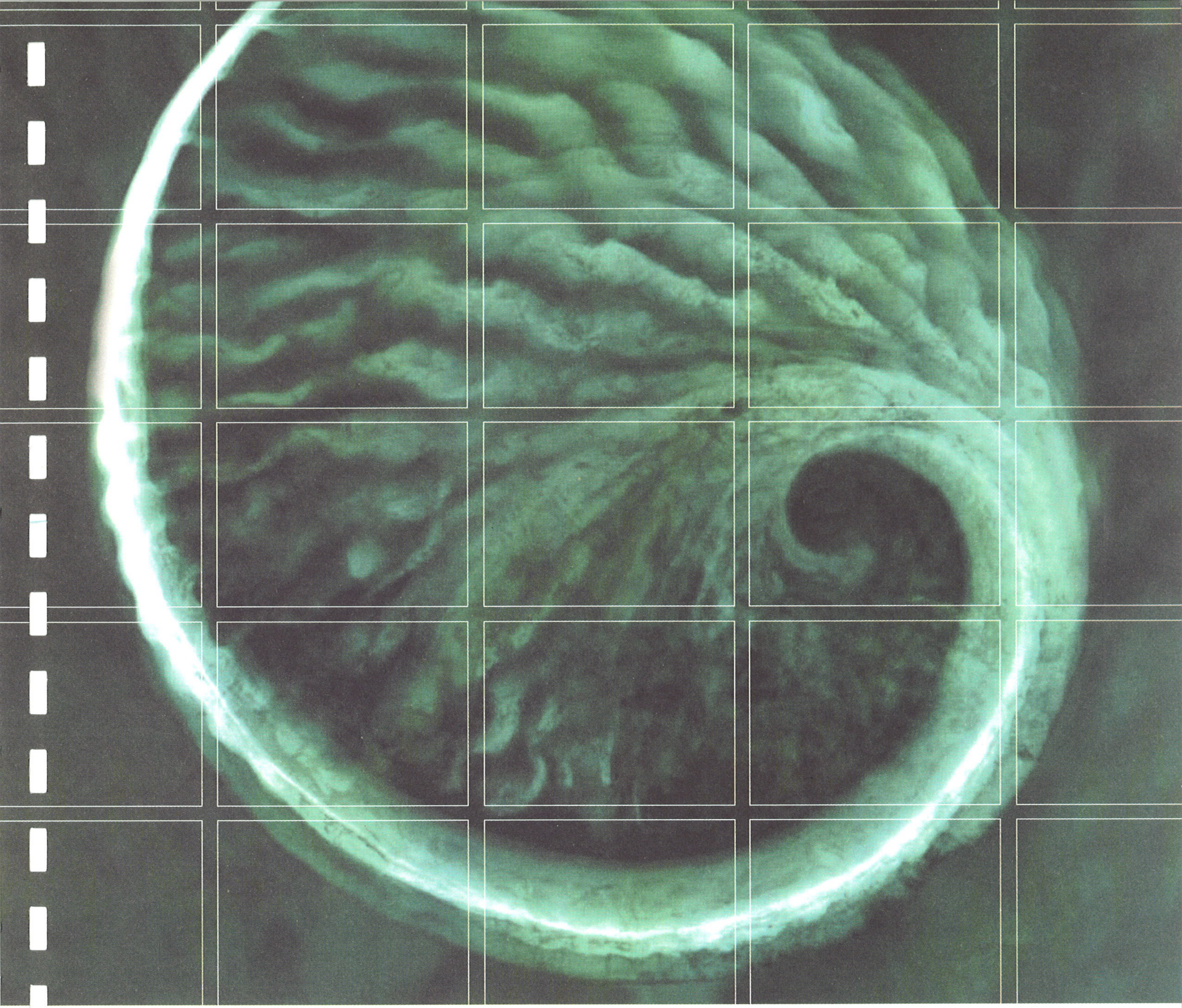

Long Island Jewish Medical Center

Preliminary Site Assessment Work Plan

400 Lakeville Road
New Hyde Park, NY

July, 2007

Environmental Resources Management
520 Broad Hollow Road
Melville, New York 11747

Delivering sustainable solutions in a more competitive world

PRELIMINARY SITE ASSESSMENT WORK PLAN

400 Lakeville Road
New Hyde Park, NY

July, 2007

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Prepared for:

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1.0 INTRODUCTION

On behalf of Long Island Jewish Medical Center (LIJMC), Environmental Resources Management (ERM) is submitting this Preliminary Site Assessment (PSA) Work Plan (WP) for the site located at 400 Lakeville Road in New Hyde Park, Nassau County, New York (the Site). This PSA WP has been prepared as per the Order on Consent dated 23 January 2007, Index No. D1-0501-06-12.

This WP, Quality Assurance Project Plan (QAPP) and Health and Safety Plan (HASP), defines all necessary operating parameters, procedures and protocols for performance of the PSA in one, comprehensive document. It is intended to:

- Identify the overall objectives of the PSA;
- Identify and describe both the technical approach and Scope of Work of the PSA;
- Define procedures and protocols for sampling and analysis, quality assurance (QA)/quality control (QC), and health and safety that will be used to implement field operations associated with the PSA;
- Establish data management and presentation guidelines;
- Establish final reporting guidelines;
- Present the overall anticipated project schedule; and
- Identify key project team members and their corresponding responsibilities and management/QA/QC roles on the project.

This document is intended to be followed by all personnel working on the PSA to ensure the generation of reliable data and measurement activities such that the resultant data and evaluations are scientifically valid, defensible, comparable, and of known precision and accuracy.

1.1 PURPOSE AND OBJECTIVES

Chlorodifluoromethane (Freon 22) has been detected in groundwater samples collected in northwestern Nassau County in a study being conducted by Lockheed Martin Corporation (LMC). The goals of the PSA are:

- investigate potential source areas at or in the vicinity of the Site;

- evaluate whether chemical constituents of concern (i.e., Freon 22 and VOCs) are present in environmental media (i.e., soil, groundwater and soil gas);
- confirm the general groundwater flow direction at the Site; and,
- evaluate data collected to determine if any impacts from past operations and/or disposal practices contributed to the existing groundwater plume in the Site area.

1.1.1 *Site Setting*

The Site presented on Figure 1-1, is located in New Hyde Park, Town of North Hempstead, Incorporated Village of Lake Success, Nassau County, New York. The Site encompasses approximately 46 acres and is designated Section 8, Block J, Lots 411 & 424. The Site is developed with a multi-story building structure, landscaping and asphalt parking areas. The property is owned by LIJMC which is located at 270-05 76th Avenue, New Hyde Park, New York 11040.

The approximate boundaries of the Site include; to the east, Lakeville Road; to the south, 410 Lakeville Road which is a two Story office building on a 5.5 acre parcel (Section 8, Block J, Lots 412 & 413) located to the southeast and 420 Lakeville Road which is a one story office building on a 3.85 acre parcel located directly south of the subject property (Section 8, Block J, Lot 423); bordering to the west is 1 Marcus Avenue (Astoria Federal Savings), a two story office building on 15.3 acre parcel (Section 8, Block J, Lots 10 & 416); and to the north, the Site is bordered by Marcus Avenue. A Site layout is presented on Figure 1-2.

1.1.2 *Site History*

Freon 22 has been used at the Site as a refrigerant in air conditioning systems using groundwater as a heat exchange medium. Groundwater was pumped from a supply well, through a chiller(s) containing the Freon 22 and then discharged back to the subsurface generally through a diffusion well(s). The system at 400 Lakeville was operated until 2004.

Freon 22 has been detected in groundwater samples collected in northwestern Nassau County in a study being conducted by LMC; and specifically in groundwater samples collected from well N-7560, located at 400 Lakeville, which was formerly used to provide groundwater to the building air conditioning system. The New York State Department of Environmental Conservation (NYSDEC) requested that LIJMC collect additional groundwater samples to evaluate whether the system at 400 Lakeville is a potential source of the Freon that has been detected in the area. In addition, the NYSDEC directed that an engineering study of the air conditioning system at 400 Lakeville be conducted to determine if the system was leaking.

Records obtained from the NYSDEC and the United States Geological Survey (USGS) indicated that the system at 400 Lakeville consisted of the following wells:

400 Lakeville Road

Well Number	**Use**	**Depth (below ground surface [bgs] in feet)**	**Aquifer**
N-7560	Supply	242	Magothy
N-7762D	Diffusion	98	Unsaturated Zone
N-9714D[1]	Diffusion	98	Unsaturated Zone

1.1.2.1 *July 6, 2004 Anson Environmental LTD. (AEL) letter referenced "Lockheed-Martin Corporation Groundwater Sampling Event"*

As presented in the letter by Anson Environmental LTD (AEL) of Huntington New York, dated July 6, 2004 to LIJMC, AEL collected several grab samples (April 15, 2002, Sept. 26, 2002, June 13, 2003, Nov. 25, 2003 and May 26, 2004) of groundwater that was supplied to the air conditioning chiller(s) located in the basement of 400 Lakeville. The chiller influent water was supplied from the on-Site well designated N-7560 located adjacent to the northwest corner of 400 Lakeville. The groundwater samples were collected from a valve located at the influent line to the chiller unit. The grab sample collected on May 26, 2004, was split-sampled with ARCADIS Geraghty & Miller, Melville, New York (a consultant representing LIJ) and analyzed for volatile organic compounds (VOCs), Freon 113 and Freon 22, using New York State Analytical Services Protocol (NYSASP) Method 95-1. In addition, a groundwater sample was collected from N-7560 in February 2002, with a submersible pump from a depth of 110-feet bgs and analyzed for VOCs.

The results of the groundwater samples collected from the chiller influent line valve and submersible pump indicated that four (4) VOC compounds were detected above the New York State Department of Environmental Conservation (NYSDEC) Class GA Groundwater Criteria. These compounds included; *cis* -1,2-dichloroethene (c-1,2-DCE), trichloroethene (TCE), tetrachloroethene (PCE) and chlorodifluoromethane (Freon 22). Concentrations of *cis* -1,2-DCE ranged in concentration from 49 to 100 (ug/L [ppb]), TCE ranged from 8 to 23 ppb, PCE ranged from 8 to 23 ppb and Freon 22 ranged from 11 to 5,800 ppb.

---

[1] Replacement well

1.1.2.2 ERM Freon Investigation Report Dated July 2005

In March 2005, North Shore - Long Island Jewish Health System NS-LIJ contracted with ERM to perform additional investigative activities of the air conditioning system operations at 400 Lakeville.

Well Access

ERM subcontracted Delta Well & Pump of Lake Ronkonkoma (Delta) to assist in gaining access to the supply and diffusion wells and to assist in well purging prior to groundwater sampling. The supply well at 400 Lakeville (N-7560), located to the north of the building in a small island in the parking area, was still connected to the building piping and contained a dedicated submersible pump. Initially, Delta disconnected the electrical connections to the pump and the piping connection from the wellhead to the building (April 2005). The first sample collected from this well was collected with the non-dedicated submersible pump in the well (i.e., the sample was collected from above the pump). After the results of the first sampling round were reviewed, ERM decided to remove the submersible pump and interior well casing prior to sample collection to permit more complete purging of the well. On June 12, 2005, Delta returned to 400 Lakeville (N-7560) and removed the pump.

The diffusion wells at 400 Lakeville (N-7762D and N-9714D) are located to the east of the building in a landscaped area and shown on Figure 1-2. After gaining access, ERM and Delta determined that the well screens of both the wells were filled with gravel and/or sediment. Construction records for these wells indicate that they both were completed to a depth of 98 feet below ground surface (bgs), above the current water table. Samples of the gravel/sediment were then collected to assess the presence of contaminants.

The contaminants detected above the method detection limit (MDL) in the soil/sediment samples collected from the diffusion wells at 400 Lakeville (N-7762D and N9715D) were acetone, trichloroethene, tetrachloroethene, *cis*-1,2-dichloroethene, toluene and xylenes. Acetone is a common laboratory artifact and its presence in these samples is likely attributable to laboratory sources. Methylene chloride was also detected in these samples and in the associated blank.

Groundwater Sampling

Three rounds of groundwater sampling were carried out. During the second round samples were split with the NYSDEC and ARCADIS - Geraghty & Miller, Inc., LMC's environmental consultant. In the third round, samples were split with LMC's environmental consultant only.

First Round - April 2005

On April 14, 2005, the supply well at 400 Lakeville was sampled using a standard three-volume purge to insure fresh groundwater was present in the well. The well was purged using a 20 gallon per minute (gpm) Grundfos pump until measurements of temperature, pH, specific conductance (SC), dissolved oxygen (DO) in the purge water stabilized, and turbidity was below 50 nephelometric turbidity units (NTUs).

Second Round - June 2005

On June 10, 2005, ERM collected another round of groundwater samples from 400 Lakeville. The purging and sample collection method was modified to permit collection of "low-flow" samples after the completion of a three-volume purge. A 5-gpm Grundfos Readi-Flow pump was "piggybacked" onto the larger 20-gpm pump wire and dedicated discharge tubing and the two pump assembly lowered into the well[2]. The 20-gpm pump was primarily used to purge the well of the standard three volumes of water.

The samples collected from the supply well at 400 Lakeville (N-7560) contained Freon 22 at concentrations of 4 micrograms per liter (ug/L [ppb]) in April and 5 ppb and 4 ppb in the samples collected in June. The Principal Organic Contaminant[3] (POC) groundwater standard for Class GA groundwater is 5 ppb (6 NYCRR Part 703.5). Freon 22 in this well is therefore just at or slightly below the standard. *cis*-1,2-DCE was detected at concentration of 21 ppb (April), and 20 ppb and 20 ppb (June), PCE was detected at concentrations of 4 ppb (April), and 4 ppb and 3 ppb (June) and TCE was detected at 4 ppb in both the April and June samples. PCE, TCE and *cis*-1,2-DCE are not site related and their presence in N7560 apparently results from an offsite source which has impacted groundwater in northwestern Nassau County.

Third Round - May 2007

On May 17, 2007, as part of LMC's annual groundwater monitoring program, ARCADIS - Geraghty & Miller, Inc., LMC's environmental consultant collected a groundwater sample from N-7560. The purging and sampling method was the modified "low-flow" method described above. ERM split samples with Arcadis. The sample contained Freon 22 at a concentration of 2.89 ppb, which is below the 5 ppb Class GA POC

---

[2] The 5-gpm Rediflow pump had its own dedicated discharge tubing

[3] Principal Organic Contaminants are six chemical classes of compounds to which a standard of 5 ug/L (ppb) is applied. POC Classes 1 and 2 include halogenated alkanes containing fluorine, chlorine, bromine and iodine atoms. Freon 22 (chlorodifluoromethane), a halogenated methane therefore is a member of these classes

standard of 5 ppb. The sample also contained *cis*-1,2-DCE, PCE, TCE, methyl acetate, methyl cyclohexane and toluene. The observed concentration of *cis*-1,2-DCE exceeded Class GA standards.

The results of all three rounds of groundwater sampling are provided in Table 1. A copy of the laboratory data is provided on CDROM in Attachment 1.

Leak Testing

Helium leak testing of the groundwater cooled chiller units at 400 Lakeville site was carried out by Hoffmann & Feige (H&F) in February 2005. The chiller units, which discharged once through cooling water, had previously been tested (September 2004) and were thought to have leaked.

The chiller (two) units each had 60- and 30- ton shell and tube heat exchangers and were in operation until September 2004. Refrigerant (Freon 22) was used on the shell side and once-through groundwater ran through the tubes of each unit. The shell side refrigerant was at a pressure higher than the groundwater and therefore if leakage occurred, refrigerant would have leaked from the shell side into the groundwater.

The four refrigerant units were isolated from the chiller units prior to testing to ensure that only Freon leakage from the shell would be measured. All equipment was calibrated prior to testing using a traceable calibrated helium leak. All four units were checked while under pressure for any stray leaks so that all units were mechanically and under helium at test pressure when testing was completed. The shell side of each unit was tested at a helium pressure similar to the refrigerant operating pressure and leakage was measured using a Varian Instruments Portatest Helium Mass Spectrometer Leak Detector.

The results of the helium leak testing carried out on the four heat exchangers in the chillers located at 400 Lakeville showed that three of the four heat exchange units (Unit 1- 60 Ton and Unit 2- 30 and 60 Ton) had minimal measured leakage rates, ranging from 0.20 to 0.61 ounces per year (oz/yr). The measured leakage rate from the Unit 1 - 30 Ton heat exchanger ranged from 6.6 to 23.5 pounds per year (lbs/yr) based on an idle pressure differential (between refrigerant and groundwater) of 110 pounds per square inch (psi) and an operating pressure differential of 200 psi.

1.2 *SITE HYDROGEOLOGY*

The Site is situated at an elevation of approximately 135 feet mean sea level (msl). The Site is located in western Nassau County, Long Island. Long Island is situated within the Atlantic Coastal Plain physiographic province, which is underlain by a wedge of unconsolidated sediments that thickens and dips to the southeast toward the Atlantic Ocean.
The groundwater aquifer system in the western part of Nassau County consists of unconsolidated glacial deposits of the Pleistocene age (an epoch of glaciations from 1.8 million to 11,000 years ago) and coastal-plain deposits of continental and marine origin of the Late Cretaceous age (65 million years ago). These unconsolidated deposits consist of gravel, sand and clay and are underlain by bedrock. The bedrock, which is relatively impermeable, forms the base of the groundwater reservoir.

The relationships between hydrogeologic and geologic units underlying the Site are depicted on Figure 1-3 to facilitate discussion and depicts a generalized north-south trending cross-sectional view of the sediments, which comprise Long Island. As shown on the figure, the unconsolidated deposits underlying the Site consist of: (descending from land surface) the Upper Glacial Aquifer, the Magothy Aquifer, the Raritan Clay Confining Unit, and the Lloyd Aquifer.

2.0 *PRELIMINARY SITE ASSESSMENT SCOPE OF WORK*

The PSA Scope of Work, presented herein, is based on the tasks set forth in the Order on Consent dated 23 January 2007, Index No. D1-0501-06-12. These tasks are identified and described in detail below.

2.1 *PRELIMINARY SITE ASSESSMENT TASKS*

The Scope of Work involves an investigation that includes:

Data and Records Search: Available historic information (documents, maps, aerial photos, building permits, reports, etc.) shall be located and reviewed. Freedom of Information Law (FOIL) requests and well records search will be performed at the NYSDEC, Nassau County Department of Health (NCDOH), Nassau County Department of Public Works (NCDPW) and USGS.

Vertical Profile Borings: Groundwater profile borings will be installed at four locations. Groundwater samples will be obtained at 10 foot intervals beginning at the water table, anticipated to be approximately 105 feet bgs to a depth of approximately 250 feet bgs. The groundwater profile sampling will be initiated to determine the nature and extent of the groundwater impacts.

Soil samples will be collected using a split-barrel core sampler ("split-spoon") to characterize local geology and screened for the presence of volatile organic constituents (VOCs) using photo-ionization detection (PID) at the proposed vertical profile boring located adjacent to diffusion wells (N-9741D and N-7762D). Soil samples will be logged and screened at 10-foot intervals beginning at ground surface to the water table. Soil samples will be analyzed for Freons by a commercial laboratory with normal turn around time (TAT). Using USEPA SW-846 Method 8260 plus Freons.

Groundwater samples will be collected utilizing the Waterloo profiling method at ten-foot intervals from the water table to approximately 250 feet bgs. Groundwater samples will be analyzed for VOCs by a commercial laboratory with an expedited turn around time (TAT). Collected soil samples will be analyzed by USEPA SW-846 Method 8260 plus Freons with an expedited TAT.

Groundwater Monitoring Wells: Groundwater monitoring wells will be installed at up to seven (7) locations. Monitoring wells will be installed at the four (4) completed groundwater profile locations and screen zone settings will be selected based upon groundwater profile sampling results.

The NYSDEC will be consulted during selection of the screen zones. A monitoring well may be installed at a downgradient location, adjacent to Nassau County Department of Public Works monitoring well N-10290, if the groundwater profiling investigation reveals Freons at depth. Shallow (Upper Glacial Aquifer) monitoring wells may also be installed, to supplement monitoring well clusters previously installed by LMC at the Lakeville Jewish Center (Cluster 37) and the Great Neck Public School (Cluster 38). Currently, these two clusters contain well screened in the Magothy Aquifer. If Freon contamination is detected in the Upper Glacial aquifer during the installation of the on-Site Vertical Profile Borings, ERM will consult with LIJ and the NYSDEC to determine if installation of Upper Glacial Aquifer well(s) at one or both of these locations is justified. If it is determine that shallow monitoring wells are required, ERM will arrange for site access and monitoring well(s) will be installed.

Groundwater Sampling: Groundwater samples will be collected from each of the newly installed wells, the existing on-site supply well N-7560 and N10290. Groundwater samples will be analyzed for VOCs using USEPA SW-846 Method 8260 plus Freons. The laboratory will achieve a detection limit of 0.5 ppb and report the ten highest concentrations tentatively identified compounds (TICs) present in the samples.

Survey: At the completion of field sampling activities a New York State licensed surveyor will establish the location of each Waterloo profile boring and the elevation and location of all monitoring wells. Elevations of all riser pipes, protective well casings and ground surface and their corresponding latitude and longitude coordinates will be determined to within 0.01 feet, based on USGS datum.

Sub-slab Soil Gas and Indoor Air Sampling: To assess intrusion of Freon 22 contaminated vapors into 400 Lakeville Road, sub-slab soil gas samples and indoor air samples will be collected. Sampling methodologies will be in accordance with the New York State Department of Health (NYSDOH) Guidance Document entitled "Guidance for Evaluating Vapor Intrusion in the State of New York, dated October 2006. Four sub-slab soil gas and four indoor samples will be collected.

Data Usability Validation: All soil and groundwater analytical data will be validated to determine whether the data meets the site/project specific data quality objectives and data use as specified in the Draft DER10 Technical Guidance by an ERM Quality Assurance/Quality Control (QA/QC) officer.

The core field investigative activities of the PSA are discussed below, which comprise the Detailed Field Activities Plan (FAP). To streamline the FAP, and ensure that the field activities are executed in a consistent and safe manner, the FAP is supported by the following documents:

- Appendix A: Standard Operating Procedures (SOP);
- Appendix B: Quality Assurance Project Plan (QAPP); and
- Appendix C: Site Specific Health and Safety Plan (HASP).

Strict adherence to the SOPs, the QAPP and HASP will ensure the generation of reliable data and measurement activities such that resultant data and evaluations of the same are scientifically valid, defensible, comparable and of known precision and accuracy.

2.1.1 *Historic Records Search*

Available historic and contemporary information (documents, topographic and tax maps, aerial photos, building permits, reports, etc.) shall be located and reviewed. Information sources may include NYSDEC's Region 1 and Central Office (Albany) files, the Town of North Hempstead files, Nassau County Health Department (NCHD) files, Department of Public Works (NCDPW) and USGS files.

2.1.2 *Underground Utility Markouts*

ERM's Health and Safety policy requires that underground utility markouts be performed at the areas to be investigated prior to finalization of sampling locations, and/or any intrusive field investigation is undertaken. As part of this survey, the Underground Utilities Protection Organization (UFPO) will be contacted as required by law. Any information identified by utility mark outs that suggests the location of underground utility lines will be considered in design of the field-sampling program. Drilling will only be performed at a safe distance from all utilities.

2.1.3 *Site Access*

ERM anticipates performing on and off-Site investigative activities. ERM's drilling subcontractor will be tasked with obtaining the necessary (if needed) road opening permits and/or other authorizations as required by the Town of North Hempstead, Nassau County, State of New York State or Federal authority to lawfully perform the work described herein, including the payment of any required fees, posting of any bonds, or acquisition of any required additional insurance coverage and providing certificates/proof of the same.

ERM will require access to the LIJMC property to temporarily stage:

- Well construction materials;
- Subcontractor vehicles (i.e. overnight parking of the drill rig);
- A self-contained decontamination area;

- Drums of investigative derived waste (IDW) such as drill cuttings, decontamination water, and groundwater monitoring well development/purge water; and
- To install the Vertical Profile Borings and monitoring wells.

Property access may be required to the north of the site; specifically at the Lakeville Jewish Center and Great Neck Public School properties for the purpose of installing Upper Glacial monitoring well(s). ERM will contact the property owners to arrange access and provide the necessary insurance documents. In addition, ERM will consult LIJ to determine the ownership of the property to the south of 400 Lakeville Road to ascertain if an access agreement is necessary to install the upgradient Vertical Profile Boring and monitoring well.

Finally, a monitoring well may be installed at the existing N-10290 monitoring well located north of the Site. If the installation of this well is required the necessary access agreements and road opening permits and/or other authorizations as required by the Town of North Hempstead, Nassau County, State of New York or Federal authority to lawfully perform the work described herein, including the payment of any required fees, posting of any bonds, or acquisition of any required additional insurance coverage and providing certificates/proof of the same.

2.1.4 *Vertical Profile Groundwater Borings*

Vertical profile borings will be installed at four (4) on-site locations. Groundwater samples will be collected at each location to vertically characterize groundwater and to determine if Site-related contaminants have migrated off-Site in the direction of groundwater flow. The vertical profile borings will be advanced to depths equivalent of the bottom of the screen zone of N-7560 (approximately 250 feet bgs).

The approximate locations of the Vertical Profile Borings are shown in Figure 2-1. The on-Site groundwater profile borings will be installed at Site in four locations, specifically to the northeast near the intersection of Lakeville Road and Marcus Avenue, to the east at the location of the diffusion wells (N-9714D and N-7762D), to the south of the 400 Lakeville Road building adjacent to the square esplanade and to the northeast along the boundary with Astoria Federal Savings.

The Vertical Profile Borings will be installed using a Waterloo Profiler. The profiling tool will be installed with a hybrid drive platform. The Waterloo Profiler is a direct push tool, however the depth requirements and drilling conditions are at, or beyond the limits of direct push technologies. To extend these limits, the hybrid approach couples conventional drilling techniques with direct push technology. Specifically, a Geoprobe GH60 hammer is mounted on a CME 1050 or a

Mobile B80 rotary drilling rig. The drill rig will use a mud rotary technique with a casing advancer. Casing will be 4-inch in diameter and advanced to just above the water table, which is approximately 105-feet bgs on-Site, using the mud rotary technique. The profiler, equipped with a protective sheath to prevent mud intrusion, will be lowered down the casing to the bottom. The Profiler will then be driven to a depth of approximately 3 feet below the water table where the first sample will be collected. In the on-Site Vertical Profiles, groundwater samples will be collected every five feet from the initial water table sample to a depth of 130 feet bgs. Subsequent on-Site groundwater samples will be collected at ten-foot intervals. At each profile location, groundwater samples will be collected at 10 foot intervals from the water table to the final depth of the Vertical Profile boring (estimated at 250 feet bgs).

Once the Profiler encounters refusal or when it is 100 feet outside the casing, the Profiler will be tripped out, the casing will be advanced to a depth that is at least 5 feet less than the next target sample interval, and the profiler will be redeployed. The profiler assembly will be removed and replaced in the borehole in 10 to 20 foot sections to shorten tripping time. Assuming that the water table is approximately 105 feet bgs, 15 groundwater samples will be collected from each vertical profile boring excluding quality assurance/quality control samples.

As indicated above, the Vertical Profile Borings will be installed using the Waterloo Profiler and groundwater will be sampled at 10 foot intervals to the desired depth. Multiple data sets will be acquired at each vertical profile location during installation. Parameters to be measured include:

- the analytical chemistry of the contaminants,
- continuous index of hydraulic conductivity so that zones of high conductivity are identified for future monitoring,
- hydraulic head at each sample depth,
- dissolved oxygen,
- reduction/oxidation potential,
- pH,
- specific conductance; and
- rate of penetration, which reveals stratigraphic changes that may affect contaminant transport, IRM or remedial design.

Groundwater samples obtained from the Vertical Profile Borings installed will be analyzed by an ELAP-certified laboratory for TCL VOCs and Freons using USEPA SW-846 Method 8260 with the addition of Freons.

The applicable standard operating procedures that will be employed during this activity are summarized below and presented in Appendix A.

Section	Standard Operating Procedure
A.1	SOP 1 Waterloo Vertical Profile Borings with Groundwater Sampling
A.2	SOP 2 Water Level Measurement Procedure
A.3	SOP 3 Groundwater pH And Temperature
A.4	SOP 4 Measurement Of Groundwater Specific Conductance
A.5	SOP 5 Measurement Of Groundwater Turbidity
A.6	SOP 6 Measurement Of Groundwater Dissolved Oxygen
A.7	SOP 7 Measurement of Oxidation Reduction Potential
A.8	SOP 8 Groundwater pH and Temperature
A.9	SOP 9 Measurement of Groundwater Specific Conductance
A.10	SOP 10 Measurement of Groundwater Turbidity
A. 11	SOP 11 Measurement of Groundwater Dissolved Oxygen

2.1.4.1 *Vertical Profile Installation Contingency Plan*

It should be noted that in the event that the Waterloo Profile subcontractor can not meet the project schedule needs, then conventional groundwater profiling techniques will be employed. The conventional temporary vertical profile wells will be installed utilizing the hollow-stem auger drilling method.

Each well will be constructed of two-inch black steel casing fitted with a five-foot long well point screen. When the borehole has been drilled to the prescribed completion depth (250-feet), the well casing and drive-point will be assembled within the augers. The temporary well will then be driven slightly ahead of the lead auger and the augers will then be retracted from the borehole leaving the temporary well behind. The formation will be allowed to collapse back against the well screen and casing.

The well will then be purged and sampled at the prescribed completion depth using a Grundfos 2-inch submersible pump. Following collection of the first sample, the temporary well will be pulled back 10 feet and another purge and sample sequence will be performed. The aforementioned sampling sequence will continue at 10-foot intervals back to the water table.

2.1.5 *Vertical Profile Soil Sampling*

Split spoon soil samples will be collected from the ground surface to the top of the water table at the vertical profile boring located adjacent to diffusion wells N-9714D and N-7762D. Split spoon sample collection will be collected at 10-foot intervals from ground surface. At approximately 95 feet bgs continuous split spoon soil sampling will be carried out to identify the water table elevation.

The drill stem shall be advanced to the sample collection depth and a split-spoon sampler shall be deployed ahead of the lead drill stem according to ASTM Method 1586 – Standards for Penetration Testing and Split-Barrel Sampling of Soils. Split-spoons shall be advanced by either the wire-line method (downhole cable hammer) or with a cathead and standard 140 pound hammer simulating a free-fall of 30 inches. The soil samples shall be collected using a 2-foot by 2-inch carbon steel split-spoon sampler driven by a 140 lb. hammer dropped 30 inches repeatedly. An ERM Hydrogeologist shall examine and identify the sample immediately upon collection. The sample shall also be screened for volatile organic compound contamination using a hand-held PID total organic vapor analyzer and the PID reading will be noted on the geologic boring log.

A standard "Geologic Log" shall be maintained for each boring that shall include all of the geological information gathered in the field, including the following:

- The structure of the soils sampled, including layering stratification features, and the dominant soil types.
- The color of soils, using Munsell Soil Color Charts.
- The moisture content of soils.
- Soil grain features, including grain sizes, degree of sorting or grading, angularity, and mineralogy. The soils shall be classified using the American Society for Testing and Materials (ASTM) Method D2488-84, a visual manual procedure.
- Identification of any rock fragments, organic material or other components.
- The consistency of clay-dominated soils.

All of the soils information collected shall be recorded as a designation under the Unified Soil Classification System (USCS) along with additional observations for each distinctive soil type within each sample. Geologic logging of each core sample will be by direct observation and classification of soils, using the Munsell Soil Color Chart and Unified Soil Classification System (USCS), as the boreholes are advanced. Each split spoon will be screened using a photoionization detector (PID) instrument for the presence of VOCs and the PID reading will be noted on the geologic boring log.

Soil samples will be submitted for laboratory analysis based on the following criteria:

- the soil sample exhibiting the highest PID reading in the borehole will submitted for VOC analysis using USEPA SW-846 Method 8260 plus Freons; and
- the soil sample from immediately above the water table (estimated at 105-feet bgs) will also be submitted for VOC analysis using Method 8260 plus Freons.

In the event that no PID detections are observed in the borehole, then only the soil sample from immediately above the water table will be submitted for laboratory analysis.

Section	**Standard Operating Procedure**
A.8	SOP 8 Organic Vapor Screening - Soil Sample Headspace

2.1.6 *Monitoring Well Installation*

Four (4) groundwater monitoring wells will be installed after completion of the Vertical Profile Borings. Each of the four (4) monitoring wells will be installed at the locations of the complete groundwater vertical profiles borings. The monitoring well locations are presented on Figure 2-2. The screen zone settings for each of the four (4) monitoring wells will be determined after review of the geologic and chemistry data is obtained from the Waterloo Groundwater Profiler and the contaminant concentration analysis is performed. The contaminant concentration analysis will consist of a plot of VOC data versus depth obtained from the groundwater samples collected during the Vertical Profile Boring installations. It is anticipated, however, that the four (4) monitoring wells will be screened at the interval equivalent to the zone of greatest groundwater impacts. If multiple depths exhibit elevated groundwater impacts at the groundwater profile location, the installation of a second well will be evaluated.

Monitoring wells will be constructed of 2-inch ID Schedule 40, 0.010-inch slot polyvinyl chloride (PVC) well screen and threaded, flush joint PVC casing. The on-Site well screens will be 10 feet in length with a screen elevation corresponding to the zone of greatest COC concentrations. Monitoring wells will be constructed with a sand pack, consisting of Morie #2 grade sand, to fill the annular space between the well screen and the borehole wall. Following placement of the sand pack, a Morie #00 sand pack will be used to create a fine sand layer between the Morie #2 sand pack and the bentonite pellet seal. Bentonite seals will consist of hydrated bentonite pellets. The remainder of the borehole annulus will be filled with a high solids bentonite grout. Construction of the wells will be similar for both on and off Site wells.

For each of the wells, a 2-inch diameter PVC riser will extend from the top of the screen to approximately 4-inches below ground surface and be fitted with a 6-inch diameter flush-mounted steel well vault and locking cover. The well vault will be cemented in place.

2.1.6.1 *Optional Off-Site Groundwater Monitoring Well Installation*

In the event that groundwater impacts are observed in the deep Magothy aquifer, the NYSDEC has requested that an optional monitoring well be installed off-Site. The monitoring well would be installed at the location of existing off-Site monitoring well N-10290 (170-feet bgs) and would be presumably screened at the zone equivalent of N-7560 screen elevation (242-feet bgs).

Upon receipt of final groundwater profile sampling results, a determination with agreement from the NYSDEC will be made as to whether installation of this monitoring well is merited. If the monitoring well is deemed necessary, an off-Site access agreement will need to be obtained and required Right-of-Way permitting (if necessary) and underground utility markouts will be completed. In addition, this newly installed monitoring well will be included in the proposed groundwater sampling event, discussed further in Section 2.1.7.

The NYSDEC has also requested that if Freon 22 contamination is detected in the Upper Glacial Aquifer, installation of Upper Glacial monitoring wells at LMC Cluster 37 (Lakeville Jewish Center) and Cluster 38 (Great Neck Public School) be considered and evaluated. Upon receipt of final groundwater profile sampling results, a determination with agreement from the NYSDEC will be made as to whether installation of one or both of these monitoring wells is merited. If the monitoring well(s) is deemed necessary, an off-Site access agreement will be obtained. If installed, this newly installed monitoring well(s) will also be included in the proposed groundwater sampling event, discussed in Section 2.1.7.

2.1.6.2 *Well Development*

Following the completion of the permanent monitoring well installation program, each monitoring well will be developed prior to groundwater sampling. The purpose of development is to:

- remove fine-grained materials from the sand pack and formation;
- reduce the turbidity of groundwater samples; and
- increase the yield of the well to reduce the potential of the well yielding an insufficient volume of water during groundwater sampling.

Monitoring wells will be developed as soon as possible, but not less than 24 hours after installation. The wells will be developed using procedures presented in SOP 14.

Monitoring Well Development

All data collected during monitoring well development will be recorded on a Well Development Data Sheet.

The applicable standard operating procedures that will be employed during this activity are summarized below and presented in Appendix A.

Section	Standard Operating Procedure
A.2	SOP 2 Water Level Measurement Procedure
A.3	SOP 3 Groundwater pH And Temperature
A.4	SOP 4 Measurement Of Groundwater Specific Conductance
A.5	SOP 5 Measurement Of Groundwater Turbidity
A.6	SOP 6 Measurement Of Groundwater Dissolved Oxygen
A.7	SOP 7 Measurement of Oxidation Reduction Potential
A.09	SOP 09 Groundwater Well Construction
A.10	SOP 10 Groundwater Well Development

2.1.7 *Groundwater Sampling*

Approximately two weeks following well development activities, groundwater samples will be collected from all newly installed monitoring wells and the existing supply well N-7560 and analyzed by a NYSDOH ELAP-certified laboratory for TCL VOCs and Freons using USEPA SW-846 Method 8260. The Laboratory will achieve a method detection limit (MDC) of 0.5 ppb and also report the ten highest concentration TICs present in the sample.

It is anticipated that USEPA traditional well sampling techniques will be utilized. Well purging will continue until the turbidity of the recovered well water is, if possible, less than 50 Nephelometric Turbidity Units (NTUs) and the pH, conductivity and temperature measurements of the purge water have stabilized within 10% for a minimum of three consecutive measurements. ERM's representative shall be responsible for collection of turbidity, pH, conductivity and temperature measurements.

The applicable standard operating procedures that will be employed during this activity are summarized below and presented in Appendix A.

Section	Standard Operating Procedure
A.1	SOP 1 Groundwater Sampling (Conventional & Low Flow)
A.2	SOP 2 Water Level Measurement Procedures
A.3	SOP 3 Groundwater pH and Temperature
A.4	SOP 4 Measurement of Groundwater Specific Conductance
A.5	SOP 5 Measurement of Groundwater Turbidity
A.6	SOP 6 Measurement of Groundwater Dissolved Oxygen

A.7	SOP 7 Measurement of Oxidation Reduction Potential

2.1.8 *Soil Gas and Indoor Air Sampling*

Four subslab soil gas and four indoor air samples will be collected at 400 Lakeville Road. The sampling will be carried out using the methodologies presented in the NYSDOH document entitled" Guidance for Evaluation Soil Vapor Intrusion in the State of New York, dated October 2006. Samples will be collected over a 24-hour period from four locations beneath the basement of 400 Lakeville Road and from adjacent basement areas. Sampling locations will be biased towards the east side of the building, nearest the former diffusion wells. Samples will be analyzed by an ELAP certified laboratory for VOCs and Freons using USEPA Method TO-15.

Section	**Standard Operating Procedure**
A.12	SOP 12 Sub Slabs Soil Gas Sampling
A.13	SOP 13 Indoor Air Sampling Using Summa® Canisters

2.1.9 *Management of Investigative Derived Wastes*

The following section describes the general protocols for handling and disposal of solid and liquid investigative derived waste (IDW) generated during the implementation of the PSA. Waste generated during the investigation is expected to consist of trash (boxes, paper, etc.), soil cuttings, decontamination wash water, groundwater monitoring well purge water, and used protective clothing.

The following guidance documents and regulations may be relied upon to guide the management, staging, storage and disposal of RI-generated IDW:

- NYSDEC's TAGM #4032 on " Disposal of Drill Cuttings" {November 21, 1989};
- NYSDEC's RCRA TAGM #3028 on " Contained-In Criteria for Environmental Media" {November 30, 1992};
- 40 C. F. R. Part 262 (Standards Applicable to Generators of Hazardous Waste);
- 40 C. F. R. Part 263 (Standards Applicable to Transporters of Hazardous Waste;
- 40 C. F. R. Part 264 (Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities); and
- 40 C. F. R. Part 268 (Land Disposal Restrictions).

Accordingly, handling and disposal will be as follows:

- Cuttings from soil borings and the tailings from the unused portion of the samples collected from on-Site and/or source areas will be collected on plastic sheeting and stored in reconditioned 55-gallon, New York State Department of Transportation (DOT) open-top drums to be provided by the ERM's drilling subcontractor. The borehole will be grouted by hand or with a tremie pipe. If necessary, the borehole will also be sealed at or near the ground surface with a non-shrinking impermeable material to prevent the hole from acting as a conduit for surface runoff.

- Cuttings from monitoring well installations will be collected on plastic sheeting and stored in reconditioned 55-gallon, New York State Department of Transportation (DOT) open-top drums to be provided by the ERM's drilling subcontractor. The annuli of the monitoring wells will be backfilled using tremie pipes to avoid bridging. As specified in Standard Operating Procedure 13 (SOP-13, Appendix A), annuli will be backfill with a cement/bentonite grout.

- With the exception of confining layers, cuttings and tailings generated from soil borings and monitoring well installations in off-Site and non-source area locations will be placed back down the borehole. Confining layers will be pressure grouted with cement/bentonite.

- Liquids generated from equipment decontamination, temporary and permanent groundwater monitoring well development/purging will be collected in drums at the point of generation. The collected water will be transported and temporarily stored in a frac tank that will be staged on the Site. The water will be sampled for VOCs and then disposed of appropriately.

- Used protective clothing and equipment that is suspected to be contaminated with hazardous waste will be placed in plastic bags, packed in 55-gallon ring-top drums.

- All drums will be labeled according to the borehole/well number. The drilling subcontractor shall move the drums on a daily basis at the direction of ERM's representative to the staging area.

- ERM will procure waste transport and disposal subcontractor services to properly dispose of all IDW in accordance with all local, State and Federal regulations.

- Non-contaminated trash, debris and protective clothing will be placed in a trash dumpster and disposed of by a local garbage hauler.

2.1.10 *Analytical Data Quality Evaluation*

Data quality objectives and analytical requirements are detailed in the QAPP (Appendix B). All laboratory data will be reviewed and qualified as necessary by an ERM QA/QC officer. Data usability will be assessed by direct comparison to the specified data quality objectives and/or procedures set forth in the QAPP. ERM's (QA/QC) Officer will validate the data from the sampling of the permanent monitoring wells and prepare a validation report to be submitted to the NYSDEC along with "Category B Deliverables".

2.1.11 *Site Survey*

At the completion of field sampling activities a New York State licensed surveyor will establish the location and elevation of each newly installed waterloo profile boring and monitoring wells. Elevations of all riser pipes, protective well casings and ground surfaces and their corresponding latitude and longitude coordinates will be determined to within 0.01 feet, +/- 0.01 feet based on the NGVD 86 datum. A notch will be placed in all interior casings to provide the reference point from which to collect future groundwater elevation measurements.

All surveyor collected latitude, longitude and elevation data will be provided to ERM in an ASCII file and imported in to GISKEY database format.

An aerial survey map will be used as a base map and all existing and newly installed wells will be accurately located and plotted on the aerial. Vertical elevation data together with depth to water measurements will be used to prepare a water table contour map.

2.2 *PRELIMINARY SITE ASSESMENT REPORT PREPARATION*

The PSA Report will be prepared following completion of all PSA field activities, and the reduction, validation and interpretation of the data. The PSA Report will provide a summary of the Scope of Work, methods, results, conclusions and recommendations from the PSA. It will present a any available waste disposal history, the environmental setting, contamination assessment, and hydrogeology. The PSA Report will also identify any data gaps that require further investigation and recommend any IRMs, if required. Further details concerning essential components to the PSA Report are discussed below.

- Reporting: The historic records will be appended to the Draft PSA Report.

- Summary of Site History and Conditions: The report will include all of the information collected during the historic records and file search and a section detailing the geologic and hydrogeologic conditions.
- Summary of Field Work: The report will include a detailed summary of investigative and analytical methods related to the fieldwork performed during the PSA. This account will include figures and tables to show sample locations, parameters analyzed for, etc.
- Summary of Analytical Data: Using tables and maps, the report will summarize to the extent possible, all of the analytical data collected during the PSA and historical records search.
- Comparison to State Standards, Criteria and Guidelines (SCGs): The PSA Report will identify SCGs. The concentrations of each contaminant detected will be compared to the SCGs.
- Evaluation of Data Collected: The completeness of the data collected during the PSA will be evaluated. ERM will make recommendations on ways to fill these data gaps, if required.

All reports and correspondence will be provided in Adobe Acrobat format in addition to providing paper copies.

3.0 *MONTHLY PROGRESS REPORTING*

ERM will submit Monthly Progress Reports (MPRs) to NYSDEC on or before the 20th of each month following Notice-To-Proceed. Each MPR will address the following topics:

- Accomplishments during the reporting period.
- Problems encountered during the reporting period.
- Compliance with project schedule and budget.
- Projected changes in Scope of Work.

All raw and validated data will be forwarded to the NYSDEC as soon as it becomes available. All reports and correspondence will be provided in Adobe Acrobat format in addition to providing paper copies.

4.0 *DETAILED WORK ASSIGNMENT SCHEDULE*

The NS-LIJ 400 Lakeville Road PSA Implementation Schedule, including milestones and deliverables for the PSA is presented in Figure 4-1.

The schedule contemplates a DATE start for field activities. ERM will endeavor to adhere to the schedule at all times, but there are several critical path items related to execution of the PSA fieldwork (i.e. drilling site access and logistical issues) and several cycles of draft/final document review by NS-LIJ and NYSDEC. As such, it may be necessary to modify and revise the schedule as the PSA progresses because of:

- Potential new requirements or activities that may be requested by the NYSDEC and/or the Town of North Hempstead;
- Force majeure;
- Severe weather conditions preventing timely completion of scheduled field activities; or
- Other matters beyond ERM's or LIJMC's reasonable anticipation and control.

5.0 *PROJECT STAFFING PLAN*

Staffing for the NS-LIJ 400 Lakeville PSA will be from ERM's Melville New York, and New York City Offices.

While all personnel involved in an investigation and in the generation of data are implicitly a part of the overall project management and QA program, certain members of the Project Team have specifically designated responsibilities. Project Team members with specific management and QA roles in the PSA are the ERM Principal in Charge (PIC), the ERM Project Manager (PM), the ERM Field Team Leader (FTL) and the ERM QA/QC Officer. In the following sections, the roles and responsibilities of key personnel are identified.

5.1 *ERM PRINCIPAL IN CHARGE*

The ERM PIC, Mr. Earnest Rossano. Mr. Rossano will oversee the ERM PM, and be responsible for all technical aspects of the project including the overall quality of the project and project deliverables for ERM. Mr. Rossano has extensive experience with the management and coordination of multi-disciplinary investigation and remedial projects in New York State.

5.2 *ERM PROJECT MANAGER*

The ERM PM, Dr. Gregory Shkuda, Ph. D, will report to the ERM PIC. Dr. Shkuda, will oversee the ERM QA/QC Officer and the ERM FTL, field investigation staff, and any subcontractors. Dr. Shkuda, will also be responsible for all technical aspects of the project for ERM. This includes scheduling, communicating to the ERM PD, technical development and review of all field activities, subcontracting, and the overall quality of the project and project deliverables for ERM. Dr. Shkuda will be the primary contact between ERM and NS-LIJ and NYSDEC. Dr. Shkuda, has extensive experience in the management and coordination of multi-disciplinary investigation and remedial projects in New York State.

5.3 *ERM QA/QC OFFICER*

The QA/QC Officer, Mr. Andrew Coenen, will report to the ERM PM and the ERM PD. Mr. Coenen will be responsible for interface with the analytical laboratory, third party data validator, and will prepare the Data Usability Report that ERM will prepare as part of this WA. Mr. Coenen will have overall responsibility for QA/QC review of all analytical data generated during the field investigation, data validation and qualification of analytical results in terms of data usability. Mr. Coenen has extensive analytical laboratory experience and experience in the validation of analytical data and the protocols and QC specifications of the analytical methods listed in the NYSDEC ASP and the data validation guidance, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data review (February 1994) and USEPA Region II CLP Data Review SOP.

5.4 *ERM FIELD TEAM LEADER*

The FTL, Mr. Michael Mattern, will report to the ERM PM and the ERM PIC. Mr. Mattern will be responsible for the day-to-day management and coordination of ERM field staff and subcontractors. Mr. Mattern will be responsible for the implementation and quality of the field activities. Mr. Mattern has extensive environmental field investigation/subcontractor oversight experience in New York State.

5.5 *PROJECT HEALTH AND SAFETY COORDINATOR*

Ms. Paulina Gravier will be the Project Health and Safety Coordinator. Ms. Gravier will report to the ERM PM and the ERM PIC. Ms. Gravier has extensive experience as a Project Health and Safety Coordinator for multi-disciplinary investigation and remedial projects in New York State. Ms. Gravier's experience includes the preparation and implementation of site-specific health and safety plans, field oversight, and field health and safety audits.

6.0 *CITIZEN PARTICIPATION*

Public Information Repositories will be established at two local libraries. Initially, copies of the PSA Work Plan will be placed in the repositories. As additional documents and/or reports become available, copies will also be placed in the repositories. The two libraries that will be used as repositories, there are:

Hillside Public Library
155 Lakeville Road
New Hyde Park, New York 11040
516.355.7850

Great Neck Library
Parkville Branch
10 Campbell Street
New Hyde Park, New York, New York 11040

7.0 *REFERENCES*

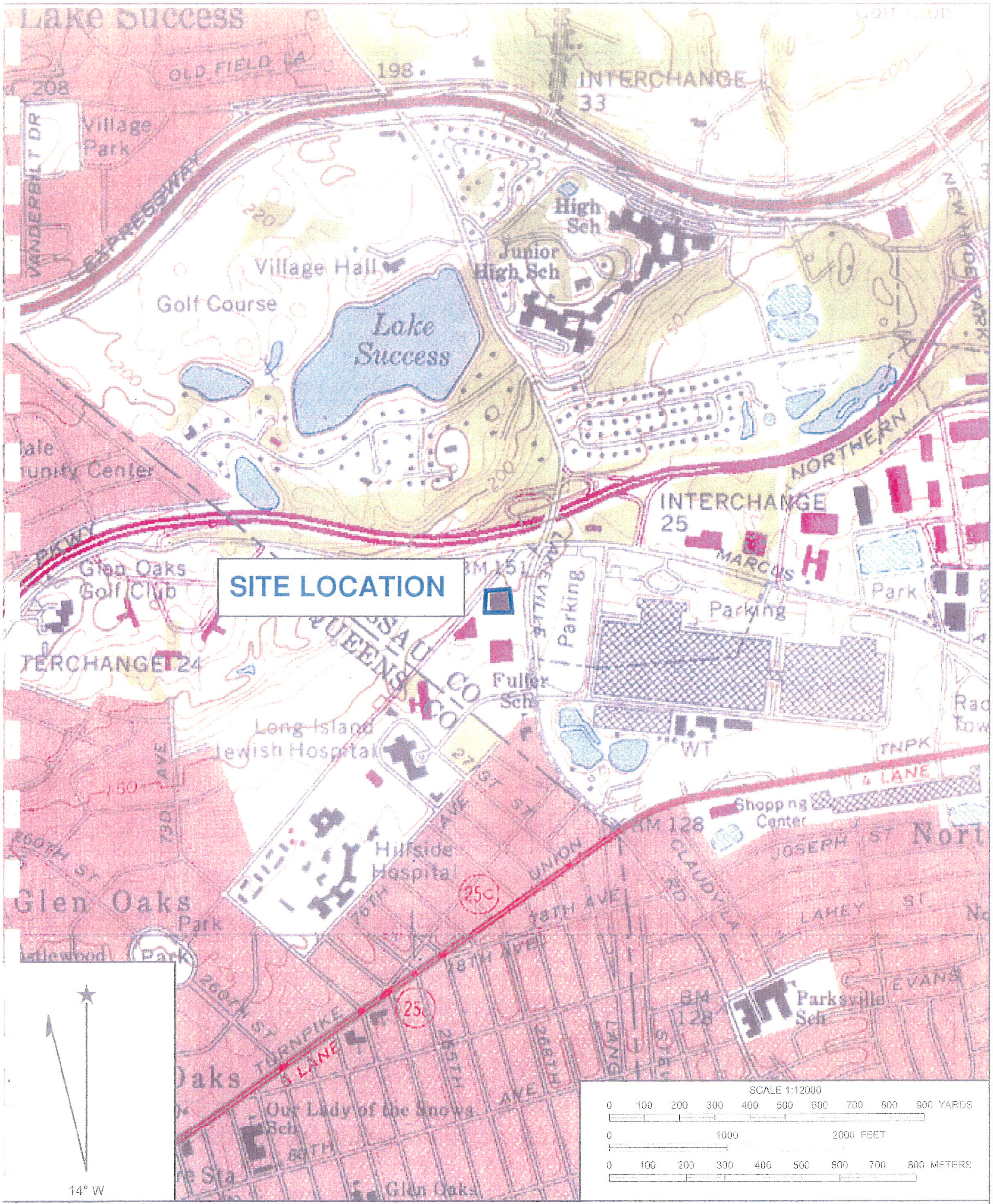
NYSDEC, 1989. Division Technical and Administrative Guidance Memorandum (TAGM): Disposal of Drill Cuttings. Division of Hazardous Waste Remediation. HWR-94-4032. 21 November 1989.

NYSDEC, 1991. New York State Water Classifications - 6 NYCRR 701. 2 August, 1991

NYSDEC, 1992. Division Technical and Administrative Guidance Memorandum (TAGM): "Contained-In" Criteria For Environmental Media. Division of Hazardous Substance Regulation. HWR-92-3028. 30 November 1992.

NYSDEC, 1994. Division Technical and Administrative Guidance Memorandum (TAGM): Determination of Soil Cleanup Objectives and Cleanup Levels. Division of Hazardous Waste Remediation. HWR-94-4046. 24 January 1994.

NYSDEC, 1998. New York State Groundwater Quality Standards - 6 NYCRR 703 (12 March 1998) and Division of Water Technical and Operational Guidance Series (1.1.1) - Ambient Water Quality Standards and Guidance Values, (June 1998), Errata Sheet (January 1999), and Addenda (April 2000).



Name: SEA CLIFF
Date: 3/8/2007
Scale: 1 inch equals 1000 feet

Location: 040° 45' 27.88" N 073° 42' 20.93" W
Caption: Fig 1-1 Site Area Location
400 Lakeville Road
Lake Success, LIJMC

NO.	DATE	APPR.	REVISION	NO.	DATE	APPR.	REVISION

LIJMC

Environmental Resources Management

ERM

CHECKED	DATE
DESIGN ENGINEER	
PROJECT ENGINEER	
PROJECT MANAGER	
APPROVED	
APPROVED	

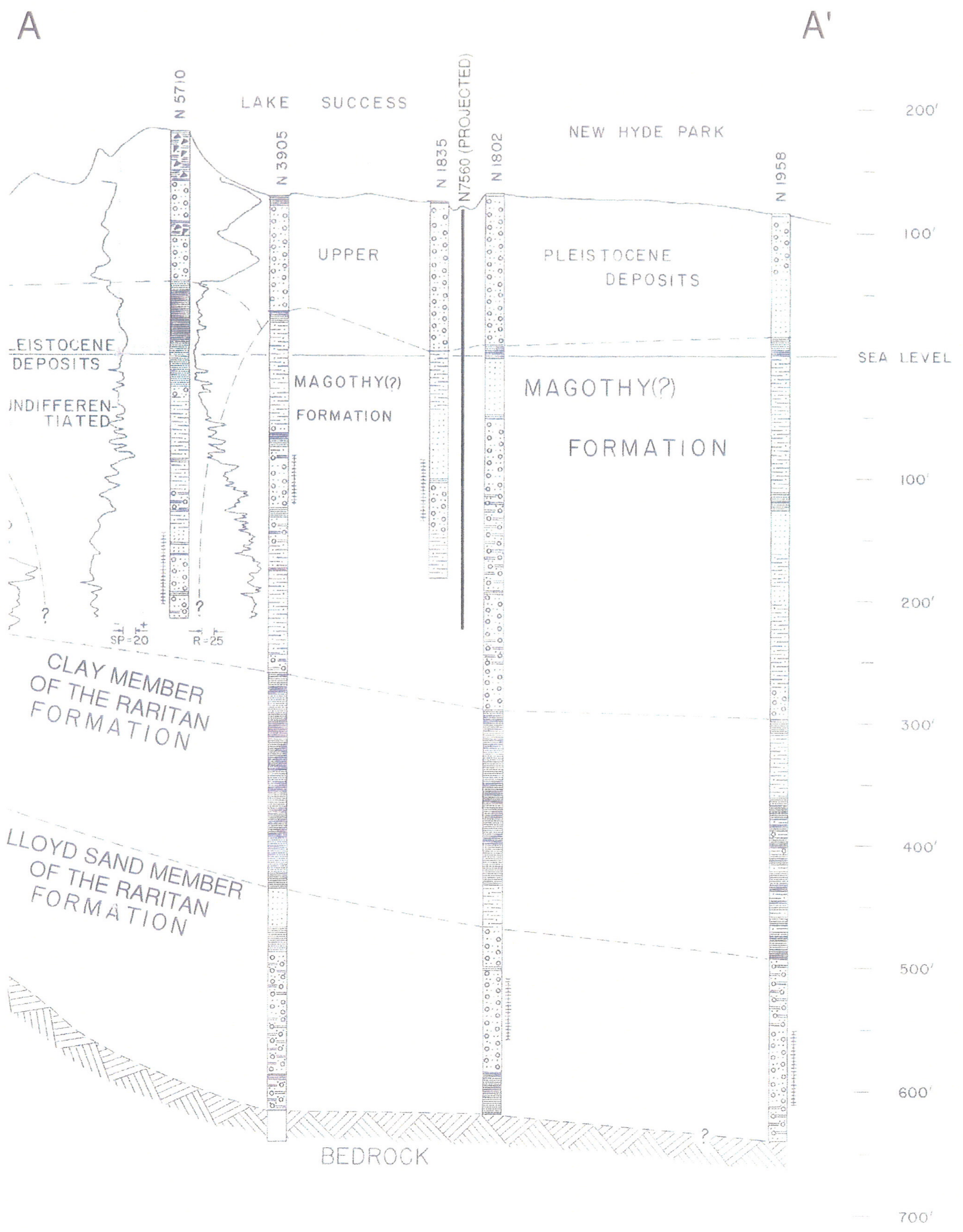
SITE LAYOUT
400 LAKEVILLE ROAD

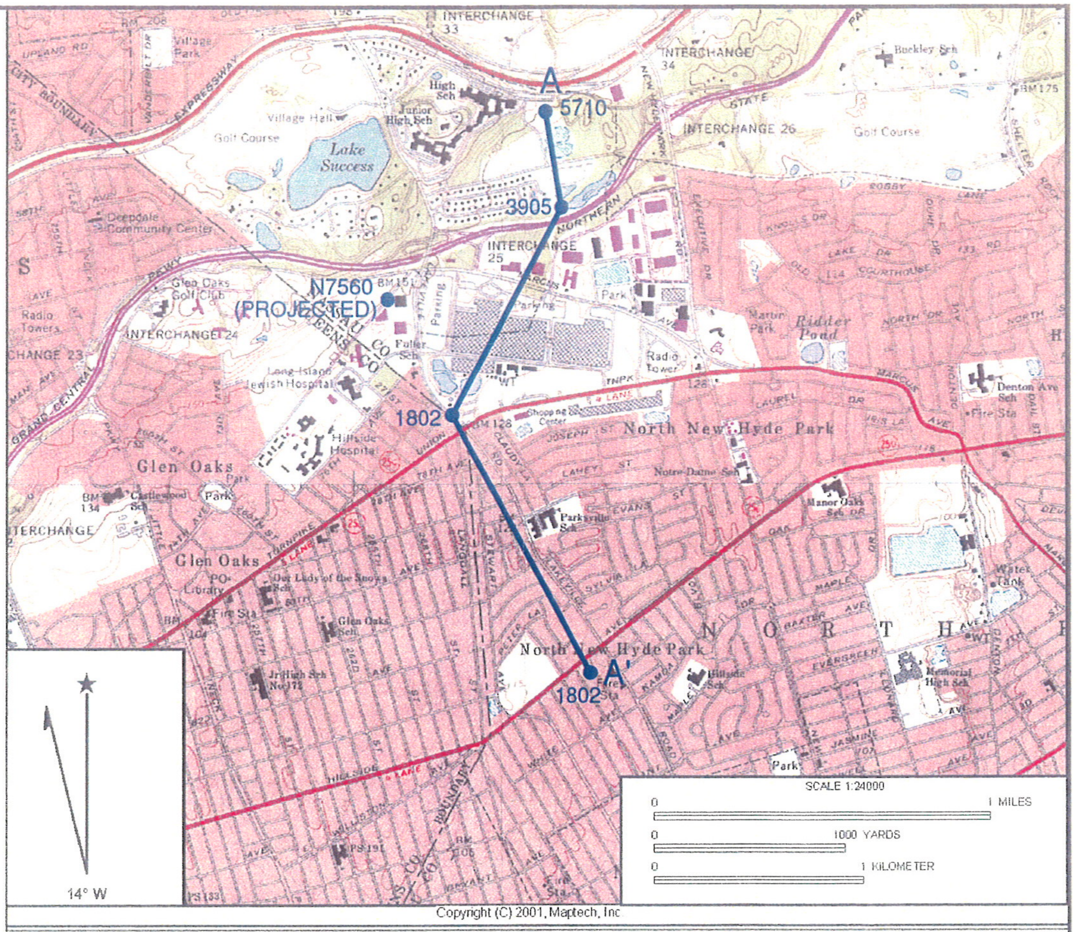
DRAWN EMF	DATE 3/2/07	REVISION DATE:
SCALE GRAPHIC	JOB NO.: 0030777	FILE NAME: 0030777-01-008

DRAWING NO. 1-2

REV. NO.

SHEET OF





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TITLE

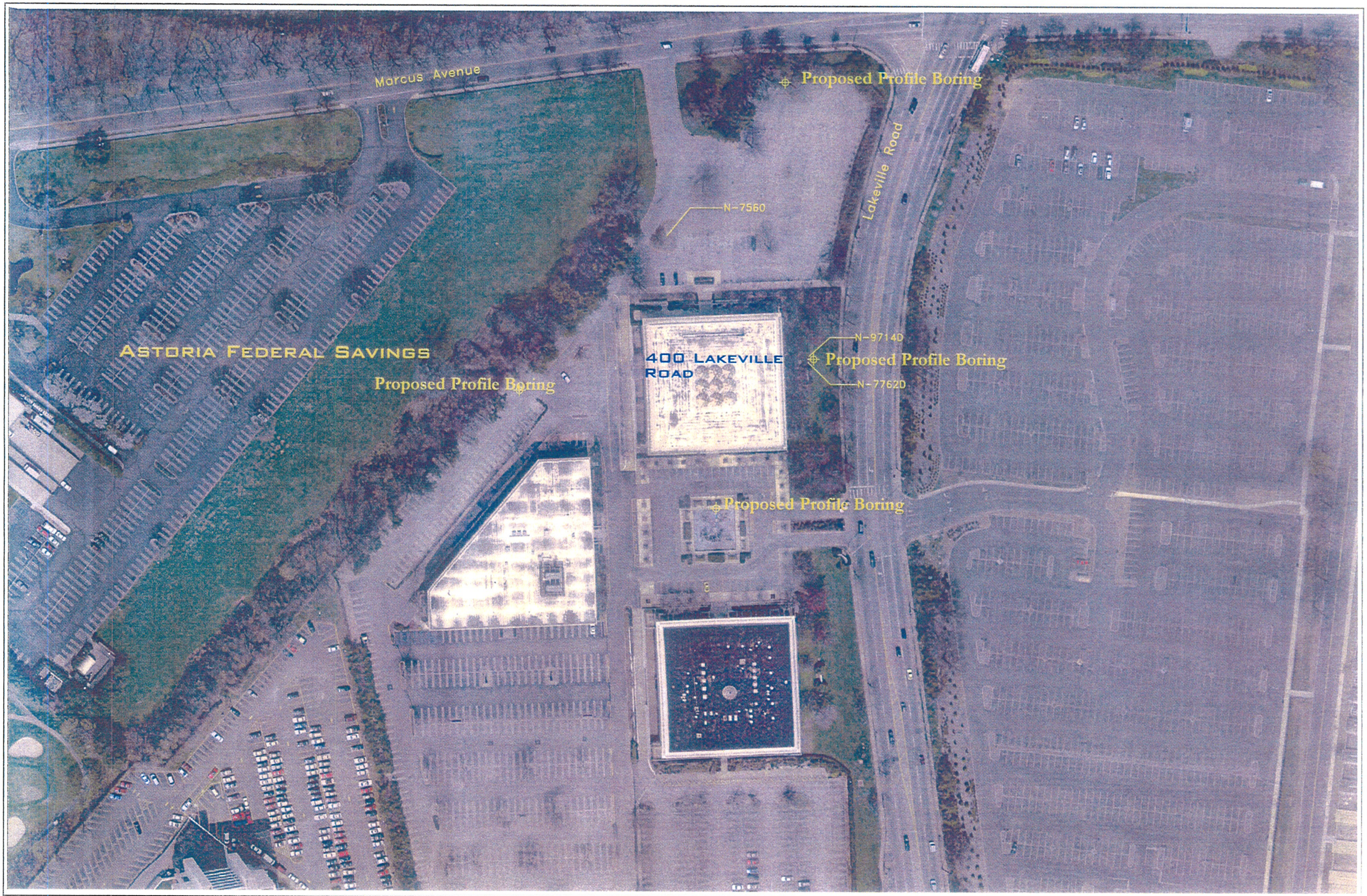
GEOLOGICAL CROSS SECTION A–A'

PREPARED FOR

LIJMC

ERM Environmental Resources Management

DRAWN: EG/EMF	JOB NO.: 0030777	FILE NAME: 0030777-01-003	SCALE GRAPHIC DATE 3/6/07	FIGURE 1–3



LIJMC

ERM Environmental Resources Management

PROPOSED MONITORING WELL
VERTICAL PROFILE BORING LOCATIONS
400 LAKEVILLE ROAD

DRAWN EMF
DATE 3/2/07
SCALE GRAPHIC
JOB NO. 0030777
FILE NAME 0030777-01-007
DRAWING NO. 2-1

TITLE

PROPOSED MONITORING
WELL LOCATIONS
400 LAKEVILLE ROAD

PREPARED FOR

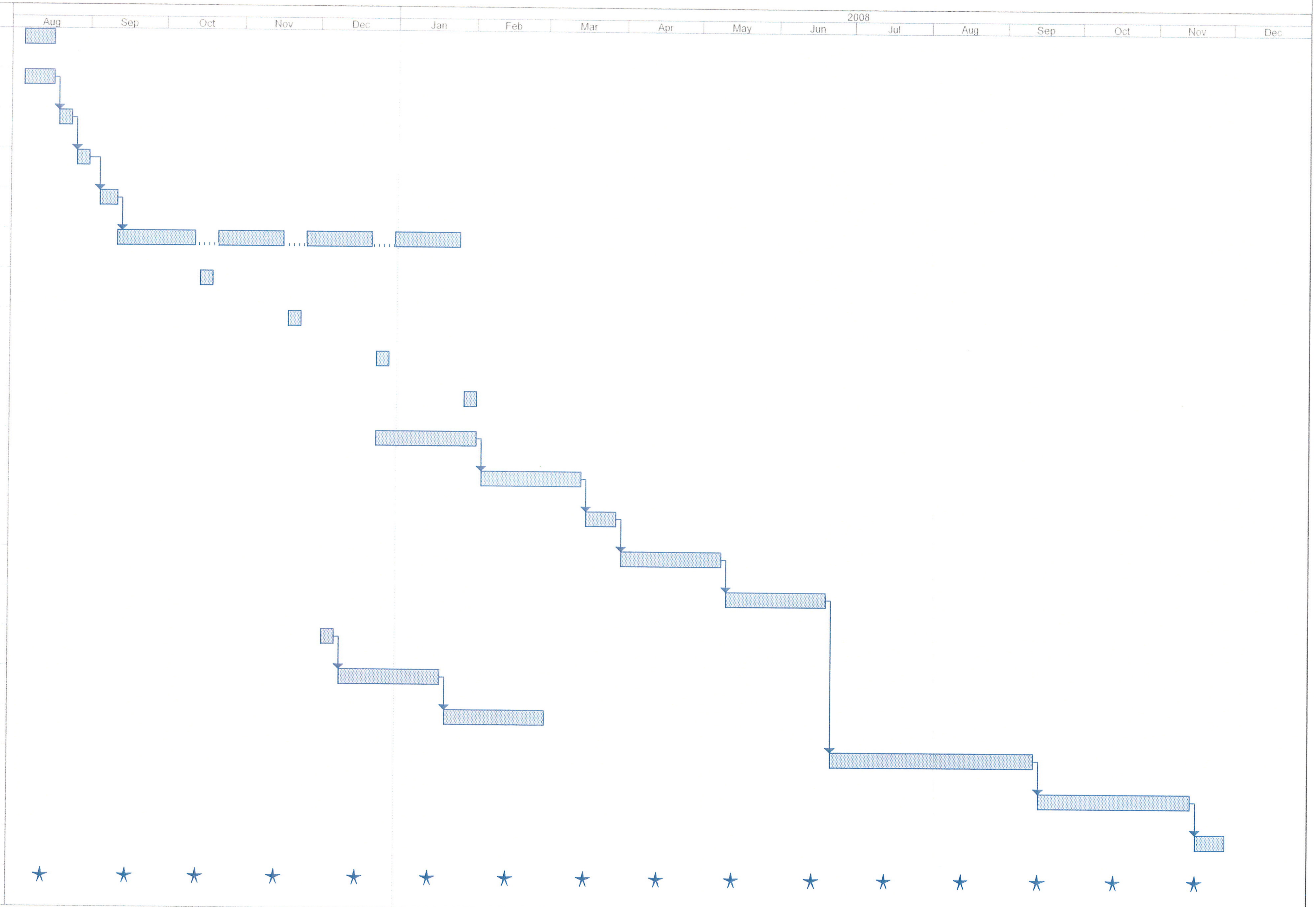
LIJ Medical Center

ERM Environmental Resources Management

DRAWN:	JOB NO.:	FILE NAME:	SCALE / DATE	FIGURE
LIJ	0030777	0030777.01.09	6-07	2-2

TABLE 4-1
PROJECT SCHEDULE PRELIMINARY SITE ASSESSMENT
400 LAKEVILLE ROAD, NEW HYDE PARK, NY

ID	Task Name
1	Historic records Search
2	Site Access
3	Utility Markouts
4	Mobilization
5	Vertical Profile Soil Sampling
6	Vertical Profile Sampling
7	Monitoring Well Installation
8	Monitoring Well Installation
9	Monitoring Well Installation
10	Monitoring Well Installation
11	Off-Site Access
12	Off-Site Monitoring Well Installation
13	Groundwater Sampling
14	Laboratory Analysis
15	Data Validation
16	Soil Gas and Indoor Air Sampling
17	Laboratory Analysis
18	Data Validation
19	Draft Preliminary Site Assessment Report
20	NYSDEC Review
21	Final Preliminary Site Assessment Report
22	Monthly Reporting



TABLES

Table 1
LONG ISLAND JEWISH MEDICAL CENTER
GROUND WATER SAMPLING RESULTS N-7560
400 Lakeville Road, New Hyde Park, New York

PERIOD: April 2005 and May 2007
SAMPLE TYPE: Water

CONSTITUENT	SITE SAMPLE ID DATE	NYSDEC TOGS	N-7560 SW-01 04/15/2005	N-7560 SW-01-STD 06/10/2005	N-7560 SW-01-LF 06/10/2005	N-7560 N-7560 05/17/2007
1,1,1-Trichloroethane	(ppb)	5	10 U	1 U	1 U	0.074 U
1,1,2,2-Tetrachloroethane	(ug/l)	5	10 U	1 U	1 U	
1,1,2-Trichloroethane	(ppb)	1	10 U	1 U	1 U	0.19 U
1,1-Dichloroethane	(ppb)	5	10 U	1 U	1 U	0.11 U
1,1-Dichloroethene	(ppb)	5	10 U	1 U	1 U	0.11 U
1,2,4-Trichlorobenzene	(ppb)	5	10 U	1 U	1 U	0.14 U
1,2-Dibromoethane	(ppb)	0.0006	10 U	1 U	1 U	0.1 U
1,2-Dichlorobenzene	(ppb)	3	10 U	1 U	1 U	0.092 U
1,2-Dichloroethane	(ppb)	0.6	10 U	1 U	1 U	0.1 U
1,2-Dichloropropane	(ppb)	1	10 U	1 U	1 U	0.11 U
1,3-Dichlorobenzene	(ppb)	3	10 U	1 U	1 U	0.11 U
1,4-Dichlorobenzene	(ppb)	3	10 U	1 U	1 U	0.066 U
2-Butanone	(ppb)	50	10 U	3 U	3 U	0.42 U
2-Hexanone	(ppb)	50	10 U	1 U	1 U	5 U
4-Methyl-2-Pentanone	(ppb)		10 U	1 U	1 U	5 U
Acetone	(ppb)	50	10 U	5 U J	5 U J	2.7 U
Benzene	(ppb)	1	10 U	1 U	1 U	0.087 U
Bromodichloromethane	(ppb)	50	10 U	1 U	1 U	0.062 U
Bromoform	(ppb)	50	10 U	1 U	1 U	0.16 U
Bromomethane	(ppb)	5	10 U	1 U J	1 U J	0.85 U
Carbon Disulfide	(ppb)	60	10 U	1 U	1 U	0.13 U

STD - Standard Three Well Volume Purge
LF - Low Flow Sample Collection

Table 1
LONG ISLAND JEWISH MEDICAL CENTER
GROUND WATER SAMPLING RESULTS N-7560
400 Lakeville Road, New Hyde Park, New York

PERIOD: April 2005 and May 2007
SAMPLE TYPE: Water

	SITE		N-7560	N-7560	N-7560	N-7560
CONSTITUENT	SAMPLE ID	NYSDEC	SW-01	SW-01-STD	SW-01-LF	N-7560
	DATE	TOGS	04/15/2005	06/10/2005	06/10/2005	05/17/2007
Carbon Tetrachloride	(ppb)	5	10 U	1 U	1 U	1.58 U
Chlorobenzene	(ppb)	5	10 U	1 U	1 U	0.14 U
Chlorodifluoromethane	(ppb)	5	4 J	[5]	[5]	2.89
Chloroethane	(ppb)	5	10 U	1 U	1 U	0.32 U
Chloroform	(ppb)	7	10 U	1 U	1 U	0.066 U
Chloromethane	(ppb)	5	10 U	1 U	1 U	0.42 U
cis-1,2-Dichloroethene	(ppb)	5	[21]	[20]	[20]	[11.97]
cis-1,3-Dichloropropene	(ppb)	0.4	10 U	1 U	1 U	0.056 U
Cyclohexane	(ppb)		10 U	1 U	1 U	5 U
Dibromochloromethane	(ppb)	50	10 U	1 U	1 U	0.16 U
Dibromochloropropane	(ppb)	0.04	10 U	3 U	3 U	10 U
Dichlorodifluoromethane	(ppb)	5	10 U	1 U J	1 U J	0.3 U
Ethylbenzene	(ppb)	5	10 U	1 U	1 U	0.094 U
Freon 113	(ppb)	5	10 U	1 U	1 U	0.17 U
Freon 115	(ug/l)	5		1 U	1 U	
Freon 123	(ug/l)	5		1 U	1 U	
Freon 152a	(ug/l)	5		1 U	1 U	
Isopropylbenzene	(ppb)	5	10 U	0.8 J	1 U	0.067 U
Methyl Acetate	(ppb)		10 U	1 U	1 U	5
Methyl Cyclohexane	(ppb)		10 U	1 U	1 U	5
Methyl Tertiary Butyl Ether	(ppb)	10	10 U	1 U	1 U	0.45 U

STD - Standard Three Well Volume Purge
LF - Low Flow Sample Collection

[x]=Greater than Action Level

Table 1
LONG ISLAND JEWISH MEDICAL CENTER
GROUND WATER SAMPLING RESULTS N-7560
400 Lakeville Road, New Hyde Park, New York

PERIOD: April 2005 and May 2007
SAMPLE TYPE: Water

CONSTITUENT	SITE SAMPLE ID DATE	NYSDEC TOGS	N-7560 SW-01 04/15/2005	N-7560 SW-01-STD 06/10/2005	N-7560 SW-01-LF 06/10/2005	N-7560 N-7560 05/17/2007
Methylene Chloride	(ppb)	5	10 U	2 U	2 U	0.19 U
Styrene	(ppb)	5	10 U	1 U	1 U	0.079 U
Tetrachloroethene	(ppb)	5	4 J	4	3	1.62
Toluene	(ppb)	5	10 U	1 U	1 U	1.05
trans-1,2-Dichloroethene	(ppb)	5	10 U	1 U	1 U	0.18 U
trans-1,3-Dichloropropene	(ppb)	0.4	10 U	1 U	1 U	0.18 U
Trichloroethene	(ppb)	5	4 J	4	4	2.64
Trichlorofluoromethane	(ppb)	5	10 U	1 U	1 U	0.22 U
Vinyl chloride	(ppb)	2	10 U	1 U	1 U	0.39 U
Xylene (total)	(ug/l)	5	10 U	3 U	3 U	
1,1,1,2-Tetrachloroethane	(ppb)	5				0.094 U
1,2-Dichloro-1,1,2-trifluoroethane	(ppb)					5 U
Dichlorofluoromethane	(ppb)	5				5 U
m+p-Xylene	(ppb)					0.15 U
o-Xylene	(ppb)	5				0.14 U

STD - Standard Three Well Volume Purge
LF - Low Flow Sample Collection

APPENDIX A
STANDARD OPERATING PROCEDURES (SOPS)

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APPENDIX A

STANDARD OPERATING PROCEDURES (SOPS)

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A.0 *STANDARD OPERATING PROCEDURES*

A.1 *WATERLOO VERTICAL PROFILE BORINGS WITH GROUNDWATER SAMPLING*

Vertical profile borings with groundwater sampling utilizing the Waterloo Groundwater profiler will be installed at four (4) on-Site locations to characterize on-Site groundwater quality/impacts. These vertical profile borings will be advanced to the depth equivalent of the N-7560 on-Site supply well screen zone (estimated at approximately 250 feet bgs).

The Vertical Profile, groundwater samples will be collected every ten feet from the initial water table sample to a depth of 250 feet bgs. This technique will refine the understanding of the plume configuration. Approximate locations for the Vertical Profile borings are shown in Figure 2-1.

A New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) -certified laboratory will analyze the groundwater samples obtained from these locations for USEPA SW-846 Method 8260. Expedited 24 to 48 hour turn-around will be requested for the groundwater samples collected from the groundwater profiles. The accelerated analyses will permit installation of a monitoring well in the borehole after the final depth has been reached.

A.1.1 *Drilling Methods*

All boreholes will be advanced using direct push technologies unless depth requirements prohibit this technology. In the event the limits of direct push technology are exceeded, a change will be made in the field to a hybrid drilling approach combining direct push techniques with conventional drilling techniques. Specifically a Geoprobe GH60 hammer is mounted on a CME 1050 or a Mobile B80. The drill rig will use a mud rotary technique with a casing advancer. Casing will be 3-inch in diameter and advanced to just above the water table (40-50 ft. below ground surface) using this mud rotary technique. The profiler, equipped with a protective sheath to prevent mud intrusion, will be lowered down the casing to the bottom. The Profiler will then be driven to a depth of approximately 3 feet below the water table where the first sample will be collected. Samples will then generally be collected at a ten-foot interval spacing. Once the profiler encounters refusal, or when it is 100 feet outside the casing, the profiler will be tripped out, the casing will be advanced to a depth that is at least 5 feet less than the next target sample interval, and the profiler will be tripped back in. The profiler is removed and replaced in the hole in 10 to 20 foot sections to shorten tripping time.

A.1.2 *Drilling Equipment Decontamination*

All drilling equipment and the back of the drilling rig shall be decontaminated by steam cleaning prior to performance of the first boring/well installation and between all subsequent borings/well installations. This shall include all hand tools, casing, augers, drill rods and bits, tremie pipe and other related tools and equipment. The steam cleaning equipment shall be capable of generating live steam with a minimum temperature of 212° degrees Fahrenheit. The equipment shall be cleaned to the satisfaction of the ERM's representative.

A.1.3 *Source of Water*

Drilling mud shall be isolated from any sampling equipment. All water used to prepare drilling mud and/or steam cleaning operations shall be from a potable source and so designated in writing. ERM's drilling subcontractor will be solely responsible for obtaining all permits from the local water purveyor and any other concerned authorities, and provision of any required back-flow prevention devices.

A.1.4 *Waterloo Groundwater Sample Collection*

In the Vertical Profiles, groundwater samples will be collected every ten (10)-feet from the initial water table sample to a depth of 250 feet bgs. ERM's drilling subcontractor will be responsible for provision of the Waterloo sampling tool and all necessary accessory items (reusable and disposable) to collect groundwater samples.

The effectiveness of the Waterloo Profiler is based on the premise that the device causes minimal drag down of contamination as it is driven through high contaminant zones into zones of little or no contamination.

The Profiler head consists of a stainless steel drive point with six 5/32-inch diameter circular ports fitted with stainless steel screens. Screen mesh sizes may be selected based on the grain size of the aquifer materials. The ports convey water into a common internal fitting tip. Stainless steel or Teflon® tubing is attached to the internal fitting using couplings. The profiler head screws into conventional AW drill rods. The stainless steel tubing is coupled in five (5) foot lengths, but the Teflon® tubing is used in a disposable continuous length. The small storage volume in the profiler and conduit tubing provides rapid transmission of the water sample to the surface. Sample bottles are fitted into stainless steel sampling caps in which an airtight seal is obtained. Because of the depth of the water table, groundwater samples will be collected using a nitrogen airlift pump. Purging of the sample containers prior to sampling ensures that formation water exists in the vials at the time of collection. The sampling tubing is protected in the AW drill rod used to drive the tip.

While the Profiler is being driven, contaminant free water, such as distilled water, is pumped down the tubing and out the small ports to purge the Profiler of formation water from the previous sampling interval and to prevent clogging of the ports. As the Profiler reaches sampling depth, the pump is reversed to begin pumping water to the surface, minimizing the introduction of foreign water to the zone to be sampled. Prior to collection, the ports are developed and the system is purged. The amount of water introduced into the formation is monitored during drilling. Samples are collected after the water introduced into the formation is recovered and field parameters such as oxidation-reduction potential, temperature, pH, dissolved oxygen and specific conductance stabilize.

Initially the continuous point sampler will be advanced to just above the designated sample depth starting with the upper most sample in the profile. The Profiler will be used to collect groundwater samples at multiple depths without tripping out the tool. The Profiler will be advanced in ten-foot intervals to collect the groundwater samples using the procedures presented above. Waterloo groundwater sample collection will continue to the borehole termination depth to be determined in the field. Once the desired numbers of sample have been obtained, the Profiler will be tripped out of the boring.

If necessary the Profiler will be properly decontaminated and re-introduced into the borehole to collect additional samples.

A.1.5 *Borehole Abandonment*

In the event that a borehole will not be converted to monitoring wells, the boring will be properly abandoned to prevent an artificial conduit for vertical groundwater flow through any confining layers. After sampling, the borehole beneath the water table will be sealed by pumping a high-solids grout down the inside of the rods and out the bottom by displacing a disposable steel point. The grout is pumped down the rods while the rod assembly is withdrawn from the hole in a process known as retraction grouting. The rod assembly will then be removed from the borehole and the excess drill cuttings and the tailings from the unused portion of the samples will be placed back down the borehole. The remaining two feet will be filled with cement/bentonite grout, consisting of 5.0 pounds of high grade bentonite for each 94 pounds of Type I or Type II Portland cement mixed with 8.3 gallons of water for a target density of 13.9 pounds/gallon with an acceptable range of 13.4 to 14.5 pounds/gallon. Boreholes constructed in paved areas will then be repaired with an asphalt patch.

A.1.6 *Work Site Restoration*

Upon completion of the work, the drilling subcontractor shall restore all work areas/drilling locations to a pre-drilling condition. The drilling subcontractor shall remove and dispose of all debris, remove all equipment and materials from the each work site promptly and leave the location in a neat and orderly fashion to the satisfaction of ERM's representative. The restoration shall include repair of any holes, trenches, tire ruts, damage to pavement, etc. caused by the movement or operation of the drilling subcontractor's equipment.

A.2 *SOP 2: SOIL SAMPLE COLLECTION*

A.2.1 *Lithologic Sample Collection*

Split-spoon soil samples or Geoprobe Macrocores shall be collected at ten-foot intervals to the water table at the Profile boring located adjacent to diffusion wells N-9741D and N-7762D.

All soil sampling shall be performed by driving two-foot split-barrel (split-spoon) samplers or Geoprobe Macrocore Sample Barrel in advance of the bottom of the borehole. Split-spoon samplers shall be driven in accordance with the general intent of ASTM Standards for Penetration Test and Split-Barrel Sampling of Soils (ASTM D1586-84).

Split-spoons will be advanced by either the wire-line method (downhole cable hammer) or with a cathead and standard 140-pound hammer simulating a free-fall of 30 inches. The soil samples will be collected using a properly decontaminated 2-foot by 2-inch carbon steel split-spoon sampler driven by a 140-lb. hammer dropped 30 inches repeatedly. An ERM Hydrogeologist will examine and identify the sample immediately upon collection. The sample will also be screened for VOCs using a hand-held photoionization detector (PID) total organic vapor analyzer as specified in SOP 3: Organic Vapor Screening.

All soil samples will be jarred upon completion of screening. A total of two (2) samples from the borehole will be submitted for laboratory analysis based on the following criteria:

- the soil sample exhibiting the highest PID reading in the borehole will submitted for VOC analysis 8260B plus Freons; and
- the soil sample from immediately above the water table (estimated at 105-feet bgs) will be submitted for VOC analysis 8260B plus Freons.

In the event that no PID detections are observed in the borehole then only the soil sample from immediately above the water table will be submitted for laboratory analysis

Soil samples will be submitted for laboratory analysis and analyzed by method 8260B plus Freons.

A.2.2 *Borehole Logging*

The ERM Hydrogeologist will examine each split-spoon/Macrocore sample and use visual and field test criteria to classify the soils. The cuttings brought to the surface during the drilling will also be:

- Screened for VOCs using a hand-held PID total organic vapor analyzer; and

- Examined for any physical soil characteristics that may have not been observed in the split-spoon samples.

A standard "Geologic Log" will be maintained for each boring that will include all of the geological information gathered in the field, including the following:

- The structure of the soils sampled, including layering stratification features, and the dominant soil types;
- The color of soils, using Munsell Soil Color Charts;
- The moisture content of soils;
- Soil grain features, including grain sizes, degree of sorting or grading, angularity, and mineralogy. The soils will be classified using the ASTM Method D2488-84, a visual manual procedure;
- Identification of any rock fragments, organic material or other components; and
- The consistency of clay-dominated soils.

All of the soil information collected will be recorded as a designation under the USCS along with additional observations for each distinctive soil type within each sample. All soil samples will be collected and stored in glass jars or plastic ziplock bags. The ERM Hydrogeologist will label the jars or plastic bags with soil boring or well number, sample interval and date.

The ERM Hydrogeologist shall record penetration resistance, recovery and sample description for each split-barrel sample in soil boring logs.

A.3 SOP 3: ORGANIC VAPOR SCREENING - SOIL SAMPLE HEADSPACE

Field screening for organic compounds in soil samples will be performed as one of several field screening criteria, and continuously in the breathing zone of all work areas where intrusive activities are to occur as of the part of the Health and Safety monitoring program. This will serve as an immediate indication as to volatile organic hazards at the work location and will determine if personnel health and safety protection is adequate. Screening with a hand-held PID meter will be performed during all intrusive work activities (i. e. installation of soil borings and/or groundwater monitoring wells, or collection of groundwater samples) field investigation and all sample collection activities.

(1) Calibrate the PID daily in accordance with the particular manufacturer's procedures.

(2) For health and safety monitoring during intrusive activities, the PID will be used to continuously monitor for organic vapors in the breathing zone of all work areas in accordance with the HASP.

(3) For soil samples, a container separate from any jars that may be used for laboratory analysis will be used to check for total organic vapor concentrations using the PID. Generally, the sample aliquot retained for geologic description and archive is used for headspace total organic vapor screening.

(4) Fill the sample container approximately 2/3 full with soil.

(5) Place aluminum foil over the sample jar mouth, tightly sealing the opening.

(6) Allow the jar to stand for 5 minutes in a location where the sample temperature change will be minimal.

(7) After the 5 minutes, shake to jar for 1 minute to aid the desegregation of VOCs from the soil matrix.

(8) Allow the jar to stand for an additional 5 minutes in a location where the sample temperature change will be minimal.

(9) After the 5 minutes, insert the probe of a PID through the foil seal and observe the instrument for the maximum organic vapor reading.

(10) Record the sample number and maximum headspace organic vapor concentration reading.

A.4 SOP 4: WATER LEVEL MEASUREMENT PROCEDURE

Groundwater elevation measurements are to be obtained using the following general procedures whenever depth to groundwater or groundwater elevation data is required. This may include activities such as soil borings, groundwater monitoring well installation/development, groundwater monitoring well sampling, and/or synoptic groundwater level measurements. The measurements will be collected concurrent with the groundwater sampling event and the water levels will be obtained prior to well evacuation and sample collection. The static water level will be measured to the nearest 0.01 foot.

(1) Clean all water-level measuring equipment using appropriate decontamination procedures.

(2) Remove locking well cap, note weather, time of day, and date, etc. in field notebook, or on an appropriate form.

(3) Remove well casing cap.

(4) Monitor headspace of well with a PID to determine presence of VOCs, and record in field notebook.

(5) Lower water level measuring device into well until the water surface is encountered.

(6) Measure distance from water surface to reference measuring point on well casing, and record in field notebook.

NOTE: if water level measurement is from either the top of protective steel casing, top of PVC riser pipe, from ground surface, or some other position on the wellhead.

(7) Measure total depth of well and record in field notebook or on log form.

(8) Remove all downhole equipment; replace well casing cap and locking steel caps.

(9) Calculate elevation of water:

Ew = E - D
Where
Ew = Elevation of Water
E = Elevation at point of measurement
D = Depth to Water

A.5 *SOP 5: MONITORING WELL CONSTRUCTION*

Following completion and sampling of the Waterloo Vertical Profile borings, a hollow stem auger drilling method will be used to install four 2-inch diameter monitoring wells at the locations of the completed vertical profile borings. The exact depth of the screens will be determined after review of the contaminant concentration analysis. However, it is anticipated that the monitoring wells will be screened in the zones of greatest groundwater impacts. The exact screen setting for each well will based on ERM's evaluation of the geologic setting and contaminant distribution data collected from all Waterloo Profiler borings. ERM will discuss our depth interval recommendations with the NYSDEC, and upon approval, install the new wells. In the event that more than one zone exhibits elevated concentrations then a second well at that location may be considered.

The NYSDEC has requested that an optional monitoring well be installed off-Site in the event that groundwater impacts are observed in the deep groundwater (magothy aquifer) profile borings. The monitoring well would be installed at the location of existing off-Site monitoring well N-10290 (170-feet bgs) and would be screened at the zone equivalent of N-7560 screen elevation (242-feet bgs).

All groundwater wells will be installed and constructed according to NYSDEC requirements. All monitoring well installation, drilling, construction, development, testing and sampling will be overseen by a qualified Hydrogeologist who will maintain detailed records (e.g., soil boring logs, screening data, field observations, odors, pumping rate/yield during development) at each well. These records will be included with the PSA Report.

A.5.1 *Source of Water*

The use of drilling mud and/or foams shall not be allowed. All water used during drilling and/or steam-cleaning operations shall be from a potable source and so designated in writing. ERM's drilling subcontractor will obtain all permits from the local water purveyor and any other concerned authorities, and provision of any required back-flow prevention devices.

A.5.2 *Monitoring Well Borehole Construction*

Boreholes shall be advanced by hollow-stem auger drilling method. Each monitoring well shall be installed within the completed Waterloo Profile borehole. Prior to starting each borehole, the drilling rig will be positioned over the new well location and leveled to ensure the borehole is drilled as plumb and true as practical. Well borings shall have an inside diameter of at least four (4) inches larger than the outside diameter of the casing and well screen to ensure that a tremie may be employed during well construction procedures.

In order to reduce the potential for "running sands", a hydraulic head of potable water will be applied within the augers when the water table is encountered to maintain a positive hydrostatic head on subsurface materials. Each borehole will be advanced to the prescribed completion depth below grade. The drilling subcontractor shall verify by measurement that the borehole is open, and drill cuttings have been removed from the borehole prior to assembly of the well string.

Cuttings generated from the construction of the boreholes will be contained in New York State Department of Transportation (NYSDOT)-approved 55-gallon ring-top drums. The drums will be labeled according to the borehole/temporary well number.

A.5.3 Well Construction Materials

All monitoring wells shall be constructed of 2-inch inside diameter, threaded flush joint, schedule 40 PVC casing and screens ten (10) feet in length, PVC construction having slot openings of 0.010-inches.

ERM' Hydrogeologist shall inspect all well materials for dents, cracks, grease, etc. and to ensure that the materials are in accordance with the specifications. Any materials found to be defective shall be rejected by ERM's Hydrogeologist and replaced by the drilling subcontractor at no cost to the NYSDEC. All well casing and screen shall be steam cleaned, wrapped in clean polyethylene sheeting and stored until the time of well construction.

A.5.4 Monitoring Well Construction Procedures

A.5.4.1 Well Assembly and Screen Placement

Once the well cluster is assembled in each borehole, the wells shall be suspended in a manner such that the screen is set approximately one (1) foot above the bottom of the borehole. When the well screens are properly positioned the augers will be slowly removed. The well pipe will also be pulled up no more than ½ foot to allow the natural formation material to fill the borehole and collapse around the well screen.

A.5.5 *Well Completions At Grade*

For each of the wells, a 2-inch diameter PVC riser will extend from the top of the screen to approximately 4-inches below ground surface. A permanent mark will be made at the top of the well casing to provide a reference point from which to make future water level measurements.

Each well will be fitted with a flush-mounted steel well vault which is a minimum of two (2) inches larger in diameter than the well casings, and secured in a surface seal to adequately protect the casing. A locking cap will be provided for each well with one (1) to two (2) inches clearance between the top of the well cap and the bottom of the locking cap of the protective casing when in the locked position. The ERM Hydrogeologist will provide keyed-alike padlocks for the wells.

Each well will have a concrete surface seal that will secure the protective casing in place. The surface seal will extend below the frost depth (a minimum of 24 inches) to prevent potential well damage. The top of the seal will be constructed by pouring concrete into a pre-built form with a minimum of 2-foot long sides. The seal will be finished with a sloping surface to prevent surface runoff from ponding and entering the well vault.

A.6 *SOP 6: MONITORING WELL DEVELOPMENT*

All newly installed monitoring wells will be developed by submersible pump or air-lift methods to ensure the removal of any drilling fines and to restore the hydraulic properties of the surrounding formation. All wells will be developed no sooner than twenty-four hours after installation, in order to allow the cement/bentonite grout to set. At no time will water be introduced into the well during well development procedures.

If submersible pumps are used during development, the pump will be decontaminated to the satisfaction of the ERM Hydrogeologist, and new lengths of dedicated polyethylene hose will be used as a discharge line. If an air-lift assembly is used during well development, the air source will be oil-less type compressor outfitted with appropriate oil trap and/or filters, and new lengths of dedicated polyethylene hose will be used as a discharge line. Additionally, the airlift assembly will be configured in a manner such that the air discharge will remain within the discharge and not come in contact with the well. The adequacy of the airlift assembly to fulfill the aforementioned conditions and effectively develop the monitoring well will be subject to the approval of the ERM Hydrogeologist or the Field Team Leader (FTL).

Each well will be developed to remove at a minimum, the volume of water introduced during drilling, and the point that the turbidity of the recovered well water is less than 50 NTUs. Additionally, well development monitoring will be supplemented by measurement of the development water for pH, conductivity, ORP and temperature that will be within 10% for a minimum of three consecutive measurements before development is considered complete. The ERM Hydrogeologist will be responsible for collection of NTU, pH, conductivity, ORP, and temperature measurements after each well volume is removed from the well. At a minimum, the volume of water introduced during drilling will be removed during development of each well.

Well development water will be handled in accordance with the Management of Investigative Derived Waste described in Section 2.1.8. Wells will not be sampled for a minimum of one (1) week following development. Analytical results of the samples collected from the groundwater monitoring wells will determine the ultimate disposition of the development water.

A.7 SOP 7: GROUNDWATER SAMPLING

Groundwater sampling will be performed using USEPA low-flow well purging/sample collection techniques on the newly installed 2-inch monitoring wells. Existing supply well N-7560 will be sampled using conventional purge and sample methods. The following subsections present general preliminary well sampling procedures common to both techniques followed by low-flow sampling procedures, and conventional procedures are also presented for reference.

The low-flow groundwater purging/sampling technique employs the use of a flow-through cell equipped with probes and a meter for measuring groundwater quality parameters such as pH, temperature, specific conductivity, and dissolved oxygen. One example of this equipment is the Horiba U-22 Flow-Through Cell and the specific manufacturer's calibration and operation instructions should be followed. In the event that low-flow purging/sampling cannot be performed and conventional procedures must be employed, SOPs 8, 9, 10 and 11 are presented to describe operating procedures for the measurement of pH, temperature, specific conductivity and dissolved oxygen using standard hand-held meters.

A.7.1 *General Procedures*

The following procedure will be used for all monitoring well groundwater sampling:

- Clean all water-level measuring equipment using appropriate decontamination procedures.
- Wear appropriate health and safety equipment as outlined in the HASP. In addition, samplers will don new sampling gloves at each individual well prior to sampling.
- Visually examine the exterior of the monitoring well for signs of damage or tampering and record in the field logbook.
- Unlock well cap.
- Take and record in field logbook PID readings.
- Measure the static water level in the well with a decontaminated steel tape or electronic water level indicator. The tape or water level indicator will be rinsed with deionized water in between individual wells to prevent cross-contamination. Synoptic round of water level measurements will all be completed on the same day.
- All wells will also be checked for the presence and thickness of Light or Dense Non Aqueous Phase Liquids (LNAPL/DNAPL).
- If LNAPL or DNAPL is encountered on the top of the water table at the time of sampling, a sample of the LNAPL or DNAPL will be collected for analysis if accumulations are sufficient. Measurement of the thickness of this layer will be taken using an interface probe. A sample of the LNAPL or DNAPL may be obtained using a dedicated bottom-loading bailer. The sample will be sent to the laboratory for analysis of its chemical composition and physical properties (e.g., specific gravity, and gas chromatograph (GC) fingerprint). Initially, no groundwater sample will be collected from wells that contain LNAPL or DNAPL.
- If LNAPL or DNAPL is not detected in the well, continue with the low-flow sampling procedures described below.

A.7.2 Low-Flow Sampling

The low-flow sampling procedure is intended to facilitate the collection of minimum-turbidity groundwater monitoring well samples.

A.7.2.1 Sample Equipment

- Adjustable-rate, positive displacement pumps (e.g., centrifugal, submersible or bladder pumps constructed of stainless-steel or Teflon®). Peristaltic pumps may be used only for inorganic sample collection. The selected pump must be specifically designed for low-flow rates (i.e., use of a high volume pump that is adjusted down to a low flow setting is not permitted).
- Tubing: Tubing used in purging and sampling each well must be dedicated to that well. Once properly located, moving the pump in the well should be avoided. Consequently, the same tubing should be used for purging and sampling. Teflon® and Teflon®-lined polyethylene tubing must be used to collect samples for organic analysis. For samples collected for inorganic analysis, Teflon® or Teflon®-lined polyethylene, PVC, Tygon, or polyethylene or silicon tubing may be used.
- Electronic water level measuring device, 0.01-foot accuracy.
- Flow measurement supplies (e.g., graduated cylinder and stop watch).
- Interface probe.
- Power or air source (generator, compressed air tank, etc.).
- In-line purge criteria parameter monitoring instruments - pH, turbidity, specific conductance, temperature, and dissolved oxygen.
- Decontamination supplies.
- Logbook and field forms.
- Sample bottles.
- Sample preservation supplies (as specified by the analytical methods).
- Sample tags or labels, chain of custody forms.
- Well construction data, location map, field data from last sampling event.

A.7.2.2 *Sample Procedure*

1) Lower pump, safety cable, tubing, and electrical lines very slowly into the well to a depth corresponding to the center of the saturated screen section of the well. The pump intake must be kept at least two feet above the bottom of the well to prevent mobilization of any sediment. Lowering the pump quickly, or even at a moderate rate, will result in disturbing sediment in the well. This is one of the most important steps in low flow sampling at the Site.

2) Measure the water level again with the pump in well before starting the pump. Start pumping the well at 100 to 500 milliliters per minute. Ideally, the pump rate should cause little or no water level drawdown in the well (less than 0.3 foot and the water level should stabilize).

   - Measure and record the depth to water and pumping rate every 3 to 5 minutes (or as appropriate) during pumping. If purging continues for more than 30 minutes, readings will be recorded at approximately 10-minute intervals. However, once stabilization is indicated, a minimum of 3 consecutive readings at 3 to 5 minute intervals will be recorded prior to sample collection.

   - Care should be taken not to cause pump suction to be broken or entrainment of air in the sample. Do not allow the groundwater level to go below the pump intake.

   - Pumping rates should, if needed, be reduced to the minimum capabilities of the pump to minimize drawdown and/or to ensure stabilization of indicator parameters.

3) During purging, measure and record the field indicator parameters using the in-line meter (turbidity, temperature, specific conductance, pH, Eh, and dissolved oxygen) every 3 to 5 minutes (or as appropriate). If purging continues for more than 30 minutes, readings will be recorded at approximately 10-minute intervals. However, once stabilization is indicated, a minimum of 3 consecutive readings at 3 to 5 minute intervals will be recorded prior to sample collection.

   - The well is considered stabilized and ready for sample collection once all the field indicator parameter values remain within 10 percent for 3 consecutive readings.

   - If drawdown in the well is measured at 1 foot or more, continue to low flow purge until a minimum of the equivalent volume of 1 well casing volume is removed. Using the flow equation to calculate the volume of purge water. Then collect the groundwater sample.

4) Before sampling, either disconnect the in-line cell or use a by pass assembly to collect groundwater samples before the in-line cell. All sample containers should be filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

5) Samples requiring pH adjustments will have their pH checked to ensure that the proper pH has been obtained. For VOC samples, this will necessitate the collection of a test sample to determine the amount of preservative that needs to be added to the sample container prior to sampling.

6) Label the samples using waterproof labels, or apply clear tape over the paper labels. Place all samples in a cooler as described in the QAPP with bagged ice or frozen cold packs and maintain at 4°C for delivery to the laboratory.

7) Do not use ice for packing material; melting will cause bottle contact and possible breakage.

8) Measure and record well depth. Take final water quality reading using low flow cell.

9) Secure the well.

A.7.3 *Conventional Purging and Sampling Procedure*

1) Calculate the volume of water in the well as follows:

$$\text{Volume (in gallons)} = 3.14r^2(h) \times 7.48 \text{ gal/ft}^3$$

Where

h - well depth (feet) - static water level (feet)

r = well radius (feet)

2) Lower the decontaminated submersible pump with new, dedicated lengths of polyethylene tubing into the well so the pump is set at the screen interval. Purge 3 to 5 volumes of water from the well, using the submersible pump.

3) Measure and record time, temperature, pH, turbidity, and specific conductance as each volume of well water is purged. Once the temperature, pH, and specific conductance have stabilized to within 10% for two successive well volumes and the turbidity is less than 50 NTUs, a groundwater sample may be collected. Measure DO and remove the submersible pump from the well.

4) After purging, allow static water level to recover to approximate original level.

5) Place polyethylene sheeting around well casing to prevent contamination of sampling equipment in the event equipment is dropped.

6) Obtain sample from well with a dedicated, factory pre-cleaned polyethylene Voss ™ bailer. The bailer will be suspended on a new, dedicated length of polypropylene string. The maximum time

between purging and sampling will be three (3) hours. All the bailers for one day of sampling will be pre-cleaned and dedicated to each individual wells.

Sample for VOCs first by lowering the bailer slowly to avoid degassing, then collect any other organic and inorganic samples by pouring directly into sample bottles from bailers.

The sample preservation procedure will be to immediately place analytical samples in the cooler and chill to 4°C. Samples will be delivered to the appropriate laboratory within 24 hours. Samples will be maintained at 4°C until time of analysis.

7) Decontaminate the submersible pump and discard the pump discharge line.

8) Re-lock well cap.

9) Fill out field notebook, Well Sample Log Sheet, labels, Custody Seals and Chain-of-Custody forms.

A.8 SOP 8: GROUNDWATER PH AND TEMPERATURE

(1) Immerse the tip of the electrode in water overnight. If this is not possible due to field conditions, immerse the electrode tip in water for at least an hour before use.

(2) Rinse the electrode with demineralized water.

(3) Immerse the electrode in pH 7 buffer solution.

(4) Adjust the temperature compensator to the proper temperature.

(5) Adjust the pH meter to read 7.0.

(6) Remove the electrode from the buffer and rinse with demineralized water.

(7) Collect a groundwater sample using a bailer (or from the pump discharge line in the case of the vertical profile wells) and pour a small amount of this sample into an extra sample jar, which will not be used to store chemically analyzed samples.

(8) Immerse the electrode into the extra sample jar. Do not immerse the electrode into a sample that will be chemically analyzed.

(9) Read and record the pH of the solution, after adjusting the temperature compensator to the sample temperature (obtained during measurement of specific conductance or from a standard scientific thermometer).

(10) Rinse the electrodes with demineralized water.

(11) Keep the electrode immersed in demineralized water when not in use.

(12) All results are to be recorded in the Field Notebook.

A.9 *SOP 9: MEASUREMENT OF GROUNDWATER SPECIFIC CONDUCTANCE*

(1) Immerse the electrode in water overnight. If this is not possible due to field conditions, immerse the electrode for at least an hour before use.

(2) Collect a groundwater sample using a bailer (or from the pump discharge line in the case of the well purging activities) and pour a small amount of this sample into an extra sample jar, which will not be used to store chemically analyzed samples.

(3) Rinse the cell with one or more portions of the sample to be tested.

(4) Immerse the electrode in the sample and measure the temperature. Do not immerse the electrode into a sample, which will be chemically analyzed.

(5) Adjust the temperature setting to the sample temperature.

(6) Immerse the electrode in the sample and measure the conductivity. Do not immerse the electrode into a sample, which will be chemically analyzed.

(7) Record the results in the Field Notebook.

A.10 *SOP 10: MEASUREMENT OF GROUNDWATER TURBIDITY*

(1) Ensure that the sample cell (sample vials) is clean, with no dust and lint on the inside or outside surface.

(2) Ensure that instrument has been standardized recently and span control has not been changed.

(3) Range calibration of instrument is performed at the factory, but it should be checked from time to time against fresh formalin turbidity standard dilutions.

(4) Check the mechanical zero setting while instrument is off.

(5) Turn on the power and press the battery check switch and verify the battery check range. The needle should be in the battery check area. If

battery was not recharged before use, switch to a charged instrument. The battery pack should be charged on a daily basis.

(6) Select the range that will exceed the expected turbidity of the sample under test and press the appropriate range switch.

(7) Place the focusing template into the cell holder and adjust the zero control for a reading of zero NTU. Remove the focusing template.

Note: If the instrument will be used in the 100 range, place the cell riser into the cell holder before inserting the test sample. When using the 1 and 10 ranges, the cell riser must not be used.

(8) Collect a groundwater sample using a bailer (or from the pump discharge line in the case of the vertical profile wells) and pour a small amount of this sample into an extra sample jar, which will not be used to store chemically analyzed samples.

(9) Fill a clean sample cell to the marked line with the sample to be measured and place it into the cell holder. Use the white dot on the sample cell to orient the cell in the same position each time. Cover the sample cell with the light shield and allow the meter to stabilize. Read the turbidity of the sample.

Notes:

The sample size for all turbidity measurements should be 18 ml. Use the line on the sample cell as a level indicator. Variation in sample volume can affect the accuracy of the determinations. When measuring the lower range (0 - 10 and 0 - 1 NTU), air bubbles in the sample will cause false high readings - before covering the cell with the light shield, observe the sample in its cell. A five-minute wait period can eliminate air bubbles from the sample and thereafter a valid reading can be taken.

(10) Record the results in the Field Notebook.

A.11 *SOP 11: MEASUREMENT OF GROUNDWATER DISSOLVED OXYGEN*

The dissolved oxygen (DO) meter will be properly calibrated prior to each sampling event.

Calibration Procedure

(1) Prepare the DO meter with a thin Teflon membrane stretched over the sensor.

(2) Perform a battery check.

(3) Set mode switch to operate and the operation switch to zero, and zero the instrument.

(4) Take a temperature measurement and determine the calibration value from the manufacturers table for the appropriate atmospheric pressure.

(5) Select the desired range and adjust the instrument to an appropriate calibration value (determined in the preceding step).

(6) Place the probe in a water sample with a known dissolved oxygen level and read mg/L-dissolved oxygen.

(7) Record temperature and dissolved oxygen calibration information on the equipment calibration and maintenance log for that instrument.

Operating Procedure

(1) Calibrate the dissolved oxygen meter.

(2) Perform the battery check.

(3) Immerse the electrode in water overnight. If this is not possible due to field conditions, immerse the electrode for at least an hour before use.

(4) Collect a groundwater sample using a bailer and pour a small amount of this sample into an extra sample jar, which will not be used to store chemically analyzed samples.

(5) Rinse the cell with one or more portions of the sample to be tested.

(6) Set mode switch to operate and the operation switch to the desired range.

(7) Immerse the probe in the water sample.

(8) Take a temperature and adjust the temperature compensator to the sample temperature (obtained during measurement of specific conductance or from a standard scientific thermometer).

(9) Switch the dissolved oxygen content measurement and allow reading to stabilize.

(10) Record the results in the Field Notebook.

(11) Repeat procedure and record a second reading. Average the results and record the average.

(12) Rinse the probe with distilled water and replace protective cover on probe with a small amount of distilled water to keep the probe membrane wet.

A.12 SOP 12: SUB SLABS SOIL GAS SAMPLING

The soil gas samples will be collected at the locations specified in the Work Plan using SUMMA® canisters equipped with timed sample acquisition regulators. The canisters and regulators will be certified clean by the laboratory prior to on-site use. A NYSDOH ELAP-certified laboratory will analyze each sample for VOCs using USEPA Method TO-15.

Selection And Preparation Of Sample Collection Point

Observe the condition of the building floor slab for apparent penetrations such as concrete floor cracks, floor drains, or sump holes. Note the floor conditions on the sampling form and select a potential location or locations for a temporary or permanent subsurface probe. The location or locations should be away from foundation walls and apparent penetrations.

Review the proposed location or locations with the occupant/owner describing how the sampling port or ports will be installed. After receiving permission from the occupant or owner, mark the proposed location(s) and describe the location(s) on the sampling form.

Using the PID, screen indoor air in the area of floor penetrations such as concrete floor cracks, floor drains, or sump holes (note that the detection limits for the laboratory analyses to be performed on the samples collected are considerably lower than the detection limits of the PID). Record the indoor air PID readings on the sampling form.

Temporary Subsurface Probe Installation

1. Drill a 1-inch diameter hole about 1 to 2 inches into the concrete slab using an electric hammer drill.

2. Extend the hole through the remaining thickness of the slab using a 3/8-inch drill bit. Extend the hole about three inches into the sub-slab material using either the drill bit or a steel probe rod.

3. Insert a section of ¼ -inch O.D. Teflon ™ or brass tubing to the bottom of the floor slab. Seal the annular space between the 1-inch hole and ¼ -inch tubing by applying hot beeswax into the 1-inch hole.

4. Connect the ¼ -inch Teflon™ tubing (or brass tubing using a length of ¼-inch I.D. Teflon™ tubing) to a stainless steel valve using compression fittings or hose clamps. Open the in-line valve and purge the probe tubing using a polyethylene 60-cubic centimeter (cc) syringe. Close the valve, remove and cap the syringe, and connect the ¼ -inch Teflon™ tubing and in-line valve to a SUMMA® canister. DO NOT DISCHARGE THE AIR/SOIL GAS SYRINGE INTO INDOOR AIR. For duplicate sample locations connect a second canister before purging by installing a ¼ -inch stainless steel "tee" fitting between the probe discharge tubing and the stainless steel valve.

Preparation Of SUMMA® Canister And Collection Of Sample

1. Place SUMMA® canister adjacent to temporary subsurface probe.

2. Record SUMMA® canister serial number on sampling summary form and COC.

3. Assign sample identification on canister ID tag, and record on sampling summary form and COC.

4. Remove brass plug from canister fitting.

5. Install pressure gauge / metering valve on canister valve fitting and tighten. If pressure gage has additional (2nd) fitting, install brass plug from canister fitting into gage fitting and tighten.

6. Open and close canister valve.

7. Record gage pressure on sample summary form and COC. Gage pressure must read >25 psi. Replace SUMMA® canister if gage pressure reads <25 psi.

8. Remove brass plug from gauge fitting and store for later use.

9. Install particulate filter onto metering valve input fitting and tighten.
10. Connect subsurface probe to end of in-line particular filter via ¼ -inch O.D. Teflon™ tubing and Swagelok® fittings.
11. Open canister valve and in-line stainless steel valve to initiate sample collection.
12. Take digital photograph of SUMMA® canister set up and surrounding area.
13. Record date and local time of valve opening on sampling summary form and COC.

Termination Of Sample Collection

1. Revisit SUMMA® canister after 80% of sample collection time has elapsed to verify sufficient amount of vacuum pressure remains for sample collection and shipment. At end of sample collection period (e.g., 24 hours after initiation of sample collection) record gauge pressure on sampling form and COC.
2. Record date and local time of valve closing on sampling summary form and COC.
3. Close canister valve.
4. Disconnect Teflon™ tubing and remove particulate filter and pressure gage / metering valve from canister.
5. Reinstall brass plug on canister fitting and tighten.
6. Remove SUMMA® canister from sample collection area.
7. Remove temporary subsurface probe and plug the slab probe hole with solid laboratory grade rubber plug. Set plug slightly below the finished floor level cover flush with the floor surface using quick drying hydraulic cement.

Preparation And Shipment Of Sample To Analytical Laboratory

1. Pack SUMMA® canister in shipping container, note presence of brass plug installed in tank fitting.
2. Complete COC and place requisite copies in shipping container.
3. Close shipping container and affix custody seal to container closure.

A.13 *SOP 13: INDOOR AIR SAMPLING USING SUMMA® CANISTERS*

Indoor air samples will be collected from buildings at and adjacent to the site. The indoor air samples will be collected at each location concurrently with sub-slab samples. The indoor air samples will be collected using SUMMA® canisters equipped with timed sample acquisition regulators. The canisters and regulators will be certified clean by the laboratory prior to onsite re-use. A NYSDOH ELAP-certified laboratory will analyze each sample for the specified VOCs using United States Environmental Protection Agency (USEPA) Method TO-15. General details are presented below.

1. Prior to sampling, ERM will select an appropriate location for collection of the indoor and outdoor air samples. ERM will attempt to obtain the sample from a central location at the sampling point, away from foundation walls. If possible, sources of VOCs will be removed from the sampling area. A PID will be used to help identify such sources.
2. The location of the sample will be marked, documented, and photographed. A Sample identification label will be visible in each photograph. In addition, a measuring device will be visible in each photograph to show that indoor ambient air sample intake valves are located between three and five-feet from the floor.
3. An initial PID reading will be made at the location of each air sample.
4. The SUMMA® canister will be attached to a sampling regulator set to collect a soil vapor sample over a 24-hour period (sample collection time interval may be changed at the discretion of the NYSDEC Project Manager). At the end of each day and after approximately 80% of the specified sample collection time has elapsed, the canister will be checked to ensure substantial vacuum pressure remains in the canister for sample collection and shipment.
5. For each indoor sample location, all the pertinent data will be recorded in the field forms. Additional general information will be recorded within a field book(s) designated to the project. This information should include the following:
   - Sampler's name;
   - Date, time and PID reading;
   - Date and time of sample start and stop;
   - SUMMA® canister serial number;

  - Survey location number, and descriptive location of the sampling area;
  - Sample identification for corresponding outdoor air samples
  - Weather conditions;
  - Barometric pressure;
  - Initial SUMMA® canister pressure; and
  - Final SUMMA® canister pressure.

__Preparation of SUMMA® Canister and Collection of Sample:__

- Place SUMMA® canister at height equivalent to approximately the breathing zone of the ground story level of a building (e.g., approximately 5 feet above the ground surface). Position canister on stable surface, or suspend from stable structure with nylon rope. The canister inlet should be protected from precipitation (rain, ice, or snow) either by pointing the inlet downward or by shielding the top of the canister.
- Record SUMMA® canister serial number on sampling summary form and COC.
- Assign sample identification on canister ID tag, and record on sampling summary form and COC.
- Remove brass plug from canister fitting.
- Install pressure gage / metering valve on canister valve fitting and tighten. If pressure gage has additional (2nd) fitting, install brass plug from canister fitting into gage fitting and tighten.
- Open and close canister valve.
- Record gage pressure on sample summary form and COC. Gage pressure must read >25 inches Hg. Replace SUMMA® canister if gage pressure reads <25 inches Hg.
- Remove brass plug from gage fitting and store for later use.
- Install particulate filter onto metering valve input fitting and tighten.
- Open canister valve to initiate sample collection.
- Record local time on sampling summary form and COC.
- Take digital photograph of SUMMA® canister and surrounding area.

__Termination of Sample Collection:__

- Revisit SUMMA® canister at the end of each sampling day and approximately after 80% of sample collection time has elapsed to verify sufficient amount of vacuum pressure remains for sample collection and shipment. If vacuum pressure no longer exists, or if vacuum pressure is <5 inches Hg, close the canister valve and document conditions. At end of sample collection period (e.g., 24 hours after initiation of sample collection) record gage pressure on sampling form and COC.
- Record local time on sampling summary and COC.
- Close canister valve.
- Remove particulate filter and pressure gage / metering valve from canister.
- Reinstall brass plug on canister fitting and tighten.
- Remove SUMMA® canister from sample collection area.
- Preparation and shipment of sample to analytical laboratory will follow the procedure below.
- Pack SUMMA® canister in shipping container, note presence of brass plug installed in tank fitting.
- Complete COC and place requisite copies in shipping container.
- Close shipping container and affix custody seal to container closure.

Quality Assurance/Quality Control (QAQC) Samples:

The collection of QA/QC samples will include the submittal of blind sample duplicates to the analytical laboratory for analyses of target compounds. Duplicate samples will be collected 'side-by-side' over the same time interval. The following procedure should be followed when collecting a duplicate sample.

- Record SUMMA® canister serial number on sampling summary form and COC.
- Assign sample identification on canister ID tag, record on sampling summary form and COC.
- Remove brass plug from canister fitting.
- Install pressure gage / metering valve on canister valve fitting and tighten. If pressure gage has additional (2nd) fitting, install brass plug from canister fitting into gage fitting and tighten.

- Open and close canister valve.
- Record gage pressure on sampling summary form and COC.

Remove pressure gage and replace brass plug on canister fitting and tighten.

APPENDIX B
QUALITY ASSURANCE PROJECT PLAN (QAPP)

400 Lakeville Road
New Hyde Park, NY

July, 2007

0030777.3777

Prepared for:

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1.0 PURPOSE AND OBJECTIVES

1.1 PURPOSE

This Quality Assurance Project Plan (QAPP) was prepared for the Preliminary Site Assessment (PSA) Work Plan (WP) for the site located at 400 Lakeville Road in New Hyde Park, Nassau County, New York (the Site). It is intended to set forth guidelines for the generation of reliable data by measurement activities, such that data generated are scientifically valid, defensible, comparable and of known precision and accuracy.

This QAPP contains a detailed discussion of the quality assurance and quality control (QA/QC) protocols to be utilized by Environmental Resources Management (ERM) and laboratory personnel. The PSA sampling program and relevant field/laboratory QA/QC requirements are summarized in Tables B-1 through B-10.

1.2 DEFINITIONS

The parameters that will be used to specify data quality objectives, and to evaluate the analytical system performance for all analytical samples are precision, accuracy, representativeness, completeness, and comparability (PARCC). Definitions of these and other key terms used in this QAPP are provided below.

- ***Accuracy*** - the degree of agreement of a measurement with an accepted reference value. Accuracy is generally reported as a percent recovery, and calculated as:

$$\frac{\text{Measured Value}}{\text{Accepted Value}} \times 100$$

- ***Analyte*** - the chemical or property for which a sample is analyzed.
- ***Comparability*** - the expression of information in units and terms consistent with reporting conventions; the collection of data by equivalent means; or the generation of data by the same analytical method. Aqueous samples will be reported as µg/l, solid samples will be reported in units of mg/kg, dry weight.
- ***Completeness*** - the percentage of valid data obtained relative to that which would be expected under normal conditions. Data are judged valid if they meet the stated precision and accuracy goals.
- ***Duplicate*** - two separate samples taken from the same source by the same person at essentially the same time and under the same

conditions that are placed into separate containers for independent analysis. Duplicate samples are intended to assess the effectiveness of equipment decontamination, the precision of sampling efforts, the impacts of ambient environmental conditions on sensitive analyses (e.g., volatile organics analysis (VOA), and the potential for contaminants attributable to reagents or decontamination fluids. Identifying such potential sources of error is essential to the success of the sampling program and the validity of the environmental data. Each QC sample is described below. As a minimum, each set of ten or fewer field samples will include a trip blank, a duplicate, and one sample collected in a sufficient volume to allow the laboratory to perform a matrix spike.

- *Field Blanks* - field blanks (sometimes referred to as "equipment blanks" or "sampler blanks") are the final analyte-free water rinse from equipment decontamination in the field and are collected at least one during a sampling episode. If analytes pertinent to the project are found in the field blank, the results from the blanks will be used to qualify the levels of analytes in the samples. This qualification is made during data validation. The field blank is analyzed for the same analytes as the sample that has been collected with that equipment.

- *Precision* - a measure of the agreement among individual measurements of the sample property under prescribed similar conditions. Precision is generally reported as Relative Standard Deviation (RSD) or Relative Percent Difference (RPD). Relative standard deviation is used when three or more measurements are available and is calculated as:

$$\mathrm{RSD} = \frac{\text{Standard Deviation}}{\text{Arithmetic Mean}} \times 100$$

  Relative percent difference is used for duplicate measurements and is calculated as:

$$\mathrm{RPD} = \frac{\text{Value 1 - Value 2}}{\text{Arithmetic Mean}} \times 100$$

- ***Quality Assurance (QA)*** - all means taken in the field and inside the laboratory to make certain that all procedures and protocols use the same calibration and standardization procedures for reporting results; also, a program which integrates the quality planning, quality assessment, and quality improvements activities within an organization.

- ***Quality Control (QC)*** - all the means taken by an analyst to ensure that the total measurement system is calibrated correctly. It is achieved by using reference standards, duplicates, replicates, and sample spikes. In addition, the routine application of procedures designed to ensure that the data produced achieve known limits of precision and accuracy.

- *Replicate* - two aliquots taken from the same sample container and analyzed separately. Where replicates are impossible, as with volatile organics, duplicates must be taken.
- *Representativeness* - degree to which data represent a characteristic of a set of samples. The representativeness of the data is a function of the procedures and caution utilized in collecting and analyzing the samples. The representativeness can be documented by the relative percent difference between separately collected, but otherwise identical sample volumes.
- *Trip Blanks* - trip blanks are samples that originate from analyte-free water taken from the laboratory to the sampling site and returned to the laboratory with the volatile organic samples. One trip blank should accompany each cooler containing volatile organics; it will be stored at the laboratory with the samples, and analyzed with the sample set. Trip blanks are only analyzed for VOCs.

1.3 DATA QUALITY OBJECTIVES

1.3.1 Overall Data Quality Objectives

Data Quality Objectives (DQO) are quantitative and qualitative statements specifying the quality of the environmental data necessary to support the decision-making process to guide the PSA and any subsequent corrective actions. DQO define the total uncertainty in the data that is acceptable for each specific activity during the PSA. This uncertainty includes both sampling error and analytical error. Ideally, the prospect of zero uncertainty is the objective; however, the very processes by which data are collected in the field and analyzed in the laboratory contribute to the uncertainty of the data. It is the overall objective to keep the total uncertainty to a minimal level such that it will not hinder the intended use of the data.

To achieve the project DQO, specific data quality parameters such as detection limits, criteria for accuracy and precision, sample representativeness, data comparability and data completeness must be specified. The overall objectives are established such that there is a high degree of confidence in the measurements.

The parameters that will be used to specify data quality objectives and to evaluate the analytical system performance for soil and groundwater samples are PARCC: precision, accuracy, representativeness, completeness, and comparability.

1.3.2 *Field Investigation Data Quality Objectives*

To permit calculation of precision and accuracy for the samples, blind field duplicate, field blanks, trip blanks, and matrix spike/matrix spike duplicate (MS/MSD) samples will be collected, analyzed, and evaluated.

Through the submission of field QC samples, the distinction can be made between laboratory problems, sampling technique considerations, sample matrix effects, and laboratory artifacts. To assure sample representativeness, all sample collection will be performed in strict accordance with the procedures set forth in this QAPP.

Precision will be calculated as RPD if there are only two analytical points and percent relative standard deviation (% RSD) if there are more than two analytical points. Blind field duplicate and MS/MSD sample analyses will provide the means to assess precision. The submission of field and trip blanks will provide a check with respect to accuracy and will monitor chemicals that may be introduced during sampling, preservation, handling, shipping, and/or the analytical process. In the event that the blanks are contaminated and/or poor precision is obtained, the associated data will be appropriately qualified.

Representativeness will be assured through the implementation of the structured and coherent PSA of which this QAPP is a part. This PSA has been designed so that the appropriate numbers of samples of each matrix and of each location of interest are obtained for analysis.

Ideally, 100% completeness is the goal. However, it must be recognized that unforeseen issues may result in the generation of some data that may not be acceptable for use. Therefore, a completeness target of 90%, as determined by the total number of usable data points versus the total number of data points measured, will be the realistic goal of this program.

Comparability is defined as the extent to which data from one data set can be compared to similar data sets. Comparability between data sets is often questionable due to issues such as different analytical methods used or inter-laboratory differences. In order that the data generated as part of this project remain comparable to any previously generated data or data to be generated in the future, currently published analytical methods have been identified for the analysis of the collected samples. These methods will be performed by an analytical laboratory with a demonstrated proficiency in the analysis of similar samples by the referenced methods. In addition, samples will be collected using documented procedures to ensure consistency of effort and reproducibility if necessary.

1.3.3 *Laboratory Data Quality Objectives*

The analytical laboratory will demonstrate analytical precision and accuracy by the analysis of various QC samples (i.e., laboratory duplicates, spike samples, matrix spike duplicates and laboratory control samples). Tables B-6 through B-10 present the relevant precision and accuracy criteria for the analytical parameters related to this PSA. Precision, as well as instrument stability, will also be demonstrated by comparison of calibration response factors from the initial calibration to that of the continuing calibrations. Laboratory accuracy will be evaluated by the addition of surrogate and matrix spike compounds, and will be presented as percent recovery (%R). Precision will be presented as RPD, % RSD, or percent difference (%D), whichever is appropriate for the number and type of QC samples analyzed. Laboratory blanks can also be used to demonstrate the accuracy of the analyses and possible effects from laboratory artifact contamination.

2.0 *FIELD QUALITY ASSURANCE/QUALITY CONTROL*

2.1 *EQUIPMENT MAINTENANCE*

In addition to the laboratory analyses conducted during the course of this PSA, field measurements will be collected for total volatile organics (air monitoring and soil sample screening), pH, conductivity, oxidation/reduction potential (ORP), dissolved oxygen (DO) and turbidity in groundwater. A maintenance, calibration, and operation program will be implemented to ensure that routine calibration and maintenance is performed on all field instruments. ERM's equipment manager, the Quality Assurance Officer (QAO), and the field team members will administer the program. ERM's equipment manager will perform the scheduled monthly and annual calibration and maintenance. Monthly and annual maintenance, calibration, and equipment operation will follow the procedures outlined in the manufacturer's Operation and Field Manuals accompanying the respective instruments.

2.2 *EQUIPMENT CALIBRATION*

Trained field team members will be familiar with the field calibration, operation, and maintenance of the equipment. They will perform field calibrations, checks, and instrument maintenance daily. The photoionization detector (PID) will be calibrated on a periodic basis with isobutylene. A trained team member will perform daily field checks and instrument maintenance prior to use. A trained team member using standard calibration solutions will calibrate the pH, conductivity, ORP, DO, and turbidity meters. Field maintenance, calibration, and equipment operation will follow the procedures outlined in the manufacturer's Operation and Field Manuals accompanying the respective instruments. All maintenance and calibration will be documented on an instrument-specific master calibration/ maintenance form.

The Field Team Leader (FTL) will be responsible for keeping a master instrument calibration/maintenance form for each measuring device. Each form will include at least the following relevant information:

- Name of device and/or instrument calibrated;
- Device/instrument serial and/or identification (I.D.) number;
- Frequency of calibration;
- Date of calibration;
- Results of calibration;
- Name of person performing the calibration;
- Identification of the calibration standards; and
- Buffer solutions (pH meter only).

2.3 *EQUIPMENT DECONTAMINATION*

To minimize the potential for cross-contamination, all drilling and sampling equipment will be properly decontaminated prior to and after each use.

2.3.1 *General Procedures*

All heavy equipment will be decontaminated in a designated clean area. Sampling equipment and probes will be decontaminated in an area covered by plastic near the sampling location. All solvents and wash water used in the decontamination process will be collected and drummed for off-site disposal. All disposable sampling equipment will be properly disposed of in dry containers.

All well casing and screen will be steam cleaned, wrapped in clean polyethylene sheeting, and stored until the time of well construction.

Extraneous contamination and cross-contamination will be controlled by wrapping the sampling equipment with aluminum foil when not in use and changing and disposing of the sampler's gloves between samples. Decontamination of sampling equipment will be kept to a minimum in the field, and wherever possible, dedicated sampling equipment will be used.

Personnel directly involved in equipment decontamination will wear appropriate protective equipment.

2.3.2 *Heavy Equipment (drill rigs, etc.)*

All drilling equipment and the back of the drilling rig will be decontaminated by steam cleaning prior to performance of the first boring/well installation and between all subsequent borings/well installations. This will include all hand tools, casing, augers, drill rods and bits, tremie pipe and other related tools and equipment. The steam cleaning equipment will be capable of generating live steam with a minimum temperature of 212 °F.

All water used during drilling and/or steam-cleaning operations will be from a potable source and so designated in writing. The drilling contractor is responsible for obtaining all permits from the local potable water purveyor and any other concerned authorities, and provision of any requested back-flow prevention devices. The equipment will be cleaned to the satisfaction of the ERM Hydrogeologist or FTL.

2.3.3 *Aqueous Sampling Equipment*

Factory pre-cleaned disposable bailers will be used during the PSA. In the event that field decontamination of reusable sampling equipment is necessary, decontamination procedures will be as follows:

- Laboratory-grade glassware detergent and tap water scrub to remove visual contamination;
- Generous tap water rinse; and
- Distilled and deionized (ASTM Type II) water rinse;
- 10% nitric acid rinse, followed by a distilled and deionized water rinse (metals only), or
- Methanol (pesticide grade) rinse (volatiles only);
- Total air dry; and
- Distilled and deionized water rinse.

The submersible sampling pumps that are placed in the borehole will be decontaminated with an Alconox detergent rinse and by pumping approximately 5 gallons of potable water through the pump. Since dedicated new lengths of polyethylene tubing will be used for sampling each well, the tubing will not be decontaminated. Unless otherwise specified, the submersible pumps will be decontaminated prior to the sampling the first well and between each subsequent well as follows:

- Potable water rinse.
- Alconox detergent and potable water scrub.
- Potable water rinse.
- Distilled/deionized water rinse.
- Wrap in aluminum foil, shiny side facing out.

2.3.4 *Meters and Probes*

All meters and probes that are used in the field (other than those used solely for air monitoring purposes, e.g., oxygen meters, explosimeters, etc.) will be decontaminated between uses as follows:

- Phosphate-free laboratory detergent solution;
- tap water;
- methanol rinse (at the FTL's discretion);
- deionized water (triple rinse).

A methanol rinse will be used if deemed necessary by the FTL.

2.4 *QUALITY ASSURANCE/QUALITY CONTROL SAMPLING*

The field sampling quality assurance-sampling program is summarized in Table B-1. Specific guidance regarding the collection of field and laboratory QA/QC samples is presented separately below.

2.4.1 *Field QA/QC Samples*

Trip Blanks

The trip blank will be used to determine if any cross-contamination occurs between aqueous samples during shipment. The analytical laboratory will supply trip blanks as aliquots of distilled, deionized water that will be sealed in a sample bottle prior to initiation of each day of fieldwork. Glass vials (40 ml) with Teflon®-lined lids will be used for trip blanks. The sealed trip blank bottles will be placed in a cooler with the empty sample bottles and will be shipped to the site by the laboratory personnel. If multiple coolers are necessary to store and transport aqueous VOC samples, then each cooler must contain an individual trip blank. Trip blanks are analyzed for VOCs only.

Field Blanks

Field blanks will be collected to evaluate the cleanliness of soil and aqueous sampling equipment, sample bottles and the potential for cross-contamination of samples due to handling of equipment, sample bottles and contaminants present in the air. Field blanks will collected at a frequency of one per decontamination event for each type of sampling equipment, and each media being sampled (e.g., a groundwater bailer for groundwater, and a hand auger for soil sampling), at a minimum of one per equipment type and/or media per day.

Field blanks will be collected prior to the occurrence of any analytical field-sampling event by pouring deionized or potable water over a particular piece of sampling equipment and into a sample container. The analytical laboratory will provide field blank water and sample jars with preservatives for the collection of all field blanks. Glass jars will be used for organic blanks. The field blanks as well as the trip blanks will accompany field personnel to the sampling location. The field blanks will be analyzed for the same analytes as the environmental samples being collected that day and will be shipped with the samples taken.

Field blanks will be taken in accordance with the procedure described below:

- Decontaminate sampler using the procedures specified in the QAPP;
- Pour distilled/deionized water over the sampling equipment and collect the rinsate water in the appropriate sample bottles;
- The sample will be immediately placed in a sample cooler and maintained at a temperature of 4°C until receipt by the laboratory; and
- Fill out sample log, labels, and COC forms, and record in field notebook.

Temperature Blanks

The temperature blank will be used to determine the temperature of the samples within the cooler upon arrival at the analytical laboratory. A laboratory-supplied temperature blank will be an aliquot of distilled, deionized water that will be sealed in a sample bottle. The sealed temperature blank bottles will be placed in a cooler with the empty sample bottles and will be shipped to the site by the laboratory personnel. If multiple coolers are necessary to store and transport samples, then each cooler must contain an individual temperature blank.

2.4.2 *Laboratory QA/QC*

Blind Field Duplicate Samples

Aqueous blind field duplicate samples will be collected analyzed to check laboratory reproducibility of analytical data. One blind field duplicate sample will be collected with the air samples. Blind field duplicate samples will not be collected in association with the vertical profile soil samples.

Blind field duplicate samples will be collected at a frequency of at least 5% (one out of every 20 samples) of the total number of samples collected to evaluate the precision and reproducibility of the analytical methods. All blind field duplicate samples will be submitted to the analytical laboratory as a normal sample, however will have a fictitious sample identification and fictitious time of sample collection. Each blind field duplicate will be cross-referenced to document which actual sample it is a blind field duplicate of in the field notes and on the master sample log.

Matrix Spike/Matrix Spike Duplicate

Additional environmental sample volume will be collected for use as MS/MSD samples at a frequency of at least 5% (one out of every 20 samples) of the total number of samples collected per matrix to evaluate the precision and reproducibility of the analytical methods. To ensure the laboratory has sufficient volume for MS/MSD analysis, triple sample volume must be submitted for aqueous organic extractable and volatile samples once per every 20 samples in a sample delivery group (SDG). MS/MSD samples will not be collected in association with the vertical profile groundwater samples or the vertical profile soil samples.

2.5 FIELD RECORDS

Proper management and documentation of field activities is essential to ensure that all necessary work is conducted in accordance with the PSA, and QAPP in an efficient and high quality manner. Field management procedures include following proper chain of custody procedures to track a sample from collection through analysis, noting when and how samples are split (if necessary), making regular and complete entries in the field logbook, and the consistent use and completion of field management forms. Field management forms and field logbook will be used to document all field activities, as this documentation will support that the samples were collected and handled properly, making the resultant data complete, comparable and defensible. Field logbook procedures and field management forms are identified in the following sections.

2.5.1 Field Logbook

The sample team or individual performing a particular sampling activity will keep a weatherproof field notebook. Field notebooks are intended to provide sufficient data and observations to enable participants to reconstruct events that occurred during projects and to refresh the memory of the field personnel if called upon to give testimony during legal proceedings. In a legal proceeding, notes, if referred to, are subject to cross-examination and are admissible as evidence. The field notebook entries should be factual, detailed, and objective. All entries are to be signed and dated. All members of the field investigation team are to use this notebook, which will be kept as a permanent record. The field notebook will be filled out at the location of sample collection immediately after sampling. It will contain sample descriptions including: sample number, sample collection time, sample location, sample description, sampling method used, daily weather conditions, field measurements, name of sampler, and other site-specific observations. The field notebook will contain any deviations from protocol and why, visitor's names, or community contacts made during sampling, geologic and other site-specific information which may be noteworthy.

2.5.2 *Field Management Forms*

In addition to maintenance of a field logbook, the use of field management forms will supplement field logbook entries for all field activities associated with this project. Field management forms provide a regular format to record the relevant information for a particular field activity. Use of these forms will ensure that the field team consistently and completely records all pertinent data relative to a particular field activity on a regular basis. All forms, sample labels, custody seals and other sample documents will be filled out completely.

A list of forms and the associated activities for which each form could be potentially be completed is presented below.

Form	***Activity***
Groundwater Sampling Record	All permanent well sampling
Soil Boring Logs	All borings
Air Sampling Checklist	All air samples
Monitoring Well Construction Logs	All permanent well installations
Well Development Data Sheet	All well development efforts
Chain of Custody (COC) Form	All field sampling efforts
Laboratory Sample Bottle Request	All field sampling efforts
Sampling Equipment Checklist	All field sampling efforts
Daily Instrument Calibration Log	Every day a field instrument is used

Form	Activity
Well Inspection Log	All permanent well sampling

Copies of each of these forms are provided at the end of this attachment.

2.6 SAMPLE PREPARATION AND CUSTODY

2.6.1 Sample Identification

To provide for proper identification in the field, and proper tracking in the laboratory, all samples must be labeled in a clear and consistent fashion using the procedures and protocols described below and within the following subsections.

- Sample labels will be waterproof and have a pre-assigned, unique number that is indelible.
- Field personnel must maintain a field notebook. This notebook must be water resistant with sequentially numbered pages. Field activities will be sequentially recorded in the notebook.
- The notebook, along with the COC form, must contain sufficient information to allow reconstruction of the sample collection and handling procedure at a later time.
- Each sample will have a corresponding notebook entry which includes:
    - Sample ID number;
    - Well or other sample location and number;
    - Date and time;
    - Analysis for which sample was collected;
    - Additional comments as necessary; and
    - Samplers' name.
- Each sample must have a corresponding entry on a COC manifest.
- The manifest entry for sampling at any one well is to be completed before sampling is initiated at any other well by the same sampling team.
- In cases where the samples leave the immediate control of the sampling team (i.e., shipment via common carrier) the shipping container must be sealed.

Each sample collected will be designated by an alphanumeric code that will identify the type of sampling location and a specific sample designation (identifier). Location types will be identified by a two-letter code. Groundwater samples from the vertical profiles will begin with "VP". Groundwater samples collected from the monitoring wells will begin with "MW". Sub-slab air samples will begin with "SS", indoor air samples from the basement will begin with "B", samples from other floors although not anticipated would begin with "FF" for first floor, etc, and ambient air samples will begin with "AA". Soil samples collected from the vertical profiles will begin with "VP-SB". The depth will also be added to soil samples if applicable. The specific sampling designation (identifier) will be identified using a two-digit number. Samples collected for waste characterization will begin with "WC". For example, the first sample collected from the first vertical profile at 100 feet will be identified as VP-01 (100). A more detailed description of each sample to be collected can be found in Table B-2.

In the case of QC samples such as field blanks, trip blanks and blind field duplicate samples, six digits will follow FB, TB and DUP respectively to represent the date (e.g., FB040107 would represent a field blank collected on 01 April 2007). For matrix spike/matrix spike duplicate samples, MS/MSD will be added following the applicable sample identification.

2.6.2 *Sample Containers*

- The analytical laboratory will provide all sample containers.
  - If glass bottles are used, extra glass bottles will be obtained from the laboratory to allow for accidental breakage that may occur.
  - If sample preservation is specified, the necessary preservatives will be placed in the sample bottles by the laboratory.
- The sample bottles will be handled carefully so that any preservatives are not inadvertently spilled.

A more detailed description of the sample containers to be utilized for this PSA can be found in Tables B-3 through B-5.

2.6.3 *Sample Preservation*

Sample Preservation

Soil samples collected during the PSA will be preserved by cooling to 4°C and maintained at this temperature until time of analysis. Groundwater samples for VOC analysis during the PSA will be preserved by acidification to a pH of <2 using hydrochloric acid (HCl), cooled to 4°C, and maintained at this temperature until time of analysis. A more detailed description of the sample preservation to be utilized for this PSA can be found in Tables B-3 through B-5.

- Immediately following collection of the samples, they will be placed in a cooler with "freezer-pacs" to maintain sample integrity. All volatile sample bottles to be filled to capacity with no headspace for volatilization. If necessary to meet a maximum recommended holding time, the samples are to be shipped by overnight courier to the laboratory.
- The shipping container used will be designed to prevent breakage, spills, and contamination of the samples. Tight packing material is to be provided around each sample container and any void around the "freezer-pacs". The container is to be securely sealed, clearly labeled, and accompanied by a COC record. Separate shipping containers should be used for "clean" samples and samples suspected of being heavily contaminated. During winter months, care should be taken to prevent samples from freezing. Sample bottles will not be placed directly on "freezer-pacs".

Sample Holding Time

- All samples will be shipped the same day they are obtained to the analytical laboratory.
- The samples must be stored at or near 4°C and analyzed within specified holding times.
- The analytical laboratory will be a NYSDOH ELAP-certified laboratory, and conform to meeting specifications for documentation, data reduction, and reporting. The laboratory will follow all method specifications pertaining to sample holding times contained in the NYSDEC ASP (revised 2005) and/or as prescribed by the specific analytical method.

A more detailed description of the sample holding times to be utilized for this PSA can be found in Tables B-3 through B-5. These holding times are consistent with NYSDEC ASP Exhibit I although technical holding times vary. The holding times for the air samples will be consistent with the method requirements and not the EPA Region 2 validation critieria.

Sample Custody

Chain of Custody - The primary objective of the sample custody procedures is to create an accurate written record that can be used to trace the possession and handling of all samples from the moment of their collection, through analysis, until their final disposition. All field-sampling personnel will adhere to proper sample custody procedures because samples collected during an investigation could be used as evidence in litigation. Therefore, possession of the samples must be traceable from the time each sample is collected until it is analyzed at the laboratory.

Custody Transfer to Field Personnel - The on-site hydrogeologist or the field personnel will maintain custody of samples collected during this investigation. All field personnel are responsible for documenting each sample transfer and maintaining custody of all samples until they are shipped to the laboratory. COC records will be completed at the time of sample collection and will accompany the samples inside the cooler for shipment to the selected laboratory.

Each individual who has the samples in their possession will sign the COC record. Preparation of the COC record is as follows:

- For every sample, the person collecting the sample will initiate the COC record in the field. Every sample will be assigned a unique identification number that is entered on the COC Record.
- The record will be completed in the field to indicate project, sampling team, etc.
- If the person collecting the sample does not transport the samples to the laboratory or deliver the sample containers for shipment, the first block for Relinquished By __________, Received By __________ will be completed in the field.
- The person transporting the samples to the laboratory or delivering them for shipment will sign the record form as Relinquished By ____________.
- If commercial carrier ships the samples to the laboratory, the original COC record will be sealed in a watertight container and placed in the shipping container, which will be sealed prior to being given to the carrier. The carbonless copy of the COC record will be maintained in the field file.
- If the samples are directly transported to the laboratory, the COC will be kept in possession of the person delivering the samples.
- For samples shipped by commercial carrier, the waybill will serve as an extension of the COC record between the final field custodian and the laboratory.
- Upon receipt in the laboratory, the Sample Custodian or designated representative, will open the shipping containers, compare the contents with the COC record, and sign and date the record. Any discrepancies will be noted on the COC record.

- If discrepancies occur, the samples in question will be segregated from normal sample storage and the field personnel immediately notified.
- COC records will be maintained with the records for a specific project, becoming part of the data package.

Custody Transfer to Laboratory - All samples collected during the PSA will be submitted to a NYSDOH ELAP-certified laboratory meeting specifications for documentation, sample login, internal chain of custody procedures, sample/analysis tracking, data reduction, and reporting. The laboratory will follow all specifications pertaining to laboratory sample custody procedures contained in the NYSDEC ASP (revised 2005).

In general, the following procedures will be followed upon sample receipt. The laboratory will not accept samples collected by project personnel for analysis without a correctly prepared COC record.

The first steps in the laboratory receipt of samples are completing the COC records and project sample login form. The laboratory Sample Custodian, or designee, will note that the shipment is accepted and notify the Laboratory Manager or the designated representative of the incoming samples.

Upon sample receipt, the laboratory Sample Custodian, or designee, will:

- Examine all samples and determine if proper temperature has been maintained during shipment. If samples have been damaged during shipment, the remaining samples will be carefully examined to determine whether they were affected. Any samples affected will also be considered damaged. It will be noted on the COC record that specific samples were damaged and that the samples were removed from the sampling program. Field personnel will be notified as soon as possible that samples were damaged and that they must be resampled, or the testing program changed, and provide an explanation of the cause of damage.
- Compare samples received against those listed on the COC record.
- Verify that sample holding times have not been exceeded.
- Sign and date the COC record and attach the waybill to the COC record.
- Denote the samples in the laboratory sample log-in book which contains the following information:
    - Project identification number
    - Sample numbers

  - Type of samples
  - Date received in laboratory
  - Record of the verified time of sample receipt (VTSR)
  - Date put into storage after analysis is completed
  - Date of disposal.

The last two items will be added to the log when the action is taken.

- Notify the Laboratory Manager of sample arrival.
- Place the completed COC records in the project file.

The VTSR is the time of sample receipt at the laboratory. The date and time the samples are logged in by the Sample Custodian or designee, will agree with the date and time recorded by the person relinquishing the samples.

A typical COC can be found as Figure B-1.

2.6.4 *Sampling Packaging and Shipping*

Sample bottles and samples will either be delivered/picked up at the site daily by the analytical laboratory, or delivered/shipped via overnight courier. Once the samples have been collected, proper procedures for packaging and shipping will be followed as described below.

Packaging

Prior to shipment, samples must be packaged in accordance with current United States Department of Transportation (USDOT) regulations. All necessary government and commercial carrier shipping papers must be filled out. The procedure below should be followed regardless of transport method:

- Samples will be transported in metal ice chests or sturdy plastic coolers (cardboard or Styrofoam containers are unacceptable).
- Remove previously used labels, tape, and postage from cooler.
- Ship filled sample bottles in same cooler in which empty bottles were received.
- Affix a return address label to the cooler.
- Check that all sample bottles are tightly capped.
- Check that all bottle labels are complete.

- Be sure COC forms are complete.
- Wrap sample bottles in bubble pack and place in cooler.
- Pack bottles with extra bubble pack, vermiculite, or Styrofoam "peanuts". Be sure to pack the trip blank, if one is being submitted with the samples.
- Keep samples refrigerated in cooler with bagged ice or frozen cold packs. Do not use ice for packing material; melting will cause bottle contact and possible breakage.
- Separate and retain the sampler's copy of COC and keep with field notes.
- Tape paperwork (COC, manifest, return address) in zipper bag to inside cooler lid.
- Close cooler and apply signed and dated custody seal in such a way that the seal must be broken to open cooler.
- Securely close cooler lid with packing or duct tape. Be sure to tape latches and drain plugs in closed position.

Shipping

Samples should arrive at the laboratory as soon as possible following sample collection to ensure that holding times are not exceeded. All samples must be hand delivered on the same day as sampling or sent via overnight courier. When using a commercial carrier, follow the steps below.

- Securely package samples and complete paperwork.
- Weigh coolers for air transport.
- Complete air bill for commercial carrier (air bills can be partially completed in office prior to sampling to avoid omissions in field). If necessary, insure packages.
- Keep customer copy of air bill with field notes and COC form.
- When coolers have been released to transporter, call receiving laboratory and give information regarding samplers' names, method of arrival.
- Call the lab on day following shipment to be sure all samples arrived intact. If bottles are broken, locations can be determined from COC and resampled.

2.7 ANALYTICAL LABORATORY

The data collected during the course of the PSA activities will be used to determine the presence and concentration of certain analytes in soil, and groundwater.

All groundwater samples collected from the vertical profile borings will be submitted to United Chemists of Melville, New York for 24-hour turnaround analysis.

All groundwater samples collected from the permanent monitoring wells as well as the air samples and the soil samples collected from the vertical profile borings collected during the PSA will be submitted to Accutest Laboratories located at 2235 Route 130, Dayton, New Jersey 08810. Accutest is a NYSDOH ELAP-certified laboratory (Lab I.D. # 10983) meeting specifications for documentation, data reduction, and reporting.

2.8 ANALYTICAL TEST PARAMETERS

The PSA will require the analysis of approximately 115 groundwater samples and 2 soil samples (including quality assurance/quality control [QA/QC] samples), for Target Compound List (TCL) Volatile Organic Compounds (VOCs) and an additional list of Freons using United State Environmental Protection Agency (USEPA) SW-846 8260B. The groundwater sampling may be conducted over two rounds and sample totals may change for the second round based on results from the initial round.

One aqueous and one soil sample will also be collected for waste characterization. Those samples are to be analyzed for Toxicity Characteristic Leaching Procedure (TCLP) in accordance with SW-846 Method 1311 for VOCs by USEPA SW-846 Method 8260B, SVOCs by USEPA SW-846 Method 8270C, and Metals by USEPA SW-846 Methods 6010B/7470A, as well as Reactivity to Sulfide and Cyanide, Corrosivity, Flammability.

These analyses will be performed in accordance with United States Environmental Protection Agency (USEPA) *"Test Methods for the Evaluation of Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions"*.

Nine air samples will be collected and analyzed for volatile compounds following *"Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition 1997, EPA/625/R-96/010B"*, Compendium Method TO-15, *"Determination Of Volatile Organic*

Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)".

2.9 *INSTRUMENT CALIBRATION*

The frequency of laboratory instrument calibration and associated procedures for the specific analytical methods to be followed by the selected laboratory are specified in the individual USEPA analytical method procedures. The selected laboratory's calibration schedule will adhere to all analytical method specifications.

2.10 *DATA MANAGEMENT AND REPORTING PLAN*

2.10.1 ***Data Use and Management Objectives***

Data Use Objectives

The typical data use objectives for this PSA are:

- Ascertaining if there is a threat to public health or the environment.
- Locating and identifying potential sources of impacts to soil or groundwater.
- Delineation of horizontal and vertical constituent concentrations, identifying clean areas, estimating the extent and/or volume of impacted soil and groundwater.
- Determining treatment and disposal options.
- Characterizing soil for on-site or off-site treatment.
- Formulating remediation strategies, and estimating remediation costs.

Data Management Objectives

The primary objective of proper data management is to ensure and document that all necessary work is conducted in accordance with the PSA and QAPP in an efficient and high quality manner thereby maximizing the confidence in the data in terms of PARCC. Data management procedures not only include field and laboratory documentation, but also include how the information is handled after the conclusion of field investigation and laboratory analyses area completed. Data handling procedures include project file management, reporting, usability analysis (review and validation) and use of consistent formats for the final presentation of the data.

Project File Specifications

The ERM Project Manager in ERM's Melville, New York office location will keep all project information in a central Project File maintained. The Project File will be assigned a unique project number that will be clearly displayed on all project file folders (including electronic files). Electronic files will be maintained in a similarly organized Project File located on the ERM Central Network system that is backed up on a weekly basis. Both hard copy and electronic Project Files will contain, at a minimum copies or originals of the following key project information:

- All correspondence including letters, transmittals, telephone logs, memoranda, and emails;
- Meeting notes;
- Technical information such as analytical data; field survey results, field notes, field logbooks and field management forms;
- Project calculations;
- Subcontractor agreements/contracts, and insurance certificates;
- Project-specific health and safety information/records;
- Access agreements;
- Project document output review/approval documentation; and
- Reports: Monthly Progress, Interim Technical, and Draft/Final Technical.

2.10.2 Reporting

Field Data

Field data will be recorded and reported by field personnel using appropriate field data documentation materials such as the field logbook, field management forms, and COC forms.

Good field management procedures include following proper chain of custody procedures to track a sample from collection through analysis, noting when and how samples are split (if necessary), making regular and complete entries in the field logbook, and the consistent use and completion of field management forms. Proper completion of these forms and the field logbook are necessary to support the consequent actions that may result from the sample analysis. This documentation will support that the samples were collected and handled properly making the resultant data complete, comparable, and defensible.

Laboratory Data

The analytical results of all samples collected, as part of the PSA will be reported following NYSDEC ASP 2005 specifications. All laboratory analytical data, except those from the groundwater samples collected from the vertical profile borings, will be reported as NYSDEC Category B deliverables. The data from the groundwater samples collected from the vertical profile borings will only contain chromatograms and quantitation reports from the samples. The Category B data deliverables include all backup QA/QC documentation necessary to facilitate a complete validation of the data.

In addition, NYSDEC "Sample Identification and Analytical Requirement Summary" and "Sample Preparation and Analysis Summary" forms will be completed and included with each data package. The sample tracking forms are specified and supplied by the 2005 NYSDEC ASP.

The laboratory will also transmit the analytical data in an electronic format to minimize the chances of transposition errors in summarizing the data. The data will be transmitted in an electronic data deliverable (EDD) in GISKEY (most recent version) format and a PDF copy of each ASP deliverable. The data will be sent to NYSDEC in USEPA Region II Miltimedia Electronic Data Deliverable (MEDD) format.

2.10.3 Data Validation

All field and laboratory data will be reviewed, validated and qualified as necessary to assess data usability by direct comparison to the specified data quality objectives and/or procedures set forth in this QAPP. The data associated with the vertical profile groundwater samples, the vertical profile soil samples, and the waste characterization samples will not be validated or qualified unless a major issue is observed after the initial review of the results. The ERM QAO will determine this. Information that can be obtained includes comparison of results obtained from samples taken at the same location, and the identification of missing data points. Examination of the data at the end of the process allows for the assessment of data quality with respect to PARCC.

Field Data Validation Protocol

Field data generated in accordance with the project-specific PSA will primarily consist of field temperature, pH, ORP, and specific conductance data, and data associated with soil boring advancement, monitoring well installation and development, and soil classification. This data will be validated by review of the project documentation to check that all forms specified in the Work Plan and this QAPP have been completely and correctly filled out and that documentation exists for the specified instrument calibrations. This documentation will be considered sufficient to provide that proper procedures have been followed during the field investigation.

Laboratory Data Validation Protocol

Data validation is the assessment of data quality with respect to method specifications and technical performance of the analytical laboratory. Analytical data packages will be examined to ensure that all specified lab components are included, all QA/QC specifications were performed or met, and the data use restrictions are well defined.

Summary documentation regarding QA/QC results will be completed by the laboratory using NYSDEC ASP forms and will be submitted with the raw analytical data packages (NYSDEC ASP Category B deliverables). Data validation will be performed to assess and document analytical data quality in accordance with the project data quality objectives. The data review will evaluate data for its quality and usability. This process will qualify results so that the end user of the analytical results can make decisions with consideration of the potential accuracy and precision of the data. For example, the results are acceptable as presented, considered estimated and qualified with a "J", or rejected and not useable and therefore qualified with an "R".

The validation of the analytical data will be performed according to the protocols and QC requirements of the analytical methods, the NYSDEC ASP, the National Functional Guidelines for Organic Data Review (October 1999), the USEPA Region II Data Review Standard Operating Procedure (SOP) HW-24, Revision 1, June 1999: Validating Volatile Organic Compounds by SW-846 Method 8260B, the USEPA Region II Data Review Standard Operating Procedure (SOP) Number HW-18, Revision 0, August 1994: Validating Canisters of Volatile Organics in Ambient Air, and the reviewer's professional judgment.

The order in which the aforementioned guidance documents and/or criteria are listed does not imply a hierarchy of reliance on a particular document for validation. ERM will utilize all guidance documents and/or criteria relying on the most comprehensive reference sources to perform the most complete validation possible.

The data validation process will provide an informed assessment of the laboratory's performance based upon contractual requirements and applicable analytical criteria. The report generated as a result of the data validation process will provide a base upon which the usefulness of the data can be evaluated by the end user of the analytical results.

During the validation process, it will be determined whether sufficient back-up data and QA/QC results are available so the reviewer may conclusively determine the quality of data support laboratory submittals for sample results. Each data package will be checked for completeness and technical adequacy of the data. Upon completion of the review, the reviewers will develop a QA/QC data validation report for each SDG.

For the organic parameter analyses, the following items or criteria will be reviewed:

- Case narrative and deliverable compliance
- Holding times both technical and procedural and sample preservation (including pH and temperature)
- Surrogate Compound recoveries, summary and data
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) results, recoveries, summary and data
- Blank Spike Sample (BSS) recoveries
- Method blank summary and data
- Gas Chromatography (GC)/Mass Spectroscopy (MS) tuning and performance
- Initial and continuing calibration summaries and data
- Internal standard areas, retention times, summary and data
- Blind Field Duplicate sample results
- Field Blank results
- Trip Blank results
- Organic analysis data sheets (Form I)
- GC/MS chromatograms, mass spectra and quantitation reports
- Quantitation and detection limits
- Qualitative and quantitative compound identification

After the Summary Reports are prepared for each SDG, the validator will prepare a Data Usability Report (DUSR). The DUSR will be prepared according to the guidelines established by Division of Environmental Remediation Quality Assurance Group and will review the following:

- Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?
- Have all holding times been met?
- Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?

- Have all of the data been generated using established and agreed upon analytical protocols?
- Does an evaluation of the raw data confirm the results provided in the data summary sheets and qualify control verification forms?
- Have the correct data qualifiers been used?

Once the data package has been reviewed and the above questions asked and answered the DUSR proceeds to describe the samples and the analytical parameters. Data deficiencies, analytical protocol deviations, and quality control problems are identified and their effect-on the data is discussed. The DUSR shall also include recommendations on resampling/reanalysis. All data qualifications must be documented following the NYSDEC ASP 2005 Rev. Guidelines.

2.10.4 *Data Presentation Formats*

Project data will be presented in consistent formats for all letters, Progress Reports, Interim Technical Reports, and Draft/Final Technical Reports. Specific formats will be tailored to best fit the needs of the data being presented but general specifications are described below.

Data Records

The data record will generally include one or more of the following:

- Unique sample or field measurement code;
- Sampling or field measurement location and sample or measurement type;
- Sampling or field measurement raw data;
- Laboratory analysis ID number;
- Property or component measured; and
- Result of analysis (e.g., concentration).

Tabular Displays

The following data will generally be presented in tabular displays:

- Unsorted (raw) data;
- Results for each medium or for each constituent monitored;
- Data reduction for statistical analysis;

- Sorting of data by potential stratification factors (e.g., location, soil layer/depth, topography, etc.); and
- Summary data.

Graphical Displays

The following data will be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.):

- Sample locations and sampling grid;
- Boundaries of sampling area;
- Areas where additional data are necessary;
- Constituent concentrations at each sample location;
- Geographical extent of impacts;
- Constituent concentration levels, averages, minima and maxima;
- Changes in concentration in relation to distance from the source, time, depth or other parameters;
- Features affecting intramedia transport; and
- Potential receptors.

2.11 PERFORMANCE AUDITS

2.11.1 Field Audits

During field activities, the ERM QAO may accompany sampling personnel into the field to verify that the sampling program is being properly implemented and to detect and define problems so that corrective action can be taken. All findings will be documented and provided to the ERM Project Manager and FTL.

2.11.2 Laboratory Audits

The NYSDOH ELAP CLP certified laboratory that has satisfactorily completed performance audits and performance evaluation samples will be used for all sample analysis. The results of the most recent performance audits and performance evaluations will be made available upon request. ERM may perform a laboratory audit if warranted.

2.11.3 Corrective Actions

The laboratory utilized for this project will meet the specifications for corrective action protocols typical for performing contract laboratory services. Laboratory corrective action may include instrumentation maintenance, methods modification, cross contamination/carry over issues, sample tracking practices, laboratory information management (LIMs), etc.

Prior to mobilization for the field investigation, a meeting may be scheduled among representatives of ERM and the laboratory to discuss general corrective action approach and establish procedures to ensure good and timely communications among all parties during the investigation. New procedures will be put into effect as appropriate.

TABLES

TABLE B-1
SAMPLE TOTAL SUMMARY

Task	*Analytical Parameters*	*Matrix*	*Number of Samples*	*Blind Field Duplicates*[1]	*MS/MSD Pairs*[2]	*Field Blanks*[3]	*Trip Blanks*[4]
Vertical Profile Groundwater Borings	TCL VOCs + Freon List[5]	Aqueous	60	6	0	0	0
Vertical Profile Soil Sampling	TCL VOCs + Freon List[5]	Soil	2[6]	0	0	0	0
Groundwater Sampling (Round One)[7]	TCL VOCs + Freon List[5]	Aqueous	11	1	1	5	5
Groundwater Sampling (Round Two)[7]	TCL VOCs + Freon List[5]	Aqueous	11	1	1	5	5
Vapor Intrusion Sampling	TO-15	Air	9	1	0	0	0
Management of Investigative Derived Waste (IDW)	Toxicity Characteristic Leaching Procedure (TCLP) for VOCs, SVOCs and RCRA Metals Reactivity to Sulfide and Cyanide, Corrosivity, Flammability	Soil	1	0	0	0	0
		Aqueous	1	0	0	0	0

Notes:

1. Duplicates are generally collected at a minimum frequency of five percent (1 per 20 field samples). More frequent collection may be warranted based on field conditions/observations and/or at the discretion of the Field Team Leader.
2. MS/MSD Pairs (two samples) will be collected at a minimum frequency of five percent (1 per 20 field samples). More frequent collection may be warranted based on field conditions/observations and/or at the discretion of the Field Team Leader.
3. Field Blanks will be collected at a minimum frequency of one per day where applicable. More frequent collection may be warranted based on field conditions/observations and/or at the discretion of the Field Team Leader.
4. Trip Blanks will be collected at the rate of one per aqueous sample shipment when VOCs are collected where applicable.
5. List of additional Freon compounds detailed in Table B-5.
6. The number of soil samples may be reduced to 1 if no PID readings are observed.
7. The Groundwater sampling may occur over two rounds. Sample totals may change for the second round based on results from the initial round.

TABLE B-2
SAMPLING LOCATIONS

Task	*Locations to be Sampled*	*Matrix*	*Analysis*
Vertical Profile Groundwater Borings	VP-01 (first depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-01 (second depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-01 (third depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-01 (fourth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-01 (fifth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-01 (sixth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-01 (seventh depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-01 (eighth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-01 (ninth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-01 (tenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-01 (eleventh depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-01 (twelfth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-01 (thirteenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-01 (fourteenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-01 (fifteenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (first depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (second depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (third depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (fourth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (fifth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (sixth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (seventh depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (eighth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (ninth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (tenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (eleventh depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (twelfth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (thirteenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (fourteenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-02 (fifteenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-03 (first depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-03 (second depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-03 (third depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-03 (fourth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-03 (fifth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-03 (sixth depth) [1]	Aqueous	TCL VOCs + Freon List [6]

TABLE B-2 (continued)
SAMPLING LOCATIONS

Task	*Locations to be Sampled* [1]	*Matrix*	*Analysis*
Vertical Profile Groundwater Borings (continued)	VP-03 (seventh depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-03 (eighth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-03 (ninth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-03 (tenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-03 (eleventh depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-03 (twelfth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-03 (thirteenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-03 (fourteenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-03 (fifteenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (first depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (second depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (third depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (fourth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (fifth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (sixth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (seventh depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (eighth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (ninth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (tenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (eleventh depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (twelfth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (thirteenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (fourteenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
	VP-04 (fifteenth depth) [1]	Aqueous	TCL VOCs + Freon List [6]
Vertical Profile Soil Sampling	VP-S-01 (first depth) [2]	Soil	TCL VOCs + Freon List [6]
	VP-S-02 (second depth) [2]	Soil	TCL VOCs + Freon List [6]
Groundwater Sampling	MW-01 (XXX) [3]	Aqueous	TCL VOCs + Freon List [6]
	MW-01 (YYY) [3]	Aqueous	TCL VOCs + Freon List [6]
	MW-02 (XXX) [3]	Aqueous	TCL VOCs + Freon List [6]
	MW-02 (YYY) [3]	Aqueous	TCL VOCs + Freon List [6]
	MW-03 (XXX) [3]	Aqueous	TCL VOCs + Freon List [6]
	MW-03 (YYY) [3]	Aqueous	TCL VOCs + Freon List [6]
	MW-04 (XXX) [3]	Aqueous	TCL VOCs + Freon List [6]
	MW-04 (YYY) [3]	Aqueous	TCL VOCs + Freon List [6]

TABLE B-2 (continued)
SAMPLING LOCATIONS

Task	*Locations to be Sampled* [1]	*Matrix*	*Analysis*
Groundwater Sampling (continued)	N-7560 [4]	Aqueous	TCL VOCs + Freon List [6]
	N-10209 [4]	Aqueous	TCL VOCs + Freon List [6]
	MW-05 (XXX) [3,5]	Aqueous	TCL VOCs + Freon List [6]
	MW-05 (YYY) [3,5]	Aqueous	TCL VOCs + Freon List [6]
Vapor Intrusion Sampling	SS-01 [7,8]	Air	TO-15
	SS-02 [7,8]	Air	TO-15
	SS-03 [7,8]	Air	TO-15
	SS-04 [7,8]	Air	TO-15
	B-01 [7,8]	Air	TO-15
	B-02 [7,8]	Air	TO-15
	B-03 [7,8]	Air	TO-15
	B-04 [7,8]	Air	TO-15
	AA-01 [7,9]	Air	TO-15
Management of IDW	WC-01	Aqueous	Waste Characterization [10]
	WC-02	Soil	Waste Characterization [10]

Notes:

1. Vertical Profile aqueous samples to be taken at 10 foot intervals starting at approximately 100 feet to 250 feet. It has been assumed a maximum of 15 samples will be collected at each location.
2. Vertical Profile soil samples to be taken at the location of the highest PID reading and the interface depth.
3. Monitoring wells may have two screened zones. XXX will be the depth of the first screened zone and YYY will be the depth of the second screened zone if required. The groundwater sampling may occur over two rounds.
4. These are existing Nassau County Wells.
5. This well will be co-located with N-10209.
6. List of additional Freon compounds detailed in Table B-5.
7. SS indicates a sample that will be collected from the sub-slab; B indicates a sample that will be collected from the basement of the building (indoor air); AA indicates a sample that will collected from the ambient air. More samples from each location may be collected if deemed necessary.
8. Will be collected over a 24-hour time period.
9. Will be collected over a 2-hour time period.
10. Waste Characterization sampling to include PCBs in accordance with SW-846 Method 8082, TCLP in accordance with SW-846 Method 1311 for VOCs by USEPA SW-846 Method 8260B, SVOCs by USEPA SW-846 Method 8270C, and Metals by USEPA SW-846 Methods 6010B / 7470A, Ignitability, Corrosivity and Reactivity to Sulfide and Cyanide.

TABLE B-3
DETAILED SUMMARY OF AQUEOUS SAMPLING PROGRAM
SAMPLE TOTALS, ANALYTICAL METHODS, PRESERVATIVES, HOLDING TIMES AND CONTAINERS

Analytical Parameters	*Analytical Method Reference*	*Sample Preservation*	*Holding Time* [1]	*Container* [2,3]
TCL VOCs	SW-846 8260B + 10 TICs + Freon List	Cool 4°C, pH<2 (HCl)	10 days	3 – 40 ml glass Teflon-lined cap
Waste Characterization				
TCL PCBs	SW-846 8082	Cool, 4°C	5 days/ 40 days	2 - 1000 ml (1 Liter) amber bottle
Toxicity Characteristic Leaching Procedure (TCLP)	Sample preparation: USEPA SW-846 Method 1311 Sample analysis: 8260B, 8270C, 6010B, & 7470A	Cool, 4°C	VOCs 7 days/NA/7 days, SVOCs, 5 days/7 days/40 days, Metals (*except Mercury*) 180 days/NA/180 days, Mercury 5 days/NA/28 days	3 – 40 ml glass Teflon-lined cap 2 - 1000 ml (1 Liter) amber bottle
Reactivity to Sulfide and Cyanide	USEPA SW-846 Methods 9034 and 9014 (Chapter Seven)	Cool, 4°C	Not Regulated (14 day holding time is suggested)	1 - 1000 ml (1 Liter) plastic bottle
Corrosivity	USEPA SW-846 Method 9045C	Cool, 4°C	Not Regulated	1 - 1000 ml (1 Liter) plastic bottle
Flammability (Ignitability)	USEPA SW-846 Method 1010	Cool, 4°C	Not Regulated	1 - 1000 ml (1 Liter) plastic bottle

<u>Notes:</u>

1. Holding times are from Validated Time of Sample Receipt (VTSR). Technical holding times vary. VOC holding times are days after VTSR until analysis; SVOC holding times are days after VTSR until extraction / days from extraction to analysis; Inorganics holding times are days after VTSR until analysis. TCLP holding times are days after VTSR until leaching / days from leaching until extraction (if required)/days from extraction until analysis.
2. As specified by Accutest Laboratories, Dayton, New Jersey.
3. Reactivity to Sulfide and Cyanide, Corrosivity, and Flammability (Ignitability) will be collected into the same 1000 ml sample container.

TABLE B-4
DETAILED SUMMARY OF SOIL SAMPLING PROGRAM
SAMPLE TOTALS, ANALYTICAL METHODS, PRESERVATIVES, HOLDING TIMES AND CONTAINERS

Analytical Parameters	*Analytical Method Reference*	*Sample Preservation*	*Holding Time* [1]	*Container* [2,3]
TCL VOCs	SW-846 8260B + 10 TICs + Freon List	Cool 4°C	10 days	1 – 2 oz. glass jar
Waste Characterization				
TCL PCBs	SW-846 8082	Cool, 4°C	5 days/ 40 days	1 – 8 oz. glass jar
Toxicity Characteristic Leaching Procedure (TCLP)	Sample preparation: USEPA SW-846 Method 1311 Sample analysis: 8260B, 8270C, 6010B, & 7470A	Cool, 4°C	VOCs 7 days/NA/7 days, SVOCs, 5 days/7 days/40 days, Metals (*except Mercury*) 180 days/NA/180 days, Mercury 5 days/NA/28 days	1 – 60 ml glass Teflon-lined cap 1 – 8 oz. glass jar
Reactivity to Sulfide and Cyanide	USEPA SW-846 Methods 9034 and 9014 (Chapter Seven)	Cool, 4°C	Not Regulated (14 day holding time is suggested)	1 – 8 oz. glass jar
Corrosivity	USEPA SW-846 Method 9045C	Cool, 4°C	Not Regulated	1 – 8 oz. glass jar
Flammability (Ignitability)	USEPA SW-846 Method 1010	Cool, 4°C	Not Regulated	1 – 8 oz. glass jar

Notes:

1. Holding times are from Validated Time of Sample Receipt (VTSR). Technical holding times vary. VOC holding times are days after VTSR until analysis; SVOC holding times are days after VTSR until extraction / days from extraction to analysis; Inorganics holding times are days after VTSR until analysis. TCLP holding times are days after VTSR until leaching / days from leaching until extraction (if required)/days from extraction until analysis.
2. As specified by Accutest Laboratories, Dayton, New Jersey.
3. Reactivity to Sulfide and Cyanide, Corrosivity, and Flammability (Ignitability) will be collected into the same sample container.

TABLE B-5
DETAILED SUMMARY OF AIR SAMPLING PROGRAM
SAMPLE TOTALS, ANALYTICAL METHODS, PRESERVATIVES, HOLDING TIMES AND CONTAINERS

Analytical Parameters	*Analytical Method Reference*	*Sample Preservation*	*Holding Time*[1]	*Container*[2,3]
VOCs in Air	TO-15 + Freon List	none	30 days	1 – 6 liter Summa Canister

Notes:

1. VOCs in Air holding times are days after the date of sample collection until analysis.
2. As specified by Accutest Laboratories, Dayton, New Jersey.

TABLE B-6
VOLATILE TARGET COMPOUND LIST (TCL) AND REPORTING LIMITS

Target Compound List	*CAS Number* [1]	*Reporting Limits (ppb)* [2]	*Method Detection Limit (ppb)* [2]
Acetone	67-64-1	10	2.4
Benzene	71-43-2	1	0.21
Bromodichloromethane	75-27-4	1	0.17
Bromoform	75-25-2	4	0.54
Bromomethane	74-83-9	2	0.22
2-Butanone	78-93-3	10	2.6
Carbon disulfide	75-15-0	2	0.21
Carbon tetrachloride	56-23-5	1	0.29
Chlorobenzene	108-90-7	1	0.22
Chloroethane	75-00-3	1	0.56
Chloroform	67-66-3	1	0.22
Chloromethane	74-87-3	1	0.35
Cyclohexane	110-82-7	5	0.5
1,2-Dibromo-3-chloropropane	96-12-8	10	1.1
Dibromochloromethane	124-48-1	1	0.19
1,2-Dibromoethane	106-93-4	2	0.52
1,2-Dichlorobenzene	95-50-1	1	0.2
1,3-Dichlorobenzene	541-73-1	1	0.32
1,4-Dichlorobenzene	106-46-7	1	0.24
1,1-Dichloroethane	75-34-3	1	0.23
1,2-Dichloroethane	107-06-2	1	0.29
1,1-Dichloroethene	75-35-4	1	0.33
cis-1,2-Dichloroethene	156-59-2	1	0.18
trans-1,2-Dichloroethene	156-60-5	1	0.42
1,2-Dichloropropane	78-87-5	1	0.2
cis-1,3-Dichloropropene	10061-01-5	1	0.15
trans-1,3-Dichloropropene	10061-02-6	1	0.2
Ethylbenzene	100-41-4	1	0.2
2-Hexanone	591-78-6	5	1.3
Isopropylbenzene	98-82-8	2	0.2
Methyl Acetate	79-20-9	5	2.1
Methylcyclohexane	108-87-2	5	0.18
Methyl tert Butyl Ether (MTBE)	1634-04-4	1	0.31
4-Methyl-2-pentanone(MIBK)	108-10-1	5	1.1

TABLE B-6 (continued)
VOLATILE TARGET COMPOUND LIST (TCL) AND REPORTING LIMITS

Target Compound List	*CAS Number*[1]	*Reporting Limits (ppb)*[2]	*Method Detection Limit (ppb)*[2]
Methylene chloride	75-09-2	2	0.27
Styrene	100-42-5	5	0.16
1,1,2,2-Tetrachloroethane	79-34-5	1	0.28
Tetrachloroethene	127-18-4	1	0.28
Toluene	108-88-3	1	0.2
1,2,4-Trichlorobenzene	120-82-1	5	0.16
1,1,1-Trichloroethane	71-55-6	1	0.28
1,1,2-Trichloroethane	79-00-5	1	0.32
Trichloroethene	79-01-6	1	0.29
Vinyl chloride	75-01-4	1	0.29
m,p-Xylene	179601-23-1	1	0.42
o-Xylene	95-47-6	1	0.31
Xylene (total)	1330-20-7	1	0.31
Trichlorofluoromethane (Freon 11)	75-69-4	5	0.25
Dichlorodifluoromethane (Freon 12)	75-71-8	5	0.75
Dichlorofluoromethane (Freon 21)	75-43-4	5[3]	0.50[3]
Chlorodifluoromethane (Freon 22)	75-45-6	5	0.57
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)	76-13-1	5	0.69
Monochloropentafluoroethane (Freon 115)	76-15-3	5[3]	0.50[3]
2,2-dichloro-1,1,1-trifluoroethane (Freon 123)	306-83-2	5[3]	0.50[3]
1,2-Dichloro-1,2,2-trifluoroethane (Freon 123a)	354-23-4	5	0.35
1,1-Difluoroethane (Freon 152a)	75-37-6	5[3]	0.50[3]

Notes:

1. Chemical Abstracts Service (CAS) Registry Number.
2. As per Accutest Laboratories, Dayton, New Jersey.
3. A method development study for these compounds will be performed by the laboratory prior to analysis of the samples. The reporting limits and MDLs may vary after the method development.

TABLE B-7
VOLATILES IN AIR COMPOUND LIST AND REPORTING LIMITS

Target Compound List	*CAS Number* [1]	*Reporting Limits (ug/m^3)* [2]	*Method Detection Limit (ug/m^3)* [2]
Acetone	67-64-1	0.48	0.17
1,3-Butadiene	106-99-0	0.44	0.15
Benzene	71-43-2	0.64	0.089
Bromodichloromethane	75-27-4	1.3	0.33
Bromoform	75-25-2	2.1	0.32
Bromomethane	74-83-9	0.78	0.14
Bromoethene	593-60-2	0.87	0.16
Benzyl Chloride	100-44-7	1.0	0.12
Carbon disulfide	75-15-0	0.62	0.11
Chlorobenzene	108-90-7	0.92	0.12
Chloroethane	75-00-3	0.53	0.11
Chloroform	67-66-3	0.98	0.21
Chloromethane	74-87-3	0.41	0.083
3-Chloropropene	107-05-1	0.63	0.12
2-Chlorotoluene	95-49-8	1.0	0.12
Carbon tetrachloride	56-23-5	1.3	0.33
Cyclohexane	110-82-7	0.69	0.15
1,1-Dichloroethane	75-34-3	0.81	0.17
1,1-Dichloroethylene	75-35-4	0.79	0.20
1,2-Dibromoethane	106-93-4	1.5	0.25
1,2-Dichloroethane	107-06-2	0.81	0.17
1,2-Dichloropropane	78-87-5	0.92	0.12
1,4-Dioxane	123-91-1	0.72	0.11
Dibromochloromethane	124-48-1	1.7	0.27
trans-1,2-Dichloroethylene	156-60-5	0.79	0.18
cis-1,2-Dichloroethylene	156-59-2	0.79	0.21
cis-1,3-Dichloropropene	10061-01-5	0.91	0.20
m-Dichlorobenzene	541-73-1	1.2	0.14
o-Dichlorobenzene	95-50-1	1.2	0.14
p-Dichlorobenzene	106-46-7	1.2	0.16
trans-1,3-Dichloropropene	10061-02-6	0.91	0.18
Ethanol	64-17-5	0.94	0.24
Ethylbenzene	100-41-4	0.87	0.083
4-Ethyltoluene	622-96-8	0.98	0.084
Heptane	142-82-5	0.82	0.13
Hexachlorobutadiene	87-68-3	2.1	0.29
Hexane	110-54-3	0.70	0.13
2-Hexanone	591-78-6	0.82	0.20
Isopropylbenzene	98-82-8	0.98	0.10

TABLE B-7 (continued)
VOLATILES IN AIR COMPOUND LIST AND REPORTING LIMITS

Target Compound List	*CAS Number* [1]	*Reporting Limits (ug/m³)* [2]	*Method Detection Limit (ug/m³)* [2]
Isopropyl Alcohol	67-63-0	0.49	0.14
Methylene chloride	75-09-2	0.69	0.063
Methyl ethyl ketone	78-93-3	0.59	0.11
Methyl Isobutyl Ketone	108-10-1	0.82	0.10
Methyl Tert Butyl Ether	1634-04-4	0.72	0.17
Propylene	115-07-1	0.86	0.12
Styrene	100-42-5	0.85	0.064
1,1,1-Trichloroethane	71-55-6	1.1	0.27
1,1,2,2-Tetrachloroethane	79-34-5	1.4	0.19
1,1,2-Trichloroethane	79-00-5	1.1	0.16
1,2,4-Trichlorobenzene	120-82-1	1.5	0.43
1,2,4-Trimethylbenzene	95-63-6	0.98	0.10
1,3,5-Trimethylbenzene	108-67-8	0.98	0.088
2,2,4-Trimethylpentane	540-84-1	0.93	0.093
Tertiary Butyl Alcohol	75-65-0	0.61	0.13
Tetrachloroethylene	127-18-4	1.4	0.16
Tetrahydrofuran	109-99-9	0.59	0.20
Toluene	108-88-3	0.75	0.064
Trichloroethylene	79-01-6	1.1	0.16
Vinyl chloride	75-01-4	0.51	0.10
Vinyl Acetate	108-05-4	0.70	0.14
m+p-Xylene	179601-23-1	0.87	0.16
o-Xylene	95-47-6	0.87	0.096
Xylenes (total)	1330-20-7	0.87	0.096
Trichlorofluoromethane (Freon 11)	75-69-4	1.1	0.35
Dichlorodifluoromethane (Freon 12)	75-71-8	0.99	0.29
Dichlorofluoromethane (Freon 21)	75-43-4	5 [3]	0.50 [3]
Chlorodifluoromethane (Freon 22)	75-45-6	5	0.57
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)	76-13-1	1.5	0.25
1,2-Dichlorotetrafluoroethane (Freon 114)	76-14-2	1.4	0.31
Monochloropentafluoroethane (Freon 115)	76-15-3	5 [3]	0.50 [3]
2,2-dichloro-1,1,1-trifluoroethane (Freon 123)	306-83-2	5 [3]	0.50 [3]
1,2-Dichloro-1,2,2-trifluoroethane (Freon 123a)	354-23-4	5	0.35
1,1-Difluoroethane (Freon 152a)	75-37-6	5 [3]	0.50 [3]

TABLE B-7 (continued)
VOLATILES IN AIR COMPOUND LIST AND REPORTING LIMITS

Notes:

1. Chemical Abstracts Service (CAS) Registry Number.
2. As per Accutest Laboratories, Dayton, New Jersey.
3. A method development study for these compounds will be performed by the laboratory prior to analysis of the samples. The reporting limits and MDLs may vary after the method development.

TABLE B-8
INVESTIGATIVE DERIVED WASTES COMPOUND LIST AND REPORTING LIMITS

POLYCHLORINATED BIPHENYL (PCBs)

Target Compound List (TCL)	*CAS Number*[1]	*Reporting Limits Aqueous (µg/l)*[2]	*Reporting Limits Solid (µg/kg)*[2,3]
Aroclor-1016	12674-11-2	0.5	17
Aroclor-1221	11104-28-2	0.5	17
Aroclor-1232	11141-16-5	0.5	17
Aroclor-1242	53469-21-9	0.5	17
Aroclor-1248	12672-29-6	0.5	17
Aroclor-1254	11097-69-1	0.5	17
Aroclor-1260	11096-82-5	0.5	17

Notes:
1. Chemical Abstracts Service (CAS) Registry Number.
2. As per Accutest Laboratories, Dayton, New Jersey.
3. Soil Reporting Levels will vary depending on percent moisture.

TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) VOLATILES

Target Compound List	*CAS Number*[1]	*Reporting Limits (mg/l)*	*Method Detection Limit (mg/l)*[2]
benzene	71-43-2	0.0050	0.0011
2-butanone	78-93-3	0.050	0.014
carbon tetrachloride	56-23-5	0.0050	0.0019
chlorobenzene	108-90-7	0.0050	0.0012
chloroform	67-66-3	0.0050	0.0017
1,4-dichlorobenzene	106-46-7	0.0050	0.0011
1,2-dichloroethane	107-06-2	0.0050	0.0016
1,1-dichloroethene	75-35-4	0.0050	0.0015
tetrachloroethene	127-18-4	0.0050	0.0035
trichloroethene	79-01-6	0.0050	0.0014
vinyl chloride	75-01-4	0.025	0.0023

Notes:
1. Chemical Abstracts Service (CAS) Registry Number.
2. Method Detection Limits as per Accutest Laboratories, Dayton, New Jersey. May vary slightly per instrument and are subject to change throughout the course of the project.

TABLE B-8 (continued)
INVESTIGATIVE DERIVED WASTES COMPOUND LIST AND REPORTING LIMITS

TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) SEMIVOLATILES

Target Compound List	*CAS Number* [1]	*Reporting Limits (mg/l)*	*Method Detection Limit (mg/l)* [3]
2-methylphenol	95-48-7	0.050	0.0049
3&4-methylphenol [2]	108-39-4/106-44-5	0.050	0.0062
pentachlorophenol	87-86-5	0.20	0.0079
2,4,5-trichlorophenol	95-95-4	0.050	0.0089
2,4,6-trichlorophenol	88-06-2	0.050	0.0081
1,4-dichlorobenzene	106-46-7	0.020	0.0028
2,4-dinitrotoluene	121-14-2	0.020	0.0036
hexachlorobenzene	118-74-1	0.020	0.0028
hexachlorobutadiene	87-68-3	0.020	0.011
hexachloroethane	67-72-1	0.050	0.0066
nitrobenzene	98-95-3	0.020	0.0045
pyridine	110-86-1	0.020	0.0017

Notes:
1. Chemical Abstracts Service (CAS) Registry Number.
2. Compounds co-elute.
3. Method Detection Limits as per Accutest Laboratories, Dayton, New Jersey. May vary slightly per instrument and are subject to change throughout the course of the project.

TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) METALS

Target Analyte List	*CAS Number* [1]	*Reporting Limits (mg/l)*	*Method Detection Limit (mg/l)* [2]
arsenic	7440-38-2	0.2	0.016
barium	7440-39-3	2.0	0.021
cadmium	7440-43-9	0.05	0.001
chromium	7440-47-3	0.2	0.0038
lead	7439-92-1	0.1	0.0046
mercury	7439-97-6	0.002	0.00047
selenium	7782-49-2	0.3	0.0098
silver	7440-22-4	0.3	0.0091

Notes:
1. Chemical Abstracts Service (CAS) Registry Number.
2. Method Detection Limits as per Accutest Laboratories, Dayton, New Jersey. May vary slightly per instrument and are subject to change throughout the course of the project.

TABLE B-9 (continued)
INVESTIGATIVE DERIVED WASTES COMPOUND LIST AND REPORTING LIMITS

GENERAL CHEMISTRY

Parameter	*Compound Number* [1]	*Reporting Limit*	*Units*
Reactivity to Sulfide	GIS-210-017	20 20	mg/l (aqueous) mg/kg (soil)
Reactivity to Cyanide	GIS-210-015	0.50 0.50	mg/l (aqueous) mg/kg (soil)
Corrosivity (pH)	GIS-210-014	0.2	pH - Standard units
Flammability (Ignitability)	GIS-210-013	140	degrees Celsius

Notes:

1. Identifier utilized by ERM via the database to generate data tables.

TABLE B-10
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY VOLATILE ANALYSES

QC Compounds	*Surrogate Compound Accuracy (% Rec.)* [1]	*Blind Field Duplicate Precision (% RPD)*	*Method Blanks*	*MS/MSD Accuracy (% Rec.)* [1]	*MS/MSD Precision (% RPD)*	*BS/BSD Accuracy (% Rec.)* [1]	*BS/BSD Precision (% RPD)*
all compounds		< 50 for aqueous < 100 for soil	≤ 2.5 x RL for methylene chloride, and cyclohexane ≤5 x RL for acetone, 2-butanone ≤ RL for all other compounds				
Acetone				32-166	24	53-154	13
Benzene				51-138	13	77-121	15
Bromodichloromethane				76-134	13	82-129	10
Bromoform				60-137	13	71-135	10
Bromomethane				62-137	15	68-133	10
2-Butanone				47-146	19	53-141	10
Carbon disulfide				54-135	15	52-134	10
Carbon tetrachloride				65-148	17	73-140	10
Chlorobenzene				76-120	12	80-118	10
Chloroethane				61-144	18	69-138	10
Chloroform				74-127	14	79-125	10
Chloromethane				53-142	20	55-152	10
Cyclohexane				50-148	15	62-124	10
1,2-Dibromo-3-chloropropane				65-136	14	68-132	10
Dibromochloromethane				70-128	11	80-125	10
1,2-Dibromoethane				73-124	12	79-122	10
1,2-Dichlorobenzene				73-123	10	79-116	10
1,3-Dichlorobenzene				75-120	12	76-120	10
1,4-Dichlorobenzene				71-120	13	77-119	10
1,2-Dichloroethane				70-132	14	77-123	10
1,1-Dichloroethene				63-142	15	66-137	10
cis-1,2-Dichloroethene				63-135	15	64-125	10
trans-1,2-Dichloroethene				70-130	10	75-120	11
1,2-Dichloropropane				69-128	13	72-121	10

TABLE B-10 (continued)
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY
VOLATILE ANALYSES

QC Compounds	Surrogate Compound Accuracy (% Rec.) 1	Blind Field Duplicate Precision (% RPD)	Method Blanks	MS/MSD Accuracy (% Rec.) 1	MS/MSD Precision (% RPD)	BS/BSD Accuracy (% Rec.) 1	BS/BSD Precision (% RPD)
cis-1,3-Dichloropropene				74-123	12	79-120	10
trans-1,3-Dichloropropene				73-128	12	78-125	10
Ethylbenzene				51-142	14	80-124	15
Freon 113				62-140	17	73-133	10
2-Hexanone				51-145	18	52-147	10
Isopropylbenzene				65-135	11	75-132	13
Methyl Acetate				45-151	16	52-147	10
Methylcyclohexane				56-142	16	71-128	10
Methyl tert Butyl Ether (MTBE)				42-149	13	72-124	23
4-Methyl-2-pentanone(MIBK)				58-142	15	64-141	10
Methylene chloride				73-128	12	75-121	10
Styrene				74-131	10	82-128	10
1,1,2,2-Tetrachloroethane				70-126	11	72-123	10
Tetrachloroethene				66-129	14	65-135	11
Toluene				49-147	13	79-122	19
1,2,4-Trichlorobenzene				68-126	12	71-128	10
1,1,1-Trichloroethane				69-140	15	77-135	10
1,1,2-Trichloroethane				81-121	12	83-120	10
Trichloroethene				64-139	13	81-123	10
Vinyl chloride				56-146	18	61-150	10
m,p-Xylene				52-145	14	82-121	19
o-Xylene				56-142	13	81-123	14
Xylene (total)				46-146	13	82-121	21

TABLE B-10 (continued)
ANALYTICAL LABORATORY DATA QUALITY OBJECTIVES (DQOs) FOR PRECISION AND ACCURACY
VOLATILE ANALYSES

QC Compounds	*Surrogate Compound Accuracy (% Rec.)* [1]	*Blind Field Duplicate Precision (% RPD)*	*Method Blanks*	*MS/MSD Accuracy (% Rec.)* [1]	*MS/MSD Precision (% RPD)*	*BS/BSD Accuracy (% Rec.)* [1]	*BS/BSD Precision (% RPD)*
Trichlorofluoromethane (Freon 11)				59-158	17	70-157	10
Dichlorodifluoromethane (Freon 12)				53-157	20	49-184	10
Dichlorofluoromethane (Freon 21)				50-150	20	50-150	10
Chlorodifluoromethane (Freon 22)				46-158	19	54-155	10
1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113)				62-140	17	73-133	10
Monochloropentafluoroethane (Freon 115)				50-150	20	50-150	10
2,2-dichloro-1,1,1-trifluoroethane (Freon 123)				50-150	20	50-150	10
1,2-Dichloro-1,2,2-trifluoroethane (Freon 123a)				50-150	20	50-150	10
1,1-Difluoroethane (Freon 152a)				50-150	20	50-150	10
Dibromofluoromethane	77-121						
1,2-Dichloroethane-D4	65-133						
Toluene-D8	80-117						
4-Bromofluorobenzene	79-124						

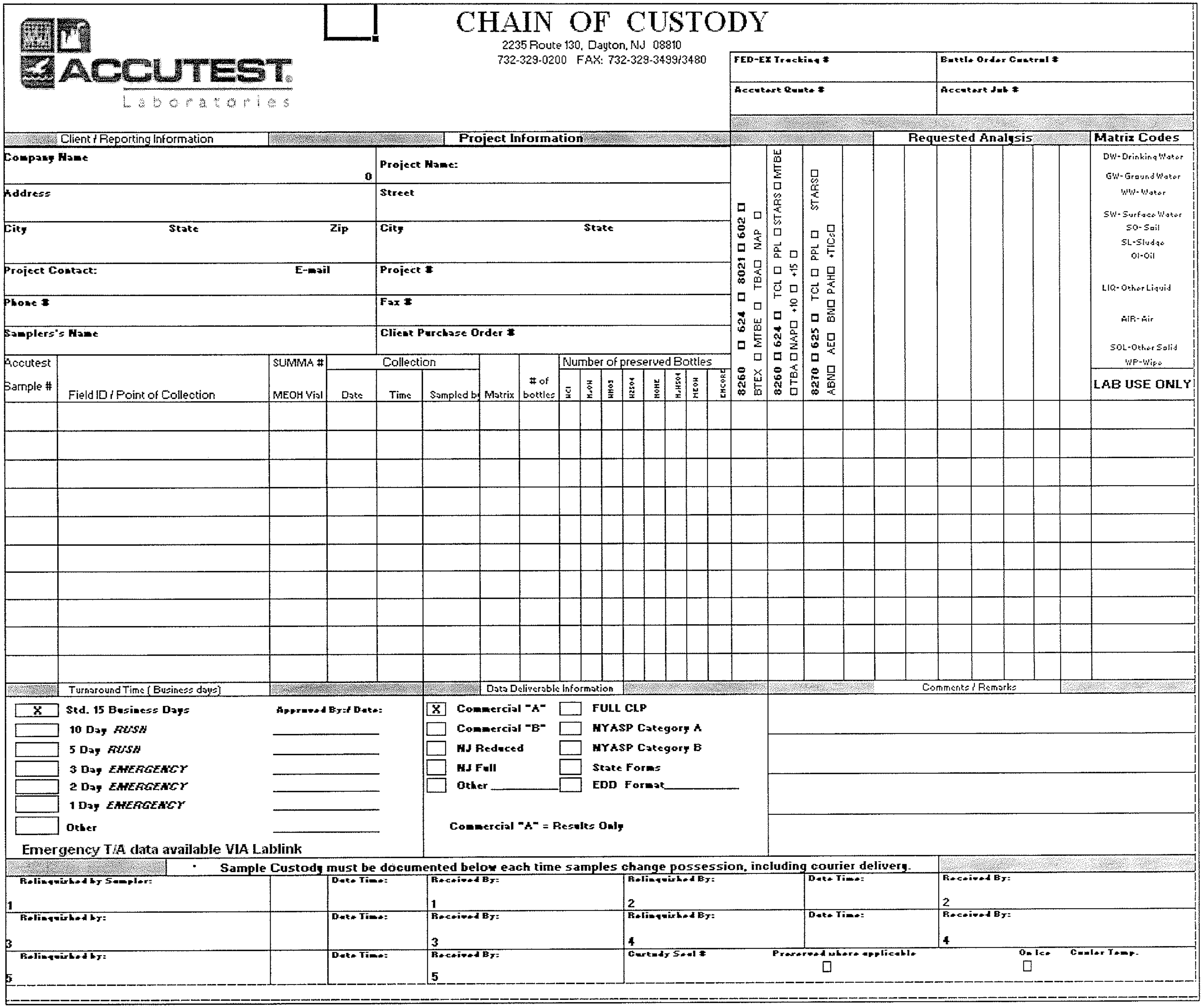
<u>Notes:</u>

1. As per Accutest Laboratories, Dayton, New Jersey.

QC = Quality Control; % Rec. = Percent Recovery; RPD = Relative Percent Difference; MS = Matrix Spike; MSD = Matrix Spike Duplicate; BS = Blank Spike; BSD = Blank Spike Duplicate.

FIGURES

FIGURE B-1
EXAMPLE CHAIN-OF-CUSTODY



ACCUTEST
Laboratories

CHAIN OF CUSTODY

2235 Route 130, Dayton, NJ 08810
732-329-0200 FAX: 732-329-3499/3480

FED-EX Tracking #	**Bottle Order Control #**
Accutest Quote #	**Accutest Job #**

Client / Reporting Information			Project Information	
Company Name 0			**Project Name:**	
Address			**Street**	
City	**State**	**Zip**	**City**	**State**
Project Contact:		**E-mail**	**Project #**	
Phone #			**Fax #**	
Samplers's Name			**Client Purchase Order #**	

Accutest		SUMMA #	Collection					Number of preserved Bottles								Requested Analysis											Matrix Codes
Sample #	Field ID / Point of Collection	MEOH Vial	Date	Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	**8260** ☐ **624** ☐ **8021** ☐ **602** ☐ BTEX ☐ MTBE ☐ TBA☐ NAP ☐	**8260** ☐ **624** ☐ TCL ☐ PPL ☐ STARS ☐ MTBE ☐TBA ☐NAP☐ +10 ☐ +15 ☐	**8270** ☐ **625** ☐ TCL ☐ PPL ☐ STARS☐ ABN☐ AE☐ BN☐ PAH☐ +TICs☐									DW-Drinking Water GW-Ground Water WW-Water SW-Surface Water SO-Soil SL-Sludge OI-Oil LIQ-Other Liquid AIR-Air SOL-Other Solid WP-Wipe LAB USE ONLY

Turnaround Time (Business days)

		Approved By:/ Date:
☒	**Std. 15 Business Days**	
☐	**10 Day *RUSH***	______
☐	**5 Day *RUSH***	______
☐	**3 Day *EMERGENCY***	______
☐	**2 Day *EMERGENCY***	______
☐	**1 Day *EMERGENCY***	______
☐	**Other**	______

Emergency T/A data available VIA Lablink

Data Deliverable Information

- ☒ **Commercial "A"**
- ☐ **Commercial "B"**
- ☐ **NJ Reduced**
- ☐ **NJ Full**
- ☐ **Other** ______
- ☐ **FULL CLP**
- ☐ **NYASP Category A**
- ☐ **NYASP Category B**
- ☐ **State Forms**
- ☐ **EDD Format**______

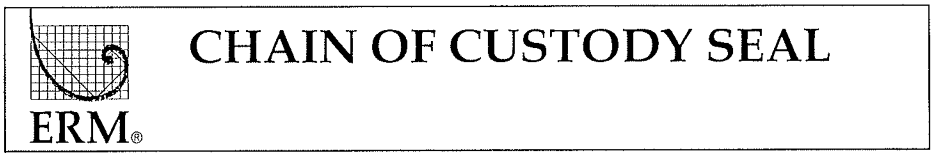
Commercial "A" = Results Only

Comments / Remarks

• **Sample Custody must be documented below each time samples change possession, including courier delivery.**

Relinquished by Sampler: 1	**Date Time:**	**Received By:** 1	**Relinquished By:** 2	**Date Time:**	**Received By:** 2
Relinquished by: 3	**Date Time:**	**Received By:** 3	**Relinquished By:** 4	**Date Time:**	**Received By:** 4
Relinquished by: 5	**Date Time:**	**Received By:** 5	**Custody Seal #**	**Preserved where applicable** ☐	**On Ice** ☐ **Cooler Temp.**

FIGURE B-2
EXAMPLE CUSTODY SEAL



CHAIN OF CUSTODY SEAL

ERM®

APPENDIX C
SITE SPECIFIC HEALTH AND SAFETY PLAN (HASP)

400 Lakeville Road
New Hyde Park, NY

July, 2007

0030777.3777

Prepared for:

Long Island Jewish Medical Center
270-05 76th Avenue
New Hyde Park, NY 11040

Prepared by:

Environmental Resources Management
520 Broad Hollow Road, Suite 210
Melville, NY 11747

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C-4 SITE-SPECIFIC AND TASK-SPECIFIC HAZARDS AND CONTROL STRATEGIES - 400 LAKEVILLE ROAD, NEW HYDE PARK, NEW YORK

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C-6 EMERGENCY DRILL FREQUENCY - 400 LAKEVILLE ROAD, NEW HYDE PARK, NEW YORK

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2 COMMUNITY AIR MONITORING PLAN

3 DAILY SAFETY MEETING

4 PROJECT SIGN-IN SHEET

5 INCIDENT REPORT

6 HOSPITAL ROUTE MAP AND DIRECTIONS

C.0 *SITE SPECIFIC HEALTH AND SAFETY PLAN (HASP)*

C.1 *INTRODUCTION*

This Health and Safety Plan (HASP) has been developed by ERM for the PSA. The procedures set forth in this HASP are designed to reduce the risk of exposure to chemical substances and physical or other hazards that may be present. The procedures described herein were developed in accordance with the publications indicated below:

- Safety and Health Standards 29 CFR 1910 (General Industry), US Department of Labor, Occupational Safety and Health Administration (OSHA). Hereafter, referred as "29 CFR 1910."
- OSHA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response, U.S. Dept. of Labor, OSHA.
- OSHA Safety and Health Standards 29 CFR 1926 (Construction Industry), U.S. Department of Labor, OSHA.
- OSHA Safety and Health Standards 29 CFR 40 Part 61 Nation Emissions Standards of Hazardous Air Pollutants, U.S. Dept. of Labor, OSHA.
- OSHA Safety and Health Standards 29 CFR 40 Part763 Asbestos, U.S. Dept. of Labor, OSHA.
- Standard Operating Safety Guides, U.S. Environmental Protection Agency (EPA), Office of Emergency and Remedial Response.
- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health (NIOSH).

The recommended health and safety guidelines within this HASP will be modified if future information changes the activities to be performed or the characterization of the area in which work is to be performed.

C.1.1 *Health And Safety Policy Statement*

ERM considers the health, safety, and well being of its employees to be of unconditional importance. Reflecting that concern, it is the policy of management to support the implementation of the Health and Safety Program. The proper resources (financial and human resources) are provided to ensure operation of a comprehensive program. The following policies will be employed:

- Prevention of occupational illnesses, accidents, resulting personal hardship, and financial loss takes precedence in the conduct of our business. Objectives of the Health and Safety Program include the identification of and the elimination or control of all hazards to personnel, products, equipment, and facilities.

- The active participation and involvement of all levels of management are essential to the success of the program. The Health and Safety Program Manager (HSPM) directs, reviews, and evaluates Health and Safety Program activities. The HSPM reports directly to the Presidents of ERM.
- All levels of supervision are responsible for maintaining safe working conditions, instructing each subordinate in proper health and safety practices, and enforcing health and safety program specifications. In addition, each supervisor is responsible for discussing the specifications of the HASP with each employee, and verifying that each employee understands/complies with health and safety directives.
- All employees have personal responsibility to conscientiously follow health and safety procedures, and to notify the project manager of potential or existing hazards to worker health or safety, so that they may be corrected prior to initiation or continuation of work.

Safe conduct is a condition of employment. Disregard for company safety rules are a serious infraction, and disciplinary action will be taken as outlined in this Section.

C.2 ERM PROJECT PERSONNEL AND RESPONSIBILITIES

ERM Principal-in-charge (PIC) Ernie Rossano
Responsible for all work and conducts ultimate Quality Assurance/Quality Control (QA/QC) overview.

ERM Project Manager (PM): Gregory Shkuda
Manages day-to-day activities; reports to PIC.

ERM Project Health and Safety Coordinator: Paulina Gravier
Directs development of HASP; provides technical advice on health and safety issues.

ERM Site Safety Officer (SSO): Mike Mattern
Responsible for implementation of HASP; reports to PD and PM.

C.3 *FIELD ACTIVITIES*

C.3.1 *Preliminary Site Assessment*

The objective of the PSA is to identify and delineate onsite and off-site groundwater impacts that pose a threat to public health or the environment. The Scope of Work contemplated by the Order on Consent involves a Site investigation that is comprised of the following subtasks:

Data and Records Search: Available historic information (documents, maps, aerial photos, building permits, reports, etc.) shall be located and reviewed. Freedom of Information Law (FOIL) requests and well records search will be performed at the NYSDEC, Nassau County Department of Health (NCDOH), Nassau County Department of Public Works (NCDPW) and USGS.

Vertical Profile Borings: Groundwater profile borings will be installed at four locations. Groundwater samples will be obtained at 10 foot intervals beginning at the water table, anticipated to be approximately 105 feet bgs to a depth of approximately 250 feet bgs. The groundwater profile sampling will be initiated to determine the nature and extent of the groundwater impacts.

Soil samples will be collected using a split-barrel core sampler ("split-spoon") to characterize local geology and screened for the presence of volatile organic constituents (VOCs) using photo-ionization detection (PID) at the proposed vertical profile boring located adjacent to diffusion wells (N-9741D and N-7762D). Soil samples will be logged and screened at 10-foot intervals beginning at ground surface to the water table. Soil samples will be analyzed for Freons by a commercial laboratory with normal turn around time (TAT). Using USEPA SW-846 Method 8260 plus Freons.

Groundwater samples will be collected utilizing the Waterloo profiling method at ten-foot intervals from the water table to approximately 250 feet bgs. Groundwater samples will be analyzed for VOCs by a commercial laboratory with expedited turn around time (TAT). Collected soil samples will analyzed by USEPA SW-846 Method 8260 plus Freons with an expedited TAT.

Groundwater Monitoring Wells: Ground water monitoring wells will be installed in up to five (5) locations. Monitoring wells will be installed at the location of the four (4) completed groundwater profile locations and screen zone settings will be selected based upon groundwater profile sampling results. An optional fifth monitoring well may be installed at a down gradient location adjacent to Nassau County Department of Public Works monitoring well N-10290, if groundwater profiling investigation reveal VOCs at depth.

Groundwater Sampling: Groundwater samples will be collected from each of the newly installed wells, the existing on-site supply well N-7560 and N10290. Groundwater samples will be analyzed for VOCs using USEPA SW-846 METHOD 8260 plus Freons. The laboratory will achieve a detection limit of 0.5 ppb and report the ten highest concentrations tentatively identified compounds (TICs) present in the samples.

Survey: At the completion of field sampling activities a New York State licensed surveyor will establish the location and each waterloo profile boring and the elevation and location of all monitoring wells. Elevations of all riser pipes, protective well casings and ground surface and their corresponding latitude and longitude coordinates will be determined to within 0.01 feet, based on USGS datum.

Data Usability Validation: All soil and groundwater analytical data will be validated to determine whether the data, meets the site/project specific data quality objectives and data use as specified in the Draft DER10 Technical Guidance by an ERM Quality Assurance/Quality Control (QA/QC) officer.

Report: Upon completion of the PSA activities, a report will be generated. The report will include a summary of the analytical data, evaluation of the data and recommendations for additional investigative activities necessary to fill existing data gaps.

C.4 HAZARD IDENTIFICATION AND CONTROL

C.4.1 Hazard Identification Process

Prior to initiating any new project activity or when there is a change in site conditions, the Site Safety Officer (SSO) will assist project team members in completing a Job Hazard Analysis (JHA). A copy of the JHA form is located in Attachment 1.

C.4.2 Chemical Hazards

Chemicals may be introduced into the body by ingestion, inhalation, or absorption through the skin. Since not all chemicals have the same level of toxicity, the length of time for the exposure and the concentration of the chemical are important in determining the risk. Inhalation and skin contact are the most common routes of entry. Chemicals can be introduced into the body by ingestion when chemicals present on the hands are transferred to food or cigarettes.

Based on historical soil and groundwater sampling, the chemicals of concern may be encountered at the site are listed in Table C-1 along with pertinent health and safety information.

C.4.3 *Ambient Air Monitoring*

Ambient air monitoring will be conducted by the ERM field team leader and coordinated by the Project Manager and the Site Health and Safety Officer as directed by the NYSDEC Case Manager, Mr. Girish Desai. The air monitoring protocol that will be followed will be the New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP). The CAMP is included as Attachment 2. Additional monitoring might also be conducted under any of the following circumstances.

- Work begins on a different portion of the site.
- Change in job tasks.
- Change in weather.
- Change in ambient levels of hazardous constituents as indicated by the sense of smell or changes in the physical appearance of the soil or groundwater.
- When new hazardous substances are encountered.

Ambient air monitoring will be conducted using direct-reading real-time instruments as indicated in Table C-3. The MiniRae will be used for continuous perimeter monitoring and a PID with an 11.6 eV bulb or a flame ionization detector (FID) will likely be used for ambient air in breathing zone. Not all work at the site will require ambient air monitoring for all contaminants. During the mobilization phase of a particular project task or activity, either the Project Manager or the SSO will determine what contaminants may be encountered in order to have the appropriate instrumentation on-site. The Project Health and Safety Consultant is available to assist the Project Manager or the SSO in determining the appropriate instrumentation.

Direct reading instrumentation will be calibrated daily per manufacturer's instructions. Cylinders of the appropriate calibration gas will be required for fieldwork lasting longer than one day.

The NYSDOH CAMP (Attachment 2) will be followed for air monitoring procedures and outlines the steps to be taken by the SSO when the action levels of the various contaminants are exceeded.

C.4.4 *Site-Specific and Task-Specific Hazards and Control Strategies*

The hazards and control strategies associated with planned work activities are summarized in Table C-4. During the mobilization phase of a specific work task, the project team can quickly review the hazards and control strategies by locating the task or activity to be performed on the table. Hazards that are common to all activities performed at the site at listed first. The hazards listed for a particular task or activity includes the common hazards.

C.5 *PERSONAL PROTECTIVE EQUIPMENT*

The level of PPE selected for a task is based on the following:

- Type and measured concentration of the chemical substance in the ambient atmosphere and its toxicity.
- Potential for exposure to substances in air, splashes of liquids or other direct contact with material due to work being done.
- Knowledge of chemicals on-site along with properties such as toxicity, route of exposure, and contaminant matrix.

In situations where the type of chemical, concentration, and possibilities of contact are not known, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be better identified.

In addition to summarizing the general PPE requirements for tasks performed at the site, Table C-5 also serves as the written certification that the PPE Hazard Assessment has been conducted.

C.5.1 ***Respiratory Protection***

The type of respiratory protection required will be based on the results of ambient air monitoring, the results of any models used to predict ambient air concentrations, and the professional judgment of either the SSO or the Project Health and Safety Coordinator.

As required by 29 CFR 1910.134, *Respiratory Protection*, a cartridge change-out schedule will be developed if it is necessary to upgrade to Level C based on either the results of ambient air monitoring, the results of any models used to predict ambient air concentration; or the professional judgment of the Project Health and Safety Coordinator. At a minimum, new respirator cartridges must be placed on the respirator at the beginning of the shift and after lunch.

C.6 HEAT AND COLD STRESS

C.6.1 *Heat Stress*

The timing of these activities may be such that heat stress may pose a threat to the health and safety of Site personnel. Acclimation periods and work/rest regimens will be implemented as necessary so that personnel do not suffer adverse effects from heat stress. Heat stress, if necessary, will be monitored in accordance with the American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) for Heat Stress or equivalent when the temperature is greater than 80°F. The following work/rest regimen will be utilized:

Temp °F	*Work-Rest Regimen*
80	Work Break Every 2 hours.
82	75% Work - 25% Rest, each hour.
85	50% Work - 50% Rest, each hour.
88	25% Work - 75% Rest, each hour.
90	Delay work until cooler temperatures prevail.

Special clothing and an appropriate diet and fluid intake will be recommended for all Site personnel to further reduce these temperature-related hazards. A good rule of thumb to prevent dehydration from heat stress is that fluid intake should equal fluid loss from the body, which can be accomplished through frequent small intakes of water. Potable water and/or a drink substitute (i.e., Gatorade) will be available for employee consumption.

C.6.2 *Cold Stress*

The timing of investigative or remediation activities may be such that cold stress may also present a threat to the health and safety of Site employees. Work/rest schedules, with rest in a warming shelter, will be implemented as necessary to reduce adverse effects from cold exposure. Cold stress, if necessary, will be monitored in accordance with the ACGIH TLV for Cold Stress or equivalent. The addition of wind speed and the resulting wind chill will be considered when determining an appropriate work/rest schedule and appropriate clothing.

Site personnel will be encouraged to consume water to avoid dehydration. Potable water and/or a drink substitute (i.e., Gatorade) shall be available for employee consumption. Workers will wear adequately insulated clothing to limit exposure to cold.

C.7 SAFE WORK PRACTICES AND STANDARD OPERATING PROCEDURES

C.7.1 General Site Provisions

C.7.1.1 Smoking and Eating Areas

Smoking will only be allowed in designated areas. Upon mobilization at the site, the SSO will establish smoking areas per site-specific or client-specific requirements. Individuals caught smoking outside the designated smoking areas will be subject to disciplinary action up to and including immediate termination.

Upon mobilization at the site, the SSO will establish eating and break areas per site-specific or client-specific requirements. Eating will only be allowed in the designated areas and the areas will be maintained in a clean and sanitary condition.

C.7.1.2 Temporary Facilities

This project will not require any temporary facilities.

C.7.1.3 Standard Operating Procedures

The following standard operating procedures will be adhered to at all times.

- All personnel entering the site must check in with the SSO.
- All individuals entering the site must demonstrate to the SSO that they have been adequately trained as defined in Section 10.
- All individuals must be familiar with emergency communication methods and how to summon emergency assistance.
- Use of alcoholic beverages before, during operations, or immediately after hours is absolutely forbidden. Alcohol can reduce the ability to detoxify compounds absorbed into the body as the result of minor exposures and may have negative effects with exposure to other chemicals. In addition, alcoholic beverages will dehydrate the body and intensify the effects of heat stress.
- Horseplay of any type is forbidden.
- All unsafe conditions will be immediately reported to the SSO, who will document such conditions in the field log. The SSO will be responsible for ensuring that the unsafe condition is correctly as quickly as possible.

- Smoking, matches, and lighters are only allowed in the designated smoking area.
- Avoid contact with potentially contaminated substances. Avoid, whenever possible, kneeling on the ground, or leaning or sitting on trucks, equipment or the ground. Do not place equipment on potentially contaminated surfaces.

C.7.2 Safe Work Practices

C.7.2.1 Ergonomics

Ergonomic risk factors include repetitive motion, force, awkward posture, and vibration. The key to preventing ergonomic injuries is education of personnel relative to the hazards and risk factors and implementation of proper controls and work practices.

Several tasks associated with this project have the potential to cause back injuries, if proper lifting techniques are not followed. Site workers should not lift objects that are beyond their physical capabilities and the use of mechanical devices such as forklifts is encouraged. In addition, when shoveling, site workers should not twist their backs while moving materials with the shovel. The proper technique is to move the feet.

Proper lifting techniques are summarized below.

- Place feet shoulder width apart with toes pointing slightly out.
- Bend at your knees keeping back straight.
- Get a good grip on the object and pull object close to your body.
- Tighten abdominal muscles.
- Keep your head up, looking forward, and lift with your legs while maintaining a straight back.
- Keep load close to your body and ensure your view is not obstructed.
- If one end of the load is heavier than the other, the heavier end should be closest to your body.
- Move your feet to relocate the object as opposed to twisting your back.
- When placing the object down, bend your knees and use your leg muscles while keeping your back straight.

Pre-Drilling/Pre-Excavation and Probing Protocol

Prior to mobilizing to the field, the Project Manager will be responsible for ensuring the following issues have been adequately addressed:

- Contacting One-Call or equivalent to identify underground pipelines, utility lines, and fiber optic cable.
- Contacting appropriate municipality to identify underground and sewer lines.
- Contacting posted pipeline companies.

C.7.3 *Fall Protection*

This project does not involve working from heights more than six feet above grade.

C.7.4 *Weather Related Events*

Weather related events that may impact fieldwork include, but are not limited to, rain, snow, thunder, and lightning. The SSO will be responsible for determining what site work can be performed safely in the rain and at what point work will cease due to either quality or safety issues. In the event of thunder and/or lightning, all work will be suspended until 15 minutes have elapsed from the last clap of thunder or flash of lightning.

During rain, lightning and/or thunder events, site workers should seek shelter in either a building or vehicle.

C.7.5 *Night Work*

This project will not involve activities being performed at night.

C.7.6 *Noise*

Employees performing any noisy task, such as but not limited to, operating heavy equipment, drilling, using power tools, or employees working within 20 feet of the person performing the task will wear hearing protection consisting of either earplugs or earmuffs. Personnel operating a drilling rig or standing within 20 feet of a drilling rig during operation will also wear hearing protection.

C.8 *EMPLOYEE TRAINING*

All employees and subcontractors working on-site, who may be exposed to hazardous substances, health hazards, or safety hazards and their supervisors and management responsible for the site will receive training meeting the requirements of 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response* (HAZWOPER) before they are permitted to engage in any job task. Employees will not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility. Once on-site all site workers will receive training covering at a minimum the following.

- Names of personnel and alternates responsible for site safety and health
- Safety, health and other hazards present on the site
- Use of PPE
- Safe use of engineering controls and equipment on the site
- Medical surveillance requirements including recognition of symptoms and signs that might indicate overexposure to hazards.

C.8.1 Subcontractor Training

The SSO will verify that subcontractor personnel have received all appropriate training as required by this HASP prior to their arriving on-site. Verification will consist of reviewing written training documentation such as copies of training certificates or cards. Copies of the written training documentation will be retained in the project file. Subcontractor personnel will not be allowed to work at the site unless said training documentation is available.

C.8.2 Daily Tailgate Safety Meeting

A tailgate safety meeting will be conducted each morning. The daily safety meeting meetings will include awareness concerns such as special concerns regarding health and safety, pollution prevention or a discussion of recent incidents or safety observations. Issues such as any changes to the HASP will be addressed daily. The meetings will include a discussion of what tasks will be completed that day and how those tasks will be conducted safely. The meetings will be documented on the Daily Safety Meeting form found in Attachment 3.

C.9 MEDICAL SURVEILLANCE

All ERM employees are enrolled in a medical surveillance program. All employees receive an initial medical examination and consultation prior to assignment to any job site. In addition, employees receive an annual medical examination, a medical examination upon termination of employment, and a medical examination when the employee exhibits signs or symptoms relating to possible overexposure to hazardous substances or when an injury or exposure above published exposure limits has occurred in an emergency situation.

Additional medical surveillance should be provided for employees who:

- Are or may be exposed to hazardous substances or health hazards at or above published exposure levels for these substances for 30 days or more a year;

- Wear a respirator for 30 days or more a year or as required by 29 CFR 1910.134, *Respiratory Protection;* and
- Are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.

C.10 SITE CONTROL MEASURES

The drilling location and surrounding area will be considered the work zone. Drilling will take place in different areas and new work zones will be delineated by the SSO as the drill rig is moved and during monitoring well sampling. The work area will be delineated using traffic cones and/or "Caution" tape. The SSO will ensure that no one enters the work zone without the proper training and requirements. All personnel entering the Work Zone will sign the project sign-in sheet in Attachment 4. Furthermore, all ERM personnel and subcontractor will sign-in at the start of each workday and sign out at the end of each workday.

C.11 DECONTAMINATION PROCEDURES

Decontamination involves the orderly controlled removal of contaminants from both personnel and equipment. The purpose of decontamination procedures is to prevent the spreading of contaminated materials into uncontaminated areas. All site personnel should limit contact with contaminated soil, groundwater or equipment in order to reduce the need for extensive decontamination.

C.11.1 Personnel Decontamination

The following decontamination procedures will be utilized:

- Clean rubber boots with water.
- Remove all PPE and dispose of the PPE in the designated drums.
- Wash hands and any skin that may have come in contact with affected soil or groundwater with moistened disposable towels, such as baby wipes, or soap and water.

C.11.2 Equipment Decontamination

All drilling equipment and the back of the drilling rig shall be decontaminated by steam cleaning prior to performance of the first boring/well installation and between all subsequent borings/well installations. This shall include all hand tools, casing, augers, drill rods and bits, tremie pipe and other related tools and equipment. The steam cleaning equipment shall be capable of generating live steam with a minimum temperature of 212^{o} degrees Fahrenheit. The equipment shall be cleaned to the satisfaction of the ERM's Hydrogeologist. More detailed decontamination procedures can be found in Appendix A.

C.12 CONFINED SPACE ENTRY PROCEDURES

Entry into permit-required confined spaces is not anticipated.

C.13 SPILL CONTAINMENT PROGRAM

The project activities involve the use of drums or other containers, the drums or containers will meet the appropriate DOT regulations and will be inspected and their integrity assured prior to being moved. Operations will be organized so as to minimize drum or container movement. Drums or containers that cannot be moved without failure will be over packed into an appropriate container.

C.13.1 Hydraulic Fluid/Engine Oil/Fuel Spills

In the event of an unexpected release of hydraulic fluid, engine oil, gasoline or diesel fuel, the release material will be absorbed with sorbent pads, which will be placed in a designated drum for disposal. Impacted soil will be excavated and placed on plastic sheeting and covered until characterization and/or disposal can be arranged.

C.14 SITE COMMUNICATION

Cell phones will be used for communication between the project team and the client and office.

C.15 COMMUNICATION AND REVIEW OF SITE-SPECIFIC HEALTH AND SAFETY PLAN

An initial review of the site-specific HASP will be held either prior to mobilization or after mobilization but prior to commencing work at the site to communicate HASP details and answer questions to individuals working at the site. Daily tailgate safety meetings will be held each morning to review work practices for the day and to discuss safety issues. Any new hazard or safety information will be disseminated at the daily tailgate safety meeting or as needed throughout the day.

C.16 EMERGENCY RESPONSE PLAN

This section describes possible contingencies and emergency procedures to be implemented at the site.

C.16.1 Personnel Roles and Lines of Authority

The SSO has primary responsibility for site evacuation and notification in the event of an emergency situation. This includes taking appropriate measures to ensure the safety of site personnel and the public. Possible actions may involve the evacuation of personnel from the site area and ensuring that corrective measures have been implemented, appropriate authorities notified, and follow-up reports completed. If the SSO is not available, the ERM Project Geologist/Engineer will assume these responsibilities. Subcontractors are responsible for assisting the SSO in their mission within the parameters of their scope of work.

C.16.2 *Reporting Emergencies*

All, including any late developing or aggravated injuries, must receive prompt medical attention. For non-life threatening injuries or illnesses site workers should be transported to the hospital. For life threatening injuries or illnesses, the local emergency responders should be contacted via 911.

The SSO is responsible for reporting all injuries, illnesses, fires, spills/releases, property damage or near misses to the following individuals.

- Injured/involved employee's supervisor
- ERM Project Manager
- ERM Partner-In-Charge
- ERM Project Health and Safety Consultant
- Client Contact

C.16.3 *Emergency Contacts*

In case of an emergency, the SSO will contact the following as appropriate.

Title/Name	*Phone Numbers*
ERM Principal-in-Charge Ernie Rossano	Work: 631-756-8900 Mobile: 516-250-1429
Project Manager Gregory Shkuda, Ph.D.	Work: 631-756-8900 Mobile: 516-652-6412
Site Safety Officer Mike Mattern	Work: 631-756-8900 Mobile: 516-315-6645
Project Geologist/Engineer Mike Mattern	Work: 631-756-8900 Mobile: 516-315-6645
Project Health and Safety Coordinator Paulina Gravier	Work: 631-756-8900 Mobile: 484-802-5243
Mr. Girish Desai NYSDEC	Work: 631-444-0243
Local Emergency Responders - all services	Phone: 911
Hospital: Long Island Jewish Hospital	Phone: 718-470-7000

C.16.4 *Incident Investigations*

An ERM Incident Form (Attachment 5) will be completed and forwarded to the Project Manager within 24 hours of an incident. All incidents will be investigated in a timely manner. The SSO and/or the Project Manager will schedule the investigation and include project supervision (ERM, subcontractors, and client), the injured/involved employee(s) and the Project Health and Safety Coordinator. Root cause analysis will be performed to assess the apparent cause and identify corrective measures to be implemented to prevent re-occurrence. The last page of the Incident Form is used to document the investigation.

C.16.5 *Directions to Nearest Hospital*

The nearest hospital is *Long Island Jewish Hospital.* A map to the medical facility is located in Attachment 6.

Long Island Jewish Hospital: 718-470-7000
27005 76th Ave, New Hyde Park, NY 11040, US

Directions to the hospital and a map to the hospital from the Site are provided in Attachment 6.

C.16.6 *Emergency Drills*

In accordance with the HAZWOPER Standard, emergency response plans will be rehearsed regularly as part of the overall training program for site operations. The frequency of this drill (rehearsal) is outlined on Table C-6. All drills will be documented in the field book. Drills do not need to be elaborate. A tabletop scenario during the daily safety meeting is an adequate drill.

C.17 *SAFETY EQUIPMENT*

A first aid kit containing first aid items for minor incidents only and a fire extinguisher is maintained in each ERM Northeast vehicle. If you are driving a personal vehicle or a rental vehicle, please rent a first aid kit and fire extinguisher from the equipment room.

C.18 *CERTIFICATION OF FAMILIARITY WITH PLAN BY SITE PERSONNEL*

By signing below, your signature certifies that you have read, understand and will abide by the contents of this HASP.

Name	Signature	Company	Date

TABLES

TABLE C-1
SUMMARY OF CHEMICAL HAZARDS FOR CHEMICALS OF CONCERN
400 LAKEVILLE ROAD, NEW HYDE PARK, NEW YORK

Chemical	Published Exposure Limit [1] (8-hour TWA [2])	Routes of Exposure	Target Organs	Signs/Symptoms of Exposure (Acute versus Chronic Effects)	First Aid &Emergency Response
Chemical Name: **tetrachloroethylene (PCE)** CAS: 127-18-4 Vapor Pressure: 14 mmHg Ionization Potential: 9.32 eV	100 ppm (OSHA PEL)	Inhalation Skin absorption Ingestion Skin or eye contact	Eyes, skin, respiratory system, liver, kidneys, and central nervous system.	Acute: Irritation eyes, skin, nose, throat, respiratory system, nausea, dizziness Chronic: cancer, liver damage	Flush skin/eyes with water Administer artificial respiration if no breathing If ingested seek medical attention
Chemical Name: **trichloroethene (TCE)** CAS: 79-01-6 Vapor Pressure: 58 mmHg Ionization Potential: 9.45 eV	100 ppm (OSHA PEL)	Inhalation Skin absorption Ingestion Skin or eye contact	Eyes, skin, respiratory system, heart, liver, kidneys, and central nervous system.	Acute: Irritation eyes, skin, nose, throat, headache, visual disturbance, weakness, exhaustion, nausea, dizziness, vomiting Chronic: cancer, liver damage	Flush skin/eyes with water Administer artificial respiration if no breathing If ingested seek medical attention
Chemical Name: **1,2-Dichloroethene** CAS: 540-59-0 Vapor Pressure: 5.2 PSI at 20°C Ionization Potential: 9.65eV	200ppm (NIOSH/OSHA)	Inhalation and ingestion.	Eyes, skin, respiratory Tract, central nervous system	Acute: Cough, Sore throat, dizziness, nausea, drowsiness, weakness, unconsciousness, vomiting, dry skin, and Irritation to eyes, and the respiratory tract. Chronic: The liquid defats the skin. May have effects on the liver.	Remove contaminated clothes, rinse skin with plenty of water or shower. Flush skin/eyes with water. Rinse mouth and drink plenty of water Seek medical attention.

TABLE C-1
SUMMARY OF CHEMICAL HAZARDS FOR CHEMICALS OF CONCERN
400 LAKEVILLE ROAD, NEW HYDE PARK, NEW YORK

Chemical	**Published Exposure Limit 1 (8-hour TWA 2)**	**Routes of Exposure**	**Target Organs**	**Signs/Symptoms of Exposure (Acute versus Chronic Effects)**	**First Aid &Emergency Response**
Chemical Name: **Vinyl Chloride** CAS: 75-01-4 Vapor Pressure: 2580 mm Hg at 20 C Ionization Potential: 9.80eV	1ppm (OSHA)	Inhalation Skin absorption Ingestion Skin or eye* contact. * Person(s) with potential exposure to vinyl chloride SHOULD NOT WEAR CONTACT LENSES.	Eyes, Skin, Respiratory System, Liver, Kidneys, And Central Nervous System.	Acute: Irritation eyes, skin, nose, throat, dizziness, headache, nausea, breathing difficulty, liver, kidney disturbance, Chronic: cancer	Flush skin/eyes with water Seek an eye specialist attention as soon as possible. If in contact with skin, remove affected clothing quickly. The flush/wash affected areas with large quantities of water. Seek medical attention.
Chemical Name: **Chlorodifluoromethane (Freon 22)** CAS: 75-45-6 Vapor Pressure: 9.4 atm Ionization Potential: 12.45eV	1000 ppm (NIOSH)	Inhalation, skin or eye contact	Respiratory System, Central Nervous System, Cardio-Vascular System, Liver, Kidney and Blood	Acute: Respiratory difficulty, ringing in ears, headache, dizziness, indigestion, nausea, central nervous system depression and oxygen deficiency. Chronic: Defatting or dryness of the skin, cardiac sensitization, permanent neurological abnormalities, damage to the lungs, liver, kidney and blood.	Remove victim(s) to fresh air, as quickly as possible. Trained personnel should administer supplemental oxygen and/ or cardio-pulmonary resuscitation, if necessary. In case of frostbite, place frostbitten part into warm. DO NOT USE HOT WATER. If warm water is not available, gently wrap affected areas in blankets. Seek medical attention.

NOTES:

1. The most conservative published occupational exposure limit is listed. Sources for occupational exposure limits were OSHA and ACGIH.
2. TWA = time weighted average.

3. PPM – PARTS OF CONTAMINANT PER MILLION PARTS OF AIR.

Sources of information include published exposure limits in 29 CFR 1910.1000 or the 2002 TLV Booklet published by ACGIH, NIOSH pocket guide, Chemical/Physical Properties from Texas Risk Reduction Program, International Chemical Safety Cards, MSDSs, and the HNU listing of Photoionization Characteristics of Selected Compounds.

TABLE C-2
SUMMARY OF CHEMICAL HAZARDS FOR CHEMICALS ROUTINELY USED BY ERM
400 LAKEVILLE ROAD, NEW HYDE PARK, NEW YORK

Chemical	Exposure Limit (1) (8-hr TWA (2))	Routes of Exposure	Target Organs	Signs/Symptoms of Exposure (Acute versus Chronic Effects)	First Aid & Emergency Response
Chemical Name: **Portland Cement** Vapor Pressure: N/A, solid Ionization Potential: N/A, solid	10 mg/m^3 (ACGIH TLV)	Inhalation Skin contact Ingestion	Eyes, skin, respiratory system	Acute Irritation of eyes, skin and respiratory system; skin burns Chronic Contains trace amounts of crystalline silica which cause silicosis and may be carcinogenic	Flush eyes/skin with water Administer artificial respiration if not breathing Seek medical attention immediately if ingested
Chemical Name: **Bentonite** Vapor Pressure: N/A, solid Ionization Potential: N/A, solid	0.05 mg/m^3 (ACGIH TLV for crystalline silica)	Inhalation Skin contact Ingestion	Eyes, skin, respiratory system	Acute Irritation of eyes, skin and respiratory system Chronic Contains trace amounts of crystalline silica which may cause silicosis; potential carcinogenic	Flush eyes/skin with water Administer artificial respiration if not breathing Seek medical attention immediately if ingested
Chemical Name: **Silica sand** Vapor Pressure: N/A, solid Ionization Potential: N/A, solid	0.05 mg/m^3 (ACGIH TLV)	Inhalation Skin contact Ingestion	Eyes, respiratory system	Acute Irritation of eyes; coughing Chronic Silicosis; lung carcinogen	Flush eyes with water Move to fresh air Seek medical attention

TABLE C-2
SUMMARY OF CHEMICAL HAZARDS FOR CHEMICALS ROUTINELY USED BY ERM
400 LAKEVILLE ROAD, NEW HYDE PARK, NEW YORK

Chemical	**Exposure Limit (1) (8-hr TWA (2))**	**Routes of Exposure**	**Target Organs**	**Signs/Symptoms of Exposure (Acute versus Chronic Effects)**	**First Aid & Emergency Response**
Chemical Name: **Isobutylene Balance Air** CAS: N/A, mixture Vapor Pressure: N/A, gas at ambient conditions Ionization Potential: N/A, mixture	None established	Inhalation	Respiratory system	Acute: Simple asphyxiant, difficulty breathing, cyanosis, rapid pulse, impairment of senses, mental disturbances, and convulsions Chronic: None known	Move to fresh air, administer artificial respiration if not breathing See medical attention

NOTES:

1. The most conservative published occupational exposure limit is listed. Sources for occupational exposure limits were OSHA and ACGIH.
2. TWA = time weighted average
3. mg/m^3 = milligrams of contaminant per cubic meter of air
4. ACGIH TLV = American Conference of Governmental Industrial Hygienists Threshold Limit Value
5. ppm = parts of contaminant per million parts of air
6. OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit

Sources of information include published exposure limits in 29 CFR 1910.1000 or the 2002 TLV Booklet published by ACGIH, NIOSH pocket guide, Chemical/Physical Properties from Texas Risk Reduction Program, International Chemical Safety Cards, MSDSs, and the HNU listing of Photoionization Characteristics of Selected Compounds.

TABLE C-3
AMBIENT AIR MONITORING INSTRUMENTS
400 LAKEVILLE ROAD, NEW HYDE PARK, NEW YORK

Contaminant	***Instrument***
Organics	Photovac PID with 11.6 eV lamp or, MiniRae 2000 with 11.6 eV lamp or, Flame ionization detector Inficon D-Tek Select Refrigerant Leak Detector (for detecting Freons)
Dust	MIE DR 1000 Personal DataRAM Aerosol Monitor

TABLE C-4
SITE-SPECIFIC AND TASK-SPECIFIC HAZARDS AND CONTROL STRATEGIES
400 LAKEVILLE ROAD, NEW HYDE PARK, NEW YORK

Task/Activity	*Hazards*	*Control Strategy*
All activities at site Level D PPE	Poisonous plants	• Identify suspect plants • Vegetation control at or below ankle height by having client mow/weed-eat path and work area • Appropriate protective clothing disposable Tyvek™ coveralls, thin nitrile gloves, disposal boots, tape at wrists and ankles • Barrier cream for uncovered skin • Wash exposed body parts and equipment thoroughly after work in highly-vegetated areas
	Non-stinging insects	• Insect repellant
	Stinging insects	• Survey work area for presence of nests • Eliminate nests
	Thunder/Lightning	• If drilling, cease work following first indication of thunder/lightning • Shelter in buildings or vehicles not underneath trees or near drilling equipment • Begin work after 15 minutes has elapsed from last thunder/lightning
Drilling	Heavy equipment movement	• Personnel maintain eye contact with operators when near the rig.
	Dropped equipment, slip, trip or fall.	• Hard hats, steel-toe safety shoes and safety glasses worn during equipment operation.
	Noise	• Hearing protectors with proper noise reduction rating.
Completion and development of groundwater well	Splashing of chemical in groundwater	• Safety glasses; chemical-resistant suits (as determined necessary by SSO)

TABLE C-5
PERSONAL PROTECTION EQUIPMENT REQUIREMENTS
400 LAKEVILLE ROAD, NEW HYDE PARK, NEW YORK

PPE Level	Ensemble Components	Anticipated Use
Level D Should be worn only as a work uniform and not in any area with respiratory or skin hazards. It provides minimal protection against chemical hazards.	• Long pants and shirt with sleeves • Steel-toed footwear • Safety glasses with molded side shields or goggles. • Hard hat if potential for head injury or falling debris is possible/or client requirement • General purpose work gloves if task does not involve water or wet materials • Hearing protection • High visibility traffic vest when in traffic areas	All activates unless otherwise directed by the SSO, PM, and Project Manager and Project Health and Safety Coordinator .
Modified Level D	Level D and the following: • Disposal Tyvek coveralls • Steel-toed rubber boots or disposal boot covers over shoes • Thin nitrile gloves • Green nitrile gloves over thin nitrile gloves when primary gloves may tear or puncture	Any of the above-referenced tasks in which there is moderate potential for skin contact
Level C Should be worn when the criteria for using air-purifying respirators are met, and a lesser level of skin protection is needed.	Level D or Modified Level D and the following: • Half-face air purifying respirator with combination organic vapor/high efficiency particular air (HEPA) cartridges	Any of the above-referenced tasks in which there is moderate potential for skin contact with constituents and data indicating need for respiratory protection. No upgrade to Level C without approval from Project Manager and Project Health and Safety Coordinator
Level B Should be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection is needed.	Not anticipated to be required	Tasks requiring Level B PPE are not anticipated during this project. If Level B PPE is needed, as determined by the SSO and/or the Project Health and Safety Consultant, the HASP will be revised.
Level A Should be worn when the highest level of respiratory, skin, and eye protection is needed.	Not anticipated to be required	Tasks requiring Level A PPE are not anticipated during this project. If Level A PPE is needed, as determined by the SSO and/or the Project Health and Safety Consultant, the HASP will be revised

TABLE C-6
EMERGENCY DRILL FREQUENCY
400 LAKEVILLE ROAD, NEW HYDE PARK, NEW YORK

Project Duration	***Drill Frequency***
Less than 30 days	None, cover during review/sign-off of HASP
Greater than one month but less than one year	Once
Greater than one year	Annually

Job Hazard Analysis

Attachment 1

400 Lakeville Road
New Hyde Park, NY

ERM

JOB HAZARD ANALYSIS

Required for those field projects that do not require a HASP (see Project Safety Evaluation Checklist). JHAs also are used to supplement HASPs.

Prior to conducting fieldwork a Job Hazard Analysis must be completed and reviewed with all members of the Project Team. At the time of site mobilization, the job Hazard Analysis will be verified and reviewed again with the Project Team at the beginning of each day as fieldwork continues.

Client:	W.O.#
Project Name:	
Location:	
ERM Project Director:	Date:
ERM Project Manager:	Revision No.:
ERM Project Team:	
Subcontractors:	

Field Work Description

NOTE: For any hazards that are not applicable for your task, mark the left hand column with N/A. Do not leave any hazards blank.

Hazard Identification	Describe Hazard Control (appropriate for site)
Job Location/Setting:	☐ Industrial facility ☐ Commercial are ☐ Urban area ☐ Residential area ☐ Undeveloped/vacant ☐ Lone worker
☐ Chemicals at site List or attach separate page:	☐ MSDS or chemical information available to project team for each chemical (required) ☐ PPE (see PPE Section) ☐ Exposure monitoring ☐ Decontamination: Specify methods:
☐ Chemicals ERM will take to site	☐ Attach copies of MSDSs for all chemicals to en to clients site.
☐ Dust-Describe source	☐ PPE *(see* PPE Section) ☐ Exposure monitoring (see monitoring section) ☐ Dust suppression
☐ Confined Space	Coordinator ERM Health and Safety for assistance

Hazard Identification	Describe Hazard Control (appropriate for site)
☐ Slips (Wet Surface), Trips and Falls ☐ fall less than 6 feet ☐ fall more than 6 feet	☐ Clean/ dry surfaces ☐ Barricade the unsafe area ☐ Eyes on path ☐ Relocate the work area ☐ Use alternate route ☐ Use a construction platform ☐ Tie-off to equipment ☐ Move work to ground level ☐ Fall restraint, guardrails, short lanyard
☐ Electrical Shock	☐ Area around electrical equipment dry ☐ Energy isolation or Lock-out/Tag-out (LOTO) ☐ Grounding ☐ GCFI ☐ Shielding on equipment
☐ Combustible materials, Fire, Explosion	☐ Remove combustible materials ☐ Relocate work ☐ Isolation/ LOTO ☐ Area air monitoring ☐ PPE/ Flame Retardant Clothing (FRC) (See PPE Section) ☐ Fire watch ☐ Fire extinguisher available
☐ Heat/Cold Stress	☐ Work/Rest regimen ☐ Task rotation, shared tasks ☐ Source of cool water/electrolyte replacement drinks ☐ Ventilation
☐ Noise - Describe source	☐ PPE (see PPE Section) ☐ Relocate work ☐ Control noise source
☐ Lighting/ Visibility	☐ Adequate for task ☐ Nighttime considerations ☐ PPE (see PPE Section) ☐ Safety cones
☐ Lifting, Pulling, Pushing, Repetitive Motion	☐ Get equipment designed for the job ☐ Proper technique ☐ Smaller, lighter loads ☐ Prepared for "unexpected release" ☐ Move feet to turn with load
☐ Airborne/Flying Material	☐ Cover/Shield source ☐ PPE (see PPE Section) ☐ Positioning
☐ Rotating/Moving Equipment and Pinch Points	☐ Energy isolation, Lock-out/Tag-out (LOTO) ☐ Guarding, barricading ☐ No loose clothing ☐ Positioning
☐ Sharp Objects	☐ Guarding ☐ PPE (see PPE Section) ☐ Positioning
☐ Falling Objects	☐ Secure objects ☐ Guarding, covers ☐ PPE (see PPE Section) Barricading
☐ Hazards from others working in	☐ Communication: Specify Method
☐ Hazards to other working in vicinity	☐ Communication: Specify Method

Hazard Identification	Describe Hazard Control (appropriate for site)
☐ Environmental Spill	☐ Containment ☐ Waste Plan ☐ Waste containers ☐ Other
☐ Overhead lines/subsurface lines	☐ Spotter ☐ Verify clearance with client ☐ One-Call ☐ Mark line
☐ Site-specific training required	☐ Specify training requirement
☐ Client-specific safety procedure/policy required?	☐ Specify client specific safety procedure or policy (attach a copy)
☐ Client permit required?	☐ Specify method for obtaining permit:
☐ Subcontractor on-site	☐ Obtain proof of required (including site-specific) training ☐ Obtain proof of required (including site-specific) medical surveillance
☐ Other Hazards	☐ Description:

Exposure Monitoring

The following equipment will be used to monitor personnel exposure:

Emergency Plan required for every site job

Method of obtaining assistance	
Evacuation Route	
Prevailing wind direction	
Emergency call list	911 or Other emergency #: ERM Project Manager: ERM Project Director: Client Coordinator: Subcontractor Coordinator:
Emergency assembly area	

Emergency Plan

First aid equipment availability	
Nearest Medical Assistance Address: Phone Number:	Direction or attach map:

Personal Protective Equipment Required (Check boxes to indicate PPE requirements)

☐ Field clothes (long or short sleeve shirt, long pants)
☐ Disposable coveralls: specify type____
☐ High visibility or reflective vests
☐ Flame Retardant Clothing
☐ Hard-hat
☐ Steel toe boots/shoes
☐ Disposable shoe covers
☐ Respiratory Protection
    ☐ Half-face cartridge respirator, cartridge type: ________________________________
    ☐ Cartridge change frequency ____
    ☐ Other respirator type
☐ Gloves: specify type(s)

☐ Hearing protection: specify type(s)

☐ Eye Protection: specify type

PPE Hazard Assessment Certified by:
(Note: PPE can be certified by any knowledgeable staff member) Date: ______

Project team (including subcontractors) has seen, been briefed and understand the contents of this job Hazard Analysis.

Name	Signature	Date

Community Air Monitoring Plan

Attachment 2

400 Lakeville Road

New Hyde Park, NY

New York State Department of Health
Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

Last Updated: June 20, 2000

Daily Safety Meeting Form

Attachment 3

400 Lakeville Road
New Hyde Park, NY

ERM

Daily Safety Meeting Form

Date of Safety Meeting	Name of Meeting Facilitator

Topics Discussed

Safety Concerns and Action Plan to Correct

Name	Signature	Company	Employee Number

Project Sign-in Sheet

Attachment 4

400 Lakeville Road
New Hyde Park, NY

ERM

PROJECT SITE SIGN-IN FORM

Date:________________

Site: *NS-LIJ 400 Lakeville Road Site*

Employee	Company	Time In	Time Out

ERM Incident Reporting Form

Attachment 5

400 Lakeville Road

New Hyde Park, NY

Environmental Resources Management

ERM INCIDENT REPORT FORM

Client Name: ____________________

Date and Time of Incident: ____________________

Type of Incident: ____________________

Location of Incident: ____________________

Employee: ____________________

Employee Job Title: ____________________

Specific Job At Time of Incident: ____________________

Level of Protection Worn at Time of Exposure: ____________________

Summary of What Occurred: ____________________

____

____

Actions Taken To Correct Situation (Engineering, PPE, etc.): ____________________

____

____

Employee Signature: ____________________

Site Safety Officer: ____________________

ERM Project Manager: ____________________

Time and Date of Report: ____________________

Please return completed forms to the Health and Safety Program Manager

____

Hospital Route Map and Directions

Attachment 6

400 Lakeville Road

New Hyde Park, NY

MAPQUEST

Start: **400 Lakeville Rd**
New Hyde Park, NY 11042-1121,
US

End: **Long Island Jewish Hospital:**
718-470-7000
27005 76th Ave, New Hyde Park,
NY 11040, US

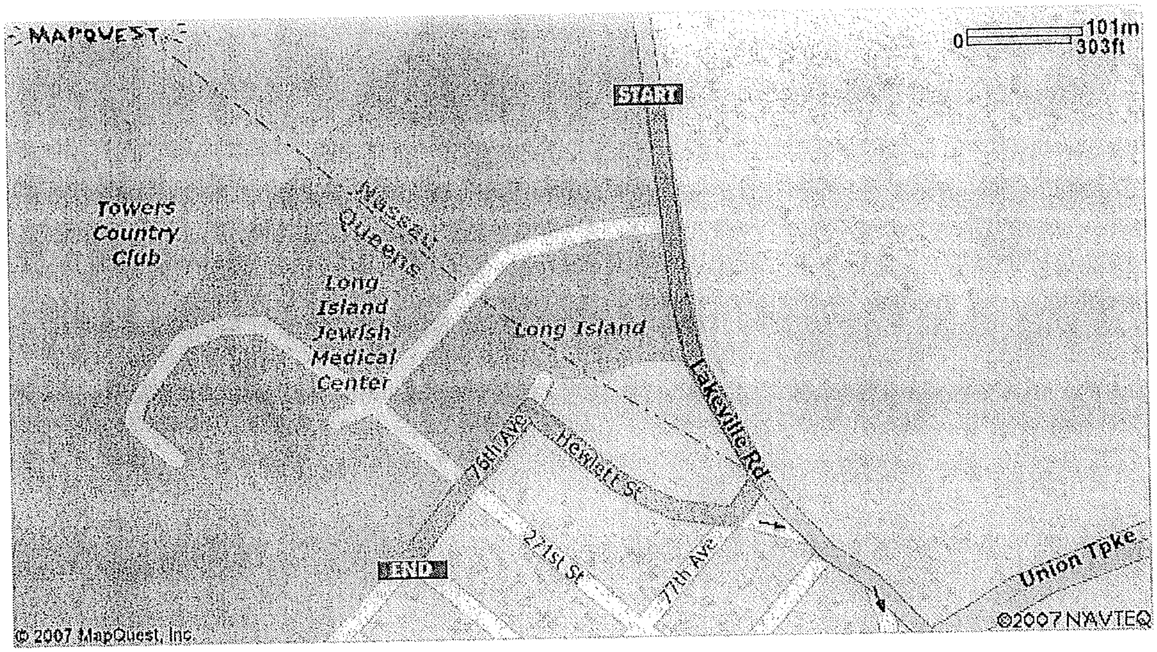
Notes:
ERM HASP
HOSPITAL ROUTE

Directions

Total Est. Time: 1 minute **Total Est. Distance:** 0.46 miles

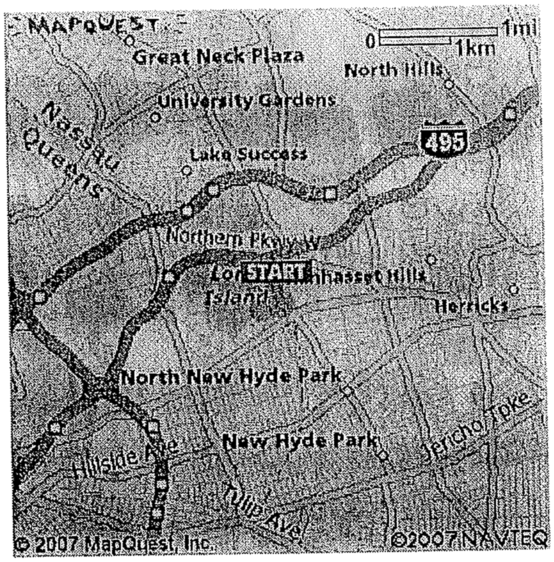
		Distance
START	**1:** Start out going SOUTH on LAKEVILLE RD toward 77TH AVE.	0.2 miles
→	**2:** Turn RIGHT onto 77TH AVE.	<0.1 miles
→	**3:** Turn RIGHT onto HEWLETT ST.	0.1 miles
←	**4:** Turn LEFT onto 76TH AVE.	<0.1 miles
END	**5:** End at **Long Island Jewish Hospital:** 27005 76th Ave, New Hyde Park, NY 11040, US	

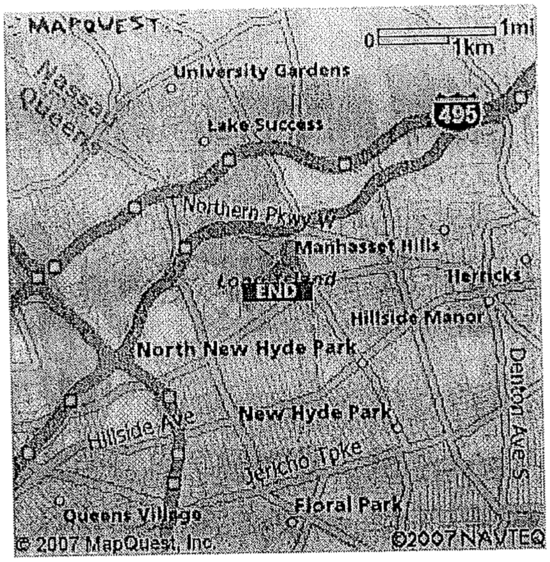
Total Est. Time: 1 minute **Total Est. Distance:** 0.46 miles



Start:
400 Lakeville Rd
New Hyde Park, NY 11042-1121, US

End:
Long Island Jewish Hospital:
718-470-7000
27005 76th Ave, New Hyde Park, NY
11040, US





APPENDIX D
400 LAKEVILLE ROAD CORRESPONDENCE DOCUMENTS

400 Lakeville Road
New Hyde Park, NY

July, 2007

0030777.3777

Prepared for:

Long Island Jewish Medical Center
270-05 76th Avenue
New Hyde Park, NY 11040

Prepared by:

Environmental Resources Management
520 Broad Hollow Road, Suite 210
Melville, NY 11747

ANSON
ENVIRONMENTAL LTD.

771 New York Avenue
Huntington, New York 11743
631-351-3555
Fax: 631-351-3615
www.AnsonLtd.com

July 6, 2004

Mr. Peter Cannuscio, Director
North Shore Long Island Jewish Health System
270-05 76 Avenue
New Hyde Park, NY 11040

RECEIVED
JUL 10 2004
Department of Facilities Services

Ref: Lockheed-Martin Corporation Groundwater Sampling Event
Long Island Jewish Medical Center
400 Lakeville Road, New Hyde Park

Dear Mr. Cannuscio:

On May 26, 2003, Anson Environmental Ltd. (AEL) collected a grab sample of the groundwater that is supplied to the air conditioning chiller located in the basement of the Building 400 on the hospital property. The chiller water is supplied from the on-site well designated N-7560. Well N-7560 is located adjacent to the northwest corner of Building 400.

The grab sample was collected at a valve located at the input to the chiller because it is more representative of the groundwater condition than the sample collected at N-7560 on February 26, 2002. On that date, the groundwater sample was collected at 110-feet below grade surface (bgs). The submersible pump mechanism installed in the well at that depth prevented collecting a sample any lower and the pump was inactive at that time.

According to Nassau County Well Listing records the reported depth below grade of well N-7560 is 242-feet. The depth to the screened portion of the well is 221-feet. The capacity of the well pump is reported to be 335-gallons per minute. The usual well sampling protocol requires that at least three to five volumes of liquid be removed from the well before collecting the sample. As explained in AEL letter to you dated May 8, 2002, that protocol can not be used to collect groundwater samples from N-7560.

The collected grab sample was split-sampled with Mr. Gary Williams, Master Technician, from ARCADIS Geraghty & Miller, Melville, New York. The AEL collected sample was delivered to EcoTest Laboratories, North Babylon, New York, where it was analyzed for concentrations of volatile organic compounds (VOCs), Freon 113 and Freon 22, using New York State Analytical Services Protocol (NYSASP) Method 95-1. According to Mr. Williams, ARCADIS is using the same method to analyze their split sample.

This letter report summarizes the EcoTest Laboratories analytical results and contains a copy of the complete laboratory report (Attachment 1).

Using NYSASP Method 95-1, the laboratory detected concentrations of four VOCs that exceeded the laboratory reporting limit (LRL). These four VOCs are c-1, 2 Dichloroethene (76 ug/L), Trichloroethylene (16 ug/L), Tetrachloroethene (17 ug/L), and Chlorodifluoromethane

"Your Environmental Partner"

(260 ug/L). Chlorodifluoromethane is also known as Freon 22. The detected concentrations of all four VOCs exceeded the New York State Department of Environmental Conservation (NYSDEC) groundwater standard (5 ug/L).

The laboratory also detected a concentration of Freon 113 (3 ug/L) that is below the New York State Department of Environmental Conservation (NYSDEC) groundwater standard (5 ug/L). The detected concentration of Chlorodifluoromethane (260 ug/L) is much less than the concentration detected in the sample collected on November 25, 2003. On that date the detected a concentration of Chlorodifluoromethane was 5800 ug/L.

Tetrachloroethene is a cleaning solvent and Trichloroethylene and 1, 2 Dichloroethene may be breakdown products of that solvent. Freon 113 is a solvent used in the manufacture of fire extinguishers, refrigerants, oils, greases and other applications. Freon 113 is also used for drying electronic parts. Chlorodifluoromethane, is used as a refrigerant.

The detected concentrations of VOCs are listed in Table 1. For comparison purposes, Table 1 also lists the concentrations of VOCs detected in the groundwater sample collected on February 26, April 15 and September 26, 2002, June 13, 2003 and November 25, 2003. The NYSDEC groundwater standard for each detected compound is also listed.

The groundwater sampling point is at a valve that is connected to the inlet water line for the chiller. This water line contains pressurized water and is not a satisfactory sampling point. When slightly opened, the liquid from the valve sprays out and is under comparatively high pressure. This condition may cause a reduction in the concentrations of VOCs that may actually be present in the liquid. AEL recommends that the chiller inlet piping be modified so that the groundwater liquid is not collected from a pressurized source.

If you have any questions concerning this matter, please call me at 631-351-3555.

Very truly yours,

Dean Anson II

Attachment: Laboratory Analytical Report for Well N-7560 Water Sample Collected at Building 400 Chiller on May 26, 2004

Copy: Mr. Gilbert Salas, LIJMC
Miriam E. Villani, Esq., Farrell, Fritz, P.C.

Table 1

Concentrations of VOCs Detected in Well N-7560 and Building 400 Chiller

Sampling Dates: 2/26/02, 4/15/02, 9/26/02, 6/13/03, 11/25/03 and 5/26/04

	5/26/04	11/25/03	6/13/03	9/26/02	4/15/02	2/26/02 at N-7560	
Sample Depth	Chiller Valve	Chiller Valve	Chiller Valve	Chiller Valve	Chiller Valve	110-feet	
Analytical Parameters							NYSDEC GW Standard
	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)
c-1,2-Dichloroethene	**76**	**76**	**100**	*	**61**	**49**	5
Trichloroethylene	**16**	**15**	**23**	*	**10**	**8**	5
Tetrachloroethene	**17**	**12**	**23**	**13**	**8**	**10**	5
Chlorodifluoromethane	**260**	**5800**	**42**	*	**11**	**22**	5
Chloromethane	*	*	*	*	*	1	5
Freon 113	3	*	3	2	2	*	5
1,2-Dichloroethene	*	*	*	**84**	*	*	5
Benzene	*	*	*	**15**	*	*	0.7
Acetone	*	**12**	*	*	*	*	5

Note: Concentrations of VOCs shown in **BOLD** print exceed NYSDEC Standard
* = not detected; concentration did not exceed LRL (laboratory reporting limit)

Arcadis (110).

Attachment 1

Laboratory Analytical Report for Well N-7560 Water Sample Collected

at

Building 400 Chiller

Date Collected: May 26, 2004

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*
377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (631) 422-5777• FAX (631) 422-5770
Email: ecotestlab@aol.com Website: www.ecotestlabs.com

LAB NO.242266.00 06/04/04

Anson Environmental Ltd.
771 New York Avenue
Huntington, NY 11743
ATTN: John Teggins PO#:

SOURCE OF SAMPLE: LIJ CHILLER, #01190
SOURCE OF SAMPLE:
COLLECTED BY: Client DATE COL'D:05/26/04 RECEIVED:05/26/04
TIME COL'D:0930
MATRIX:Water SAMPLE: LIJ CHILLER, N-7560

LYTICAL PARAMETERS	UNITS	RESULT	FLAG	DATE OF ANALYSIS	LRL	ANALYTICAL METHOD
chlordifluoromethane	ug/L	< 1		05/27/04	1	ASP95-1
loromethane	ug/L	< 1		05/27/04	1	ASP95-1
yl Chloride	ug/L	< 1		05/27/04	1	ASP95-1
omomethane	ug/L	< 1		05/27/04	1	ASP95-1
loroethane	ug/L	< 1		05/27/04	1	ASP95-1
chlorofluoromethane	ug/L	< 1		05/27/04	1	ASP95-1
Dichloroethene	ug/L	< 1		05/27/04	1	ASP95-1
thylene Chloride	ug/L	< 1		05/27/04	1	ASP95-1
,2-Dichloroethene	ug/L	< 1		05/27/04	1	ASP95-1
Dichloroethane	ug/L	< 1		05/27/04	1	ASP95-1
2-Dichloropropane	ug/L	< 1		05/27/04	1	ASP95-1
1,2-Dichloroethene	ug/L	76		05/27/04	1	ASP95-1
mochloromethane	ug/L	< 1		05/27/04	1	ASP95-1
oroform	ug/L	< 1		05/27/04	1	ASP95-1
1 Trichloroethane	ug/L	< 1		05/27/04	1	ASP95-1
bon Tetrachloride	ug/L	< 1		05/27/04	1	ASP95-1
-Dichloropropene	ug/L	< 1		05/27/04	1	ASP95-1
nzene	ug/L	< 1		05/27/04	1	ASP95-1
Dichloroethane	ug/L	< 1		05/27/04	1	ASP95-1
chloroethylene	ug/L	16		05/27/04	1	ASP95-1
2 Dichloropropane	ug/L	< 1		05/27/04	1	ASP95-1
bromomethane	ug/L	< 1		05/27/04	1	ASP95-1
modichloromethane	ug/L	< 1		05/27/04	1	ASP95-1
,3Dichloropropene	ug/L	< 1		05/27/04	1	ASP95-1
luene	ug/L	< 1		05/27/04	1	ASP95-1

cc:

LRL=Laboratory Reporting Limit

REMARKS:

DIRECTOR

rn = 20876 NYSDOH ID # 10320

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (631) 422-5777• FAX (631) 422-5770

Email: ecotestlab@aol.com Website: www.ecotestlabs.com

LAB NO.242266.00 06/04/04

Anson Environmental Ltd.
771 New York Avenue
Huntington, NY 11743
ATTN: John Teggins PO#:

SOURCE OF SAMPLE: LIJ CHILLER, #01190
SOURCE OF SAMPLE:
COLLECTED BY: Client DATE COL'D:05/26/04 RECEIVED:05/26/04
TIME COL'D:0930
MATRIX:Water SAMPLE: LIJ CHILLER, N-7560

ALYTICAL PARAMETERS	UNITS	RESULT	FLAG	DATE OF ANALYSIS	LRL	ANALYTICAL METHOD
-1,3Dichloropropene	ug/L	< 1		05/27/04	1	ASP95-1
2 Trichloroethane	ug/L	< 1		05/27/04	1	ASP95-1
trachloroethene	ug/L	17		05/27/04	1	ASP95-1
3-Dichloropropane	ug/L	< 1		05/27/04	1	ASP95-1
lorodibromomethane	ug/L	< 1		05/27/04	1	ASP95-1
2 Dibromoethane	ug/L	< 1		05/27/04	1	ASP95-1
lorobenzene	ug/L	< 1		05/27/04	1	ASP95-1
thyl Benzene	ug/L	< 1		05/27/04	1	ASP95-1
12Tetrachloroethane	ug/L	< 1		05/27/04	1	ASP95-1
p Xylene	ug/L	< 2		05/27/04	2	ASP95-1
Xylene	ug/L	< 1		05/27/04	1	ASP95-1
yrene	ug/L	< 1		05/27/04	1	ASP95-1
moform	ug/L	< 1		05/27/04	1	ASP95-1
opropylbenzene	ug/L	< 1		05/27/04	1	ASP95-1
romobenzene	ug/L	< 1		05/27/04	1	ASP95-1
22Tetrachloroethane	ug/L	< 1		05/27/04	1	ASP95-1
3-Trichloropropane	ug/L	< 1		05/27/04	1	ASP95-1
-Propylbenzene	ug/L	< 1		05/27/04	1	ASP95-1
Chlorotoluene	ug/L	< 1		05/27/04	1	ASP95-1
5-Trimethylbenzene	ug/L	< 1		05/27/04	1	ASP95-1
-Chlorotoluene	ug/L	< 1		05/27/04	1	ASP95-1
rt-Butylbenzene	ug/L	< 1		05/27/04	1	ASP95-1
4-Trimethylbenzene	ug/L	< 1		05/27/04	1	ASP95-1
-Butylbenzene	ug/L	< 1		05/27/04	1	ASP95-1
-Isopropyltoluene	ug/L	< 1		05/27/04	1	ASP95-1

cc:

LRL=Laboratory Reporting Limit

REMARKS:

DIRECTOR______________________

rn = 20877 NYSDOH ID # 10320

ECOTEST LABORATORIES, INC. ENVIRONMENTAL TESTING
377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (631) 422-5777• FAX (631) 422-5770
Email: ecotestlab@aol.com Website: www.ecotestlabs.com

LAB NO.242266.00 06/04/04

Anson Environmental Ltd..
771 New York Avenue
Huntington, NY 11743
ATTN: John Teggins PO#:

SOURCE OF SAMPLE: LIJ CHILLER, #01190
SOURCE OF SAMPLE:
COLLECTED BY: Client DATE COL'D:05/26/04 RECEIVED:05/26/04
TIME COL'D:0930
MATRIX:Water SAMPLE: LIJ CHILLER, N-7560

LYTICAL PARAMETERS	UNITS	RESULT	FLAG	DATE OF ANALYSIS	LRL	ANALYTICAL METHOD
3 Dichlorobenzene (v)	ug/L	< 1		05/27/04	1	ASP95-1
4 Dichlorobenzene (v)	ug/L	< 1		05/27/04	1	ASP95-1
utylbenzene	ug/L	< 1		05/27/04	1	ASP95-1
Dichlorobenzene (v)	ug/L	< 1		05/27/04	1	ASP95-1
romochloropropane	ug/L	< 1		05/27/04	1	ASP95-1
-Trichlorobenzene (v)	ug/L	< 1		05/27/04	1	ASP95-1
achlorobutadiene	ug/L	< 1		05/27/04	1	ASP95-1
hthalene(v)	ug/L	< 1		05/27/04	1	ASP95-1
-Trichlorobenzene	ug/L	< 1		05/27/04	1	ASP95-1
.ButylMethylEther	ug/L	< 1		05/27/04	1	ASP95-1
thyltoluene	ug/L	< 1		05/27/04	1	ASP95-1
on 113	ug/L	3		05/27/04	1	ASP95-1
Tetramethylbenz	ug/L	< 1		05/27/04	1	ASP95-1
tone	ug/L	< 10		05/27/04	10	ASP95-1
thyl Ethyl Ketone	ug/L	< 10		05/27/04	10	ASP95-1
hylisobutylketone	ug/L	< 10		05/27/04	10	ASP95-1
rodifluoromethane	ug/L	260		05/28/04	10	ASP95-1
iethylbenzene	ug/L	< 1		05/27/04	1	ASP95-1

cc:

LRL=Laboratory Reporting Limit

REMARKS:

DIRECTOR

rn = 20878 NYSDOH ID # 10320 Page 3 of 3

U I UR HE NC. ENV NM AL STI

377 Sheffield Avenue, North Babylon, New York 11703
(631) 422-5777 • FAX (631) 422-5770

CHAIN OF CUSTODY RECORD

Client: ANSON ENVIRONMENTAL LTD.
Address: 771 NEW YORK AVE.
HUNTINGTON, NY 11743
Phone: 631-351-3555 FAX: 631-351-3615
Person receiving report: JOHN TEGINS
Sampled by: JOHN TEGINS
Source: LIJ CHILLER
Job No.: 01190

MATRIX (Soil, Water, etc.)	COLLECTED DATE	COLLECTED TIME	SAMPLE IDENTIFICATION	TOTAL NUMBER OF CONTAINERS	TYPE & NUMBER OF CONTAINERS: 40 mL GLASS VOA VIALS	REMARKS–TESTS REQUIRED, SPECIAL TURNAROUND, SPECIAL Q.C. etc
WATER	5/26/04	0930	LIJ CHILLER N-7560	2		TEST FOR VOAS USING
						NYS ASP 95-1
						PLUS FREON 113 PLUS
						FREON 22

Relinquished by: (Signature)	DATE/TIME	SEAL INTACT?	Received by: (Signature)	Relinquished by: (Signature)	DATE/TIME	SEAL INTACT?	Received by: (Signature)
John Tegins Representing: ANSON	5/26/04 1020	YES NO [✓ NA]	Representing:	Representing:		YES NO NA	Representing:
Relinquished by: (Signature) Representing:	DATE/TIME	SEAL INTACT? YES NO NA	Received by: (Signature) Representing:	Relinquished by: (Signature) Representing:	DATE/TIME	SEAL INTACT? YES NO NA	Received by: (Signature) Representing:

5/26/04

NORTH SHORE HEALTH SYSTEM

LIJ

LONG ISLAND JEWISH MEDICAL CENTER
DEPARTMENT OF FACILITIES SERVICES

400 Lakeville Road, New Hyde Park, New York (718) 470-8700 FAX (718) 470-8719

Fax

To: Vic Composti
Paul Grosser

From: Peter Cannuscio, P.E.
Asst. Exec. Dir., Facilities Services

Fax: 631-589-8705

Date:

Phone:

Pages:

Re:

CC: Jerry Schuster

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Comments: Recent · New Testing @
400 Lakeville.

Confirmation Report – Memory Send

Time : 07-16-04 02:17pm
Tel line : +7189626759
Name : LIJ FACILITIES CONSTRUCTION DEPT

Job number : 540

Date : 07-16 02:07pm

To : 17184706807

Document pages : 10

Start time : 07-16 02:14pm

End time : 07-16 02:17pm

Pages sent : 10

Status : OK

Job number : 540 *** SEND SUCCESSFUL ***

LONG ISLAND JEWISH MEDICAL CENTER
DEPARTMENT OF FACILITIES SERVICES
400 Lakeville Road, New Hyde Park, New York (718) 470-8700 FAX (718) 470-8719

Fax

To: [illegible]
Fax: 631-589-8765
Phone:
Re:

From: Peter Cannuscio, P.E.
Asst. Exec. Dir., Facilities Services
Date:
Pages:
CC: Jerry [illegible]

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Comments: Recent : New Testing @ 400 Lakeville.

Confirmation Report — Memory Send

Time : 07-16-04 02:15pm
Tel line : +7189626759
Name : LIJ FACILITIES CONSTRUCTION DEPT

Job number : 539

Date : 07-16 02:07pm

To : 5621384

Document pages : 10

Start time : 07-16 02:09pm

End time : 07-16 02:14pm

Pages sent : 10

Status : OK

Job number : 539 *** SEND SUCCESSFUL ***

LONG ISLAND JEWISH MEDICAL CENTER
DEPARTMENT OF FACILITIES SERVICES
400 Lakeville Road, New Hyde Park, New York (718) 470-8700 FAX (718) 470-8719

Fax

To: Joe Capozzi
Dave [illegible]
Fax: 631-589-8705
Phone:
Re:

From: Peter Cannuscio, P.E.
Asst. Exec. Dir., Facilities Services
Date:
Pages:
CC: Jerry [illegible]

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Comments: Recent Well Testing @
400 Lakeville

Confirmation Report – Memory Send

Time : 07-16-04 02:08pm
Tel line : +7189626759
Name : LIJ FACILITIES CONSTRUCTION DEPT

Job number : 538

Date : 07-16 02:05pm

To : 16315898705

Document pages : 10

Start time : 07-16 02:05pm

End time : 07-16 02:08pm

Pages sent : 10

Status : OK

Job number : 538 *** SEND SUCCESSFUL ***

LONG ISLAND JEWISH MEDICAL CENTER
DEPARTMENT OF FACILITIES SERVICES
400 Lakeville Road, New Hyde Park, New York (718) 470-8700 FAX (718) 470-8719

Fax

To: Joe [illegible] / [illegible]
Fax: 631-589-8705
Phone:
Re:

From: Peter Cannuscio, P.E.
Asst. Exec. Dir., Facilities Services
Date:
Pages:
CC: Jerry [illegible]

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Comments: RECENT NEW TESTING @
400 LAKEVILLE.

APPENDIX E
PROFESSIONAL PROFILES

400 Lakeville Road
New Hyde Park, NY

July, 2007

0030777.3777

Prepared for:

Long Island Jewish Medical Center
270-05 76th Avenue
New Hyde Park, NY 11040

Prepared by:

Environmental Resources Management
520 Broad Hollow Road, Suite 210
Melville, NY 11747

Ernest Rossano, C.P.G.

Mr. Rossano has 20 years of varied hydrogeologic experience, including 3 years as a Project Manager for the United States Geological Survey, Water Resources Division on Long Island. His experience includes the design of monitoring well networks for volatile organics, hydrocarbons, and collection of basic hydrogeologic parameters; seismic, downhole geophysical, and sample log analysis and correlation; supervision and analysis of pump tests in confined and unconfined strata; numerical modeling of ground water flow and solute transport; and management of large scale remedial investigations and remediation.

Registrations & Professional Affiliations

- Certified Professional Geologist
- National Ground Water Association
- American Institute of Professional Geologists
- Association of Ground Water Scientists & Engineers

Fields of Competence

- Management of ground water pollution investigations
- Analysis of surface and ground water flow systems
- Surface and subsurface water quality monitoring
- In-situ permeability testing
- Infiltration testing
- Stratigraphic analysis, correlation and interpretation
- Multi-media sampling
- Tank removal and associated soils assessment
- Aquifer test analysis
- Ground water modeling
- Fate & Transport modeling
- Applied geophysics
- Municipal water supply
- Soil Vapor Extraction
- Air Sparging
- Bioventing/Biosparging
- Design & Installation of Horizontal Wells
- Construction Management
- Data Management using GIS Systems

Education

- M.S. Hydrogeology, State University of New York at Stony Brook, 1992
- B.S. Geology, Southampton College, New York, 1984

ERM

Key Projects

Comparison of major land use with the overall water quality of Long Island, New York.

Management and supervision of monitoring well network using over 1,000 wells. Correlation of data for use in USGS-published annual reports.

Stream gauging and surface water sampling on Long Island for the USGS National Stream Quality Accounting Network (NASQAN) and National Water Quality Assessment (NAWQA) programs.

Supervision of field activities including aquifer testing, test borings, well installation, recovery well construction, soil vapor and ground water sampling, and data evaluation.

Design and installation of a static hydrocarbon recovery system using 29 wells to recover over 450,000 gallons of product.

Supervision of tank removal and subsequent soils evaluation for contamination.

Design and installation of a municipal supply well yielding over 1,000 gallons per minute. Supervised all aspects of well construction and acceptance testing.

Three dimensional ground water flow model of New Jersey Coastal Plain deposits, to determine recovery well locations and rates, and feasibility of recharging treated effluent.

Pilot testing of soil vapor extraction and air sparging at several sites with varied hydrogeologic settings.

Pilot testing of bioventing and biosparging in glacial outwash deposits in New York.

Project Manager for the design, construction and operation of a 4000 scfm air sparge and 6200 scfm soil vapor extraction system consisting of 181 vertical and three horizontal sparge wells and 33 vertical and 1 horizontal soil vapor extraction wells. Provided direct construction management supervision for installation of 4 horizontal wells averaging 1100 feet in length. As project manager was responsible for construction management of above ground treatment system components.

Regional scale three-dimensional flow and solute transport model of hydrocarbons in glacial terrain in New York used to negotiate favorable cleanup criteria for the client.

Flow & transport model of a chlorinated solvent plume on Long Island, New York Constructed a model involving the movement of ground water and chlorinated solvents in highly permeable glacial sediments. This model utilized the MT3D code and site-specific decay rates to demonstrate fate and transport.

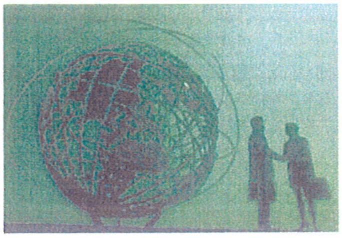
Flow & transport model of a chlorinated solvent plume in East Rutherford, New Jersey. Constructed a model involving the movement of ground water and chlorinated solvents in overburden sediments and wetland areas. This model utilized the RT3D code and site-specific decay rates to develop a Classification Exception Area and demonstrate monitored natural attenuation.

Managed a site decommissioning and remedial investigation for a large defense industry client. Investigation results indicated significant chromium contamination in soil and ground water and led to inclusion in the New York State Voluntary Cleanup Program. Sediment and surface water samples were collected from multiple locations in the East River as part of the remedial investigation. Additional investigation and remediation are pending NYSDEC review. Chosen remedial methods were excavation and in situ stabilization/reduction. As project manager was responsible for construction management aspect of implementing the remedial strategy.

Database setup and management for multiple large remedial investigation projects using GIS/Key. Database outputs include geologic and chemical cross sections, isoconcentration maps, graphs, data tables, and statistical analysis. Exports from databases have been used in ground water flow and solute transport modeling.

Management of a large ISRA project on a site contaminated with metals and chlorinated solvents. Key aspects of this project include; litigation support, active ground water remediation, off site plume delineation, ground water monitoring, data management and soil remediation.

Gregory K. Shkuda, Ph.D.



Mr. Shkuda has more than 20 years of environmental consulting experience including project direction, regulatory agency negotiation, cost and schedule control, and expert opinion/testimony in matters ranging from fate and transport of chemical contaminants to hydrocarbon fingerprinting.

Registrations & Professional Affiliations

- American Chemical Society

Fields of Competence

- Federal and State environmental regulations
- Evaluation of complex ground-water quality problems
- Analysis of biodegradation of organics in ground water
- Expert testimony on hazardous waste compliance
- Review of QA/QC plans
- Development of analytical protocols for litigation purposes
- Environmental Forensics including fingerprinting of petroleum fuels/oils/PCBs/MGP waste
- Risk Evaluation/Communication

Education

- Ph.D. Organic Chemistry, New York University, 1976
- M.S. Organic Chemistry, New York University, 1973
- B.A. Chemistry, New York University, 1968

Publications

Jalajas, P. Gregory Shkuda, and Thomas A. Mackie. Petroleum Release Dating: A Case Study Emphasizing Site Specific Conditions. NWWA 1997 - Petroleum Hydrocarbons and Organic Chemicals in Groundwater Conference, November 12-14, 1997, Houston, Texas.

Rodgers, J.A. and G.K. Shkuda. Training and Safety Considerations in Using Self-Contained Breathing Apparatus (SCBA) and Tethered Cascade Breathing Apparatus (TCBA) in Hazardous Atmosphere at Uncontrolled Hazardous Waste Sites. Procedures of the American Chemical Society 184th Annual Meeting, Kansas City, MO, September 1982.

Geller, S., S.C. Wei, G.K. Shkuda, D.M. Marcus, and C.F. Brewer, 1980. Carbon- 13-Enriched Tetra-L-Alanine Hapten to Fab' Fragments of Antipoly (L-Alanine) Antibodies. Biochemistry 1980, 3614-3623.

Shkuda, G.K., 1976. The Decomposition of Bicyclic Diazo Compounds: A Mechanistic Study. New York University, New York.

Shkuda, G.K., Coenen, A., Morgan, R.L., and Speis, D. 2004. Analysis of Samples Containing Polychlorinated Biphenyls and Polychlorinated Naphthalenes. Remediation of Chlorinated and Recalcitrant Compounds, Fourth International Conference, Monterey, California.

Shkuda, G.K. 2005. Daubert v. Emile Fischer. Geological Society of America- 39th Annual Meeting North-Central Section. Minneapolis, Minnesota May 2005.

Shkuda, G.K., Mendes, M., Coenen, A. 2005. 1st International Conference on Challenges in Site Remediation, Chicago, Illinois, October 2005.

Key Projects

Provided litigation support and expert testimony for a Potentially Responsible Party (PRPs) Group at a Superfund site in Indiana. The litigation support required detailed analysis of production records to of the PRPs and other landfill users to determine the chemical manufacturing processes used, likely products and whether unwanted by-products could be contained in waste streams. Identified hazardous substances contained in the waste streams of potential users of the disposal site to identify additional PRPs to require them to share in clean-up costs.

Provided litigation support at a New Jersey Superfund site. Detailed analysis of production records of chemical manufacturing, review of analytical methodologies and the fate and transport of product chemicals and by products was required for the production of an Expert Report. Assisted in critique of other experts.

Analyzed the groundwater transport and fate, distribution, and analytical methodology used to quantify a pesticide used on Long Island. Provided expert testimony on behalf of the manufacturer to defend a toxic tort.

Evaluated dioxin analytical methodologies and the potential for dioxin formation from copper recovery operations at New Jersey Secondary Smelter impacting New York City.

Evaluated dioxin formation for a chemical manufacturer in Newark, New Jersey to determine the likelihood of dioxin formation and transport of putative dioxins to the Passaic River.

Provided expert testimony on behalf of a petroleum company regarding the origin of product detected in a former tank pit. Use of high-resolution gas chromatography allowed determination that the product was not related to the client's operations but resulted from subsequent usage of the property. The expert opinion was a key element in the summary judgment motion, which was granted by the court.

Provided expert testimony for the Department of Justice regarding the nature, mobility, persistence, and fate of organic and inorganic contaminants at a Superfund site in Jacksonville, Florida.

Directed an RI/FS at a former MGP site in Syracuse, NY. Identified new approaches to rapidly collect vertical profile data on DNAPL MGP wastes.

Directed the remedial investigation at a closed aircraft manufacturing facility on Long Island including negotiations with the NYSDEC regarding the scope of the investigation, evaluation of the monitoring data, supervision of Resource Conservation Recovery Act (RCRA) closure activities and coordination of cleanup activities.

Directed an environmental study at a chemical plant in New Jersey, which included determination of the impacts to both ground and surface water of releases from the plant, detection, and mitigation of the impacts of non-aqueous phase liquids (NAPL) and assessment of the risk to local residences presented by the NAPL via volatilization and intrusion of the vapors into homes.

Directed an RI/FS at two municipal landfills on Long Island. Was responsible for; negotiating the scopes of the work plans including assessment of risks to both human health and the environment with the New York State Department of Environmental Conservation (NYSDEC), implementing the studies, coordination of activities with the regulatory agencies (state, federal, and local), obtaining access for off-site activities with municipalities and residents. Presented the results of the RI/FS including communication of the risk assessment results at the CERCLA required public meeting.

Collected ambient air monitoring data determining the concentrations of vinyl chloride being emitted from a municipal landfill and potentially impacting an adjacent elementary school.

Provided expert testimony for a major petroleum company regarding the identity, age, and origin of petroleum hydrocarbons detected in the subsurface at a bulk terminal facility in Texas. Gas chromatographic fingerprinting and component ratio analyses were used to demonstrate that the client was not the source of the contamination impacting a nearby park.
Provided litigation support for a petroleum company at a refinery site in California. The expert analysis involved fingerprinting of free product detected below the area of the refinery where finished gasoline was produced to determine origin, type, and age of product so that it could be distinguished from the product detected off-site. Various techniques were applied including high-resolution gas chromatography, biomarker and PIANO analyses and the occurrence and nature of organic lead species.

Michael B. Mattern

Mr. Mattern has more than six years of diversified experience in the environmental field specializing in hydrogeology, waste and potable water treatment, nutrient management, hazardous waste management/ remediation and water supply. Diverse project experience including oxidizer injections, summa sampling, monitoring well installation, and site remediation. Strong background in wastewater and industrial regulations.

Fields of Competence

- Computer skills (IBM, Windows, Microsoft, Internet, some AutoCAD)
- Field sampling and recording skills
- Selective chemical testing
- First Aid, Child and Adult CPR, Life Saving
- Forensic photographer
- Chemical handling
- Emergency Response
- Geology and Hydrogeology
- Well versed in Environmental Regulations
- Nutrient management
- Potable water testing
- Well head protection
- Health and Safety Officer of Site Investigations
- Air Quality Investigations and Monitoring
- Ergonomics Trainer
- OSHA Reporting
- Waste Water Management
- Fork lift license

Education

- B.A., Environmental Studies and Anthropology, Adelphi University, 2003
- M.S., Environmental Science currently pursuing, Adelphi University
- 40-Hour OSHA 1910.120 Health and Safety Training, 2000
- 8-Hour OSHA Supervisory Training For Level A Activities, 2000
- 8-Hour OSHA Annual Refresher Training, current
- 10-Hour OSHA General Industry Health and Safety Training, 2000
- Exxon Mobile Certified, 2003

- Confined spaced trained, 2000 - current
- Maryland Level IV Waste Water Certification, 2000
- Maryland Level III Potable Water Certification, 2000
- CPR Certification and First Aid Certification

Key Projects

Conducted several investigations of nutrient uptake of crops in an investigation and feasibility studies of pelletized chicken litter being used as a fertilizer.

Participated in a study to assess the feasibility of powering a Co-Generation plant using chicken litter and sludge generated in a DAF (Dissolved Air Floatation Unit). After test showed positive results I aided in the engineering of a 5 mega-watt Co-generation plant.

Chair of the Ergonomics, Health and Safety committee for hourly employees. While in that position I placed several Standard Operating Procedures into action that reduced the amount of loss time incidence and repetitive motion injuries my previous employer incurred per year.

Participated in several Sodium Permanganate in injections to aid in the remediation of a site laden with PCE and TCE contaminated soils and ground water.

Preformed an injection of the Oxidizer Perm-Ox to aid in the aerobic digestion of Fuel oil #2 at residential location. Also acted as the site Manager and the health and safety officer.

Field Manager and site health and safety officer during instillation of multi-level Waterloo System wells. Included soil logging, monitoring well installation, oversight and ground water sampling.

Conducted numerous sub-slab and soil vapor sampling task. In addition to vast experience in air quality sampling in homes and in commercial buildings such as the IBM facility in Endicott, NY.

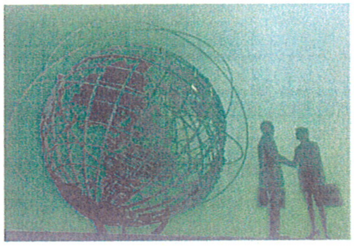
Participated in the oversight, construction and operation of several active and passive Soil Vapor Extraction systems.

Conducted several RI/FS investigations using the Waterloo Profiling Technology to pinpoint exact depths and locations of contaminates.

Performed surveys of building to identify potentially hazardous mold and asbestos issues.

Conducted industrial hygiene sampling for air quality and noise dissymmetry.

Andrew Coenen



Experience Summary

Nine years of general experience with analytical chemistry. Six years of analytical laboratory experience. Three years of experience involved with environmental consulting, including analytical data validation and quality assurance programs and and providing technical support and QA oversight for fixed laboratory and field analysis. Knowledge of various analytical methodologies. Experience in data validation of analytical data package deliverables for adherence to USEPA CLP, NYSDEC ASP and NJDEP protocols. Proficient with GIS/Key environmental management software. Operated a mobile gas chromatograph laboratory testing soil and water samples for quick-turn volatile analysis.

Fields of Competence

- Analytical data review and validation
- Analytical protocols for pollutants by USEPA methodologies
- Methods of analysis of organic and inorganic parameters
- Review of QA/QC plans
- Environmental database management (GIS Key)
- Field analytical techniques
- Multi-Media Sampling

Education/Training

- BS, Chemistry, University of Michigan, 1991
- Computer Aided Drafting, 50-Hour Course, Island Drafting and Technical Institute, 1998
- Immunoassay Testing Training Program, Strategic Diagnostics Inc., 1998

Certifications

40-Hour OSHA [29 CFR 1910.120 (e) (2)] Health and Safety Training, 1998

8-Hour OSHA Annual Refresher Training, 1999 – 2000

Key Projects

Data validation for numerous projects located in New York, New Jersey, Pennsylvania, Illinois, Massachusetts, Indiana, and Wisconsin, involving evaluation of aqueous, soil, sediment, leachate and air samples analyzed by USEPA Contract Laboratory Protocols, New York State DEC Contract Laboratory and Analytical Services Protocols and SW-846 methodologies for organic, inorganic, wet chemistry parameters, and TPH

Reviewed sampling and laboratory chemical data for adherence to New Jersey Department of Environmental Protection protocols on numerous projects. Also construced electronic deliverables for submission to NJDEP in required haz-deliverable format.

Database construction & management for numerous investigations utilizing GIS/Key software. Compiled field and laboratory data and generated result summary tables, contours, isopleths, contaminant plume maps, cross-sections and boring logs.

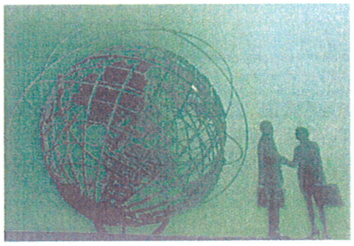
Prepared numerous Sampling and Analysis Plans (SAPs) and Quality Assurance Project Plans (QAPPs) for adherence to state and federal guidelines.

Utilized Immunoassay test kits for field measurement of PCB contamination at the former Brooklyn Navy Yard, Brooklyn, New York. Performed data validation of all field analytical samples and off-site laboratory samples and compared off-site results to test kits.

Conducted subsurface investigations with a Geoprobe. Performed various field tests.

Supervision of tank removal and subsequent soils evaluation for contamination.

Paulina Gravier



As a senior consultant with 9 years of experience, Ms. Gravier has served as a client steward developing, managing, and implementing EHS global services. Ms. Gravier brings a unique combination of insurance and EHS management and consulting experience to ERM. She has worked with a variety of private and public sectors, including telecommunications, biotechnology, pharmaceutical, printing and publishing, manufacturing, legal, entertainment, and consumer products, and retail industries.

Ms. Gravier has extensive experience in managing and conducting comprehensive industrial hygiene investigations and developing corporate-wide health and safety programs compliant with OSHA regulations, such as respiratory protection, emergency response, and hearing conservation programs, as well as program implementation and training. She has assessed chemical, biological, and physical agents of concern at hazardous waste sites and industrial, commercial, and educational facilities. Extensive communication with corporate management, EHS managers, employees, insurers, brokers, consultants, laboratories, attorneys and underwriters, provides Ms. Gravier with a broad management view of various business sectors.

Ms. Gravier's compliance expertise includes worker exposure assessments, administering OSHA compliance training programs, Phase I site assessments, dataroom reviews, air emission inventories, human health risk assessments and global regulatory reviews.

Registrations & Professional Affiliations

- American Industrial Hygiene Association (AIHA)
- Pursuing Certification as a Chartered Property and Casualty Underwriter (CPCU 2, 3, and 5 passed) and as Certified Industrial Hygienist

Fields of Competence

- Industrial hygiene surveys and management
- Occupational health and safety program development
- Supply Chain Auditing
- Corporate Data Verification
- Job Task Hazard Analysis
- Hazardous Facility Closure Plans - California Specific
- Envornmental Compliance Auditing
- Indoor air quality investigations
- EHS training
- Workers compensation management
- Asbestos operations and management plans
- Human health risk assessment
- M&A Advisory Services
- Product stewardship

Education

- M.S. Industrial Hygiene, New York University, 1999
- B.S. Chemistry/Biology, Providence College, 1996
- Professional Development Classes for the following: Indoor Air Quality, Metalworking Fluids, Industrial Hygiene Calculations, Ergonomics, Stack Emissions, and Advanced Design of Ventilation Systems

Key Projects

Participated in a data verification project for a Fortune 100 global firm. This project consisted of a detailed analysis of health and safety metrics reported to corporate, and therefore, used in their Annual Report. The North American facility involved in this audit has a local presence since the late 1800s and with that, came a great deal of pride with respect to EHS. Clear communication with site EHS management and Human Resources was key in validating the data in question (e.g., Loss Time Accidents). Project required skills in handling large spreadsheets and data packages. The key findings were communicated back to ERM's global team headquartered in the UK.

Performed and managed job hazard evaluations as well as health and safety risk assessments for multiple industries, including printing and publishing, jewelry manufacturing, telecommunications, medical device manufacturing and pharmaceutical companies. These evaluations were performed in partnership with the client's EHS managers and employees with the final results being produced in a tabular spreadsheet format.

Provided an EHS lecture to pharmacy students at Long Island University detailing the potential application of EHS in their field of practice. This lecture was the first of its kind for the university. This comprehensive 60 minute lecture consisted of an introduction to EHS, role playing between a pharmacist and patient, and case studies. The lecture was used to generate questions for the final exam.

Participated in the performance of a Safety Workshop for Health and Safety professionals managing large scale construction projects in New York City. This two day workshop was developed to strategize ways for the management of change, focusing on key target areas requiring immediate attention as well as long term goals. Survey results were graphically displayed to allow the client to benchmark themselves against the industry and specific competitors.

Contributed to various project efforts related to Asset Retirement obligations for FASB reporting obligations, as required by the client's accounting department. This project required skills in obtaining, tracking, and calculating costs related to potential environmental assets applicable to FASB.

Managed and performed a pilot study to assess the auditing process related to external manufacturers contracted by a pharmaceutical company. The audit process consisted of site visits to evaluate the conformance status related to ethics, labor and employment, health and safety and the environment.

Served as the key health and safety practioner providing support to a biomedical manufacturing plant in New Jersey. Completed projects related to the following health and safety areas of interest: chemical hygiene plan, methylene chloride and formaldehyde exposure monitoring, and exhaust hood calculations. The management role consists of fielding calls and emails regarding various topics of interest as well as site visits to accomplish specific tasks requested by the client. This client is continuously evolving, and therefore, opening the doors to more and more health and safety initiatives.

Acted as a team member for the development of a market trend report for Finnish clean air technology in North America. This role consisted of researching common practice, drawing on expert knowledge within and outside of ERM, and writing a market trend analysis for indoor air. The objective of this report is to provide the Finnish clients with the information needed to determine potential market penetration in North America.

Managed and supported an ERM staff level health and safety specialist serving as a full time, on-site resource for a global pharmaceutical and cosmetics firm headquartered in NY.

Managed and participated in a million dollar plus environmental compliance project for a large domestic based confidential client. As the state lead for Nevada, my key responsibilities included quality assurance and control of deliverable documents, such as permit applications, environmental discovery phase reports, and audit exception reports. The management role also involved direct communication with other environmental consultants, local and state agencies, and attorneys. Communicating key findings on a tight timeline was an essential component of this project, and these findings were discussed and resolved expeditiously to facilitate the corporate environmental compliance objectives of the client.

Developed Hazardous Materials Business Closure plans for industries specializing in high technology. These plans incorporate the requirements of the local fire departments, which have jurisdiction over the property transfers in counties of California. The management role involved project oversight during hazardous materials removal and/or decontamination activities performed by subcontractors, post decontamination verification sampling, and final closure plan submittals.

Conducted a quantitative human health risk assessment, in accordance with the USEPA Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual, to evaluate potential receptors at a California site, where the main contaminants of concern were trichloroethylene and vinyl chloride. Quantitative risk assessment was used to define pathways and actual risks posed to identify receptors and to assess and advise on the extent of corrective measures that may need to be applied. Being that the key route of exposure at the site was inhalation via indoor air, the Johnson & Ettinger Vapor Intrusion Model was used as part of the assessment. In managing the risk assessment work, direct communication and concurrence was required of toxicologists at the Cal-EPA Department of Toxic Substance Control (DTSC) as well as other risk assessors and project management.

Managed a partial risk assessment project for a California client with potential Proposition 65 notification concerns related to indoor air exposures of trichloroethylene. The trichloroethylene present in site groundwater as well as soil gas was quantitatively measured and assessed via the Johnson & Ettinger Vapor Intrusion Model. Model results were then converted and qualitatively compared to the Proposition 65 No Significant Risk Level (NSRL) value for trichloroethylene to determine posting needs.

Managed and participated in the annual updates of a Global Regulatory Matrix developed for a California-based biotech firm. The matrix was provided to the client via a web based environmental management information system (EMIS) specifically created by ERM and known as Dot Right®. Key global regulatory update issues were related to Commerce-Related Laws and Regulations Applicable to the International Transfer of Sensitive Technologies, exemptions and regulatory definitions related to Research & Development, and the Globally Harmonized System.

Conducted quantitative human health risk assessments, in accordance with the USEPA Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual, to evaluate potential receptors at two New York Superfund sites, where the main contaminants of concern were PCBs, tetrachloroethylene, and trichloroethylene. Quantitative risk assessment was used to define pathways and actual risks posed to identify receptors and to assess and advise on the extent of corrective measures that need to be applied. Extensive use and manipulation of the Johnson & Ettinger Vapor Intrusion Model was used as part of the assessments. Local and state regulators were involved as well as multiple consulting firms and attorneys.

Contributed to the strategic development of the corporate product stewardship program for an electronics manufacturer serving the telecommunications industry. Specific evaluations related to the proposed European regulations, the RoHS and WEEE Directives, which are soon to be implemented and are expected to have a major impact on the entire electronics industry supply chain during the next several years.

Managed and developed a baseline air monitoring survey for a California-based winery to determine OSHA compliance and to evaluate the need for engineering controls, interim respiratory protection, additional air monitoring, and administrative controls. Ongoing work with this client includes: the development and implementation of an OSHA compliant respiratory protection plan, collecting direct reading measurements for airborne carbon monoxide, performing a ventilation assessment within the barrel room, and establishing a worse case monitoring strategy for harvest time, such that potential contaminants, such as crystalline silica and sulfur dioxide, may be assessed when the largest quantities of these products are used at the facility.

Conducted quantitative human health risk assessments, in accordance with the USEPA Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual, to evaluate potential receptors at two New York Superfund sites, where the main contaminants of concern were PCBs, tetrachloroethylene, and trichloroethylene. Quantitative risk assessment was used to define pathways and actual risks posed to identify receptors and to assess and advise on the extent of corrective measures that need to be applied. Extensive use and manipulation of the Johnson

& Ettinger Vapor Intrusion Model was used as part of the assessments. Local and state regulators were involved as well as multiple consulting firms and attorneys.

Contributed to the development of the Remedial Investigation (RI) report and Feasibility Study for a New York State Superfund site formerly occupied by a Cables Manufacturing Company and currently occupied by an entertainment production company. These reports were submitted to the New York State Department of Environmental Conservation. Items addressed in the comprehensive reports include, but are not limited to, ecological and human health risk assessments, surface and subsurface investigation results for contaminants such as PCBs, toxic metals, petroleum products, indoor lead assessments due to current facility occupancy, research related to historical fill and development of the site (Sanborn Maps and Aerial Photographs) and alternative PCB treatment and disposal technologies.

Managed and performed dozens of indoor air quality (IAQ) investigations for hospitals, office buildings, and apartment complexes. Some specific projects include the following: a remediation project at an apartment complex in New Jersey, which involved over 25 apartment units and the local health department; a newspaper publishing company contracted with ERM to determine the potential relationship between indoor air pollutants and the onset of cancer amongst the maintenance workers as well as perform a ventilation assessment within the potentially affected areas. After the reports were shared with employees, a two-hour question/answer session was conducted with ERM on behalf of the employer to discuss the findings in detail and provide verbal assurance.

Conducted a dozen Phase I site assessments as part of ERM's mergers and acquisitions advisory services. In addition, managed over 20 Phase I site assessments across the United States for a merger and acquisition project involving a wholesale grocer. Extensive communication with all transaction partners, such as corporate EHS management and lawyers.

Managed and evaluated the extent of pigeon contamination within the ventilation system of a newly renovated building in downtown Manhattan. The construction management company overseeing the project renovation contracted ERM. This assessment involved collecting microbial samples as well as performing cleaning and sanitizing activities for the affected ductwork. Due to the potential sensitive receptors, immuno-compromised individuals in the building, meetings were held with management to clearly address employee concerns.

Managed and conducted numerous OSHA compliance monitoring surveys that involved evaluating chemical, biological, and physical agents of concern, such as welding fumes, metalworking fluids, silica, styrene, methyl ethyl ketone, asbestos, fiberglass, lead, methylene chloride, PAHs, noise, toxigenic mold, radon, heat stress, ergonomics, etc.

Provided technical support and training for the field Health and Safety Coordinator at a demolition project in Utica, NY. The training involved the use of direct reading instruments, such as the MiniRam and Photoionization Detectors, for performing the required air monitoring at the site. Developed the site specific Health and Safety Plan (HASP), which provided details regarding key items such as the contaminants of concern, exclusion zone air action levels, and community air monitoring plan. Also developed dozens of other site specific HASPs.

Assisted in the development of a Spill Prevention Control and Countermeasures Plan (SPCC) for an asphalt manufacturing plant. This comprehensive plan addressed items such as secondary containment for above ground storage tanks and emergency response procedures.

Developed, managed, and implemented a written hazard communication and respiratory protection program for the facilities engineering department at a printing & publishing company. In addition, an interactive training seminar and respirator fit testing session were held to comply with OSHA requirements and clearly communicate the elements of these programs to the affected employees. Items addressed during the presentation include spill response procedures, personal protective equipment, Material Safety Data Sheets, and labeling. A mock spill was used to facilitate the training process.

Reviewed numerous industrial hygiene reports in regards to a preacquisition project for a confidential client. Key items addressed during the review were OSHA violations and worker compensation claims related to employment at the client site.

ATTACHMENT 1
400 LAKEVILLE ROAD
RAW CHEMICAL DATA
(CDROM)

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July, 2007

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