PHASE II
ENVIRONMENTAL ASSESSMENT

Federal Mogul/HUCK

Huck International
Installation Equipment Division Site
Kingston, New York

AUGUST 1993

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CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

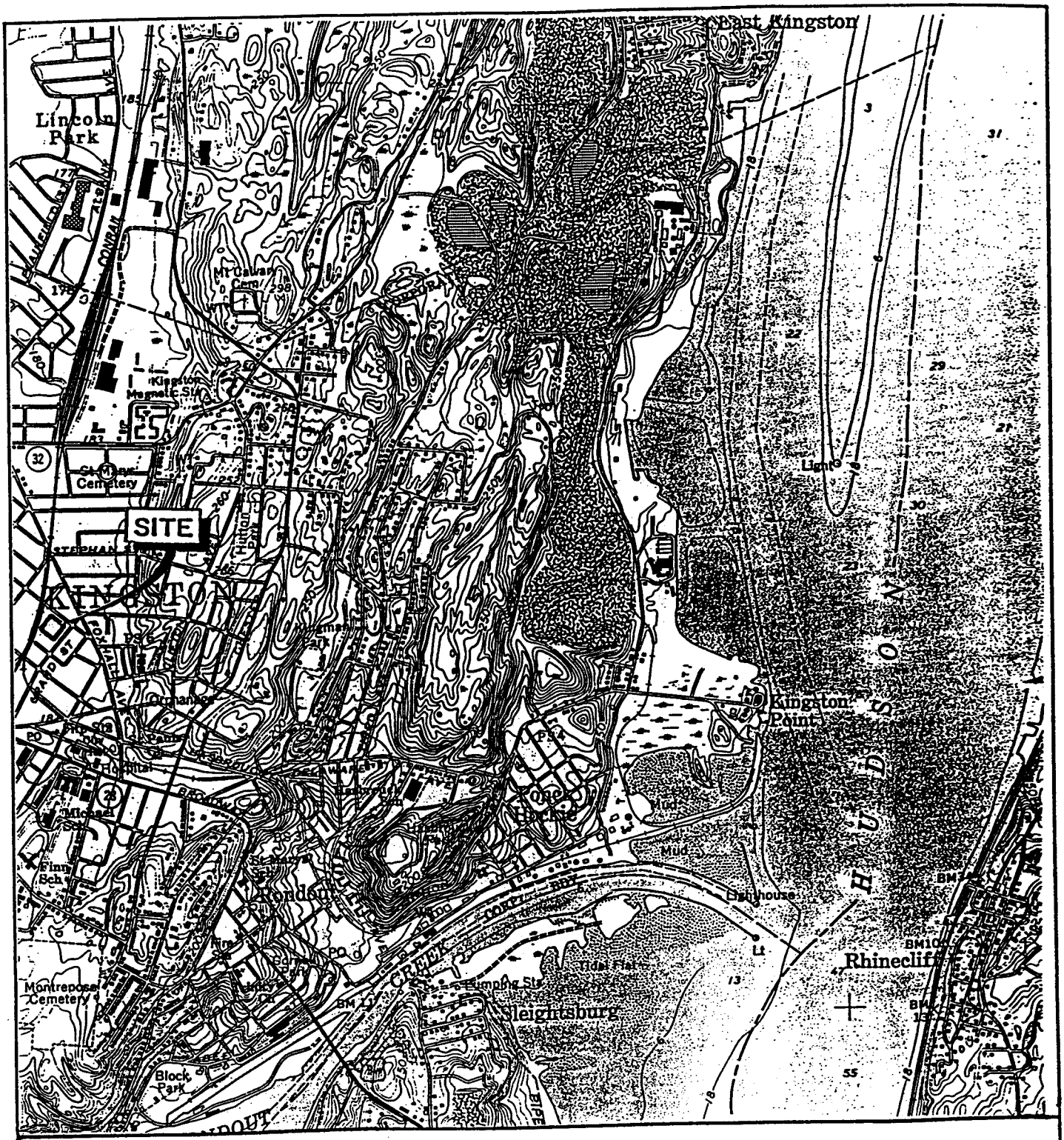
Conestoga-Rovers and Associates (CRA) was retained by Thiokol Corporation to conduct a Phase II Environmental Assessment at the Huck International Facility in Kingston, New York. This report presents the findings of the Phase II Environmental Assessment. Figure 1.1 provides the Site location.

1.1 BACKGROUND

The Site is located on approximately 4.5 acres of property, in a mixed commercial, industrial and residential area of Kingston, New York. The facility consists of two buildings comprising a total of 105,000 square feet. A site plan is presented on Figure 1.2.

In 1991, Thiokol retained a consultant to conduct a Phase I Environmental Assessment. The principal findings of this assessment are as follows:

- one 10,000-gallon underground storage tank (UST) was closed by removal in 1987 with proper closure documentation and approval by the State;
- two USTs were identified on a 1968 insurance map, but could not be accounted for by the Phase I audit or during previous excavations;
- one above-ground storage tank (AST) containing fuel oil is currently in use at the facility;
- asbestos-containing materials (ACM) were identified at the Site;
- a review of historical records indicates that disposal of hazardous materials may have been conducted at the facility and on adjacent railroad property; and



SCALE: 1"=24000'

SOURCE: USGS TOPOGRAPHIC MAPS
KINGSTON, N.Y. QUADS

figure 1.1

SITE LOCATION
HUCK INTERNATIONAL
PHASE II ENVIROMENTAL ASSESSMENT
Kingston, New York

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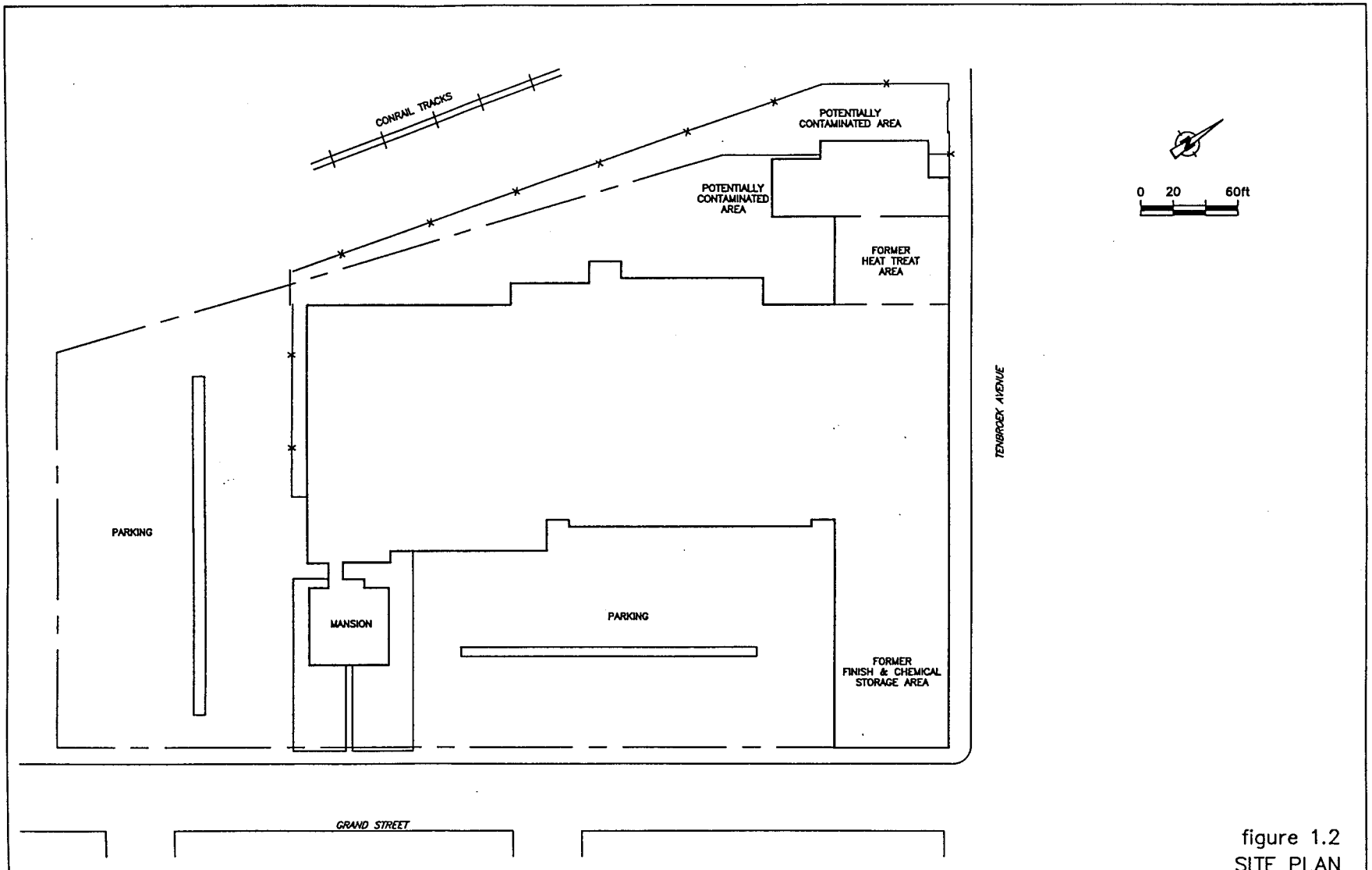

figure 1.2
SITE PLAN
HUCK INTERNATIONAL
PHASE II ENVIRONMENTAL ASSESSMENT
Kingston, New York

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- hazardous wastes and chemicals have been generated and stored on-Site and may have been discharged into facility sewers.

1.2 SITE HISTORY

The facility has been in operation since 1889 and has been used by a number of companies for automotive, electrical and refrigeration supplies manufacturing. A list of known past occupants is presented on Table 1.1. The various occupants have used a variety of chemicals, solvents and oil in their various processes.

1.3 OBJECTIVE

The objective of the Phase II Assessment was to identify whether previous operations at the facility have had an environmental impact on the property.

TABLE 1.1

LIST OF FORMER OCCUPANTS
PHASE II ENVIRONMENTAL ASSESSMENT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Date of Occupancy	*Occupant*
1900 to 1906	Peckham Motor Truck and Wheel Company
1906 to 1911	New York Car and Truck Company
1911 to 1916	W.A. Wood Automobile Manufacturing Company
1916 to 1917	Emerson Motors Company, Inc.
1917 to 1921	Cambell Motor Car Company
1922 to 1938	Apollo Magneto Corporation
1938 to 1964	Electrol, Inc.
1964 to 1980	Hucktrol, Inc.
1980 to 1991	Huck Installation Equipment Division, Federal Mogul Corp.
1991 to present	Huck International, Installation Equipment Division, Subsidiary of Thiokol

2.0 SITE INVESTIGATIVE FIELD PROGRAM

During the period of April through June 1993, the following investigative activities were performed at the Site:

- 29 soil borings were drilled;
- 6 monitoring wells were installed;
- 31 subsurface soil samples were collected for chemical analysis;
- 24 groundwater samples were collected for chemical analysis;
- a ground penetrating radar survey was conducted;
- an asbestos survey was conducted;
- 9 potential ACM samples were collected for chemical analysis; and
- 3 sewer sediment samples were collected for chemical analysis.

2.1 SOIL BORING PROGRAM

During the investigation, a total of 29 soil borings which consisted of 16 intermediate depth borings (BH-1 to BH-17) and 13 shallow borings (SS-1 to SS-13) were drilled to investigate 11 potential source areas. The 11 areas investigated were:

- 4 potential underground storage tank (UST) locations;
- former heat treat area;
- former metal finish area;
- former degreaser area;
- former chemical storage area;
- 2 former PCB transformer areas; and
- a suspected former disposal area.

One boring (BH-1) was drilled to a depth of 80 feet to define subsurface geologic conditions. Soil boring locations are presented on Figure 2.1. The soil borings were drilled using hollow stem auger drilling methods. Drilling services were performed by Marcor, Inc. of Rochester, New York (Marcor).

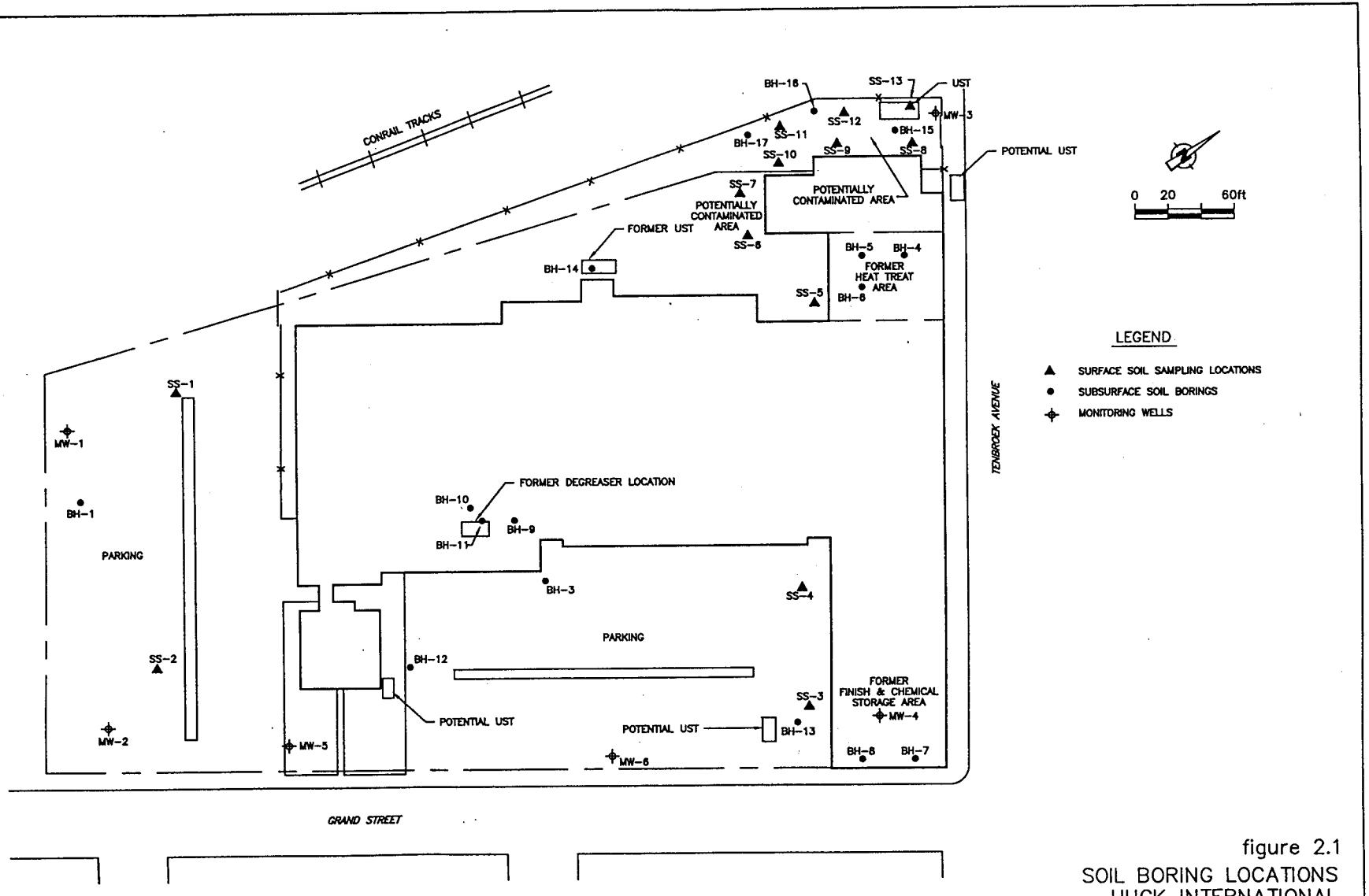

figure 2.1
SOIL BORING LOCATIONS
HUCK INTERNATIONAL
PHASE II ENVIRONMENTAL ASSESSMENT
Kingston, New York

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The boreholes were advanced to preselected depths. A borehole summary is presented on Table 2.1. Soil samples were collected continuously using pre-cleaned, 2-inch outside diameter, stainless steel split spoons. Split spoon samples were collected in accordance with ASTM Method D-1586, "Standard Method for Penetration Test and Split Barrel Sampling of Soils". Each soil sample was classified in accordance with the Unified Soil Classification System (USCS). Soils were classified in the field by CRA's representative.

Each recovered soil sample was screened for the presence of organic vapors using a HNu Photoionization Detector (PID). Soil samples were selected for chemical analysis based on the highest PID reading, its proximity to the potential source or visual inspection. A borehole soil sampling summary is presented on Table 2.2.

Soil cuttings were collected and transferred into 55-gallon drums and were stored on-site for subsequent disposal at an approved off-site treatment facility. Upon completion, boreholes were grouted to the surface with a neat bentonite/cement grout. Soil boring logs are presented in Appendix A.

2.2 MONITORING WELL INSTALLATION

Six monitoring wells (MW-1 through MW-6) were installed to define groundwater quality and groundwater flow conditions. Monitoring well locations are presented on Figure 2.2. Drilling services were performed by Marcor. Monitoring wells were installed in accordance with applicable State regulations.

Boreholes for the monitoring wells were advanced using hollow stem auger drilling methods to a depth approximately seven feet below the water table. Soil samples were collected at five foot intervals using pre-cleaned, 2-inch outside diameter, stainless steel split spoons (ASTM D1586). Soil samples were classified in accordance with the USCS.

TABLE 2.1

BOREHOLE SUMMARY
PHASE II ENVIRONMENTAL ASSESSMENT REPORT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Borehole I.D.	*Date*	*Depth*	*Area*
BH-1	April 30, 1993	80.0-feet	Western parking area
BH-3	April 30, 1993	8.0-feet	Sewer pipe area
BH-4	April 30, 1993	8.0-feet	Former heat treat area
BH-5	April 30, 1993	8.0-feet	Former heat treat area
BH-6	May 1, 1993	14.0-feet	Former heat treat area
BH-7	May 1, 1993	8.5-feet	Former finish area
BH-8	May 2, 1993	8.5-feet	Former finish area
BH-9	May 2, 1993	8.5-feet	Former degreaser area
BH-10	May 2, 1993	8.5-feet	Former degreaser area
BH-11	May 2, 1993	8.5-feet	Former degreaser area
BH-12	May 2, 1993	12.0-feet	Potential UST area
BH-13	May 2, 1993	12.0-feet	Potential UST area
BH-14	May 2, 1993	26.0-feet	Former UST area
BH-15	May 3, 1993	8.0-feet	Potential UST area
BH-16	May 3, 1993	8.0-feet	Potentially contaminated area
BH-17	May 3, 1993	8.0-feet	Potentially contaminated area
SS-1	April 29, 1993	3.0-feet	Western parking area
SS-2	April 29, 1993	3.0-feet	Western parking area
SS-3	April 29, 1993	3.0-feet	Former PCB transformer area
SS-4	April 29, 1993	3.0-feet	Former PCB transformer area
SS-5	April 29, 1993	3.0-feet	Former PCB transformer area
SS-6	April 29, 1993	3.0-feet	Potentially contaminated area
SS-7	April 29, 1993	3.0-feet	Potentially contaminated area
SS-8	May 3, 1993	3.0-feet	Potentially contaminated area
SS-9	May 3, 1993	3.0-feet	Potentially contaminated area
SS-10	May 3, 1993	3.0-feet	Potentially contaminated area
SS-11	May 3, 1993	3.0-feet	Potentially contaminated area
SS-12	May 3, 1993	3.0-feet	Potentially contaminated area
SS-13	May 3, 1993	3.0-feet	Potentially contaminated area

TABLE 2.2

BOREHOLE SOIL SAMPLING SUMMARY
PHASE II ENVIRONMENTAL ASSESSMENT REPORT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Sample Location	*Date*	*Sample Identification*	*Depth (feet)*	*Hnu/PID Reading (ppm)*	*Sample Description (Sample media - sand)*	*Analysis*
BH-1	4-30-93	W-5269-043093-EF-BH1WA	N/A	N/A	Rinsate	VOC, semi-VOC, PCB, CN, metals & TPH
BH-3	4-30-93	S-5269-043093-EF-BH3A	2.0-4.0	3.5	Light brown, medium, moist, loose	VOC, semi-VOC, PCB, CN and metals
BH-4	4-30-93	S-5269-043093-EF-BH4D	5.0-6.0	4.0	Brown, medium, gravel, moist, loose	VOC, semi-VOC, PCB, CN and metals
BH-5	4-30-93	S-5269-043093-EF-BH5E	6.0-8.0	5.5	Tan, medium, moist compact	VOC, semi-VOC, PCB, CN and metals
BH-6	5-01-93	S-5269-050193-EF-BH6D	5.0-6.0	16.0	Dark brown, medium, dry, loose	VOC, semi-VOC, PCB, CN and metals
BH-7	5-01-93	S-5269-050193-EF-BH7B	2.5-4.5	5.5	Brown, fine, dry , loose	VOC, semi-VOC, PCB, CN and metals
BH-8	5-02-93	S-5269-050293-EF-BH8A	0.5-2.5	45.0	Brown, medium, moist, loose	VOC, semi-VOC, PCB, CN and metals
BH-9	5-02-93	S-5269-050293-EF-BH9A	0.5-2.5	20.0	Brown, medium, dry , loose	VOC, semi-VOC, PCB, CN and metals
BH-10	5-02-93	S-5269-050293-EF-BH10D	6.5-8.5	13.0	Tan, fine, dry, loose	VOC, semi-VOC, PCB, CN and metals
BH-11	5-02-93	S-5269-050293-EF-BH11C	4.5-6.5	18.0	Brown, fine, dry, loose	VOC, semi-VOC, PCB, CN and metals
BH-14	5-02-93	S-5269-050293-EF-BH14I	18.0-20.0	3.0	Brown, medium, saturated , loose	Total petroleum hydrocarbons (TPH)
BH-14	5-02-93	S-5269-050293-EF-BH14J	20.0-22.0	4.0	Brown, medium, saturated, loose (odor)	Total petroleum hydrocarbons (TPH)
BH-14	5-02-93	S-5269-050293-EF-BH14K	22.0-24.0	4.0	Brown, medium, saturated, loose (odor)	Total petroleum hydrocarbons (TPH)
BH-14	5-02-93	S-5269-050293-EF-BH14L	24.0-26.0	4.0	Brown, medium, saturated, loose (odor)	Total petroleum hydrocarbons (TPH)
BH-14	5-02-93	S-5269-050293-EF-BH14M	22.0-24.0	4.0	Duplicate of S-5269-050293-EF-BH14K	Total petroleum hydrocarbons (TPH)
BH-16	5-03-93	S-5269-050393-EF-BH16B	4.0-6.0	7.0	Brown, medium, dry , loose	VOC, semi-VOC, PCB, CN and metals
BH-17	5-03-93	S-5269-050393-EF-BH17B	4.0-6.0	11.0	Gray, medium, moist, loose	VOC, semi-VOC, PCB, CN and metals

TABLE 2.2

BOREHOLE SOIL SAMPLING SUMMARY
PHASE II ENVIRONMENTAL ASSESSMENT REPORT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Sample Location	*Date*	*Sample Identification*	*Depth (feet)*	*Hnu/PID Reading (ppm)*	*Sample Description (Sample media - sand)*	*Analysis*
SS-1	4-29-93	S-5269-042993-WW-SS1	1.0-3.0	0.0	1-inch black layer, brown/gray, dry	VOC, semi-VOC, PCB, CN and metals
SS-2	4-29-93	S-5269-042993-WW-SS2	1.0-3.0	0.0	1-inch black layer, brown/gray, dry	VOC, semi-VOC, PCB, CN and metals
SS-3	4-29-93	S-5269-042993-WW-SS3	1.0-3.0	5.0	3-inch black layer, brown/gray, dry	VOC, semi-VOC, PCB, CN and metals
SS-4	4-29-93	S-5269-042993-WW-SS4	1.0-3.0	0.0	3-inch black layer, brown/gray, dry	VOC, semi-VOC, PCB, CN and metals
SS-5	4-29-93	S-5269-042993-WW-SS5	1.0-3.0	1.0	5-inch black layer, brown/black, dry	VOC, semi-VOC, PCB, CN and metals
SS-6	4-29-93	S-5269-042993-WW-SS6	1.0-3.0	1.0	4-inch black layer, black w/rocks (oily)	VOC, semi-VOC, PCB, CN and metals
SS-6	4-29-93	S-5269-042993-WW-SS6A	1.0-3.0	1.0	Duplicate of S-5269-042993-WW-SS6	VOC, semi-VOC, PCB, CN and metals
SS-7	4-29-93	S-5269-042993-WW-SS7	1.0-3.0	13.0	4-inch black layer, black w/rocks (oily)	VOC, semi-VOC, PCB, CN and metals
SS-8	5-03-93	S-5269-050393-EF-SS8	1.0-3.0	2.0	Black/tan, fine, moist, loose	VOC, semi-VOC, PCB, CN and metals
SS-9	5-03-93	S-5269-050393-EF-SS9	1.0-3.0	1.0	Black/tan, fine, moist (coal ash)	VOC, semi-VOC, PCB, CN and metals
SS-10	5-03-93	S-5269-050393-EF-SS10	1.0-3.0	5.0	Black/tan, fine, moist (coal ash)	VOC, semi-VOC, PCB, CN and metals
SS-11	5-03-93	S-5269-050393-EF-SS11	1.0-3.0	110.0	Black, stained, wet, compact	VOC, semi-VOC, PCB, CN and metals
SS-12	5-03-93	S-5269-050393-EF-SS12	1.0-3.0	21.0	Black/tan, medium, dry, (coal)	VOC, semi-VOC, PCB, CN and metals
SS-13	5-03-93	S-5269-050393-EF-SS13	1.0-3.0	1.0	Tan, medium, dry, compact (rocks)	VOC, semi-VOC, PCB, CN and metals

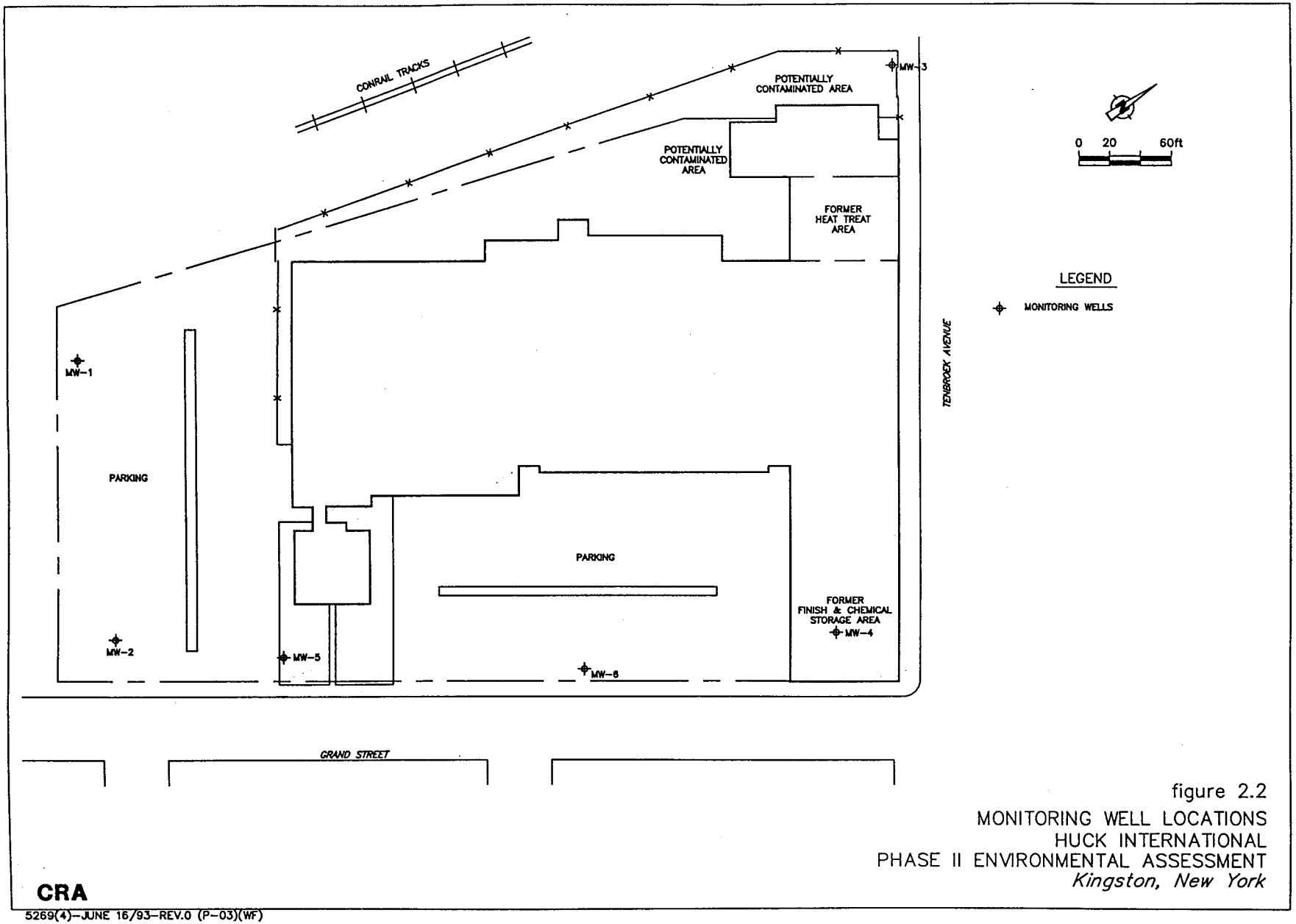

figure 2.2
MONITORING WELL LOCATIONS
HUCK INTERNATIONAL
PHASE II ENVIRONMENTAL ASSESSMENT
Kingston, New York

CRA

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Recovered soil samples were screened for the presence of organic vapors using a HNu PID. The soil sample with the highest non-background PID reading in each boring was submitted to the laboratory and were analyzed for volatile organic compounds (VOCs). A monitoring well soil sampling summary is presented on Table 2.3.

Soil cuttings from the drilling program were collected and transferred into 55-gallon drums and were stored on-site for subsequent disposal at an approved off-site treatment facility.

The monitoring wells were constructed of 2-inch inside diameter, stainless steel well pipe attached to 10-foot stainless steel well screen with a slot size of .010 inch. A filter sandpack was placed around and a minimum of two feet above the well screen. A two-foot minimum bentonite seal was placed above the sandpack and the remaining annulus was tremie grouted with neat bentonite/cement grout to two feet below ground surface. All monitoring wells were completed at grade. Monitoring well construction and stratigraphic logs are presented in Appendix B.

The drill rig and associated drilling equipment (e.g. augers) were cleaned between drilling locations at an established decontamination area. Equipment was cleaned using a high pressure, low volume, hot water wash. Waters from equipment cleaning were collected and transferred into 55-gallon drums, and were stored on-site pending off-site disposal at an approved facility.

After installation, monitoring wells were developed to a relatively silt-free condition by surging and bailing techniques using a precleaned stainless steel bailer. A well development summary is presented on Table 2.4. Development waters were contained on-site in 55-gallon drums pending off-site disposal at an approved facility.

2.2.1 Surveying

After installation of the monitoring wells, the wells were

TABLE 2.3

MONITORING WELL SOIL SAMPLING SUMMARY
PHASE II ENVIRONMENTAL ASSESSMENT REPORT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION

Sample Location	*Date*	*Sample Identification*	*Depth (feet)*	*HNu PID Reading*	*Sample Description*	*Analysis*
MW-1	4-27-93	S-5269-042793-WW-MW1C	13-15	1 ppm	Light brown/gray, wet sand	VOCs
MW-2	4-27-93	S-5269-042793-WW-MW2C	13-15	4 ppm	Light brown, moist, coarse sand	VOCs
MW-3	4-29-93	S-5269-042993-WW-MW3C	13-15	5 ppm	Light brown/gray, fine, medium moist sand	VOCs
MW-4	5-01-93	S-5269-050193-EF-MW4C	6-8	14 ppm	Brown, medium sand with dry, loose pebbles	VOCs, semi-VOCs, PCBs, cyanide and metals
MW-5	5-04-93	W-5269-050493-WW-MW5C	13-15	N/A	Rinsate blank	VOCs, semi-VOCs, PCBs, TPH, cyanide and metals
MW-5	5-04-93	S-5269-050493-WW-MW5C	13-15	1 ppm	Brown/gray medium sand	VOCs
MW-5	5-04-93	S-5269-050493-WW-MW5CA	13-15	1 ppm	Duplicate of MW5C	VOCs
MW-6	5-04-93	W-5269-050493-WW-MW6C	13-15	N/A	Rinsate blank	VOCs, semi-VOCs, PCBs, TPH, cyanide and metals
MW-6	5-04-93	S-5269-050493-WW-MW6C	13-15	1 ppm	Brown, fine, moist sand	VOCs
MW-6	5-04-93	S-5269-050493-WW-MW6CA	13-15	1 ppm	Duplicate of MW6C	VOCs

TABLE 2.4

MONITORING WELL DEVELOPMENT SUMMARY
PHASE II ENVIRONMENTAL ASSESSMENT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Well I.D.	*Date*	*Cumulative Volume Removed*	*Well Volumes Removed*
MW-1	April 29, 1993	10.5 gallons	8.0
MW-2	April 29, 1993	9.0 gallons	6.0
MW-3	May 4, 1993	10.0 gallons	8.0
MW-4	May 4, 1993	7.5 gallons	5.0
MW-5	May 6, 1993	13.5 gallons	10.0
MW-6	May 6, 1993	12.0 gallons	9.0

surveyed by Robert L. Campbell, a licensed New York land surveyor, for vertical control Elevation data for this investigation were based on an assumed local datum using a hydrant located at Grand Street and Tenbroek Avenue.

2.3 ANALYTICAL SAMPLING

As part of this environmental assessment, soil, groundwater and sewer sediment samples were collected for chemical analysis of organic and inorganic compounds.

2.3.1 Soil Sampling

Subsurface soil samples were collected during monitoring well installation and soil boring programs. Soil samples were collected for analysis of VOCs (EPA Method 8240), semi-VOCs (EPA Method 8270), polychlorinated biphenyls (PCBs) (EPA Method 8080), total petroleum hydrocarbons (TPH) (Method 310-13), cyanide (EPA Method 9010 or 9012) and RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver) (EPA Series 6000 and 7000). A soil sampling summary is presented in Tables 2.2 and 2.3.

Representative soil samples were collected from pre-cleaned split spoons based on PID measurements, proximity to potential source(s) and visual inspection. Samples were transferred to laboratory cleaned sample bottles. Samples were placed in iced coolers and were shipped under standard chain-of-custody procedures to General Testing Laboratories (GTL) in Rochester, New York.

2.3.2 Groundwater Sampling

Two groundwater sampling rounds were conducted at the Site. The first round of groundwater samples was collected on May 6 and 10,

1993. The second round of samples was collected on June 3, 4, and 8, 1993. Both rounds of groundwater samples were collected in accordance with the New York State Department of Environmental Conservation (NYSDEC) Sampling Guidelines.

Prior to sample collection, the monitoring wells were purged of three well volumes using pre-cleaned, stainless steel bailers. Upon removal of each well volume, pH, conductivity and temperature were recorded. Purged water was contained in 55-gallon drums pending off-Site disposal at an approved facility, depending on analytical results.

Groundwater samples were collected using pre-cleaned, stainless steel bailers attached to dedicated polypropylene rope. The first round of groundwater samples was collected for analysis of VOCs, semi-VOCs, PCBs, cyanide and total RCRA metals. The second round of samples was collected for analysis of VOCs, cyanide and dissolved RCRA metals. A groundwater sampling summary is presented in Tables 2.5A and 2.5B for sampling round 1 and sampling round 2, respectively.

Groundwater samples were shipped in iced coolers under standard chain-of-custody procedures. Samples were shipped by commercial courier to GTL.

2.3.3 Sewer Sediment Sampling

Prior to sample collection, sewer discharge points from the facility were identified and storm and sanitary sewer lines were located and traced utilizing flourescein dye. Plotted sewer lines are presented on Figure 2.3.

Representative sewer sediment samples were collected from three storm sewer locations that were thought to have been discharge lines from Plant 1. Sewer sediment samples were collected utilizing pre-cleaned, stainless steel spoons. Samples were transferred to laboratory cleaned sample bottles. Samples were placed in iced coolers and were shipped under chain-of-custody

TABLE 2.5A

GROUNDWATER SAMPLING SUMMARY - ROUND 1
PHASE II ENVIRONMENTAL ASSEMENT REPORT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Well I.D.	*Date*	*Cumulative Volume Removed (gallons)*	*pH*	*Temperature (°C)*	*Conductivity (µmhos)*	*Sample Description*	*Sample I.D.*
MW-1	5-06-93	15.0	7.09	16.5	300	Cloudy	GW-5269-050693-WW-01
MW-2	5-06-93	13.5	7.06	17.0	400	Cloudy	GW-5269-050693-WW-02
MW-3	5-06-93	14.5	7.02	15.5	200	Cloudy	GW-5269-050693-WW-03
MW-3	5-06-93	14.5	7.02	15.5	200	Duplicate Of 03	GW-5269-050693-WW-04
MW-4	5-10-93	12.0	6.44	19.0	400	Cloudy	GW-5269-051093-WW-08
MW-4	N/A	N/A	N/A	N/A	N/A	Rinsate Blank	GW-5269-051093-WW-07
MW-5	5-10-93	18.0	6.60	14.5	300	Slightly cloudy	GW-5269-051093-WW-05
MW-6	5-10-93	18.0	6.70	15.0	400	Slightly cloudy	GW-5269-051093-WW-06

*Note: All samples analyzed for VOCs, semi-VOCs, PCBs, Cyanide and Total Metals.

TABLE 2.5B

GROUNDWATER SAMPLING SUMMARY - ROUND 2
PHASE II ENVIRONMENTAL ASSEMENT REPORT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Well I.D.	*Date*	*Cumulative Volume Removed (gallons)*	*pH*	*Temperature (°C)*	*Conductivity (µmhos)*	*Sample Description*	*Sample I.D.*
MW-1	6-3-93	19.5	6.29	17.0	300	Cloudy	GW-5269-060393-WW-11(1)
MW-1	6-3-93	19.5	6.29	17.0	300	Duplicate of 11	GW-5269-060393-WW-12(1)
MW-1	6-8-93	24.0	6.75	17.5	300	Cloudy	GW-5269-060893-WW-20(2)
MW-2	6-4-93	18.0	6.57	14.5	500	Slightly cloudy	GW-5269-060493-WW-13 (1)
MW-2	6-8-93	22.5	7.09	17.0	400	Duplicate of 21	GW-5269-060893-WW-22(2)
MW-2	6-8-93	22.5	7.09	17.0	400	Slightly cloudy	GW-5269-060893-WW-21(2)
MW-3	6-3-93	19.0	6.17	16.5	200	Cloudy	GW-5269-060393-WW-10 1)
MW-3	6-8-93	23.5	7.17	17.0	200	Cloudy	GW-5269-060893-WW-19(2)
MW-4	6-3-93	16.5	6.33	19.0	400	Cloudy	GW-5269-060393-WW-09(2)
MW-4	6-8-93	21.0	6.90	18.0	400	Cloudy	GW-5269-060893-WW-18(2)
MW-4	N/A	N/A	N/A	N/A	N/A	Rinsate Blank	GW-5269-060893-WW-17(2)
MW-5	6-4-93	22.5	6.23	15.0	200	Slightly cloudy	GW-5269-060493-WW-14(1)
MW-5	6-8-93	27.0	6.60	16.0	200	Slightly cloudy	GW-5269-060893-WW-23(2)
MW-6	6-4-93	22.5	6.59	15.5	500	Slightly cloudy	GW-5269-060493-WW-16 (1)
MW-6	N/A	N/A	N/A		N/A	Rinsate Blank	GW-5269-060493-WW-15 (1)
MW-6	6-8-93	27.0	7.00	16.0	400	Slightly cloudy	GW-5269-060893-WW-24(2)

(1) Analyzed for VOCs and CN
(2) Analyzed for Dissolved Metals

TABLE 2.6

SEWER SEDIMENT SAMPLE SUMMARY
PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Location	*Date*	*Description*	*Depth*	*Sample I.D.*
Manhole A	6-2-93	Brown-gray silt w/organics	0- 6"	SD-5269-060293-EF-001
Manhole B	6-2-93	Brown-gray silt w/organics	0- 6"	SD-5269-060293-EF-002
Manhole C	6-2-93	Brown-gray silt w/organics	0- 6"	SD-5269-060293-EF-003

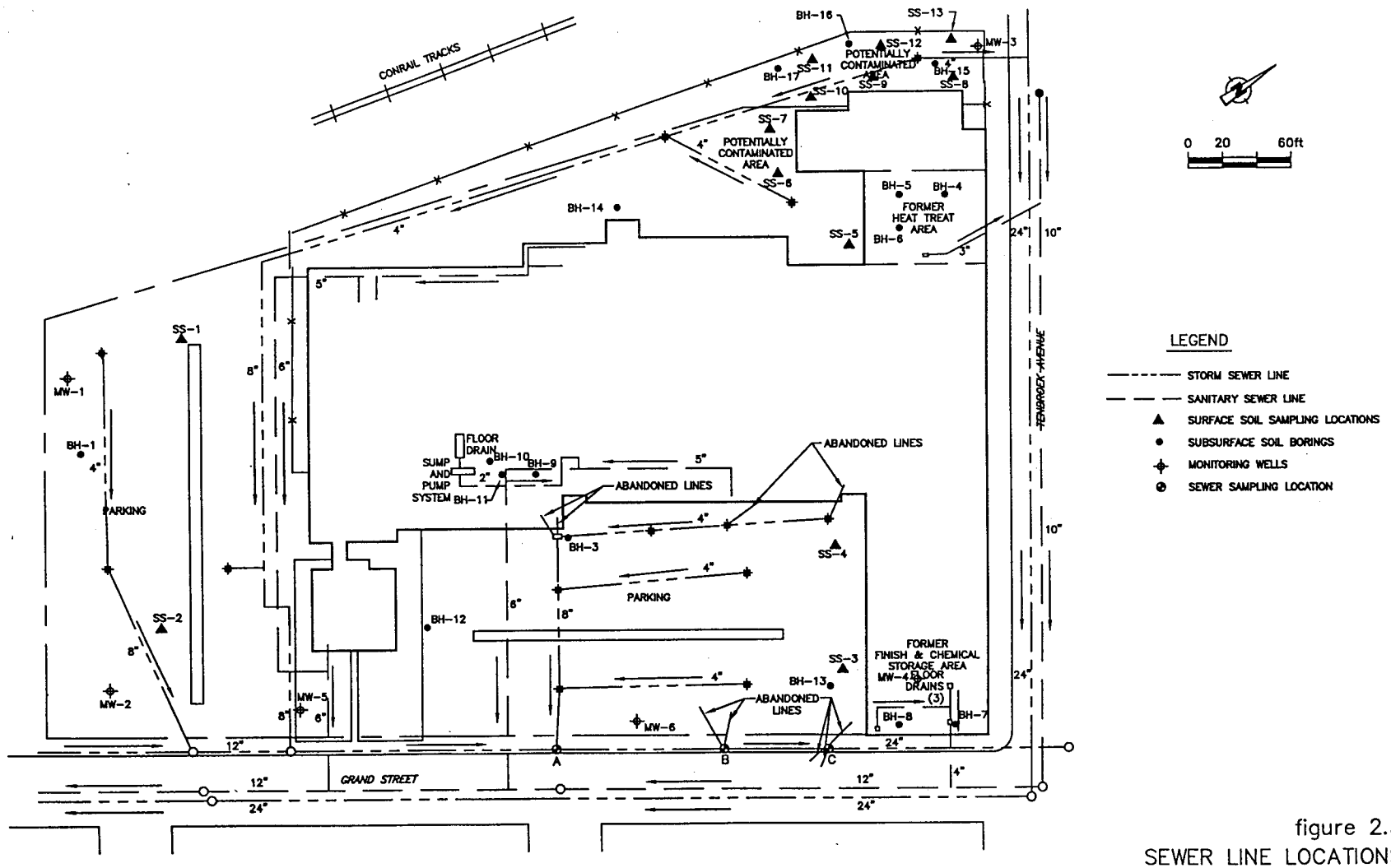

figure 2.3
SEWER LINE LOCATIONS
HUCK INTERNATIONAL
PHASE II ENVIRONMENTAL ASSESSMENT
Kingston, New York

CRA

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procedures to GTL.

Sewer sediment samples were collected for analysis of VOCs, semi-VOCs, PCBs, cyanide and RCRA metals. A sewer sediment sampling summary is presented in Table 2.6.

2.4 HISTORICAL UNDERGROUND STORAGE TANK (UST) INVESTIGATION

Based on information reviewed for the Site, there was one known former UST at the Site. This UST was a 10,000-gallon capacity UST that was closed by removal in 1987. Two additional USTs were identified on a 1968 insurance map, but could not be located during previous investigations. One of these USTs was shown to exist under Tenbroek Avenue near the northeast corner of the plant. The second UST was shown near the former guard shack along the eastern edge of the south parking lot. Two additional potential UST locations were identified by CRA during the Site inspection based on potential vent/fill piping. One of these UST locations was north of the building. The second potential UST location was outside the southeast corner of the mansion.

Prior to the soil boring program associated with the USTs, Layne GeoService, Inc. (LGI) conducted a ground penetrating radar (GPR) investigation at the four potential UST locations on April 26 and 27, 1993. LGI utilized the GSSI SIR-3 system, a 500 MHz antenna and a 60-nanoseconds records length for each of the five areas. The purpose of the GPR survey was to attempt to define the most likely position and orientation of the USTs in order to optimize placement of soil borings.

GPR profiles located one UST. One UST was adjacent to the northeast corner of Plant 1, as shown on Figure 2.1. The GPR profiles at the other three areas did not indicate the presence of USTs. Representative GPR profiles are presented in Appendix C.

Soil borings (BH-12, BH-13, BH-14 and BH-15) were drilled at the former and three suspect UST areas based on GPR profiles, physical Site

constraints and historical information. The UST that was reportedly underlying Tenbroek Avenue was not investigated with a soil boring due to a lack of evidence that a UST was present at that location and the physical limitations of drilling on the east side of the building. Figure 2.1 shows soil boring locations. A borehole sample summary is presented on Table 2.2. BH-14 was drilled in the area where the former 10,000-gallon UST was removed in 1987. Soil samples were collected for TPH analysis at BH-14, because visual observations indicated potential hydrocarbon contamination. Borehole installation and sampling were conducted according to procedures discussed in Sections 2.1 and 2.3.1.

2.5 ASBESTOS SURVEY

A detailed inventory of potential ACM pipe insulation, floor and ceiling tiles was conducted on May 17 and 18, 1993, for the Mansion and Plant 1. A summary of the asbestos inventory is shown in Tables 2.7A and 2.7B. Locations of pipes containing potential ACM insulation and potential ACM floor and ceiling tiles are shown on Figure 2.4.

Potential ACM pipe insulation, floor and ceiling tile samples were collected utilizing a pre-cleaned utility knife. Rectangular sections of insulation were removed from the pipes. As incisions were made, the exposed cross sections of insulation were moistened with distilled water. The samples were transferred to clean plastic bags. Upon completion of sample removal from the pipe, the area was thoroughly duct taped to prevent insulation cross-sections from being exposed to the atmosphere.

Floor and ceiling tile samples were either collected in single tile units or collected following the protocol mentioned above depending upon the size of the tiles. All tile samples were also transferred to clean plastic bags. A sample summary of potential ACM is presented in Table 2.8. Samples were placed in a secure box and shipped under standard chain-of-custody procedures to Asteco, Inc. of Middleport, New York for confirmatory testing.

TABLE 2.7A

ASBESTOS SURVEY SUMMARY - PIPE INSULATION
PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Pipe I.D.	*Pipe Length*	*Pipe Diameter*	*Insulation Thickness*	*Insulation Volume*
Mansion Attic	200.0-feet	2-inches	1-inch	13.09-cubic feet
Mansion Basement	27.0-feet	3-inches	1-inch	2.36-cubic feet
A	15.5-feet	3-inches	1-inch	1.36-cubic feet
B	15.0-feet	2-inches	1-inch	0.98-cubic feet
C	60.0-feet	4-inches	1-inch	6.54-cubic feet
D	12.0-feet	2-inches	1-inch	0.79-cubic feet
E	155.0-feet	4-inches	1-inch	16.90-cubic feet
F	33.0-feet	4-inches	1-inch	3.60-cubic feet
G	6.0-feet	3-inches	1-inch	0.52-cubic feet
H*	N/A	N/A	N/A	N/A
I	135.0-feet	4-inches	1-inch	14.72-cubic feet
J	140.0-feet	4-inches	1-inch	15.26-cubic feet
K	140.0-feet	4-inches	1-inch	15.26-cubic feet
L	125.0-feet	6-inches	1-inch	19.09-cubic feet
M	182.0-feet	4-inches	1-inch	19.84-cubic feet
N	41.5**-feet	8-inches	1-inch	8.15-cubic feet
O	128.0-feet	4-inches	1-inch	13.95-cubic feet
P	63.50-feet	4-inches	1-inch	6.92-cubic feet
Q	84.0-feet	8-inches	1-inch	16.49-cubic feet
R	133.0-feet	4-inches	1-inch	14.50-cubic feet
S	108.0-feet	3-inches	1-inch	9.43-cubic feet
T	220.0-feet	8-inches	1-inch	43.20-cubic feet
U	56.0-feet	6-inches	1-inch	8.53-cubic feet

* End section of Pipe E
** Visible section only

TABLE 2.7B

ASBESTOS SURVEY SUMMARY - FLOOR AND CEILING TILE
PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Location	*Tile Type*	*Area Dimensions*	*Area*
Mansion			
- Entire first & second floor	Floor	50-feet by 50-feet	5,000 square feet
- Second floor	Ceiling	14-feet by 16-feet	224 square feet

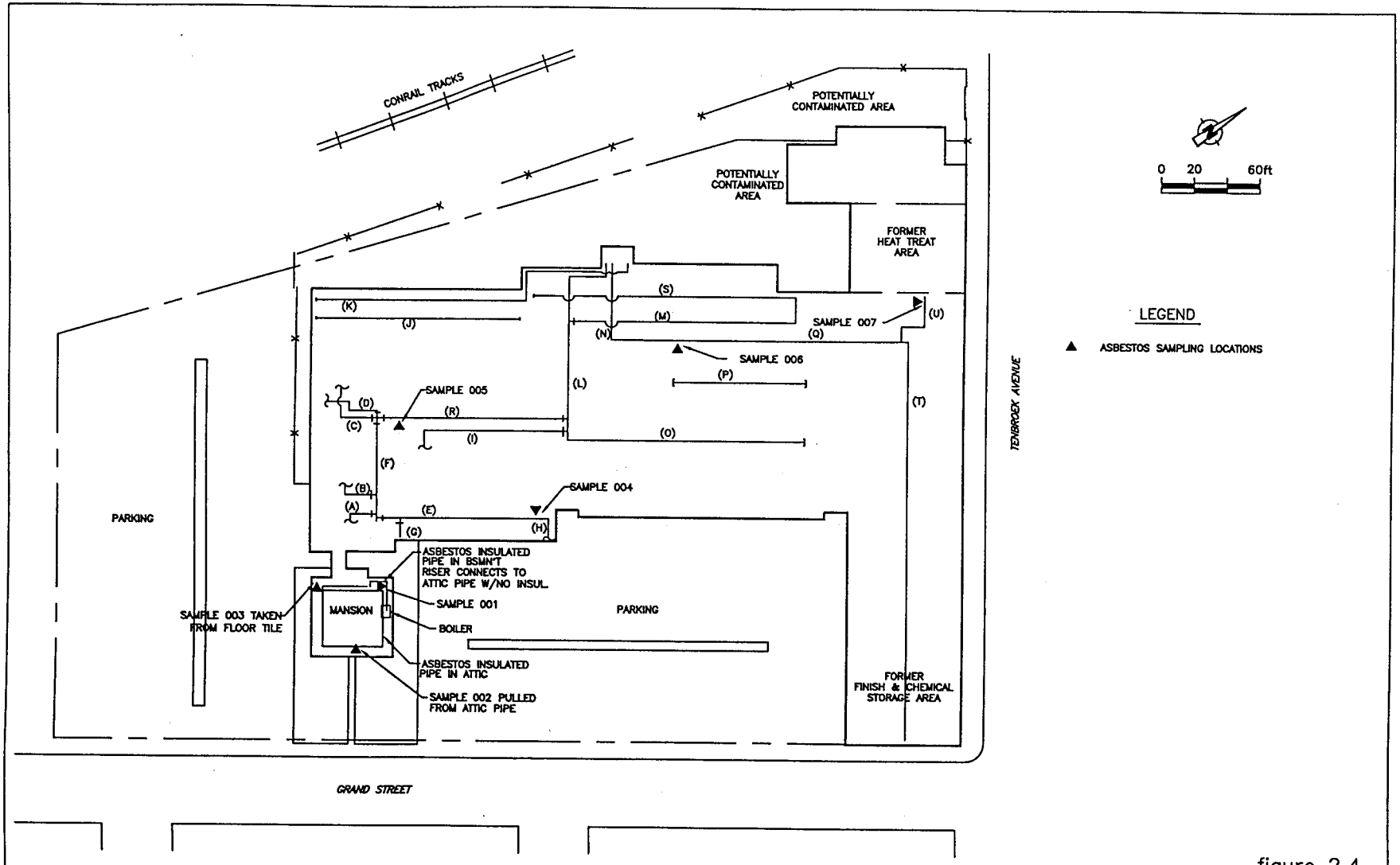

figure 2.4
ASBESTOS PLAN
HUCK INTERNATIONAL
PHASE II ENVIRONMENTAL ASSESSMENT
Kingston, New York

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TABLE 2.8

ASBESTOS SAMPLE SUMMARY
PHASE II ENVIRONMENTAL ASSEMENT REPORT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Date	*Type*	*Location*	*Sample I.D.*
5-17-93	Pipe insulation	Mansion basment	A-5269-051793-EF-01
5-17-93	Floor tile	First floor of Mansion	A-5269-051793-EF-02
5-17-93	Pipe insulation	Mansion attic	A-5269-051793-EF-03
5-17-93	Pipe insulation	Pipe E	A-5269-051793-EF-04
5-17-93	Pipe insulation	Pipe R	A-5269-051793-EF-05
5-17-93	Pipe insulation	Pipe Q	A-5269-051793-EF-06
5-18-93	Pipe insulation	Pipe U	A-5269-051793-EF-07

3.0 RESULTS

This section discusses the findings of the environmental assessment, which includes a discussion of the geology, hydrogeology and analytical sampling results.

3.1 GEOLOGY

The site is located within the Lower Hudson River Basin. Based on the stratigraphy identified in soil boring BH-1, it was determined that the site is underlain by unconsolidated sand to an approximate depth of 70 feet below grade. The sand is classified as a fine to coarse grained sediment, which becomes more silty with depth.

Underlying the sand is a clay unit which was encountered at an approximate depth of 70 feet below grade. The soil boring (BH-1) was advanced 10 feet into the clay unit, but did not penetrate it. Bedrock was not encountered during the drilling program.

Two geologic cross sections were developed for this Site. Cross section locations are presented on Figure 3.1. The two cross sections are presented on Figure 3.2.

3.2 HYDROGEOLOGY

Groundwater is encountered in the sand deposit under unconfined conditions at an approximate depth of 13 feet below grade. Two rounds of water levels were collected as part of this investigation. Groundwater measurements are presented in Table 3.1. Groundwater at the Site flows to the west. Figure 3.3 presents a groundwater flow contour map for the Site.

The groundwater elevation at the Site is approximately 170 feet above mean sea level (AMSL). The Hudson River is east of the Site and

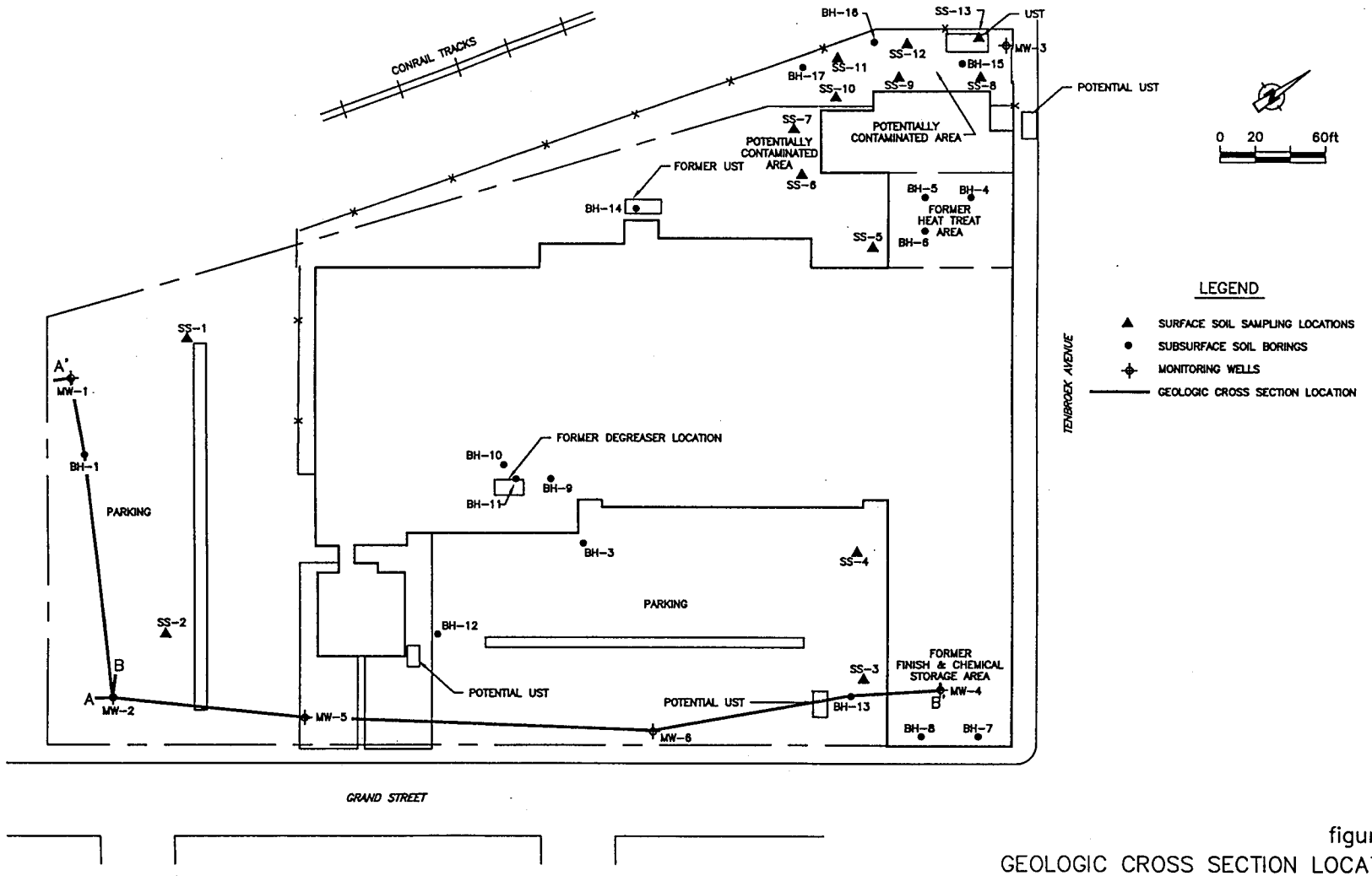

figure 3.1
GEOLOGIC CROSS SECTION LOCATIONS
HUCK INTERNATIONAL
PHASE II ENVIRONMENTAL ASSESSMENT
Kingston, New York

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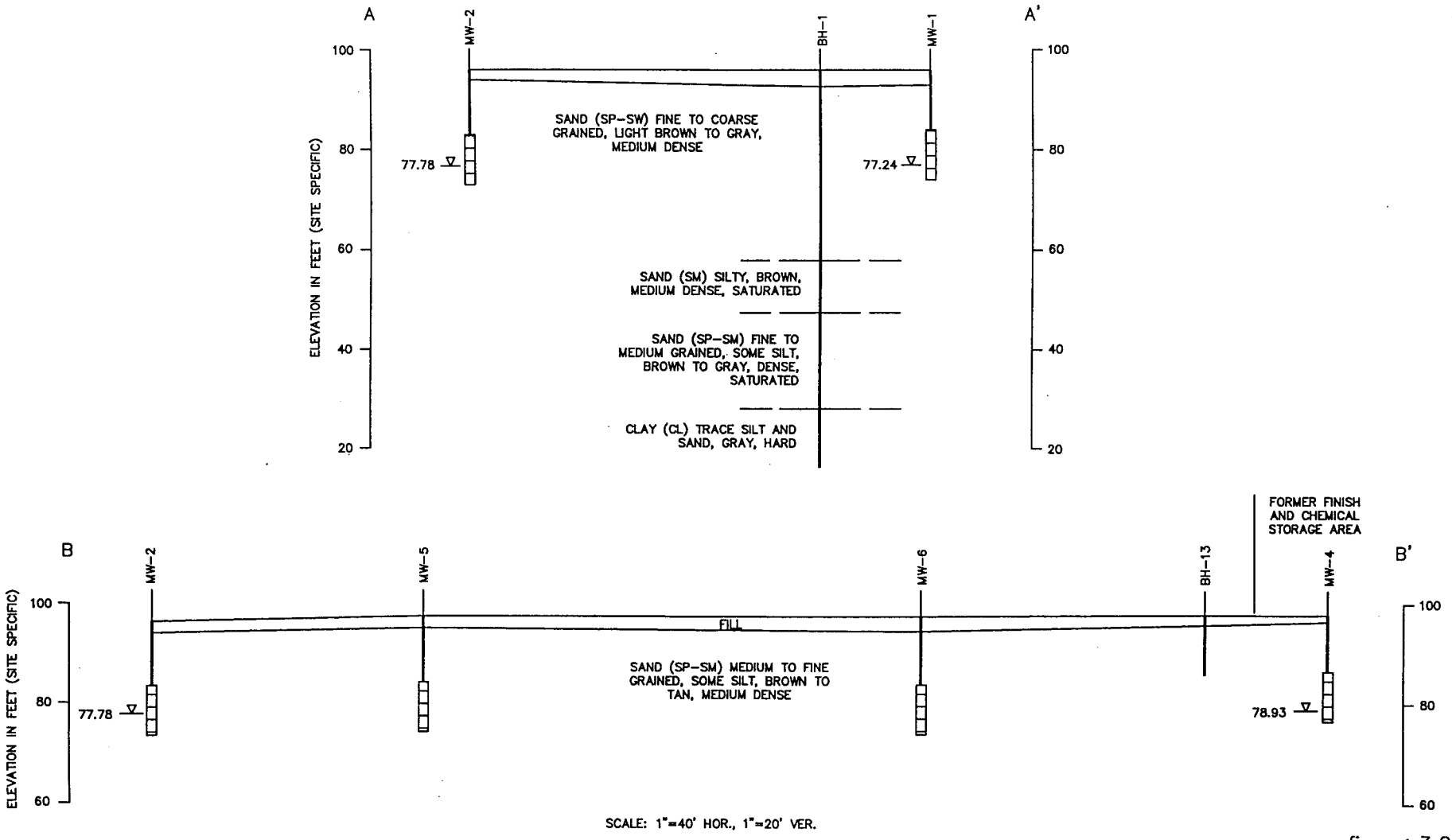

figure 3.2

GEOLOGIC CROSS SECTIONS A–A' & B–B'
HUCK INTERNATIONAL
PHASE II ENVIRONMENTAL ASSESSMENT
Kingston, New York

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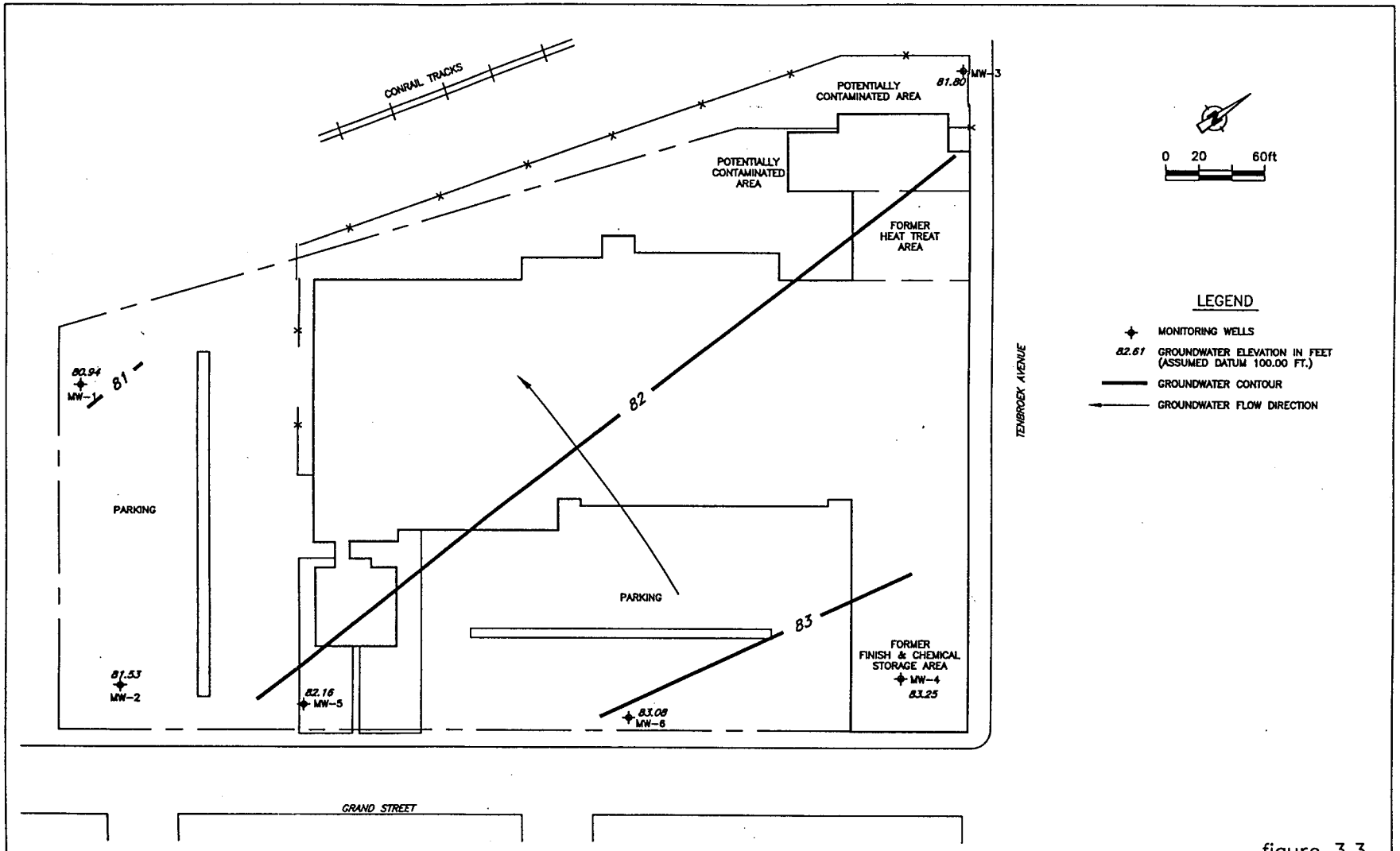

figure 3.3
GROUNDWATER CONTOURS (6–17–93)
HUCK INTERNATIONAL
PHASE II ENVIRONMENTAL ASSESSMENT
Kingston, New York

CRA

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TABLE 3.1

GROUNDWATER ELEVATION
PHASE II ENVIRONMENTAL ASSESSMENT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Well	*Groundwater Elevation*	
	6/17/93	*7/15/93*
MW-1	80.94	80.50
MW-2	81.53	81.10
MW-3	81.80	81.34
MW-4	83.25	82.70
MW-5	82.16	81.64
MW-6	83.08	82.57

is at an approximate elevation of 5 feet AMSL. The significant elevation difference between the groundwater elevation at the Site and the Hudson River, in conjunction with the presence of a 10 foot (minimum) clay unit, would imply that the water table aquifer is not hydraulically connected to the Hudson River.

A westerly groundwater flow direction implies that the groundwater discharges to a surface water body to the west, Esopus Creek. Esopus Creek is an underfit stream located within a former glacial drainage channel. Esopus Creek flows to the northeast towards the Hudson River. Esopus Creek is approximately 5,200 feet west-northwest of the Site at an elevation of 150 feet AMSL. The change in groundwater elevation over distance corresponds to a hydraulic gradient of approximately 0.004, which is the on-site groundwater gradient. Hence, it appears that groundwater flows from the Site to Esopus Creek.

Hydraulic conductivity of the aquifer is estimated using the Hazen's equation. Attempts to calculate the hydraulic conductivity using single well response tests were unsuccessful because the water level recovered too rapidly to collect the necessary data.

The Hazen's equation is an empirically derived equation that estimates hydraulic conductivity (K) based on the grain size diameter using the following equation (Freeze and Cherry, 1979)[1]:

$$K = Ad_{10}^2$$

Where:

- K is the hydraulic conductivity (in cm/s);
- A is an empirical coefficient equal to 1.0; and
- d_{10} is the grain size diameter (in mm) of the 10% passing through a mechanical sieve.

Two grain size analyses were performed on samples

1 Freeze, R.A. and Cherry, G.A. 1979. Groundwater: Prentice Hall; Englewood Cliffs, New Jersey.

collected at the well screen interval from MW-1 and MW-2. Grain size distribution curves are presented in Appendix D. The grain size analysis from MW-1 classifies the sediment as a poorly graded sand. The grain size analysis from MW-2 is classified as a silt. Due to the high silt content, the sample from MW-2 cannot be applied to the Hazen's equation. However, the single well response test conducted on this well recovered in less than one minute. Hence, the collected soil is not representative of the aquifer. By applying the above equation, a hydraulic conductivity value of 3×10^{-2} cm/s is obtained from the MW-1 sample.

The average linear groundwater velocity (V) can be calculated from the hydraulic conductivity according to the following equation:

$$V = \frac{Ki}{n}$$

Where:

V is average linear groundwater flow velocity;
K is the hydraulic conductivity (0.03 cm/s);
i is the hydraulic gradient (0.004); and
n is the effective porosity (0.3, assumed).

The average linear groundwater flow velocity is calculated at 4×10^{-4} cm/s, or 1.1 ft/d. Based on the potential error of the estimates used in the velocity determination, the calculated groundwater velocity should be considered to be accurate within an order of magnitude.

3.3 SOIL SAMPLING RESULTS

Analytical results for soil samples collected from the intermediate soil borings, shallow soil borings and monitoring wells are presented on Tables 3.2A, 3.2B and 3.2C, respectively, for organic compounds (VOCs, SVOCs, PCBs and TPHs). Inorganic sampling results (metals and cyanide) are presented on Tables 3.3A, 3.3B and 3.3C.

TABLE 3.2A

SOIL SAMPLING SUMMARY OF DETECTED ORGANIC COMPOUNDS
INTERMEDIATE SOIL BORINGS
PHASE II ENVIRONMENTAL ASSESSMENT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Compound	*BH-3 (2-4 ft bgs)*	*BH-4 (5-6 ft bgs)*	*BH-5 (6-8 ft bgs)*	*BH-6 (5-6 ft bgs)*	*BH-7 (2.5-4.5 ft bgs)*	*BH-8 (0.5- 2.5 ft bgs)*	*BH-9 (0.5- 2.5 ft bgs)*	*BH-10 (6.5-8.5 ft bgs)*	*BH-11 (4.5-6.5 ft bgs)*	*BH-14I (18-20 ft bgs)*	*BH-14J (20-22 ft bgs)*	*BH-14K (22-24 ft bgs)*	*BH-14L (24-26 ft bgs)*	*BH-16 (4-6 ft bgs)*	*BH-17 (4-6 ft bgs)*
VOCs															
cis-1,2-Dichloroethene	0.0088	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA (NA)	NA	0.062	ND
1,1,1-Trichloroethane	ND	ND	ND	0.0085	ND	ND	ND	ND	ND	NA	NA	NA (NA)	NA	0.012	ND
Trichloroethene	0.130	0.024	ND	0.010	ND	0.0076	0.170	ND	0.093	NA	NA	NA (NA)	NA	0.0062	ND
Tetrachloroethene	0.099	0.022	ND	ND	ND	ND	0.110	ND	0.023	NA	NA	NA (NA)	NA	ND	ND
Total Petroleum Hydrocarbons	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND (ND)	ND	NA	NA
Semi-VOCs	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA (NA)	NA	ND	ND
PCBs	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA (NA)	NA	ND	ND

All values are given in mg/kg
ND - not detected above the quantitation limit
NA - not analyzed
( ) - duplicate sample

TABLE 3.2B

SUMMARY OF DETECTED ORGANIC COMPOUNDS
SHALLOW SOIL BORINGS
PHASE II ENVIRONMENTAL ASSESSMENT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Compound	*SS-1 (1-3 ft bgs)*	*SS-2 (1-3 ft bgs)*	*SS-3 (1-3 ft bgs)*	*SS-4 (1-3 ft bgs)*	*SS-5 (1-3 ft bgs)*	*SS-6 (1-3 ft bgs)*	*SS-7 (1-3 ft bgs)*	*SS-8 (1-3 ft bgs)*	*SS-9 (1-3 ft bgs)*	*SS-10 (1-3 ft bgs)*	*SS-11 (1-3 ft bgs)*	*SS-12 (1-3 ft bgs)*	*SS-13 (1-3 ft bgs)*
VOCs													
Acetone	ND	ND	ND	ND	ND	ND (ND)	ND	0.051 J	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ND	ND	1.1	ND	ND	520 (7.1)	280	0.048 J	0.210	0.4	15	260	0.023
1,1,1-Trichloroethane	ND	ND	ND	0.0059	ND	ND (ND)	ND	0.026 J	ND	ND	ND	ND	ND
Trichloroethene	95	0.044	350	0.120	0.2	76 (5.1)	130	0.140 J	0.200 J	0.38	ND	170	0.49
Tetrachloroethene	6.8	0.0054	18	18	ND	3.9 (ND)	1.3	ND	ND	ND	ND	140	0.26
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	22 (ND)	18	ND	ND	ND	ND	9	ND
Semi-VOCs													
Naphthalene	ND	ND	ND	ND	ND	ND (ND)	ND	ND	ND	3.9	6.4	ND	ND
Acenaphthene	ND	ND	ND	ND	ND	ND (ND)	ND	ND	ND	4.6	ND	0.67	ND
Fluorene	ND	ND	ND	ND	ND	ND (ND)	ND	ND	ND	4.4	ND	0.7	ND
Phenanthrene	ND	ND	ND	ND	370	ND (ND)	ND	ND	ND	31	ND	5.5	0.75
Anthracene	ND	ND	ND	ND	ND	ND (ND)	ND	ND	0.68	7.1	ND	1.3	ND
Fluoranthene	ND	ND	ND	ND	420	ND (ND)	ND	ND	3.6	33	ND	4.6	0.56
Pyrene	ND	ND	ND	ND	ND	ND (ND)	ND	ND	3.7	31	7.9	5.4	1.1
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND (ND)	ND	ND	1.7	18	4.7	2.6	ND
Chrysene	ND	ND	ND	ND	ND	ND (ND)	ND	ND	1.9	19	4.5	2.6	0.39
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND (ND)	ND	ND	1.7	15	ND	2.0	0.44
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND (ND)	ND	ND	0.86	10	ND	1.4	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND (ND)	ND	ND	1.4	15	ND	1.8	ND
Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND	ND (ND)	ND	ND	0.77	7.9	ND	0.82	ND
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND (ND)	ND	ND	ND	2.4	ND	ND	ND
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND	ND (ND)	ND	ND	0.84	9.1	ND	0.94	ND
Dibenzofuran	ND	ND	ND	ND	ND	ND (ND)	ND	ND	ND	3.3	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND (ND)	ND	ND	ND	3.5	ND	ND	ND
PCBs													
Aroclor 1254	ND	ND	ND	ND	ND	ND (ND)	ND	ND	ND	ND	2.5	0.22	ND

All values are given in mg/kg
ND - not detected above the quantitation limit
NA - not analyzed
( ) - duplicate sample
J - associated value is estimated

TABLE 3.2C

SOIL SAMPLING RESULTS
MONITORING WELL INSTALLATION
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Compound	*MW-1 13-15 ft*	*MW-2 13-15 ft*	*MW-3 13-15 ft*	*MW-4 6-8 ft*	*MW-5 13-15 ft*	*MW-6 13-15 ft*
VOCs						
Trichloroethene	ND	ND	ND	ND	ND (ND)	0.130 (ND)
Tetrachloroethene	ND	ND	ND	ND	ND (ND)	0.120 (ND)
Semi-VOCs	NA	NA	NA	ND	NA (NA)	NA (NA)
PCBs	NA	NA	NA	ND	NA (NA)	NA (NA)

All values given in mg/kg
ND - not detected above the quantitation limit
NA - not analyzed
( ) - duplicate sample

TABLE 3.3A

SOIL SAMPLING SUMMARY OF DETECTED INORGANIC COMPOUNDS
INTERMEDIATE SOIL BORINGS
PHASE II ENVIRONMENTAL ASSESSMENT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Compound	*BH-3 (2-4 ft bgs)*	*BH-4 (5-6 ft bgs)*	*BH-5 (6-8 ft bgs)*	*BH-6 (5-6 ft bgs)*	*BH-7 (2.5-4.5 ft bgs)*	*BH-8 (0.5- 2.5 ft bgs)*	*BH-9 (0.5- 2.5 ft bgs)*	*BH-10 (6.5-8.5 ft bgs)*	*BH-11 (4.5-6.5 ft bgs)*	*BH-14I (18-20 ft bgs)*	*BH-14J (20-22 ft bgs)*	*BH-14K (22-24 ft bgs)*	*BH-14L (24-26 ft bgs)*	*BH-16 (4-6 ft bgs)*	*BH-17 (4-6 ft bgs)*
RCRA Metals															
Arsenic	5.24	8.12	6.68	5.32	10.3	4.67	5.34	3.95	3.68	NA	NA (NA)	NA	NA	3.46	6.23
Barium	79.2	50.1	30.3	27.7	39.8	54.6	72.5	29.7	21.2	NA	NA (NA)	NA	NA	20.3	46.8
Cadmium	ND	ND	ND	ND	ND	(490)	ND	ND	ND	NA	NA (NA)	NA	NA	ND	ND
Chromium	13.5	18.1	15.3	15.6	(380)	25.1	11.0	8.92	8.61	NA	NA (NA)	NA	NA	7.64	14.1
Lead	18.4	28.2	13.1	60.7	10.7	18.9	15.6	5.48	6.14	NA	NA (NA)	NA	NA	5.88	17.1
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA (NA)	NA	NA	ND	ND
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA (NA)	NA	NA	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA (NA)	NA	NA	ND	ND
Cyanide, Total	ND	ND	ND	ND	ND	46.7	ND	ND	ND	NA	NA (NA)	NA	NA	ND	ND

All values are given in mg/kg
ND - not detected above the quantitation limit
NA - not analyzed
( ) - duplicate sample

TABLE 3.3B

SUMMARY OF DETECTED INORGANIC COMPOUNDS
SHALLOW SOIL BORINGS
PHASE II ENVIRONMENTAL ASSESSMENT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Compound	*SS-1 (1-3 ft bgs)*	*SS-2 (1-3 ft bgs)*	*SS-3 (1-3 ft bgs)*	*SS-4 (1-3 ft bgs)*	*SS-5 (1-3 ft bgs)*	*SS-6 (1-3 ft bgs)*	*SS-7 (1-3 ft bgs)*	*SS-8 (1-3 ft bgs)*	*SS-9 (1-3 ft bgs)*	*SS-10 (1-3 ft bgs)*	*SS-11 (1-3 ft bgs)*	*SS-12 (1-3 ft bgs)*	*SS-13 (1-3 ft bgs)*
RCRA Metals													
Arsenic	9.45	8.74	7.32	8.57	6.46	8.28 (15.0)	6.19	6.16	11.9	7.28	10.2	13.6	21.6
Barium	90.5	30.5	75.3	67.1	92.4	116 (117.0)	31.8	76.6	162.0	420.0	77.5	50.3	134
Cadmium	ND	ND	ND	ND	ND	ND (9.05)	ND	ND	ND	ND	ND	ND	3.04
Chromium	15.7	12.4	70.7	11.6	12.4	18.1 (214.0)	12	17.9	75.1	28.2	27.6	21.9	174.0
Lead	87.0	11.1	106.0	66.3	32.8	26.6 (468.0)	24.2	84.4	244.0	610	79.7	19.9	334.0
Mercury	ND	ND	ND	ND	ND	ND (1.15)	ND	0.27	1.04	0.28	2.22	0.16	0.38
Selenium	0.75	ND	ND	0.76	ND	0.67 (ND)	0.97	1.11	0.88	1.51	1.07	2.8	1.38
Silver	ND	ND	ND	ND	ND	ND (ND)	ND	ND	1.78	ND	ND	ND	1.69
Cyanide, Total	ND	ND	ND	ND	ND	ND (3.56)	ND	ND	ND	ND	ND	ND	ND

All values are given in mg/kg
ND - not detected above the quantitation limit
( ) - duplicate sample

TABLE 3.3C
SOIL SAMPLING RESULTS
MONITORING WELL INSTALLATION
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Compound	*MW-1 13-15 ft*	*MW-2 13-15 ft*	*MW-3 13-15 ft*	*MW-4 6-8 ft*	*MW-5 13-15 ft*	*MW-6 13-15 ft*
Metals						
Arsenic	NA	NA	NA	2.7	NA (NA)	NA (NA)
Barium	NA	NA	NA	24.9	NA (NA)	NA (NA)
Cadmium	NA	NA	NA	ND	NA (NA)	NA (NA)
Chromium	NA	NA	NA	10.8	NA (NA)	NA (NA)
Lead	NA	NA	NA	5.52	NA (NA)	NA (NA)
Mercury	NA	NA	NA	ND	NA (NA)	NA (NA)
Selenium	NA	NA	NA	ND	NA (NA)	NA (NA)
Silver	NA	NA	NA	ND	NA (NA)	NA (NA)
Cyanide	NA	NA	NA	ND	NA (NA)	NA (NA)

All values are given in mg/kg
ND - not detected above the quantitation limit
NA - not analyzed
( ) - duplicate sample

NYSDEC soil cleanup objectives are as follows:

PCBs	1 mg/kg (surface), 10 mg/kg (subsurface)
TVOCs	10 mg/kg
SVOCs	500 mg/kg
Individual SVOC	50 mg/kg

3.3.1 VOC Soil Sampling Results

All of the shallow soil boring samples (SS-1 to SS-13) and seven of the eleven intermediate soil boring samples exhibited VOCs. Soil samples from the monitoring well borings did not exhibit VOCs. The VOCs identified in soil samples consisted primarily of chlorinated solvents (cis 1,2 dichloroethene, trichloroethene and tetrachloroethene) with total VOC (TVOC) concentrations ranging from ND to 622 mg/kg. Figure 3.4 presents the TVOC concentrations from the soil sampling program.

The highest concentrations of VOCs were observed in near surface soils in the vicinity of SS6, SS7 and SS12. Several locations exceeded the NYSDEC cleanup goal of 10 mg/kg.

TPH was analyzed at the former UST location (BH-14) and was not detected.

3.3.2 SVOC Soil Sampling Results

SVOCs were detected in six of the shallow soil borings (SS-5 and SS-9 to SS-13). SVOCs were not detected in the intermediate soil borings. The SVOCs detected were primarily polynuclear aromatic hydrocarbons (PAHs), such as pyrene and benzo (a) pyrene. Total SVOC (TSVOC) concentrations ranged from ND to 218 mg/kg. The highest TSVOC concentrations were found in the near surface soil in the former chemical storage area. Figure 3.5 presents

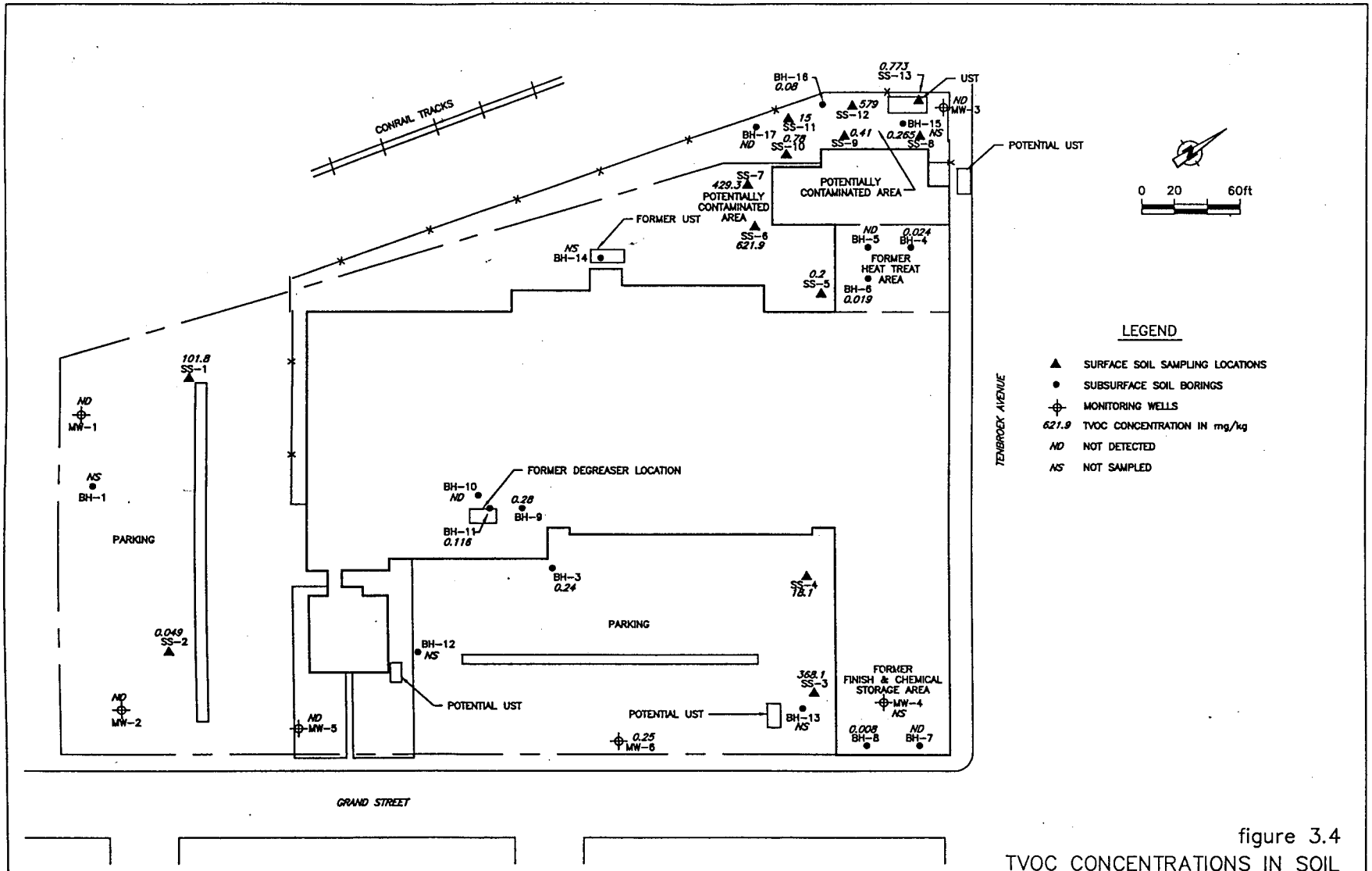

figure 3.4
TVOC CONCENTRATIONS IN SOIL
HUCK INTERNATIONAL
PHASE II ENVIRONMENTAL ASSESSMENT
Kingston, New York

CRA

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the concentrations from the soil sampling program. None of the soil samples exceeded the NYSDEC SVOC cleanup guideline.

3.3.3 PCB Soil Sampling Results

PCBs were detected in the near surface soils at only two locations (SS-11 and SS-12) in the former chemical storage area. The PCB detected was Aroclor 1254 at a concentration ranging from 0.22 to 2.5 mg/kg. PCBs were not detected in samples collected in the vicinity of previous and current transformers. One location exceeded the NYSDEC surface soil cleanup guideline for PCBs.

3.3.4 RCRA Metals Soil Sampling Results

A majority of the eight RCRA metals were typically detected in the soil samples, because they are naturally occurring elements. According to the NYSDEC (1992)[2], a range of background values and recommended soil cleanup goals for the RCRA metals is presented below:

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2 NYSDEC; Division of Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels. November 1992.

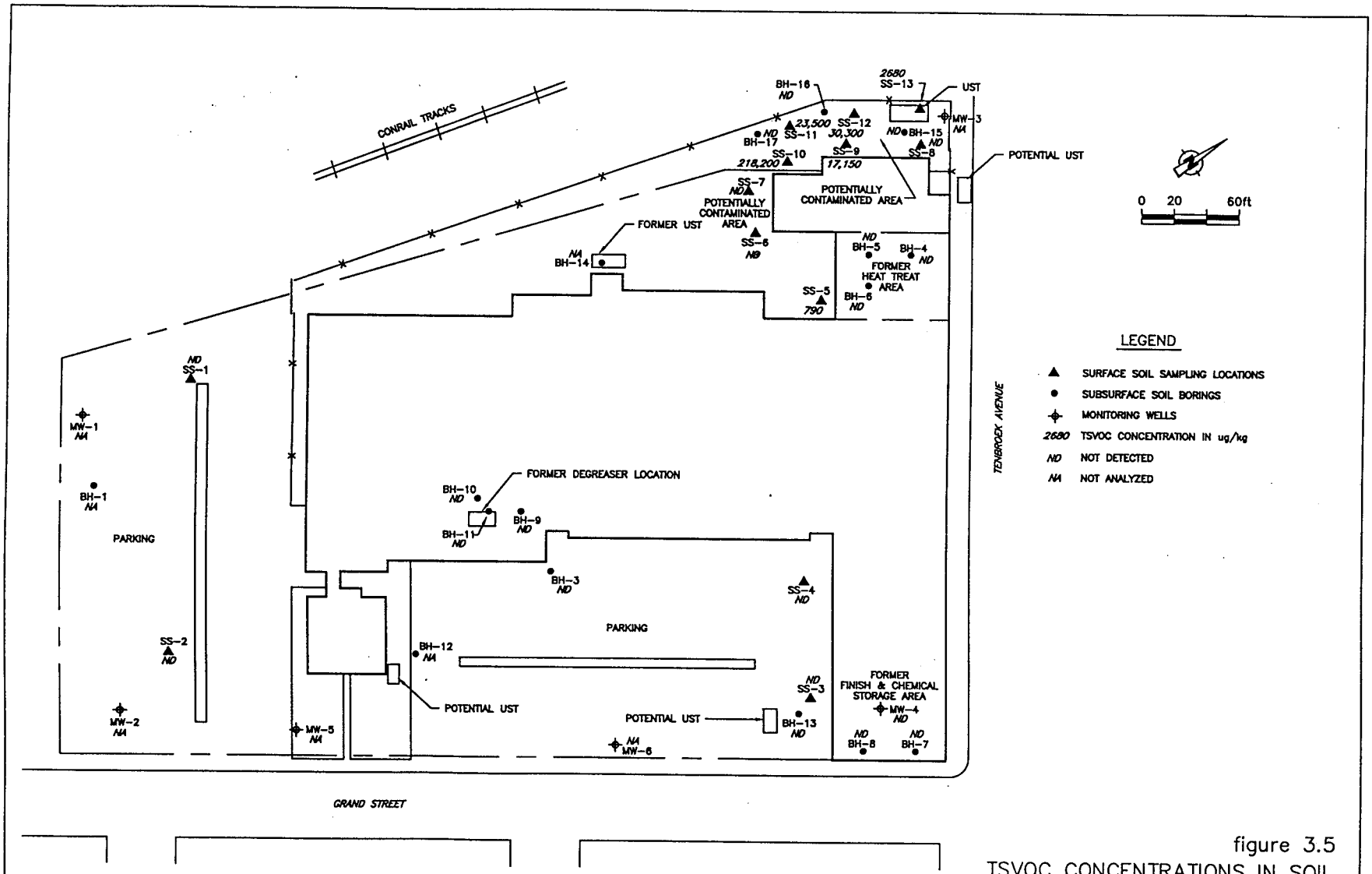

figure 3.5
TSVOC CONCENTRATIONS IN SOIL
HUCK INTERNATIONAL
PHASE II ENVIRONMENTAL ASSESSMENT
Kingston, New York

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Metal	*Background Concentration Range (in mg/kg)*	*Recommended Soil Cleanup Goal (in mg/kg)*
Arsenic	3 to 12	7.5 to S.B.
Barium	15 to 600	300 to S.B.
Cadmium	0.1 to 1.0	1 or S.B.
Chromium	1.5 to 40	10 or S.B.
Lead	4 to 61	30 or S.B.
Mercury	0.001 to 0.2	0.1
Selenium	0.1 to 3.9	2 or S.B.
Silver	No Range Given	200

*S.B. - Site Background

A comparison of sampling results to background and cleanup goals shows exceedences.

3.3.5 Cyanide Sampling Results

Cyanide was observed only at two locations, SS-6 (3.56 mg/kg) and BH-8 (46.7 mg/kg). Only the sample at BH-8 would be considered significantly above background. The NYSDEC has not established soil background values or recommended soil cleanup goals for cyanide.

3.4 GROUNDWATER SAMPLING RESULTS

Two rounds of groundwater samples were collected as part of this investigation. Samples were analyzed for VOCs, SVOCs, PCBs, cyanide and metals (total and dissolved). Analytical results for groundwater sampling rounds 1 and 2 are presented on Tables 3.4A and 3.4B, respectively.

PCBs and SVOCs were not detected in either groundwater sampling round.

TABLE 3.4B

GROUNDWATER SAMPLING RESULTS
ROUND 2 - JUNE 1993
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Compound	*MW-1*	*MW-2*	*MW-3*	*MW-4*	*MW-5*	*MW-6*	*NYSDEC Drinking Water Standard*
VOCs							
cis-1,2-Dichloroethene	67(61)	27	ND	3,400	33	340	5
Trichloroethene	1,300(1,100)	490	27	4,500	170	770	5
Tetrachloroethene	1,400(1,300)	ND	12	ND	300	800	5
Semi-VOCs	NA	NA	NA	NA	NA	NA	--
PCBs	NA	NA	NA	NA	NA	NA	--
*Metals**							
Arsenic	ND	ND	ND	ND	ND	ND	25
Barium	ND	ND	ND	ND	ND	ND	1,000
Cadmium	ND	ND	ND	ND	ND	ND	1
Chromium	13.2	ND	ND	16.2	ND	ND	50
Lead	ND	ND	10.5	ND	ND	ND	25
Mercury	ND	ND	ND	ND	ND	ND	2
Selenium	ND	ND	ND	ND	10.5	ND	1
Silver	ND	ND	ND	ND	ND	ND	50
Cyanide	ND(ND)	ND	ND	ND	ND	ND	100

All values are given in µg/L
NA - Not Analyzed
ND - Not detected above the quantitation limit
( ) - Duplicate Sample
* - Samples collected for metals were field-filtered during Round 2

TABLE 3.4B

GROUNDWATER SAMPLING RESULTS
ROUND 2 - JUNE 1993
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Compound	*MW-1*	*MW-2*	*MW-3*	*MW-4*	*MW-5*	*MW-6*	*NYSDEC Drinking Water Standard*
VOCs							
cis-1,2-Dichloroethene	67(61)	27	ND	3,400	33	340	5
Trichloroethene	1,300(1,100)	490	27	4,500	170	770	5
Tetrachloroethene	1,400(1,300)	ND	12	ND	300	800	5
Semi-VOCs	NA	NA	NA	NA	NA	NA	--
PCBs	NA	NA	NA	NA	NA	NA	--
*Metals**							
Arsenic	ND	ND	ND	ND	ND	ND	25
Barium	ND	ND	ND	ND	ND	ND	1,000
Cadmium	ND	ND	ND	ND	ND	ND	1
Chromium	13.2	ND	ND	16.2	ND	ND	50
Lead	ND	ND	10.5	ND	ND	ND	25
Mercury	ND	ND	ND	ND	ND	ND	2
Selenium	ND	ND	ND	ND	10.5	ND	1
Silver	ND	ND	ND	ND	ND	ND	50
Cyanide	ND(ND)	ND	ND	ND	ND	ND	100

All values are given in µg/L
NA - Not Analyzed
ND - Not detected above the quantitation limit
( ) - Duplicate Sample
* - Samples collected for metals were field-filtered during Round 2

Cyanide was detected once at one location (MW-4) at a concentration of 21 µg/L.

VOCs were detected in each monitoring well at concentrations above the Federal drinking water standard or Maximum Contaminant Level (MCL). The primary VOCs detected were cis-1,2-dichloroethene, trichloroethene and tetrachloroethene.

Figure 3.6 shows the total VOC (TVOC) concentration measured at each monitoring well for Rounds 1 and 2. MW-4, located in the former metals finish and chemical storage area, exhibits the highest TVOC concentration range of 8,300 µg/L. Monitoring wells MW-1, MW-2, MW-5 and MW-6 also exhibit TVOC concentrations greater than 500 µg/L. MW-3 exhibited the lowest TVOC, but still exhibited individual VOC compound concentrations above the MCL.

The presence of VOCs at MW-5 and MW-6 may be associated with an off-site source. Both wells are supposedly upgradient from the Site and are not near suspected source areas. Yet, each well exhibits significant (i.e., greater than 1,000 µg/L) VOC contamination.

Two rounds of samples were collected for RCRA metals analysis. The samples collected during the first round were not field filtered and, hence, they were analyzed for total metals. The second round of groundwater samples was field filtered and was analyzed for dissolved metals.

The first round exhibited low levels (i.e., less than 1,000 µg/L) for RCRA metals. The second round showed considerably lower levels of metals in groundwater. The presence of metals in Round 1 samples are considered to be associated with suspended sediment in the groundwater sample.

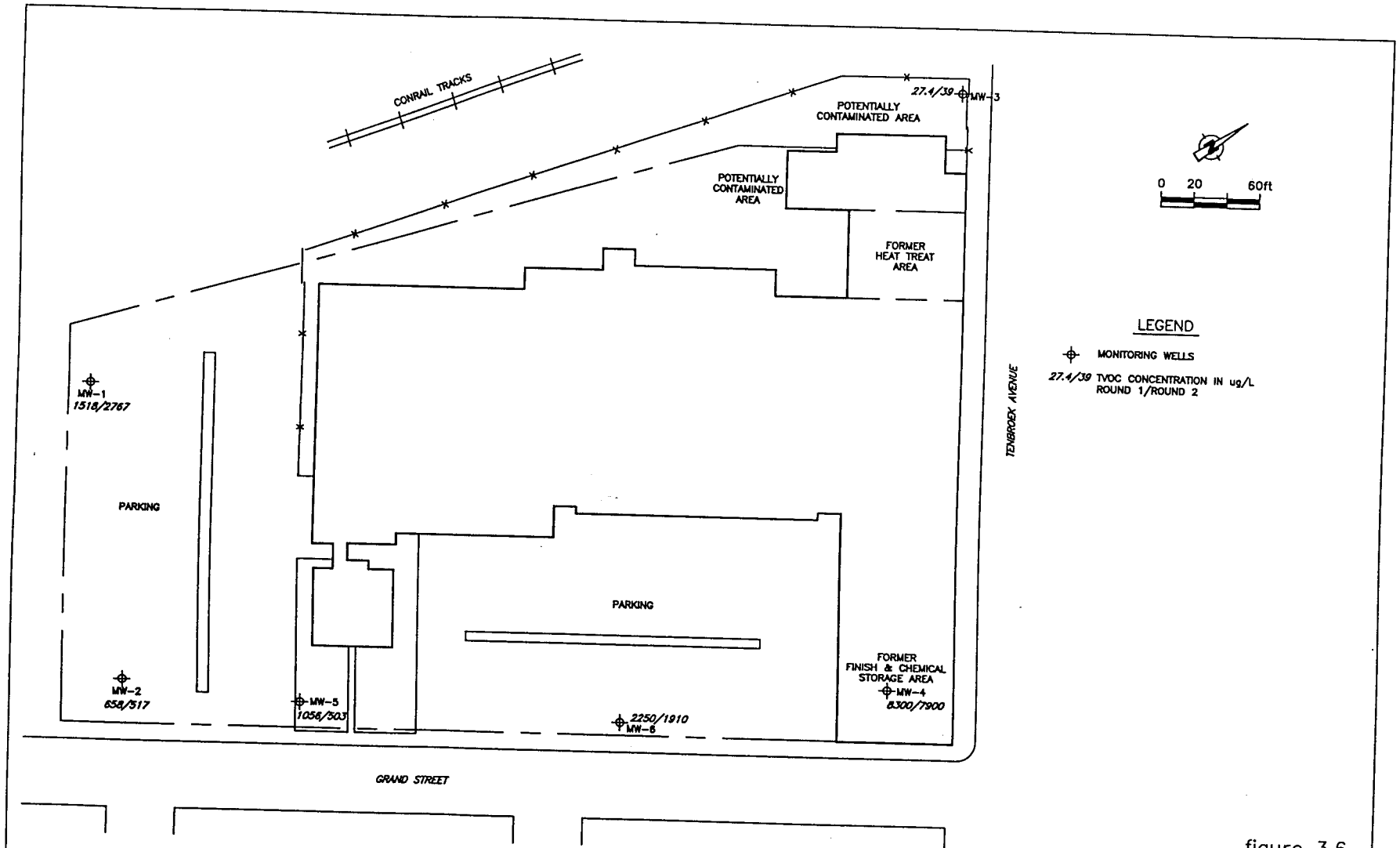

figure 3.6
TVOC CONCENTRATIONS IN GROUNDWATER
ROUND 1 (5-4-93)/ROUND 2 (6-3-93)
HUCK INTERNATIONAL
PHASE II ENVIRONMENTAL ASSESSMENT
Kingston, New York

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3.5 SEWER SEDIMENT SAMPLING RESULTS

Sewer sediment samples were collected from three locations and were analyzed for VOCs, SVOCs, PCBs, RCRA metals and cyanide. Analytical results for the sewer sediment samples are presented on Table 3.5.

VOCs were detected at each location with total VOC concentrations ranging from 24.200 mg/kg (Manhole A) to 0.1 mg/kg (Manhole C). The three VOCs detected were cis-1,2-dichloroethene, trichloroethene and tetrachloroethene.

SVOCs were detected at each location, with total SVOC concentrations ranging from 47.52 mg/kg to 4.2 mg/kg. A majority of SVOCs detected were PAHs (e.g., pyrene).

PCBs were also detected in each sample, with concentrations ranging from 1.6 mg/kg to 4.1 mg/kg. The detected PCB was identified as Aroclor 1254.

The RCRA metal analysis detected elevated levels at each manhole location. At Manhole A, elevated levels of barium, cadmium, chromium and selenium were observed. The sample from Manhole B exhibited elevated levels of chromium, lead and selenium. Manhole C exhibited elevated levels of chromium and lead.

Cyanide was not detected in any sewer sediment sample.

A comparison of sewer sediment to soil cleanup goals shows exceedences of VOCs, RCRA metals and PCBs. However, the comparison of soil and sewer sediment are not directly applicable.

3.6 ASBESTOS SAMPLING RESULTS

Asbestos sampling results are presented on Table 3.6. All of

TABLE 3.5

SEWER SEDIMENT SAMPLING RESULTS
PHASE II ENVIRONMENTAL ASSESSMENT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Compound	*Manhole A*	*Manhole B*	*Manhole C*
VOCs			
cis-1,2-Dichloroethene	23	0.18	0.019
Trichloroethene	ND	0.11	0.047
Tetrachloroethene	1.2	15	0.034
Semi-VOCs			
Phenanthrene	ND	2.8	3.9
Anthracene	ND	ND	0.74
di-n-butylphthalate	ND	0.56	ND
Fluoranthene	ND	7.7	7.4
Pyrene	ND	7.1	7.8
Benzo(a)anthracene	ND	3.5	4.0
bis(2-Ethylhexyl)phthalate	4.2	1.9	1.2
Chrysene	ND	4.0	4.5
Benzo(b)fluoranthene	ND	4.9	6.1
Benzo(k)fluoranthene	ND	3.2	2.3
Benzo(a)pyrene	ND	3.9	4.2
Indeno(1,2,3-cd)pyrene	ND	2.6	2.2
Benzo(g,h,i)perylene	ND	3.4	2.9
Carbazole	ND	0.5	0.48
Dibenzo(a,h)anthracene			0.65
PCBs			
Aroclor 1254	4.1	1.6	1.9
Metals			
Arsenic	11.1	8.68	9.41
Barium	496	121	115
Cadmium	42.1	11	11.5
Chromium	336	1,120	321
Lead	684	305	583
Mercury	0.37	0.33	0.22
Selenium	35.7	19.1	2.94
Silver	4.8	2.96	3.51
Cyanide	ND	ND	ND

All values are given in mg/kg
ND - not detected above the quantitation limit

TABLE 3.6

ASBESTOS SAMPLING RESULTS
PHASE II ENVIRONMENTAL ASSESSMENT
HUCK INTERNATIONAL INSTALLATION EQUIPMENT DIVISION
KINGSTON, NEW YORK

Location	*Type*	*Total Asbestos (%)**
Mansion - Basement	Pipe Insulation	27
Mansion - First Floor	Floor Tile	2
Mansion - Attic	Pipe Insulation	36
Pipe E	Pipe Insulation	32
Pipe R	Pipe Insulation	40
Pipe Q	Pipe Insulation	15
Pipe U	Pipe Insulation	30

* Asbestiform identified as chrysotile

the nine samples collected for asbestos analysis detected asbestos. The remaining floor tile and insulation samples all contained asbestos at percentages ranging from 2, in the floor tile, to 48 in the insulation at pipe R.

The floor tile would be considered non-friable and should not be a concern. The pipe insulation is often likely friable if distrubed and should be monitored to assure that it is properly maintained.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

Based on the results of the Phase II Environmental Assessment, the following conclusions can be made:

- The near surface soils (approximately 0 - 5 feet) in the former chemical storage area and suspected disposal area exhibit levels of VOCs, PCBs and RCRA metals exceeding NYSDEC cleanup goals.

- The water table aquifer exhibits elevated levels of VOCs, primarily cis-1,2-dichloroethene, trichloroethene and tetrachloroethene, at concentrations above MCL. Monitoring wells MW-2, MW-5 and MW-6 are upgradient of the Site and exhibit elevated VOC concentrations, which indicate an off-site source area.

- Sewer sediment exhibit levels of VOCs, RCRA metals and PCBs in excess to NYSDEC cleanup goals. The measured concentrations of VOCs and metals imply the sediment may be considered hazardous under RCRA.

- Pipe insulation contains asbestos at levels of 15 to 40 percent.

- The environmental assessment was able to identify one of the four potential USTs.

4.2 RECOMMENDATIONS

Based on the results of the Phase II Environmental Assessment and the conclusions, the following can be made:

1. Further groundwater investigation should be conducted to identify potential sources of groundwater contamination upgradient (southeast) of the Huck facility. An evaluation of the scope of groundwater remediation

and the responsible parties needs to be conducted.

2. It is recommended that further delineation of soil contamination be conducted in areas exceeding NYSDEC cleanup guidelines in order to evaluate the need and scope of soil remediation.

3. It is recommended that further sewer sampling be conducted to delineate and characterize sewer sediment contamination. An evaluation of the need and scope of sewer remediation (such as cleaning) is recommended.

4. It is recommended that an asbestos management plan be developed.

5. It is recommended that the UST north of the plant be closed by removal in accordance with State and Federal regulations.

All of Which is Respectfully Submitted,

CONESTOGA-ROVERS & ASSOCIATES

Ronald Frehner

Brian C. Boevers

APPENDIX A

SOIL BORING LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-07)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-1
(Page 1 of 3)
DATE COMPLETED: APRIL 28, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		96.0 (Approx.)					
	BLACK TOP	-0.3					
	SP-SAND(FILL), some gravel, black						
2.5		-3.0					
	SP-SAND, medium grained, light brown, moist			1SS		11	1
5.0							
7.5	- light brown and gray			2SS		12	1.5
10.0			8"ø BOREHOLE				
12.5				3SS		18	2
15.0		-15.8 ▽					
17.5	- compact, gray, wet		CEMENT/ BENTONITE GROUT	4SS		3	5
20.0							
22.5	- brown			5SS		10	4
25.0							
27.5							
	SW-SAND, fine to medium grained, compact, brown, wet	-28.0		6SS		19	4
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-07)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-1

DATE COMPLETED: APRIL 28, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
35.0				7SS		16	3.5
37.5	SM–SAND, some silt, dense, brown, saturated	-38.0		8SS		14	1
40.0							
42.5			8"ø BOREHOLE				
45.0				9SS		19	0
47.5	SW–SAND, trace silt, dense, fine to medium grained, brown, saturated	-48.0					
50.0			CEMENT/ BENTONITE GROUT	10SS		29	2
52.5	SP–SAND, trace silt, dense, fine to medium grained, brown, saturated	-53.0					
55.0				11SS		21	1
57.5							
60.0				12SS		29	1
62.5	– gray						
65.0				13SS		36	1

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-07)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-1 (Page 3 of 3)
DATE COMPLETED: APRIL 28, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
67.5							
	CL-CLAY, trace silt and sand, hard, saturated	-68.0		14SS		40	1.5
70.0			8" ø BOREHOLE				
72.5			CEMENT/ BENTONITE GROUT	15SS		76	2
75.0							
77.5				16SS		49	1
80.0	END OF HOLE @ 80.0 FT. BGS	-80.0					
82.5							
85.0							
87.5							
90.0							
92.5							
95.0							
97.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-08)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-2
DATE COMPLETED: APRIL 28, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
	SP-SAND(FILL), some gravel, black						
2.5	SP-SAND, loose, fine grained, brown gray, dry	-2.0		1SS		8	0
5.0			8"ø BOREHOLE	2SS		3	0
7.5	- medium grained, moist		CEMENT/ BENTONITE GROUT	3SS		4	0.5
10.0				4SS		8	1
12.5	END OF HOLE @ 12.0 FT. BGS	-12.0		5SS		12	1
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-09)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-3
DATE COMPLETED: APRIL 29, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
	ASPHALT and ROADBASE			1SS		3	2
		-2.0					
2.5	SP-SAND, loose, medium grained, light tan, moist		8" ø BOREHOLE	2SS		2	3.5
	- brown		CEMENT/ BENTONITE GROUT				
5.0				3SS		17	3.0
	- wet						
7.5				4SS			3.0
	END OF HOLE @ 8.0 FT. BGS	-8.0					
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-10)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-4
DATE COMPLETED: APRIL 30, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: E. FINCK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
2.5	SW/GW-SAND and GRAVEL(FILL), concrete - loose, moist		8"ø BOREHOLE CEMENT/ BENTONITE GROUT	1SS		34	11
	GP-GRAVEL, some sand, loose, medium grained, brown, moist	-3.0		2SS			10
5.0				3SS		10	3
	SP-SAND, some gravel and quartz, loose, medium grained, tan, moist	-6.0		4SS			4
7.5				5SS		12	3.5
	END OF HOLE @ 8.0 FT. BGS	-8.0					
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-11)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-5
DATE COMPLETED: APRIL 30, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: ED FINCK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
		Approx. 96.0					
	SP-/GP-SAND and GRAVEL	-0.5					
	SP-SAND, pebbles, concrete, asphalt, loose, medium grained, brown, moist			1SS		10	2
2.5	- trace silt, compact, medium grained, tan, moist		8"ø BOREHOLE	2SS			3.5
			CEMENT/ BENTONITE GROUT	3SS		6	2.5
5.0				4SS			4
				5SS		14	5.5
7.5	END OF HOLE @ 8.0 FT. BGS	-8.0					
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-12)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-6
DATE COMPLETED: APRIL 28, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: ED FINCK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
2.5	SP-SAND(FILL), pebbles, concrete, brown		8"ø BOREHOLE; CEMENT/ BENTONITE GROUT	1SS		9	1
				2SS			1
	Concrete and red brick debris	-3.0					
	SP-SAND, loose, medium grained, dark brown, dry	-4.0		3SS		14	4
5.0				(4SS)			16
7.5				5SS		12	15
	END OF HOLE @ 8.0 FT. BGS	-8.0					
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-13)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-7
DATE COMPLETED: APRIL 28, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: ED FINCK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
		Approx. 96.0					
2.5	SM-SAND(FILL), some silt, compact, fine grained, brown and gray, wet - loose, dry			1SS		12	6
5.0	- brown and red		8"ø BOREHOLE	2SS		5	5.5
7.5	SP-SAND, loose, medium grained, brown, dry	-6.5	CEMENT/ BENTONITE GROUT	3SS		7	3
10.0				4SS		16	3.5
12.5				5SS			4
15.0	END OF HOLE @ 14.0 FT. BGS	-14.0		6SS		15	3.5
17.5				7SS		24	3.5
20.0				8SS			4
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-14)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-8
DATE COMPLETED: MAY 2, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: ED FINCK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
	SP-SAND, loose, medium grained, brown, moist			1SS			45
	SM-SAND, some silt, loose, fine grained, brown, moist	-1.5		2SS			45
2.5	SP-SAND, pebbles, loose, fine grained, brown moist	-2.5	8"ø BOREHOLE	3SS		7	20
5.0	SM-SAND, some silt, compact, fine grained, wet	-5.0	CEMENT/ BENTONITE GROUT	4SS			11
	SP-SAND, loose, medium grained, brown, moist	-5.5		5SS			11
7.5				6SS			11
	END OF HOLE @ 8.5 FT. BGS	-8.5		7SS		14	5
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-15)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-9
DATE COMPLETED: MAY 2, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: ED FINCK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
2.5	SM-SAND, some silt, loose, medium grained, brown, dry - fine grained, tan		8"ø BOREHOLE CEMENT/ BENTONITE GROUT	1SS		5	20
				2SS		4	19
5.0	SP-SAND, pebbles, loose, medium grained, tan, dry	-4.5		3SS		9	13
7.5				4SS		11	16
	END OF HOLE @ 8.5 FT. BGS	-8.5					
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-16)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-10
DATE COMPLETED: MAY 2, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: ED FINCK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
2.5	SP-SAND, loose, fine grained, tan, dry		8" ø BOREHOLE	1SS		5	12
	- medium grained			2SS		9	7
5.0	- fine grained		CEMENT/ BENTONITE GROUT	3SS		16	9
7.5				4SS		16	13
	END OF HOLE @ 8.5 FT. BGS	-8.5					
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (○) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-17)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-11
DATE COMPLETED: MAY 2, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: ED FINCK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
		Approx. 96.0					
2.5	SM—SAND, some silt, loose, fine grained, reddish brown, dry — tan		8"ø BOREHOLE CEMENT/ BENTONITE GROUT	1SS		6	16
5.0	— brown			2SS		3	9
7.5	SP—SAND, loose, medium grained, brown, dry	-6.5		3SS		9	18
10.0	END OF HOLE @ 8.5 FT. BGS	-8.5		4SS		9	17
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-19)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-13
DATE COMPLETED: MAY 2, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
2.5	SP-SAND, loose, fine grained, red, moist			1SS		5	4
5.0	SM-SAND, some silt, loose, fine grained, tan, dry	-4.0	8"ø BOREHOLE	2SS		7	1
7.5	SW-SAND, loose, fine to medium grained, brown, moist - compact, dry	-6.0	CEMENT/ BENTONITE GROUT	3SS		9	3
10.0				4SS		14	3
12.5	SM-SAND, some silt, pebbles, loose, fine grained, brown, dry	-10.0		5SS		12	4
15.0	END OF HOLE @ 12.0 FT. BGS	-12.0					
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-20)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-14
DATE COMPLETED: MAY 3, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: ED FINCK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
		Approx. 96.0					
2.5	SP-SAND, pebbles, loose, fine grained, brown, dry			1SS		5	3
5.0				2SS		7	3
7.5	SW-SAND, loose, fine to medium grained, tan, moist	-6.0		3SS		7	1
10.0			8" ø BOREHOLE	4SS		7	2
12.5				5SS		11	2
15.0	SM-SAND, some silt, compact, fine to medium grained, brown, wet - saturated	-14.0	CEMENT/ BENTONITE GROUT	6SS		11	3
17.5				7SS		9	3
20.0	SP-SAND, loose, medium grained, brown, saturated	-18.0		8SS		12	3
22.5	SW-SAND, compact, fine to medium grained, dark brown, saturated, strong odor, sheen on water - strong odor, slight sheen on water	-20.0		(9SS)		6	3
25.0	SM-SAND, some silt, compact, fine to medium grained, dark brown, saturated	-24.0		(10SS)		8	4
27.5	END OF HOLE @ 26.0 FT. BGS	-26.0		(11SS)		5	4
30.0				12SS		6	4
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-21)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-15
DATE COMPLETED: MAY 3, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: ED FINCK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
		Approx. 96.0					
2.5	SM-SAND, compact, fine grained, tan, moist		8" ø BOREHOLE	1SS			2
5.0	– loose, medium grained, brown		CEMENT/ BENTONITE GROUT	3SS			1
7.5				5SS			1
	END OF HOLE @ 8.0 FT. BGS	-8.0					
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-22)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-16
DATE COMPLETED: MAY 3, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: ED FINCK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
2.5	SW-SAND(FILL), some gravel, loose, fine to medium grained, dark brown, dry		8" ø BOREHOLE; CEMENT/ BENTONITE GROUT	1SS		9	4
5.0				2SS		9	7
7.5				3SS		13	6
	END OF HOLE @ 8.0 FT. BGS	-8.0					
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (2SS) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-23)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: BH-17
DATE COMPLETED: MAY 3, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: ED FINCK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
		Approx. 96.0					
2.5	SW-SAND, loose, fine to medium grained, black and brown, moist		8" ø BOREHOLE; CEMENT/ BENTONITE GROUT	1SS		7	5
5.0	SP-SAND, loose, medium grained, grey, moist	-4.0		2SS		4	11
7.5	END OF HOLE @ 8.0 FT. BGS	-8.0		3SS		14	10
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-24)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: SS-1
DATE COMPLETED: APRIL 29, 1993
DRILLING METHOD: SPLIT SPOON
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
2.5	SP-SAND, brown and gray with a 1" black layer, dry		2" ø SPLIT SPOON; NATIVE MATERIAL	1SS			0
	END OF HOLE @ 3.0 FT. BGS	-3.0					
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-25)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: SS-2
DATE COMPLETED: APRIL 29, 1993
DRILLING METHOD: SPLIT SPOON
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
2.5	SP-SAND, brown and gray with a 1" black layer, dry		2" ø SPLIT SPOON; NATIVE MATERIAL	1SS			0
	END OF HOLE @ 3.0 FT. BGS	-3.0					
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-26)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: SS-3
DATE COMPLETED: APRIL 29, 1993
DRILLING METHOD: SPLIT SPOON
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
		Approx. 96.0					
2.5	SP-SAND, brown with a 3" black layer, dry		2" ø SPLIT SPOON; NATIVE MATERIAL	1SS			5
	END OF HOLE @ 3.0 FT. BGS	-3.0					
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-27)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: SS-4
DATE COMPLETED: APRIL 29, 1993
DRILLING METHOD: SPLIT SPOON
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
		Approx. 96.0					
2.5	SP-SAND, brown with a 3" black layer, dry		2" ø SPLIT SPOON; NATIVE MATERIAL	1SS			0
	END OF HOLE @ 3.0 FT. BGS	-3.0					
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-28)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: SS-5
DATE COMPLETED: APRIL 29, 1993
DRILLING METHOD: SPLIT SPOON
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
2.5	SP-SAND, brown with a 5" black layer, dry		2" ø SPLIT SPOON; NATIVE MATERIAL	1SS			1
	END OF HOLE @ 3.0 FT. BGS	-3.0					
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (1SS) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-29)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: SS-6
DATE COMPLETED: APRIL 29, 1993
DRILLING METHOD: SPLIT SPOON
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
		Approx. 96.0					
2.5	SP-SAND, some gravel, black with a 4" brown layer, oily		2"ø SPLIT SPOON; NATIVE MATERIAL	1SS			1
	END OF HOLE @ 3.0 FT. BGS	-3.0					
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-30)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: SS-7
DATE COMPLETED: APRIL 29, 1993
DRILLING METHOD: SPLIT SPOON
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
		Approx. 96.0					
2.5	SP-SAND, some gravel, black with a 4" brown layer, oily		2" ø SPLIT SPOON; NATIVE MATERIAL	1SS			13
	END OF HOLE @ 3.0 FT. BGS	-3.0					
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-31)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: SS-8
DATE COMPLETED: APRIL 29, 1993
DRILLING METHOD: SPLIT SPOON
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
2.5	SM-SAND, some silt, fine grained, black and tan, moist		2" SPLIT SPOON; NATIVE MATERIAL	1SS			2
	END OF HOLE @ 3.0 FT. BGS	-3.0					
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-32)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: SS-9
DATE COMPLETED: APRIL 29, 1993
DRILLING METHOD: SPLIT SPOON
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
		Approx. 96.0					
2.5	SM-SAND, some silt, black and tan, coal ashes		2" SPLIT SPOON; NATIVE MATERIAL	1SS			1
	END OF HOLE @ 3.0 FT. BGS	-3.0					
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (○) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-33)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: SS-10
DATE COMPLETED: MAY 3, 1993
DRILLING METHOD: SPLIT SPOON
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
2.5	SP-SAND, loose, fine grained, black and tan, moist, coal		2" ø SPLIT SPOON; NATIVE MATERIAL	1SS			5
	END OF HOLE @ 3.0 FT. BGS	-3.0					
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-34)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: SS-11
DATE COMPLETED: MAY 3, 1993
DRILLING METHOD: SPLIT SPOON
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
		Approx. 96.0					
2.5	SP-SAND, some pebbles, compact, black stained, wet		2" ø SPLIT SPOON; NATIVE MATERIAL	1SS			110
	END OF HOLE @ 3.0 FT. BGS	-3.0					
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (1SS) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-35)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: SS-12
DATE COMPLETED: MAY 3, 1993
DRILLING METHOD: SPLIT SPOON
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
		Approx. 96.0					
2.5	SM-SAND, some silt, medium grained, black, dry		2" ø SPLIT SPOON NATIVE MATERIAL	1SS			21
	END OF HOLE @ 3.0 FT. BGS	-3.0					
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-36)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: SS-13
DATE COMPLETED: MAY 3, 1993
DRILLING METHOD: SPLIT SPOON
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
		Approx. 96.0					
2.5	SM-SAND, some silt, compact, brown and tan, dry		2" ø SPLIT SPOON; NATIVE MATERIAL	1SS			1
	END OF HOLE @ 3.0 FT. BGS	-3.0					
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

APPENDIX B

MONITORING WELL AND STRATIGRAPHIC LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

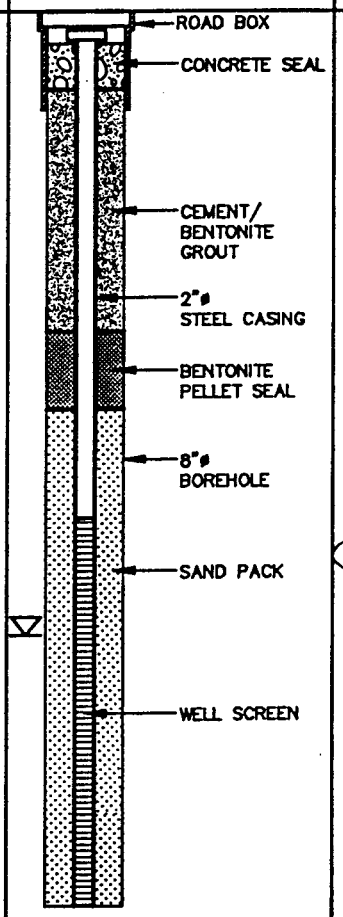
(L-01)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: MW-1
DATE COMPLETED: APRIL 27, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
	REFERENCE POINT (Top of Riser)	95.66
	GROUND SURFACE	96.0
	BLACK TOP	95.6
	SP–SAND(FILL), some gravel, black	
2.5	– light brown, no gravel	
5.0		
7.5	– coarse grained	
10.0		
12.5	– gray, wet	
15.0		
		79.9
17.5		
20.0		
22.5		
	END OF HOLE @ 23.0 FT. BGS	72.9
25.0		
27.5		
30.0		
32.5		

MONITOR INSTALLATION



SCREEN DETAILS:
Screened Interval:
13.0 to 23.0' BGS
Length –10.0'
Diameter –2.0"
Slot # 10
Material –Stainless Steel
Sand pack interval:
10.2 to 23.0' BGS
Material –# 40 Mesh

SAMPLE NUMBER	STATE	'N' VALUE	HNU (ppm)
1SS	X	8	0
2SS	X	13	0
(3SS)	X	18	1
4SS	X	1	2
5SS	X	9	4

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-02)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: MW-2
DATE COMPLETED: APRIL 27, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNU (ppm)
	REFERENCE POINT (Top of Riser)	95.33					
	GROUND SURFACE	95.8					
	BLACK TOP	95.5	ROAD BOX				
	ROADBASE	94.9	CONCRETE SEAL				
2.5	SP-SAND, brown - light brown, dry						
				1SS		13	2
5.0			CEMENT/ BENTONITE GROUT				
7.5			2"ø STEEL CASING				
				2SS		17	1
10.0			BENTONITE PELLET SEAL				
			8"ø BOREHOLE				
12.5	- coarse grained, moist						
				3SS		12	4
15.0			SAND PACK				
		79.8 ▽					
17.5	- compact, brown, wet						
			WELL SCREEN				
				4SS		8	3.5
20.0	- brown to gray						
				5SS		37	5
22.5	END OF HOLE @ 23.0 FT. BGS	72.8					
25.0							
27.5							
30.0							
32.5							

SCREEN DETAILS:
Screened Interval:
13.0 to 23.0' BGS
Length -10.0'
Diameter -2.0"
Slot # 10
Material -Stainless Steel
Sand pack interval:
10.2 to 23.0' BGS
Material -# 40 Mesh

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

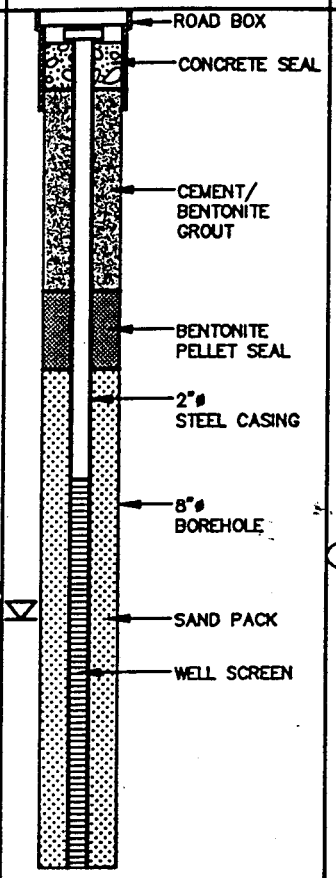
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-03)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: MW-3
DATE COMPLETED: APRIL 27, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
	REFERENCE POINT (Top of Riser)	96.20
	GROUND SURFACE	96.6
0	BLACK TOP	96.3
	SP-SAND(FILL), some gravel, black	
2.5		93.6
	SP-SAND, fine grained, light brown to gray, moist	
5.0		
7.5		88.6
	SW-SAND, fine to medium grained, light brown to grey, moist	
10.0		
12.5		83.6
	SP-SAND, medium grained, light brown to gray, moist	
15.0		81.0 ▽
17.5	- damp	
20.0		
22.5	END OF HOLE @ 22.0 FT. BGS	74.6
25.0		
27.5		
30.0		
32.5		



SCREEN DETAILS:
Screened Interval:
12.0 to 22.0' BGS
Length -10.0'
Diameter -2.0"
Slot # 10
Material -Stainless Steel
Sand pack interval:
9.2 to 22.0' BGS
Material -# 40 Mesh

SAMPLE NUMBER	STATE	'N' VALUE	HNu (ppm)
1SS	X	10	3
2SS	X	14	4
(3SS)	X	15	5
4SS	X	6	2

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (○) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

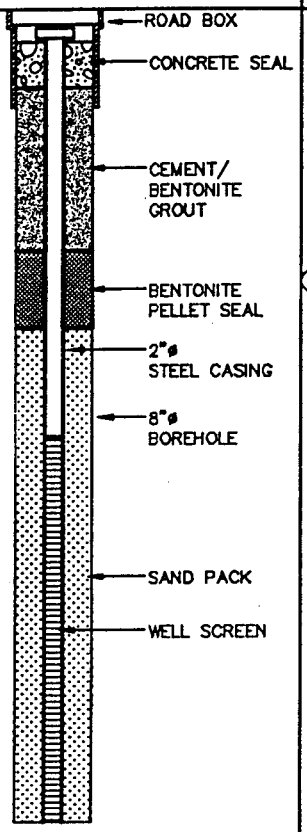
(L-04)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: MW-4
DATE COMPLETED: APRIL 27, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: ED FINCK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
	REFERENCE POINT (Top of Riser)	96.73
	GROUND SURFACE	97.1
	CONCRETE	96.8
	SP-SAND(FILL), some gravel, black	
2.5	SP-SAND, loose, fine grained, brown, dry, concrete dust	95.1
	– trace silt	
5.0		
	– small pebbles, medium grained	
7.5		
10.0	SM-SAND, some silt, loose, brown, moist	87.1
12.5		
	– fine grained, saturated	
15.0	– brown	
17.5		
	– compact	
20.0		
	END OF HOLE @ 21.0 FT. BGS	76.1
22.5		
25.0		
27.5		
30.0		
32.5		

MONITOR INSTALLATION



SCREEN DETAILS:
Screened Interval:
11.0 to 21.0' BGS
Length –10.0'
Diameter –2.0"
Slot # 10
Material –Stainless Steel
Sand pack interval:
8.2 to 21.0' BGS
Material –# 40 Mesh

SAMPLE NUMBER	STATE	'N' VALUE	HNu (ppm)
1SS		12	12
2SS		9	9
(3SS)		14	14
4SS		10	13
5SS		12	65
6SS		4	50

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

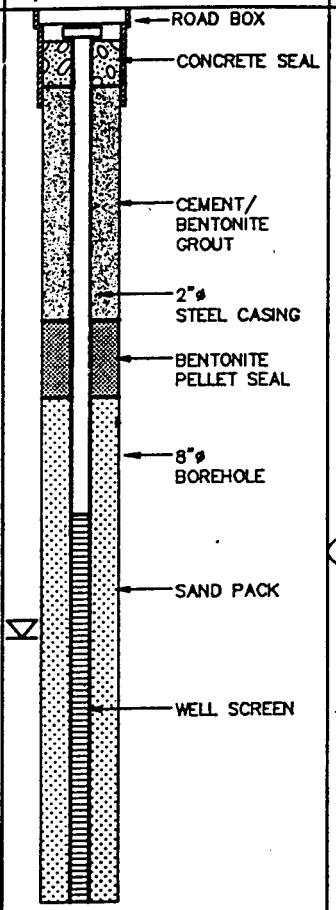
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-05)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: MW-5
DATE COMPLETED: may 4, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE HNu (ppm)
	REFERENCE POINT (Top of Riser)	96.80					
	GROUND SURFACE	97.2					
2.5	SP-SAND(FILL), some gravel, black	94.2					
5.0	SP-SAND, brown			1SS		4	0
7.5		89.2					
10.0	SW-SAND, fine to medium grained, brown gray			2SS		11	0.5
12.5							
15.0				3SS		14	1
17.5		81.0 ▽					
20.0	SP-SAND, medium grained, dark brown, wet	79.2		4SS		4	1
22.5							
25.0	END OF HOLE @ 20.0 FT. BGS	77.2					
27.5							
30.0							
32.5							



SCREEN DETAILS:
Screened Interval:
13.0 to 23.0' BGS
Length -10.0'
Diameter -2.0"
Slot # 10
Material -Stainless Steel
Sand pack interval:
10.0 to 23.0' BGS
Material -# 40 Mesh.

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

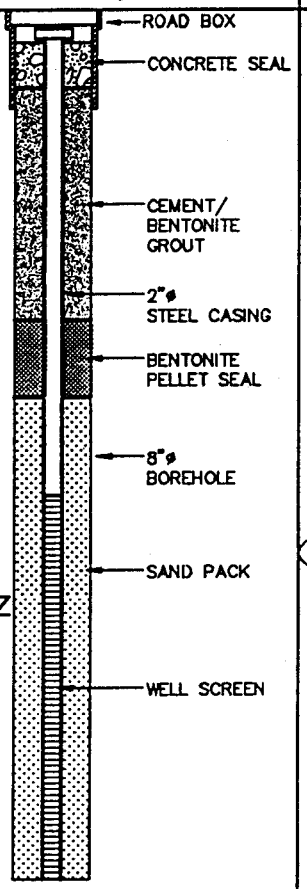
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-06)

PROJECT NAME: HUCK MANUFACTURING COMPANY
PROJECT NO.: 5269
CLIENT: THIOKOL CORPORATION
LOCATION: KINGSTON, NEW YORK

HOLE DESIGNATION: MW-6
DATE COMPLETED: MAY 4, 1993
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. WELSEK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
	REFERENCE POINT (Top of Riser)	96.97
	GROUND SURFACE	97.4
0	ASPHALT	97.1
	SP-SAND(FILL), some gravel, black	
2.5		
	SP-SAND, fine grained, brown	94.4
5.0		
7.5		
	SW-SAND, fine to medium grained, brown, moist	89.4
10.0		
12.5		
	SP-SAND, fine grained, brown, moist	84.4
15.0		
		81.8
17.5	- brown gray, wet	
20.0		
22.5	END OF HOLE @ 22.5 FT. BGS	74.9
25.0		
27.5		
30.0		
32.5		



SCREEN DETAILS:
Screened Interval:
12.5 to 22.5' BGS
Length -10.0'
Diameter -2.0"
Slot # 10
Material -Stainless Steel
Sand pack interval:
9.4 to 22.5' BGS
Material -# 40 Mesh

SAMPLE NUMBER	STATE	'N' VALUE	HNU (ppm)
1SS		11	1
2SS		14	1
3SS		19	1
4SS		5	0.5

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

APPENDIX C

GPR PROFILES

LGI

A Division of Layne GeoSciences, Inc.

409 Penn Avenue • Sinking Spring, Pennsylvania 19608 • 215/670-5900 • 215/670-5903 (FAX)

May 7, 1993
Project #44.7067

Mr. William Welsek
Conestoga-Rovers Associates
15 Meyers Corners
Suite 3A
Wappingers Falls, New York 12590

Subject: *Results of a Ground Penetrating Radar Survey in Kingston, New York*

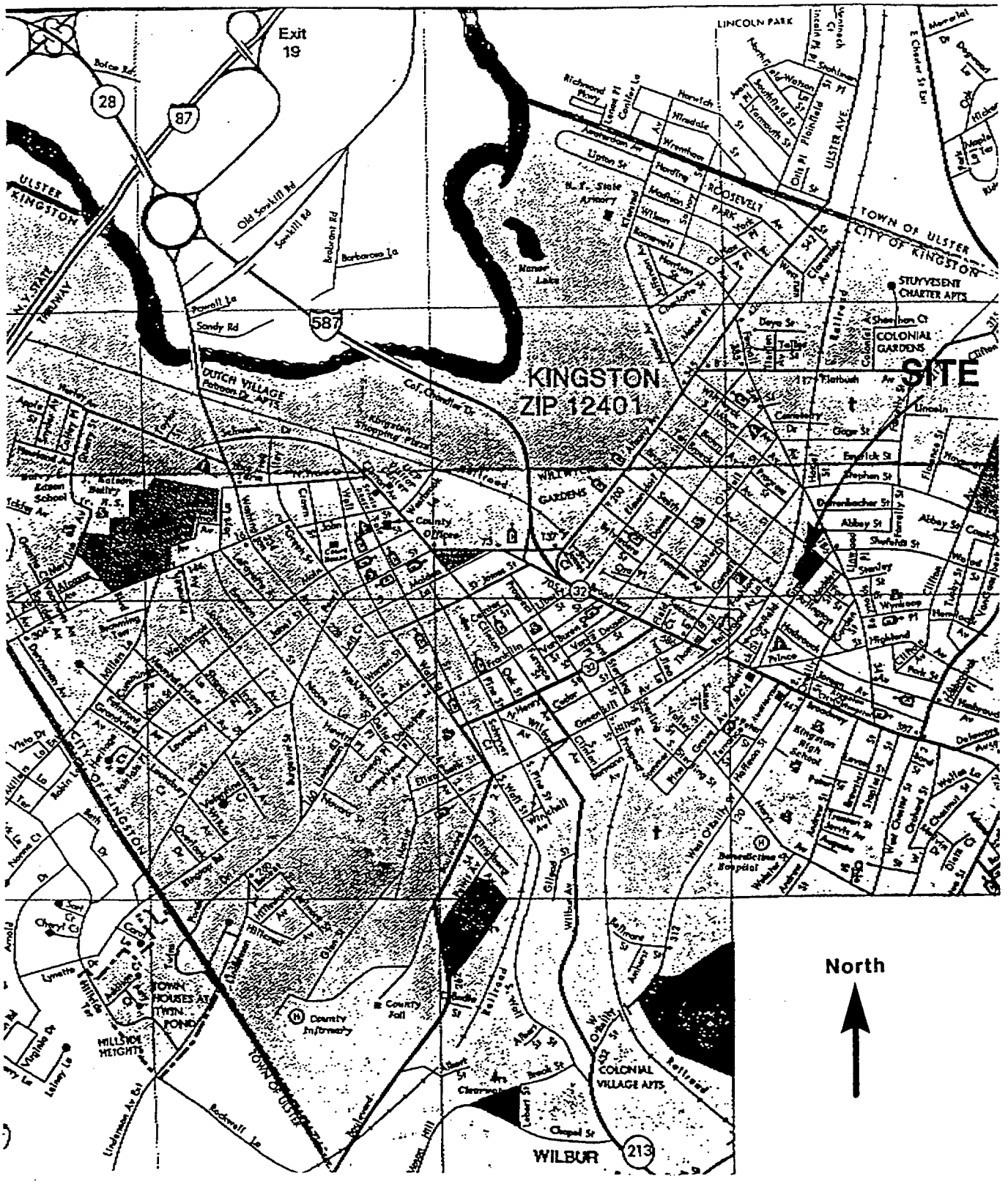
Dear Mr. Welsek:

On April 26th and 27th, 1993, **LGI,** a division of **Layne GeoSciences, Inc.,** conducted a ground penetrating radar (GPR) investigation at the Huck Site, near the corner of Grand and Tenbroek Streets, Kingston, New York (**Figure 1**). The purpose of the investigation was to locate and identify possible underground storage tanks (UST's) using GPR.

Due to cultural interferences (vehicles, buildings and power lines), the GPR method was selected as the most appropriate geophysical technique for UST detection. Initially, electromagnetic induction had been proposed as a suitable reconnaissance tool, however fences and overhead powerlines proximal to the survey areas would have caused severe signal interference. As a result, only GPR data were collected during the investigation. In total, approximately 5,400 linear feet of GPR data was collected in five separate areas.

1.0 METHODOLOGY AND FIELD DESIGN

Ground penetrating radar (GPR) is a non-destructive, non-invasive geophysical technique. This method involves the transmission of very high-frequency electromagnetic waves (radar) into the subsurface and recording the energy that reflects off subsurface objects or features. The resulting information is passed through a signal processing controller and output real-time to a hardcopy graphics device. The analog data provides continuous, high-resolution profiles detailing the shallow subsurface.



LGI

Site Location Map **Figure 1**

Radar wave transmission and reflection is dependant upon the electrical properties of subsurface materials. For example, silt and clay-rich soils are relatively good conductors and as a result may limit GPR signal penetration. Conversely, more resistive materials, such as dry sands and gravel, are conducive to deeper GPR exploration. Since metallic objects are excellent conductors, strong reflections can be anticipated from where fill or soil contacts metal. However, variations in the composition of the fill material can affect the quality of the radar data recorded.

The GPR survey was broken into five separate areas. For ease in data collection and organization, Areas I, II and III were gridded by establishing a 10' X 10' control grid (**Figures 2 & 3**). GPR profiles were collected on a 5' X 5' grid pattern by bisecting the control grid. Ungridded Areas IV and V were located near the northeastern corner of the administration building and near the garage area at the Spiesman Building respectively. **LGI** utilized the GSSI SIR-3 system, a 500 MHz antenna and a 60 nanoseconds (nsec) record length for the entire survey. Under favorable subsurface conditions the GPR system may explore 8 feet below the land surface. GPR data were closely scrutinized by the **LGI** geophysicist during the course of the investigation.

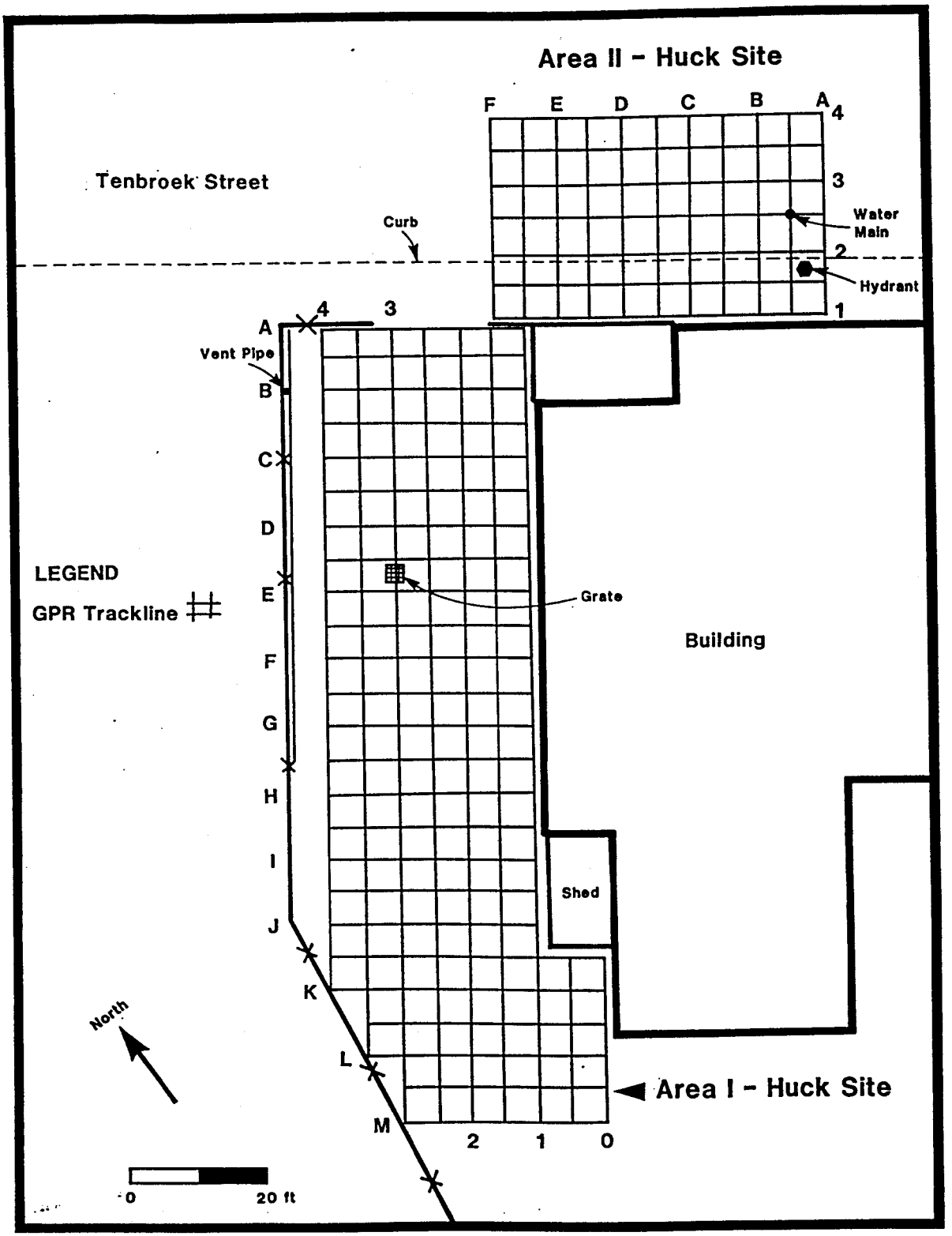
2.0 DATA INTERPRETATION AND RESULTS

Initial GPR interpretations were made by the **LGI** geophysicist during the site investigation. Additional GPR profiles were collected in the vicinity of strong anomalies to delineate the extent of subsurface features. Final data interpretations were completed in the office to further define subsurface anomalies. In general, the locations of all interpreted features should be accurate to plus or minus two lateral feet. Representative GPR profiles are contained in **Appendix A.**

2.1 Area I

GPR data were collected on a 5' x 5' grid between the Huck building and a fenced area (**Figure 2**). Results of the survey document a northeast-southwest trending feature interpreted as an UST (**Figure 4 & Appendix A**). The interpreted UST was field-flagged by the **LGI** geophysicist. A storm sewer pipe is interpreted to trend in the same direction as the UST but at a deeper subsurface depth, and correlates to the field location of a grate (**Figure 4**).

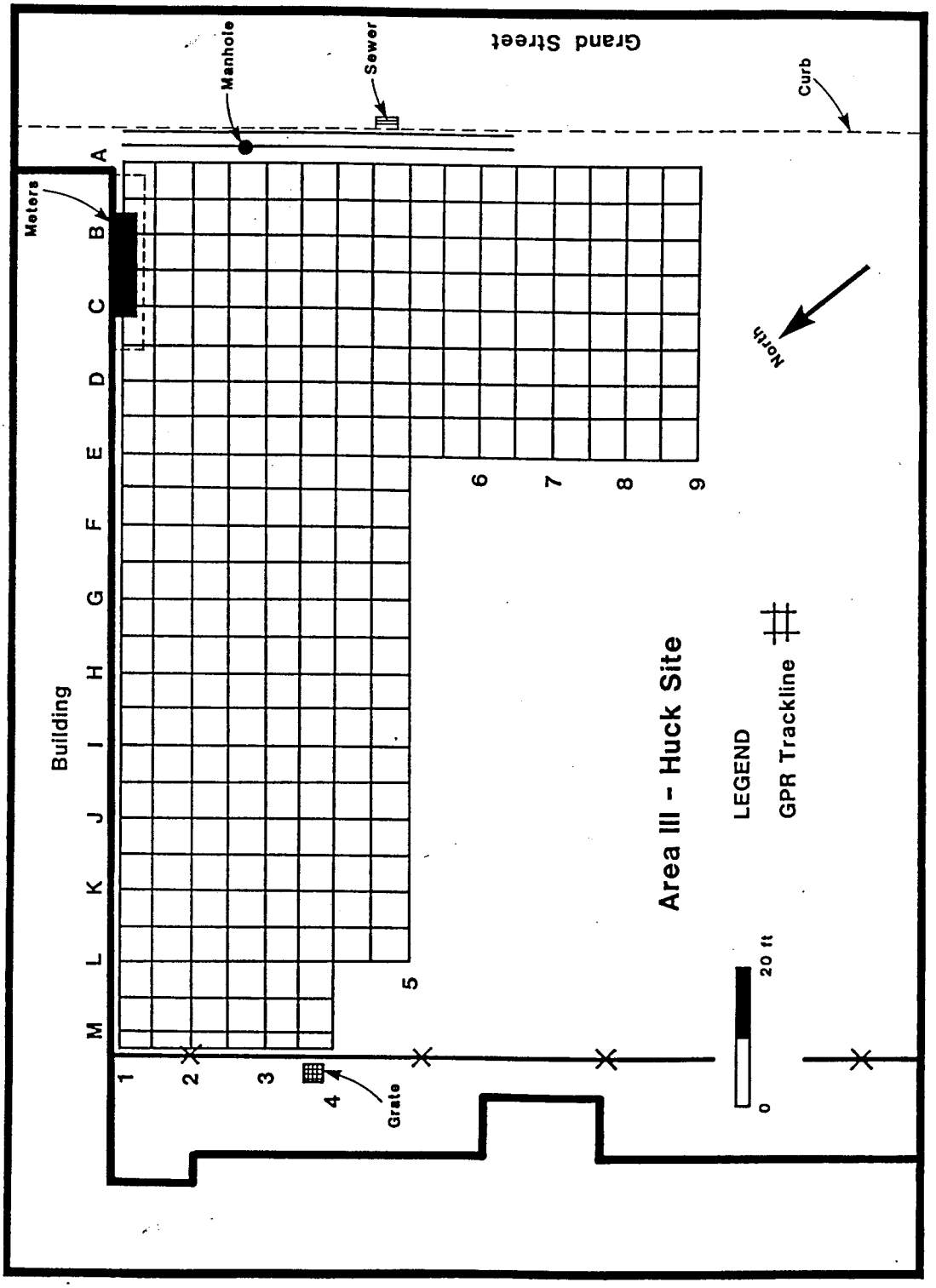
GPR Data Reference Map - Areas I & II



LGI

Figure 2

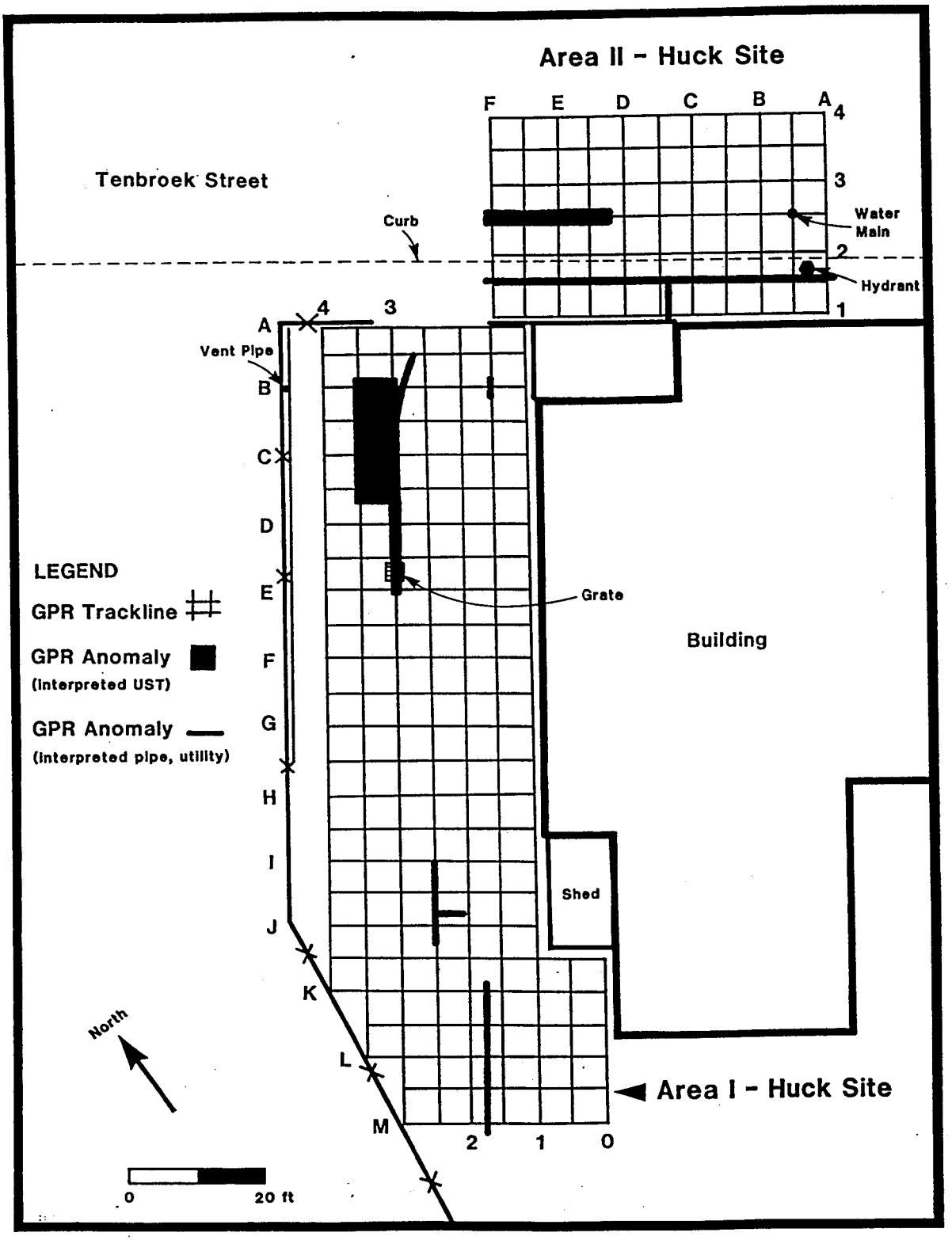
GPR Data Reference Map - Area III



LGI

Figure 3

GPR Anomaly Map - Areas I & II



LGI

Figure 4

2.2 Area II

A 5' x 5' grid pattern was established near the northeast corner of the Huck building and along Tenbroek Street (**Figure 2**). Two pipe-shaped features were interpreted to trend parallel to the street (**Figure 4 & Appendix A**). The more southerly anomaly extends the length of the grid. The broader, more northerly anomaly was only interpreted to extend along the western portion of Area II.

2.3 Area III

GPR data collection was conducted on a 5' x 5' grid on a parking lot west of Grand Street and adjacent to the Huck site (**Figure 3**). Data interpretation reveal multiple pipe-shaped anomalies throughout Area III (**Figure 5**). These anomalous features correlate to sewer or drainage pipes based on field identified surface features (**Appendix A**). A strong GPR anomaly is interpreted at the intersection of several pipe-shaped features (**Figure 5**). The rather flat-lying reflection (FLR) character observed in perpendicular traverses over the strong GPR anomaly is not typical of an UST and is interpreted as a conduit vault (**Appendix A**).

2.4 Area IV

Ungridded GPR profiles were collected near the northeastern corner of the administration building. The nature of the fill material within this area produced a reverbatory or multiple-like signal. A subtle reflection event at the location of the vent pipe is interpreted as a possible UST or pipe (**Appendix A**), but site conditions limited the interpretative quality of the data.

2.5 Area V

Ungridded GPR data were collected near the southern corner of the Spiesman building. A vent and fill pipe were located in this area. An interpreted UST reflection was detected on an adjoining property (**Appendix A**).

GPR Anomaly Map - Area III

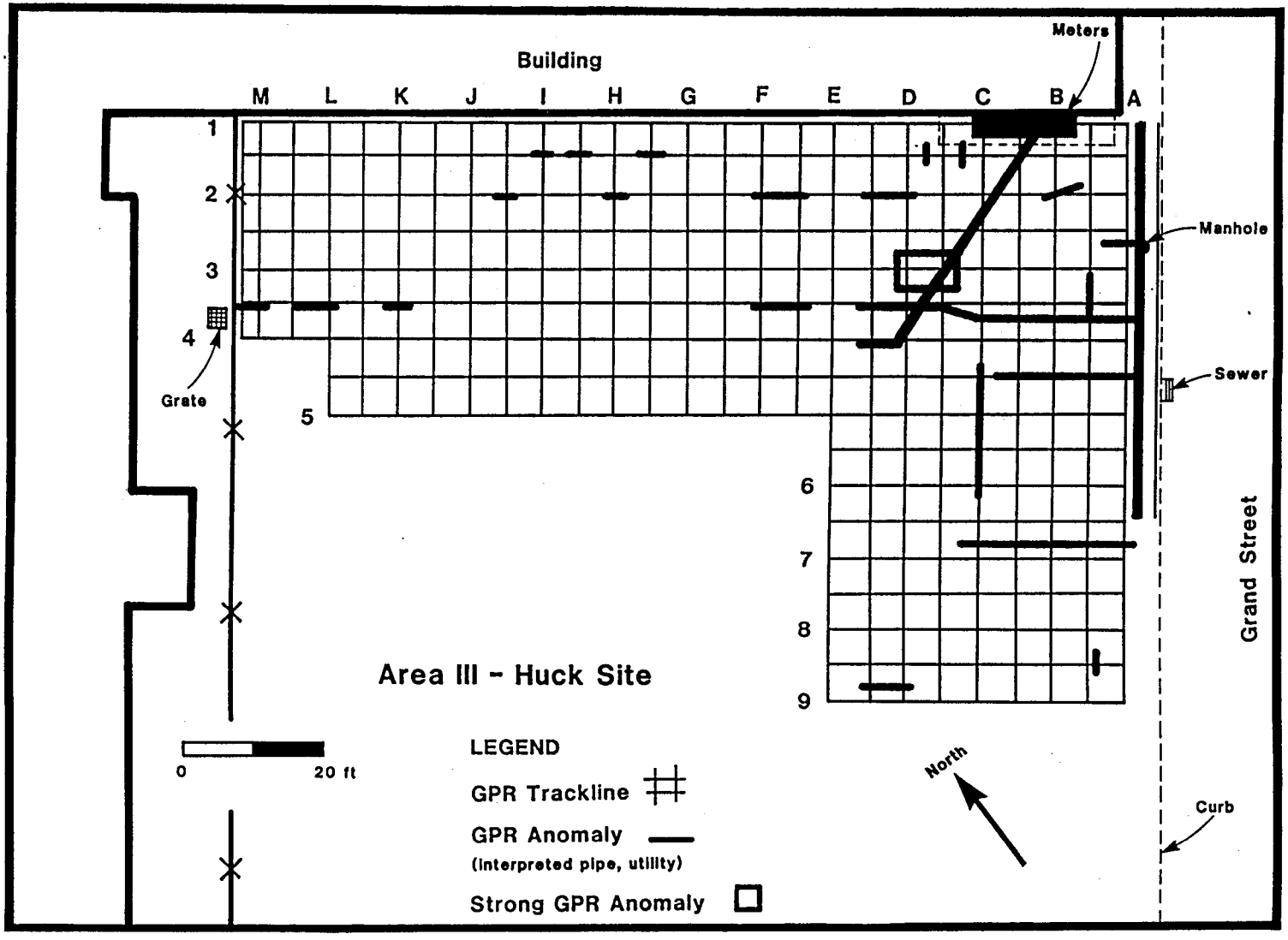


Figure 5

3.0 CONCLUSIONS

A ground pentrating radar survey was conducted by **LGI** at a site in Kingston, New York. The results include:

(1) An interpreted UST was detected in Area I and field-flagged.

(2) Interpreted pipe-shaped reflections were detected in Areas II and III and probably correlate to sewers or other buried utilities.

(3) A possible UST or pipe was interpreted at Area IV

(4) Area V data interpretations revealed an UST reflection located on an adjoining property.

4.0 CLOSING

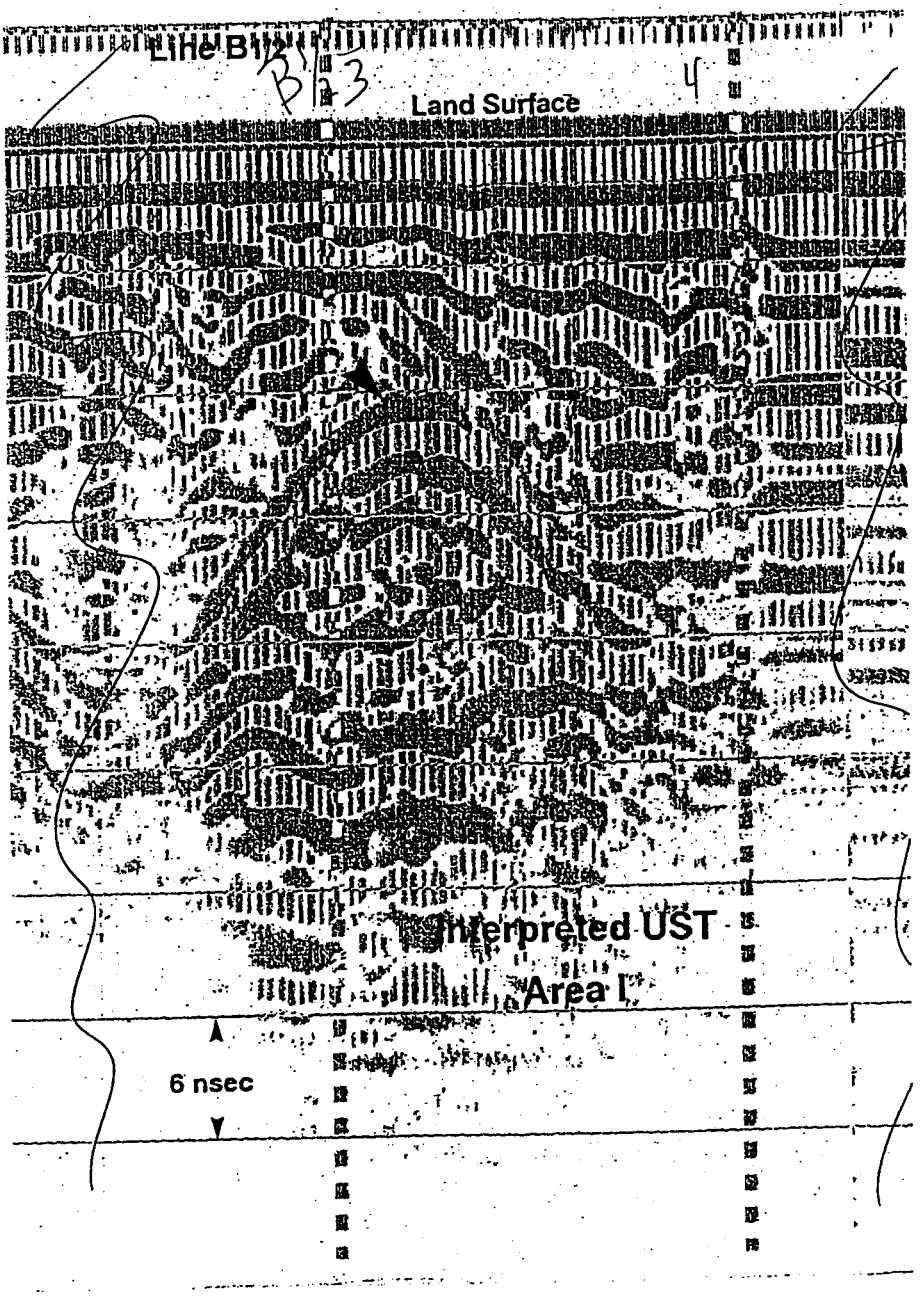
The field procedures and interpretative methodologies used in this project are consistent with standard, recognized practices in similar geophysical investigations. The correlation of geophysical anomalies with probable subsurface features is based on the past result of similar surveys although it is possible that some variation could exist at this site. This warranty is in lieu of all other warranties either implied of expressed. **LGI** assumes no responsibility for interpretations made by others based on work performed by or recommendations made by **LGI.**

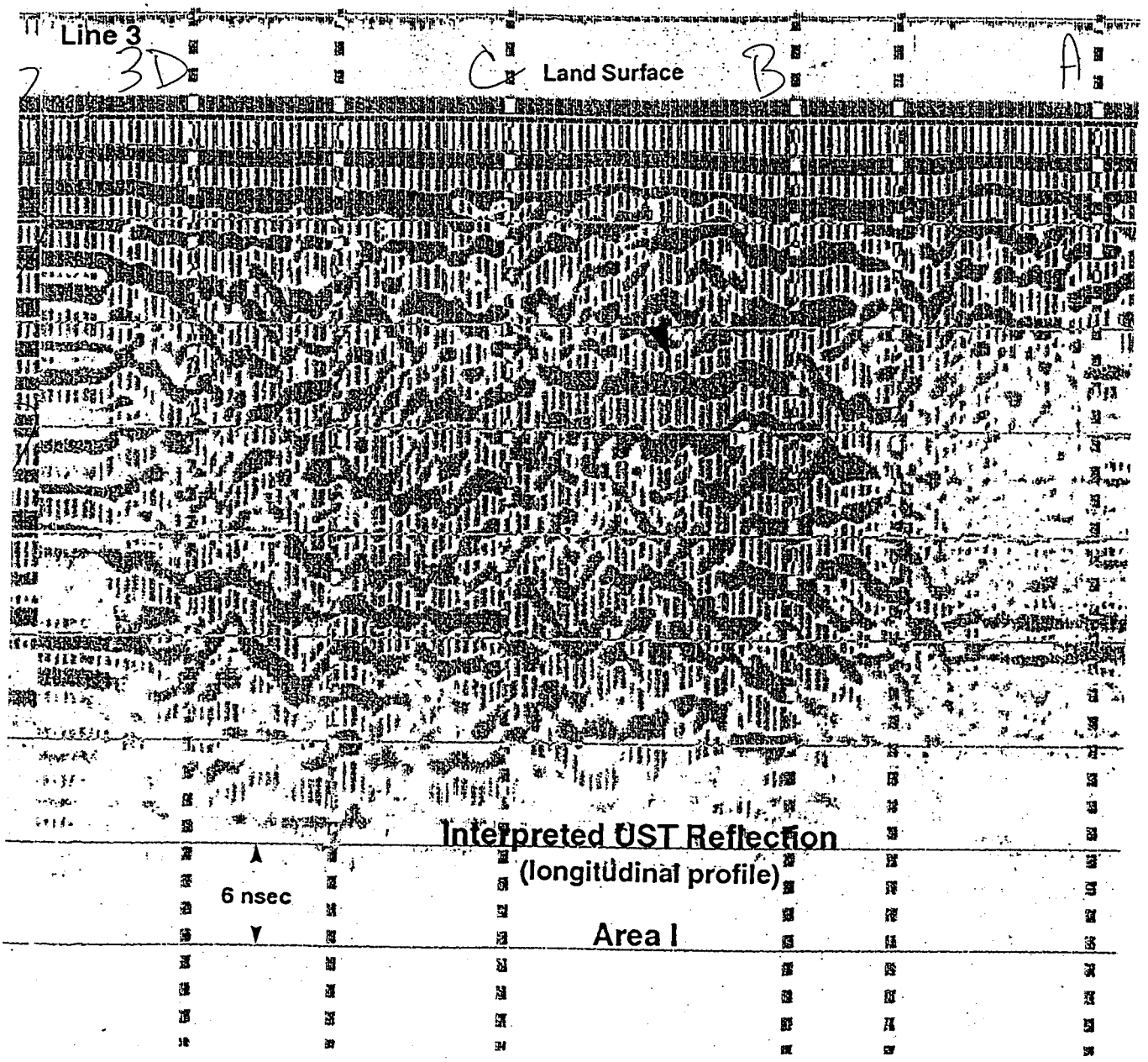
Sincerely,
LGI, a division of **Layne GeoSciences, Inc.**
Environmental and Geophysical Consultants

John L. Petruccione
Geophysicist

APPENDIX A

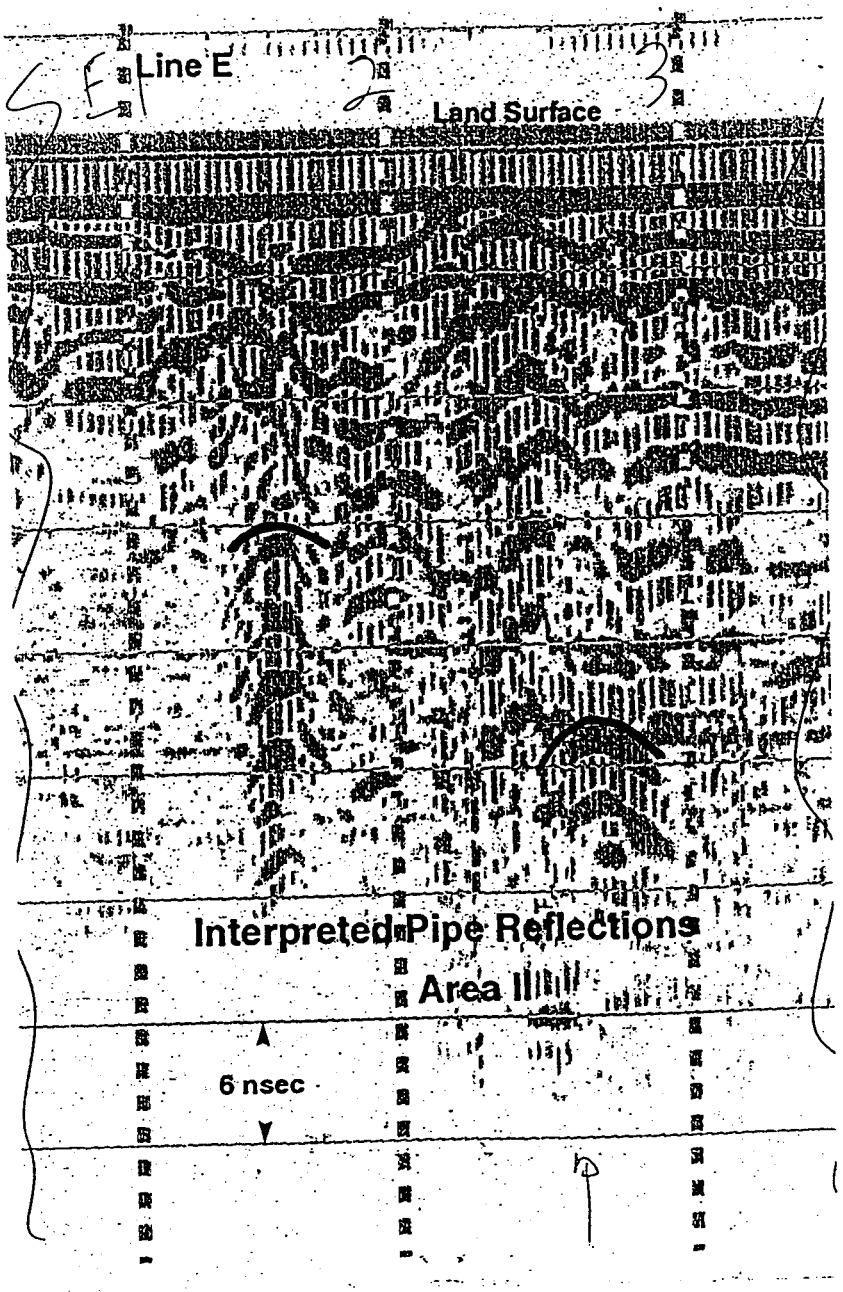
REPRESENTATIVE GPR PROFILES

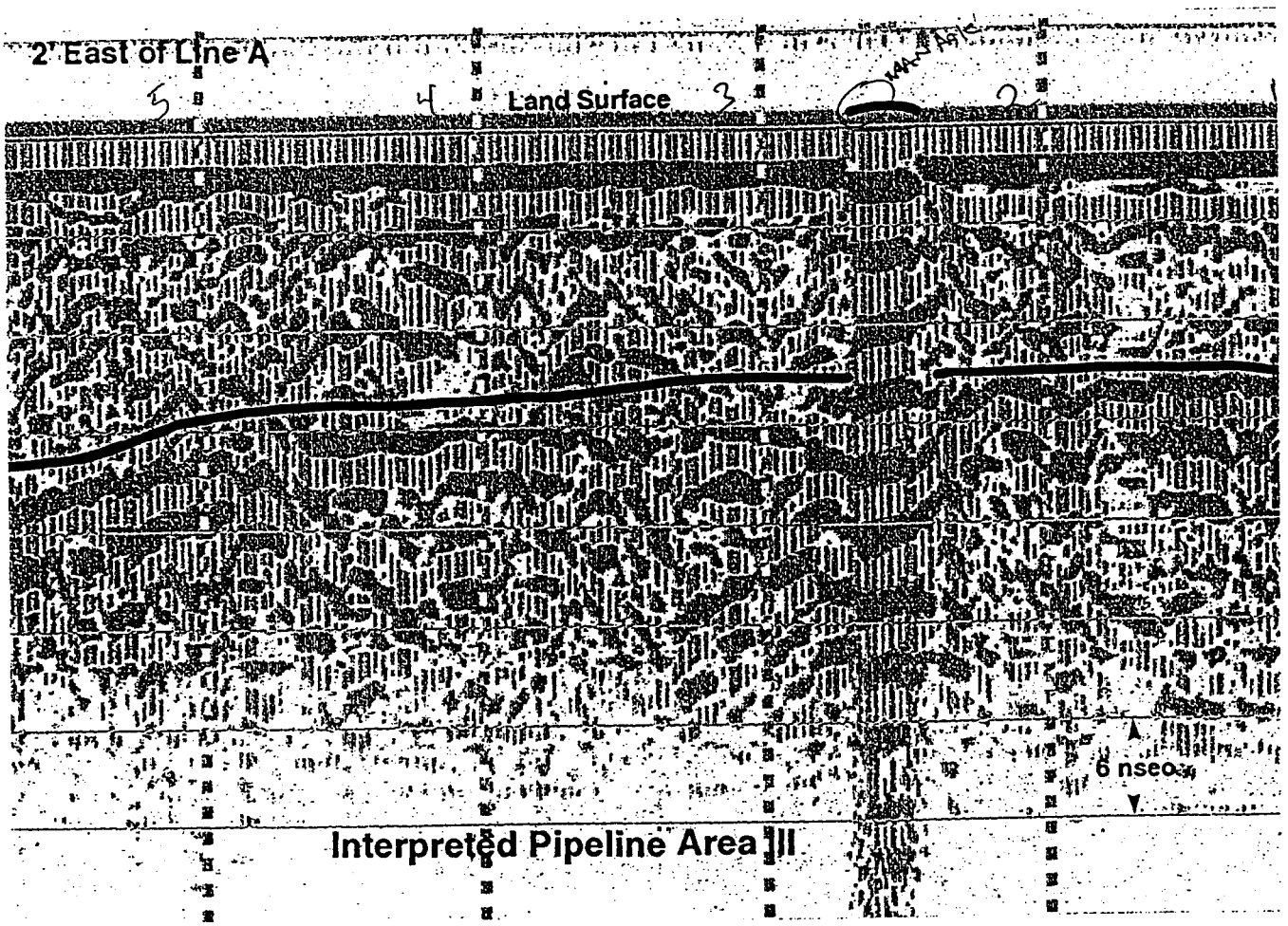

Line B
Land Surface
Interpreted UST
"Area I"
6 nsec

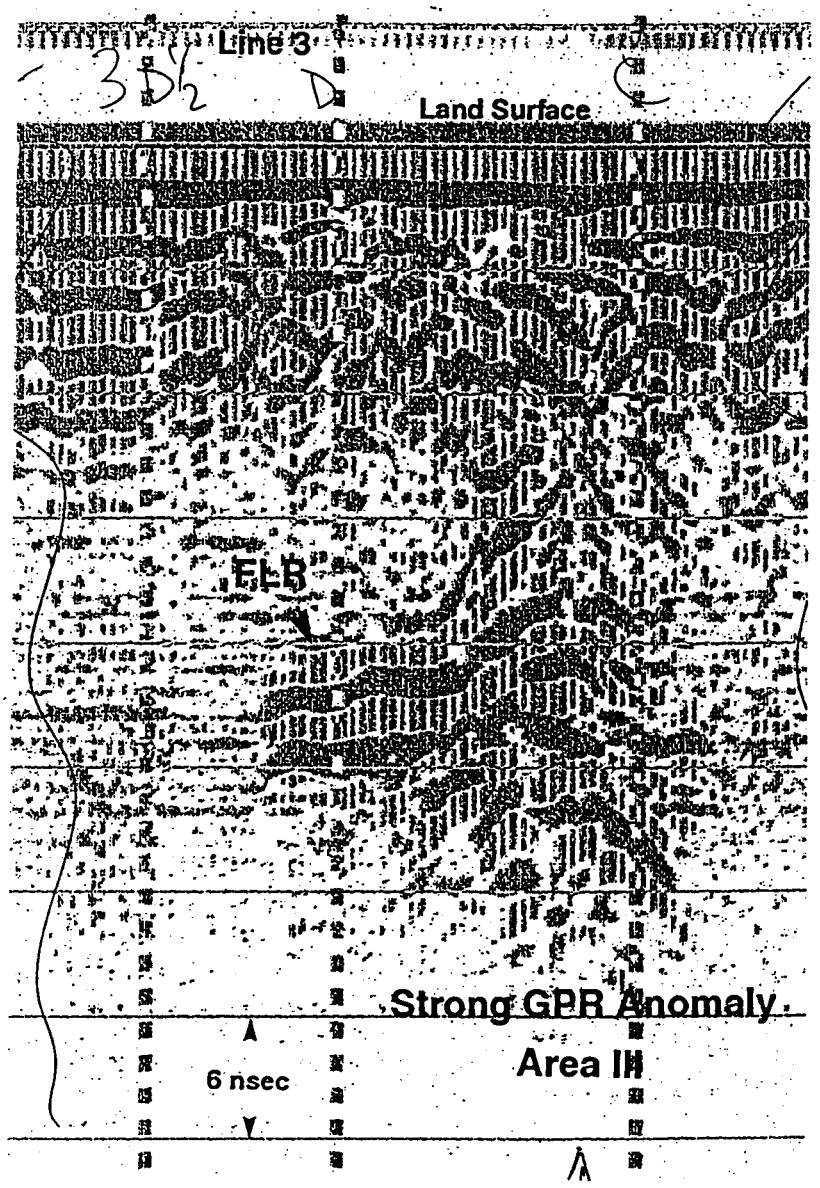


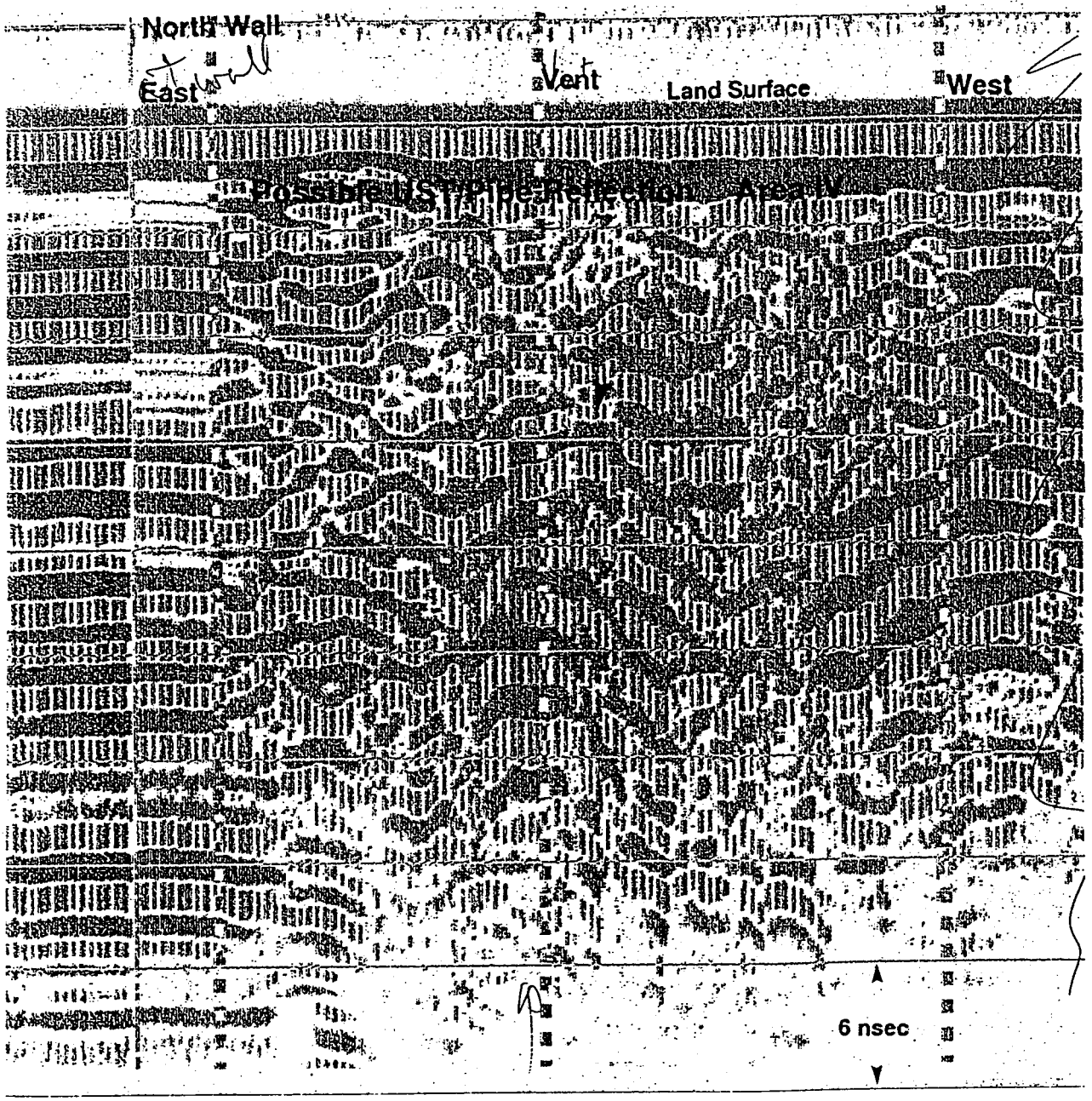
Interpreted UST Reflection
(longitudinal profile)

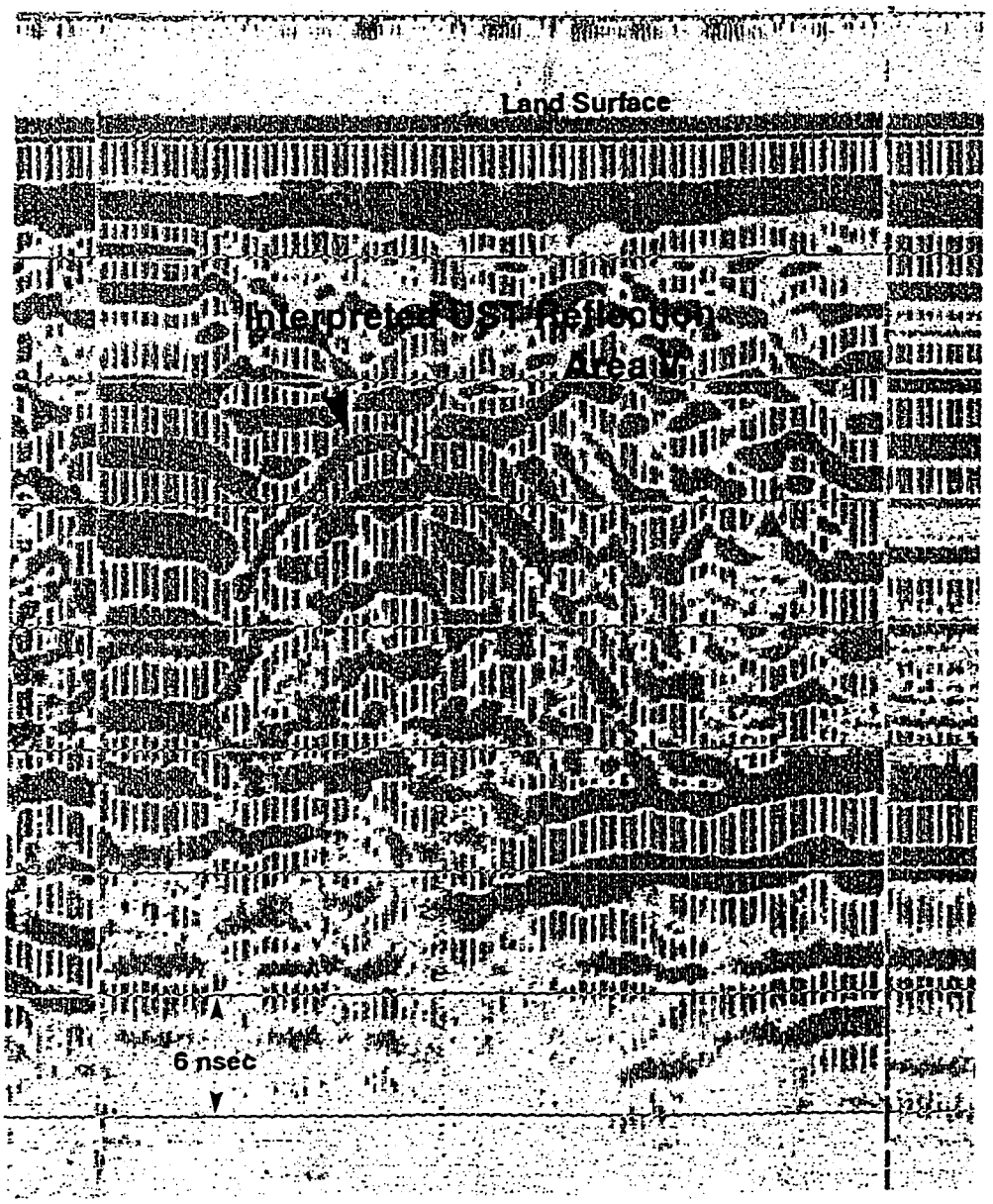
Area I


Line E
Land Surface
Interpreted Pipe Reflections
Area II
6 nsec


2' East of Line A
Land Surface
6 nsec
Interpreted Pipeline Area


Line 3
Land Surface
E-B
Strong GPR Anomaly
Area III
6 nsec


North Well
East
Vent
Land Surface
West
Possible UST Pipe Reflection
Area IV
6 nsec


Land Surface
Interpreted UST Reflection
Area
6 nsec

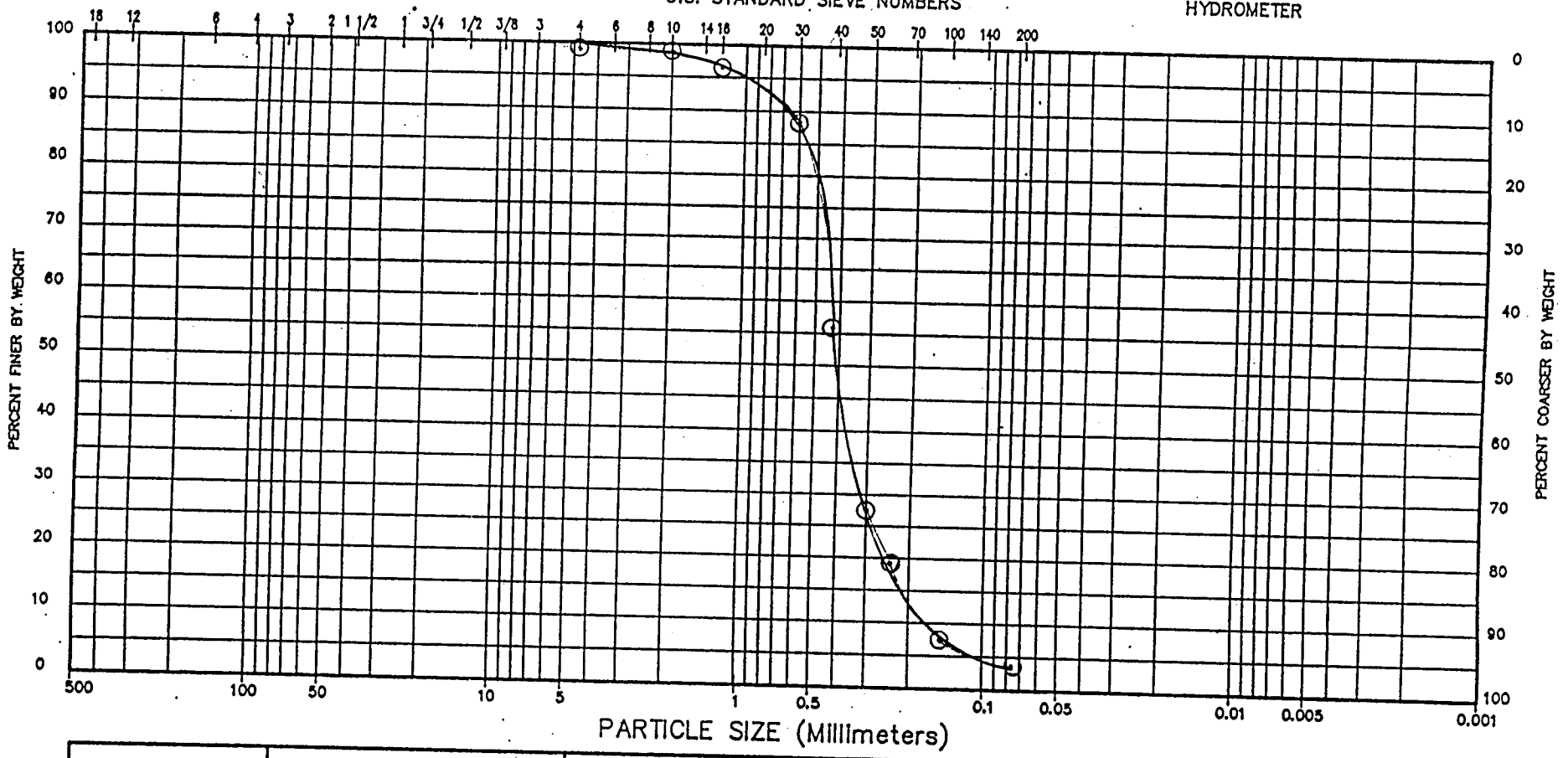
APPENDIX D

GRAIN SIZE DISTRIBUTION

TECTONIC
ENGINEERING CONSULTANTS P.C.
P.O. Box 447, 600 Route 32
Highland Mills, N.Y. (914) 928-6531

GRAIN SIZE ANALYSIS
(ASTM STANDARDS)

W.O. No.: 1247.01
PROJECT NAME HUCK CRA
TEST DATE: June 22, 1993



COBBLES	GRAVEL			SAND			SILT	CLAY
	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

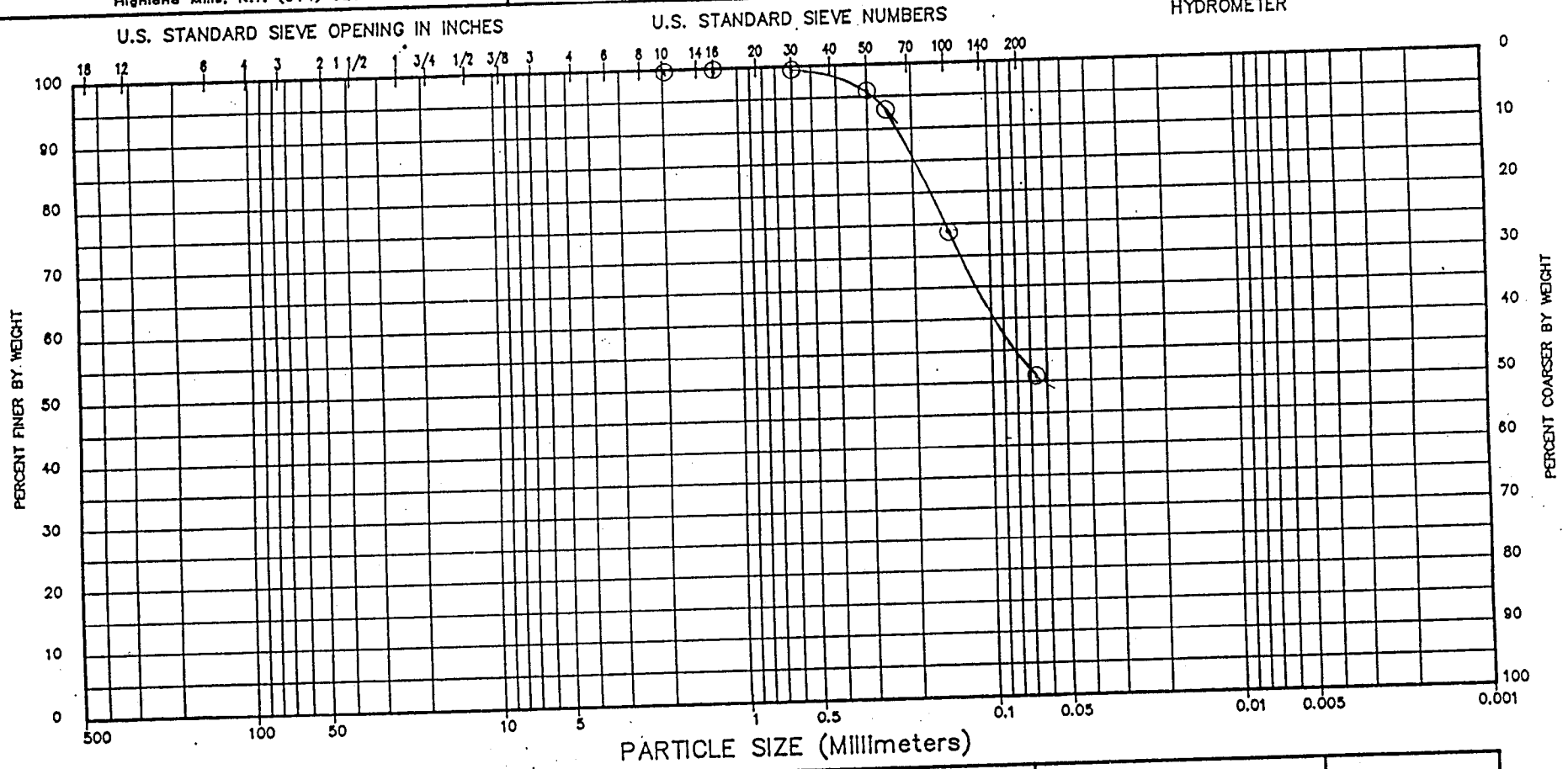
LEGEND	BORING/TP	SAMPLE	ELEV. or DEPTH	DESCRIPTION	U.S.C.S.	% W	Cu	Cc	LL	PL	PI
O	MW-1E	1	SCREEN	Dark Grey Brown M-F SAND, trace Silt	SP	23					
Δ											
◇											

NOTES:

TECTONIC
ENGINEERING CONSULTANTS P.C.
P.O. Box 447, 600 Route 32
Highland Mills, N.Y. (914) 928-6531

GRAIN SIZE ANALYSIS
(ASTM STANDARDS)

W.O. No.: 1247.01
PROJECT NAME: HUCK - CRA
TEST DATE: 6/22/93



COBBLES	GRAVEL			SAND			SILT	CLAY
	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

LEGEND	BORING/TP	SAMPLE	ELEV. or DEPTH	DESCRIPTION	U.S.C.S.	% W	Cu	Cc	LL	PL	PI
O	MW 2-E	1	SCREEN	Dark Brown Grey Fine SAND and SILT	SM-ML	18.5					
△											
◇											