ON-SITE REMEDIAL WORK PLAN 100 COMMERCIAL STREET PLAINVIEW, NEW YORK

PREPARED IN CONJUNCTION WITH
NYSDEC VOLUNTARY CLEANUP PROGRAM
AGREEMENT NO. D1-0001-97-04
BETWEEN DAVID DOYAGA, ESQ., AS TRUSTEE IN BANKRUPTCY FOR
COMM 100 ASSOCIATES AND NYSDEC

PROJECT NO. COMM 97-01

APRIL 1998

H2M GROUP

Engineers • Architects • Scientists • Planners

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Melville, New York 11747-5076

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1.0 INTRODUCTION

Holzmacher, McLendon & Murrell, P.C. (H2M) submits this work plan for the 100 Commercial Street site located in Plainview, New York (the "Site", see Figure 1.1) under the New York State Department of Environmental Conservation (NYSDEC) Voluntary Cleanup Program Agreement (No. D1-0001-97-04). This work plan identifies the past soil and groundwater investigation and cleanup activities that have been conducted at the site and describes the design of the Air Sparge/Soil Vapor Extraction System ("AS/SVE System") proposed to address residual contamination, the monitoring, operation and maintenance (O&M) schedule, and closure criteria.

Based upon the extensive soil and groundwater investigation and cleanup activities that have been performed to date, H2M has determined that the proposed AS/SVE System is the most effective method for addressing site conditions. The goals of the remediation project are to remediate the soils and groundwater to NYSDEC closure criteria.

2.0 SUMMARY OF CONTAMINATION AND HYDROGEOLOGY

This section of the work plan summarizes the nature and extent of soil and groundwater contamination and site-specific hydrogeology, based upon investigation and cleanup activities performed to date.

2.1 Soil Contamination

Several rounds of soil investigation across the site were conducted in the early 1990's by Eikon Planning and Development Corporation (Eikon) for the following areas of the property, as an earlier Phase 1 study had identified these locations as potential areas of concern. These investigations focused on:

- Two sub-surface wastewater disposal systems. One system consisted of two leaching pools and the second system consisted of three leaching pools.
- Five storm water dry wells.
- An electrical transformer.
- An area located adjacent to a 10,000-gallon fuel oil underground storage tank.

In addition, a site-wide stratigraphic evaluation was conducted.

Sub-Surface Wastewater Disposal Systems

Eikon evaluated the bottom sediments and soil adjacent to two leaching pools (LPs) in the rear yard and three LPs in the southerly front yard (see Figure 2.1). As shown in Figures 2.2 and 2.3, bottom sediments were collected from the five leaching pools. Additionally, Eikon collected soil samples from adjacent to the leaching pools.

The bottom sediments collected from LP-2 and LP-5 did not contain any volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) or priority pollutant metals (PPM) above concentrations of concern (see Table 2.1). The bottom sediments from LP-3 and LP-4 contained PPM metals above the NYSDEC recommended soil cleanup objectives (RSCO) presented in the NYSDEC Division Technical and Administrative Guidance Memo (TAGM): Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-94-4046, January 24, 1994 (revised 4/95). The bottom sediments from LP-1 contained PPM, SVOCs, and VOCs above NYSDEC RSCOs. Tetrachloroethene (PCE) and trichloroethene (TCE) were detected in the bottom sediment sample collected from LP-1 at 48,170 and 932.4 milligrams per kilogram (mg/kg), respectively. None of the soil samples drilled in the vicinity of the five LPs contained contaminants above levels of concern (see Table 2.1).

Based upon these analytical results, Eikon conducted a remedial action which consisted of removing the bottom sediments from LP-1, LP-3, and LP-4. Post-remediation confirmatory soil samples were collected and analyzed for PPM from all three leaching pools. The sample from LP-1 was also analyzed for VOCs and SVOCs (see Table 2.1). PCE was present in the confirmatory soil sample from LP-1 at 550 mg/kg. Additionally, 1,2,4-trichlorobenzene was detected above its respective RSCO in the LP-1 confirmatory soil sample. Copper, at 34.2 mg/kg in the LP-4 confirmatory sample, was the only priority pollutant metal detected above RSCOs in the three samples. While the copper detected in the soil sample from LP-4 exceeded its NYSDEC RSCO, it was present within typical Eastern United States background concentrations (e.g., 1 to 50 mg/kg); therefore, additional remediation of the bottom sediments of LP-4 were not conducted. Post-remediation depth-to-bottom measurements for the leaching pools are included in Table 2.2.

Based upon the Eikon reports, leaching pools LP-1, LP-3 and LP-4 were remediated. In 1994, approximately 6,500 gallons of waste water were removed from LP-1 and approximately 7,500 gallons of waste were removed from LP-3 by the Help Cesspool and Sewer Services and disposed of with NCDPW approval at the Bay Park Scavenger Waste Disposal facility. An undetermined amount of bottom sediments removed from LP-1, LP-3 and LP-4 were disposed of at Republic Environmental Systems facility located in Hatfield, Pennsylvania.

Soil boring SP1 was drilled and sampled through LP-1 to a depth of 45-feet bgs. The 40- to 42- and 45- to 47-foot bgs soil samples were submitted for VOCs, SVOCs, and PPM analyses. Concentrations below respective RSCOs of select VOCs and SVOCs were detected in both soil samples. No priority pollutant metal exceeded RSCOs in either soil sample.

Five Storm Drain Dry Wells

Five storm drain dry wells are present at the site (see Figure 2.1). Eikon collected bottom sediments from each dry well and analyzed the samples for VOCs, SVOCs, target analyte list (TAL) metals plus cyanide, pesticides/PCB, and total petroleum hydrocarbons.

No analytes exceeded NYSDEC RSCOs in the bottom sediments collected from storm drains (SD) SD-1 and SD-2 (see Table 2.1). Minor exceedances of RSCOs were noted for select SVOCs in the bottom sediments collected from SD-3, SD-4, and SD-5. Selected metals were detected above RSCOs in the bottoms sediments from SD-3. Due to the depth of groundwater (greater than 90 feet below ground surface) and the relatively minor exceedances of RSCOs, remediation was not recommended. Depth-to-bottom measurements for the dry wells are included in Table 2.2.

Electrical Transformer

Eikon collected and analyzed a sample of the surface soils adjacent to the pad-mounted electrical transformer for PCBs. The PCB Aroclor 1254 was detected at 2.2 mg/kg (see Figure 2.1 and Table 2.1). Due to the depth of groundwater (greater than 90 feet below ground surface) and the relatively minor exceedances of RSCOs, no remediation was recommended.

Area Located Adjacent to a 10,000-Gallon Fuel Oil Underground Storage Tank

Disposal of this soil - chk w/ Shah in DSHM x 392

Eikon conducted a Phase II Site Investigation during which four soil borings were drilled and sampled adjacent to the 10,000-gallon fuel oil underground storage tank (UST) (see Figures 2.1 and 2.2 and Table 2.1). This northwest area was also referred to as the "rear yard" and the "contaminated soil area" by Eikon in several reports.

While drilling soil boring SB2 adjacent to the fuel oil UST, Eikon noted "elevated volatile odors". A soil sample was grabbed from the side-wall of the boring at a depth of 2- to 3-feet bgs and submitted for VOC. Based upon the cuttings generated while drilling SB-2, VOC-impacted sediments were not thought to extend below 3 feet in depth. PCE, toluene, ethylbenzene, methylene chloride, and trichlorofluoromethane were detected in the SB2 soil sample (see Table 2.1).

Based upon the analytical results of SB2 and the soil vapor survey (SVS), Eikon conducted a removal action of the "solvent contaminated soil". An approximately 38-foot long, 27-foot wide, and 25-foot deep pit was eventually excavated. Excavation activities were halted due to structural concerns for the nearby building. A confirmatory soil sample (SS2) was collected from 15-feet bgs and analyzed for VOCs. Relatively low concentrations of toluene, ethylbenzene, and xylenes were detected. After excavating as much sediment as possible, Eikon lined the excavated area with plastic sheeting and backfilled it with clean soil. The soil was stockpiled near the northwest corner of the building (see Figure 2.2).

A total of 17 soil borings were drilled and sampled by Eikon as part of the Phase IV Investigation (see Figure 2.2). Elevated soil vapor PID readings were present to the west, north, and northeast of the excavation area. Eikon apparently assumed that elevated PID readings indicated the presence of VOC contamination and did not submit any soil samples exhibiting high PID readings for confirmatory laboratory analyses. Eikon submitted five soil samples for VOC analyses. These samples were collected from soil borings in which the shallower soil samples indicated the presence of VOCs. The SB8-2 soil sample collected from 20- to 22-feet bgs contained PCE and TCE were at 490 and 11J ug/kg, respectively (the "J" qualifier indicates an estimated value). Some of the SVOCs exceeded the RSCOs in soil samples collected from SB-1, SB-2, SB-3, and SB-4.

Four additional soil borings were drilled and sampled in areas where elevated PID responses had been noted in the area. Soil samples were collected from the depths with elevated PID readings and submitted for chemical analyses. Additionally, soil boring SB1-3 was drilled and sampled to evaluate the presence of VOCs between 35- and 37-feet bgs directly beneath the excavation area. The soil samples were analyzed for VOCs by EPA Method 8240 plus a ten-peak library search and total xylenes. The 4- to 6-foot bgs soil sample from SB3-3 contained toluene, ethylbenzene, and total xylenes at 2.2, 11.3, and 127.9 mg/kg, respectively.

Concentrations below respective RSCO of toluene and/or xylenes were detected in the other two soil samples which had exhibited elevated PID readings in the past.

Site-wide stratigraphic evaluation

Eikon drilled an additional 27 soil borings to approximately 20-feet bgs as part of a site-wide stratigraphic assessment (see Figure 2.1). The cuttings were screened with a PID and lithologic logs of the borings were prepared. Eikon noted varying amounts of fill across the site based on the 27 soil borings. Based upon elevated PID readings from the cuttings, a soil sample was collected from the northwest corner of the facility's rear yard. The 2- to 4-foot bgs soil sample from SB-5 was analyzed for VOCs+10 (the +10 indicates that that a 10-peak library search for tentatively identified compounds was conducted). No VOCs were detected above NYSDEC RSCOs (see Table 2.1).

Summary of Soil Investigations

Based upon Eikon's results, two areas of soil contamination remain at the site:

1. The sediments underlying Leaching Pool No. 1 located near the northwest corner of the facility (see Figures 2.1 and 2.2) contain halogenated VOCs.

2. Hydrocarbon VOCs, including toluene and ethylbenzene and SVOCs, were detected in a soil boring (SS2) located near the 10,000-gallon No. 2 fuel oil underground storage tank (UST) also located in the northwest corner of the facility.

Both areas of soil contamination are located in the northwest corner of the property (see Figure 2.2). The remedial alternative discussed in Section 3.0 was selected and will be designed to address both documented areas of soil contamination.

2.2 Groundwater Contamination

As part of a NYSDEC-approved 1995 Investigation, H2M installed and sampled two Upper Glacial aquifer groundwater monitoring wells (MW-3 and MW-4) (See Figure 2.4) on the site (see H2M letter report dated August 30, 1995). Well MW-7, installed by others for an upgradient source area investigation, was also sampled. A potentiometric surface map was prepared for the Upper Glacial aquifer. The groundwater flow direction beneath the site was to the south southeast with a gradient of 0.0074 feet per foot on August 23, 1995.

The groundwater sample collected from MW-3 (located on an upgradient portion of the site) contained 12 micrograms per liter (ug/l) PCE. The groundwater sample collected from MW-4 contained total 1,2-dichloroethene (1,2-DCE), 1,1,1-trichloroethane (TCA), TCE, and PCE at 27, 22, 31, 310 ug/l, respectively. TCL VOCs were not detected in the groundwater sample collected from MW-7.

In May of 1996, H2M conducted a NYSDEC-approved off-site groundwater investigation (OSGI) to evaluate the vertical and horizontal extent contamination. The results of the OSGI are detailed in a H2M letter dated July 15, 1996. The data indicated that a groundwater contamination plume existed south southeast of the property (see Figure 2.5).

On January 20, 1998, H2M collected two groundwater samples for TCL VOC analysis from the proposed location for MW-5 utilizing the Hydropunch sampling technique. The water sample collected from just below the water table contained 6 ug/l PCE while the sample collected from 25 feet below the water table contained 14 ug/l PCE.

Based upon the results of work conducted by H2M , the following conclusions can be made:

1. Groundwater in the Upper Glacial aquifer beneath the 100 Commercial Street site is impacted by halogenated solvents and associated degradation products.
2. The concentrations of halogenated solvents attenuate in the downgradient direction. This attenuation is observed both horizontally and vertically.

3. Groundwater downgradient of the 100 Commercial Street site in the vicinity of Express Street is impacted by halogenated solvents at concentrations which exceeded NYSDEC Class GA groundwater-quality standards.
4. The analytical data indicate that a potential source of TCA and TCE is present south southeast of the site.

2.3 Hydrogeology

Based upon the boring logs prepared during the drilling of Wells MW-3 and MW-4, the site is underlain to a depth of approximately 114 feet below ground surface (bgs) predominantly by sand and gravelly sand. These lithologies are consistent with a glacial outwash origin typically found in the Upper Glacial aquifer (Smolensky, et. al., 1989). According to published data, the top of the Magothy aquifer occurs between 320 to 420 feet bgs in the vicinity of the site.

A potentiometric surface map was prepared for the Upper Glacial aquifer using data collected from Wells MW-3, MW-4, and MW-7 (see Figure 2.4). The resulting groundwater flow direction was east southeast with a gradient of 0.0074 feet per foot. A potentiometric surface map prepared for April 25, 1994 using data from nearby monitoring wells resulted in a groundwater flow direction to the east with a gradient of 0.0044 feet per foot (see Figure 2.4). The variation in groundwater flow direction is likely due to the site's location near the groundwater flow divide of Long Island. The well depth, depth to groundwater and groundwater elevation values for August 23, 1995 are included in Table 2.3.

3.0 PROPOSED REMEDIAL ACTION PLAN

An AS/SVE will address the known source areas of soil and groundwater contamination at the site. Additionally, the stock-piled soil will be covered with plastic sheeting.

This remedial technology has been selected for the following reasons:

1. The AS/SVE technology has proven very effective in remediating the contaminants of concern (COCs) (halogenated solvents and associated degradation products) in the highly porous and homogeneous sand and gravel lithologies of Long Island.
2. The AS/SVE system will address both the on-site groundwater contamination and unsaturated zone contamination. The SVE system will also remediate both VOCs and SVOCs present in the northwest corner of the facility and in the stockpiled soil which was generated during the removal action.
3. Within 18 to 24 months of start up, the AS/SVE system is expected to remediate the impacted soils underlying the site as well as the on-site groundwater contamination in the Upper Glacial aquifer.
4. The technology is performed in-situ, generates minimal waste products requiring off-site disposal, and involves minimal facility disruption during installation and operation.

Other remedial technologies were evaluated prior to selecting the AS/SVE remedial alternative, including excavation of the soils beneath LP-1 to a depth of 45 feet and the installation of a groundwater pump and treat system to address the groundwater contamination. Excavation of impacted soils is infeasible due to the depth and the extent of VOC contamination (VOCs were documented in subsurface in the vicinity of the UST). Without source remediation in the unsaturated zone, the groundwater pump and treat alternative would require at least 5 years and likely substantially longer to successfully remediate the contaminated groundwater. To reiterate, the AS/SVE system was selected due to its ability to concurrently remediate the unsaturated soils in the two documented source areas and the on-site groundwater within a 18 to 24 month time period. Additionally, similar systems have proved successful in remediating similar sites on Long Island due to the highly porous and homogeneous nature of the underlying sand and gravel units.

3.1 AS/SVE System Conceptual Design

As envisioned, the AS system would consist of five air-sparge points installed in the area of LP-1 and the UST excavation (see Figures 3.1 and 3.2). Each sparge point will be set at a depth of approximately 10 to 12 feet below groundwater (approximately 112 feet below ground surface (bgs)) and air will be injected through each point to volatilize the COCs. Based upon our experience with Long Island lithologies, we have assumed a conservative 15-foot radius of influence (ROI) for the AS system for this conceptual design. This ROI would be confirmed through system start-up testing.

Nine SVE points will be installed within the selected boreholes of the AS injection points. As shown in Figure 3.2, three SVE points, set at different depths, will be placed within three separate bore holes. The purpose of the SVE system is to capture and remove the VOCs stripped from the groundwater by the AS system and any remnant VOC contamination which may still be present in the unsaturated zone. Additionally, a single SVE point will be installed within the on-site soil stockpile which resulted from the Eikon removal action. If present at concentrations above NYSDEC Air Guide 1 values, the extracted vapors will be directed through a granulated activated carbon (GAC) system to remove the VOCs prior to discharge to the atmosphere. H2M will provide detailed design and specification deliverables once the NYSDEC approves the conceptual design.

H2M expects that the AS/SVE system will be operated for approximately 18 to 24 months. During this time, H2M will conduct weekly inspections to ensure that the AS/SVE system is operating properly. Additionally, the VOC concentration in the SVE out gas will be measured with a PID and with samples analyzed by the analytical laboratory to assess system performance.

3.2 Closure Criteria

Once the AS/SVE system is on line and operating properly, H2M will monitor the system's operational performance to evaluate when the remedial action will be complete. This performance monitoring will include evaluating both the quality of on-site groundwater and the concentrations of VOCs in the SVE system off-gas.

3.2.1 Groundwater Closure Criteria

On-site wells MW-3, MW-4, MW-5 and MW-7 will be sampled on a quarterly basis during the operational phase of the remediation. All groundwater samples will be analyzed for TCL VOCs. The remediation of the on-site groundwater will be considered complete when:

1. VOCs are not detected above NYSDEC Class GA groundwater quality standards; or
2. Based upon review of the quarterly groundwater data, once the groundwater quality in the on-site downgradient monitoring wells is equal to or better than the groundwater quality in the upgradient monitoring well (MW-3). For comparison purposes, analytical results within 5 micrograms per liter of one another will be considered equal.

During the post-shutdown monitoring period, the following groundwater sampling schedule will be implemented to evaluate the effectiveness of the remediation:

- Two quarterly sampling events.
- Two semi-annual (e.g., six months) events.
- One annual event.

3.2.2 Soil Closure Criteria

The SVE off-gas will be measured weekly with a PID during the operational phase of the remediation. At a minimum, the SVE system will be operated while the AS system is on line to ensure that VOCs stripped from the groundwater are captured in the vadose zone.

The PID data will be plotted against time to determine the effectiveness in remediating the contaminated vadose zone. With time, we expect the concentrations of VOCs to reduce dramatically until an asymptotic condition occurs. Once an asymptotic condition is observed and the AS system is shut off, the SVE system will be shut down for a two week period and then restarted. The off gas PID readings will be plotted against time to determine if rebounding effects occur. The vadose zone remediation will be considered complete when minimal (e.g., 20 percent) or no VOC rebound occurs.

Six soil borings will be drilled and sampled at nominal 10-foot intervals to evaluate the effectiveness of the soil remediation effort at the locations indicted in Figure 2.2. The soil samples will be field screened with a PID to determine the presence of VOCs. At a minimum, two soil samples from each boring will be analyzed by the analytical laboratory of TCL VOCs. The analytical results will be compared to the appropriate Recommended Soil Cleanup Objectives. The H2M standard operating procedures for field screening of soils and field instrumentation are included in Appendix A.

The stock-piled soil will be sampled and analyzed for waste-characterization parameters prior to shut down of the SVE system. The soils will be properly disposed of based upon the waste characterization results.

3.3 PCB Soils Investigation

In order to assess the presence of PCBs in the soils in the vicinity of the electrical transformer, two surface (0 to 18 inches) soil samples, two subsurface (18 to 24 inches) and one concrete chip sample will be collected and analyzed for PCBs by EPA Method 8080 (see Table 5.1). The analytical data will be compared to the NYSDEC Recommended Soil Cleanup Objectives to determine if remediation is required. An addendum to the Work Plan will be issued detailing the proposed remedial action, if necessary.

4.0 GROUNDWATER AND AS/SVE SYSTEM MONITORING

The groundwater quality beneath the site will be monitored on a quarterly basis to evaluate the effectiveness of the AS/SVE system as described in this section. Additionally, the off gas of the SVE system will be monitored on a weekly basis.

4.1 Groundwater Monitoring Well Installation

A third on-site groundwater monitoring well (herein designated MW-5) will be installed approximately 200 feet west of MW-4 along Commercial Street (see Figure 2.4). The contractor for drilling and related well installation activities will be a New York State licensed monitoring well driller. The driller will be made aware of the nature of the drilling activities and will be experienced in soil/groundwater investigations of this nature. All field activities will be conducted under the direction of a qualified H2M hydrogeologist. The well boring will be drilled and sampled utilizing a HSA drill rig. All drilling equipment will be decontaminated prior to use at each drilling location.

Prior to commencement of drilling, site-specific underground structures, overhead structures, and other surface features which may impede drilling will be identified. Appropriate utilities will be contacted for mark outs. All drill cuttings will be transported to the site and placed on and covered by plastic sheeting near the MW-3 location.

The groundwater monitoring well will be constructed with 4-inch polyvinyl chloride (PVC) flush-joint risers with a 15-foot section of 0.010 inch slot-size PVC well screen. The well will be installed in accordance with NYSDEC specifications for wells in unconsolidated formations. Groundwater is expected to be encountered at approximately 100-ft bgs. However, the depth at which groundwater is first encountered may vary due to the topographic variations in the vicinity of the site.

The annular space around the well screen will be filled with a sand filter pack extending from 6-inches below the bottom of the screen to a height of 2 feet above the top of the screen. A 2-foot seal of bentonite pellets will be placed above the filter pack. The bentonite pellets will be hydrated for 30-60 minutes prior to installation of the

All groundwater samples will be analyzed for TCL VOCs. The groundwater results will be compared to the Class GA Groundwater Standards presented in the NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1): Ambient Water Quality and Guidance Values, October, 1993.

The synoptic round of water levels collected from the four wells during each sampling period will be utilized to prepare potentiometric surface maps of the Upper Glacial aquifer to determine groundwater flow direction and gradient.

Decontamination

All drilling equipment will be steam cleaned prior to work and in between drilling locations. An on-site potable water supply will be used for steam cleaning and other purposes as necessary. The well screen and casing will be decontaminated by steam cleaning unless the well materials have been cleaned and sealed in plastic at the factory. The decontamination rinsate will be disposed of on site.

All non-drilling equipment (including pumps, bailers, etc.) shall be decontaminated for field use either by steam cleaning or according to the following procedures:

- Non-phosphate detergent and tap water wash and scrubbing.
- Tap water rinse.
- Distilled/deionized water rinse.

During the installation of MW-5, one groundwater sample will be collected from approximately 25 feet below the groundwater table utilizing the hydropunch sampling method. The groundwater sample will be analyzed for TCL VOCs.

4.3 SVE Monitoring

The SVE system will be monitored as follows:

- Weekly air monitoring of the influent and effluent (e.g., prior to and after the GAC filter, if utilized) with a PID.

cement/bentonite grout. The depth to the bottom and top of each seal will be measured in the borehole to the nearest 0.1 foot using a weighted tape. The remaining annular space will be grouted with a bentonite/cement slurry using the tremie method. A cement/bentonite surface seal will be constructed by filling the annular space of the borehole and will extend from approximately three feet below-grade to grade where a flush-mounted well manhole will be installed. A water-tight locking cap will be attached to the top of the PVC casing. A flush-to-grade steel cover assembly will be set in grout around the well casing.

The groundwater monitoring well will be developed by bailing and pumping. During purging, the pump will be moved up and down through the saturated section of the screened interval to surge the well. Specific conductivity, pH, and temperature measurements will be taken of the discharge until the test parameters stabilize to confirm adequate development. Stabilization will be established when two consecutive well-volume readings are within 10 percent of one another. Turbidity of the discharge will also be monitored and well development will continue until a measurement of less than 50 nephelometric turbidity units (NTU) is achieved or until turbidity stabilizes. Depth to groundwater measurements will be made before and after well development. All observations made during development will be recorded on well sampling development forms. The development water will be disposed of on site.

Once the groundwater monitoring well has been installed and developed, the top of casing elevation of the well will be surveyed to the nearest 0.01 foot to the site-specific datum. The horizontal location of the well will be surveyed to the corners of existing building and property boundaries. A synoptic round of depths to groundwater, measured from the top of casing, will be collected from the three on-site wells.

Based on the survey and depths to groundwater, a potentiometric surface map of the Upper Glacial aquifer will be prepared. The direction of groundwater flow, as well as the gradient of the potentiometric surface, will be determined from this map.

4.2 Groundwater Sampling

Following well construction and development, groundwater samples will be collected from wells MW-3, MW-4, MW-5 and MW-7 on a quarterly basis. Upon opening the monitoring wells, a PID will be used to screen for total VOCs in the ambient atmosphere and in the headspace of the well. PID values will be recorded and compared to ambient background readings. The following procedure will be followed for groundwater sampling:

1. Prior to the purging of the wells for sample collection, a static water level measurement to the nearest hundredth foot will be recorded in each monitoring well.
2. To ensure a representative sample from the monitoring well, purging of the well is required. In general, the groundwater standing in the well casing prior to the sample collection will be similar in quality to that in the surrounding aquifer or local groundwater, but it may not be representative.
3. A volume of water equal to at least three times that standing in the screened casing will be purged from the well before sample collection. If the monitoring well has a low yield, standing water will be fully evacuated and a sample collected upon recovery to 80 percent of static water level. A decontaminated PVC bailer shall be used to remove the required volume of groundwater. Prior to the sampling event, all sampling equipment shall be decontaminated. All water removed during the evacuation process shall be disposed of on site.
4. A dedicated, pre-cleaned, polyethylene, disposable bailer will be attached to dedicated polypropylene rope or nylon line. The appropriate sample bottles will be filled directly from the bailer as soon as it is removed from the well. The sample containers will be immediately placed on ice in a cooler under strict chain of custody procedures.
5. The well cap shall be secured and the above process shall be repeated at the next monitoring well.

- Monthly air monitoring of the influent and effluent utilizing a PID, Draeger tube for PCE and TCE and carbon sorbent tubes for laboratory analysis.

Pursuant to the Voluntary Agreement, no permits are required. Process, Exhaust or Ventilation System application will be submitted for the NYSDEC Division of Air Resources (DAR) review but not filed.

5.0 QA/QC PLAN

All groundwater and quality assurance/quality control (QA/QC) samples will be analyzed at H2M Labs, Inc. in Melville, New York. H2M Labs, Inc. is a NYSDOH-ELAP-CLP certified laboratory, proficient in all aspects of the 1991 Analytical Services Protocol including the ability to perform continuous liquid-liquid extraction. All groundwater and QA/QC groundwater samples will be analyzed for TCL VOCs. The list of analytes and contract-required quantitation limits (CRQLs) are included in Table 5.2. In the vicinity of the electrical transformer, the soil and concrete chip samples will be analyzed for PCBs by EPA Method 8082. The list of analytes and contract-required quantitation limits (CRQLs) are included in Table 5.1. The TCL VOC and PCB analyses will be conducted following NYSDEC contract-laboratory protocols (CLP).

The overall QA/QC Plan objective is to produce data at the highest quality level. In order to ensure that data collected in the field is consistent and accurate, forms will be utilized for repetitive data collection, such as depth to water in wells, well locations, etc. These field forms include Well Logging, Field Sampling and Water Level Data Records.

The purpose of the QA/QC samples is to ensure that the analytical data are precise, accurate, representative, complete, and comparable. Table 5.3 presents a summary of the analyses to be performed per task as well as what QA/QC samples to be utilized.

Blind Duplicate Samples

One blind duplicate groundwater sample will be collected per quarterly sampling event of the groundwater monitoring wells. Each sample will be assigned a fictitious identification to ensure the applicability of the method. The analytical results between the sample/blind duplicate will be compared to evaluate whether the data reported by the laboratory are precise, accurate, representative, and comparable.

Trip Blanks

One trip blank per each day of TCL VOC sample collection will be utilized during groundwater sampling activities. The analytical results from the trip blanks will be used to evaluate the impact to the groundwater analytical results by sample transport, shipping, and field conditions.

Field Blanks

One field blank (equipment rinsate blank) per sampling event will be collected and analyzed to determine if the field decontamination procedures were effective. One field blank will be collected by pouring analyte-free water through a unused disposable bailer into the appropriate glassware.

5.1 Project Management

The H2M Officer-in-Charge for the work is Mr. Gary M. Miller, P.E. Mr. Miller's primary role is to provide overall project direction for the consultant activities and provide general QA/QC support.

Mr. Richard J. Baldwin will serve as the H2M Project Manager. Mr. Baldwin is a certified professional geologist (C.P.G.). Mr. Baldwin's responsibilities for the project will include coordinating the development of project plans, implementation of various remedial tasks, and overseeing field activities.

The Quality Assurance Officer (QAO) for this project will be Mr. Kenneth J. Cottrell, C.P.G. of H2M. Mr. Cottrell will be responsible for overall project quality including development of the project QA/QC plans, review of specific task QA/QC procedures, review of laboratory, vendor and subcontractor plans and procedures, and auditing specific tasks at established intervals. The QAO will report directly to the officer in charge of the project. Specific tasks that the QAO will be responsible for include reviewing laboratory results for the groundwater samples pertaining to the site from a data usability standpoint. EPA's "Laboratory Data Validation, Functional Guidelines for Evaluating Organics Analyses and NYSDEC ASP" will be used to determine data usability. Based upon the evaluation, the QAO will determine whether all data are usable.

The resumes for the above-referenced H2M personnel are included Appendix B.

6.0 HEALTH AND SAFETY PLAN

The primary health and safety concerns while conducting the remedial construction, system O&M, and groundwater monitoring are inhalation or dermal-contact exposure to hazardous materials and physical hazards. H2M has prepared a site-specific Health and Safety Plan (HASP) (see Appendix C). All field personnel (including subcontractors) shall abide by the H2M HASP during all phases of the work.

FIGURES

FIGURE 1.1

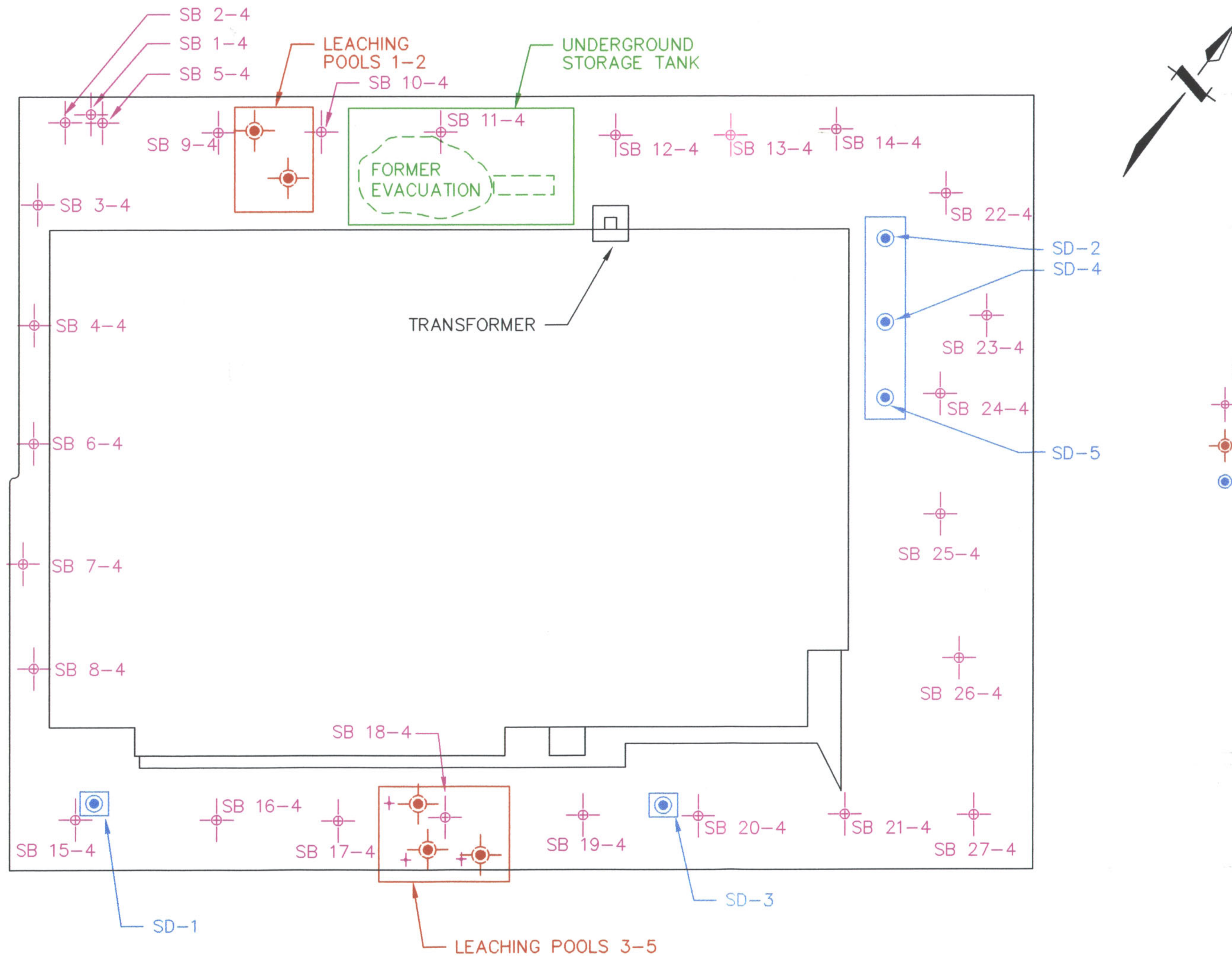
100 COMMERCIAL ST.

SITE LOCATION MAP

SCALE 1" = 2000'

H2M GROUP ENGINEERS · ARCHITECTS · PLANNERS · SCIENTISTS · SURVEYORS

MELVILLE, N.Y. TOTOWA, N.J.



LEGEND:

- SB: STRATIGRAPHIC ASSESSMENT
- SANITARY SYSTEM LEACHING POOLS
- STORM DRAIN DRY WELLS

FIGURE 2.1
100 COMMERCIAL STREET SITE OVERVIEW

SCALE
1" = 50'

H2M GROUP ENGINEERS · ARCHITECTS · PLANNERS · SCIENTISTS · SURVEYORS
MELVILLE, N.Y. RIVERHEAD, N.Y. SHELTON, CT. TOTOWA, N.J.

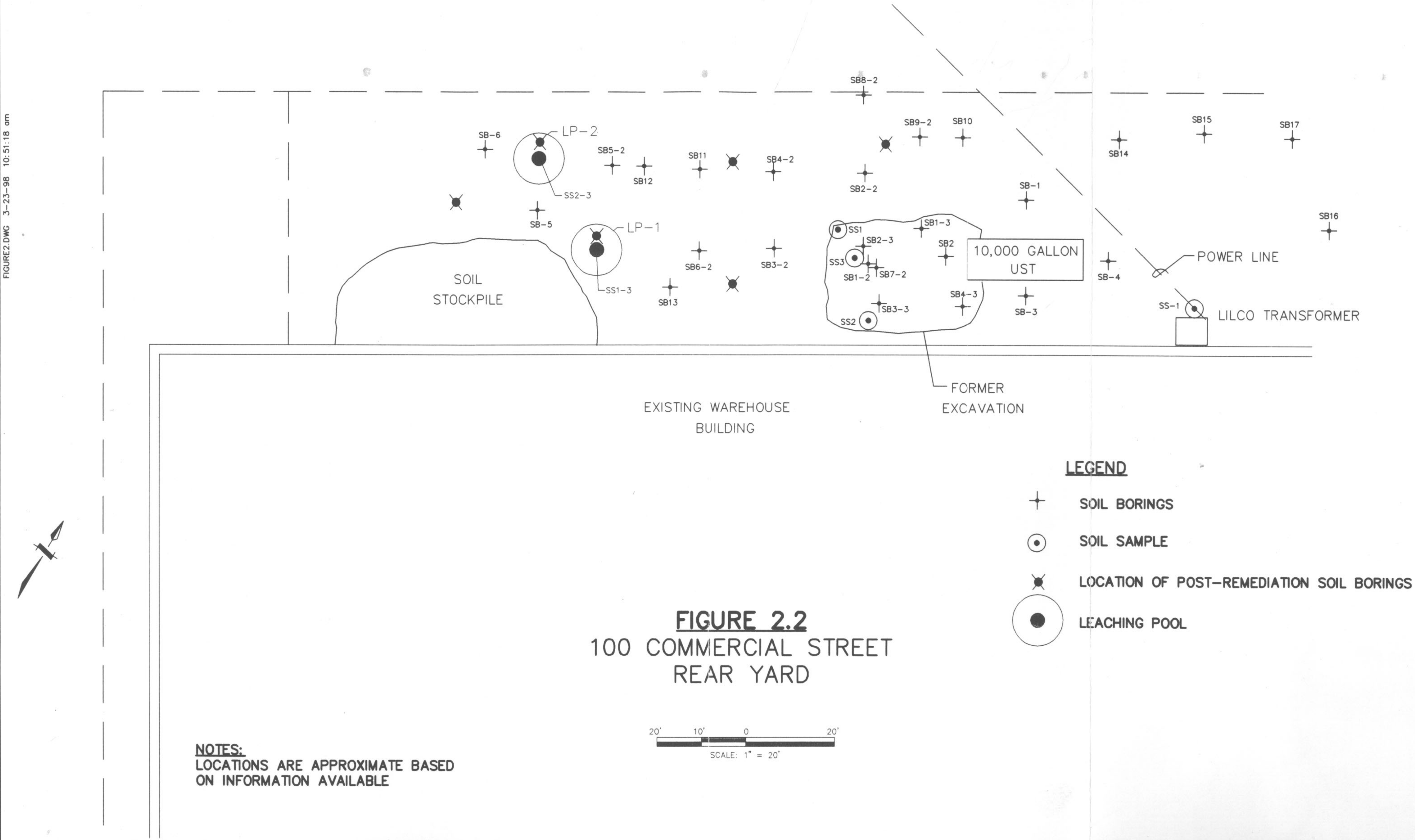


FIGURE 2.2
100 COMMERCIAL STREET
REAR YARD

20' 10' 0 20'
SCALE: 1" = 20'

NOTES:
LOCATIONS ARE APPROXIMATE BASED ON INFORMATION AVAILABLE

FIGURE2.DWG 3-23-98 10:51:18 am

H2M GROUP
ENGINEERS · ARCHITECTS · PLANNERS · SCIENTISTS · SURVEYORS
MELVILLE, N.Y. TOTOWA, N.J.

M:\CADD\COMM\9701\FIGURE2 8-8-97 1:40:00 pm EST

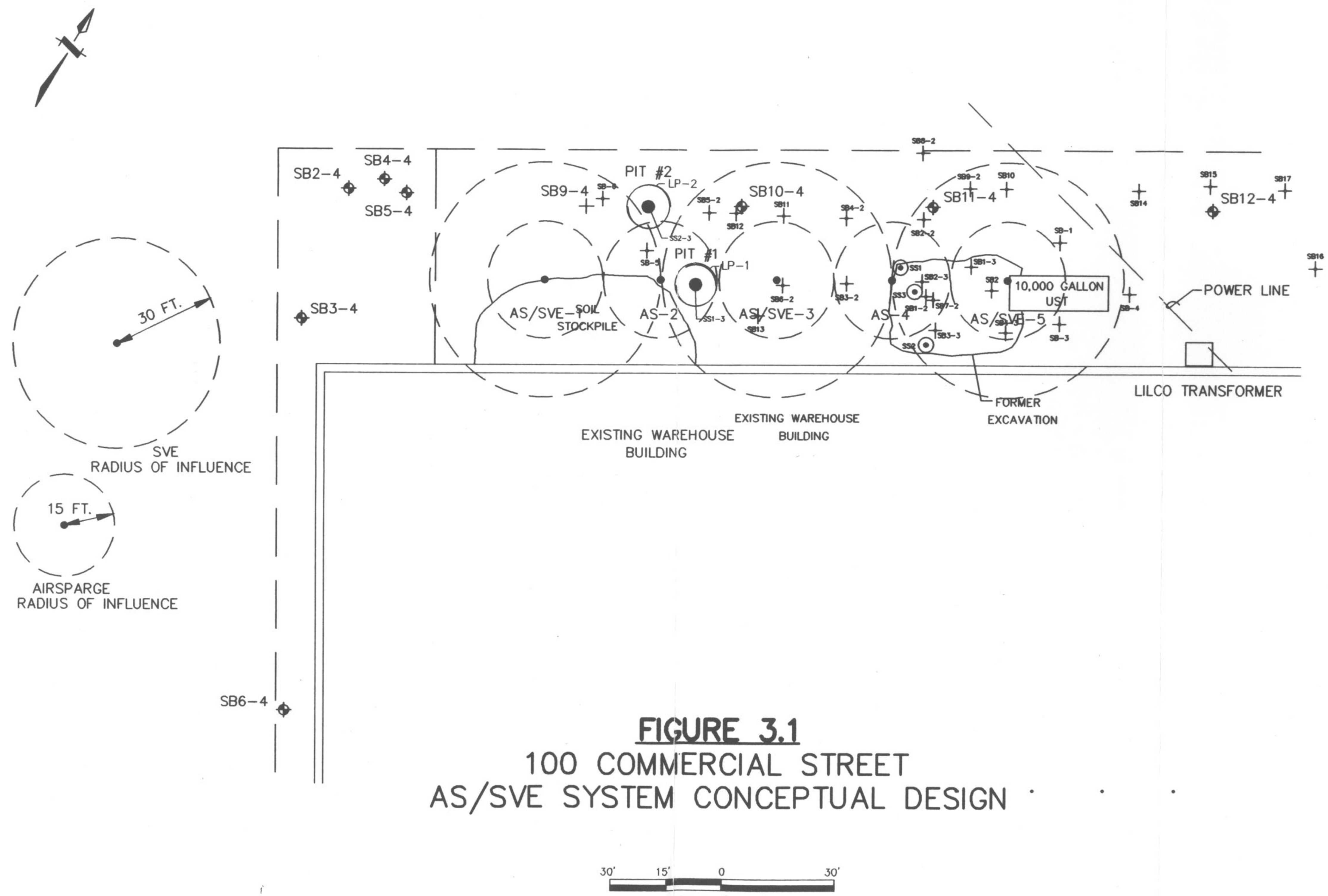
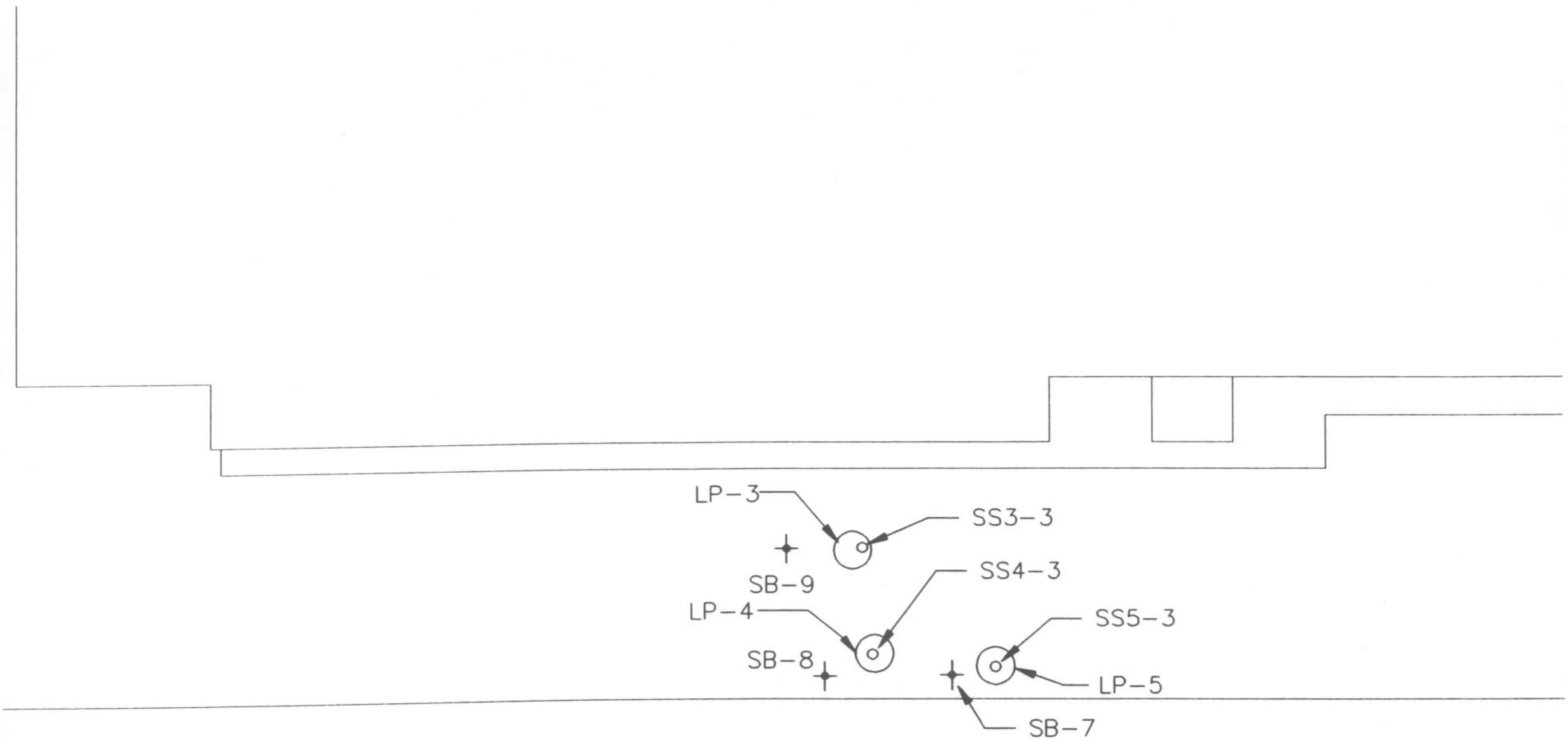


FIGURE 3.1

100 COMMERCIAL STREET
AS/SVE SYSTEM CONCEPTUAL DESIGN

H2M GROUP ENGINEERS · ARCHITECTS · PLANNERS · SCIENTISTS · SURVEYORS
MELVILLE, N.Y. TOTOWA, N.J.

M:\CADD\COMM\9701\FIG2_1 8-8-97 1:43:52 pm EST



LEGEND

+ SOIL BORING

◎ LEACHING POOL

FIGURE 2.3
100 COMMERCIAL STREET
FRONT YARD

SCALE: 1" = 30'

NOTE:
LOCATIONS ARE APPROXIMATE BASED ON INFORMATION AVAILABLE

H2MGROUP ENGINEERS · ARCHITECTS · PLANNERS · SCIENTISTS · SURVEYORS
MELVILLE, N.Y. RIVERHEAD, N.Y. SHELTON, CT. TOTOWA, N.J.

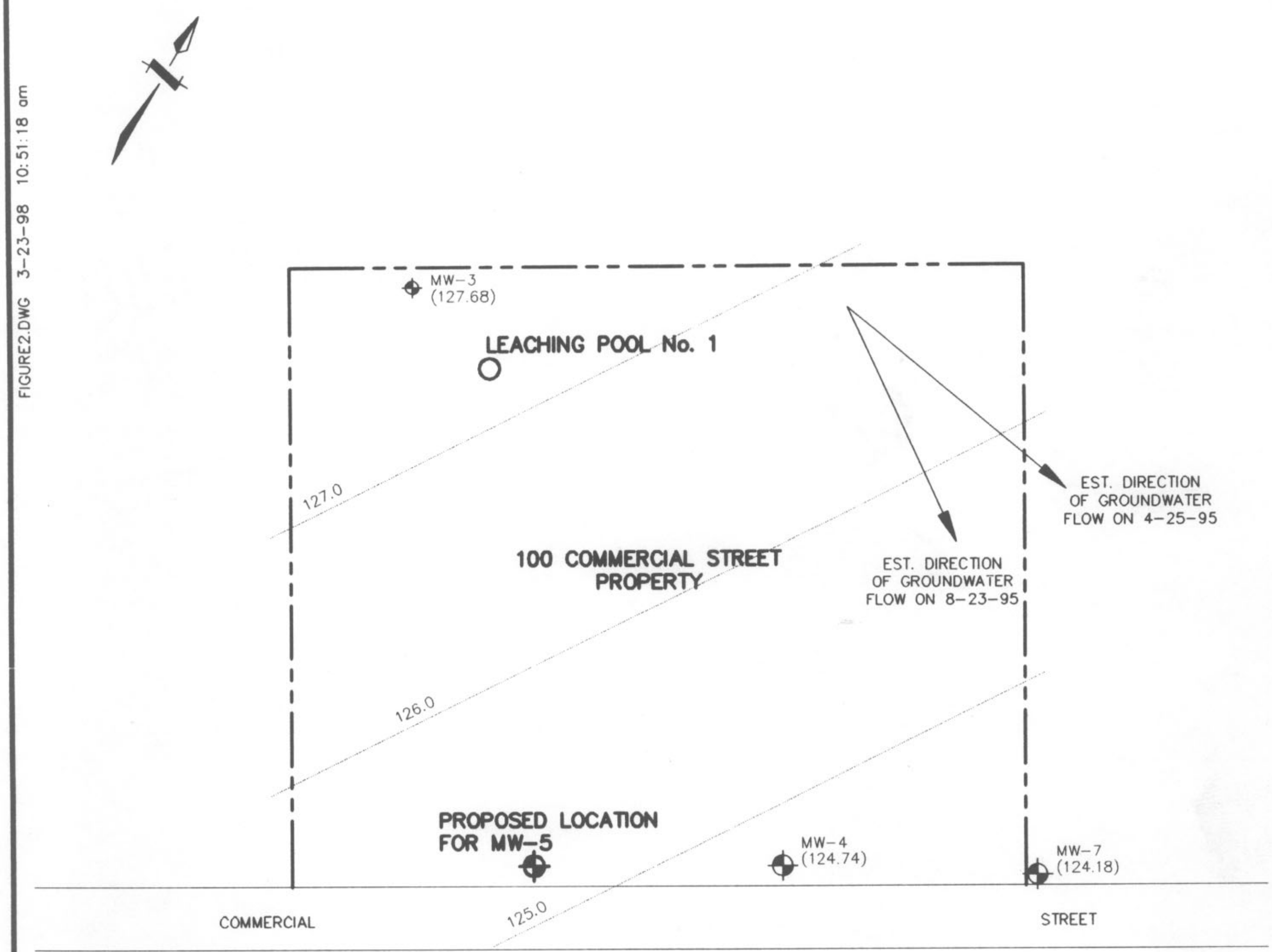


FIGURE 2.4
SITE VICINITY MAP WITH POTENTIOMETRIC SURFACE ON 4-25-95, AND 8-23-95

EXPLANATION

100' 50' 0 100'

SCALE: 1" = 100'

MW-3 (127.68) LOCATION MONITORING WELL WITH GROUNDWATER ELEVATION

127.0 POTENTIOMETRIC SURFACE LINE

H2MGROUP ENGINEERS · ARCHITECTS · PLANNERS · SCIENTISTS · SURVEYORS

MELVILLE, N.Y. TOTOWA, N.J.

M:\CADD\COMM\9701\FIGURE2 7-1-97 3:29:43 pm

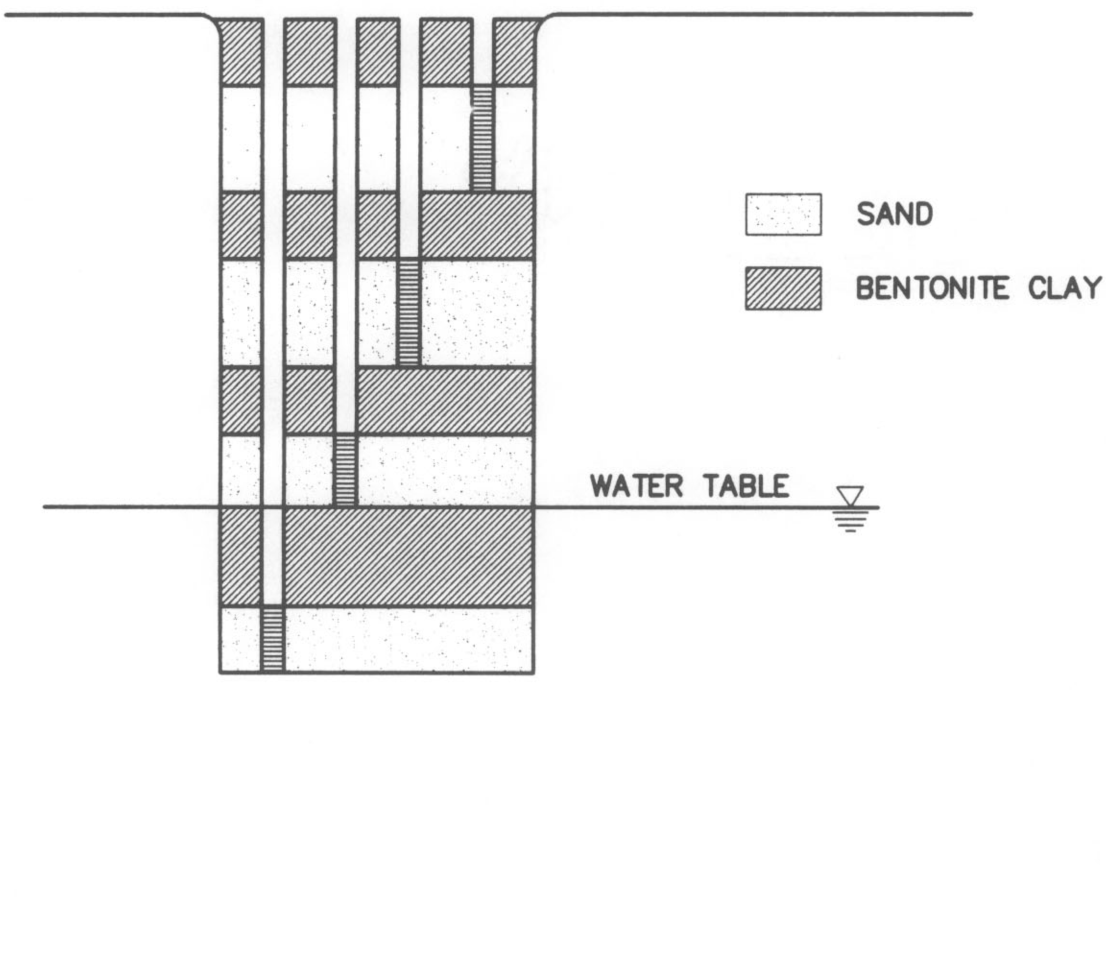


FIGURE 3.2

100 COMMERCIAL STREET
DETAILS OF SVE CLUSTER WELLS
AS/SVE CONCEPTUAL DESIGN

NO SCALE

TABLES

TABLE 2.1
100 COMMERCIAL STREET
ON-SITE REMEDIAL WORK PLAN
SUMMARY OF PAST SAMPLING ACTIVITY

SUB-SURFACE WASTEWATER DISPOSAL SYSTEMS					
Eikon Activity #V1-2: Soil Borings Adjacent to 2 Leaching Pools In Rear Yard and 3 Leaching Pools In Front Yard					
Date Performed: August 7, 1989 - August 8, 1989					
ID Number	**SB-5**	**SB-6**	**SB-7**	**SB-8**	**SB-9**
Depth	15.5'-17.5'	23'-25'	17'-19'	16.5'-18.5'	15.5'-17.5'
VOCs (mg/kg)	0.038	0.011	0.022	0.016	0.021
PCE (mg/kg)	0.011	ND	ND	ND	ND
Toluene	ND	ND	0.002	ND	ND
Trichloroethene	ND	ND	ND	0.003	ND
SVOCs (mg/kg)					
Base Neutrals (mg/kg)	2.1	3.4	2.6	6.2	8.3
PCBs (mg/kg)	1.1	ND	ND	ND	ND
Cyanide (mg/kg)	ND	ND	ND	ND	ND
Phenol (mg/kg)	24*	23.8*	0.5*	7.1*	62.8*
Priority Pollutant Metals (mg/kg)					
Chromium (mg/kg)	20.4*	3.1	3.3	4.1	3.3
Lead (mg/kg)	6.3	1.2	<1.0	1.9	<1.0
Zinc (mg/kg)	19.8	12.6	6.5	10.3	11.8
Eikon Activity #V3-3: Leaching Pool Sediment Samples					
I. PRIOR TO REMOVAL OF BOTTOM SEDIMENTS					
Date Performed: March 3, 1993 - March 9, 1993					
	Rear Yard		**Front Yard**		
ID Number	**LP-1**	**LP-2**	**LP-3**	**LP-4**	**LP-5**
VOCs					
TIC VOCs	ND	ND	ND	ND	ND
Acetone (mg/kg)	ND	ND	ND	0.026	0.033
Methylene Chloride	ND	ND	0.002	ND	ND
TCE (mg/kg)	932.41*	ND	ND	ND	ND
Toluene (mg/kg)	ND	ND	0.003	ND	0.003
PCE (mg/kg)	48,170*	0.002	0.014	0.074	ND
SVOCs (mg/kg)					
TIC SVOCs	876.281	9.004	0.969	4.659	0.698
Benzo(a)anthracene (mg/kg)	2.386*	ND	ND	0.045	ND
Chrysene (mg/kg)	3.708*	ND	0.052	0.076	ND
bis(2-ethylhexyl)phthalate	18.983	1.206	0.742	0.158	ND
Benzo(b)flouranthene (mg/kg)	1.651*	ND	0.046	0.070	ND
Benzo(k)flouranthene (mg/kg)	1.711*	ND	ND	0.042	ND
Benzo(a)pyrene (mg/kg)	1.325*	ND	ND	0.052	ND
Priority Pollutant Metals (mg/kg)					
Antimony	10.0	<1.3	<1.4	<1.3	<1.3
Arsenic	3.2	<1.1	1.500	1.200	<1.1
Beryllium	0.48*	<0.11	0.150	0.150	<0.11
Cadium (mg/kg)	4.1*	<0.27	<0.28	1.5	<0.27
Chromium (mg/kg)	160*	2.3	4.5	34*	2.6
Copper (mg/kg)	140*	1.2	180*	47*	2.6
Lead (mg/kg)	130.0	<1.6	7.5	72.0	2.3
Mercury (mg/kg)	5.1*	<0.27	<0.28	<0.27	<0.27
Nickel (mg/kg)	66*	1.5	4.3	15*	1.2
Zinc (mg/kg)	230*	8.6	36*	67*	5.9

NT: Not Tested
ND: Not Detected
* : Above New York DEC Recommended Soil Cleanup Objectives
**: Above Groundwater Standards

TABLE 2.1
100 COMMERCIAL STREET
ON-SITE REMEDIAL WORK PLAN
SUMMARY OF PAST SAMPLING ACTIVITY

II. AFTER REMOVAL OF BOTTOM SEDIMENTS FROM PIT 1, PIT 3 AND PIT 4					
Date Performed: March 11, 1994					
	Rear Yard			**Front Yard**	
ID Number	**LP-1**	**LP-2**	**LP-3**	**LP-4**	**LP-5**
Depth (ft)	17'-17.5'	Remediation	18.5'-19'	16'-16.5'	Remediation
VOCs		Not			Not
TIC VOCs	366		NT	NT	
PCE (mg/kg)	550*	Required	NT	NT	Required
SVOCs					
TIC SVOCs	226		NT	NT	
1,2,4 Trichlorobenzene	5.5*		NT	NT	
Butylbenzylphthalate	1.2		NT	NT	
Bis(2-ethylhexyl)phthalate	10.0		NT	NT	
Di-n-octylphthalate	0.6		NT	NT	
Metals					
Arsenic (mg/kg)	0.8		<0.62	1.4	
Chromium (mg/kg)	8.7		2.5	3.7	
Copper (mg/kg)	4.6		3.0	34.2*	
Lead (mg/kg)	5.2		1.8	16.7	
Zinc (mg/kg)	8.0		18.3	4.4	
III. SOIL BORING CONDUCTED THROUGH LP-1					
Date Performed: March 14, 1994					
ID Number	**20' - 29' bgs**	**30'-34' bgs**	**35'-39' bgs**	**40'-42' bgs**	**45'-47' bgs**
PID	1700 ppm - 2000 ppm		4 ppm - 7 ppm		45 ppm
VOCs					
TIC VOCs (mg/kg)				0.019	0.013
Acetone (mg/kg)				0.010	ND
Methyl Chloride (mg/kg)				ND	0.001
PCE (mg/kg)				0.001	0.001
SVOCs					
TIC SVOCs (mg/kg)				15.130	7.990
Phenol (mg/kg)				0.30*	0.23*
Priority Pollutant Metals					
Arsenic (mg/kg)				2.3	0.86
Chromium (mg/kg)				6.9	3.6
Copper (mg/kg)				2.7	1.9
Lead (mg/kg)				1.9	0.95
Nickel (mg/kg)				2.1	0.22
Zinc (mg/kg)				6.6	5.50

NT: Not Tested
ND: Not Detected
* : Above New York DEC Recommended Soil Cleanup Objectives
**: Above Groundwater Standards

TABLE 2.1
100 COMMERCIAL STREET
ON-SITE REMEDIAL WORK PLAN
SUMMARY OF PAST SAMPLING ACTIVITY

STORM DRAIN DRY WELL SEDIMENT SAMPLING					
Eikon Activity #V3-4					
Date Performed: July 21, 1994					
ID Number	**SD-1**	**SD-2**	**SD-3**	**SD-4**	**SD-5**
TPH (mg/kg)	84	ND	330	83	
VOCs (mg/kg)					
Methyl Chloride	ND	0.001	0.001	ND	0.001
1,2-Dichloroethane	0.004	ND	ND	ND	ND
SVOCs (mg/kg)					
Phenanthrene	0.019	0.085	1.800	0.140	0.055
Benzo(a)anthracene	ND	0.049	1.6*	0.100	0.066
Chrysene	0.026	0.084	2.4*	0.190	0.120
Pyrene	0.037	0.120	3.400	0.240	0.130
Benzo(b)fluoranthene	0.027	0.072	2.4*	0.190	0.130
Benzo(k)fluoranthene	0.020	0.055	1.5*	0.160	0.084
Benzo(a)pyrene	0.019	0.059	1.7*	0.130	0.054
Dibenz(a,h)anthracene	ND	ND	0.73*	ND	0.031*
Indeno(1,2,3-cd)pyrene	ND	0.053	1.900	0.150	0.074
Metals (mg/kg)					
Aluminum	1,540	9,430	1,060	3,180	8,440
Arsenic	ND	2.6	ND	ND	2.5
Cadmium	ND	ND	2*	ND	ND
Chromium	3.1	10.1*	18.1*	4.5	12.6*
Copper	ND	ND	16.5	ND	17.1
Iron	2,490*	9,720*	4,740*	4,330*	16,100*
Lead	1.5	12.0	126.0	3.3	16.2
Manganese	23.4	76.1	54.8	64.4	181.0
Nickel	ND	ND	ND	ND	12.2
Zinc	ND	16.5	130*	11.3	45*
ELECTICAL TRANFORMER					
Eikon Activity #V1-3: Surface Soil Adjacent to Electrical Transformer					
Date Performed: August 7, 1989 - August 8, 1989					
ID Number	**SS-1**				
PCB					
PCB Aroclor 1254	2.2 mg/kg				

NT: Not Tested
ND: Not Detected
* : Above New York DEC Recommended Soil Cleanup Objectives
**: Above Groundwater Standards

TABLE 2.1
100 COMMERCIAL STREET
ON-SITE REMEDIAL WORK PLAN
SUMMARY OF PAST SAMPLING ACTIVITY

REAR YARD/SOLVENT-CONTAMINATED SOIL/UST AREA					
Eikon Activity #V1-1: Soil Borings Adjacent To 10,000 Gallon Underground Storage Tank					
Date Performed: August 7, 1989 - August 8, 1989					
ID Number	**SB-1**	**SB-2**		**SB-3**	**SB-4**
Depth	12'-14'	2'-3'	12'-14'	12'-14'	12'-14'
Base Neutrals (mg/kg)	6.5	ND	ND	ND	1.7
Petroleum Hydrocarbons (mg/kg)	27.1	NT	42.7 Odor Detected	33.4	ND
VOCs (mg/kg)	NT	724.4	NT	NT	NT
Tetrachloroethene (PCE) (mg/kg)	NT	2.7*	NT	NT	NT
Toluene (mg/kg)	NT	110*	NT	NT	NT
Ethylbenzene (mg/kg)	NT	47.0*	NT	NT	NT
Methyl Chloride (mg/kg)	NT	2.9*	NT	NT	NT .
Trichlorofluoromethane (mg/kg)	NT	8.7	NT	NT	NT
SVOCs					
Phenanthrene (mg/kg)	0.4	NT	ND	ND	0.110
Fluoranthene (mg/kg)	1.0	NT	0.012	0.014	0.470
Pyrene (mg/kg)	0.960	NT	0.011	0.011	0.420
Chrysene (mg/kg)	0.88*	NT	ND	ND	0.43*
Benzo(a)anthracene (mg/kg)	0.67*	NT	ND	ND	0.35*
Benzo(b)fluoranthene (mg/kg)	0.760	NT	ND	ND	0.330
Benzo(a)pyrene (mg/kg)	0.85*	NT	ND	ND	0.39*
Benzo(g,h,i)perylene	0.520	NT	ND	ND	0.082
Dibenzo(a,h)anthracene	0.140	NT	ND	ND	0.037
Indeno(1,2,3-cd)pyrene	0.440	NT	ND	ND	0.190
Eikon Activity #V1-4: Solvent Contaminated Soils Removed Adjacent To 10,000 Gallon UST					
Date Performed: May 7, 1990					
ID Number	**Soil Sample 1**		**Soil Sample 2**		**Soil Sample 3**
Depth (ft)	15'	24'	15'	24'	24'
PID Reading (ppm)	1	48	24	125	45
VOCs (mg/kg)					
Methylene Chloride (mg/kg)	0.003	NT	0.005	NT	0.003
Carbon Disulfide (mg/kg)	0.010	NT	<6.0	NT	<5.0
Ethylbenzene (mg/kg)	<6.0	NT	0.011	NT	<5.0
Toluene (mg/kg)	<6.0	NT	0.008	NT	<5.0
Acetone (mg/kg)	<12.0	NT	0.070	NT	<10.0
m,p-Xylene	<6.0	NT	0.068	NT	<5.0
o-Xylene	<6.0	NT	0.009	NT	<5.0
Eikon Activity #V2-1: Seventeen (17) Soil Borings for Soil Vapor Plume Delineation Adjacent to 10,000 Gallon UST					
Date Performed: September 7, 1990					
ID Number	**SB 7-2**	**SB 8-2**	**SB 12**	**SB 13**	**SB 16**
Depth (ft)	24'-26'	20'-22'	23'-25'	40'-42'	20'-22'
VOCs (mg/kg)					
TIC VOCs	0.021	ND	0.018	ND	ND
Total Identified VOCs	ND	0.490	ND	0.132	ND
Acetone (mg/kg)	<0.010	<0.058	<0.010	0.132	<0.011
Methyl Chloride (mg/kg)	0.002	0.014	0.002	0.002	0.004
TCE (mg/kg)	<0.005	0.011	<0.005	<0.005	<0.006
PCE (mg/kg)	<0.005	0.490	0.002	<0.005	0.002

NT: Not Tested
ND: Not Detected
* : Above New York DEC Recommended Soil Cleanup Objectives
**: Above Groundwater Standards

TABLE 2.1
100 COMMERCIAL STREET
ON-SITE REMEDIAL WORK PLAN
SUMMARY OF PAST SAMPLING ACTIVITY

Eikon Activity #V3-1: Soil Borings Rear Yard Study					
Date Performed: March 1, 1993 - March 2, 1993					
ID Number	**SB1-3**	**SB2-3**	**SB3-3**	**SB4-3**	
Depth (ft)	35'-37'	3'-5'	4'-6'	33'-35'	
VOCs (mg/kg)					
Acetone (mg/kg)	0.012	0.105	ND	ND	
Methyl Chloride (mg/kg)	0.002	ND	ND	ND	
Toluene (mg/kg)	ND	0.491	2.193*	0.007	
Ethylbenzene (mg/kg)	ND	ND	11.296*	ND	
m,p-Xylene (mg/kg)	ND	0.009	107.0	ND	
o-Xylene (mg/kg)	ND	ND	20.94	ND	
Eikon Activity #V3-5: Twenty-seven (27) Soil Borings for Stratigraphic Assessment					
Date Performed: October 18, 1994					
ID Number	**SB1-4**		**SB2-4**	**SB5-4**	
Depth (ft)	0'-4'	4'-8'	0'-3'	0'-2'	2'-4'
PID (ppm)	271	148	0	395	384
VOCs (mg/kg)	NT	NT	NT	NT	ND
GROUNDWATER INVESTIGATION					
Eikon Activity #V3-2: Groundwater Investigation West of Area of Excavation					
Date Performed: April 7, 1993					
ID Number	**MW-1**	**MW-2**	**MW-3**	**MW-4**	
Depth to Water	*DRY*	*DRY*	*Not Installed*	110 feet bgs	
VOCs					
TIC VOCs				8.0	
TPH (ug/L)				740.0	
PCE (ug/L)				4.1	
Trichloroethane (TCA) (ug/L)				2.0	
1,1,1 TCA (ug/L)				3.0	

NT: Not Tested
ND: Not Detected
* : Above New York DEC Recommended Soil Cleanup Objectives
**: Above Groundwater Standards

TABLE 2.2
100 COMMERCIAL STREET
DRYWELL/LEACHING POOL FIELD OBSERVATIONS

Pool Identification	Date of Observation	Cover Type	Depth to Sediment (feet)	Depth to Liquid (feet)
LP-1	25-Nov-97	OG[1]	NA[2]	NA
LP-2	25-Nov-97	OG	NA	NA
LP-3	25-Nov-97	OG	17.5	13.9
LP-4	25-Nov-97	OG	NA	NA
LP-5	25-Nov-97	OG	17.1	NP[3]
SD-1	25-Nov-97	SC[4]	17.5	NP
SD-2	25-Nov-97	SC	11.8	NP
SD-3	25-Nov-97	SC	16.8	NP
SD-4	25-Nov-97	SC	4.9	2.4
SD-5	25-Nov-97	SC	NA	NA

NOTES:

1 O.G. -Dry wells were equipped with open-grate covers.

2 NA - Not Accessable- table willbe updated as new measurements are acquired.

3 NP - No Liquid Present

4 S.C. - Leaching Pools were equipped with solid covers.

TABLE 2.3
100 COMMERCIAL STREET
GROUNDWATER ELEVATION MEASUREMENTS

Well ID	Date	Depth of Well[1]	Depth to Groundwater[2]	Reference Elevation[3]	Groundwater Elevation
MW-3	23-Aug-95	100.0	90.25	217.93	127.68
MW-4	23-Aug-95	115.1	104.60	229.34	124.74
MW-7	23-Aug-95	100.0	109.42	233.60	124.18

NOTES:

[1] Measured from grade.

[2] Measured from the top of protective casing.

[3] Reference - feet above mean sea level from Veeco data.

TABLE 5.1
PCB ANALYTE LIST WITH CRQLS
100 COMMERCIAL STREET
PLAINVIEW, NEW YORK

Compound	Contract-Required Quantiation Limits (ug/kg)
Acorlor-1016	33
Acorlor-1221	67
Acorlor-1232	33
Acorlor-1242	33
Acorlor-1248	33
Acorlor-1254	33
Acorlor-1260	33

TABLE 5.2
TCL VOC ANALYTE LIST WITH CRQLS
100 COMMERCIAL STREET
PLAINVIEW, NEW YORK

Compound	NYSDEC-Required Quantiation Limits (ug/l)
Chloromethane	5
Bromomethane	5
Vinyl Chloride	5
Chloroethane	5
Methylene Chloride	5
Acetone	5
Carbon Disulfide	5
1,1-Dichloroethene	5
1,1-Dichloroethane	5
1,2-Dichloroethene (total)	5
Chloroform	5
1,2-Dichloroethane	5
2-Butanone	5
1,1,1-Trichloroethane	5
Carbon Tetrachloride	5
Bromodichloromethane	5
1,2-Dichloropropane	5
cis-1,3-Dichloropropene	5
Trichloroethene	5
Dibromochloromethane	5
1,1,2-Trichloroethane	5
Benzene	5
trans-1,3-Dichloropropene	5
Bromoform	5
4-Methyl-2-Pentanone	5
2-Hexanone	5
Tetrachloroethene	5
Toluene	5
1,1,2,2-Tetrachloroethane	5
Chlorobenzene	5
Ethylbenzene	5
Styrene	5
Xylene (total)	5

TABLE 5.3
SAMPLE MEDIA CHART
100 COMMERCIAL STREET
PLAINVIEW, NEW YORK

Task Identification	Sampling Frequency	Rpting Level	Matrix	Analysis			QA Samples per Event			
				TCL VOCs	T01/T02 VOCs	PCBs	Trip Blank	Blind Dup.	Rinsate Blank	MS/MSD
1/4 Groundwater Sampling	Monthly	CLP	Groundwater	4			1	1	1	1
PCB Dileneation	Once	CLP	Soil			5		1	1	1
Soil Closure	Once	CLP	Soil	12			1	1	1	1
SVE Monitoring	Monthly	Rpt. Only	Air		2					

APPENDIX A
H2M STANDARD OPERATING PROCEDURES

H2M
Standard Operating Procedure 1
Soil Sample Field Screening

Soil samples are field screened for the presence of VOCs by placing a small aliquot of soil in a precleaned field-screening jar. The jar is sealed with a septa of aluminum foil and the sample vigorously agitated. After an equilibration period of approximately 5 minutes, the probe of an PID/FID is inserted through the septa to quantify the presence of VOCs in the headspace of the field-screening jar. All field screening results will be recorded in boring log forms or project notebook.

H2M
Standard Operating Procedure 2
Field Sampling Equipment

FIELD SAMPLING EQUIPMENT

H2M maintains a wide variety of field sampling and testing equipment. For projects with highly unique sampling programs, specialized sampling equipment is rented on an as needed basis.

Equipment Maintenance

The storage and maintenance of field sampling equipment is the responsibility of H2M's designated Equipment Manager, Christopher Flynn. Mr. Flynn is responsible for the following:

- Performing routine, preventive equipment maintenance;
- Minor equipment repair work;
- Equipment checkout prior to use;
- Instrument calibrations and documentation; and
- Maintaining instrument warranties.

Manually operated, mechanical-type field sampling equipment (e.g., hand augers, dredges, etc.) are checked for damaged and excessive wear, and they are fully operational. If necessary, minor repairs are performed in-house. For major repairs and overhauls, the equipment is returned to the manufacturer.

Prior to implementing a field investigation program, the Field Team Supervisor should coordinate with the Equipment Manager, identifying equipment requirements for the program. The Equipment Manager then checks the status of each required piece of equipment to ensure that it is fully operational.

Equipment Calibration

Certain equipment utilized in field investigation programs require routine calibration to ensure proper operation and accuracy. These instruments include:

- Flame Ionization Detectors,
- Photoionization Detectors,
- Multigas Meters,
- pH/Conductivity Probes,
- Turbidity Meters, and
- Air Flow Meters.

Each of the above instruments undergoes a calibration prior to each day's use. If necessary, the instrument is recalibrated in accordance with the manufacturer's instructions. In some instances the instruments may require periodic recalibration in the field. Equipment calibration records, indicating the date of calibration, person performing the calibration and the instrument's serial number are used to document each calibration. In addition to in-house calibrations, each air monitoring instrument is returned to the manufacturer for factory calibration.

Equipment Decontamination

All field equipment used to collect samples, with the exception of dedicated equipment, must be decontaminated prior to reuse to minimize potential cross-contamination between samples. Dedicated equipment not requiring decontamination typically include such items as disposable bailers and bailer cord.

All non-dedicated equipment is decontaminated using the following procedures:

1. Non-phosphate detergent wash.
2. Tap water rinse.
3. Deionized water rinse.
4. 10% nitric acid rinse (only if sample is to be analyzed for metals).
5. Methanol rinse.
6. Deionized water rinse.
7. Air dry.

Large drilling equipment, such as drill rods and augers, are decontaminated by manual scrubbing to remove foreign material, followed by steam cleaning.

APPENDIX B
H2M RESUMES

GARY J. MILLER, P.E.

Vice President, Director of Environmental Engineering

PROFESSIONAL EXPERIENCE

Holzmacher, McLendon & Murrell, P.C. (1980 - Present)

EDUCATION

B.S., Engineering Technology and Civil-Environmental, Virginia Polytechnic Institute and State University

A.S., Mechanical Technology, CUNY-Queensborough Community College

REGISTRATION/ CERTIFICATIONS

Licensed Professional Engineer-New York

Hazardous Materials Manager - Master Level

Health and Safety Operations at Hazardous Waste Sites (OSHA)

Asbestos Abatement Inspector and Management Planner

MEMBERSHIPS

Air and Waste Management Association

Hazardous Waste Action Coalition

Institute of Hazardous Materials Management

Water Pollution Control Federation

PROFESSIONAL PAPERS

Miller, Gary J. **Closure of Industrial Facilities Containing Hazardous Wastes.** New York Water Pollution Control Association, Winter Meeting, January 1989.

Miller, Gary J. **Design of Hazardous Materials Storage Facilities.** Spill Control and Hazardous Materials Conference, New Haven, Connecticut, September 1983.

Mr. Miller has over 15 years experience in the field of environmental engineering covering a broad range of projects including solid and hazardous waste management, water and wastewater treatment, air pollution control, hazardous material storage, groundwater investigations and site remediation. As head of H2M's Environmental Engineering Division, Mr. Miller oversees and provides technical direction on major environmental projects.

His experience at H2M includes all aspects of project engineering and management including engineering studies, economic analyses, treatability studies, design, construction and startup. He has been responsible for projects ranging from landfill leachate collection and methane venting systems for municipal clients to wastewater treatment, air pollution control and hazardous waste management for private industrial clients. He also has extensive experience inspecting and auditing industry for environmental compliance. He has worked closely with a spectrum of industries including petrochemical, pharmaceutical, food processing, printing, metal finishing and plating, printing circuit board and electronics, semiconductor, communications and commercial waste treatment. He is a specialist in assisting industrial clients with RCRA and other regulatory compliance programs including the storage and handling of hazardous materials, hazardous material response, and health and safety issues.

Mr. Miller has directed numerous site investigations utilizing a variety of techniques including soil gas surveys, geophysical surveys, soil borings, monitoring wells and groundwater modeling to assess environmental impacts and implement effective remediation programs. Site investigation projects have ranged from Phase I and II environmental assessments as part of property transactions to remedial investigations/feasibility studies at state and federal Superfund sites. Selected experience includes:

- Study of wastewater collection, treatment, disposal facilities for the NYC Transit Authority. Inspections and sampling of fueling, washing, maintenance, repair and painting facilities at 20 bus depots of varying sizes and age located in NYC's five boroughs.
- Preparation of design plans and specifications for bulk chemical storage facilities at Pall Corporation's East Hills manufacturing facility. Design elements included indoor and outdoor bulk storage tanks, containerized and gas cylinder storage, spill containment and inventory control systems, chemical distribution.
- Preparation of RCRA permit application, including personnel training program, waste analysis plan, contingency plan and closure plan for a waste solvent reclamation facility. The application was approved and a permit issued by the USEPA.
- Hazardous waste lagoon closure at a northern New Jersey manufacturing facility. The project involved developing a NJDEP approved closure plan, technical specifications and bid documents, and directing the closure of five lagoons containing over 250,000 gallons of hazardous wastes.

RICHARD J. BALDWIN, C.P.G.

Senior Geologist, Groundwater/Hydrogeology

PROFESSIONAL EXPERIENCE

Holzmacher, McLendon & Murrell, P.C. (1993 - Present)
Montgomery Watson (1990-1995)
Western Geo. Survey(1989-1990)
Weiss Associates (1988-1989)
US Geological Survey (1985-88)

EDUCATION

Course work towards M.S., Geology, San Francisco State University
B.A., Geology, San Francisco State University

SPECIALIZED COURSES

Environmental Law & Regulations, U.C. Berkeley Extension
Princeton Groundwater Hydrogeology and Pollution

CERTIFICATIONS

Certified Professional Geologist

Health and Safety Operations at Hazardous Waste Sites (OSHA)

Radiation Safety Training

MEMBERSHIPS

American Institute of Professional Geologists

Geological Society of America

Long Island Geologists

National Ground Water Assoc.

Society of American Military Engineers

PROFESSIONAL PAPERS

Baldwin, Richard J. **Ground Water Sampling Gets a Direct Push**. International Ground Water Tech. Vol. 3, No.2, April/May '97.

Baldwin, Richard J. **Groundwater Sampling with Direct Push Technology**. New York Water Environment Assc., Inc. 69th Annual Conference, 1997

Baldwin, Richard J. and D.E. Wilhelms. **The Role of Sills in Shaping the Martian Uplands**. Proceedings of the 19th Lunar and Planetary Science Conf., 1989.

Baldwin, Richard J. and D.W. Anderson. **Provenance of the Eocene Wasatch Formation,** Green River Basin, SW Wyoming. American Assoc. of Petroleum Geologists Nat'l Meeting, Abstract & Presentation, 1987

Mr. Baldwin is a Certified Professional Geologist with over ten years of experience in the fields of hydrogeology, geology, ground and surface water quality analysis, groundwater flow and contaminant modeling, and environmental assessment. As a senior hydrogeologist, he serves as project manager on numerous projects involving multi-media investigations, including a Remedial Investigation/Feasibility Study (RI/FS), preparation of remedial action plans, and hazardous waste remediation services. Current activities include:

- Supervising subsurface environmental investigations at industrial, public, and private facilities on Long Island and in the New York Metropolitan area. Work includes performing initial site assessments, conducting investigations, selecting remedial alternatives, and performing remedial activities.
- Supervising aquifer analyses, including tidal influence studies, step-draw down tests, aquifer pumping tests, and slug tests. Performs soil and groundwater investigation programs utilizing the Geoprobe, hollow stem auger, and air and mud rotary drilling methods. Supervising remedial activities and interim remedial actions (IRMs), including underground storage tank and petroleum hydrocarbon-contaminated soil excavation and removal, septic system clean out and abandonment, storm drain remediation, asbestos containing material abatement, and water well abandonment.
- Supervising and participating in H2M multi-disciplinary teams of hydrogeologists, environmental engineers and planners, risk assessors, CAD operators, and support staff. Uses PC-based groundwater modeling programs (MODCAD, MODFLOW, Random Walk, etc.) to evaluate aquifer properties and contaminant transport. Supervising quarterly groundwater sampling, data tabulation, statistical analysis, and reporting for a Long Island landfill under the New York State Department of Environmental Conservation Part 360 regulations.

Prior to H2M, Mr. Baldwin was a project geologist/field team leader responsible for conducting multi-site RI/FS, preliminary assessment/site investigations, and IRMs activities at several large military bases and one industrial federal Superfund site. He supervised field activities and participated in and supervised data reduction and evaluation, groundwater basin modeling, risk assessment preparation, and report generation. Field activities included drilling and installing shallow and deep groundwater monitoring and extraction wells (over 450 feet), soil sampling, conducting aquifer pumping and slug tests, characterization of explosive ordnance, and obtaining and interpreting down-hole geophysical data. Mr. Baldwin also participated in a remote investigation of the Martian landscape and a geophysical study of Jupiter's satellite, Io. ■

- Phase II site investigation at a Suffolk County, New York metal plating facility, conducted under an order-on-consent with the NYSDEC. Investigation included an evaluation of suspected source areas, a groundwater monitoring program and preparation of the site's HRS score.
- Preparation of engineering reports, design plans and specifications for upgrade of a 60,000 gpd industrial wastewater treatment system at a Long Island metal finishing facility.
- RCRA closure of a large manufacturing facility in Poughkeepsie, New York. The closure work included a series of soil borings and monitoring wells to examine soil and groundwater quality of the site. H2M also evaluated alternative methods for dealing with petroleum contaminated soils. Alternatives included off-site disposal, off-site treatment and in-situ bioremediation.
- Remedial investigation at an automobile parts manufacturing facility in Queens County, New York. The project involved development of work plans, including HASP, field sampling and quality assurance/quality control, and the installation of soil boring and monitoring wells to assess the nature and extent of site contamination.
- Remedial design studies at a major NPL Superfund site in Massachusetts. As part of a multi-consultant remedial design team, H2M developed and implemented a field testing program to measure gaseous emissions from a specific source area. H2M also developed and implemented a groundwater treatability study assessing oxidation and air stripping as the primary unit treatment operations and biological treatment and ion-exchange as polishing operations.
- Preparation of design plans, technical specifications and bid documents for a soil vapor extraction system designed as the final phase of an ongoing remediation program at the site of a former manufacturing facility.
- Feasibility study at a State Superfund Site in Hicksville, New York. The feasibility study evaluated various alternatives, including soil vapor extraction, air sparging and bioremediation for the in-situ treatment of soil impacted by chlorinated solvents.

Prior to joining H2M, Mr. Miller was an operations manager involved in the mechanical and electrical checkout and startup of multiple hearth furnaces, waste heat boilers, wet scrubbers and sludge handling equipment. He was also responsible for operations training, performance, emissions and acceptance tests and served as construction superintendent responsible for coordination and supervision of all subcontractors and vendors in the construction of Nichols Herreshoff multiple hearth carbon regeneration, lime recalcining and sludge incinerators. ■

KENNETH J. COTTRELL, C.P.G.

Senior Hydrogeologist

PROFESSIONAL EXPERIENCE

H2M Associates, Inc. (1988 - Present)

EDUCATION

M.S., Earth Science, Hydrogeology, Adelphi University

B.S., Earth Science, Adelphi University

SPECIALIZED COURSES

ECRA Compliance

Ecological Risk Assessment

Focus Conference on Eastern Groundwater Issues

Health Risk Characterization and Soil Cleanup Criteria

NJPDES Compliance

New Jersey Technical Requirements for Site Remediation

CERTIFICATIONS

Certified Professional Geologist

Licensed Professional Geologist-Alaska

Certified Health and Safety Operations at Hazardous Waste Sites (OSHA)

NJDEP Licensed Subsurface Evaluation

OFFICES

Adjunct Faculty, Adelphi University, Earth Science Department

LECTURER

New York University - "Geology, Hydrogeology, Practical Environmental Science "

MEMBERSHIPS

American Institute of Professional Geologists

Connecticut Groundwater Association

Geological Society of America

National Groundwater Association- Association of Groundwater Scientists & Engineers

Mr. Cottrell serves as a Project Manager for multi-disciplinary projects, including preliminary site assessments, Phase II site assessments, and Remedial Investigation/Feasibility Studies (RI/FS). His responsibilities as a project manager include project scoping, development of work plans, including data quality objectives, health and safety plans, and quality assurance plans; regulatory liaison and compliance; field work implementation, data evaluation and reporting; development of site-specific cleanup standards; and development of remedial cost estimates for design, construction, and operation for various remedial alternatives.

In the course of performing these investigations, Mr. Cottrell also serves as a senior hydrogeologist and geophysicist, and provides the basis for the design of soil and groundwater remediation systems. In addition, Mr. Cottrell conceptually designs the necessary unit operations for groundwater extraction, treatment, and discharge, based on his analysis of remedial alternatives. This remedial alternatives analysis, or feasibility study, typically includes an evaluation of remedial alternatives from the standpoint of Implementability, effectiveness, protection of human health and the environment, and cost. Projects he has recently managed include:

- Final RCRA Closure Certification of a 9-acre industrial facility, including regulatory liaison, reporting, soil sampling at over 50 locations, shallow and deep aquifer monitoring well installation and groundwater sampling, aquifer testing, soil excavation and disposal, and final disposition of 11 solid waste management units and seven RCRA closure units.

- RI/FS at a 24-acre industrial facility, including Interim Remedial Measures (IRMs) consisting of source area remediation, and alternate water supply for nearby residences. The remedial investigation included review of historical usage of adjacent properties, geologic mapping and fracture evaluation, soil gas survey using field gas chromatography, electromagnetic (EM) geophysical survey, soil sampling and analysis, test pitting, monitoring well installation and rock coring, aquifer testing, and groundwater sampling. The RI/FS has also included negotiation of an Administrative Consent Order, which required the development of an extensive work plan and project schedule. Further, the RI/FS included development of a Citizen Participation Plan, evaluation of historical aerial photography, development of detailed monthly progress reports, performance of citizen participation activities to inform the public of site activities, and calculation of site-specific soil cleanup standards based on protection of groundwater quality.

- Geophysical surveys, including seismic, magnetometer, ground penetrating radar and EM, including EM survey for the City of New York Department of Environmental Protection to investigate an abandoned, inactive landfill within a watershed protection area in western New York.

PUBLICATIONS

Cottrell, Kenneth J. ***Consistency in Sampling and Analysis Techniques.*** *Water and Wastes Digest, Vol. 30, No.4, July/August 1990.*

Cottrell, Kenneth J. ***Geology and Geologic Investigation Techniques.*** *Presented at New York University School of Continuing Education, Spring 1993.*

The survey included collection of over 9800 measurements of terrain, conductivity and in-phase date over five acres, mapping of leachate beneath the landfill and assessing the potential for buried drums to be present in fill areas. Other geophysical surveys have included a combination of an EM and ground penetrating radar survey to map a clay confining unit beneath a site, in order to determine clay layer topography between monitoring well locations, and to assess the presence and potential for DNAPL, or dense free-phase solvent, migration from confirmed source areas.

- Underground storage tank (UST) closure and site remediation at a municipal property, including removal of six USTs, soil sampling and analysis, monitoring well installation, groundwater sampling and analysis, aquifer testing, and conceptual remedial design for soils and groundwater impacted by leaking fuel oil, gasoline, and diesel USTs. The conceptual design addressed the presence of both dissolved contamination in the groundwater and free-phase floating product on top of the water table, as well as soils impacted by lead, volatile organic, and semi-volatile organic compounds.
- Groundwater modeling, including development of work plans to collect necessary model input data, model selection and calibration, and evaluation of model results. Among the sites modeled have been a 200-acre landfill on the National Priorities List. The U.S. Geological Survey computer model MODFLOW was used to simulate groundwater flow beneath five fill areas and the effects of two rivers bordering the landfill. Other models have included simulation of contaminant capture zones from groundwater extraction wells, and the effects of existing sanitary disposal fields and proposed groundwater recharge areas to the groundwater recovery system.
- Performance of over 100 comprehensive environmental site assessments throughout the United States, more than 30 of which were for Fortune 500 defense contractors involved in the manufacture of electronic, satellite, and weapons systems. The multi-disciplinary investigations involved hydrogeologic evaluations in complex geologic environments, regulatory database review, geophysical investigations including EM, magnetometer, ground penetrating radar, and seismic surveys, soil gas surveys, soil sampling, monitoring well installation and groundwater sampling, LNAPL and DNAPL investigations, remedial design, and regulatory agency liaison.
- RI/FS at an electroplating facility conducted in accordance with the New Jersey Industrial Site Recovery Act and the New Jersey Technical Requirements for Site Remediation. The investigation was performed to evaluate the effects of former metal hydroxide settling lagoons, buried drums, underground storage tanks, and former waste management practices at the property and an adjacent wetland. Delineation of site contamination was performed in all media, as well as performance of a risk assessment to develop site-specific human health-based cleanup standards using current EPA databases for site contaminants. ■

APPENDIX C
HEALTH AND SAFETY PLAN

ON-SITE REMEDIAL
HEALTH AND SAFETY PLAN
100 COMMERCIAL STREET
PLAINVIEW, NEW YORK

PREPARED IN CONJUNCTION WITH
NYSDEC VOLUNTARY CLEANUP PROGRAM
AGREEMENT NO. D1-0001-97-04
BETWEEN DAVID DOYAGA, ESQ., AS TRUSTEE IN BANKRUPTCY FOR
COMM 100 ASSOCIATES AND NYSDEC

PROJECT NO. COMM 97-01

MARCH 1998

ON-SITE REMEDIAL WORK PLAN
HEALTH AND SAFETY PLAN
100 COMMERCIAL STREET

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APPENDICES

ON-SITE REMEDIAL WORK PLAN
HEALTH AND SAFETY PLAN
100 COMMERCIAL STREET

MARCH 1998

1.0 PURPOSE

The purpose of this Health and Safety Plan (HASP) is to establish a protocol for protecting H2M, its agents, and other personnel involved in remedial construction, O&M, and groundwater sampling activities from situations which may arise while performing field activities associated with the 100 Commercial Street site located in Plainview, New York. This plan has been prepared in accordance with the United States Environmental Protection Agency (US EPA) document, "Emergency and Remedial Response Division's Standard Operating Safety Guides", November 1984. This plan establishes personnel protection standards, mandatory operations procedures, and provides contingencies for situations that may arise while field work is being conducted at the site. All H2M field personnel will be required to abide by these procedures. H2M's subcontractor personnel will be provided with a copy of this plan for their consideration.

Personnel performing the environmental field work involving chemical substances may encounter conditions that are unsafe or potentially unsafe. In addition to the potential risks associated with the physical, chemical, biological and toxicological properties of the material(s) which may be encountered, other types of hazards (i.e., electricity, water, temperature, heavy equipment, falling objects, loss of balance, tripping, etc.) can have an adverse effect on the health and safety of personnel. It is important that personnel protective equipment (PPE) and safety requirements be appropriate to protect against potential and/or known hazards. PPE will be selected based on the type(s), concentration(s), and routes of personnel exposure from hazardous substances at a site. In situations where the type of materials and possibilities of contact are unknown or the potential hazards are not clearly identifiable, a more subjective (but conservative) determination will be made of the PPE required for initial safety.

2.0 SITE CONDITIONS

The 100 Commercial Street property is located in Plainview, New York. Studies by Eikon Planning and Development Corporation (Eikon) indicated the presence of a leaching pool located in the northwest corner of the property whose bottom sediments have been impacted by tetrachloroethene (PCE). The bottom sediments from the leaching pool contained 500 milligrams per kilogram (mg/kg) PCE after a remedial action had been conducted by Eikon.

Based upon H2M investigations, the on-site groundwater has been impacted with halogenated volatile organic compounds (VOCs) on the order of 300 to 400 micrograms per liter (ug/l) total VOCs. The data also indicate that the concentrations of VOCs attenuate rapidly in groundwater downgradient to the site.

The property owner has selected to install and operate an air sparge/soil vapor extraction (AS/SVE) system to address the on-site contamination issues.

2.1 Proposed Field Activities

The field activities which will be conducted under this HASP include:

- Drilling and installing the AS/SVE well network.
- Trenching and installing subsurface piping from the well heads to the treatment plant.
- Installing treatment plant.
- Weekly O&M activities.
- Quarterly sampling of three groundwater monitoring wells.

3.0 PERSONNEL SAFETY

Personnel involved in field operations must often make complex decisions regarding safety. To make these decisions correctly requires more than elementary knowledge. For example, selecting the most effective PPE requires not only expertise in the technical areas of respirators, protective clothing, air monitoring, physical stress, etc., but also experience and professional judgment. Only competent, qualified personnel having the technical judgment to evaluate a particular situation and determine the appropriate safety requirements will perform field investigations at the site. These individuals, through a combination of professional education, on-the-job experience, specialized training, and continual study, have the expertise to make sound decisions.

3.1 Education and Training

All personnel involved in field work will be trained to carry out their designated field operations. Training will be provided in the use of all equipment, including respiratory protection apparatus and protective clothing; safety practices and procedures; general safety requirements; first aid; and hazard recognition and evaluation. Each individual involved with the field work must provide documentation of training and medical surveillance, as per 29 CFR 1910.120. In addition, each individual must sign an appendix to the Health and Safety Plan, indicating they have read and understood its contents (as included in Appendix A-1).

3.2 Health and Safety Manager

The Health and Safety Manager shall be responsible for overall implementation and coordination of the Health and Safety Program for field personnel at the site. Responsibilities include providing adequate manpower, materials, equipment, and time needed to safely accomplish the tasks under the site investigation. The Health and Safety Manager is also responsible for taking appropriate corrective actions when unsafe acts or practices arise. The Health and Safety Manager for the project is Richard J. Baldwin, C.P.G. of H2M.

3.3 Site Health and Safety Officer

A designated individual(s) will perform the function of the project Site Health and Safety Officer. Michael P. Engelmann will serve as the Site Health and Safety Officer during the site work. At all times the Site Health and Safety Officer will report directly to the Health and Safety Manager. As a minimum, the Site Health and Safety Officer will be responsible for the following:

1. Conducting an initial site safety meeting for field personnel.

2. Assuring that all personnel protective equipment is available and properly utilized by all field personnel at the site.

3. Assuring that all personnel are familiar with standard operating safety procedures and additional instructions contained in the Health and Safety Plan.

4. Assuring that all personnel are aware of the hazards associated with the field operations.

5. Inspecting the work site for hazards before field operations.

6. Determining personal protection levels including clothing and equipment for personnel and periodic inspection of protective clothing and equipment.

7. Monitoring of site conditions prior to initiation of field activities, and at various intervals during on-going operations as deemed necessary for any changes in site hazard conditions. (Monitoring parameters include, but are not limited to, volatile organic contaminant (VOC) levels in the atmosphere and weather conditions).

8. Executing decontamination procedures.

9. Monitoring the work parties for signs of stress such as cold exposure, heat stress, or fatigue.

10. Prepare reports pertaining to incidents resulting in physical injuries or exposure to hazardous materials.

Mr. Engelmann may designate another qualified H2M employee as Site Health and Safety Officer. All designees will be familiar with all aspects of the HASP and their responsibilities. At all times the Site Health and Safety Officer shall report directly to the Health and Safety Manager.

4.0 LEVELS OF PROTECTION

Anyone entering the investigation site must be protected against potential hazards. The purpose of the personal protection clothing and equipment is to minimize exposure to hazards while working on site. Careful selection and use of adequate PPE should protect the respiratory system, skin, eyes, face, hands, feet, head, body and hearing of all personnel.

The appropriate level of protection is determined prior to the initial entry on site based on available information and preliminary monitoring of the site. Subsequent information may warrant changes in the original level selected. Appropriate equipment to protect personnel against exposure to known or anticipated chemical hazards has been divided into four categories according to the degree of protection afforded.

4.1 Level A Protection

The highest degree of protection is used in a Level A situation. It should be worn when the highest available level of respiratory, skin and eye protection is needed. This level of protection is placed in effect when there is no historic information about the site and it is assumed that the worst possible conditions exist. Situations requiring Level A PPE are not anticipated during the field work.

4.1.1 Personal Protective Equipment

a. Pressure demand, self-contained breathing apparatus, approved by the Occupational Safety and Health Administration (OSHA) and National Institute of Occupational Safety and Health (NIOSH).

b. Fully encapsulating chemical-resistant suit.

c. Coveralls.*

d. Long cotton underwear.*

e. Gloves (outer), chemical-resistant.

f. Gloves (inner), chemical-resistant.

g. Boots, chemical-resistant, steel toe and shank. (Depending on suit construction, worn over or under suit boot.)

h. Hard hat* (under suit).

i. Disposable protective suit, gloves and boots* (worn over fully-encapsulating suit).

j. Two-way radio communications (intrinsically safe).

*Optional

4.1.2 Criteria for Selection

Meeting any of the criteria listed below warrants use of Level A protection:

a. The chemical substance(s) has been identified and requires the highest level of protection for skin, eyes and the respiratory system based on:

   (1) Measured (or potential for) high concentrations-of atmospheric vapors, gases, or particulates; or

   (2) Site operations and work functions involving high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates.

b. Extremely hazardous substances are known or suspected to be present and skin contact is possible.

c. The potential exists for contact with substances that destroy skin.

d. Operations must be conducted in confined, poorly ventilated areas until the absence of hazards requiring Level A protection is demonstrated.

e. An oxygen deficient atmosphere where the oxygen level is less than 20.9 percent (%) by volume as measured with an oxygen meter. This condition, existing alone, could result in a down grade to EPA Level B PPE.

f. Total atmospheric readings on photoionization detector indicate readings above 500 parts per million (ppm) of calibration gas equivalents (cge) of unidentified substances.

4.1.3 Limiting Criteria

a. Fully encapsulating suit material must be compatible with the substances involved.

4.1.4 Minimum Decontamination Procedure

Station 1: Segregated equipment drop.

Station 2: Outer garment, boots and gloves wash and rinse.

Station 3: Outer boot and glove removal.

Station 4: Tank change.

Station 5: Boots, gloves and outer garment removal.

Station 6: SCBA removal.

Station 7: Field wash.

4.2 Level B Protection

Level B protection will be used by all personnel entering confined spaces and/or if the conditions outlined in Section 4.2.2 are encountered. Situations requiring Level B PPE are not anticipated during the field work.

4.2.1 Personal Protective Equipment

a. Pressure-demand, self-contained breathing apparatus or cascade supplied air system (OSHA/NIOSH approved).

b. Chemical-resistant clothing (coveralls and long-sleeved jacket; coveralls, hooded, one or two-piece chemical-splash suit; disposable chemical-resistant coveralls).

c. Coveralls.*

d. Gloves (outer), chemical-resistant.

e. Gloves (inner), chemical-resistant.

f. Boots, chemical-resistant, steel toe and shank.

g. Boots (outer), chemical resistant (disposable*).

h. Hard hat (face shield*).

i. Two-way radio communications (intrinsically safe).

*Optional

4.2.2 Criteria for Selection

Meeting any one of these criteria warrants use of Level B protection:

a. The type(s) and atmospheric concentration(s) of toxic substances have been identified and require the highest level of respiratory protection, but a lower level of skin and eye protection than is required with Level A. These would be atmospheres:

   (1) With concentrations immediately dangerous-to life and health (IDLH); or

   (2) Exceeding limits of protection afforded by a full-face, air-purifying mask; or

   (3) Containing substances for which air-purifying canisters do not exist or have low removal efficiency; or

   (4) Containing substances requiring air-supplied equipment, but substances and/or concentrations do not represent a serious skin hazard.

b. The atmosphere contains less than 20.9 percent oxygen.

c. Site operations make it highly unlikely that the small, unprotected area of the head or neck will be contacted by splashes of extremely hazardous substances.

d. Total atmospheric concentrations in the breathing zone of unidentified vapors or gases range from 50 ppm to 500 ppm (calibration gas equivalence units) on monitoring instruments, and vapors are not suspected of containing high levels of chemicals toxic to skin.

4.2.3 Limiting Criteria

a. Use only when the vapor or gases present are not suspected of containing high concentrations of chemicals that are harmful to skin or capable of being absorbed through skin contact.

b. Use only when it is highly unlikely that the work being done will generate high concentrations of vapors, gases, or particulates or splashes of material that will affect exposed skin.

4.2.4 Minimum Decontamination Procedures

Station 1: Equipment drop.

Station 2: Outer garment, boots and gloves wash and rinse.

Station 3: Outer boot and glove removal.

Station 4: Tank change.

Station 5: Boot, gloves and outer glove removal.

Station 6: SCBA removal.

Station 7: Field wash.

4.3 Level C Protection

Level C protection will be used by all personnel if the conditions outlined in Section 4.3.2 are encountered.

4.3.1 Personal Protective Equipment

a. Full-face, air purifying, canister-equipped respirator (MSHA and NIOSH approved).

b. Chemical-resistant clothing (coveralls; hooded, two-piece chemical splash suits; chemical-resistant hood and apron; disposable chemical-resistant coveralls).

c. Coveralls.*

d. Gloves (outer), chemical-resistant.

e. Gloves (inner), chemical-resistant.

f. Boots, chemical-resistant, steel toe and shank.

g. Boots (outer), chemical-resistant (disposable*).

h. Hard hat (face shield*).

i. Escape mask.*

j. Two-way radio communications (intrinsically safe).

*Optional

4.3.2 Criteria for Selection

Meeting all of these criteria permits use of Level C Protection:

a. Measured air concentrations of identified substances will be reduced by the respirator to, at or below the substance's exposure limit, and the concentration is within the service limit of the canister.

b. Atmospheric contaminant concentrations do not exceed IDLH levels.

c. Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect the small area of skin left unprotected by chemical-resistant clothing.

d. Job functions have been determined not to require self-contained breathing apparatus.

e. Total vapor readings register between 5 ppm cge and 50 ppm cge above background on instruments.

f. Air will be monitored periodically.

g. Cartridges are available and are approved by NIOSH and MSHA for the specific chemical(s) encountered.

4.3.3 Limiting Criteria

a. Atmospheric concentration of chemicals must not exceed IDLH levels.

b. The atmosphere must contain at least 20.9 percent oxygen.

c. Must have sufficient information available regarding specific compounds, and their concentrations, likely to be encountered.

4.3.4 Minimum Decontamination Procedures

Station 1: Equipment drop.

Station 2: Outer boot and glove removal.

Station 3: Canister or mask change.

Station 4: Boots, gloves and outer garment removal.

Station 5: Face piece removal.

Station 6: Field wash.

4.4 Level D Protection

Level D protection has been selected for personnel for this project. Should conditions change, re-evaluation of personnel protection will be conducted.

4.4.1 Personal Protective Equipment

a. Coveralls.

b. Gloves.*

c. Boots/shoes, leather or chemical-resistant, steel toe and shank.

d. Boots (outer), chemical/resistant (disposable).*

e. Safety glasses or chemical splash goggles.*

f. Hard hat (face shield*).

g. Escape mask.*

*Optional

4.4.2 Criteria for Selection

Meeting any of these criteria allows use of Level D protection:

a. No hazardous air pollutants have been measured.

b. Work functions preclude splashes, immersion, or potential for unexpected inhalation of any chemicals.

c. Extensive information on suspected hazards/risks are known.

4.4.3 Limiting Criteria

a. The atmosphere must contain at least 20.9 percent oxygen.

4.4.4 Minimum Decontamination Procedure

Station 1: Equipment drop.

Station 2: Hand and face wash.

4.5 Duration of Work Period

The anticipated duration of the work period will be established prior to daily activities. The work will only be performed during daylight hours. Other factors that may limit the length of time personnel can work include:

a. Air supply consumption (SCBA-assisted work);

b. Suit/ensemble, air purifying chemical cartridge, permeation and penetration by chemical contaminants; and

c. Ambient temperature and weather conditions.

d. Contractual requirements.

4.5.1 Air Supply Consumption

The duration of the air supply must be considered before any SCBA-assisted work activity (Levels A and B) commences. Although the anticipated operating time of an SCBA is clearly indicated on the breathing apparatus the following variables should be considered and work actions and operating time adjusted accordingly:

Work Rate: The actual in-use duration of SCBA's may be reduced by one-third to one-half during strenuous work, e.g. drum handling, major lifting or any task requiring repetitive speed of motion.

Fitness: Well conditioned individuals generally utilize oxygen more efficiently and can extract more oxygen from a given volume of air than unfit individuals, thereby slightly increasing the SCBA operating time.

Body Size: Larger individuals generally consume air at a higher rate than smaller individuals, thereby decreasing the SCBA operating time.

Breathing Patterns: Quick, shallow or irregular breaths consume air more rapidly than deep, regular spaced breaths. Heat induced anxiety and lack of acclimatization may induce hyperventilation, resulting in decreased SCBA operating times.

4.5.2 Suit/Ensemble, Air Purifying Chemical Cartridge, Permeation and Penetration

The possibility of chemical permeation or penetration of chemical protective clothing (CPC) ensembles and air purifying respirator (APR) chemical cartridges during the work mission is always a matter of concern and may limit mission duration. It should be remembered that no single clothing material is an effective barrier to all chemicals or all combinations of chemicals, and no material is an effective barrier to prolonged chemical exposure. Manufacturer recommendations should be followed.

In addition, when performing work in Level C respiratory protection, care should be taken to inspect the respirators prior to usage. The chemical cartridges should be changed, at a minimum, on a daily basis, or when the cartridge becomes dirty, damaged or when breakthrough is suspected.

4.5.3 Ambient Temperature

The ambient temperature has a major influence on work period duration as it effects both the worker and the protective integrity of ensembles (see Section 11.4.1) as well as the operation of the monitoring equipment. When ambient temperatures rise or fall to a level which may hinder personnel performance or becomes a threat to personal safety, consideration should be given to stop work and recommence work when temperatures or conditions are less severe.

5.0 AMBIENT AIR MONITORING

Based on site-specific air monitoring data, elevated levels of VOCs in the atmosphere are not anticipated during site activities. The presence of VOCs will be evaluated using a photoionization detector (PID). Air monitoring for VOCs will be monitored at the downward perimeter of the work area on a continuous basis. If total VOC vapor levels exceed 5 parts per million above background, work will be halted and the actions contained in the Vapor Emission Response Plan followed (see Appendix A-2). Particulates will be monitored upwind, downwind and within the work area. If downwind concentrations exceed 150 micrograms per cubic meter that of the upwind concentrations, dust suppression methods will be employed. All PID and particulate readings will be recorded and available for Department personnel.

6.0 DETERMINATION OF THE SITE-SPECIAL LEVEL OF HAZARD

Categories of personnel protection required depend on the degree of hazard and probability of exposure by a route of entry into the body. For this site, the most probable potential route of entry is via inhalation of gases and dermal adsorbtion of contaminants released from field activities.

Based upon the known site history and disposal practices, the appropriate level of protection for the field operations at the site is Level D. The determination of Level D protection is based on the fact that field work will be performed in open, well-ventilated areas and that the potential for accidents and injuries due to obstructions caused by and/or magnified by the use of level A, B, or C protection (i.e., slip/trip hazards) is greater than the potential for problems associated with exposure from contaminants using level D protection. Level C protection will be used if ambient air monitoring results warrant a protective equipment upgrade (above Level D conditions). The Site Health and Safety Officer will be responsible for requesting an upgrade in the level of personnel protection. The final decision will be made by the Health and Safety Manager in conjunction with the Project Manager.

A PID will be used to monitor air quality throughout the course of field work. If necessary (based upon field equipment readings), the work zone will be evacuated and consideration will be given to upgrading the level of protection. An upgrade to the appropriate level of protection for field personnel will be required before re-entering the work zone if hazardous conditions persist.

In addition to potential chemical hazards, there also exists potentially greater physical hazards associated with the activities at the facility. Due to the nature of the OSGI, heavy equipment including drill rigs and trucks will be on site throughout the project. Therefore, all personnel should always be aware of vehicular traffic while working. All work must be performed in strict accordance with OSHA regulations. Hard hats must be worn at all times around heavy equipment and/or in the vicinity of suspended loads.

7.0 DESIGNATED WORK ZONES

Work zones will be determined prior to commencement of a specific field activity. An area large enough to encompass the activity will be delineated as the work/exclusion zone. Only qualified field personnel with the proper PPE involved in the field activity will be allowed into the designated zone. Within the work/exclusion zone and, ambient air quality will be monitored following the procedures detailed in Section 5.0 to determine any changes from background air quality. Based upon the results of the air monitoring, the procedures detailed in the Vapor Emission Response Plan (Appendix A-2) will be instituted.

8.0 DECONTAMINATION STATIONS

Decontamination stations will be located in fixed areas to be used for the cleaning of all heavy equipment, vehicles, tools and supplies required for the completion of field operations. Personnel decontamination procedures for the appropriate levels of protection are described in Section 4.0.

9.0 SITE ACCESS CONTROL

Vehicular access to the drilling locations is readily attainable. Appropriate traffic controls and barricades will used in areas of vehicular and pedestrian traffic.

10.0 PERSONAL HYGIENE

The following personal hygiene rules must be followed while performing work at the site:

1. Eating, drinking, chewing gum or tobacco, smoking, or any other practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the work area.

2. Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking, or any other activities.

3. Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.

4. No excessive facial hair (i.e., beards), which interferes with a satisfactory fit of the mask-to-face seal, is allowed on personnel required who wear respiratory protective equipment.

5. Contact with contaminated or suspected contaminated surfaces will be avoided. Whenever possible, walking through puddles, mud and discolored surfaces; kneeling on ground; leaning, sitting, or placing equipment on drums, containers, vehicles, or the ground will be avoided.

6. Medicine and alcohol can increase the effects from exposure to toxic chemicals. Prescribed drugs will not be taken by personnel on site where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Alcoholic beverage intake will be prohibited during all on-site field operations.

11.0 CONTINGENCY PLAN

Section 11.0 shall serve as the investigation Contingency Plan. It has been developed to identify precautionary measures, possible emergency conditions, and emergency procedures. The plan shall be implemented by the Site Health and Safety Officer.

11.1 Emergency Medical Care and Treatment

This section addresses emergency medical care and treatment of field personnel, resulting from possible exposures to toxic substances and injuries due to accidents. The following items will be included in emergency care provisions (see Appendix A-3):

a. Name, address and telephone number of the nearest medical treatment facility will be conspicuously posted. Directions for locating the facility, plus the travel time, will be readily available.

b. Names and telephone numbers of ambulance service, police and fire departments, and procedures for obtaining these services will be conspicuously posted.

c. Procedure for prompt notification of the H2M Site Health and Safety Officer.

d. Emergency eyewash fountains and first aid equipment will be readily available on site and located in an area known to all personnel.

e. Specific procedures for handling personnel with excessive exposure to chemicals or contaminated soil.

f. Readily available dry-chemical fire extinguisher.

11.2 Off-Site Emergency Medical Care

The Site Health and Safety Officer shall pre-arrange for access to emergency medical care services at a convenient and readily accessible medical facility and establish emergency routes. The Site Health and Safety Officer shall establish emergency communications with emergency response services.

11.3 Personnel Accidents

Bodily injuries which occur as a result of an accident during the operation at the site will be handled in the following manner:

a. First aid equipment will be available on site for minor injuries. If the injuries are not considered minor, proceed to the next step.

b. The local first aid squad rescue unit, a paramedic unit, the local hospital and the Site Health and Safety Officer shall be notified of the nature of the emergency.

c. The injured employee shall be transported by the local emergency vehicle to the local hospital.

d. A written report shall be prepared by the Site Health and Safety Officer detailing the events and actions taken during the emergency within 48 hours of the accident.

e. See Appendix A-3 for a list of emergency contacts in the Plainview area.

11.4 Personnel Exposure

In the event that any person is splashed or otherwise excessively contaminated by chemicals, the following procedure will be undertaken:

a. Disposable clothing contaminated with observable amounts of chemical residue is to be removed and replaced immediately.

b. In the event of direct skin contact in Level D, the affected area is to be washed immediately with soap and water, or other solutions as directed by medical personnel.

c. The Site Health and Safety Officer or other individuals who hold a current first aid certificate will determine the immediate course of action to be undertaken. This may involve using the first aid kit and/or eyewash stations.

11.4.1 Weather

Adverse weather conditions are an important consideration in planning and conducting site operations. Hot or cold weather can cause physical discomfort, loss of efficiency, and personal injury. Of particular importance is heat stress resulting when protective clothing decreases natural body ventilation. One or more of the following will help reduce heat stress:

a. Provide plenty of liquids. To replace body fluids (water and electrolytes) lost because of sweating, use a 0.1 percent salt water solution, more heavily salted foods, or commercial mixes. The commercial mixes may be preferable for those employees on a low sodium diet.

b. Provide cooling devices to aid natural body ventilation. These devices, however, add weight, and their use should be balanced against worker efficiency. Long cotton underwear help absorb moisture and protect the skin from direct contact with heat absorbing protective clothing.

c. Install mobile showers and/or hose down facilities to reduce body temperature and cool protective clothing.

d. In extremely hot weather, conduct non-emergency response operations in the early morning or evening.

e. Ensure that adequate shelter is available to protect personnel against heat, cold, rain, snow, etc.

f. In hot weather, rotate shifts of workers wearing impervious clothing.

11.4.2 Heat Stress

If field operations are conducted in the warm summer months, heat related fatigue will be closely monitored. Monitoring of personnel wearing impervious clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. Frequency of monitoring should increase as the ambient temperature increases or as slow recovery rates are indicated. When temperatures exceeds 85 degrees Fahrenheit, workers should be monitored for heat stress after every work period. The following screening mechanism will be used to monitor for heat stress:

Heart rate (HR) will be periodically measured by the radial pulse for 30 seconds during a resting period. The HR should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by 33 percent. If the pulse rate is 100 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by 33 percent.

Heat-related illnesses range from heat fatigue to heat stroke, the most serious. Heat stroke requires prompt treatment to prevent irreversible damage or death. Protective clothing may have to be cut off. Less serious forms of heat stress require prompt attention or they may lead to a heat stroke. Unless the victim is obviously contaminated, decontamination should be omitted or minimized and treatment begun immediately. Heat-related problems can be categorized into:

Heat Rash:	Caused by continuous exposure to hot and humid air and aggravated by chafing clothes. Decreases ability to tolerate heat as well as being a nuisance.
Heat Cramps	Caused by profuse perspiration with inadequate fluid intake and chemical replacement (especially salts). Signs: muscle spasm and pain in the extremities and abdomen.
Heat Exhaustion	Caused by increased stress on various organs to meet increased demands to cool the body. Signs: shallow breathing; pale, cool, moist skin; profuse sweating; dizziness and lassitude.
Heat Stroke:	The most severe form of heat stress. The body must be cooled immediately to prevent severe injury and/or death. Signs and symptoms are: red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

Some of the symptoms of heat stress are: hot dry skin, fever, nausea, cramps, red or spotted skin, confusion, lightheadedness, delirium, rapid pulse, convulsions and unconsciousness. For workers suffering from heat stress, the following actions should be taken:

1. Remove the victim to a cool area

2. Loosen clothing

3. Thoroughly soak the victim in cool water or apply cold compresses

4. Call for medical assistance.

11.4.3 Cold Stress

If field operations are conducted in the cold winter months, cold stress will be monitored. Two factors influence the development of a cold injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10 degrees Fahrenheit air with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18 degrees Fahrenheit.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked.

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

Frost Nip or

Incipient Frostbite. Characterized by suddenly blanching or whitening of skin.

Superficial Frostbite. Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.

Deep Frostbite. Tissues are cold, pale and solid; extremely serious injury.

Hypothermia. Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperatures. Its symptoms are usually exhibited in five stages: (1) shivering; (2) apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body temperature to less than 95 degrees Fahrenheit; (3) unconsciousness, glassy stare, slow pulse and slow respiratory rate; (4) freezing of the extremities; and finally, (5) death.

11.5 Fire

The telephone number to the local fire department will be posted along with other emergency numbers conspicuously on-site at all times. (see Appendix A-3). In the event of a fire occurring at the site, the following actions will be undertaken by the Site Health and Safety Officer and the designated fire control personnel:

a. Evacuate all unnecessary personnel from the area of the fire and site, if necessary.

b. Contact the local fire and police departments informing them of the fire and any injuries if they have occurred.

c. Contact the local hospital of the possibility of fire victims.

d. Contact the Site Health and Safety Officer, Health and Safety Manager, and the H2M Project Manager.

11.6 Personnel Protective Equipment Failure

If any site worker experiences a failure or alteration of PPE that affects the protection factor, that person and his/her buddy shall immediately leave the Exclusion Zone. Re-entry shall not be permitted until the equipment has been repaired or replaced to the satisfaction of the Site Health and Safety Officer.

12.0 SUMMARY

The Health and Safety Plan establishes practices and procedures to be followed so that the welfare and safety of workers is protected. It is important that personal equipment and safety requirements be appropriate to protect against the potential or known hazards at a site. Protective equipment will be based upon the type(s), concentration(s), and routes of personal exposure from substances at the site, as well as the potential for hazards due to heavy equipment use, vision impairment, weather, etc. All site operation planning incorporates an analysis of the hazards involved and procedures for preventing or minimizing the risk to personnel. The following summarizes the rules which must be obeyed:

a. The Health and Safety Plan will be made available to all personnel doing field work on site. All personnel must sign this plan, indicating they have read and understood its terms.

b. All personnel will be familiar with standard operating safety procedures and additional instructions contained in the Health and Safety Plan.

c. All personnel going on site will be adequately trained and thoroughly briefed on anticipated hazards, equipment to be worn, safety practices to be followed, emergency procedures and communications.

d. Any required respiratory protective devices and clothing will be worn by all personnel going into work areas.

APPENDIX A-1

HEALTH AND SAFETY PLAN ACKNOWLEDGMENT FORM

I acknowledge that I have read and understand the provisions of this Health and Safety Plan, and that I will, to the best of my ability, abide by the terms of this plan:

Name	Date	Name	Date
______	______	______	______
______	______	______	______
______	______	______	______
______	______	______	______
______	______	______	______
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______	______	______	______
______	______	______	______

APPENDIX A-2

NYSDEC AIR MONITORING PLAN

Community Air Monitoring Plan (Ground Intrusive Activities)

Real-time air monitoring, for volatile compounds and particulate levels at the perimeter of the work area is necessary. The plan must include the following:

- Volatile organic compounds must be monitored at the downwind perimeter of the work area on a **continuous** basis. If total organic vapor levels exceed 5 ppm above background, work activities must be halted and monitoring continued under the provisions of a Vapor Emission Response Plan. All readings must be recorded and be available for State (DEC & DOH) personnel to review.
- Particulates should be continuously monitored upwind, downwind and within the work area at temporary particulate monitoring stations. If the downwind particulate level is 150 $\mu g/m^3$ greater than the upwind particulate level, then dust suppression techniques must be employed. All readings must be recorded and be available for State (DEC & DOH) personnel to review.

Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- the organic vapor level 200 ft. downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

Community Air Monitoring Plan
(Ground Intrusive Activities)

Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source are unsuccessful and if the following levels persist for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect;

- if organic vapor levels are approaching 5 ppm above background.

However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in the Health and Safety Plan of the Work Plan will go into effect.
2. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.
3. Frequent air monitoring will be conducted at 30 minutes intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

APPENDIX A-3

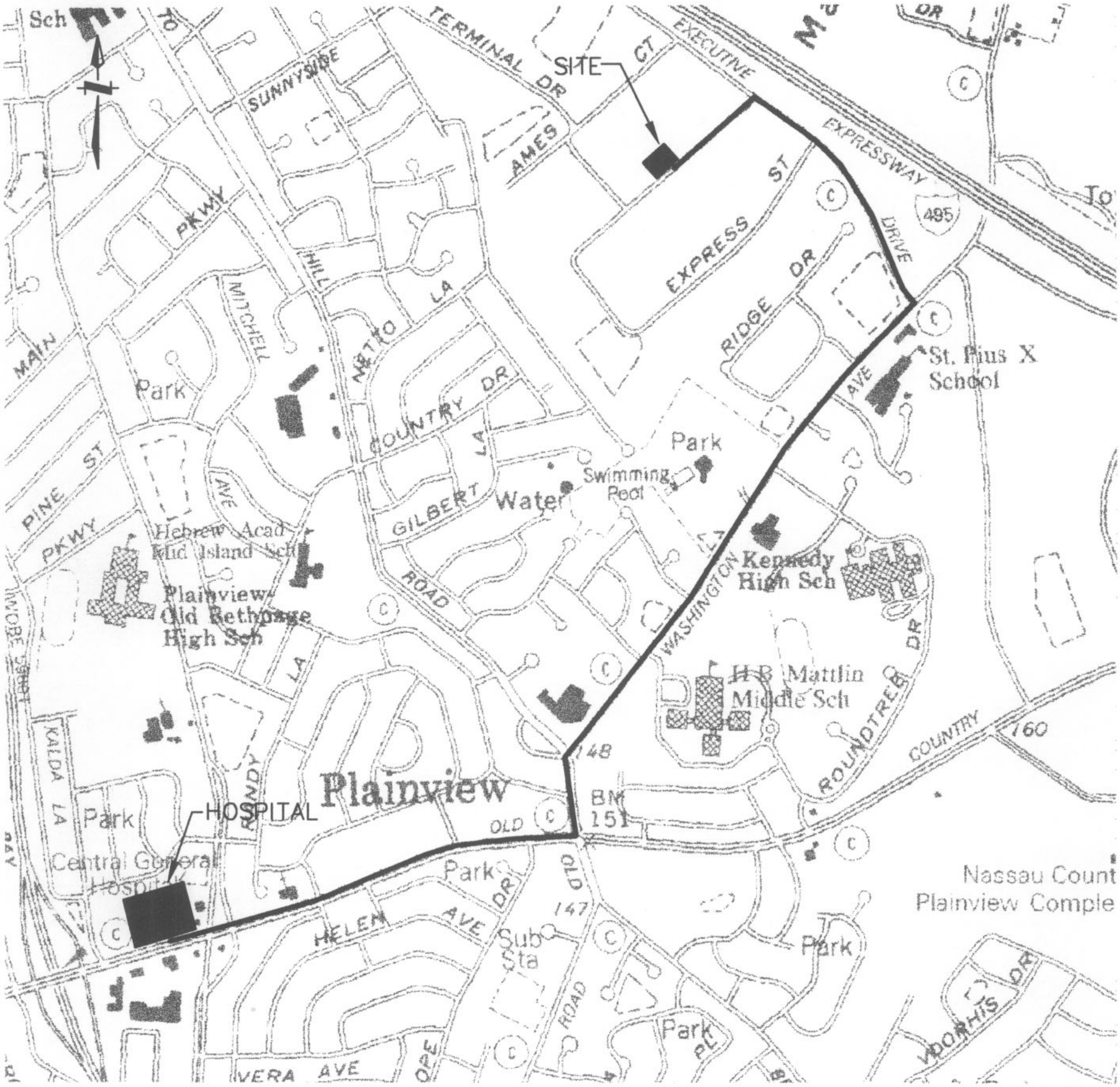
EMERGENCY RESPONSE INFORMATION

EMERGENCY TELEPHONE NUMBERS

All Emergency Rescue Services (Police, Fire, Ambulance)	911
Plainview Fire Department (emergency)	(516) 938-1515
Police Department (non-emergency)	(516) 755-1843
NYSDEC Emergency Spill Response:	(516) 444-0320
North Shore University Hospital at Plainview (non-emergency)	(516) 681-8900
H2M Project Manager: Richard J. Baldwin	(516) 756 - 8000, ext. 611
Health & Safety Manager: Richard J. Baldwin	(516) 756 - 8000, ext. 611
NYSDEC Project Manager Jamie Ascher	(516) 444-0246
NYSDOH Project Manager William Gilday	(518) 457-2225

DIRECTIONS TO HOSPITAL:

From the front of the 100 Commercial Street property turn left (northeast) onto Commercial Street. Go approximately 800 feet and turn right (southeast) onto Executive Drive. Take Executive Drive for approximately 0.4 miles and turn right (southwest) onto Washington Avenue. Follow Washington Avenue approximately 0.8 miles and turn left (south) onto Manetto Hill Road. Take Manetto Hill Road for approximately 600 feet and turn right (west) onto Old Country Road. The North Shore University Hospital of Plainview is approximately 0.6 miles up Old Country road on the right-hand side. The hospital route map is attached.



HOSPITAL ROUTE MAP

SCALE: 1" = 2000'

From the front of the 100 Commercial Street property turn left (northeast) onto Commercial Street. Go approximately 800 feet and turn right (southeast) onto Executive Drive. Take Executive Drive for approximately 0.4 miles and turn right (southwest) onto Washington Avenue. Follow Washington Avenue approximately 0.8 miles and turn left (south) onto Manetto Hill Road. Take Manetto Hill Road for approximately 600 feet and turn right (west) onto Old Country Road. The North Shore University Hospital of Plainview is approximately 0.6 miles up Old Country Road on the right hand side.