (total)	5 ST*	10	NA	10	32	190	190	23 J	29 J	NA
1,1,1-Trichloroethane	5 ST	10	3.4	3 J	14	130	280	180	290	850
Trichloroethene	5 ST	10	12	9 J	36	230	260	610	630	210
Total Targeted VOCs			45	42	137	878	1262	1753	2309	1230
Additional Compounds:										
Chloroethane	5 ST	10	NA	8 J	14	4 J	5 J	U	U	NA
Chloroform	7 ST	10	NA	10	U	U	U	U	U	NA
Acetone	50 ST	10	NA	U	U	U	U	U	95 J	NA
Methylene Chloride	5 ST	10	BQL	U	3 J	1 JB	U	U	11 J	BQL
Carbon Tetrachloride	5 ST	10	U	U	U	U	U	U	U	U
1,2-Dichloroethane	0.6 ST	10	U	U	U	U	U	U	U	U
Tetrachloroethene	5 ST	10	U	U	U	U	U	U	U	U
Benzene	1 ST	10	U	0.8 J	0.9 J	U	U	U	U	U
Toluene	5 ST	10	U	U	U	U	U	U	U	U
Chlorobenzene	5 ST	10	U	U	U	U	U	U	U	U
Ethylbenzene	5 ST	10	U	U	U	U	U	U	U	U
M&P-Xylene	5 ST	10	U	U	U	U	U	U	U	U
O-Xylene	5 ST	10	U	U	U	U	U	U	U	U
Total Non-Targeted VOCs			U	18.8	17.9	5	5	U	106	U

QUALIFIERS/ABBREVIATIONS:

ug / l: Micrograms per liter.

U: Compound analyzed for but not detected.

B: Compound also found in the method blank.

J: Compound found at level below CRDL, value estimated.

CRDL: Contract Required Detection Limit.

BQL: Detected below the minimum quantitation limit.

NA : Compound not analyzed for.

: Exceeds NYSDEC groundwater Standard/Guidance Value.

ST: Standard

ST*: Applies to the sum of the cis and trans isomers.

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GROUNDWATER MONITORING WELL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			P-12	P-12	P-14	P-14	OC-17D	OC-17S	OC-18D	OC-18S
DATE OF COLLECTION			11/3/99	1/28/00	11/4/99	1/28/00	4/8/99	4/8/99	4/8/99	4/8/99
DILUTION FACTOR			1	1	1	1	200	20	200	200
UNITS			(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
LABORATORY LOCATION (ON/OFF) SITE			OFF	OFF	OFF	OFF	ON	ON	ON	ON
Targeted Compounds:	NYSDEC Class GA Ground-water Standard/Guidance Value	CRDL								
Vinyl Chloride	2 ST	10	U	U	U	U	BQL	U	U	U
Freon 113	5 ST	10	66	120	U	U	1500	120	5600	300
1,1-Dichloroethene	5 ST	10	U	U	U	U	220	85	600	64
t-1,2-Dichloroethene	5 ST	10	NA	NA	NA	NA	U	U	U	U
1,1-Dichloroethane	5 ST	10	2 J	4 J	2 J	U	130	32	250	BQL
c-1,2-Dichloroethene	5 ST	10	NA	U	NA	NA	230	57	U	U
1,2-Dichloroethene (total)	5 ST*	10	4 J	U	U	U	NA	NA	NA	NA
1,1,1-Trichloroethane	5 ST	10	34	100	0.4 J	U	840	760	3100	250
Trichloroethene	5 ST	10	24	14	U	U	680	290	1800	230
Total Targeted VOCs			130	238	2.4	U	3600	1344	11350	844
Additional Compounds:										
Chloroethane	5 ST	10	U	U	U	U	NA	NA	NA	NA
Chloroform	7 ST	10	U	U	U	U	NA	NA	NA	NA
Acetone	50 ST	10	U	U	U	U	NA	NA	NA	NA
Methylene Chloride	5 ST	10	U	U	U	U	BQL	BQL	BQL	BQL
Carbon Tetrachloride	5 ST	10	U	U	U	U	U	U	U	U
1,2-Dichloroethane	0.6 ST	10	U	U	U	U	U	U	U	U
Tetrachloroethene	5 ST	10	U	U	U	U	U	U	U	U
Benzene	1 ST	10	U	U	U	U	U	U	U	U
Toluene	5 ST	10	U	U	U	U	U	U	U	U
Chlorobenzene	5 ST	10	U	U	U	U	U	U	U	U
Ethylbenzene	5 ST	10	U	U	U	U	U	U	U	U
M&P-Xylene	5 ST	10	U	U	U	U	U	U	U	U
O-Xylene	5 ST	10	U	U	U	U	U	U	U	U
Total Non-Targeted VOCs			U	U	U	U	U	U	U	U

QUALIFIERS/ABBREVIATIONS:

ug / l: Micrograms per liter.

U: Compound analyzed for but not detected.

B: Compound also found in the method blank.

J: Compound found at level below CRDL, value estimated.

CRDL: Contract Required Detection Limit.

BQL: Detected below the minimum quantitation limit.

NA : Compound not analyzed for.

: Exceeds NYSDEC groundwater Standard/Guidance Value.

ST: Standard

ST*: Applies to the sum of the cis and trans isomers.

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GROUNDWATER MONITORING WELL SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			OC-19D	OC-19S	MW-20S	MW-20S	MW-20D	MW-20D	MW-20R	MW-20R
DATE OF COLLECTION			4/9/99	4/9/99	11/1/99	1/28/00	11/1/99	1/28/00	11/1/99	1/28/00
DILUTION FACTOR			200	50	1	1	1	1	1	1
UNITS			(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
LABORATORY LOCATION (ON/OFF) SITE			ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
Targeted Compounds:	NYSDEC Class GA Ground-water Standard/Guidance Value	CRDL								
Vinyl Chloride	2 ST	10	U	U	6 J	7 J	U	U	U	U
Freon 113	5 ST	10	6700	1600	U	U	U	U	U	U
1,1-Dichloroethene	5 ST	10	810	180	15	11	2	2 J	U	U
t-1,2-Dichloroethene	5 ST	10	U	U	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	5 ST	10	310	110	24	23	4 J	4 J	U	U
c-1,2-Dichloroethene	5 ST	10	U	U	NA	NA	NA	NA	NA	NA
1,2-Dichloroethene (total)	5 ST*	10	NA	NA	64	53	4 J	3 J	U	U
1,1,1-Trichloroethane	5 ST	10	4000	1100	U	U	U	U	U	U
Trichloroethene	5 ST	10	2400	640	U	U	32	15	U	U
Total Targeted VOCs			14220	3630	109	94	42	24	U	U
Additional Compounds:										
Chloroethane	5 ST	10	NA	NA	U	U	U	U	U	U
Chloroform	7 ST	10	NA	NA	U	U	2 J	2 J	8 J	4 J
Acetone	50 ST	10	NA	NA	U	U	U	U	U	U
Methylene Chloride	5 ST	10	BQL	BQL	U	2 J	U	U	U	10 B
Carbon Tetrachloride	5 ST	10	U	U	U	U	U	2 J	U	2 J
1,2-Dichloroethane	0.6 ST	10	U	U	U	U	U	U	U	U
Tetrachloroethene	5 ST	10	U	U	U	U	U	U	U	U
Benzene	1 ST	10	U	U	U	U	U	U	U	U
Toluene	5 ST	10	U	U	U	U	0.4 J	U	1 J	U
Chlorobenzene	5 ST	10	U	U	U	U	U	U	U	U
Ethylbenzene	5 ST	10	U	U	U	U	U	U	U	U
M&P-Xylene	5 ST	10	U	U	U	U	U	U	U	U
O-Xylene	5 ST	10	U	U	U	U	U	U	U	U
Total Non-Targeted VOCs			U	U	U	2	2.4	4	9	16

QUALIFIERS/ABBREVIATIONS:

ug / l: Micrograms per liter.

U: Compound analyzed for but not detected.

B: Compound also found in the method blank.

J: Compound found at level below CRDL, value estimated.

CRDL: Contract Required Detection Limit.

BQL: Detected below the minimum quantitation limit.

NA : Compound not analyzed for.

: Exceeds NYSDEC groundwater Standard/Guidance Value.

ST: Standard

ST*: Applies to the sum of the cis and trans isomers.

REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GROUNDWATER MONITORING WELL SAMPLE RESULTS
METALS

SAMPLE IDENTIFICATION			MW-1	MW-1	MW-3	MW-3	MW-8S	MW-8S	MW-8D	MW-8D	MW-8R
DATE OF COLLECTION			11/2/99	1/29/00	11/2/99	1/29/00	11/2/99	1/29/00	11/1/99	1/29/00	11/2/99
METALS	NYSDEC Class GA Groundwater Standard/Guidance Value	IDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Aluminum	-	22	U	859 B	U	U	U	1270	606	U	431
Antimony	3 ST	10	U	16 B	U	U	U	27.6 B	U	U	U
Arsenic	25 ST	6	5.2 B	U	5.2 B	U	U	U	U	U	5.1 B
Barium	1000 ST	1	72.4 B	66.3	44.3 B	42.7 B	22.3 B	34.5 B	35.4 B	22 B	123 B
Beryllium	3 GV	1	U	U	U	U	U	U	U	U	U
Cadmium	5 ST	1	U	U	U	U	U	U	U	U	U
Calcium	-	70	37000	23600 B	42600	33800	28400	25900	22200	16700 B	31500
Chromium	50 ST	1	U	U	U	U	U	U	U	U	U
Cobalt	-	2	U	U	U	U	U	U	3.2B	U	U
Copper	200 ST	1	U	27.6 B	U	U	U	U	U	U	2.9 B
Iron	300 ST*	50	U	9690	U	265 B	U	2750	1300	752	451
Lead	25 ST	2	U	U	U	U	U	U	U	U	U
Magnesium	35000 GV	30	9530	6640 B	12500	10100 B	6960	7330 B	6620	4810 B	5130
Manganese	300 ST*	1	2520	1630	2100	1530	U	138	101	17.6 B	40.3
Mercury	0.7 ST	0.1	U	U	U	U	U	U	U	U	U
Nickel	100 ST	3	U	U	U	U	U	U	4.2 B	U	3.1 B
Potassium	-	66	5070	1940 B	2590 B	1310 B	2800 B	1260 B	2120 B	1460 B	22500
Selenium	10 ST	4	U	U	U	U	U	U	U	U	U
Silver	50 ST	2	U	U	1.3 B	U	1.5 B	U	1.7 B	U	1.5 B
Sodium	20000	32	19600	10300 B	6350	5230 B	2250 B	1170	3570 B	2800 B	16100
Thallium	0.5 GV	7	U	U	U	U	U	U	U	U	U
Vanadium	-	2	U	U	U	U	U	6.1 B	2.5 B	U	4.4 B
Zinc	2000 GV	8	U	17.2 B	5.3 B	10.1 B	U	21.9 B	U	37.9 B	U
Cyanide	200 ST	10	U	U	U	U	U	U	U	U	U

QUALIFIERS/ABBREVIATIONS:

ug / l: Micrograms per liter.

U: Analyzed for but not detected.

B: Concentration is > IDL but <CRDL

J: Compound found at level below CRDL, value estimated.

IDL: Instrument Detection Limit.

ST: Standard.

GV : Guidance Value.

- : Standard/guidance value not established.

CRDL: Contract Required Detection Limit.

ST*: Standard for the sum of Iron and Manganese is 500 ug / l.

Exceeds NYSDEC groundwater Standard / Guidance Value.

REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GROUNDWATER MONITORING WELL SAMPLE RESULTS
METALS

SAMPLE IDENTIFICATION			MW-8R	P-9	P-9	MW-10S	MW-10S	MW-10D	MW-10D	MW-10R	MW-10R	P-12
DATE OF COLLECTION			1/29/00	11/4/99	1/29/00	11/2/99	1/29/00	11/2/99	1/29/00	11/2/99	1/29/00	11/3/99
METALS	NYSDEC Class GA Groundwater Standard/Guidance Value	IDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Aluminum	-	22	U	U	396 B	U	U	212	255 B	190 B	U	U
Antimony	3 ST	10	U	U	U	U	U	U	U	U	U	U
Arsenic	25 ST	6	U	U	U	5.4 B	U	U	U	U	U	U
Barium	1000 ST	1	68.3 B	14.9 B	18.7 B	124 B	111 B	50.9 B	44.8 B	114 B	81.1	29.2 B
Beryllium	3 GV	1	U	U	U	U	U	U	U	U	U	U
Cadmium	5 ST	1	U	U	U	U	U	2.3 B	U	U	U	U
Calcium	-	70	23700 B	10200	8240 B	138000	110000	67800	61700	46300	47800	14200
Chromium	50 ST	1	U	U	U	U	U	2.2 B	U	U	U	U
Cobalt	-	2	U	2.3B B	U	2.5 B	U	3.9 B	U	2.3 B	U	U
Copper	200 ST	1	U	U	U	U	U	4.4 B	U	U	7.3 B	U
Iron	300 ST*	50	U	U	529	U	12300	368	207 B	401	U	U
Lead	25 ST	2	U	U	U	U	U	U	U	U	U	U
Magnesium	35000 GV	30	4780 B	2280 B	2150 B	26600	27800	22600	20800	11700	12500 B	3510 B
Manganese	300 ST*	1	15.5 B	5.2B	13.7 B	2730	1890	307	237	49.6	72.7 B	58.2
Mercury	0.7 ST	0.1	U	U	U	U	U	U	U	U	U	0.13 B
Nickel	100 ST	3	U	4.5 B	U	U	U	3.9 B	U	3.8 B	U	11.5 B
Potassium	-	66	2670 B	1320 B	686 B	8710	3940 B	5470	2040 B	4040 B	2450 B	1820 B
Selenium	10 ST	4	U	U	U	7.8	U	6.4	U	U	U	U
Silver	50 ST	2	U	1.9 B	U	1.6 B	U	U	U	1.3 B	U	1.4 B
Sodium	20000	32	5980 B	2990 B	2050 B	31400	15500 U	9640	6530 B	10200	7010 B	10500
Thallium	0.5 GV	7	U	U	U	U	U	U	U	U	U	U
Vanadium	-	2	U	U	U	U	U	U	U	2.4 B	U	U
Zinc	2000 GV	8	18.7 B	U	9.1	4.9 B	18.6	9.7 B	32.5 B	U	19.1 B	U
Cyanide	200 ST	10	U	U	U	U	U	U	U	U	U	U

QUALIFIERS/ABBREVIATIONS:

ug / l: Micrograms per liter.

U: Analyzed for but not detected.

B: Concentration is > IDL but <CRDL

J: Compound found at level below CRDL, value estimated.

IDL: Instrument Detection Limit.

ST: Standard.

GV : Guidance Value.

- : Standard/guidance value not established.

CRDL: Contract Required Detection Limit.

ST*: Standard for the sum of Iron and Manganese is 500 ug / l.

Exceeds NYSDEC groundwater Standard / Guidance Value.

REMEDIAL INVESTIGATION / FEASIBILITY STUDY
GROUNDWATER MONITORING WELL SAMPLE RESULTS
METALS

SAMPLE IDENTIFICATION			P-12	P-14	P-14	MW-20S	MW-20S	MW-20D	MW-20D	MW-20R	MW-20R
DATE OF COLLECTION			1/29/00	11/4/99	1/29/00	11/1/99	1/29/00	11/1/99	1/29/00	11/1/99	1/29/00
METALS	NYSDEC Class GA Groundwater Standard/Guidance Value	IDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Aluminum	-	22	252 B	71.4 B	U	91.6 B	U	58.4 B	306 B	545	1800
Antimony	3 ST	10	U	U	U	U	U	U	U	U	U
Arsenic	25 ST	6	U	U	U	U	U	U	U	4 B	U
Barium	1000 ST	1	22.4 B	123 B	129 B	104 B	90 B	268	87.1 B	140 B	215 B
Beryllium	3 GV	1	U	U	U	U	U	U	U	U	U
Cadmium	5 ST	1	U	U	U	U	U	U	5.8 B	U	U
Calcium	-	70	11700 B	63800	74600	77400	71200	270000	229000	94400	104000
Chromium	50 ST	1	U	U	U	U	U	U	549	8.6 B	6.5 B
Cobalt	-	2	U	5.1 B	U	2.2 B	U	2.4 B	U	2 B	U
Copper	200 ST	1	U	U	U	U	U	U	8.5 B	3.3 B	15.3 B
Iron	300 ST*	50	U	U	42200	1080	U	U	269 B	801	2420
Lead	25 ST	2	U	U	U	U	U	U	U	U	U
Magnesium	35000 GV	30	3080 B	17500	21900	25800	24400 B	110000	89200	9000	1940 B
Manganese	300 ST*	1	24.6 B	8590	12000	555	522	69.9	171	19.3	31.6 B
Mercury	0.7 ST	0.1	U	NR	U	U	U	U	U	U	U
Nickel	100 ST	3	U	U	U	U	U	U	U	8.2 B	U
Potassium	-	66	662 B	5020	3260 B	4910 B	2450 B	8100	4400 B	130000	194000
Selenium	10 ST	4	U	U	U	6.7	U	U	U	U	U
Silver	50 ST	2	U	U	U	1.1B B	U	1.7 B	U	1.5 B	U
Sodium	20000	32	3890 B	7690	5860 B	24100	17100 B	26400	17800 B	62000	124000
Thallium	0.5 GV	7	U	U	U	U	U	U	U	U	U
Vanadium	-	2	U	U	U	U	U	U	U	2.5 B	7.2 B
Zinc	2000 GV	8	35.3	15.3 B	20.8	34.7	12.6 B	U	35.6	11.1 B	19.8 B
Cyanide	200 ST	10	U	U	U	U	U	U	U	U	U

QUALIFIERS/ABBREVIATIONS:

ug / l: Micrograms per liter.

U: Analyzed for but not detected.

B: Concentration is > IDL but <CRDL

J: Compound found at level below CRDL, value estimated.

IDL: Instrument Detection Limit.

ST: Standard.

GV : Guidance Value.

- : Standard/guidance value not established.

CRDL: Contract Required Detection Limit.

ST*: Standard for the sum of Iron and Manganese is 500 ug / l.

Exceeds NYSDEC groundwater Standard / Guidance Value.

TABLE H-7
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION FEASIBILITY STUDY
GEOPROBE GROUNDWATER FIELD DATA

SAMPLE IDENTIFICATION	UNITS	GP-W A-0	GP-W A-0	GP-W A-50	GP-W A-50	GP-W A-100	GP-W A-100	GP-W B-0	GP-W B-0	GP-W B-50
SAMPLE DEPTH		(8-12')	(23-27')	(10-14')	(45-49')	(4-8')	(51-55')	(12-16')	(22-26')	(8-12')
DATE OF COLLECTION		1/4/99	1/4/99	1/4/99	1/4/99	1/5/99	1/5/99	4/6/99	4/6/99	1/6/99
pH	(SU)	6.09	6.59	6.78	6.76	7.09	6.58	6.90	7.17	6.26
Conductivity	(mS / cm)	0.500	0.373	0.378	0.378	0.349	0.327	0.212	0.440	0.401
Temperature	(°C)	7.8	12.0	10.1	10.1	1.1	10.9	11.9	12.0	10.1
Dissolved Oxygen	(mg / l)	4.93	1.60	2.78	2.78	6.30	0.40	3.15	0.65	1.23
Turbidity	(NTU)	>999	>999	>999	>999	>999	>999	>999	>999	>999
DNAPL Screening	(1)	NR	NR	NR	NR	NR	NR	--	--	NR
Eh	(mV)	--	--	--	--	--	--	-26.9	-7.14	--

SAMPLE IDENTIFICATION	UNITS	GP-W B-50	GP-W B-100	GP-W B-100	GP-W C-100	GP-W C-100	GP-W-D-(-60)	GP-W-DEPRS	GP-W-DEPRS	GP-W E-(-10)
SAMPLE DEPTH		(36-40')	(12-16')	(46-50')	(12-16')	(48-52')	(4-8')	(12-16')	(38-42')	(12-16')
DATE OF COLLECTION		1/6/99	1/6/99	1/6/99	1/6/99	1/6/99	10/4/99	4/13/99	4/13/99	3/17/99
pH	(SU)	6.88	7.26	7.23	7.01	5.51	7.47	6.14	6.86	6.50
Conductivity	(mS / cm)	0.404	0.483	0.513	0.574	0.640	0.224	0.313	0.586	0.295
Temperature	(°C)	9.1	11.1	5.5	10.2	11.0	19.8	10.6	12.4	14.0
Dissolved Oxygen	(mg / l)	1.18	0.85	0.74	9.40	1.93	6.74	0.93	0.65	6.93
Turbidity	(NTU)	>999	>999	>999	>999	>999	>999	>999	>999	>999
DNAPL Screening	(1)	NR	NR	NR	NR	NR	--	--	--	NR
Eh	(mV)	--	--	--	--	--	--	--	--	-6.6

SAMPLE IDENTIFICATION	UNITS	GP-W E-0	GP-W E-0	GP-W E-100	GP-W E-100	GP-W F-(-10)	GP-W F-0	GP-W F-0	GP-W F-100	GP-W F-100
SAMPLE DEPTH		(16-20')	(39-43')	(12-16')	(58-62')	(12-16')	(16-20')	(36-40')	(12-16')	(53-57')
DATE OF COLLECTION		01/21/99	01/21/99	01/06/99	01/06/99	03/17/99	01/21/99	01/21/99	01/07/99	01/07/99
pH	(SU)	5.84	6.59	6.54	7.04	6.38	5.55	5.40	6.43	7.04
Conductivity	(mS / cm)	0.226	0.553	0.621	0.604	0.244	0.255	0.282	0.572	0.606
Temperature	(°C)	13.2	12.1	11.2	9.9	15.3	12.6	12.3	10.8	11.2
Dissolved Oxygen	(mg / l)	1.05	0.22	0.34	8.54	1.26	1.29	0.54	1.18	2.87
Turbidity	(NTU)	>999	>999	>999	>999	>999	>999	>999	>999	>999
DNAPL Screening	(1)	NR	NR	NR	NR	NR	--	--	NR	NR
Eh	(mV)	--	--	--	--	8	--	--	--	--

Qualifiers:
DNAPL: Dense Non-aqueous Phase Liquid.
- -: No data was collected for this sample.
NR: No Response.

Notes:
(1) DNPAL screening performed with Sudan IV dye.

TABLE H-7
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION FEASIBILITY STUDY
GEOPROBE GROUNDWATER FIELD DATA

SAMPLE IDENTIFICATION	UNITS	GP-W G-(-10)	GP-W G-(-10)	GP-W G-(-25)	GP-W G-(-45)	GP-W G-(-45)	GP-W G-(-65)	GP-W G-(-65)	GP-W G-(-80)	GP-W H-50
SAMPLE DEPTH		(12-16')	(16-20')	(14-18')	(12-16')	(23-27')	(12-16')	(23-27')	(12-16')	(36-40')
DATE OF COLLECTION		03/17/99	03/17/99	03/18/99	03/18/99	03/18/99	03/19/99	03/19/99	03/19/99	01/19/99
pH	(SU)	6.23	6.01	5.91	5.86	6.04	5.80	6.04	6.18	6.58
Conductivity	(mS / cm)	0.470	0.203	0.160	0.246	0.177	0.134	0.151	0.132	0.422
Temperature	(°C)	12.1	13.1	13.7	13.6	13.6	10.4	12.0	12.6	12.1
Dissolved Oxygen	(mg / l)	5.46	4.24	3.90	6.61	0.62	6.05	2.22	7.53	1.34
Turbidity	(NTU)	>999	>999	>999	>999	551	881	990	370	>999
DNAPL Screening	(1)	--	NR	NR	--	--	--	--	--	NR
Eh	(mV)	20.2	30.2	23.6	21.3	--	21.9	4.99	54.4	--

SAMPLE IDENTIFICATION	UNITS	GP-W G-(-80)	GP-W G-(-85)	GP-W G-(-85)	GP-W G-100	GP-W G-100	GP-W H-0	GP-W H-25	GP-W H-50	GP-W I-100
SAMPLE DEPTH		(20-24')	(12-16')	(18-22')	(12-16')	(58-62')	(14-18')	(12-16')	(12-16')	(12-16')
DATE OF COLLECTION		03/19/99	03/22/99	03/22/99	01/07/99	01/07/99	01/22/99	01/20/99	01/19/99	01/07/99
pH	(SU)	6.13	5.72	5.96	6.24	7.03	5.92	5.48	6.26	6.63
Conductivity	(mS / cm)	0.158	0.148	0.152	0.441	0.542	0.411	0.249	0.426	0.515
Temperature	(°C)	11.4	10.0	10.0	11.4	10.3	12.3	10.4	12.0	10.5
Dissolved Oxygen	(mg / l)	0.67	6.47	2.81	10.68	1.02	0.73	2.08	0.40	0.60
Turbidity	(NTU)	880	676	546	>999	>999	>999	>999	>999	>999
DNAPL Screening	(1)	NR	NR	NR	NR	NR	NR	--	NR	NR
Eh	(mV)	69.6	51.8	40	--	--	--	--	--	--

SAMPLE IDENTIFICATION	UNITS	GP-W H-75	GP-W H-75	GP-W H-100	GP-W H-100	GP-W I-0	GP-W I-25	GP-W I-50	GP-W I-50	GP-W J-75
SAMPLE DEPTH		(12-16')	(40-44')	(12-16')	(51-55')	(14-18')	(13-17')	(12-16')	(25-29')	(42-46')
DATE OF COLLECTION		01/13/99	01/13/99	01/07/99	01/07/99	04/05/99	04/05/99	04/05/99	04/05/99	04/01/99
pH	(SU)	6.24	6.64	6.86	6.92	4.22	6.79	6.05	6.34	6.92
Conductivity	(mS / cm)	0.396	0.515	0.567	0.585	0.593	0.363	0.338	0.285	0.562
Temperature	(°C)	11.5	11.3	9.9	10.5	12.9	12.6	11.5	12.7	11.1
Dissolved Oxygen	(mg / l)	1.13	0.62	10.62	11.66	2.48	0.19	0.85	7.70	0.82
Turbidity	(NTU)	>999	>999	>999	>999	>999	>999	>999	>999	>999
DNAPL Screening	(1)	NR	NR	NR	NR	--	--	--	NR	NR
Eh	(mV)	--	--	--	--	-55.9	-34.4	35.9	4.45	--

Qualifiers:
DNAPL: Dense Non-aqueous Phase Liquid
- -: No data was collected for this sample.
NR: No Response.

Notes:
(1) DNPAL screening performed with
Sudan IV dye.

TABLE H-7
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION FEASIBILITY STUDY
GEOPROBE GROUNDWATER FIELD DATA

SAMPLE IDENTIFICATION	UNITS	GP-W I-100	GP-W J-(-50)	GP-W J-0	GP-W J-25	GP-W J-50	GP-W J-50	GP-W J-75	GP-W J-75	GP-W L-50	GP-W Q-100
SAMPLE DEPTH		(51-55')	(10-14')	(6-10')	(12-16')	(12-16')	(26-30')	(12-16')	(17-21')	(12-16')	(12-16')
DATE OF COLLECTION		01/07/99	04/02/99	04/02/99	01/12/99	01/20/99	01/20/99	04/01/99	04/01/99	01/12/99	3/23//99
pH	(SU)	6.86	6.83	6.82	6.32	5.99	6.08	7.17	7.01	6.31	7.36
Conductivity	(mS / cm)	0.579	0.550	0.990	0.405	0.298	0.324	0.435	0.261	0.402	0.577
Temperature	(°C)	11.0	12.6	12.7	11.3	11.1	11.9	11.5	12.5	12.1	10.2
Dissolved Oxygen	(mg / l)	10.32	0.73	3.12	0.48	1.04	0.47	0.47	0.65	0.63	0.32
Turbidity	(NTU)	>999	>999	>999	>999	>999	>999	>999	>999	>999	>999
DNAPL Screening	(1)	NR	--	--	NR	NR	NR	--	--	NR	NR
Eh	(mV)	--	6.1	12.3	--	--	--	-64.9	-31.2	--	-19.1

SAMPLE IDENTIFICATION	UNITS	GP-W J-100	GP-W J-100	GP-W K-100	GP-W K-100	GP-W L-0	GP-W L-25	GP-W L-25	GP-W L-(-40)	GP-W P-100	GP-W R-100
SAMPLE DEPTH		(12-16')	(48-52')	(12-16')	(48-52')	(10.5-14.5')	(12-16')	(30-34')	(12-16')	(44-48')	(48-52')
DATE OF COLLECTION		01/08/99	01/08/99	01/08/99	01/08/99	01/12/99	01/12/99	01/12/99	10/04/99	01/13/99	01/13/99
pH	(SU)	6.79	6.71	6.91	6.38	6.44	6.62	6.15	6.42	7.54	7.23
Conductivity	(mS / cm)	0.585	0.585	5.970	0.274	0.388	0.815	0.415	0.490	0.793	0.556
Temperature	(°C)	11.2	11.2	11.3	10.6	12.8	12.3	12.9	17.1	11.0	8.7
Dissolved Oxygen	(mg / l)	0.22	0.22	0.05	0.62	1.75	2.12	0.50	5.03	1.39	1.82
Turbidity	(NTU)	<999	>999	>999	>999	>999	>999	>999	>999	>999	>999
DNAPL Screening	(1)	NR	--	NR	NR	NR	NR	NR	--	NR	NR
Eh	(mV)	--	--	--	--	--	--	--	--	--	--

SAMPLE IDENTIFICATION	UNITS	GP-W L-50	GP-W N-25	GP-W P-25	GP-W P-50	GP-W P-50	GP-W P-75	GP-W P-75	GP-W P-100	GP-W Q-200	GP-W T-85
SAMPLE DEPTH		(30-34')	(6-10')	(32-36')	(12-16')	(40-44')	(12-16')	(44-48')	(12-16')	(32-36')	(44-48')
DATE OF COLLECTION		01/12/99	10/05/99	01/14/99	01/13/99	01/13/99	01/13/99	01/13/99	01/13/99	03/26/99	01/18/99
pH	(SU)	6.24	6.54	6.94	6.77	6.77	6.44	7.20	6.43	7.98	6.71
Conductivity	(mS / cm)	0.308	0.410	0.161	0.717	0.221	1.530	0.432	1.090	0.369	0.266
Temperature	(°C)	12.8	15.8	9.1	10.1	9.1	12.3	11.8	11.5	11.0	11.8
Dissolved Oxygen	(mg / l)	0.78	4.72	3.42	0.50	0.86	0.55	1.15	2.86	1.67	0.97
Turbidity	(NTU)	>999	>999	>999	>999	>999	>999	>999	>999	>999	>999
DNAPL Screening	(1)	NR	--	NR	NR	NR	NR	NR	NR	NR	NR
Eh	(mV)	--	--	--	--	--	--	--	--	-94	--

Qualifiers:
DNAPL: Dense Non-aqueous Phase Liquid
--: No data was collected for this sample.
NR: No Response.

Notes:
(1) DNPAL screening performed with
Sudan IV dye.

TABLE H-7
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION FEASIBILITY STUDY
GEOPROBE GROUNDWATER FIELD DATA

SAMPLE IDENTIFICATION	UNITS	GP-W Q-100	GP-W Q-125	GP-W Q-125	GP-W Q-150	GP-W Q-150	GP-W Q-175	GP-W Q-175	GP-W T-4
SAMPLE DEPTH		(47-51')	(6-10')	(32-36)	(32-36')	(68-72')	(6-10')	(66-70')	(56-60')
DATE OF COLLECTION		03/23/99	03/23/99	03/25/99	03/24/99	03/23/99	03/23/99	03/23/99	04/14/99
pH	(SU)	8.22	7.08	7.77	7.52	8.67	7.42	7.94	8.04
Conductivity	(mS / cm)	0.414	0.708	0.591	0.663	0.417	0.443	0.617	0.496
Temperature	(°C)	10.7	10.1	10.9	11.8	11.9	9.2	11.6	13.1
Dissolved Oxygen	(mg / l)	0.17	0.15	0.41	0.21	0.14	0.87	2.44	0.02
Turbidity	(NTU)	>999	>999	766	>999	>999	>999	>999	>999
DNAPL Screening	(1)	NR	NR	--	--	--	NR	NR	--
Eh	(mV)	-23.9	-9.2	-43.8	-48.5	-96	-47.6	-33.7	--

SAMPLE IDENTIFICATION	UNITS	GP-W S-0	GP-W S-50	GP-W S-50	GP-W T-2	GP-W T-4	GP-W BB-0	GP-W T-10	GP-W T-85
SAMPLE DEPTH		(9-13')	(12-16')	(30-34')	(31-35')	(28-32')	(10-14')	(52-56')	(12-16')
DATE OF COLLECTION		01/22/99	01/18/99	01/18/99	04/14/99	04/14/99	04/06/99	04/14/99	01/18/99
pH	(SU)	6.31	6.85	7.19	7.89	7.28	6.66	7.70	6.78
Conductivity	(mS / cm)	0.147	0.308	0.306	1.020	0.685	0.188	0.548	0.393
Temperature	(°C)	9.6	11.0	11.5	12.7	11.9	13.5	12.9	11.8
Dissolved Oxygen	(mg / l)	3.50	1.80	2.02	0.49	0.55	2.13	0.18	0.31
Turbidity	(NTU)	>999	>999	>999	>999	>999	>999	>999	>999
DNAPL Screening	(1)	--	NR	NR	--	--	--	--	NR
Eh	(mV)	--	--	--	--	--	-11.5	--	--

SAMPLE IDENTIFICATION	UNITS	GP-W U-50	GP-W U-50	GP-W VI-75	GP-W EE-0	GP-W R-50	GP-W R-50	GP-W T-6	GP-W T-10
SAMPLE DEPTH		(12-16')	(29-33')	(12-16')	(6-10')	(12-16')	(42-46')	(36-40')	(12-16')
DATE OF COLLECTION		01/18/99	01/19/99	10/04/99	03/31/99	01/18/99	01/18/99	04/14/99	04/14/99
pH	(SU)	6.80	6.58	7.07	6.33	6.37	6.75	8.13	6.92
Conductivity	(mS / cm)	0.300	0.175	0.219	0.278	0.403	0.232	0.277	0.701
Temperature	(°C)	11.7	11.5	18.4	14.7	10.6	11.5	12.8	11.9
Dissolved Oxygen	(mg / l)	1.06	2.52	7.84	0.92	0.87	1.51	0.87	0.26
Turbidity	(NTU)	>999	>999	960	>999	>999	>999	>999	>999
DNAPL Screening	(1)	NR	NR	--	--	NR	NR	--	--
Eh	(mV)	--	--	--	-16.2	--	--	--	--

Qualifiers:
DNAPL: Dense Non-aqueous Phase Liquid
- -: No data was collected for this sample.
NR: No Response.

Notes:
(1) DNPAL screening performed with
Sudan IV dye.

TABLE H-7
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION FEASIBILITY STUDY
GEOPROBE GROUNDWATER FIELD DATA

SAMPLE IDENTIFICATION	UNITS	GP-W BB-0	GP-W BB-100	GP-W CC-50	GP-W CC-50	GP-W CC-100	GP-W DD-50	GP-W DD-100	GP-W DD-100	GP-W OS-1	GP-W EE-0
SAMPLE DEPTH		(18-22')	(64-68')	(12-16')	(44-48')	(12-16')	(44-48')	(12-16')	(59-63')	(24-28')	(16-20')
DATE OF COLLECTION		04/06/99	01/19/99	01/19/99	01/19/99	01/19/99	01/20/99	01/20/99	01/20/99	03/26/99	03/31/99
pH	(SU)	6.88	6.94	6.33	6.86	6.72	6.36	6.36	6.65	7.42	6.60
Conductivity	(mS / cm)	0.184	0.386	0.855	0.330	0.840	0.388	0.699	0.388	0.564	0.164
Temperature	(°C)	13.7	12.6	13.1	12.6	12.5	11.4	12.6	11.3	11.6	14.7
Dissolved Oxygen	(mg / l)	5.34	1.09	0.88	0.83	1.41	0.16	0.86	0.71	0.51	4.28
Turbidity	(NTU)	>999	>999	>999	>999	>999	>999	>999	>999	>999	>999
DNAPL Screening	(1)	--	NR	--	NR	NR	--	NR	NR	NR	NR
Eh	(mV)	2.7	--	--	--	--	--	--	--	-54.7	7.2

SAMPLE IDENTIFICATION	UNITS	GP-W EE-50	GP-W EE-100	GP-W EE-100	GP-W HH-0	GP-W HH-0	GP-W HH-100	GP-W OS-1 **	GP-W UG-4	GP-W OS-2	GP-W OS-2
SAMPLE DEPTH		(49-53')	(12-16')	(60-64')	(12-16')	(40-44')	(46-50')	(6-10')	(50-54')	(12-16')	(35-39')
DATE OF COLLECTION		03/31/99	03/29/99	03/29/99	03/30/99	03/30/99	03/29/99	03/22/99	03/31/99	03/24/99	03/24/99
pH	(SU)	7.52	6.72	6.53	7.27	6.98	7.03	7.00	6.37	8.06	8.03
Conductivity	(mS / cm)	0.331	0.875	0.368	0.616	0.378	0.431	0.589	0.532	0.525	0.319
Temperature	(°C)	15.9	11.4	13.1	13.9	14.4	13.9	10.1	16.4	11.0	11.9
Dissolved Oxygen	(mg / l)	0.98	1.10	0.85	1.73	0.53	0.15	0.23	0.46	0.20	0.81
Turbidity	(NTU)	467	>999	>999	>999	>999	>999	>999	>999	>999	>999
DNAPL Screening	(1)	--	NR	NR	NR	NR	NR	NR	NR	--	--
Eh	(mV)	-12.7	-36.7	-2.7	-43.1	-6	-26.7	0.2	25.6	-44.5	7.53

SAMPLE IDENTIFICATION	UNITS	GP-W OS-1	GP-W OS-3	GP-W OS-3	GP-W OS-3	GP-W UG-1	GP-W UG-3	GP-W UG-6	GP-W UG-6	SUMP	SUMP
SAMPLE DEPTH		(51-55')	(6-10')	(24-28')	(51-55')	(12-16')	(54-58')	(12-16')	(42-46')	(12-16')	(27-31')
DATE OF COLLECTION		03/22/99	03/25/99	03/25/99	03/25/99	03/30/99	03/30/99	04/02/99	04/02/99	01/21/99	01/21/99
pH	(SU)	7.46	7.00	7.62	6.99	6.55	7.39	6.93	7.22	FIELD PARA-	6.36
Conductivity	(mS / cm)	0.167	0.465	0.613	0.285	0.189	0.380	0.560	0.296	METERS NOT	0.417
Temperature	(°C)	9.9	9.0	12.1	10.9	11.6	16.1	12.7	12.9	MEASURED	15.0
Dissolved Oxygen	(mg / l)	2.81	0.80	0.77	2.31	1.96	0.05	0.75	1.00	BECAUSE OF	0.71
Turbidity	(NTU)	546	979	>999	>999	>999	>999	>999	>999	POSSIBLE	>999
DNAPL Screening	(1)	NR	--	--	--	NR	--	N	--	DNAPL	NR
Eh	(mV)	-23.7	-83.1	-45.6	-62.1	5	-20.6	-27.2	-3.6		--

Qualifiers:
DNAPL: Dense Non-aqueous Phase Liquid
- -: No data was collected for this sample.
NR: No Response.

Notes:
(1) DNPAL screening performed with Sudan IV dye.

APPENDIX I

ANALYTICAL DATA TABLES - SURFACE WATER

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SURFACE WATER SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			23 GRAND SUMP	SW-K-150	SW-N-150	SW-W-4	SW-W-POND	SW-W-H
DATE OF COLLECTION			3/25/99	10/15/99	10/15/99	4/16/99	3/23/99	3/25/99
LABORATORY LOCATION (ONSITE/OFFSITE)			ON	OFF	OFF	ON	ON	ON
DILUTION FACTOR			5	1	1	1	5	5
Targeted Compounds	NYSDEC Class C Surface-water Standard/Guideline	CRDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Vinyl Chloride	- -	10	U	U	3 J	U	U	U
Freon 113	- -	10	U	0.7 J	12	U	5.9	13
1,1-Dichloroethene	- -	10	U	U	11	U	U	BQL
t-1,2-Dichloroethene	- -	10	U	NA	NA	NA	U	U
1,1-Dichloroethane	- -	10	U	4 J	41	U	7.1	18
c-1,2-Dichloroethene	- -	10	U	NA	NA	NA	U	6.2
1,2-Dichloroethene (total)	- -	10	NA	2 J	28	U	NA	NA
1,1,1-Trichloroethane	- -	10	U	12	200	U	99	190
Trichloroethene	40	10	U	2 J	33	U	8.1	20
Total Targeted VOCs			U	20.7	328	U	120.1	247.2
Additional Compounds								
Methylene Chloride	- - -	10	U	U	1 J	U	U	U
Carbon Tetrachloride	- - -	10	U	U	U	U	U	U
1,2-Dichloroethane	- - -	10	U	2 J	U	U	U	U
Tetrachloroethene	- - -	10	U	U	U	U	U	U
Benzene	760 GV	10	U	U	U	U	U	U
Toluene	480 GV	10	U	U	U	U	U	U
Chlorobenzene	- - -	10	U	U	U	U	U	U
	150 GV	10	U	U	U	U	U	U
M&P-Xylene	- - -	10	U	NA	NA	NA	U	U
O-Xylene	- - -	10	U	NA	NA	NA	U	U
Xylene (total)	590 GV	10	NA	U	U	U	NA	NA
Chloroethane	- - -	10	NA	6 J	29	U	NA	NA
Chloroform	- - -	10	NA	2 J	1 J	U	NA	NA
Bromodichloromethane	- - -	10	NA	0.2 J	U	U	NA	NA
Acetone	- - -	10	NA	U	U	U	NA	NA
2-Butanone	- - -	10	NA	U	U	U	NA	NA
Total Non-Targeted VOCs			U	10.2	31	U	U	U

QUALIFIERS/ABBREVIATIONS:

ug / l: Micrograms per liter
U: Compound analyzed for but not detected
CRDL: Contract Required Detection Limit
GV: Guidance Value
NA: Not analyzed
J: Compound detected below CRDL
B: Compound also found in the method blank
---: Not established

: Concentration exceeds NYSDEC Standard/Guideline

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SURFACE WATER SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			SW-W-K	SW-W-O	SW-W-1(FF)	SW-W-OF0
DATE OF COLLECTION			3/25/99	3/25/99	1/5/99	3/26/99
LABORATORY LOCATION (ONSITE/OFFSITE)			ON	ON	OFF	ON
DILUTION FACTOR			5	10	1	5
Targeted Compounds	NYSDEC Class C Surface-water Standard/Guideline	CRDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Vinyl Chloride	--	10	U	U	U	U
Freon 113	--	10	8.9	U	U	U
1,1-Dichloroethene	--	10	U	U	U	U
t-1,2-Dichloroethene	--	10	U	U	NA	U
1,1-Dichloroethane	--	10	U	U	U	U
c-1,2-Dichloroethene	--	10	U	U	NA	U
1,2-Dichloroethene (total)	--	10	NA	NA	U	NA
1,1,1-Trichloroethane	--	10	32	47	U	U
Trichloroethene	40	10	U	U	U	U
Total Targeted VOCs			40.9	47	U	U
Additional Compounds						
Methylene Chloride	---	10	U	U	U	U
Carbon Tetrachloride	---	10	U	U	U	U
1,2-Dichloroethane	---	10	U	U	U	U
Tetrachloroethene	---	10	U	U	U	U
Benzene	760 GV	10	U	U	U	U
Toluene	480 GV	10	U	U	U	U
Chlorobenzene	---	10	U	U	U	U
	150 GV	10	U	U	U	U
M&P-Xylene	---	10	U	U	NA	U
O-Xylene	---	10	U	U	NA	U
Xylene (total)	590 GV	10	NA	NA	U	NA
Chloroethane	---	10	NA	NA	U	NA
Chloroform	---	10	NA	NA	U	NA
Bromodichloromethane	---	10	NA	NA	U	NA
Acetone	---	10	NA	NA	U	NA
2-Butanone	---	10	NA	NA	U	NA
Total Non-Targeted VOCs			U	U	U	U

QUALIFIERS/ABBREVIATIONS:

ug / l: Micrograms per liter
U: Compound analyzed for but not detected
CRDL: Contract Required Detection Limit
GV: Guidance Value
NA: Not analyzed
J: Compound detected below CRDL
B: Compound also found in the method blank
---: Not established

: Concentration exceeds NYSDEC Standard/Guideline

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SURFACE WATER SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			SW-W-OF1		SW-W-OF2		SW-OF2
DATE OF COLLECTION			3/26/99		3/26/99		10/15/99
LABORATORY LOCATION (ONSITE/OFFSITE)			ON	OFF	ON	OFF	OFF
DILUTION FACTOR			5	5	25	10	20
Targeted Compounds	NYSDEC Class C Surface-water Standard/Guideline	CRDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Vinyl Chloride	--	10	U	U	U	U	28 J
Freon 113	--	10	U	U	51	U	120 J
1,1-Dichloroethene	--	10	U	U	48	35 J	110 J
t-1,2-Dichloroethene	--	10	U	NA	U	NA	NA
1,1-Dichloroethane	--	10	U	4 J	37	54 J	420
c-1,2-Dichloroethene	--	10	11	NA	41	NA	NA
1,2-Dichloroethene (total)	--	10	NA	16	NA	51 J	300
1,1,1-Trichloroethane	--	10	17	16	1100	1300	2300
Trichloroethene	40	10	19	24	280	280	370
Total Targeted VOCs			47	60	1557	1720	3648
Additional Compounds							
Methylene Chloride	---	10	U	2 J	U	44 JB	21 J
Carbon Tetrachloride	---	10	U	U	U	U	U
1,2-Dichloroethane	---	10	U	U	U	U	U
Tetrachloroethene	---	10	U	U	U	23 J	U
Benzene	760 GV	10	U	U	U	U	U
Toluene	480 GV	10	U	U	U	U	U
Chlorobenzene	---	10	U	U	U	U	U
	150 GV	10	U	U	U	U	U
M&P-Xylene	---	10	U	NA	U	NA	NA
O-Xylene	---	10	U	NA	U	NA	NA
Xylene (total)	590 GV	10	NA	U	NA	U	U
Chloroethane	---	10	NA	U	NA	U	270
Chloroform	---	10	NA	U	NA	U	U
Bromodichloromethane	---	10	NA	U	NA	U	U
Acetone	---	10	NA	8 JB	NA	100 B	320
2-Butanone	---	10	NA	U	NA	U	U
Total Non-Targeted VOCs			U	10	U	167	611

QUALIFIERS/ABBREVIATIONS:

ug / l: Micrograms per liter
U: Compound analyzed for but not detected
CRDL: Contract Required Detection Limit
GV: Guidance Value
NA: Not analyzed
J: Compound detected below CRDL
B: Compound also found in the method blank
---: Not established

: Concentration exceeds NYSDEC Standard/Guideline

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SURFACE WATER SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			SW-W-OF3		SW-W OS-2	SW-W-OS3 Stream	SW-W-TRIB-A	SW-W-TRIB-B
DATE OF COLLECTION			3/26/99		3/28/99	3/25/99	3/25/99	3/25/99
LABORATORY LOCATION (ONSITE/OFFSITE)			ON	OFF	OFF	ON	ON	ON
DILUTION FACTOR			5	1	1	5	5	1
Targeted Compounds	NYSDEC Class C Surface-water Standard/Guideline	CRDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Vinyl Chloride	--	10	U			U	U	U
Freon 113	--	10	11	U	U	U	U	U
1,1-Dichloroethene	--	10	U	U	U	U	U	U
t-1,2-Dichloroethene	--	10	U	NA	NA	U	U	U
1,1-Dichloroethane	--	10	U	2 J	2 J	U	U	U
c-1,2-Dichloroethene	--	10	U	NA	NA	U	U	U
1,2-Dichloroethene (total)	--	10	NA	U	1 J	NA	NA	NA
1,1,1-Trichloroethane	--	10	24	19	24	5.2	U	U
Trichloroethene	40	10	BQL	5 J	2 J	U	U	U
Total Targeted VOCs			35	26	29	5.2	U	U
Additional Compounds								
Methylene Chloride	---	10	U	2 JB	4 JB	U	U	U
Carbon Tetrachloride	---	10	U	U	U	U	U	U
1,2-Dichloroethane	---	10	U	U	U	U	U	U
Tetrachloroethene	---	10	U	U	U	U	U	U
Benzene	760 GV	10	U	U	U	U	U	U
Toluene	480 GV	10	U	U	U	U	U	U
Chlorobenzene	---	10	U	U	U	U	U	U
	150 GV	10	U	U	U	U	U	U
M&P-Xylene	---	10	U	NA	U	U	U	U
O-Xylene	---	10	U	NA	U	U	U	U
Xylene (total)	590 GV	10	NA	U	U	NA	NA	NA
Chloroethane	---	10	NA	U	U	NA	NA	NA
Chloroform	---	10	NA	U	U	NA	NA	NA
Bromodichloromethane	---	10	NA	U	U	NA	NA	NA
Acetone	---	10	NA	4 JB	38 B	NA	NA	NA
2-Butanone	---	10	NA	3 J	U	NA	NA	NA
Total Non-Targeted VOCs			U	9	42	U	U	U

QUALIFIERS/ABBREVIATIONS:

ug / l: Micrograms per liter
U: Compound analyzed for but not detected
CRDL: Contract Required Detection Limit
GV: Guidance Value
NA: Not analyzed
J: Compound detected below CRDL
B: Compound also found in the method blank
---: Not established

: Concentration exceeds NYSDEC Standard/Guideline

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SURFACE WATER SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			SW-W-UG1	SW-W-UG2	SW-XA-175
DATE OF COLLECTION			3/30/99	3/31/99	10/15/99
LABORATORY LOCATION (ONSITE/OFFSITE)			ON	ON	OFF
DILUTION FACTOR			1	1	1
Targeted Compounds	NYSDEC Class C Surface-water Standard/Guideline	CRDL	(ug / l)	(ug / l)	(ug / l)
Vinyl Chloride	--	10	1.7	U	U
Freon 113	--	10	U	U	0.3 J
1,1-Dichloroethene	--	10	U	U	U
t-1,2-Dichloroethene	--	10	U	U	NA
1,1-Dichloroethane	--	10	U	U	2 J
c-1,2-Dichloroethene	--	10	1.3	U	NA
1,2-Dichloroethene (total)	--	10	NA	NA	0.8 J
1,1,1-Trichloroethane	--	10	U	U	4 J
Trichloroethene	40	10	U	2	0.6 J
Total Targeted VOCs			3	2	7.7
Additional Compounds					
Methylene Chloride	---	10	BQL	BQL	U
Carbon Tetrachloride	---	10	U	U	U
1,2-Dichloroethane	---	10	U	U	U
Tetrachloroethene	---	10	U	U	U
Benzene	760 GV	10	U	U	U
Toluene	480 GV	10	U	U	U
Chlorobenzene	---	10	U	U	U
	150 GV	10	U	U	U
M&P-Xylene	---	10	U	U	NA
O-Xylene	---	10	U	U	NA
Xylene (total)	590 GV	10	NA	NA	U
Chloroethane	---	10	NA	NA	4 J
Chloroform	---	10	NA	NA	2 J
Bromodichloromethane	---	10	NA	NA	0.3 J
Acetone	---	10	NA	NA	U
2-Butanone	---	10	NA	NA	U
Total Non-Targeted VOCs			U	U	6.3

QUALIFIERS/ABBREVIATIONS:

ug / l: Micrograms per liter
U: Compound analyzed for but not detected
CRDL: Contract Required Detection Limit
GV: Guidance Value
NA: Not analyzed
J: Compound detected below CRDL
B: Compound also found in the method blank
---: Not established

: Concentration exceeds NYSDEC Standard/Guideline

TABLE I-2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SURFACE WATER SAMPLE RESULTS

PCBs

SAMPLE IDENTIFICATION			SW-W-4	SW-W-OF1	SW-W-OF2	SW-W-OF3	SW-W-1(FF)	SW-W-OS-2
DATE OF COLLECTION			4/16/99	3/25/99	3/25/99	3/25/99	1/5/99	3/29/99
DILUTION FACTOR			1	1	1	1	1	1
PCBs	NYSDEC Class C Surface Water Standard/Guideline	CRDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Aroclor-1016	*	1	U	U	U	U	U	U
Aroclor-1221	*	2	U	U	U	U	U	U
Aroclor-1232	*	1	U	U	U	U	U	U
Aroclor-1242	*	1	U	U	U	U	U	U
Aroclor-1248	*	1	U	U	U	U	U	U
Aroclor-1254	*	1	U	U	U	U	U	U
Aroclor-1260	*	1	U	U	U	U	U	U
Total PCBs	10^{-6}** ST		U	U	U	U	U	U

QUALIFIERS/ABBREVIATIONS:
ug/ l: Micrograms per liter.
U: Compound analyzed for but not detected.
CRDL: Contract Required Detection Limit.
ST: Standard.
*: Standard not provided for individual constituents.
**: Applies to the sum of Aroclors.

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
SURFACE WATER SAMPLE RESULTS
INORGANIC PARAMETERS

SAMPLE IDENTIFICATION			SW-K-150	SW-N-150	SW-W-4	SW-W-OF1	SW-W-OF2	SW-W-OF2
DATE OF COLLECTION			10/15/99	10/15/99	4/15/99	03/25/99	03/25/99	10/15/99
Metals	NYSDEC Class C Surface Water Standard/Guideline	IDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Aluminum	---	22	170 B	1580	131000	U	87.3 B	U
Antimony	---	10	U	U	U	U	U	U
Arsenic	150 ST	6	U	U	176	U	U	U
Barium	---	1	54.2 B	106 B	2060	24.5 B	47.1 B	71.8 B
Beryllium	11 ST	1	U	U	2.1 B	U	U	U
Cadmium	2.1*	1	U	U	43.1	1.3 B	1.3 B	U
Calcium	---	70	31500	33800	68600	20000	34000	48200
Chromium	74.1*	1	U	3.7 B	234	U	1.2 B	U
Cobalt	5 ST	2	U	U	164	U	U	U
Copper	8.9*	1	6.7 B	22.6 B	963	1.8 B	30.5	36.2
Iron	300 ST	50	1380	7230	479000	102	895	2920
Lead	3.8*	2	U	16.8	1310	U	2.2 B	U
Magnesium	---	30	9930	10400	49500	5670	6180	9710
Manganese	---	1	267	668	4170	4.8 B	189	699
Mercury	0.0007 ST	0.1	U	U	1.3	U	U	U
Nickel	52*	3	U	4.2 B	428	5.5 B	5.5 B	U
Potassium	---	66	1980 B	2160 B	26700	1600 B	3460 B	4070 B
Selenium	4.6 ST	4	U	U	46.9	U	U	U
Silver	0.1 ST	2	U	U	U	U	U	U
Sodium	---	32	14000	13100	10900	7390	31600	26300
Thallium	8 ST	7	U	U	34.8	U	U	U
Vanadium	14 ST	2	U	5.1 B	352	U	U	U
Zinc	82.6*	8	188	123	2520	U	16.5 B	70
Cyanide	5.2 ST	10	U	U	U	U	U	U
TOC (mg / L)	---	-	NA	NA	30.4	1.61	1.22	NA

QUALIFIERS/ABBREVIATIONS:
ug / l: Micrograms per liter.
U: Compound analyzed for but not detected.
CRDL: Contract Required Detection Limit.
ST: Standard.
B: Concentration is > IDL but < CRDL.
: Concentration exceeds NYSDEC Standard/Guideline.
NA: Compound not analyzed.
IDL: Instrument Detection Level

NOTE:
--- : Value not established.
*: Value was calculated using default value for hardness of 100 ppm

FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
SURFACE WATER SAMPLE RESULTS
INORGANIC PARAMETERS

SAMPLE IDENTIFICATION			SW-W-OF3	SW-W-OS2	SW-W-1(FF)	SW-XA-175
DATE OF COLLECTION			03/25/99	03/29/99	1/6/99	10/15/99
Metals	NYSDEC Class C Surface Water Standard/Guideline	IDL	(ug / l)	(ug / l)	(ug / l)	(ug / l)
Aluminum	---	22	U	U	54.9 B	56.2 B
Antimony	---	10	U	U	U	U
Arsenic	150 ST	6	U	7 B	3.1 B	U
Barium	---	1	24.1 B	39 B	23 B	51.6 B
Beryllium	11 ST	1	U	U	U	U
Cadmium	2.1*	1	1.3 B	1.1 B	U	U
Calcium	---	70	16200	31200	15600	32300
Chromium	74.1*	1	U	U	U	U
Cobalt	5 ST	2	U	U	U	U
Copper	8.9*	1	4.6 B	2.4 B	U	2.5 B
Iron	300 ST	50	159	133	31.6 B	620
Lead	3.8*	2	U	U	U	U
Magnesium	---	30	3140 B	9360	4710 B	9870
Manganese	---	1	20.5	12.9 B	U	139
Mercury	0.0007 ST	0.1	U	U	U	U
Nickel	52*	3	13.5 B	3.5 B	U	U
Potassium	---	66	1190 B	1970 B	1380 B	1910 B
Selenium	4.6 ST	4	U	4.8 B	U	U
Silver	0.1 ST	2	U	U	U	U
Sodium	---	32	4630 B	23100	6020	15200
Thallium	8 ST	7	U	U	5.5 B	U
Vanadium	14 ST	2	U	U	U	U
Zinc	82.6*	8	45.1	U	5.6 B	82.9
Cyanide	5.2 ST	10	U	U	U	U
TOC (mg / L)	---	-	1.31	3.36	NA	NA

QUALIFIERS/ABBREVIATIONS:
ug / l: Micrograms per liter.
U: Compound analyzed for but not detected.
CRDL: Contract Required Detection Limit.
ST: Standard.
B: Concentration is > IDL but < CRDL.
[ ]: Concentration exceeds NYSDEC Standard/Guideline.
NA: Compound not analyzed.
IDL: Instrument Detection Level

NOTE:
- :Value not established
*: Value was calculated using default value for hardness of 100 ppm

APPENDIX J

ANALYTICAL DATA TABLES - SURFACE WATER SEDIMENT

TABLE J - 1
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SURFACE WATER SEDIMENT SAMPLE RESULTS
VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION			SED K-150	SED N-150	SED OF-1	SED 0F-3	SED S-4	SED XA-175
SAMPLE DEPTH			0-4"	0-4"	0-4"	0-4"	0-4"	0-4"
DATE OF COLLECTION			10/15/99	10/15/99	03/26/99	03/25/99	04/15/99	10/15/99
DILUTION FACTOR			1	1	1	1	1	1
PERCENT SOLIDS			100	100	50	83	25	32
Targeted Compounds	NYSDEC Sediment Criteria	CRDL	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)
Vinyl Chloride	---	10	U	U	3 J	U	U	U
Freon 113	---	10	U	U	U	U	U	U
1,1-Dichloroethene	---	10	U	U	U	U	U	U
1,2-Dichloroethene(total)	---	10	U	U	5 J	U	U	U
1,1-Dichloroethane	---	10	3 J	U	10 J	3 J	U	5 J
1,1,1-Trichloroethane	---	10	U	U	2 J	18	U	1 J
Trichloroethene	---	10	0.7 J	U	7 J	10 J	U	U
TOTAL TARGETED VOCs			3.7	ND	27	31	ND	6
Additional Compounds		10						
Acetone	---	10	31 B	14 B	18 JB	7 JB	220 B	76 B
Methylene Chloride	---	10	1 J	2 J	23	12	6 JB	6 J
Carbon Tetrachloride	---	10	U	U	U	U	U	U
1,2-Dichloroethane	---	10	U	U	U	U	U	U
Tetrachloroethene	---	10	U	U	U	U	U	U
Benzene	1595[1]/306[2]/283[3]	10	U	U	U	U	U	U
Toluene	2759[1]/529[2]/490[3]	10	U	U	U	U	U	U
Chlorobenzene	197[1]/38[2]/35[3]	10	U	U	U	1 J	U	U
Ethylbenzene	1351[1]/259[2]/240[3]	10	U	U	U	U	U	U
M&P-Xylene	5180[1]/994[2]/920[3]	10	U	U	NA	NA	U	U
O-Xylene	5180[1]/994[2]/920[3]	10	U	U	NA	NA	U	U
Xylenes	5180[1]/994[2]/920[3]	10	U	U	U	U	U	U
Carbon Disulfide	---	10	U	U	1 J	U	2 J	1 J
2-Butanone	---	10	9 J	7 J	4 J	4 J	78 B	43
TOTAL NON-TARGETED VOCs			41	23	46	24	306	121

QUALIFIERS/ABBREVIATIONS:

---: Not established

VOCs: Volatile organic compounds

U: Compound analyzed for but not detected

CRDL: Contract Required Detection Limit

J: Compound found at or below CRDL. Value estimated

B: Compound also found in method blank.

ug/kg: Micrograms per kilogram

WQC: Water Quality Criteria

NOTES

: Concentration exceeds NYSDEC WQC

[1] Value derived using Equilibrium Partitioning method and appropriate surface water criteria (NYSDEC Division of Fish, Wildlife and Marine Resources *Technical Guidance For Screening Contaminated Sediment* January 1999, for sample SED-OF-1, based on fraction organic carbon = 5.63%

[2] Value derived using method and sources described above, for sample SED-OF-3, based on fraction organic carbon = 1.08%

[3] Value derived using method and source described above, for default fraction organic carbon = 1%, for samples where TOC was not analyzed.

TABLE A - 11
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION FEASIBILITY STUDY
NYSDEC GUIDANCE VALUES FOR SURFACE WATER SEDIMENT CONTAMINANTS

	LOG Kow	Kow	Benthic Aquatic Life Chronic Toxicity (Fresh) WQC	Benthic Aquatic Life Chronic Toxicity (Fresh) Scoc	Benthic Aquatic Life Chronic Toxicity (Fresh) SC (foc = 5.63%) [1]	Benthic Aquatic Life Chronic Toxicity (Fresh) SC (foc = 1.08%) [2]	Benthic Aquatic Life Chronic Toxicity (Fresh) SC (foc = 1%) [3]
Compound/Constituent		l/kg	ug/l	ug/gOC	ug/kg	ug/kg	ug/kg
Targeted VOCs							
Vinyl Chloride	0.06	14.13	-	-	-	-	-
1,2-Dichloroethene (total)	1.48	30.2	-	-	-	-	-
1,1-Dichloroethane	1.48	30.2	-	-	-	-	-
1,1,1-Trichloroethane	n.a.	n.a.	-	n.a.	n.a.	n.a.	n.a.
Trichloroethene	2.29	194.98	-	-	-	-	-
Additional VOCs							
Acetone	n.a.	n.a.	-	n.a.	n.a.	n.a.	n.a.
Methylene Chloride	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.
Chlorobenzene	2.84	691.83	5	3.5	197	38	35
Carbon Disulfide	n.a.	n.a.	nr	n.a.	n.a.	n.a.	n.a.
2-Butanone	n.a.	n.a.	-	n.a.	n.a.	n.a.	n.a.
BTEX							
Benzene	2.13	134.9	210	28	1595	306	283
Ethylbenzyne	3.15	1412.54	17	24	1351	259	240
Toluene	2.69	489.78	100	49	2759	529	490
Xylene	3.15	1412.54	65	92	5180	994	920

NOTES:

[1] Value derived using Equilibrium Partitioning method and appropriate surface water criteria (NYSDEC Division of Fish, Wildlife and Marine Resources, *Technical Guidance For Screening Contaminated Sediment, January, 1999*) using an organic carbon content of 5.63% (foc = 56.3g OC/kg sediment)

[2] Value derived using Equilibrium Partitioning method and appropriate surface water criteria (NYSDEC Division of Fish, Wildlife and Marine Resources, *Technical Guidance For Screening Contaminated Sediment,* January,1999) using an organic carbon content of 1.08% (foc = 10.8g

[3] Values derived using Equilibrium Partitioning method and appropriate surface water criteria (NYSDEC Division of Fish, Wildlife and Marine Resources, *Technical Guidance For Screening Contaminated Sediment*, January, 1999) using a default organic carbon content of 1% (foc = 10 g

l/kg : liters per kilogram

ug/kg : micrograms per kilogram

ug/gOC : Micrograms per gram organic carbon

- : no surface water/sediment guidance value established.

n.r.: not regulated

n.a. - derivation using equilibrium partitioning not valid as compound is polar organic

foc: fraction organic carbon by weight

K_{ow}: octanol/water partition coefficient

K_{oc}: sediment organic carbon/water partition coefficeint, where K_{oc} approximately = K_{ow}

WQC: water quality criterion

SCoc: organic carbon normalized sediment criterion, where SCoc = WQC * K_{ow}

SC : site specific sediment criteria, where SC = SCoc * foc

Dvirka and Bartilucci CONSULTING ENGINEERS

Sheet No. 1 of 5
By V. Vassil Date 6/7/00
Chkd. by _____ Date _____

Project: Farrand Controls Job No. 1617
Subject: Determination of Sc for Benzene; log Kow = 2.13, WQC = 210 ug/l

$SCoc = WQC \times Kow$

$= 210\ ug/l \times 134.9\ l/kg \times 1\ kg/1000\ g\ OC$

$= 28.33\ ug/g\ OC$

a) For sediment samples with no TOC analysis (SED-K-150, SED-N-150, SD-S-4 and SED-XA-175): use default FOC = 1% = 10 g OC/kg

$Sc = SCoc \times foc$

$= 28.33\ ug/g\ OC \times 10\ g\ OC/kg$

$= 283\ ug/kg = 0.28\ mg/kg$

b) For sediment sample SED-OF3; where TOC = 10800 mg/kg, FOC = 10.8 g OC/kg

$Sc = SCoc \times foc$

$= 28.33\ ug/g\ OC \times 10.8\ g\ OC/kg$

$= 306\ ug/kg = .31\ mg/kg$

c) For sediment sample SED-OF1; where TOC = 56300 mg/kg, FOC = 56.3 g OC/kg

$Sc = SCoc \times foc$

$= 28.33\ ug/g\ OC \times 56.3\ g\ OC/kg$

$= 1,595\ ug/kg = 1.6\ mg/kg$

$$\text{Coc} = \text{WCQ} \times \text{Kow}$$

$$= 17\ \text{ug/l} \times 1412.5\ \text{l/kg} \times 1\ \text{kg}/1000\ \text{g OC}$$

$$= 24\ \text{ug/g OC}$$

a) FOR SEDIMENT SAMPLES WITH NO TOC ANALYSIS, USE DEFAULT
FOC = 1% = 10 g OC/kg

$$Sc = SCoc \times foc$$

$$= 24\ \text{ug/g OC} \times 10\ \text{g OC/kg}$$

$$= 240\ \text{ug/kg}$$

B) FOR SEDIMENT SAMPLE # SED-OF 3; WHERE TOC = 10,800 mg/kg
FOC = 1.08% = 10.8 g OC/kg

$$SC = SCoc \times foc$$

$$= 24\ \text{ug/g OC} \times 10.8\ \text{g OC/kg}$$

$$= 259\ \text{ug/kg}$$

c) FOR SEDIMENT SAMPLE # SED-OF 1; WHERE TOC = 56,300 mg/kg
FOC = 5.63% = 56.3 g OC/kg

$$Sc = SCoc \times foc$$

$$= 24\ \text{ug/g OC} \times 56.3\ \text{g OC/kg}$$

$$= 1,351\ \text{ug/kg}$$

Dvirka and Bartilucci CONSULTING ENGINEERS

Sheet No. 3 of 5
By V. VASSIL Date 6/7/00
Chkd. by _____ Date _____

Project: FARRAND CONTROLS Job No. 1617
Subject: DETERMINATION OF Sc FOR TOLUENE; $\log K_{OW} = 2.69$
$WCQ = 100\ ug/l$

$SC_{OC} = WQC \times K_{OW}$

$= 100\ ug/l \times 489.8\ l/kg \times 1\ kg/1000\ g\ OC$

$= 49\ ug/g\ OC$

a) FOR SEDIMENT SAMPLES WITH NO TOC ANALYSIS, USE $f_{OC} = 1\%$
$f_{OC} = 10\ g\ OC/kg$

$S_c = SC_{OC} \times f_{OC}$

$= 49\ ug/g\ OC \times 10\ g\ OC/kg$

$= 490\ ug/kg$

b) FOR SEDIMENT SAMPLE SED-OF3, WHERE TOC = 10 800 mg/kg
$f_{OC} = 1.08\% = 10.8\ g\ OC/kg$

$S_c = SC_{OC} \times f_{OC}$

$= 49\ ug/g\ OC \times 10.8\ g\ OC/kg$

$= 529\ ug/kg$

c) FOR SEDIMENT SAMPLE SED-OF1, WHERE TOC = 56300 mg/kg
$f_{OC} = 5.63\% = 56.3\ g\ OC/kg$

$S_c = SC_{OC} \times f_{OC}$

$= 49\ ug/g\ OC \times 56.3\ g\ OC/kg$

$= 2,758.7\ ug/kg$

Dvirka and Bartilucci CONSULTING ENGINEERS

Sheet No. 4 of 5
By V. Vassil Date 6/7/00
Chkd. by _____ Date _____

Project: Farrand Controls Job No. 1617
Subject: Determination of Sc for Xylene; log Kow = 3.15
WQC = 65 ug/l

$SCoc = WQC \times Kow$

$= 65\ ug/l \times 1412.5\ l/kg \times 1\ kg/1000\ g\ OC$

$= 91.8\ ug/g\ OC = 92\ ug/g\ OC$

a) For sediment samples with no TOC analysis, use default:
FOC = 1% = 10 g OC/kg

$Sc = SCoc \times foc$

$= 92\ ug/g\ OC \times 10\ g\ OC/kg$

$= 920\ ug/kg$

b) For sediment sample SED-OF3, where TOC = 10,800 mg/kg
FOC = 10.8 g OC/kg

$Sc = SCoc \times foc$

$= 92\ ug/g\ OC \times 10.8\ g\ OC/kg$

$= 994\ ug/kg$

c) For sediment sample SED-OF1, where TOC = 56300 mg/kg
FOC = 56.3 g OC/kg

$Sc = SCoc \times foc$

$= 92\ ug/g\ OC \times 56.3\ g\ OC/kg$

$= 5180\ ug/kg$

Dvirka and Bartilucci CONSULTING ENGINEERS

Sheet No. 5 of 5
By V. Vassick Date 6/7/00
Chkd. by _____ Date _____

Project: FARRAND CONTROLS Job No. 1607
Subject: DETERMINATION OF Sc FOR CHLOROBENZENE; log Kow = 2.84
WQC = 5.0 ug/l

$SCoc = WQC \times Kow$

$= 5\ ug/l \times 691.8\ l/kg \times 1\ kg/1000\ g\ OC$

$= 3.5\ ug/g\ OC$

a) FOR SEDIMENT SAMPLES WITH NO TOC ANALYSIS, USE DEFAULT Foc = 1% = 10 g OC/kg:

$Sc = SCoc \times foc$

$= 3.5\ ug/g\ OC \times 10\ g\ OC/kg$

$= 35.0\ ug/kg$

b) FOR SEDIMENT SAMPLE SED-OF3, WHERE TOC = 10800 mg/kg.
Foc = 1.08 % = 10.8 g OC/kg

$Sc = SCoc \times foc$

$= 3.5\ ug/g\ OC \times 10.8\ g\ OC/kg$

$= 37.8\ ug/kg = 38\ ug/kg$

c) FOR SEDIMENT SAMPLE SED-OF1, WHERE TOC = 56300 mg/kg:
foc = 5.63 % = 56.3 g OC/kg

$Sc = SCoc \times foc$

$= 3.5\ ug/g\ OC \times 56.3\ g\ OC/kg$

$= 197\ ug/kg$

TABLE J - 2
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
SURFACE WATER SAMPLE RESULTS
PCBs

SAMPLE IDENTIFICATION			SW-K-150	SW-N-150	SW-W-OF1	SW-W-0F3	SW-W-4	SW-XA-175
SAMPLE DEPTH			0-4"	0-4"	0-4"	0-4"	0-4"	0-4"
DATE OF COLLECTION			10/15/99	10/15/99	4/5/99	3/25/99	4/15/99	10/15/99
DILUTION FACTOR			1	1	1	1	1	1
PERCENT SOLIDS			45	26	40	87	40	43
PCBs	NYSDEC Screening Guidance Value	CRDL	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)	(ug / kg)
Aroclor-1016	*	33	U	U	U	U	U	U
Aroclor 1221	*	66	U	U	U	U	U	U
Aroclor-1232	*	33	U	U	U	U	U	U
Aroclor-1242	*	33	U	U	U	U	U	U
Aroclor-1248	*	33	U	U	120 P	U	U	U
Aroclor-1254	*	33	U	U	150 P	7.1 JP	U	U
Aroclor-1260	*	33	U	U	U	U	20 JP	U
TOTAL PCBs	19.3 ug/gOC	160	U	U	270	7.1	20	U

QUALIFIERS/ABBREVIATIONS:
*: Guidance value applies to total
GV: Guidance value
ug/kg: Micrograms per kilogram
CRDL: Contract Required Detection Limit
- : Not established
U: Compound analyzed for but not detected.
P: Concentrations between the 2 columns were > 25% different, lower value reported.
: Concentration exceeds NYSDEC Screening Guidance Value

TABLE J-3
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/ FEASIBILITY STUDY
SURFACE WATER SEDIMENT SAMPLE RESULTS
INORGANIC PARAMETERS

SAMPLE IDENTIFICATION				SED-K-150	SED-N-150	SED-0F1	SED-0F3	SD-S-4	SED-XA-175
SAMPLE DEPTH				0-4"	0-4"	0-4"	0-4"	0-4"	0-4"
DATE OF COLLECTION				10/15/99	10/15/99	3/25/99	3/25/99	4/15/99	10/15/99
PERCENT SOLIDS				44.1	27.9	44.8	80.7	46	36.4
Metals	NYSDEC Guidance Values for Surface Water Sediments (1)		IDL	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)	(mg / kg)
	Lowest Effect Level (ppm)	Severe Effect Level (ppm)							
Aluminum	---	---	22	17800	28800	10600	4300	27600	21800
Antimony	2	25	10	4.9 B	7.5 B	U	U	U	5 B
Arsenic	6	33	6	5.6	8.9	U	2.1	9.6	10.3
Barium	---	---	1	164	286	110	28 B	245	202
Beryllium	---	---	1	U	U	0.4 B	0.2 B	0.77 B	U
Cadmium	0.6	9	1	U	U	1.3 B	0.9	2.5	U
Calcium	---	---	70	5760	5460	6400	47100	2850	6690
Chromium	26	110	1	40.4	78.5	23.8	6	42.4	35.3
Cobalt	---	---	2	11.3 B	16.3 B	11.6 B	4.8 B	20.2	19.4 B
Copper	16	110	1	82.6	[redacted]	77.4	37.1	66.5	39.5
Iron	20000	40000	50	34700	[redacted]	16500	12000	[redacted]	28400
Lead	31	110	2	46.8	93.3	44.9	17.7	108	36.9
Magnesium	---	---	30	7210	8890	4270	14600	8540	6550
Manganese	460	1100	1	490	584	605	144	[redacted]	[redacted]
Mercury	0.15	1.3	0.1	0.16	0.23	0.046	0.029	0.1	0.2
Nickel	16	50	3	29.8	46.2	[redacted]	13.7	[redacted]	37.4
Potassium	---	---	66	3000	3610	1870	826 B	4390	1820 B
Selenium	---	---	4	2.4	5.9	U	0.78 B	2.8	U
Silver	1	2.2	2	U	0.75 B	U	U	U	U
Sodium	---	---	32	355B	471 B	148 B	154 B	244 B	538 B
Thallium	---	---	7	U	U	U	U	U	U
Vanadium	---	---	2	41.1	60.5	22.3	13.2	66.6	41
Zinc	120	270	8	236	[redacted]	[redacted]	103	236	188
Cyanide	---	---	10	U	U	U	U	U	U
TOC*	---	---	2	NA	NA	56300	10800	NA	NA

QUALIFIERS/ABBREVIATIONS:

mg/kg: Milligrams per kilogram.

IDL: Instrument Detection Limit.

*: Total Organic Carbon.

[redacted]: Concentration exceeds NYSDEC Lowest Effect Guidance

[redacted]: Concentration exceeds NYSDEC Severe Effect Guidance Value for surface water sediments.

---: No Guidance Value established.

U: Compound analyzed for but not detected.

B: Concentration is > IDL but < CRDL.

APPENDIX K

ANALYTICAL DATA TABLES – INDOOR AIR

TABLE K-1
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION / FEASIBILITY STUDY
INDOOR AIR ANALYTICAL RESULTS
DETECTED VOLATILE ORGANIC COMPOUNDS

SAMPLE IDENTIFICATION				AA-A-01 (Sump)	AA-A-02 (Adjacent Sump)
DATE OF COLLECTION				1/25/99	1/25/99
Targeted Compounds	**NYSDEC SGC**	**NYSDEC AGC**	**OSHA (O)* NIOSH (N)***		
Freon 113	1,800,00	30,000	7,600,000 (O)(N)	U	9.9 J
Chloromethane	22,000	770	100,000-(O)	U	3.1 J
cis- 1,2 Dichloroethene	190,000	1,900	ca (N)	U	6.1 J
1,1,1-Trichloroethane	450,000	1,000	ca (N)	U	42.0
Trichloroethene	33,000	4.5 E-01	ca (N)	U	30.0
TOTAL TARGETED VOCs				U	91.1
Additional Compounds					
Acetone	140,000	1,400	590,000 (N)	18,000.0 E	2,400.0 E
Methylene Chloride	41,000	27	ca (N)	73.0 J	2.2 J
Ethanol	450,000	45,000	1,900,000 (N)	1,200.0	180.0
Toluene	45,000	400	375,000 (N)	U	14.0 J
Chlorobenzene	--	--	350,000 (O)	U	7.8 J
M,P Xylene	100,000	300	435,000 (N)	U	7.4 J
2-Propanol	230,000	2,300	400,000 (O) (N)	U	18.0 J
2-Butanone	140,000	300	590,000 (O)(N)	U	18.0 J
TOTAL NON-TARGETED VOCs				19,273.0	2,647.4

NOTES:
Analyses conducted using EPA Method TO-14 GC/MS Full Scan
Units are ug/m^3, micrograms per cubic meter

QUALIFIERS/ABBREVIATIONS:
VOCs: volatile organic compounds
U: Compound analyzed for but not detected
J: Estimated value
E: Exceeds calibration curve range
--: Not established

SGC: Air Guide short term exposure
AGC: Air Guide averaged annual exposure
NIOSH: National Institute for Occupational Safety and Health, Recommended Exposure Limit (REL)
OSHA: Occupational Safety and Health Administration, Permissable Exposure Limit (PEL)
* : Where OSHA and NIOSH limits differ, lowest limits are given
ca: Carcinogenic, no exposure limits established
(O): OSHA REL
(N): NIOSH PEL

APPENDIX L

NATURAL ALTERNATION PARAMETER RESULTS

TABLE L - 1
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
NATURAL ATTENUATION PARAMETER SAMPLE RESULTS

SAMPLE IDENTIFICATION	GP-W-B50	GP-W-B50	GP-W-B100	GP-W-B100	GP-W-H100	GP-W-K100	GP-W-M100	GP-W-H0
DATE OF COLLECTION	1/6/99	1/6/99	1/6/99	1/6/99	1/7/99	1/8/99	1/11/99	1/23/99
SAMPLE DEPTH (ft)	8-12	36-40	12-16	46-50	51-55	48-52	44-48	14-18
UNITS*	(mg / l)	(mg / l)	(mg / l)	(mg / l)	(mg / l)	(mg / l)	(mg / l)	(mg / l)
Ferrous Iron	12.9	U	2.55	1.77	12.8	12.8	40.7	40.7
Nitrate	0.12	U	U	U	0.11	U	U	U
Sulfate	33.1	34.8	28.8	28.3	36.7	40.8	41.2	40.7
Sulfide	U	U	1.8	U	U	U	U	3.14
Dissolved Methane (ug/l)	20	80	15	220	150	37	70	23
Dissolved Oxygen	1.23	1.18	0.85	0.74	11.66	0.62	0.48	0.73

SAMPLE IDENTIFICATION	GP-W-J25	GP-W-R100	GP-W-P0	GP-W-T85	GP-W-H50	GP-W-J50	GP-W-SUMP	GP-W-0100
DATE OF COLLECTION	1/12/99	1/13/99	1/14/99	1/18/99	1/19/99	1/20/99	1/21/99	3/27/99
SAMPLE DEPTH (ft)	12-16	48-52	26-30	44-48	36-40	12-16	27-31	23-27
UNITS*	(mg / l)	(mg / l)	(mg / l)	(mg / l)	(mg / l)	(mg / l)	(mg / l)	(mg / l)
Ferrous Iron	0.52	1.44	0.71	17.2	--	U	38	36
Nitrate	2.56	U	0.45	0.153	0.229	U	0.373	0.13
Sulfate	41.3	48.7	20.8	26.3	38.2	34.2	47.2	37.9
Sulfide	U	U	U	U	1.2	1.28	U	U
Dissolved Methane (ug/l)	U	15	U	8	67	82	40	180
Dissolved Oxygen	0.48	1.82	4.11	0.97	1.34	1.04	0.71	--

Notes:
U: Constituent analyzed for but not detected.
- -: Constituent not analyzed.
*: Dissolved methane units are (ug / l).

TABLE L - 1
FARRAND CONTROLS SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
NATURAL ATTENUATION PARAMETER SAMPLE RESULTS

SAMPLE IDENTIFICATION	GP-W-G(-10)	GP-W-G(-25)	GP-W-G(-65)	GP-W-OS1	GP-W-Q150	GP-W-OS2	GP-W-OS3
DATE OF COLLECTION	3/18/99	3/19/99	3/22/99	3/22/99	3/23/99	3/25/99	3/26/99
SAMPLE DEPTH (ft)	12-16	12-16	23-27	51-55	68-72	35-39	51-55
UNITS*	(mg / l)	(mg / l)	(mg / l)	(mg / l)	(mg / l)	(mg / l)	(mg / l)
Ferrous Iron	U	U	2.03	12.7	191	53.3	41.9
Nitrate	1.12	1.54	0.751	0.8	U	0.56	0.57
Sulfate	50.9	48.1	27.9	24.8	40.1	31.5	32.2
Sulfide	U	U	U	64.4	5.6	U	1.7
Dissolved Methane (ug/l)	8	U	10	8	22	11	12
Dissolved Oxygen	5.46	- -	2.22	2.81	0.14	0.81	2.31

SAMPLE IDENTIFICATION	GP-W-EE100	GP-W-UG1	GP-W-EEO	GP-W-BBO	GP-W-D25	GP-W-I0	GP-W-T6
DATE OF COLLECTION	3/29/99	3/30/99	3/31/99	4/6/99	4/7/99	4/5/99	4/14/99
SAMPLE DEPTH (ft)	60-64	12-16	- -	18-22	42-46	14-18	12-16
UNITS *	(mg / l)	(mg / l)	(mg / l)	(mg / l)	(mg / l)	(mg / l)	(mg / l)
Ferrous Iron	30.7	105	U	U	9.18	U	12.5
Nitrate	0.23	U	0.97	0.93	0.11	35.8	U
Sulfate	36.8	30.8	27.6	27.3	34.2	U	U
Sulfide	U	U	U	U	U	246	U
Dissolved Methane (ug/l)	220	15	9	8	170	20	30
Dissolved Oxygen	0.85	1.96	4.28	5.34	- -	2.48	- -

Notes:

U: Constituent analyzed for but not detected.

- -: Constituent not analyzed.

*: Dissolved methane units are (ug / l).