WORK PLAN

Remedial Investigation/Feasibility Studies (RI/FSs) Railroad Dry Cleaners (Site No. 1-30-066) and Hercules Machine Sales (Site No. 1-30-083) Oceanside, New York

New York State Department of Environmental Conservation

April 2006

O'BRIEN & GERE

10653/37556

WORK PLAN

Remedial Investigation/Feasibility Studies (RI/FSs)
Railroad Dry Cleaners (Site No. 1-30-066)
and
Hercules Machine Sales (Site No. 1-30-083)

New York State Department of
Environmental Conservation
Albany, New York

Douglas M. Crawford, P.E.
Vice President

April 2006

O'BRIEN & GERE
ENGINEERS, INC.

435 New Karner Road
Albany, New York 12205

Contents

List of Tables

List of Figures

List of Appendices

List of Exhibits

1. Introduction

1.1. General

This document is the Remedial Investigation/Feasibility Study (RI/FS) Work Plan for the Railroad Dry Cleaners (Railroad) and Hercules Machine Sales (Hercules) properties (Sites). The Railroad (1-30-066) and Hercules (1-30-083) properties are listed as Class 2 sites in the New York State Registry of Inactive Hazardous Waste Sites. The Sites are located in the Hamlet of Oceanside, Town of Hempstead, Nassau County, New York; a location map is included as Figure 1-1. The RI/FS is being performed in accordance with State Superfund Work Assignment #D004090-36 (Work Assignment).

The scope presented herein was developed based on information presented in the Work Assignment, reviews of previous remedial investigation activities, and on discussions with New York State Department of Environmental Conservation (NYSDEC) personnel.

1.2. Project objectives

The objectives of the RI/FS are to:

- Develop a conceptual site model describing the constituent source(s) and the nature and extent of site-related constituents.
- The collection of additional data necessary to further evaluate and characterize the nature and extent of site-related constituents in ground water, and soil vapor.
- An evaluation of potential exposure pathways between human receptors and site-related constituents.
- Gathering of sufficient data to support the FS process.
- Evaluation of a remedial alternative that provides protection to human health and the environment; is cost-effective; and complies to the extent practicable with applicable standards, criteria and guidance (SCGs).

1.3. Document format

This document contains the following sections:

Section 1 – Introduction
Section 2 – Background
Section 3 – Remedial Investigation Work Plan
Section 4 – Remedial Investigation Report
Section 5 – Feasibility Study
Section 6 – Project Schedule

2. Background

2.1. Location and description

The Railroad and Hercules Sites are located at 3180 and 3188 Lawson Boulevard, respectively, in the Hamlet of Oceanside, Town of Hempstead, Nassau County, New York. As illustrated in Figure 2-1, the Railroad site is bounded by Weidner Avenue to the north, Lawson Boulevard to the east, the Long Island Railroad to the west, and the Hercules site to the south. A multi-tenant commercial property located at 3194 Lawson Boulevard abuts the Hercules site to the south. The subject properties occupy Lots 37 through 40, Block 209, Section 43 of the Town of Hempstead.

The Railroad Cleaners site measures approximately 35 feet by 100 feet, with the single story rectangular-shaped building housing the dry cleaning business occupying most of the site; a parking lot/alley is found to the west.

The Hercules site consists of a single story rectangular-shaped building of approximately 40 feet by 100 feet. The building shares common walls with the Railroad Cleaners to the north and 3194 Lawson Boulevard to the south.

The sites are located in a mixed neighborhood of retail businesses, apartments, and commercial establishments. The topography of the site and surrounding properties is relatively level, sloping gently from about five feet above mean sea level at the Sites westward to the East Rockaway Channel and southward to the Reed Channel.

2.2. History and background

The properties were one parcel until 1963, when the warehouse once home to Hercules Machine Sales Corporation was extended to the north with the construction of the Railroad Cleaners building.

The Railroad Cleaners site has been operated as a dry cleaners and shirt laundry at 3180 Lawson Boulevard since 1963-1964 (EEA, 2003). Around 1988, Mr. David Goldman purchased the building and the interest in Hercules Laundry Machinery Co., Inc. from Mr. Moe Sperber. In or around 1995, a new corporation, Hercules Machinery Sales, Inc., was formed and operated at the 3188 Lawson Boulevard address. Hercules Machinery Sales supplied and repaired dry cleaning equipment

at the site until 1999, when Hercules Dry Cleaning Equipment, Inc. was formed. Hercules Dry Cleaning Equipment operated at the site until April 2002, when the building was leased to Rightway Air Conditioning and Heating.

2.3. Investigations at the Railroad Cleaners Site

The limited information supplied by NYSDEC included files and reports pertaining to investigations conducted at the Railroad Cleaners site and the Hercules Machine Sales site. The previous investigations conducted at the sites, as depicted in the files supplied by NYSDEC, are described briefly in the following paragraphs.

2.3.1. Nassau County Department of Health (NCDH) (1988)

In 1988, an underground storage tank (UST) was removed from the rear of the Railroad property; enforcement actions began with this removal. The 550-gallon capacity fuel oil UST was removed from the rear of the property, purportedly approximately five feet north of the property line with the Hercules site. The tank was removed from the site and dismantled before an inspection was made; however, the contractor reported the presence of a hole in the tank bottom. According to the NCDH inspector, approximately two cubic feet of contaminated soil was removed and placed near the open hole. Ground water was present at about four feet below ground surface, as was observable fuel oil contamination. A sample of soil collected at the soil/ground water interface by NCDH personnel contained tetrachloroethene (PCE) at a concentration of 2,600 parts per billion (ppb), xylenes at 590 ppb, ethylbenzene at 260 ppb, and toluene at 95 ppb (Galli, 1989b).

2.3.2. Richard D. Galli, P.E., P.C. (RDG) (1989a)

A letter of June 21, 1989 to the NCDH presented the results of a Phase I RI at the Railroad Cleaners site. Soil samples were collected at four locations near the former tank location; no depths of sampling were available. The samples contained up to 1,100,000 ppb of PCE. The letter recommended further investigation.

2.3.3. Richard D. Galli, P.E., P.C. (1989b)

In July 1989, RDG prepared a work plan for a Phase II RI investigation, subsequently amended in a September 1989 addendum after review by the NCDH. The NCDH requested the installation of three monitoring wells to establish a ground water flow direction, and a fourth well at a later date at a downgradient location. The addendum presumed a ground water flow direction of south-southwest at a gradient of 0.0015 feet per foot based on published reports. MW-1 was to be installed on Weidner Avenue in a presumed upgradient location, MW-2 on Lawson Boulevard, and MW-3 in a presumed downgradient location. According

to the addendum, the wells were to be constructed of 4-inch diameter PVC with a screened length of 15 feet, to be placed at a minimum ten feet into ground water but no less than three feet below ground surface.

2.3.4. Richard D. Galli, P.E., P.C. (1990)

Limited results of the Phase II RI were included in documents supplied to O'Brien & Gere by the NYSDEC. The July 1990 report also summarized the results of the Phase I RI (1989a), which indicated the presence of PCE in soil at concentrations ranging from 10 to 1,100,000 ppb, with an increasing concentration found correlated with increasing depth. Smaller amounts of trichloroethene (TCE) were also identified in the Phase I effort.

Soil and ground water samples were collected as part of the Phase II RI in three locations, previously identified as MW-1, MW-2, and MW-3. According to the report, calculations indicated ground water flow to be generally to the west, in the direction of East Rockaway Channel. Based on this flow direction, not that presumed by the earlier addendum, MW-1 was actually located in a cross-gradient location, MW-2 was located upgradient of the site, and MW-3 was located near the former UST location within the central area of contamination. Soil collected at 5 to 7 feet below ground surface contained no detectable concentrations of PCE in the sample from MW-1, 10 ppb in sample MW-2, and 265 ppb in sample MW-3. No PCE was found in ground water collected in January 1990 from MW-1 and MW-2; MW-3 contained PCE at 126 ppb. Ground water collected in March 1990 found no PCE contamination in the sample from MW-1, 91 ppb in sample MW-2 and 10,000 ppb in sample MW-3.

Fuel oil constituents were found in soil boring B-4 at 4 feet below ground surface, including toluene at 210,000 ppb, ethylbenzene at 42,000 ppb, and total xylene at 140,000 ppb. Benzene was found in ground water in all wells, with the highest concentration (150 ppb) in MW-2, located in the purported upgradient location. RDG submitted FOIL inquiries to evaluate the potential for the migration of off-site sources of petroleum contamination to the property. Historical sample locations are included on the figure in Exhibit 1.

RDG recommended the installation of two additional monitoring wells in the reported direction of ground water. The first of these wells was to be screened near the intersection of the water table, while the second was to have a 10-foot screen placed approximately 40 feet below the water table. The placement of the screen in the deeper well was proposed to intercept contamination confined by the so-called 20-Foot Clay common to this area of Long Island and believed to underlie the site. These wells were located during the September 2005 site visit, approximately 600 feet downgradient (west-northwest) of the site, however, no well logs or analytical data from these wells were present in the information supplied by NYSDEC. RDG also recommended the removal of an additional 4 to 5 cubic yards of soil near MW-3.

The NCDH disagreed with the contention of RDG that on-site petroleum contamination may have been caused by migration from off-site oil storage terminals, and directed the facility to investigate and remediate the fuel oil and PCE contamination in and around the site. The NCDH agreed with the recommendations of the July 1990 report, and requested a proposal for the recommended work by September 1990.

2.3.5. EEA, Inc. (2003)

After the owner of Railroad Dry Cleaners failed to complete the remedial activities requested by the NCDH, the County nominated the site to the NYSDEC for inclusion in the New York State Registry of Inactive Hazardous Waste Disposal Sites. The NYSDEC listed Railroad Cleaners as a Class 2 site in the Registry as site number 1-30-066. A Class 2 designation means that a significant threat to the public health or environment exists and action is required to address that threat.

In June 2003, EEA prepared a RI/FS Work Plan for further work at the Railroad Cleaners site. The first phase of the RI was completed on September 9, 2003. Seventeen soil gas samples were collected at a depth of 0 to 2 inches below ground surface and 0 to 2 feet below ground surface and analyzed in the field by flame ionization detector (FID) and organic vapor monitor (OVM). The 0 to 2 inch interval analyzed in the field by FID returned the highest concentrations southwest of the former tank location; the same interval field analyzed by OVM returned the highest concentrations in the former tank location. The 0 to 2 foot interval analyzed by FID again returned the highest concentrations southwest of the former tank location; when analyzed by OVM the highest concentrations were south of the former tank location and in front of the building along Lawson Boulevard.

The two locations with the highest field readings were absorbed on carbon/porpack cartridges and analyzed by EPA 8260 for volatile organic compounds. SG-13, located southwest of the former UST, returned high concentrations of the PCE-degradation products cis-1,2-dichloroethene (DCE, at 210,000 $\mu g/m^3$) and vinyl chloride (VC, at 550,000 $\mu g/m^3$) compared to PCE (4,700 $\mu g/m^3$) and TCE (4,700 $\mu g/m^3$). SG-14, located south of the former UST locations and close to the building, contained a higher concentration of PCE (410,000 $\mu g/m^3$) when compared to the degradation products.

Table 2-1. *Results of EEA Remedial Investigation*

	Soil Gas (µg/m3)	
Soil Boring	SG-13	SG-14
Depth Interval	*0-2'*	*0-2'*
Compound		
1,1-Dichloroethene	1,600	300
cis-1,2-Dichloroethene	210,000	50,000
Methylene Chloride	<63	64
trans-1,2-Dichloroethene	5,300	380
Tetrachloroethene	4,700	410,000
Trichloroethylene	4,700	22,000
Vinyl Chloride	550,000	16,000
Total VOCs	776,300	498,744

Based on the results of the soil gas sampling, EEA suggested five locations for further soil and ground water sampling.

Ten soil samples were subsequently collected in 2004, at 0 to 2 inches below ground surface and 0 to 3 feet below ground surface at each of the five locations. Four ground water profile samples were conducted in each of the new borings, and additional ground water samples were collected from the three existing monitoring wells.

Soil and ground water samples were analyzed for VOCs by EPA Method 624. PCE was detected above method detection limits in all samples.

Table 2-2. *Results of EEA Remedial Investigation*

	Soil (µg/kg)		Ground Water (ppb)			
	0-2"	*0-3'*	*5'*	*30'*	*50'*	*75' (60' SB-1)*
SB-1/GW-1						
PCE	6500	10 (11)	440	12000	140	660
TCE	280	0.8 (0.9)	380	ND	93	86
DCE	180	1 (1)	1700	250	210	1400
VC	ND	ND (0.6)	ND	ND	6	140
SB-2/GW-2						
PCE	8	2500	27	280 (350)	49	87
TCE	ND	220	ND	ND (ND)	2	4
DCE	ND	78	210	ND (ND)	5	5
VC	ND	ND	12	ND (ND)	ND	ND
SB-3/GW-3						
PCE	3300	24000	530	9	29	58 (83)
TCE	ND	ND	ND	ND	ND	ND (3)
DCE	ND	ND	ND	ND	ND	ND (ND)
VC	ND	ND	ND	ND	ND	ND (ND)
SB-4/GW-4						
PCE	3600	1500 (18000)	340	27	8	16
TCE	ND	ND (ND)	ND	10	2	2
DCE	ND	ND (ND)	ND	8	2	1
VC	ND	ND (ND)	ND	ND	ND	ND
SB-5/GW-5						
PCE	680	520	380	2	2	4
TCE	ND	ND	11	ND	ND	ND
DCE	ND	ND	21	2	1	2
VC	ND	ND	ND	ND	ND	ND

	MW-1	MW-2	MW-3
PCE	45	4	ND
TCE	ND	ND	ND
DCE	1500	ND	ND
VC	480	ND	ND

*Note: Results indicated in parentheses indicate a blind duplicate sample.

Soil from SB-1/GW-1, located south of the former UST, contained high concentrations of PCE and degradation products (TCE and DCE) in the shallow interval and much lower concentrations in the deeper interval. Elevated concentrations of PCE were found in ground water from the four intervals sampled in SB-1/GW-1; TCE, DCE, and VC were also present. PCE, TCE, and DCE were present in the deeper soil interval of boring SB-2/GW-2, and throughout the ground water column. The remaining borings contained high levels of PCE in soil and shallow ground water, with lesser concentrations of degradation products. The presence of degradation products and distribution throughout the water column may indicate the that source of contamination west of the building may be older when compared to that found in SB-3/GW-3, SB-4/GW-4, and SB-5/GW-5. Exhibit 2 contains figures with the EEA, Inc. soil vapor, soil and ground water sampling results.

2.3.6. EEA, Inc. Freedom of Information Law Request (2003)

The RI/FS report referenced a Freedom of Information Law (FOIL) search of historical records in the possession of the Nassau County Fire Marshall, the Town of Hempstead Building Department, and the Nassau County Department of Health (NCDH). The Fire Marshall maintained no records for the Railroad Cleaners or the Hercules Machine Sales site.

The Town of Hempstead Building Department possessed a 1963 plan to build the present Railroad Cleaners building as an extension of the existing warehouse (Hercules) to the south. Two dry wells were shown located west of the proposed building. The building plans indicate that the Railroad Cleaners building may have been partially or entirely over a septic system for the Hercules building. The septic system operated from 1947 to 1963, when the application to construct the Railroad building was filed; at that time, the original building and the new structure were connected to the municipal sewer system. However, the report states that there is no record of Hercules having abandoned the septic system.

The NCHD inspected the business in December 1997 to confirm the absence of floor drains at the property. The inspector found a sewer cleanout near the back (west) wall and approximately 6 feet from the dry cleaning machine. The comments of the inspector (NCDH 1997) describe an 18" by 24" cleanout under a steel plate; at the time of the inspection, the cleanout was filled to floor level with sand. The EEA report states that the structure has since been removed and closed. A second sewer cleanout was observed in the office area during the 1997 inspection.

2.4. Investigations at the Hercules Machine Sales Site

In 1992, the NCDH found activated carbon, likely from solvent recovery filters used in the dry cleaning process, on unpaved ground behind the building. Subsequent sampling indicated levels of PCE and degradation products in soil and ground water in exceedance of guidance values.

2.4.1. Nassau County Department of Health (1995)

In 1995 the NCDH collected samples of activated carbon, soil and ground water from the Hercules site and submitted samples to the NCDH Center for Laboratories and Research for analysis. Soil contained PCE at concentrations up to 1,400 mg/kg, TCE at 36 mg/kg, and *cis*-1,2-DCE at 24 mg/kg. TAGM 4046 cleanup guidelines for those compounds are 1.4, 0.7, and 0.25 mg/kg respectively.

PCE was found at a maximum concentration of 28,000 µg/L, TCE at 865 µg/L, *cis*-1,2-DCE at 3,000 µg/L, *trans*-1,2-DCE at 27 µg/L, and VC at 43 µg/L in ground water samples collected from two downgradient monitoring wells. The New York State Class GA ground water standard of 5 µg/L applies to these compounds.

Based on these results, NYSDEC listed the site as site number 1-30-083 in the New York State Registry of Inactive Hazardous Waste Disposal Sites as a Class 2 site.

2.4.2. CA Rich Consultants, Inc. (2003)

CA Rich Consultants (CAR) completed a RI/FS Work Plan for the Hercules site in June 2003. The plan proposed two phases of work, the first consisting of a well survey and records search, receptor survey, soil vapor survey, monitoring well installation and sampling. The second phase included sampling of soil and ground water by direct push methods and report preparation.

2.4.3. CA Rich Consultants, Inc. (2004)

A monthly progress report of February 6, 2004 presented the results of soil gas samples and soil samples collected as part of the first phase of the RI proposed in the work plan (CAR 2003). High concentrations of total organic vapor as measured by a MiniRAE 2000 photoionization detector were found clustered at the rear (west) of the building. Laboratory analysis of soil samples confirmed concentrations of PCE up to 104,000 µg/kg west of the building.

Badge samples indicated an interior air concentration of 13 $\mu g/m^3$ and an exterior concentration of 97 $\mu g/m^3$. Soil gas samples contained PCE at concentrations of up to 370,000 $\mu g/m^3$, corresponding to those borings where high concentrations were encountered in soil. Exhibit 3 contains

tables and figures with the results of the CA Rich Consultants, Inc. investigation.

No additional soil or ground water sampling was conducted as originally proposed.

2.5. Conceptual Site Model

2.5.1. General

The Conceptual Site Model (CSM) is one of the primary planning tools used in systematic project planning. The CSM organizes existing information about a site and identifies the need for additional information. The project team will use the CSM to direct the collection of additional information, and the CSM will be revised as the nature and extent of contamination is more accurately defined.

2.5.2. Historical Use

As described above, the Railroad Cleaners site has been operated as a dry cleaners and shirt laundry since 1963-1964. Hercules Machine Sales Corporation supplied, repaired, and recycled dry cleaning equipment until 1999. The sites are located in a mixed neighborhood of retail businesses, apartments, and commercial establishments.

2.5.3. Physiographic

The site is located in the Atlantic Coastal Plain physiographic province of New York State. Pleistocene glaciation has shaped the major physiographic features of Long Island. The Wisconsin-age advance and retreat of ice sheets resulted in east-west trending terminal moraines in the northern and central parts of the Island that diverge to form the North Fork and South Fork. Between and south of these moraines, erosion has resulted in a gently sloping to flat, glaciofluvial outwash plain extending southward to the coast. The glacial deposits overlie a southward sloping surface of Precambrian and Paleozoic-age crystalline bedrock. The bedrock surface dips to the southeast, resulting in a thickening of the coastal plain aquifer units from a relatively thin section under Long Island Sound to more than 2000 feet in thickness along the southern margin of the Island.

2.5.4. Climatic

Climate data for the Site area was obtained from the National Climatic Data Center (NCDC) of the National Oceanic and Atmospheric Administration (NCDC, 2002).

The average value of a meteorological element over 30 years is defined as a climatological normal. The normal climate helps in describing the

climate and is used as a base to which current conditions can be compared. Every ten years, NCDC computes new thirty-year climate normals for selected temperature and precipitation elements for a large number of U.S. climate and weather stations. These normals are summarized in daily, monthly, divisional, and supplementary normals products. In the United States, normals have been computed for 1971-2000, 1961-1990, 1951-1980, 1941-1970, 1931-1960, and 1921-1950. The data for the latest normals period (1971-2000) are included in Table 3-1 for the coastal zone of New York State, *i.e.*, Long Island.

2.5.5. Geologic

The geology of Long Island consists of a sequence of unconsolidated glacial, lacustrine, deltaic, and marine deposits of clay, silt, sand, and gravel that range in age from Upper Cretaceous to Pleistocene. These deposits overlie a southward sloping surface of Precambrian and (or) Paleozoic-aged crystalline bedrock.

The major features of the present-day topography of Long Island are a result of Pleistocene glaciation and are oriented in parallel ridges. The most prominent are two eastwest-trending morainal ridges (Ronkonkoma and Harbor Hill moraines) that traverse the island. These moraines are interpreted as the terminal moraines of two major ice advances; many small, less continuous ridges on the island were probably deposited between or at the terminus of smaller lobes of the ice sheet, or as other types of glacial features.

The Harbor Hill Moraine forms the northernmost prominent ridge and extends from the western part of Kings County through central Queens County and northern Nassau County, then eastward through northern Suffolk County to the North Fork; the topographic elevation of the moraine ranges from 100 to 300 feet above sea level. The Ronkonkoma Moraine forms the southern prominent ridge and extends from northwestern Nassau county eastward across central Suffolk County to the South Fork; the moraine reaches a maximum topographic elevation of about 380 feet above sea level (the highest point on Long Island) in western Suffolk County. An outwash plain slopes southward from the base of the Harbor Hill Moraine in Kings and Queens Counties, and from the Ronkonkoma Moraine in Nassau and Suffolk Counties, to the southern shore. The outwash plain has an topographic elevation of 100 to 150 feet along its northern border and slopes southward at about 20 feet per mile. The outwash plain is overlain by recent deposits of sand, silt, and organic material along the south-shore beaches and along stream channels (USGS, 2002).

2.5.6. Hydrogeologic

The major hydrostratigraphic units of Long Island are formed from surficial glacial deposits of Pleistocene age, which unconformably overlie older deposits of Cretaceous age developed on the slowly

subsiding coastal plain. As Long Island is bordered on all sides by salt-water bodies, the ground water beneath the island forms a freshwater lens bordered by a freshwater-saltwater interface zone. Three major aquifers contribute to the ground water resources of Long Island (USGS 2002).

2.5.6.1. Upper glacial aquifer

The Upper Glacial aquifer, which underlies all of Nassau and Suffolk Counties, has a probable maximum thickness of about 700 feet. It contains large quantities of ground water in both the outwash plain and the morainal deposits. The deposits underlying the outwash plain are composed largely of stratified, brown, fine to coarse sand and gravel forming a large unconfined aquifer. This aquifer is recharged directly by rainfall on Long Island. Horizontal hydraulic conductivity in the Upper Glacial Aquifer averages 270 feet per day; vertical hydraulic conductivity averages approximately 27 feet per day.

2.5.6.2. Magothy aquifer

The Magothy aquifer, which underlies both Nassau and Suffolk Counties, ranges from zero to 1,100 feet in thickness. A sequence of sands is sandwiched within discontinuous layers of clay that act as localized aquitards. However, the Magothy often behaves as an unconfined aquifer in hydrologic connection with the Upper Glacial. Horizontal hydraulic conductivity in the Magothy aquifer averages 50 feet per day. The Magothy is recharged directly by downward flow from the Upper Glacial Aquifer. An average horizontal hydraulic conductivity of approximately 50 feet per day and a vertical hydraulic conductivity of about 1.4 feet per day were reported for the Magothy Aquifer (Weston 1994).

2.5.6.3. Lloyd aquifer

The Lloyd Aquifer is a deep sand and gravel aquifer separated from the overlying Magothy aquifer by an interval of clay called the Raritan clay. The aquifer, which lies immediately above solid bedrock, ranges from approximately zero to 550 feet in thickness. Horizontal hydraulic conductivity in the Lloyd Aquifer averages approximately 40 feet per day; horizontal hydraulic conductivity in the Raritan confining unit is approximately 0.01 feet per day. The Lloyd Aquifer is recharged by leakage across the confining unit beneath the north-central region of Long Island near the ground water divide.

2.5.7. Contaminated Media

As described in Sections 2.3 and 2.4, elevated concentrations of PCE and related degradation products have been detected in soil, ground water, and soil vapor at the Railroad and Hercules sites. Fuel oil related compounds have been detected at Railroad Cleaners.

PCE, TCE, DCE and VC are present in site ground water as deep as 75 feet below ground surface, the deepest extent of investigation to date. The long history of use of PCE at both sites, considered with the geological and hydrogeological environment of shallow ground water

and sandy, highly conductive aquifers, results in a likelihood of off-site contamination.

This investigation will seek to further define the extent of ground water contamination to depths of 150 feet below ground surface at both the Railroad and Hercules properties, and off-site in the direction of ground water flow. Soil vapor concentrations will be measured to confirm the existence of a potential exposure pathway to indoor air.

(This page intentionally left blank)

3. Remedial Investigation Work Plan

3.1. Field Activities Plan

The Field Activities Plan (FAP) for the Railroad Dry Cleaners and Hercules Machine Sales site is provided in Appendix A of this RI/FS Work Plan. The FAP includes the plan for the implementation of the RI/FS field investigation; the locations of proposed monitoring wells and samples; and detailed procedures for collecting environmental samples, including equipment and personnel requirements, drilling and well installation techniques, sampling techniques, and equipment decontamination procedures. Deviations from this FAP will require notification and prior approval by NYSDEC.

3.2. Site Specific Quality Assurance Project Plan

The site-specific Quality Assurance Project Plan (QAPP) for the Railroad Dry Cleaners and Hercules Machine Sales sites is provided in Appendix B of this RI/FS Work Plan. The QAPP provides quality assurance/quality control (QA/QC) criteria for work efforts associated with the sampling and analysis of environmental media as part of the site characterization. The site-specific QAPP provided in Appendix B presents the seven elements of site-specific information required by *DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2002).

O'Brien & Gere has prepared a comprehensive QAPP intended to be applicable to the sampling and analytical activities conducted pursuant to Superfund Standby Contract #D004090 (O'Brien & Gere, 2005). The Superfund Standby Contract QAPP provides supplemental and more detailed laboratory information, including corrective action tables for laboratory analyses associated with investigation activities. This Superfund Standby Contract QAPP was prepared utilizing the guidance and formats provided in the following documents:

- New York State Department of Environmental Conservation, *Draft DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2002).
- United States Environmental Protection Agency (USEPA), *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA,* Office of Emergency and Remedial Response, Washington, D.C. (USEPA, 1988).

- USEPA, *EPA Requirements For Quality Assurance Project Plans For Environmental Data Operations,* EPA QA/R-5 (USEPA, 2001).

The QAPP will assist in generating data of a known and acceptable level of precision and accuracy. The QAPP provides information regarding the project personnel responsibilities, and sets forth specific procedures to be used during sampling of relevant environmental matrices, other field activities, and the analyses of data. The procedures in the QAPP will be followed by personnel participating in the site characterization and in the laboratory analyses of environmental samples.

3.3. Site Specific Health and Safety Plan

The site-specific Health and Safety Plan (HASP) for the Railroad Dry Cleaners and Hercules Machine Sales sites is provided in Appendix C of this RI/FS Work Plan. The HASP has been developed to provide both general procedures and specific requirements to be followed by O'Brien & Gere personnel while performing RI activities at the Site.

The HASP describes the responsibilities, training requirements, protective equipment, and standard operating procedures to be used by O'Brien & Gere personnel to address potential health and safety hazards while in investigation areas. The plan specifies health and safety procedures and equipment to be used by O'Brien & Gere personnel during work activities and emergency response to minimize exposures of O'Brien & Gere personnel to hazardous materials.

3.4. Data management and validation

Analytical data from the laboratory will be received in hardcopy and electronic format. The electronic data will be entered into a project database for use in preparation of summary tables.

Analytical data will be validated as discussed in the QAPP. A Data Usability Summary Report (DUSR) will be prepared by a data validator and included as an appendix in the RI Report.

3.5. File review

NYSDEC provided several informational documents pertaining to the Railroad Cleaners and Hercules Machine Sales sites for review; these are listed in the reference section of this document.

It is the understanding of O'Brien & Gere that this constitutes all the information available from NYSDEC for these Sites. In addition to this

information, O'Brien & Gere will obtain and review the following information relating to the Sites:

- Available environmental records supplied by Environmental Data Resources, Inc., including Sanborn Maps.
- Property tax ownership maps and records.
- Available public databases of environmental information.
- Available published geologic and hydrogeologic reports for the area.
- Basic climate data for general area of the Site.
- Information related to the presence of underground utilities near the Site.
- Available county records and town records.
- Available aerial photographs.

The available environmental records available from Environmental Data Resources, Inc. (EDR) will conform to the government records search requirements of the ASTM Standard Practice for Environmental Site Assessments, E 1527-00. Applicable search distances will be those specified in the E 1527-00 standard, depending on the database the search distances range from the specific target property to a maximum distance of one mile.

A well survey will be conducted at the Railroad and Hercules sites. Potable water is provided to the sites by Suffolk County Water Authority. O'Brien & Gere will confirm the locations and relevant details of public water supply wells or other pumping wells that may influence ground water flow at the Sites.

3.6. Qualitative Human Health and Environmental Exposure Assessment

O'Brien & Gere will conduct a qualitative human health and environmental exposure assessment in accordance with the provisions of DER-10 Technical Guidance to characterize the exposure setting. Exposure assessment is an evaluation of the potential for a complete pathway to exist by which humans may be exposed to site contaminants. A complete pathway requires the following:

- Presence of a contaminant source in a medium (soil, air, or water);
- A receptor (a person);
- A pathway along which the contaminant can migrate to the receptor; and,
- A cause of contaminant migration and receptor exposure.

However, the presence of a complete pathway does not automatically mean that exposure will result in negative health consequence. If a complete pathway is identified, a qualitative evaluation of contaminant

fate and transport will be conducted to identify potential impacts, if warranted.

3.6.1. Contaminant summary

Exposure assessment requires an initial evaluation of contaminant concentrations to determine whether a complete pathway may exist.

Soil sampling at the Railroad Cleaners site has yielded PCE and degradation products at concentrations of up to 1,100 parts per million (ppm), and components of fuel oil from an UST that has been removed from the property. At the Hercules site, samples of soil contained PCE at concentrations up to 1,400 mg/kg, TCE at 36 mg/kg, and *cis*-1,2-DCE at 24 mg/kg. TAGM 4046 cleanup guidelines for those compounds are 1.4, 0.7, and 0.25 mg/kg respectively.

In ground water, PCE was found at a maximum concentration of 28,000 µg/L, TCE at 865 µg/L, *cis*-1,2-DCE at 3,000 µg/L, *trans*-1,2-DCE at 27 µg/L, and VC at 43 µg/L in ground water samples collected from two downgradient monitoring wells. The New York State Class GA ground water standard of 5 µg/L applies to these compounds.

The chemical properties of these compounds influence their behavior and potential migration pathways in the environment, therefore influencing potential pathways that may result in exposure.

3.6.2. Pathway assessment

The following potential exposure pathway scenarios will evaluated as part of the exposure assessment:

- Utility and construction workers may have direct contact with soil and groundwater during remediation activities and potential further site development. It is not anticipated that shoppers, trespassers, or neighbors would have direct contact with soil and ground water, and the ground water beneath the site is not used for drinking or other purposes.

- Personnel working in the businesses may have potential indoor air exposure. In general, elevated levels of VOCs have been detected in soil and ground water beneath the site. Results of soil vapor sampling indicate that indoor air levels associated with the detected concentrations in soil vapor could pose a health risk to occupants of the building.

4. Remedial Investigation Report

Upon completion of the tasks detailed in the FAP, a RI Report will be completed. This report will summarize the data collected during the RI, as well as relevant data prior to the RI for the site.

4.1. Summary of site history and conditions

Available field reports from various sources will be summarized and examined for completeness and accuracy.

4.2. Summary of field work

The various investigation activities conducted as part of this RI will be detailed, including soil, ground water, and soil vapor sampling; utility delineation, and surveying. Drilling logs for all wells installed and sampling logs for all samples collected will be provided to the NYSDEC.

4.3. Summary and presentation of analytical data

The report will include a summary of analytical data resulting from the remedial investigation and historical records search, including sample locations, analytical parameters and results. Data will be summarized by media type in text, tables, and graphical representations, if applicable.

Ground water elevation data and flow direction will be contoured for each measurement event. Data will be presented by medium and contaminant type, and the tabulated data will include a comparison to SCGs. Areas of the Site that exceed SCGs will be identified and mapped.

4.4. Evaluation of data collected

In consultation with the NYSDEC, the data collected during the investigation will be evaluated for completeness; areas requiring further sampling will be identified.

4.5. Comparison to State Standards, Criteria and Guidelines (SCGs)

Tables of sampling data will include New York State SCG values for comparison and those concentrations exceeding SCGs will be highlighted. The following SCGs have been identified for this Site:

- Technical and Operational Guidance Series (TOGS) Number 1.1.1 – *Ambient Water Quality Standards and Guidance Values and Ground water Effluent Limitations. New York State Department of Environmental Conservation* (June 1998, and as amended April 2000)
- Technical and Administrative Guidance Memorandum (TAGM) #4046: *Determination of Soil Cleanup Objectives and Cleanup Levels*. New York State Department of Environmental Conservation (1994)
- *Preliminary Remediation Goals*. U.S. Environmental Protection Agency (2003)
- *Tetrachloroethene (Perc) in Indoor and Outdoor Air*. New York State Department of Health (2003)

Tabulated data will be presented both with the overall analytical results, and separately with only those results that exceed applicable SCGs.

4.6. Qualitative Human and Environmental Exposure Assessment

A qualitative human health and environmental exposure assessment (HHEA) will be conducted in accordance with the provisions of DER-10 Technical Guidance (Appendix 3B). Site contaminants will be reviewed, and those selected for further evaluation are identified based upon consideration of the following factors:

- Concentrations of contaminants in environmental media both on-site and off-site;
- Field data quality, laboratory data quality and sampling design; and,
- Comparison of on-site and off-site contaminant concentrations in environmental media with typical background levels

Consideration of additional risk assessment activities to support development of remedial action objectives will also be reviewed with NYSDEC prior to the development of the FS.

4.7. Remedial goals

The RI Report will include a preliminary identification of remedial goals and objectives to be utilized as part of the feasibility study.

4.8. Project deliverables

The RI Report, including text, tables, and figures will be provided in both hard copy and appropriate electronic formats. For budgeting purposes, it is assumed that O'Brien & Gere will submit four copies of the draft RI report to NYSDEC for review and comment. Following receipt of one round of consolidated comments from NYSDEC and NYSDOH on the draft RI Report, O'Brien & Gere will finalize the Report and submit five copies. A copy of the final report will also be submitted as a single Portable Document Format (PDF) file. Electronic files will be submitted to NYSDEC on a compact disc.

4.9. Contract required reporting

Monthly reporting of project status will be provided to the NYSDEC project manager.

(This page intentionally left blank)

5. Feasibility study

The objective of the feasibility study (FS) is to develop and evaluate remedial alternatives for the site to present sufficient information for decision makers to compare alternatives and select a remedy.

The FS will be conducted in accordance with the provisions of:

- Comprehensive Environmental Response and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA)
- EPA *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA 1988)
- NYSDEC revised TAGM on *Selection of Remedial Actions at Inactive Hazardous Waste Sites* (NYSDEC 1990).

5.1. Development of alternatives

The first phase of the FS will be the development of a range of remedial alternatives that are reflective of appropriate waste management options that are protective of public health and the environment. The development of alternatives will encompass the following steps:

5.1.1. Development of remedial action objectives

Remedial action objectives will identify the contaminants and media of interest, pathways of exposure, and preliminary remediation goals. Remedial action objectives will be based on public health and environmental concerns identified in the RI and NYS Standards, Criteria, and Guidelines (SCGs) given conditions at the site. The identification of SCGs is an iterative process that continues throughout the RI/FS. SCGs will be identified and modified throughout the RI/FS as a better understanding of site conditions, contaminants and remedial action alternatives are gained.

SCGs are identified as chemical-specific, location-specific, or action-specific. Chemical-specific SCGs are usually health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in the establishment of numerical values. These values will establish the acceptable amount or concentration of a chemical that may be found in, or discharged to, the ambient environment. Location-specific SCGs set restrictions on activities based on the characteristics of the site or immediate environs. Action-specific SCGs set controls or

restrictions on particular types of actions related to management of hazardous substances, pollutants, or contaminants.

5.1.2. Development of general response actions

General response actions are medium-specific actions (*e.g.* containment, treatment) that satisfy the remedial action objectives.

5.1.3. Identification of volumes or areas of media

The volumes or areas of contaminated media will be identified based on the site conditions defined by the RI, the nature and extent of contamination, potential exposure routes, and the level of protectiveness specified by the remedial action objectives.

5.1.4. Identification and screening of remedial technologies and process options

Remedial technology types and process options that address the site-specific issues will be identified and screened based on technical implementability. Site contaminant information and physical characteristics will be used to evaluate the technical feasibility of identified process options. Infeasible process options will not be considered further.

5.1.5. Evaluation of process options

Each of the process options remaining after the initial screening will be evaluated in greater detail based on the following criteria:

- Effectiveness – the evaluation of effectiveness will address the potential effectiveness of process options in handling the estimated areas or volumes of contaminated media and meeting the pertinent remedial action objectives; the effectiveness of the process options in protecting human health and the environment during construction and implementation; and how proven and reliable the process options are relative to site conditions.
- Implementability – the evaluation of implementability will include the technical and administrative feasibility of implementing a process option under such institutional constraints as the availability of treatment, storage, and disposal services, special permitting requirements, and the need and availability of equipment and skilled workers.
- Cost – the capital and operation and maintenance costs of each process option will be evaluated relative to the other process options of each technology type.

Based on the evaluation of process options, representative process options will be selected to represent each technology type in the assembly of alternatives.

5.1.6. Assembly of remedial alternatives

In this phase, general response actions and process options selected to represent each technology type will be assembled into alternatives such that the site impacts are addressed. The assembled remedial alternatives will be assumed to be limited to up to four alternatives. The results of the development of alternatives will be documented in the FS Report.

5.2. Detailed analysis of alternatives

The objective of this task is to evaluate the remedial alternatives in detail to provide the basis for selection of a remedy. The detailed evaluation will include a technical and statutory assessment and a cost analysis, as presented below. Prior to the evaluation of alternatives, a detailed description of each alternative will be prepared, including refinements to the alternatives resulting from the acquisition of additional data.

The alternatives will be evaluated based on specific regulatory requirements, technical, cost, institutional considerations, and community and support agency acceptance. The detailed evaluation will consist of an assessment of each alternative against the evaluation criteria described below. The evaluation will also include a comparative analysis identifying the relative performance of each alternative against the criteria. The following criteria will be used to evaluate the alternatives in detail.

5.2.1. Overall protection of human health and the environment

The analysis of each alternative with respect to overall protection of human health and the environment will provide an evaluation of whether each alternative achieves and maintains adequate protection of human health and the environment and a description of how site risks are eliminated, reduced, or controlled through treatment, engineering, or institutional controls.

5.2.2. Compliance with SCGs

Each alternative will be evaluated as to whether it will attain federal, state, and local SCGs.

5.2.3. Long-term effectiveness and permanence

The evaluation of long-term effectiveness and permanence will address the magnitude of residual risk remaining at the Site after alternative implementation from untreated material or treatment residuals and the adequacy and reliability of controls used to manage untreated materials or treatment residuals. The magnitude of residual risks remaining after the implementation of a remedial alternative will be assessed in terms of

the amounts and concentrations of the remaining hazardous materials, considering the persistence, toxicity and mobility of the hazardous substances. Long-term management controls include engineering controls, (*e.g.*, containment technologies), institutional controls, monitoring, operation and maintenance. The potential need for replacement of the remedy will also be evaluated.

5.2.4. Reduction of toxicity, mobility or volume

The degree to which the alternatives employ treatment that reduces toxicity, mobility, or volume of the hazardous materials will be evaluated. The factors that will be considered include:

- The treatment technologies utilized and the materials they would treat
- The amount of hazardous materials that would be destroyed or treated
- The expected degree of reduction in toxicity, mobility, or volume of the hazardous materials
- The degree to which treatment is irreversible
- The type and quantity of residuals that would remain following treatment of hazardous materials. This will include consideration of the persistence, toxicity, and mobility of the residuals.

5.2.5. Short-term effectiveness

The short-term effectiveness of each alternative will be evaluated with respect to the protection of workers and the community during construction and implementation of the alternative, environmental effects resulting from implementation of the alternative, and the time required to achieve remedial action objectives.

5.2.6. Implementability

The ease or difficulty of implementing each alternative will be evaluated. The following factors will be considered:

- The degree of difficulty in constructing the technologies associated with the alternative
- The expected reliability of the technologies associated with the alternative
- The need to coordinate with or obtain permits and approvals from government agencies in order to implement the alternative
- The availability of necessary equipment and specialists
- The available capacity and location of treatment, storage, and disposal services necessary for implementation

- The availability of prospective technologies that are under consideration
- The ability to monitor the effectiveness of the remedy
- The ease of undertaking additional remedial actions, if required.

5.2.7. Cost

The costs that will be evaluated include:

- Capital costs
- Operation and maintenance costs
- Present worth of capital costs and operation and maintenance costs

(This page intentionally left blank)

6. Project schedule

The RI/FS schedule is presented as Table 6-1.

(This page intentionally left blank)

References

CA Rich Consultants, Inc. 2003. *Remedial Investigation / Feasibility Study Work Plan Hercules Dry Cleaning Equipment, Inc. & David Goldman 3188 Lawson Boulevard Oceanside, N.Y.* 11572, Forest Hills, New York.

CA Rich Consultants, Inc. 2004. *Monthly Progress Report - January 2004 Hercules Dry Cleaning Equipment, Inc. & David Goldman 3188 Lawson Boulevard Oceanside Site #1-30-083*, Forest Hills, New York.

EEA, Inc. 2003. *Remedial Investigation Feasibility Study (RI/FS) Luson Cleaners, Inc. d/b/a Railroad Cleaners Oceanside New York NYSDC Site No. 1-30-066,* Garden City, New York.

EEA, Inc. 2004. *Addendum to the Preliminary Summary Report Railroad Cleaners Oceanside New York NYSDC Site No. 1-30-066,* Garden City, New York.

Nassau County Department of Health, 1997. Continuation Sheet describing the Railroad Dry Cleaners site inspection of 12/5/97.

National Climatic Data Center (NCDC), 2002. *CLIMATOGRAPHY OF THE UNITED STATES NO. 85 Divisional Normals and Standard Deviations of Temperature, Precipitation, and Heating and Cooling Degree Days 1971 – 2000 (and previous normals periods).*

New York State Department of Environmental Conservation, 2002. *Draft DER-10 Technical Guidance for Site Investigation and Remediation.*

New York State Department of Environmental Conservation, 2003. *Fact Sheet Remedial Investigation to begin at Railroad Dry Cleaners Site, 3180 Lawson Boulevard Hamlet of Oceanside, Town of Hempstead, Nassau County, New York Site No. 1-30-066.*

New York State Department of Environmental Conservation, 2003a. *Fact Sheet Remedial Investigation to begin at Hercules Machine Sales Site, 3188 Lawson Boulevard Hamlet of Oceanside, Town of Hempstead, Nassau County, New York Site No. 1-30-083.*

New York State Department of Environmental Conservation, 1990. *Technical and Administrative Guidance #4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites.*

New York State Department of Health (NYSDOH), 2003. *Fact Sheet: Tetrachloroethene (PERC) in Indoor and Outdoor Air,* Flanigan Square, 547 River Street, Troy, New York 12180-2216.

O'Brien & Gere, 2005. Oceanside Sites Field Activities Plan, Albany, New York.

O'Brien & Gere, 2005. Oceanside Sites Site-specific Quality Assurance Plan, Albany, New York.

O'Brien & Gere, 2005. Oceanside Sites Site-specific Health and Safety Plan, Albany, New York.

O'Brien & Gere Engineers, Inc. 2005. *Superfund Standby Contract Quality Assurance Project Plan (QAPP),* Syracuse, New York.

Richard D. Galli, P.E., P.C. 1989a. *Soils & Groundwater Investigation Railroad Dry Cleaners 3180 Lawson Blvd. Oceanside, NY 11752*, Greenlawn, New York.

Richard D. Galli, P.E., P.C. 1989b. *Remedial Investigation Work Plan Addendum Phase II Submitted for: Railroad Dry Cleaners 3180 Lawson Blvd. Oceanside, NY 11752*, Greenlawn, New York.

Richard D. Galli, P.E., P.C. 1990. *Remedial Investigation Work Plan Phase II Submitted for: Railroad Dry Cleaners 3180 Lawson Blvd. Oceanside, NY 11752*, Greenlawn, New York.

Roy F. Weston, Inc., 1994. *Final Remedial Investigation Report for the Liberty Industrial Finishing Site, Farmingdale, New York.* January 1994.

United States Environmental Protection Agency, 1975. *Nassau-Suffolk Aquifer System, Support Document for Sole Source Aquifer Designation.*

United States Environmental Protection Agency (USEPA). 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA,* Office of Emergency and Remedial Response, Washington, D.C.

United States Environmental Protection Agency, 2001. *EPA Requirements For Quality Assurance Project Plans For Environmental Data Operations,* EPA QA/R-5.

United States Environmental Protection Agency, 2001b. *Risk Assessment Guidance for Superfund: Volume 1 – Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments).*

United States Environmental Protection Agency, 2002. *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Ground water and Soils (Soil Vapor Intrusion Guidance)*, (EPA 530-F-02-052).

United States Geological Survey, 2002. *Water-Table and Potentiometric-Surface Altitudes of the Upper Glacial, Magothy, and Lloyd Aquifers on Long Island, New York, in March-April 2000, with a Summary of Hydrogeologic Conditions.* Water-Resources Investigations Report 01-4165.

Tables

Table 3-1
Climatic Data for Long Island

Temperature

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1931-2000	*Average*	31.0	32.0	39.4	49.2	59.5	68.7	74.2	72.9	66.0	55.6	45.4	35.2	52.4
	Standard Dev.	4.4	4.0	3.0	2.3	2.3	1.7	1.7	1.7	1.9	2.5	2.5	3.7	1.1
1931-1960	*Average*	31.6	31.6	38.5	48.8	59.3	68.5	73.9	72.5	65.8	55.9	45.0	34.6	52.2
	Standard Dev.	4.6	4.3	3.5	2.6	2.0	1.8	1.6	1.9	1.8	2.4	2.5	3.7	1.2
1941-1970	*Average*	30.7	31.6	38.9	49.3	59.3	68.8	74.0	72.6	66.1	56.4	45.4	34.2	52.3
	Standard Dev.	3.9	3.3	3.1	2.5	2.6	1.7	1.7	1.7	2.1	2.2	2.2	3.5	1.0
1951-1980	*Average*	30.5	31.7	39.4	49.6	59.5	68.7	74.2	73.2	66.2	55.8	45.5	35.1	52.5
	Standard Dev.	3.7	3.8	2.5	2.2	2.5	1.7	1.6	1.6	2.1	2.4	2.4	3.6	0.9
1961-1990	*Average*	29.9	31.6	39.9	49.3	59.5	68.8	74.2	73.2	66.0	55.4	45.7	35.2	52.4
	Standard Dev.	4.1	3.5	2.4	2.1	2.5	1.5	1.3	1.5	2.1	2.7	2.4	3.7	0.8
1971-2000	*Average*	31.1	32.8	40.4	49.7	59.9	68.9	74.5	73.3	66.0	55.2	45.8	36.4	52.8
	Standard Dev.	4.4	4.0	2.5	1.9	2.2	1.7	1.8	1.5	1.6	2.6	2.4	3.9	1.1

Precipitation

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1931-2000	*Average*	3.72	3.20	4.26	3.94	3.84	3.47	3.78	4.24	3.85	3.41	4.04	3.83	45.58
	Standard Dev.	1.85	1.16	1.64	1.79	1.91	1.72	1.79	2.27	2.24	1.82	2.02	1.82	6.74
1931-1960	*Average*	3.67	3.12	4.38	3.75	3.66	3.37	3.72	4.67	3.88	3.46	4.00	3.66	45.34
	Standard Dev.	1.47	1.10	1.55	1.41	1.66	1.42	1.69	2.50	2.77	1.83	1.95	1.61	5.00
1941-1970	*Average*	3.18	3.24	4.20	3.66	3.57	3.01	3.80	4.35	3.27	3.14	4.27	3.96	43.65
	Standard Dev.	1.41	1.05	1.63	1.55	1.67	1.32	1.86	2.48	2.06	1.89	1.87	1.54	5.99
1951-1980	*Average*	3.51	3.41	4.41	3.96	3.66	3.15	3.63	4.37	3.73	3.53	4.13	4.10	45.59
	Standard Dev.	2.19	1.23	1.68	1.64	1.61	1.72	1.90	2.55	2.12	1.80	2.04	1.87	6.90
1961-1990	*Average*	3.59	3.38	4.02	4.19	4.12	3.70	3.89	3.87	3.66	3.44	4.25	3.94	46.05
	Standard Dev.	2.22	1.28	1.79	2.16	2.30	2.02	1.90	2.11	1.81	1.73	2.27	2.08	8.65
1971-2000	*Average*	4.17	3.18	4.30	4.23	4.25	3.76	3.94	4.12	3.99	3.69	4.09	3.94	47.66
	Standard Dev.	2.21	1.28	1.79	2.15	2.17	2.09	1.83	2.17	1.78	1.94	2.19	2.06	7.42

CLIMATOGRAPHY OF THE UNITED STATES NO. 85
Divisional Normals and Standard Deviations
Deviations of Temperature Precipitation, and Heating and Cooling Degree Days 1971-2000 (and previous normals periods)

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION; NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE
NATIONAL CLIMATIC DATA CENTER; ASHEVILLE, NC

Data for NY-04 Coastal (Long Island)

TABLE 6-1
Schedule
RI/FS Railroad Cleaners and Hercules Machine Sales Sites

ID	Task Name	Start	Finish
1	Issuance of Work Assignment to Consultant	9/7/05	9/7/05
2	Acknowledge Receipt of WA	9/12/05	9/12/05
3	Site Visit	9/14/05	9/14/05
4	Scoping Session	9/21/05	9/21/05
5	Submit Task 1, Phase A Deliverable Project Scoping Plan (PSP)	11/10/05	11/10/05
6	DEC comments on Project Scoping Plan	11/23/05	11/23/05
7	Submit Draft RI/FS Work Plan	2/10/06	2/10/06
8	DEC comments on Draft RI/FS Work Plan	4/7/06	4/7/06
9	Submit Final RI/FS Work Plan	4/20/06	4/20/06
10	Final RI/FS Work Plan Approved Notice to Proceed (NTP)	5/18/06	5/18/06
11	Initiation of Field Work	5/22/06	11/23/06
12	Hydraulic Monitoring	5/22/06	6/1/06
13	Data Reduction	6/2/06	6/8/06
14	On-site Well Installation	6/9/06	6/29/06
15	On-site Well Development	6/30/06	7/6/06
16	Stabilization	7/7/06	7/20/06
17	On-site Well Sampling	7/21/06	8/3/06
18	Sample Turnaround Time	8/4/06	8/31/06
19	Off-site Well Installation	9/1/06	10/5/06
20	Off-site Well Development	10/6/06	10/19/06
21	Stabilization	10/20/06	11/2/06
22	Off-site Well Sampling	11/3/06	11/23/06
23	Prepare Data Validation/Usability Report	11/24/06	2/8/07
24	Laboratory TAT	11/24/06	12/21/06
25	Review	12/22/06	12/28/06
26	Data Validation	12/29/06	2/1/07
27	Review	2/2/07	2/8/07
28	Second Sampling Round	1/29/07	2/6/07
29	Submit Draft RI Report	5/30/07	5/30/07
30	DEC comments on Draft RI Report	6/14/07	6/14/07
31	Submit Final RI Report	7/6/07	7/6/07
32	Submit Draft FS Report	8/6/07	8/6/07
33	DEC comments on Draft FS Report	8/21/07	8/21/07
34	Submit Final FS Report	9/19/07	9/19/07
35	Public Information Meeting - Present the PRAP	11/15/07	11/15/07

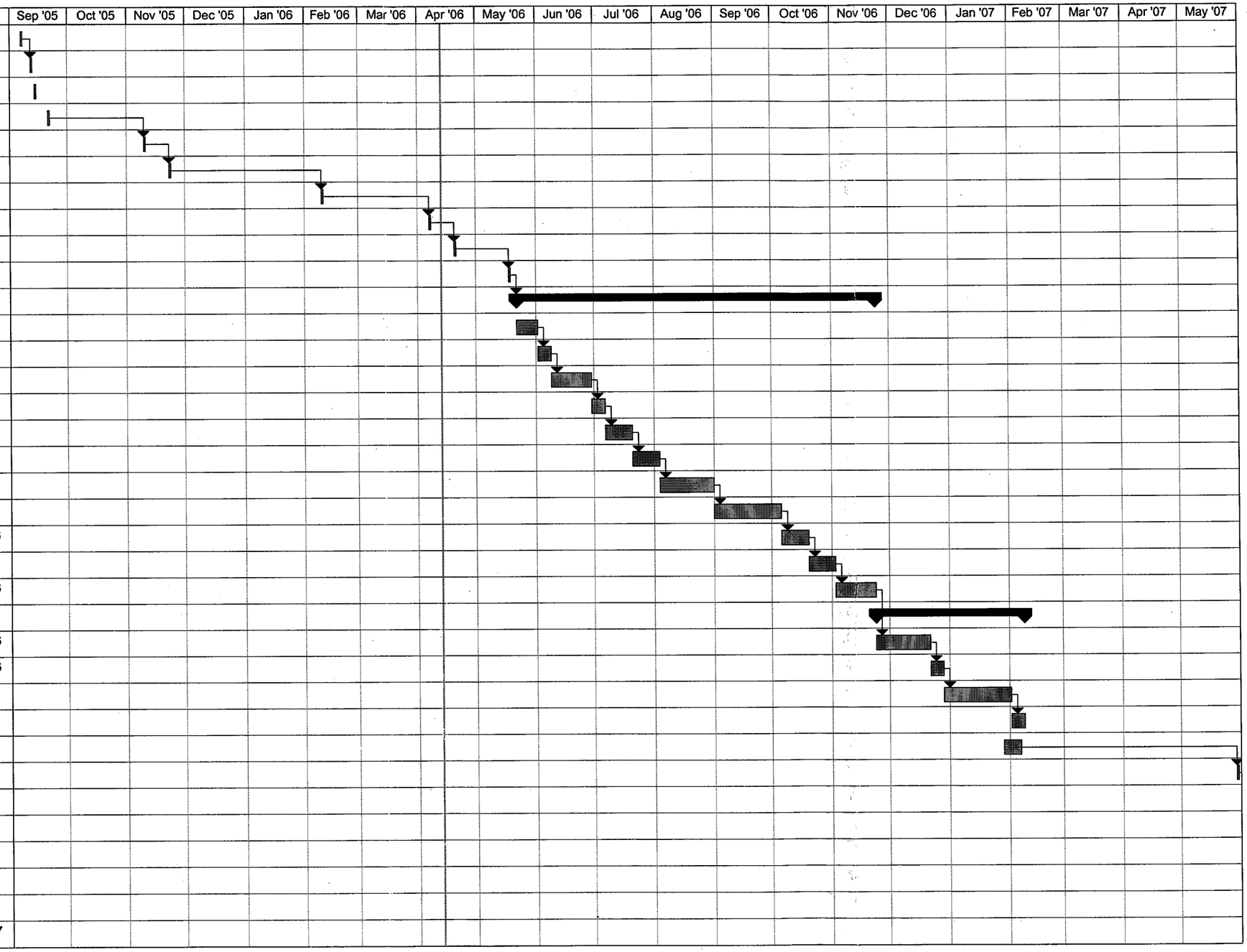
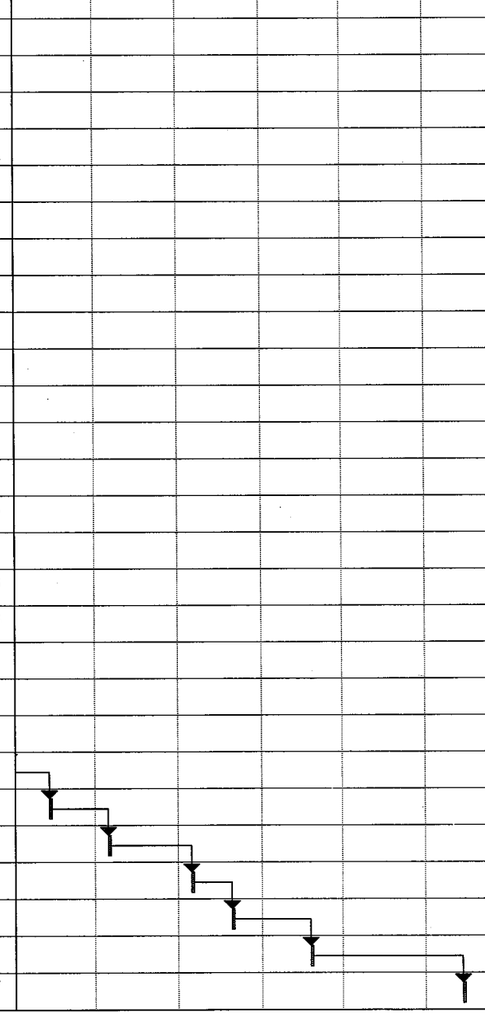
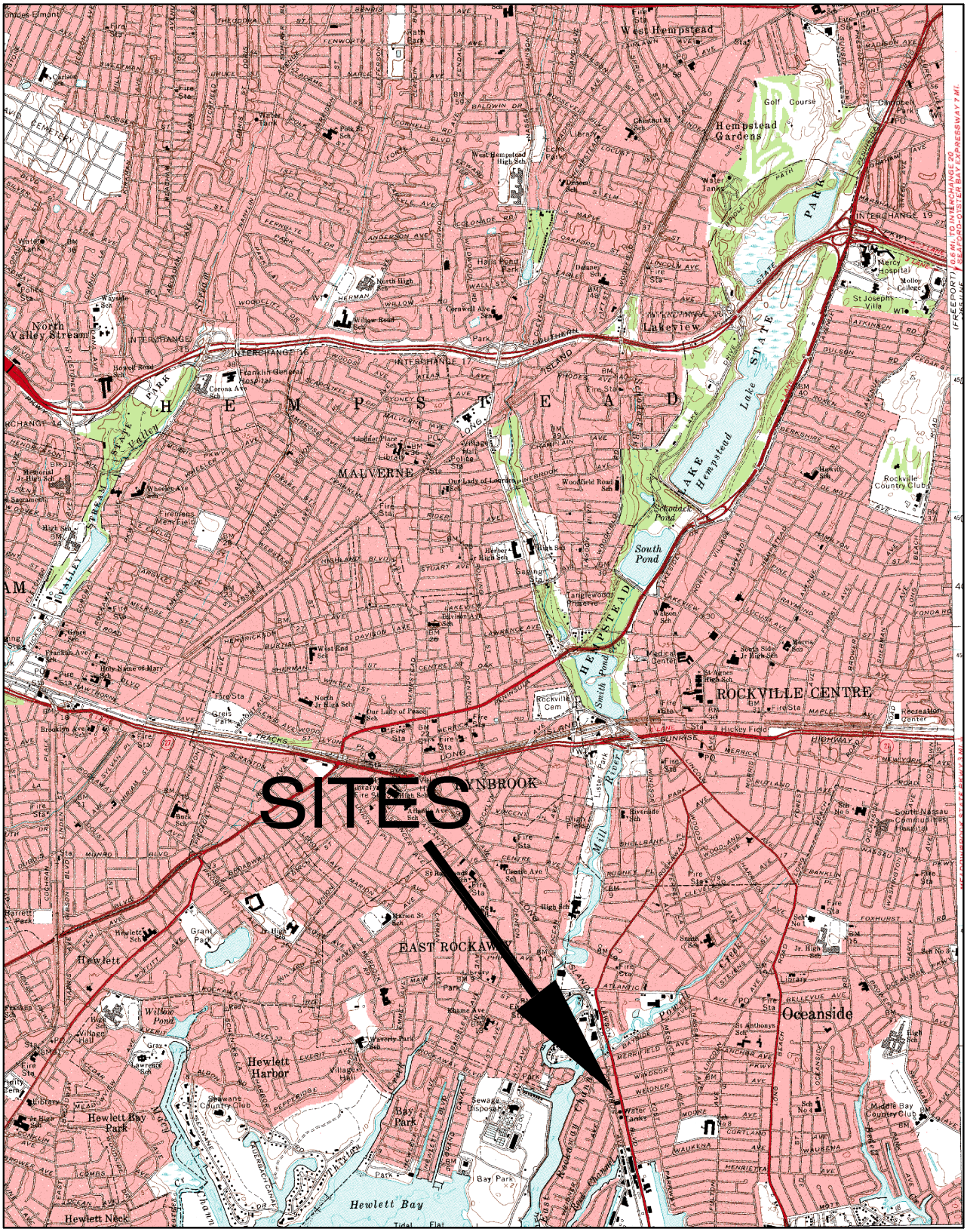


TABLE 6-1
Schedule
RI/FS Railroad Cleaners and Hercules Machine Sales Sites

ID	Task Name	Start	Finish
1	Issuance of Work Assignment to Consultant	9/7/05	9/7/05
2	Acknowledge Receipt of WA	9/12/05	9/12/05
3	Site Visit	9/14/05	9/14/05
4	Scoping Session	9/21/05	9/21/05
5	Submit Task 1, Phase A Deliverable Project Scoping Plan (PSP)	11/10/05	11/10/05
6	DEC comments on Project Scoping Plan	11/23/05	11/23/05
7	Submit Draft RI/FS Work Plan	2/10/06	2/10/06
8	DEC comments on Draft RI/FS Work Plan	4/7/06	4/7/06
9	Submit Final RI/FS Work Plan	4/20/06	4/20/06
10	Final RI/FS Work Plan Approved Notice to Proceed (NTP)	5/18/06	5/18/06
11	Initiation of Field Work	5/22/06	11/23/06
12	Hydraulic Monitoring	5/22/06	6/1/06
13	Data Reduction	6/2/06	6/8/06
14	On-site Well Installation	6/9/06	6/29/06
15	On-site Well Development	6/30/06	7/6/06
16	Stabilization	7/7/06	7/20/06
17	On-site Well Sampling	7/21/06	8/3/06
18	Sample Turnaround Time	8/4/06	8/31/06
19	Off-site Well Installation	9/1/06	10/5/06
20	Off-site Well Development	10/6/06	10/19/06
21	Stabilization	10/20/06	11/2/06
22	Off-site Well Sampling	11/3/06	11/23/06
23	Prepare Data Validation/Usability Report	11/24/06	2/8/07
24	Laboratory TAT	11/24/06	12/21/06
25	Review	12/22/06	12/28/06
26	Data Validation	12/29/06	2/1/07
27	Review	2/2/07	2/8/07
28	Second Sampling Round	1/29/07	2/6/07
29	Submit Draft RI Report	5/30/07	5/30/07
30	DEC comments on Draft RI Report	6/14/07	6/14/07
31	Submit Final RI Report	7/6/07	7/6/07
32	Submit Draft FS Report	8/6/07	8/6/07
33	DEC comments on Draft FS Report	8/21/07	8/21/07
34	Submit Final FS Report	9/19/07	9/19/07
35	Public Information Meeting - Present the PRAP	11/15/07	11/15/07



Figures



O'BRIEN & GERE ENGINEERS INC.

FIGURE 1-1
Site Location Map
Railroad Dry Cleaners and
Hercules Machine Sales
Oceanside, New York

FILE NO.	10653/37556
DATE	January 2006
DWG NO.	Rev. 1

FIGURE 2–1

LEGEND

MW-1 — Existing Monitoring Well

PMW-1 — Proposed Monitoring Well

SS (Subslab)
IA (Indoor air)
AA (Ambient air)

NYSDEC
DER
Work Assignment
#D004090–36
1–30–066 / 1–30–083

Railroad Dry Cleaners
Hercules Machine Sales
Remedial Investigation
Feasibility Study

SITE VICINITY MAP
with
Existing & Proposed
Monitoring Well
Locations

Job No. 37556
4/2006

O'BRIEN & GERE
ENGINEERS, INC.

Appendices

Appendix A

Field Activities Plan

Field Activities Plan

Remedial Investigation/Feasibility Studies (RI/FSs)
Railroad Dry Cleaners
(Site No. 1-30-066)
and
Hercules Machine Sales
(Site No. 1-30-083)
Oceanside, New York

New York State Department of Environmental Conservation

April 2006

O'BRIEN & GERE

10653/37556

Field Activities Plan

Remedial Investigation/Feasibility Studies (RI/FSs)
Railroad Dry Cleaners (Site No. 1-30-066)
and
Hercules Machine Sales (Site No. 1-30-083)
Oceanside, New York

New York State Department of
Environmental Conservation
Albany, New York

April 2006

O'BRIEN & GERE
ENGINEERS, INC.

435 New Karner Road
Albany, New York 12205

Contents

List of Figures

List of Attachments

1. Introduction

1.1. General plan

This Field Activities Plan (FAP) for the Railroad Dry Cleaners and Hercules Machine Sales sites (Figure 1-1) presents the procedures for implementing the field activities associated with the Remedial Investigation (RI), described in the RI/FS (Remedial Investigation / Feasibility Study) Work Plan (O'Brien & Gere, 2006).

The FAP describes the location and number of environmental samples to be collected as part of the investigation; and provides detailed procedures for collecting the samples, as well as equipment and personnel requirements, drilling and well installation, sampling techniques, and equipment decontamination procedures. Deviations from this FAP will require notification and prior approval of NYSDEC.

This FAP is provided as Appendix A to the RI/FS Work Plan (O'Brien & Gere, 2006). The other support documents that have been developed for use in conjunction with the RI/FS Work Plan include a Minority Business Enterprise / Woman-owned Business Enterprise (MBE/WBE) Utilization Plan (O'Brien & Gere, 2006a), a Quality Assurance Project Plan (QAPP) (O'Brien & Gere, 2006b), and a Health and Safety Plan (HASP) (O'Brien & Gere, 2006c). The MBE/WBE Utilization Plan was submitted to the NYSDEC as a letter under separate cover. O'Brien & Gere has prepared a comprehensive QAPP intended to be applicable to the sampling and analytical activities conducted pursuant to Superfund Standby Contract #D004090. The site-specific QAPP developed for this RI/FS addresses quality assurance/quality control (QA/QC) issues associated with this specific project, and is provided as Appendix B of the RI/FS Work Plan. Health and safety issues associated with this project are addressed in the site-specific HASP developed for this program, and the HASP is provided as Appendix C of the RI/FS Work Plan.

(This page deliberately left blank)

2. Remedial investigation field activities

This section describes the field activities to be completed as part of the RI. The characterization of on-site and off-site ground water quality is central to the goals of the RI. The direction of ground water movement will be evaluated by a hydraulic monitoring program to be conducted before well installation. Monitoring wells will be installed to evaluate the horizontal and vertical ground water gradients, and the distribution of contaminants. One or more monitoring wells will be placed within the source area, likely located at one or both of the Sites, to assess the decay of the source.

2.1. Hydraulic monitoring program

Prior to the installation of additional monitoring wells at the Site, hydraulic monitoring will be performed for a two-week period in the three existing wells at the Railroad Cleaners site (MW-1, MW-2 and MW-3) and the two off-site wells (MW-4 and MW-5) using pressure transducers and associated data loggers. The existing wells are shown on Figure 2-1. The results of the hydraulic monitoring program will be used to evaluate ground water flow directions at the Site and to monitor for tidal influences that may affect the selection of the final well locations.

The hydraulic monitoring program will be performed using pressure transducers equipped with integral data loggers with an appropriate pressure range for site conditions. Each of the data loggers is capable of collecting and storing up to 220,000 data points from each of two channels for subsequent transfer to a portable computer. Water level elevation measurements will be obtained using a 15-minute recording interval. The reported accuracy is within 0.05% of full scale at 15°C and within 0.1% of full scale over the entire range.

The data loggers will be installed as a dedicated installation, whereby the components of the data logger are installed within the borehole and the extra extension cable, if any, will be coiled within the protective casing. Since the equipment is contained within the well, the caps and protective casings could be locked during the monitoring period.

At the beginning of the hydraulic monitoring program, water level measurements will be obtained from each of the wells being monitored. At the end of the monitoring period, the water level elevation data will be transferred from the data logger to a portable computer for processing. In addition, the water levels obtained manually will be converted to water

level elevations with respect to mean sea level using the surveyed elevations of the measuring points.

Climatic data (*i.e.*, precipitation, temperature and barometric pressure) will be obtained from the Oceanside weather monitoring station through a web-based data retrieval system of the National Climatic Data Center, part of the National Oceanic & Atmospheric Administration (NOAA). These data will be obtained in order to evaluate water level fluctuations potentially related to recharge. NOAA also supplies tidal data gathered from four stations around Long Island.

2.2. On-site ground water monitoring well installation and development

The Work Assignment #D004090-36 for a RI/FS for the Railroad Dry Cleaners and Hercules Machine Sales sites (NYSDEC, 2005) proposed a two-phase investigative effort consisting of ground water screening followed by the installation of permanent monitoring wells.

An alternative approach was discussed during the scoping session on September 21, 2005. This approach would utilize multilevel monitoring wells to be installed in one drilling mobilization. A multiple level monitoring system allows the assessment of several depth-discrete zones within a single boring and results in a reduced quantity of investigative-derived waste.

2.2.1. Locations

For budgeting purposes, it is assumed that two multilevel ground water monitoring wells will be installed at the Hercules Machine Sales site and three multilevel ground water monitoring wells will be installed at the Railroad Dry Cleaners site. The five multilevel wells (identified as PMW-6 through PMW-10) will be installed to a maximum depth of 150 feet below ground surface, and will be screened at approximately 20-foot intervals. Proposed monitoring well locations are illustrated on Figure 2-2.

2.2.2. Monitoring well installation procedures

Supervision of the drilling and monitoring well installation activities will be provided by a qualified geologist and/or hydrogeologist who will be in attendance during the drilling and well installation activities to:

- Perform air monitoring
- Inspect split-barrel samples
- Prepare geologic field logs based on soil observations

- Properly label, package and handle soil samples
- Supervise monitoring well installation
- Complete daily drilling records.

Soil borings will be advanced through the unconsolidated deposits 150 feet utilizing 4¼-inch inside diameter (ID) hollow-stem auger drilling techniques.

At two locations, continuous split spoon sampling according to ASTM Method D-1586 will be conducted starting at the water table and continuing until the target depth of 150 feet is achieved. Soil samples from the borings will also be screened for the presence of VOCs using a portable photoionization detector (PID). The PID screening will be conducted by placing a representative portion of the sample in a glass jar, covering the jar with aluminum foil, capping the jar, and allowing the sample to equilibrate for a minimum of 15 minutes. After the equilibration time, the jar will be uncapped and the aluminum foil will be pierced. The headspace within the jar will then be screened using the PID. The PID screening information will be recorded on the Soil Boring Log.

Each soil sample will be classified in the field by a supervising geologist using the New York State Department of Transportation Soil Description Procedure. In addition to logging the geologic descriptions, observations including soil sample color, moisture content, density, grain-size distribution, and recovery will be recorded on test boring logs. An example of the Soil Boring Log to be used on this project is provided in Attachment A.

Prior to the installation of each multilevel monitoring well, the driller will verify the total depth of the borehole by sounding the bottom with a weighted tape. Once the total depth is verified as correct, the multilevel monitoring well will be constructed. Each multilevel monitoring well will consist of a 150-foot central riser constructed of 1.5-inch diameter Schedule 40 flush joint PVC riser pipe equipped with a PVC well screen. The central riser will be surrounded with six, 0.5-inch diameter Schedule 40 flush joint PVC riser pipes equipped with PVC well screens spaced at approximately 20-foot intervals. The length of the screened intervals will be determined based on geologic logging.

The installation of multilevel wells utilizing hollow-stem augers allows for the collapse of the natural formation around the well as the augers are withdrawn, thus providing minimal disturbance to the native strata. Each multilevel well will be finished at grade with a 12-inch diameter bolt down manhole in a concrete pad. In addition, a designated measuring point will be notched in to the top of each PVC riser pipe or steel casing to provide a permanent reference point for subsequent total depth and depth to water measurements. The total depth of each well will be

recorded on the well casing and on the well cap. The well construction is illustrated in Attachment B.

Decontamination of drilling equipment will be completed between each drilling location. Investigation derived waste (IDW) generated during field activities will be containerized for proper characterization and disposal pending receipt of analytical results.

2.2.3. Well development procedures

Following the completion of the multilevel monitoring well installation program, each monitoring well will be developed prior to ground water sampling.

Each newly constructed monitoring well will be developed to:

- Remove fine-grained materials from the sand pack and formation
- Reduce the turbidity of ground water samples
- Increase the yield of the well to reduce the potential of the well yielding an insufficient volume of water during ground water sampling

Requirements for developing the multilevel wells vary depending on the type of installation. If no foreign water is introduced to the aquifer during installation, well development can be limited to thorough purging to remove fines from the borehole wall and enhance the hydraulic connection with the formation. The wells installed during this RI will be developed using one of the following procedures:

- Bailing
- Inertial pumping (*i.e.*, WaTerra pump); and/or
- Centrifugal pumping in conjunction with manual inertial pumping.

The well development equipment (*e.g.*, bailers, tubing) will be new, pre-cleaned and/or dedicated to each monitoring well. Care will be taken not to introduce contaminants on the equipment during installation.

Well development will proceed by repeated removal of ground water from the well. The goals for development will be to obtain ground water in which the pH, temperature and specific conductivity have stabilized and exhibits a turbidity of less than or equal to 50 Nephelometric Turbidity Units (NTUs). However, a minimum of five well volumes will be removed regardless of whether these goals have been achieved earlier during development. If the goals discussed above can not be obtained, well development will continue until an amount of ground water

equivalent to ten well volumes has been removed. An example of the Well Development Log to be used on this project is provided in Attachment C.

2.2.4. Decontamination procedures

The drilling program will also include decontamination procedures such that potential contaminants are not introduced into the borehole or transferred across the Site. A temporary decontamination pad will be constructed at the Site. Prior to drilling the first boring, the equipment used in drilling and well installation will be cleaned to remove possible contaminants, which may have been encountered during mobilization of drilling equipment to the Site. Equipment which will come into contact with the soil, as well as drill tools, augers, drill rod, hoses and the back of the drill rig will undergo the initial cleaning process. While working at the Site, the drilling equipment that comes into contact with the soil will be decontaminated between monitoring well locations to prevent cross-contamination. Drilling equipment will again undergo the cleaning process prior to leaving the Site at the conclusion of drilling activities.

The well construction materials will be transported to the Site factory sealed in plastic. In the event the well construction materials are not sealed, then they will be decontaminated and sealed in plastic before beginning drilling at the first location.

The cleaning process will involve the use of a high-pressure steam cleaner. Potable water will be used for all decontamination and drilling procedures. Decontamination water will be collected and stored for subsequent characterization and off-site disposal in accordance with Section 3.0.

2.3. Off-site ground water monitoring well installation and development

Prior to the implementation of the off-site monitoring well installation and development, one round of ground water sampling will be conducted. Ground water sampling procedures are the same as those described in Section 2.5.

Based on the results of the ground water sampling of the three existing on-site wells, the two existing off-site wells, and the five newly-installed on-site wells, an off-site ground water investigation may be conducted to evaluate the extent of off-site contamination. Off-site migration of contaminants is likely, based on historical RI information and site characteristics. Final off-site monitoring well locations will be approved by the NYSDEC.

2.3.1. Locations

For budgeting purposes, it is assumed that ten multilevel ground water monitoring wells (identified as PMW-11 through PMW-20) will be installed to a maximum depth of 150 feet below ground surface.

One or more of the off-site monitoring wells will be installed along the approximate center flow line of the contamination plume, as evaluated by the hydraulic monitoring conducted prior to the drilling program. If the ground water analysis obtained from the two off-site monitoring wells indicates that the contaminant plume has migrated to those locations, at least one multilevel monitoring well will be installed further downgradient and along the projected center flow line to detect downgradient migration of the plume. Additional multilevel monitoring wells will be installed on either side of the approximate center flow line to assess the width of the plume, to evaluate fluctuations in ground water flow direction, and to detect the plume expansion. The proposed off-site multilevel monitoring well locations are shown on Figure 2-1. Final well locations will be determined in conjunction with the department.

The configuration of the proposed wells shown in Figure 2-1 assumes that the two existing off-site wells (MW-4 and MW-5) are located on the centerline of the plume, if any. The proposed wells are spaced on transects located at approximately 200-foot intervals along the assumed central flow line, and are located either 100 feet to each side of the central flow line. If hydraulic monitoring indicates that the direction of ground water flow differs from this west-northwest orientation, the locations of the proposed monitoring wells will be adjusted to conform to the direction of flow as evaluated by the hydraulic monitoring.

2.3.2. Well installation procedures

At three of the locations, continuous split spoon sampling according to ASTM Method D-1586 will be conducted starting at the water table and continuing until the target depth of 150 feet is achieved. Well installation procedures are described in Section 2.2.2.

2.3.3. Well development procedures

Well development procedures are described in Section 2.2.3.

2.4. Water level measurements

A round of water level measurements will be obtained from the new and existing monitoring wells prior to each ground water sampling event. Water level measurements will be obtained with an electronic water level indicator. The electronic water level measurement method involves lowering a probe into a well, which upon contact with the water completes an electric circuit. When the circuit is closed, the water level indicator provides an audible and/or visual alarm, which indicates that

the water has been contacted. The cable of the probe(s) utilized will be graduated in 0.01 feet increments.

Water level measurements will be obtained in accordance with the procedures below. Nitrile gloves will be worn during water level measurement activities.

1. Unlock the well cover and carefully remove to avoid having foreign material enter the well. The riser pipe will be monitored with a PID for the presence of VOCs, as required by the HASP.

2. Clean the water level probe and lower portion of cable, and the test water level meter to ensure that the batteries are charged.

3. Lower the probe slowly into the monitoring well until the audible and/or visual alarm indicates the top of the water column.

4. Read the depth, to the nearest 0.01 feet, from the graduated cable using the notched measuring point on the monitoring well's riser pipe. Record the depth to water in the field notebook. If the well is dry or frozen, record that condition in the field notebook.

5. Remove the probe from the monitoring well slowly. Clean the probe and lower portion of cable using clean paper towels saturated with distilled or deionized water.

6. Replace the monitoring well's cap and lock the protective casing's cap in place.

2.5. Ground water sampling

2.5.1. Locations

The first round of ground water sampling will include the five existing wells and the five new wells to be installed at the Railroad and Hercules properties. The ten new off-site wells will be sampled in the second round. Assuming that up to seven zones are screened in the multilevel monitoring wells, this results in a potential total of one hundred ten samples. Based on the results of these first two ground water sampling events, it is anticipated that fewer samples will be collected in one subsequent round (*i.e.*, round three); for budgeting purposes it is assumed that one-third of the multiple level well zones will be sampled in the third round, resulting in a total of thirty-seven samples. Overall, the sampling effort will collect one hundred forty-seven water samples for analysis.

2.5.2. Sampling procedures

Prior to collecting each ground water sample, the depth to water will be measured in accordance with the procedures outlined in Section 2.4. The following equipment should be available and ready for use prior to initiating the field sampling efforts:

- Personal safety equipment (*e.g.*, steel-toed work boots, nitrile gloves, safety glasses)
- Suction-lift or inertial-lift pump and 0.25-inch polyethylene tubing for well purging, if required
- Dedicated one-way foot valves, if required
- Dedicated Teflon® or PVC bailers with Teflon®-coated stainless-steel wire or disposable nylon line, if required
- Power source (generator or battery)
- Water level measuring device which can obtain 0.01 foot accuracy (An electronic device is preferred for tracking water level drawdown during pumping operations)
- Parameter monitoring instrument to monitor pH, specific conductance, temperature, and turbidity
- Decontamination supplies
- Logbook(s)
- Interface probe, if needed
- Sample bottles
- Sample tags or labels
- Well construction data and Site location map.

2.5.3. Monitoring well purging

To collect representative ground water samples using conventional sampling techniques, ground water monitoring wells must be adequately purged prior to conventional sampling. Purging refers to the process of removing standing water from within the casing of a monitoring well. In rapidly recharging wells, a thorough purging will be accomplished by removal of a minimum of three well volumes of water to ensure that representative ground water is brought into the well for sampling. In slowly recharging wells, the well should be purged to dryness for a

minimum of one well volume. Samples should be collected within three hours of completing well purging activities.

The procedure to be followed in purging the monitoring wells is as follows:

1. Prior to opening the well, the water level measurement obtained pursuant to Section 2.4 and the known total depth of each well will be reviewed to calculate the volume of water to be purged from the well. Using the water level and known total depth, the length of the water column in the well is calculated. This is accomplished by subtracting the depth to water from the measured total depth, both measured from the top of the casing, followed by multiplication by a conversion factor of 0.0102 for 0.5-inch diameter wells, 0.02922 for the 1.5-inch central riser, and 0.163 for existing 2-inch diameter wells, to determine the number of gallons of water equaling one well volume. That value is multiplied by three to determine the volume of water required to purge the well of three well volumes.

2. The well cover will be unlocked and carefully removed to avoid having foreign material enter the well.

3. If a dedicated bailer is used for evacuation, a sampling team member will remove the bailer from the protective bag and lower it down the well until it comes in contact with the water. The sampling team member will continue to lower the bailer allowing it to submerge. Care will be taken to prevent the bailer or nylon rope from coming in contact with any objects other than the riser of the well, ground plastic and latex gloves worn by the sampler(s).

4. Some of the monitoring wells may be purged using a suction lift pump, inertial-lift pump or manually pumped and dedicated HDPE tubing with a dedicated "Delrin" acetal thermoplastic or stainless steel foot valve. After securely attaching the foot valve to the HDPE tubing, the HDPE tubing will be carefully lowered just below the water level and lowered as the water level lowers while pumping the monitoring well.

5. Well purging shall continue for a minimum of three well volumes with field parameters stabilizing. At a minimum, conductivity, turbidity, temperature and pH will be recorded after each well volume is removed. Sufficient time will be allowed for slowly recovering wells to recharge prior to sampling.

6. Purge water will be initially collected in 5-gallon pails and transferred to 55-gallon drums for subsequent off-site disposal.

2.5.4. Ground water sample collection

The ground water samples will be collected from the monitoring wells using either a bailer, a peristaltic pump, an inertial hydrolift pump or manually pumped. The larger diameter wells (*i.e.*, 2-inch and 1.5-inch diameter) will be sampled using an inertial hydrolift pump. The smaller diameter wells (*i.e.*, 0.5-inch) will be sampled using either a bailer, a peristaltic pump or manually pumped; the final method will be determined in the field based on recovery rates.

Ground water sample collection using conventional sampling methodology will be conducted as follows:

1. Ground water samples will, if at all possible, be collected within three hours of purging. If recharge is sufficient, then samples will be collected immediately following well purging. For slowly recharging wells, or at wells that have not met the turbidity goal of 50 NTUs, the monitoring well can be allowed to recover for up to 24 hours prior to sampling.

2. Don new nitrile gloves.

3. If a bailer is utilized, lower the bailer slowly down the well taking care to minimize agitation of the water column, which could result in the loss of VOCs. After the bailer is submersed to within the screened section of the well, slowly remove the bailer from the well and fill individual sample containers directly from the bailer. During sampling, take care to prevent the bailer and wire from coming in contact with any objects other than the riser of the well, ground plastic and nitrile gloves worn by the sampler(s). Special attention should be taken when filling vials for volatile organic analysis. The vials will be filled in a controlled manner focused at reducing ground water contact with the air and ensuring that no headspace remains after capping.

4. For wells purged using an inertial hydrolift pump or manually pumped using dedicated HDPE tubing, samples will be collected directly from the HDPE tubing. The dedicated HDPE tubing and foot valve will remain in the well between sampling events.

5. Record the date and time of sampling onto the sampling containers and in the field notebook. Begin preparing the Chain-of-Custody documentation.

6. Place sample containers in a cooler containing wet ice for transportation to the laboratory.

7. Close and lock the monitoring well. If a bailer was used for purging and sampling, it should be rinsed thoroughly with deionized water and placed in a labeled clean, plastic storage bag to be ready for the next sampling event. Remove all waste

materials from the area before moving to the next sampling location.

Specific information regarding sample bottle and preservation requirements are provided in the QAPP presented in Appendix B.

2.5.5. Analyses

Ground water samples will be submitted to an ELAP-certified laboratory for the analysis of TCL VOCs by USEPA Method 8260 in accordance with the QAPP. Method detection limits will be no higher than the applicable ground water standard of 5 µg/L for PCE, specified in NYSDEC Technical and Operational Guidance Series (1.1.1) *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (1998).

As specified in the QAPP, QA/QC samples, consisting of MS, MSD and field blank duplicate samples will be collected at a frequency of one per matrix type and/or sample batch and every twenty samples of similar matrix. If non-dedicated equipment is used, an equipment blank will be collected for each set of sampling equipment per sampling event. Trip blanks will be submitted to the laboratory in coolers that contain VOC samples. One trip blank will be required per cooler. A temperature control blank will be included in each cooler shipment to the laboratory.

2.6. Soil vapor sampling

Historical analytical data indicates that the soil vapor at both sites is contaminated with VOCs. Soil vapor screening field activities will be consistent with the data quality objectives for vapor impact delineation, potential receptor health protection, and mitigation design, as necessary.

2.6.1. Locations

For budgeting purposes, it is assumed that soil vapor will be sampled at a maximum of twenty-five locations, seven of which will conform to NYSDOH guidance (NYSDOH, 2005). In an attempt to define the extent of the soil vapor plume to 100 ppb, the sample points will be arrayed in the direction of ground water flow and perpendicular to this direction.

Sample points will also be positioned where soil vapor may have migrated off-site by diffusion and other preferential pathways (*i.e.*, pavement, buildings, utilities). Points will be sampled sequentially from the presumed source area in the downgradient direction of ground water flow, as well as, in the presumed directions of flow caused by diffusion or other pathways.

The sampling points will be installed manually or by direct push equipment to a maximum depth of five feet below ground surface, or to a lesser depth depending on depth to water.

2.6.2. Procedures

Subsurface soil vapor samples will be collected from above the ground water table, at about 3 to 5 feet below ground surface. For each subsurface soil vapor sample, a soil vapor sample probe will be installed manually by installing a ¾-inch hollow steel rod driven by a slide hammer or powered tool. The hollow steel rod will contain $^{1}/_{8}$- inch inner diameter tubing. A slotted aluminum sampling point will be inserted into the vapor point holder at the end of the hollow rod. The vapor point will be fitted to the tubing, and the hollow rod will be removed after it has been advanced to the selected sampling depth. Alternatively, the tubing may be installed directly into the soil penetration after the hollow rod is extracted.

Washed and uniform-grade #1A crushed stone will be installed after the hollow rod is extracted. The vapor sample point and tubing will remain. The crushed stone will provide a permeable pathway for soil vapor to flow to the sampling point. The remainder of the penetration will be sealed with hydrated bentonite or grout to preclude ambient air at the surface from flowing down the penetration and "short circuiting" the sampling process.

To remove stagnant or ambient air from the sample string consisting of the vapor point, stone pack and tubing, and to provide samples that are representative of subsurface conditions, a calculated volume of ambient air will be purged. Sampling points may be purged with a syringe or with a low-volume vacuum pump. To allow subsurface conditions to equilibrate, samples will not be collected for a minimum of 30 minutes. Drive rods and appropriate reusable equipment will be decontaminated with distilled water between each sampling location.

Helium tracer gas screening will be used with the SUMMA canisters to evaluate the adequacy of the sampling point construction technique. At a minimum, seven soil vapor sampling locations will be evaluated with tracer gas. The requirement of tracer gas at additional sample locations will be evaluated based on the results of the five vapor sample locations where tracer gas was implemented during sampling. The sampling apparatus is depicted in Figure 2-3.

The tracer gas screening procedure is presented below:

- Helium tracer gas will be retained around the sample location by filling a bucket or clear plastic hopper, which is positioned over the sample location;
- The bucket will be suitably sealed to the ground surface;

- The bucket will have a valve fitting at the top to introduce helium tracer gas into the bucket and a valve fitting at the bottom to let the ambient air out while introducing the helium. The valves will be closed after the bucket has been filled with helium;

- In addition, a modified bulkhead compression fitting will also be installed at the top of the bucket to allow the sample tubing to pass through the compression fitting and exit the bucket;

- After the bucket has been filled with helium, the sample tube will be attached to a personal air-monitoring pump;

- The pump will be pre-calibrated to extract soil vapor at a rate of 0.1 liters per minute;

- A hand-held helium detector will be attached to the exit fitting on the pump to confirm there is no short circuiting of ambient air around the annular space of the borehole (e.g., the presence or absence of helium in soil gas will confirm the integrity of the borehole seal prior to sampling);

- The soil gas probe will be purged for a period of three to five minutes to screen for helium/short circuiting;

- A Mark Helium detector Model 9822 or equivalent will be used to screen the extracted vapor stream for helium. This detector is sensitive to 100 part per million by volume (ppmv);

- If helium is detected during this procedure, the sample will not be collected until the short-circuit is corrected and the sample probe is re-screened and passes;

- If helium is not detected, the sample tubing will be attached to the sampling equipment and soil gas sample collection will be initiated. Soil gas collection procedures are discussed below;

- After sample collection is complete, the bucket will be checked using the fitting on the bucket to verify helium is still present around the sample probe location;

- Finally, following the completion of sample collection, the personal monitoring pump and helium meter will be reconnected to the sample tubing to check for helium in the soil gas sample to verify that short circuiting has not occurred during sampling. If helium is not detected, the sample will be submitted to the laboratory for analysis. If helium is detected, the NYSDEC project manager will be notified and a decision will be made as to whether or not the sample will be submitted for analysis, or if an additional

sample should be obtained following an evaluation of the integrity of the borehole seal.

The samples will be collected using certified-clean 6-liter stainless steel SUMMA vacuum canisters equipped with laboratory-calibrated fixed rate flow controllers. The flow controllers will be set to collect soil gas samples for a period of four hours. As such, the airflow into the SUMMA canister will not exceed 0.2 liters per minute. Sample collection will be terminated before the canister vacuum is exhausted.

Sample identifications, SUMMA canister identification numbers, flow controller identification numbers, initial and final vacuum readings, time of sample collection, and PID readings will be documented for each soil vapor sample. Chain-of-custody documentation will be maintained throughout sample collection and analysis. Digital photos will be taken of the SUMMA canister and the surrounding area.

2.6.3. Analyses

Soil vapor sampled per NYSDOH guidance will be collected in batch certified stainless steel SUMMA canisters and will be submitted to an ELAP-certified laboratory for the analysis of VOCs using USEPA Method TO-15.

Sampling will include QC sample collection and analyses in addition to the samples identified in this section; a field trip blank sample, and a duplicate sample will be submitted to the laboratory.

2.7. Sub-slab vapor sampling, indoor air sampling and background air sampling

Sub-slab and indoor air sampling field activities will be consistent with the data quality objectives for vapor impact delineation, potential receptor health protection, and mitigation design, as necessary.

The sampling approach will include:

- Sub-slab soil vapor samples and building survey to evaluate potential sub-slab COPC (compounds of potential concern) vapor sources.
- Indoor air and background samples and building survey to evaluate indoor air COPC levels related to vapor intrusion.

The sub-slab, indoor air, and ambient air sample collection and analytical methods are described in the following sections. The sample results will be evaluated in accordance with the NYSDOH *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (2005). Based on the sampling results, further sampling and analysis, not included in the scope of this RI, may be performed.

2.7.1. Locations

Sub-slab soil vapor and indoor air will be sampled in selected occupied residential structures and commercial/institutional structures located within the limits of the on-site soil vapor plume. No sub-slab vapor or indoor air will be sampled at the Railroad Cleaners site because of active dry cleaning operations. One sub-slab soil vapor and one indoor air sample will be collected at the Hercules Machine Sales site, and one sub-slab soil vapor and one indoor air sample will be collected in the building bordering Hercules to the south.

Per Section 2.6.3 of the NYSDOH guidance, Samples collected from selected residential properties will include sub-slab soil vapor, basement air, first floor or lowest occupied space air. For budget estimating purposes, six buildings will be selected for sub-slab and indoor air sampling, including four residential and two commercial structures.

Ambient air samples will be collected outside concurrent with the sub-slab and indoor air samples for purposes of identifying background air quality. The exact location of the ambient air sample will be based on field conditions (*e.g.*, wind direction, or the potential for cross-contamination by interior or unrepresentative exterior sources, at the time of collection).

2.7.2. Procedures

2.7.2.1. Sub-slab soil vapor samples

For each sample, an approximate ⅜-inch diameter hole will be drilled through the concrete slab to a depth just beneath the slab and a ¼-inch tube will be inserted into the hole. The hole will be sealed with hydrated bentonite or melted 100% pure bees wax poured around the tubing to prevent infiltration of ambient air and dilution of the sample. Prior to the collection of the soil gas samples, the sampling tubing will be purged of ambient air. One to three volumes of air within the sample probe and tubing will be purged prior to sample collection. The sample collection string will be connected to a 6-liter vacuum canister to collect the sample. Sub-slab vapor samples will be collected over a 24-hour period, concurrent with indoor air samples, ensuring that the airflow into the SUMMA canisters does not exceed 0.2 liters per minute. Sub-slab samples will utilize batch-certified SUMMA canisters.

Sample collection will be terminated before the canister vacuum is exhausted. The sampling location will also be screened for possible organic vapors using a portable PID. Sample identifications, SUMMA canister identification numbers, flow controller identification numbers, initial and final vacuum readings, time of sample collection, and PID readings will be documented for each soil vapor sample. Chain-of-custody documentation will be maintained throughout sample collection and analysis.

Digital photos will be taken of the SUMMA canister and the surrounding area. At the time of retrieval, noticeable changes in the condition of the sampling area, such as open windows and doors, changes in the operation of the heating/ventilation system or the condition or location of items in proximity to the canister will be noted.

2.7.2.2. Indoor air samples

The on-site buildings are considered a potential vapor intrusion exposure point. Samples will be collected during the heating season as specified by NYSDOH guidance.

Prior to sample collection, field personnel will complete the Indoor Air Quality Questionnaire and Building Inventory, Appendix B of the NYSDOH guidance. Elements that may influence vapor intrusion into the building include building foundation conditions or utility appurtenances. Therefore, building surveys will consist of 1) identifying potential ground water discharges to building foundations, 2) identifying potential preferential vapor migration pathways, 3) identifying potential points of vapor intrusion at basement foundations using a ppb-range PID meter, and 4) identifying building construction details that can influence vapor intrusion rates.

Indoor air sampling results often can be confounded by ambient or indoor sources of VOCs. Therefore, in addition to the survey elements noted above, the survey will include 1) an inventory of potential indoor COPC sources, 2) occupant activities will be surveyed, and 3) potential indoor COPC sources may be removed. In addition, an (ambient) outdoor air background sample is recommended when the indoor air is sampled.

Indoor air samples will be collected in individually-certified, 6-liter stainless steel SUMMA vacuum canisters equipped with laboratory-calibrated, fixed rate flow controllers. Indoor air samples will be collected over a 24-hour period to account for daily building activities that might influence VOC concentrations in indoor air. As such, the airflow into the SUMMA canisters will not exceed 0.2 liters per minute.

Sample collection will be terminated before the canister vacuum is exhausted. The sampling location will also be screened for possible organic vapors using a portable PID. Sample identifications, SUMMA canister identification numbers, flow controller identification numbers, initial and final vacuum readings, time of sample collection, and PID readings will be documented for each indoor air sample. Chain-of-custody documentation will be maintained throughout sample collection and analysis. Indoor air samples will utilize individually certified SUMMA canisters.

Digital photos will be taken of the SUMMA canister and the surrounding area. At the time of retrieval, noticeable changes in the condition of the

sampling area, such as open windows and doors, changes in the operation of the heating/ventilation system or the condition or location of items in proximity to the canister will be noted.

2.7.2.3. Background air samples

Background, or ambient, air samples will be collected concurrently with sub-slab and indoor air samples for purposes of identifying outdoor background air quality. As a general goal, ambient air samples will be collected at each of the structures where indoor air is sampled. However, ambient air samples may be batched such that one ambient air sample is obtained in the general vicinity of several structures being sampled during one event. Background air samples will utilize individually certified SUMMA canisters.

2.7.3. Analyses

For budgeting purposes, it is assumed that a maximum of eight sub-slab soil vapor; eight indoor air, and eight outdoor ambient air samples will be obtained and analyzed for VOCs. The indoor air sampling will include a detailed product inventory of household items likely to contain VOCs. A total of 25 sub-slab soil vapor, basement, indoor and ambient outdoor air samples will be submitted to an ELAP-certified laboratory for the analysis of VOCs using the TO-15 method.

Sampling will include QC sample collection and analyses in addition to the samples identified in this section, including two field trip blank samples and four duplicate samples.

2.8. Sample and field equipment handling

The equipment will be inspected to verify that it is in working order and sampling equipment will be decontaminated, as appropriate. Equipment or materials that are in short supply or are showing indication of wear will be noted and replaced.

Upon receipt of the sampling containers from the laboratory, the containers will be inventoried to verify appropriate containers were delivered, to check if preservatives have been added, if necessary, and to assess the general condition of containers.

Samples will be handled and standard chain of custody procedures will be applied according to procedures presented in the QAPP. Upon collection, samples will be placed in appropriate containers. Samples will be assigned a sample designation identifying sample location, date, and time. The labeled ground water sample containers will be chilled to approximately 4°C, and transported to the analytical laboratory for analysis within 24 hours of sample collection.

For each sample collected, field notes will be completed by field personnel to document details of the sampling event. Photographs of the site taken during the remedial investigation will include date, and time.

A sample may be further labeled MS or MSD if the sample is to be used by the laboratory as an MS or MSD. Blind field duplicate samples will be labeled X-1, X-2, etc. Trip blank samples obtained from the laboratory will be dated and identified as a trip blank. The trip blank sample will accompany those samples collected on that particular date and submitted to the laboratory for VOC analysis. The field notes will identify the blind field duplicate samples as well as where they were obtained.

In addition to the sample identification, each sample container will be labeled with the following information:

- Site name
- Date and time of sample collection
- Analysis requested
- Preservative(s)
- Client name

Information will also be entered in the field notes in waterproof ink. Sample container labels will be completed with ink containing no organic solvents. Specific details on chain-of-custody protocols and shipping requirements are provided in the QAPP.

2.9. Survey of sample locations

A New York State licensed surveyor will establish the location and elevation of existing monitoring wells, newly installed monitoring wells, soil vapor sample locations and other relevant site features. Monitoring wells will be surveyed to the nearest 0.01 feet at the top of the wells riser pipe (measuring point), the top of the protective steel casing, and the surrounding ground surface.

The surveying will consist of two mobilizations, the first to establish existing site conditions and the elevation of previously installed wells to be used with hydraulic monitoring data, and a second to determine location of newly installed wells and sampling points.

The horizontal datum will be the New York State Plane Coordinate System (NAD83) derived from GPS technology utilizing local monuments; the vertical datum will be the 1988 National Geodetic Vertical Datum (NGVD 88) derived from local benchmarks.

2.10. Quality assurance/quality control

Quality assurance/quality control issues associated with this project are addressed in the QAPP developed for this program. The QAPP is provided in Appendix B of the RI/FS Work Plan.

2.11. Health and safety

Health and safety issues associated with this project are addressed in the HASP developed for this program. The HASP is provided in Appendix C of the RI/FS Work Plan.

(This page deliberately left blank)

3. Handling of investigation-derived materials

3.1. General

The RI activities will produce investigation-derived materials (IDM) which will require appropriate management. IDM includes the following:

- Soil cuttings
- Ground water resulting from development of new monitoring wells
- Ground water resulting from the sampling of the monitoring wells
- Decontamination fluids resulting from decontamination of the drill equipment
- Personnel protective equipment (PPE) and associated refuse resulting from the execution of field activities

The management of these materials is discussed below.

3.1.1. Soil cuttings

An estimated 65 tons of soil cuttings will be generated during the drilling program and well installation. Soil cuttings will be contained in either a 20-ton roll-off or 55-gallon drums and temporarily staged at the Site. The cuttings will be labeled with the borehole identification and the date which the cuttings were initially containerized. These materials will be stored at a location deemed mutually acceptable by NYSDEC and the Site owners. The final disposition of the cuttings will be determined after the various analytical results from the investigation are available. Depending on the results of the investigation, and any other characterization deemed appropriate, it is assumed that various drill cuttings will be transported off-site for disposal at a permitted facility.

3.1.2. Ground water

An estimated 7,100 gallons of ground water will be produced during development and sampling activities. Ground water will be containerized in either a 4,900-gallon polyethylene tank or 55-gallon drums and temporarily staged on the respective properties. The 55-gallon drums will be labeled with the monitoring well identification and the date which the ground water was initially containerized. The final disposition of the ground water will be evaluated after the various analytical results from the investigation are available.

3.1.3. Decontamination fluids

Decontamination fluids will be containerized in either a 4,900-gallon polyethylene tank or 55-gallon drums, and temporarily staged on the respective properties. At the conclusion of field activities, these materials will be characterized using the TCLP sampling method and, after receiving the necessary approvals, will be transported off-site for treatment and/or disposal at a permitted facility.

3.1.4. PPE and associated debris

Used PPE and other associated debris (*e.g.*, ground plastic and tubing) will be containerized in 55-gallon drums and temporarily staged at the Site at a location deemed mutually acceptable by NYSDEC and the property owners. At the conclusion of field activities, these materials will be characterized using the TCLP sampling method and, after receiving the necessary approvals, will be transported off-site for treatment and/or disposal at a permitted facility.

3.1.5. General refuse

General refuse will be placed in trash bags and disposed of in appropriate waste receptacles.

References

New York State Department of Environmental Conservation (NYSDEC), 1998. Division of Water Technical and Operational Guidance Series (1.1.1) *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.*

NYSDEC, 2002. *Draft DER-10 Technical Guidance for Site Investigation and Remediation.*

New York State Department of Health (NYSDOH), 2003. *Fact Sheet: Tetrachloroethene (PERC) in Indoor and Outdoor Air.*

NYSDOH, 2005. *Guidance for Evaluating Soil Vapor Intrusion in the State of New York, Bureau of Environmental Exposure Investigation.*

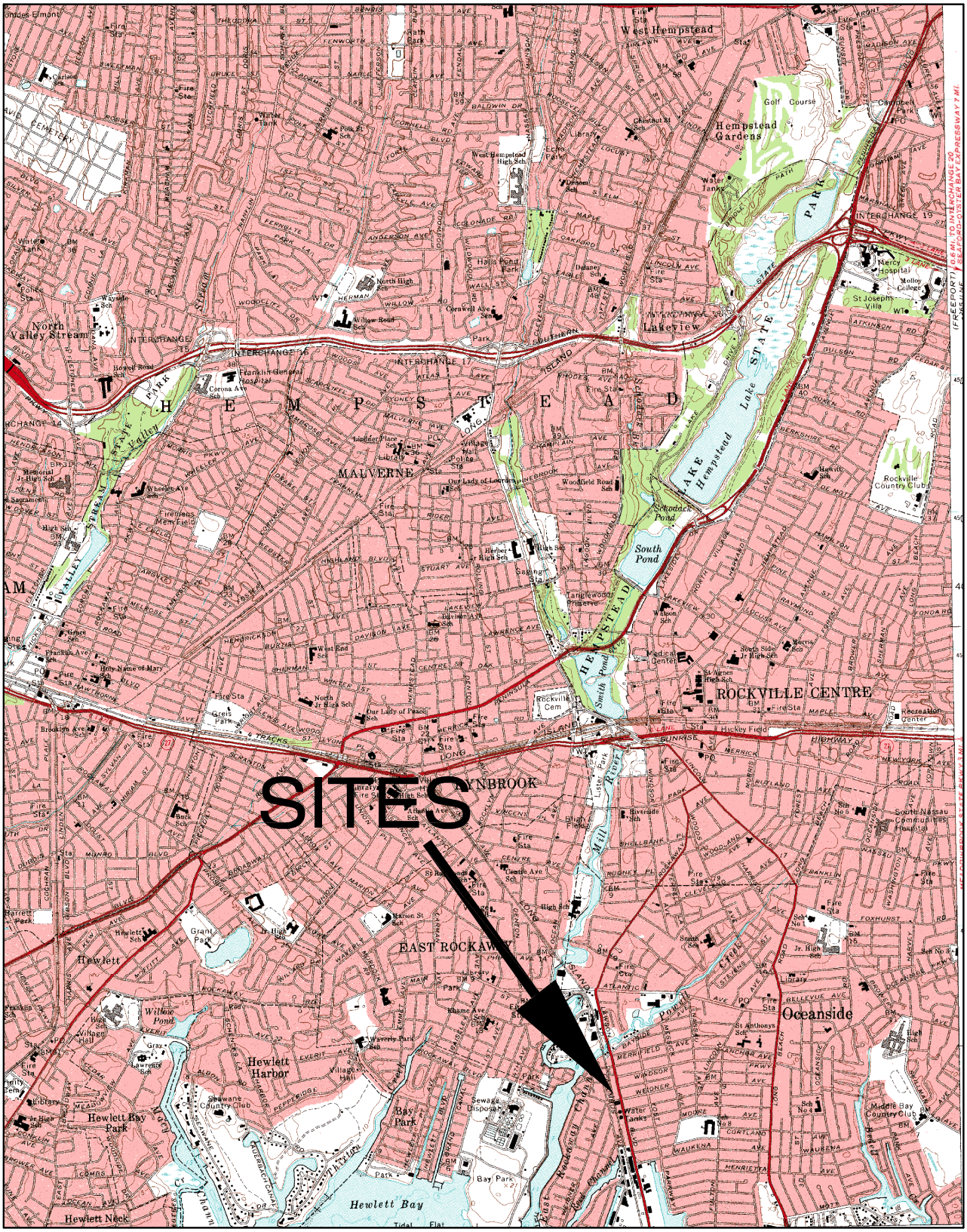
O'Brien & Gere, 2006. *Remediation Investigation/Feasibility Study Work Plan, Railroad Dry Cleaners and Hercules Machine Sales Sites*, Albany, New York.

O'Brien & Gere, 2006a. *M/WBE Utilization Plan, Railroad Dry Cleaners and Hercules Machine Sales Sites*, Albany, New York.

O'Brien & Gere, 2006b. *Site-specific Quality Assurance Plan, Railroad Dry Cleaners and Hercules Machine Sales Sites,* Albany, New York.

O'Brien & Gere, 2006c. *Site-specific Health and Safety Plan, Railroad Dry Cleaners and Hercules Machine Sales Sites*, Albany, New York.

United States Environmental Protection Agency (USEPA), 2003. *Using the Triad Approach to Streamline Brownfields Site Assessment and Cleanup - Brownfields Technology Primer Series.*



O'BRIEN & GERE ENGINEERS INC.

FIGURE 1-1
Site Location Map
Railroad Dry Cleaners and
Hercules Machine Sales
Oceanside, New York

FILE NO.	10653/37556
DATE	January 2006
DWG NO.	Rev. 1

FIGURE 2–1

LEGEND

MW-1 — Existing Monitoring Well

PMW-1 — Proposed Monitoring Well

SS (Subslab)
IA (Indoor air)
AA (Ambient air)

NYSDEC
DER
Work Assignment
#D004090–36
1–30–066 / 1–30–083

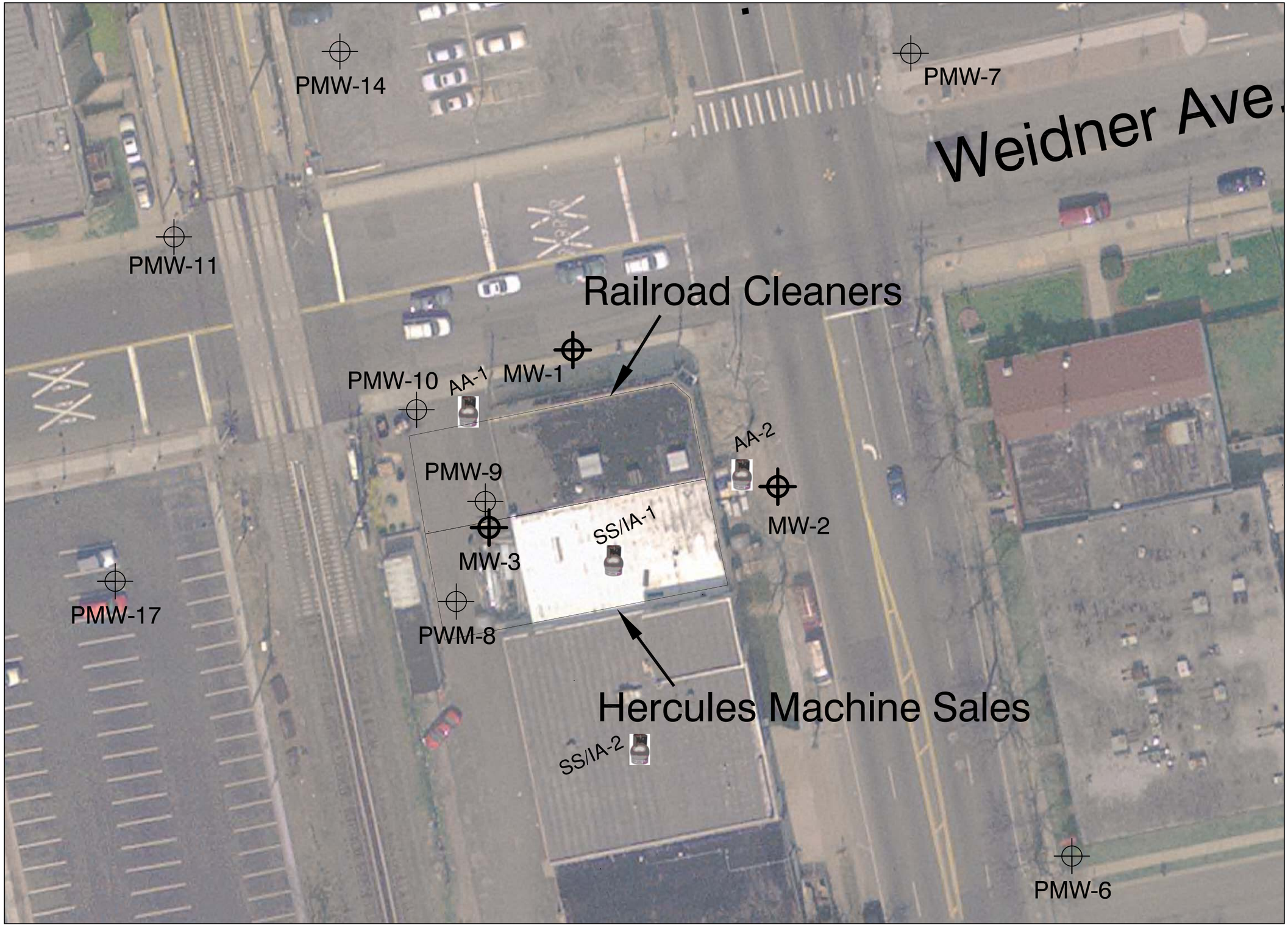
Railroad Dry Cleaners
Hercules Machine Sales
Remedial Investigation
Feasibility Study

SITE VICINITY MAP
with
Existing & Proposed
Monitoring Well
Locations

Job No. 37556
4/2006

O'BRIEN & GERE
ENGINEERS, INC.

FIGURE 2–2



LEGEND

- MW-1 — Existing Monitoring Well
- PMW-1 — Proposed Monitoring Well
- SS (Subslab) IA (Indoor air) AA (Ambient air)

NYSDEC
DER
Work Assignment
#D004090–36
1–30–066 / 1–30–083

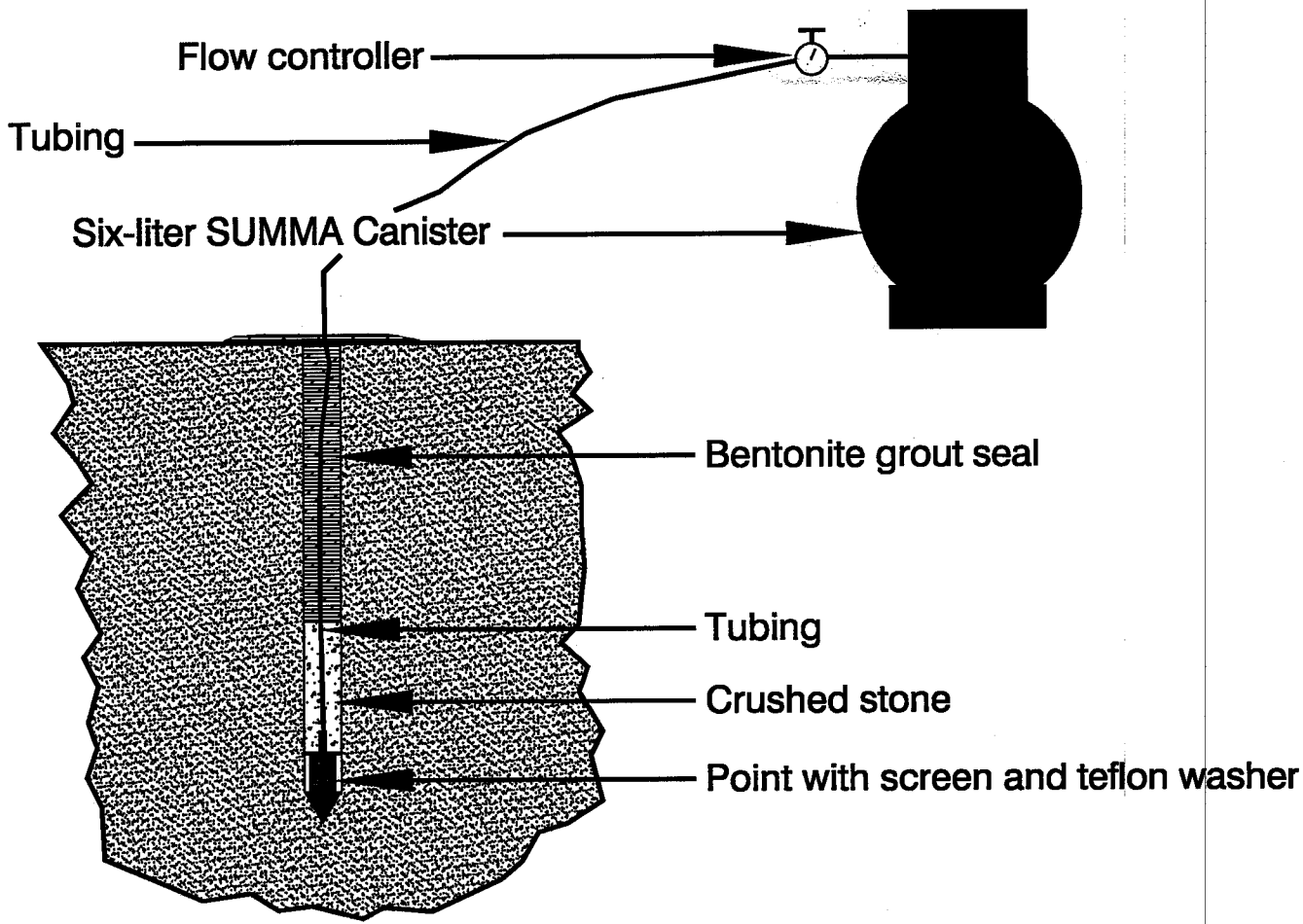
Railroad Dry Cleaners
Hercules Machine Sales
Remedial Investigation
Feasibility Study

SITE MAP
with
Existing & Proposed
Monitoring Well
Locations

Job No. 37556
4/2006

O'BRIEN & GERE
ENGINEERS, INC.

FIGURE 2-3



NYSDEC
DER
Work Assignment
#D004090-36
1-30-066 / 1-30-083

Railroad Dry Cleaners
Hercules Machine Sales
Remedial Investigation
Feasibility Study

Soil Vapor Point
Sampling Apparatus

JOB NO. 37556
1/2006

OBRIEN&GERE
ENGINEERS, INC.

Attachment A

Soil Boring Log

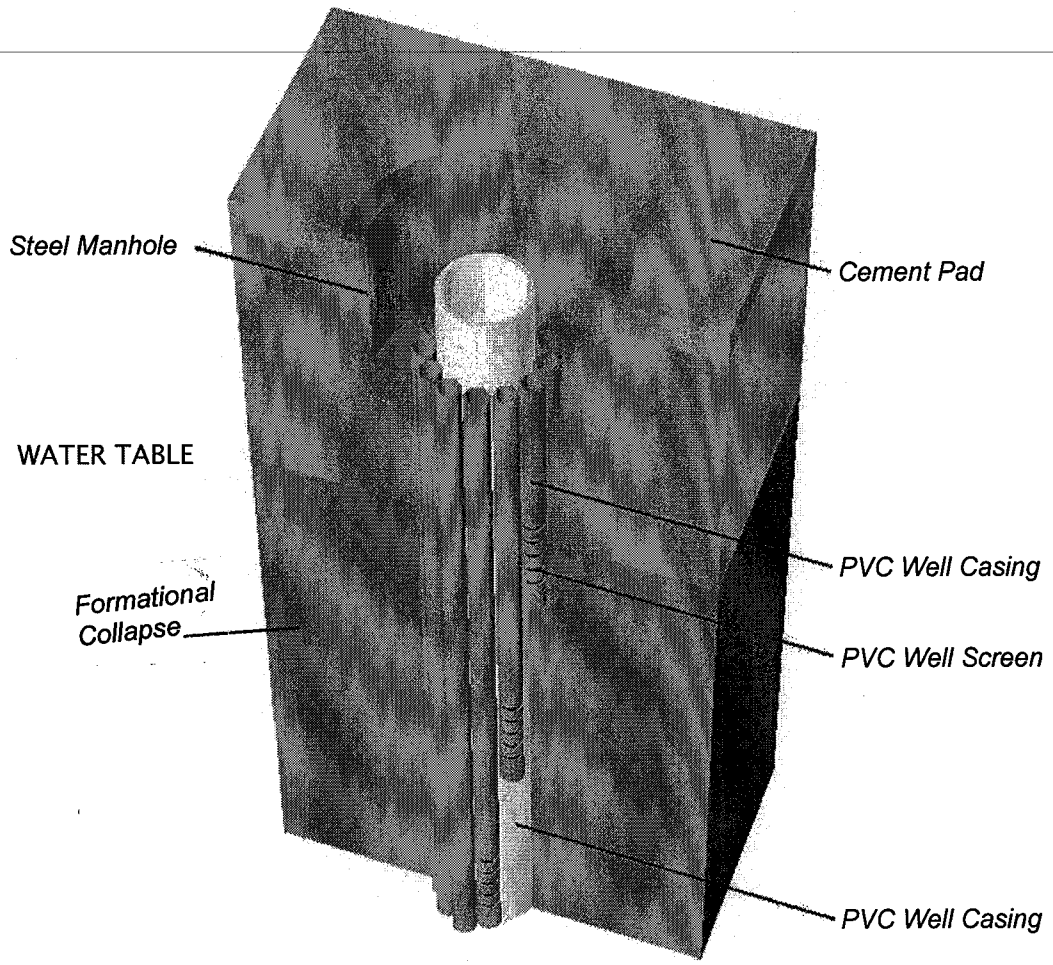
O'BRIEN & GERE	TEST BORING LOG	BORING NO.

PROJECT: Oceanside Sites					**SHEET** 1 **OF**
CLIENT: NYSDEC					**JOB NO.** 37556
DRILLING CONTRACTOR:					**MEAS. PT. ELEV.**
PURPOSE: Multi-level Monitoring Well Installation					**GROUND ELEV.**
DRILLING METHOD:		SAMPLE	CORE	CASING	**DATUM** Ground Surface
DRILL RIG TYPE:	TYPE				**DATE STARTED**
GROUND WATER DEPTH:	DIA.				**DATE FINISHED**
MEASURING POINT:	WEIGHT				**DRILLER**
DATE OF MEASUREMENT:	FALL				**INSPECTOR**

Depth Ft.	Sample Number	Blows on Sample Spoon per 6"	Penetration Recovery	Unified Classi-fication	GEOLOGIC DESCRIPTION	REMARKS
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Attachment B

Typical Multiple-Level Well Construction



1.5" Diameter Central Monitoring Well with 0.5" Diameter Piezometers

Not to Scale

Typical Multi-level Well Construction

Attachment C

Well Development Log

O'BRIEN & GERE

Well Development Log

Date		Personnel		Well #	
Site Name	Oceanside Sites	Contractor		Weather	
Site Location	Oceanside, NY	Evacuation Method		Project #	

Well information:

Depth of Well (Initial) *	ft.	Date(s) Installed		Date(s) Developed	
Depth of Well (Final) *	ft.	Driller		Start	
Depth of Water (Initial) *	ft.	Well Diameter		Stop	
Depth of Water (Final) *	ft.	Well Volume		Total	
Measuring Point *	ft.	Pump Setting			

Well Volumes	Volume of Water Removed (Gallons)	Temperature ° C	pH s.u.	Conductivity mS/cm	Turbidity (NTU)	Approximate Flow Rate (gal/min)	Depth to Water	Appearance of Water

Development Water Characteristics:

Total volume of purged water removed:

Physical appearance at start		Physical appearance at end	
Color		Color	
Odor		Odor	
Sheen/Free Product		Sheen/Free Product	

Notes

Signature:

Appendix B

Site-Specific Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN

Remedial Investigation/Feasibility Studies (RI/FSs) Railroad Dry Cleaners (Site No. 1-30-066) and Hercules Machine Sales (Site No. 1-30-083) Oceanside, New York

New York State Department of Environmental Conservation

April 2006

O'BRIEN & GERE

10653/37556

QUALITY ASSURANCE PROJECT PLAN

Remedial Investigation/Feasibility Studies (RI/FSs)
Railroad Dry Cleaners (Site No. 1-30-066)
and
Hercules Machine Sales (Site No. 1-30-083)

Oceanside, New York

New York State Department of
Environmental Conservation
Albany, New York

April 2006

O'BRIEN & GERE
ENGINEERS, INC.

435 New Karner Road
Albany, New York 12205

Contents

List of Tables

(This page intentionally left blank)

1. Project scope and goals

1.1. Introduction

This site-specific Quality Assurance Project Plan (QAPP) has been developed in conjunction with Remedial Investigation (RI) activities to be conducted at the Railroad Dry Cleaners (Railroad) and Hercules Machine Sales (Hercules) sites. The sites are located in the Hamlet of Oceanside, Town of Hempstead, Nassau County, New York (Figure 1-1). This QAPP is one component of the Remedial Investigation Work Plan (RIWP).

The site-specific QAPP provided below presents the seven elements of site-specific information required by *DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2002). O'Brien & Gere has also prepared a comprehensive QAPP intended to be applicable to the sampling and analytical activities conducted pursuant to Superfund Standby Contract #D004090 (O'Brien & Gere, 2005). The Superfund Standby Contract QAPP provides supplemental and more detailed laboratory information, including corrective action tables for laboratory analyses associated with characterization activities. The Superfund Standby Contract QAPP was prepared utilizing the guidance and formats provided in the following documents:

- New York State Department of Environmental Conservation, *Draft DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2002).

- United States Environmental Protection Agency (USEPA), *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA,* Office of Emergency and Remedial Response, Washington, D.C. (USEPA, 1988a).

- USEPA, *EPA Requirements For Quality Assurance Project Plans For Environmental Data Operations,* EPA QA/R-5 (USEPA, 2001a).

The combination of the site-specific QAPP and the Superfund Standby Contract QAPP address how the quality of data will be managed for the remedial investigation. The QAPPs will assist in generating data of a known and acceptable level of precision and accuracy, for the analysis of environmental samples and related field activities. The QAPPs provide information regarding the project description and personnel responsibilities, and set forth specific procedures to be used during

sampling of relevant environmental matrices, other field activities, and the analyses of data. The procedures in this QAPP will be followed by personnel participating in the field investigation and in the laboratory analyses of environmental samples.

The data reportables and deliverables package will comply with NYSDEC ASP Category B for use during data validation.

1.2. Data quality objectives

The data quality objectives (DQOs) of this characterization include the following:

- Evaluate the nature and extent of potential site-related constituents in environmental media at the Railroad and Hercules sites and offsite, consisting of ground water, soil, water, and air.
- Evaluate environmental data, including comparison to New York State screening values as shown in the following table:

Media	***Guidance***
Water	*TOGS 1.1.1* (NYSDEC 1998)
Soil	*TAGM 4046* (NYSDEC 1994)
Air	New York State Department of Health (NYSDOH) *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (2005)

- Provide data to support a selection of remedial action objectives discussed in the Feasibility Study (FS) Report.

- Provide documentation of laboratory data that will allow for complete data validation. Data validation results will be reported in a data usability summary report (DUSR) and incorporate results into data summaries.

- Incorporate resulting data into the conceptual site model describing the occurrence of constituent source(s) and potential migration pathways.

- Develop a qualitative exposure pathway analysis describing potential human contact with constituents present at the Sites.

2. Project organization and responsibility

2.1. Project organization

Personnel assigned to the project are listed in Table 2-1.

TABLE 2-1. *Project organization.*

NYSDEC Project Manager	Jeffrey L. Dyber
O'Brien & Gere Personnel	
Project Officer	Douglas M. Crawford, P.E.
Technical Advisor	Ralph E. Morse, CPG
Project Manager	Robert M. Ossman, CPG
Field Manager	Jennifer A. Warnicke
Quality Assurance Officer	Karen Storne
Data Quality Reviewer	Nancy J. Potak
Sampling personnel	TBD
Laboratory QA Coordinator	TBD
Laboratory Sample Custodian	TBD

(This page intentionally left blank)

3. Sampling procedures and equipment decontamination procedures

The objective of field sampling procedures is to obtain samples that represent the environmental matrix being investigated. Field sampling procedures are provided in the Field Activities Plan (FAP).

(This page intentionally left blank)

4. Site map showing sample locations

The sites are located at 3180 and 3188 Lawson Boulevard in the Hamlet of Oceanside, Town of Hempstead, Nassau County. The Remedial Investigation / Feasibility Study Work Plan includes figures showing the site location and proposed sampling locations.

(This page intentionally left blank)

5. Analytical methods/quality assurance summary table

The analytical methods/quality assurance summary table is presented as Table 5-1. The environmental samples will be submitted to the contracted laboratory for the analyses as listed in Table 5-1.

NYSDEC Analytical Services Protocol (ASP) Exhibit E quality control requirements will be used to perform the sample analysis, including the non-contract laboratory program (CLP) analyses, utilizing the laboratory interpretation of the requirements as they apply to USEPA Methods.

(This page intentionally left blank)

6. Site-specific sampling methods, storage, and handling time requirements

Site-specific sampling methods, storage, and handling time requirements are presented in the FAP.

(This page intentionally left blank)

7. Analytical data in electronic format

Provision of laboratory data in electronic format is discussed in the Superfund Standby Contract QAPP (O'Brien & Gere, 2005).

(This page intentionally left blank)

References

New York State Department of Environmental Conversation (NYSDEC) 1998. Division of Water Technical and Operational Guidance Series (TOGS) – *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Guidelines* (TOGS 1.1.1).

NYSDEC 1994. *Technical and Administrative Guidance Memorandum #4046 Determination of Soil Cleanup Objectives and Cleanup Levels.*

NYSDEC 2000. *Analytical Services Protocol (ASP).*

New York State Department of Health (NYSDOH) 2005. *Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York.*

O'Brien & Gere Engineers, Inc. 2005. *Superfund Standby Contract Quality Assurance Project Plan (QAPP),* Syracuse, New York.

United States Environmental Protection Agency (USEPA). 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA,* Office of Emergency and Remedial Response, Washington, D.C.

USEPA, 1999. *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition 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).* Cincinnati, Ohio

USEPA, 2001. EPA Requirements For Quality Assurance Project Plans For Environmental Data Operations, Final, EPA QA/R-5. Washington, D.C.

USEPA, 2001. *CLP Organics Data Review and Preliminary Review,* HW-6, Revision 12. New York, NY.

Table 5-1. *Analytical Methods/ Quality Assurance Summary.*

Parameter (method)	Matrix	Sample containers	Preservation	Holding times	Number of environmental samples	QC sample frequency			
						Field duplicate	Trip Blank	MS/MSD or Duplicate	Equipment Blank
VOCs (USEPA Method 8260)[1]	Ground water	3 - 40-milliliter glass vials with Teflon® lined septum caps.	4°C, 0.008% ascorbic acid in the presence of free chlorine, HCl to pH<2	10 days VTSR	147 plus QA/QC **Total: 191**	One per 20 samples or one per matrix (for less than 20 samples)	1 per cooler containing VOC samples	One MS/MSD per 20 samples or one per matrix (for less than 20 samples)	Per sampling event, one per 20 samples, as required.
VOCs (USEPA Method TO15)[2]	Air	Canisters as prepared in Method TO-15.	None	14 days VTSR	49 plus QA/QC **Total: 70**	One per 20 samples or one per matrix (for less than 20 samples)	NA	NA	Canisters Blank test met and sampling system certified as per Method TO-15.

Notes:

VTSR indicates verified time of sample receipt at the laboratory
MS/MSD indicates matrix spike/matrix spike duplicate sample.
VOCs indicates volatile organic compounds.
SVOCs indicates semivolatile organic compounds.
PCBs indicates polychlorinated biphenyls.
*For locations where subsurface soil, surface soil, or waste samples are collected to be analyzed for SVOCs, PCBs, and metals, the samples may be collected in a single 250-ml container.

TBD indicates that the number of samples will be determined at a later date.
NA indicates not applicable

References:

1- New York State Department of Conservation 2000. *Analytical Services Protocol (ASP),* June 2000 Revision. Albany, NY.
2- United States Environmental Protection Agency (USEPA) 1999b. *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition 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).* Cincinnati, Ohio.

Appendix C

Health and Safety Plan

Health & Safety Plan
Railroad Dry Cleaners
(Site No. 1-30-066)
and
Hercules Machine Sales
(Site No. 1-30-083)
Oceanside, New York

New York State Department of Environmental Conservation

April 2006

O'BRIEN & GERE

10653/37556

Health & Safety Plan
Railroad Dry Cleaners (Site No. 1-30-066)
and
Hercules Machine Sales (Site No. 1-30-083)
Oceanside, New York

New York State Department of
Environmental Conservation
Albany, New York

April 2006

O'BRIEN & GERE
ENGINEERS, INC.

435 New Karner Road
Albany, New York 12205

Contents

List of Tables

List of Figures

(This page intentionally left blank)

1. Introduction

This Health and Safety Plan (HASP) has been developed to provide both general procedures and specific requirements to be followed by O'Brien & Gere Engineers, Inc. (O'Brien & Gere) personnel while performing a remedial investigation at the Railroad Cleaners and Hercules Machine Sales sites. The sites are located at 3180 and 3188 Lawson Boulevard in the Hamlet of Oceanside, Town of Hempstead, Nassau County. A site location map is included as Figure 1-1.

The intent of the remedial investigation is to implement environmental assessment activities at the sites and surrounding properties to evaluate the type and concentration of potential contaminants. This work is being performed under the State Superfund Standby Contract with the New York State Department of Environmental Conservation (NYSDEC) as Work Assignment #D004090-36.

This HASP describes the responsibilities, training requirements, protective equipment, and standard operating procedures to be used by O'Brien & Gere personnel to address potential health and safety hazards while conducting the remedial investigation tasks. This plan specifies procedures and equipment to be used by O'Brien & Gere personnel during work activities and emergency response to minimize exposures of personnel to hazardous materials.

1.1. Implementation of Health and Safety Plan

The requirements and guidelines presented in this HASP are based on a review of available information and an evaluation of potential on-site hazards. This HASP incorporates by reference the applicable Occupational Safety and Health Administration (OSHA) requirements in 29 CFR Part 1910 and 29 CFR Part 1926. The protective equipment selection was made according to Subpart I of 29 CFR 1910. O'Brien & Gere personnel are required to read this HASP before beginning work on site. This HASP will be available for inspection and review by O'Brien & Gere employees while work activities are underway.

When conducting the remedial investigation activities listed in the Remedial Investigation Work Plan (RIWP), O'Brien & Gere personnel will comply with this HASP. On-site O'Brien & Gere personnel will notify the O'Brien & Gere Site Safety and Health Coordinator (SSHC) of matters of health and safety. The SSHC is responsible to the Project Manager for monitoring activities, monitoring compliance with the provisions of this HASP, and for modifying this HASP to the extent necessary if site conditions change.

This HASP is specifically intended for guiding the conduct of remedial investigation activities defined in the RIWP by O'Brien & Gere personnel. Although this HASP can be made available to interested persons for informational purposes, O'Brien & Gere does not assume responsibility for the interpretations or activities of any persons or entities other than employees of O'Brien & Gere.

The health and safety considerations of subcontractors to O'Brien & Gere will be set forth in HASPs provided by each subcontractor.

1.2. Project organization

The personnel involved in the remedial investigation activities at the Railroad Cleaners and Hercules Machine Sales sites implicitly have a part in implementing the HASP. Among them, the Project Officer, the Project Manager, the Corporate Associate for Safety and Health, the SSHC, and the Site Supervisor have specifically designated responsibilities. Their names and telephone numbers are listed in Table 1-1. Other key O'Brien & Gere project personnel, the project's organization, and other primary contacts for the project are presented in the RIWP.

Key project personnel and their responsibilities with regard to the sampling activities are discussed below.

Project Officer

Douglas M. Crawford, P.E. is the Project Officer. The Project Officer is responsible for the overall administration and technical execution of the project. The Project Officer is further responsible for the acquisition and delegation of resources necessary for project completion and HASP implementation.

Project Manager

Robert M. Ossman, CPG is the Project Manager. The Project Manager reports to the Project Officer and is directly responsible for the technical progress and financial control of the project.

Corporate Associate for Safety and Health

Jeffrey Parsons, C.I.H. is the Corporate Associate for Safety and Health. Mr. Parsons will be responsible for implementation of this HASP. Procedural changes and modifications to this HASP must be approved by Mr. Parsons.

Site Safety and Health Coordinator

Jennifer Warnicke is the Site Safety and Health Coordinator (SSHC). The SSHC for O'Brien & Gere reports to the O'Brien & Gere Project Manager, coordinates her activities with the O'Brien & Gere Corporate Associate for Safety and Health, establishes operating standards, and coordinates overall project safety and health activities for the site. The SSHC reviews project plans and revisions to plans to determine that safety and health procedures are maintained throughout the investigation. The SSHC audits the effectiveness of the HASP on a continuing basis and suggests changes, if necessary, to the Project Manager.

Specifically, the SSHC is responsible for the conducting the following actions:

- Provide a complete copy of the HASP at the site before the start of activities
- Familiarize O'Brien & Gere employees with the HASP
- Conduct on-site health and safety training and briefing sessions
- Document the availability, use, and maintenance of personal protective and other safety or health equipment
- Maintain safety awareness among O'Brien & Gere employees onsite and communicating safety and health matters to them
- Review field activities for performance in a manner consistent with O'Brien & Gere policy and this HASP
- Monitor health and safety conditions during field activities
- Coordinate with emergency response personnel and medical support facilities
- Notify the Project Manager of the need to initiate corrective actions in the event of an emergency, an accident, or identification of a potentially unsafe condition
- Notify the Project Manager of an emergency, an accident, the presence of a potentially unsafe condition, a health or safety problem encountered, or an exception to this HASP
- Recommend improvements in safety and health measures to the Project Manager
- Conduct safety and health performance and system audits.

The SSHC has the authority to recommend that the Project Manager take the following actions:

- Suspend field activities or otherwise limit exposures if the health or safety of any O'Brien & Gere employee appears to be endangered
- Notify O'Brien & Gere personnel to alter work practices that the SSHC deems to not protect them
- Suspend an O'Brien & Gere employee from field activities for violating the requirements of this HASP.

Site Supervisor

The Site Supervisor, Jennifer Warnicke, will be responsible for the implementation of sampling programs. The Site Supervisor will be responsible for overall site coordination including field sampling collection and chain-of-custody. The Site Supervisor will report directly to the Project Manager or designee.

Table 1-1. *Project personnel.*

Name and Title	***Telephone***
Douglas M. Crawford, P.E. Project Officer Syracuse, New York	(315) 437-6100
Robert M. Ossman, CPG Project Manager Albany, New York	(518) 452-9392 (518) 452-9525 (fax)
Jeffrey Parsons, C.I.H. Corporate Associate for Safety and Health Syracuse, New York	(315) 437-6100 (315) 391-0638 (cell)
Jennifer Warnicke Albany, New York	(518) 452-9392
Jeffrey L. Dyber, P.E. Environmental Engineer NYS Department of Environmental Remediation Bureau A, Section C 625 Broadway Albany NY 12233-7015	(518) 402-9621 (518) 402-9627 (fax)

2. Hazard analysis

General site chemical and environmental hazards are summarized in Section 2.1. Specific health and safety considerations for field tasks as detailed in the Field Activities Plan (FAP) contained in Appendix A of the RIWP, are presented in separate subsections as outlined below:

- On-Site Ground Water Monitoring Well Installation and Development (FAP Section 2.1)
- Off-Site Ground Water Monitoring Well Installation and Development (FAP Section 2.2)
- Ground Water Sampling (FAP Section 2.3)
- Soil Vapor Sampling (FAP Section 2.4)
- Sub-slab Vapor Sampling, Indoor Air Sampling and Background Air Sampling (FAP Section 2.5)
- Sample and Field Equipment Handling (FAP Section 2.6)
- Survey of Sample Locations (FAP Section 2.7)

Both the potential health and safety hazards and the hazard and contaminant control procedures for each task of the remedial investigation are discussed in the sections below.

2.1. General site hazards

2.1.1. Previous investigations

The Galli Phase I RI (1989a) conducted at the Railroad site indicated the presence of tetrachloroethene (PCE) at concentrations ranging from 10 to 1,100,000 ppb, with an increasing concentration found correlated with increasing depth. Smaller amounts of trichloroethene (TCE) were also identified in the Galli Phase I effort.

Soil and ground water samples were collected as part of the Galli Phase II RI in three locations. Soil collected at 5 to 7 feet below ground surface contained no detectable concentrations of PCE in the sample from MW-1, 10 ppb in sample MW-2, and 265 ppb in sample MW-3. No PCE was found in ground water collected in January 1990 from MW-1 and MW-2; MW-3 contained PCE at 126 ppb. Ground water collected in March 1990 found no PCE contamination in the sample from MW-1, 91 ppb in sample MW-2 and 10,000 ppb in sample MW-3.

Fuel oil constituents were found in soil boring B-4 at 4 feet below ground surface, including toluene at 210,000 ppb, ethylbenzene at 42,000 ppb, and total xylene at 140,000 ppb. Benzene was found in ground

water in all wells, with the highest concentration (150 ppb) in MW-2, located in the purported upgradient location.

Soil gas sampling conducted in 2003 returned high concentrations of PCE, and the PCE-degradation products TCE, cis-1,2-dichloroethene (DCE) and vinyl chloride (VC).

2.1.2. Chemical hazards

Chemical hazards associated with site operations are related to inhalation, ingestion, and skin exposure to site contaminants of potential concern (COPCs). Site COPCs include DCE, TCE, PCE and VC. Chemical specific risks of Site COPCs consist of acute and chronic health effects. Acute health effects include, mood and behavioral changes; irritation to eyes, nose, mouth and throat; and headache, dizziness, vomiting, nausea, unconsciousness, and kidney dysfunction. Chronic health effects include, neurological effects, carcinogenic effects, developmental/reproductive effects, central nervous system effects, and kidneys and liver damage.

Airborne dust concentrations of COPCs during most activities are not anticipated to exceed OSHA action levels due to minimal dust associated with site activities. However, air monitoring for VOCs will be conducted periodically and if odors are observed during intrusive activities (i.e., drilling, well development and well sampling). Health and safety air monitoring requirements are outlined in Section 6.

The potential for unprotected personnel for inhalation of constituents during intrusive site operations is low to moderate. The potential for unprotected personnel for dermal contact with soils or water containing COPCs during drilling and sampling operations is moderate to high. Proper use of personnel protective equipment is intended to reduce potential exposure to site contaminants.

2.1.3. Potential environmental and physical hazards

Prior to initiating activity, the site conditions will be discussed with site personnel. Hazards will be identified and protective measures will be explained.

Environmental hazards, in addition to site contaminants, include site fauna and flora. Aggressive fauna, such as ticks, fleas, mosquitoes, bees, wasps, spiders and snakes may be present at the site. Poison ivy and poison oak may also be present.

Physical hazards involved with field activities are primarily associated with the site environment. The work area presents hazards of slips, trips, and falls from scattered debris and irregular walking surfaces. Weather related hazards include wet, muddy, slick, walking surfaces and unstable soil, sunburn, lightning, rain, snow, ice, and heat and cold related

illnesses. There exists a potential for incidents involving personnel struck by or struck against objects resulting in fractures, cuts, punctures, or abrasions. Walking and working surfaces during activities may involve slip, trip, and fall hazards, as well as hazards associated with working in or near roadways.

Materials handling and manual site preparation may cause blisters, sore muscles, and joint and skeletal injuries; and may present eye, contusion and laceration hazards. A common type of accident that occurs in material handling operations is the "caught between" situation when a load is being handled and a finger or toe are caught between two objects. Extreme care must be taken when loading and unloading material. Proper lifting technique must be employed.

Slippery working surfaces can increase the likelihood of back injuries, overexertion injuries, and slips and falls. All personnel should frequently inspect working surfaces and keep working surfaces clear of debris and moisture.

2.1.4. Hazard and contaminant control

For each field task, Level D personal protective equipment (PPE) is to be worn initially. Protective equipment will include steel toe boots with good treads and personnel will be reminded to remain alert of the area where they are walking to decrease the chance of slipping. Eye protection will be worn to minimize splashing into eyes. The specific requirements for Level D PPE are presented in Section 4.

The primary hazards for contaminant exposure for each task are summarized on Table 2-1. If odors are observed during field activities, air monitoring with a PID should be conducted to evaluate the presence of VOCs. Action levels for upgrading PPE are presented in Section 6.2.

Field equipment will be inspected and in proper working condition. Mechanical assistance will be provided for large lifting tasks if required. Ground Fault Circuit Interrupter (GFCI) will be used on electric power tools and electrical extension cords in outdoor work locations. Electrical extension cords will be protected or guarded from damage (*i.e.*, cuts from machinery) and will be maintained in good condition.

Table 2-1. *Personal protection requirements for remedial investigation activities at the Railroad and Hercules sites*

Task	Description of primary health concerns	PPE Level	Monitoring	Action Level
2.2. On-Site Ground Water Monitoring Well Installation and Development	Inhalation due to dust, absorption by skin contact. Past disposal practices may have resulted in concentrations of site constituents in subsurface materials.	Level D (Section 4)	Organic vapor monitoring	See section 6.2 of HASP.
2.3. Off-Site Ground Water Monitoring Well Installation and Development	Inhalation due to dust, absorption by skin contact. Past disposal practices may have resulted in concentrations of site constituents in subsurface materials.	Level D (Section 4)	Organic vapor monitoring	See section 6.2 of HASP.
2.4. Ground Water Sampling	Inhalation due to volatilization, absorption by skin contact	Level D (Section 4)	Organic vapor monitoring	See section 6.2 of HASP
2.5. Soil Vapor Sampling	Inhalation due to volatilization, absorption by skin contact	Level D (Section 4)	Organic vapor monitoring	See section 6.2 of HASP.
2.6. Sub-slab Vapor Sampling, Indoor Air Sampling and Background Air Sampling	Inhalation due to dust, absorption by skin contact.	Level D (Section 4)	Organic vapor monitoring	See section 6.2 of HASP.
2.7. Sample and Field Equipment Handling	Inhalation due to volatilization, absorption by skin contact	Level D (Section 4)	Organic vapor monitoring	See section 6.2 of HASP.
2.8. Survey of Sample Locations	Inhalation due to volatilization, absorption by skin contact	Level D (Section 4)	Organic vapor monitoring	See section 6.2 of HASP.

Notes:
HASP = Health and Safety Plan
Sections referred to in parentheses are found in this HASP.

2.2. On-site ground water monitoring well installation and development

This component of the field operations will consist of the advancement of borings for the installation of monitoring wells and the collection of ground water samples. The physical hazards of this operation are primarily associated with operation of a drill rig and contact with potentially contaminated soil and water.

2.2.1. Potential health hazards and contaminants

Hazards generally associated with well drilling operations include noise levels exceeding the OSHA Permissible Exposure Limit of 90 dBA, that are both a hazard and a hindrance to communication, carbon monoxide from the drill rig, and overhead electrical and telephone wires which can be hazardous when the drill rig boom is in the upright position. Moving parts on the drill rig may catch clothing, and free or falling parts from the cathead, if applicable, may cause head injury. Moving the drill rig over uneven terrain may cause the vehicle to roll over or become stuck in a rut or mud. High-pressure hydraulic lines and air lines used on drill rigs are hazardous when they are in disrepair or incorrectly assembled.

Environmental sampling presents hazards that may include inhalation and dermal contact with hazardous materials. Drilling tools may result in injury if not handled properly, and high-pressure hydraulic lines used on drilling equipment may be hazardous when they are in disrepair or incorrectly assembled. During the retrieval of drilling tools, the possibility exists for splashing of exposed subsurface materials onto the workers and release of dust and volatile materials onto workers' bodies and into the workers' breathing zones.

An additional potential hazard arises from traffic patterns when completing well drilling, development and sampling activities within the public right-of-way. Moving vehicles may cause severe injury to any personnel working in this area. When completing any activities within the public right-of-way, orange vests will be worn and cones will be set up to divert traffic. In addition, one person will observe the traffic patterns until the work is completed.

2.2.2. Hazard and contaminant control

General PPE requirements presented Section 2.1 apply to this task. Personnel must wear hard hats and ear muffs and/or earplugs when working near operating heavy machinery. Prior to approaching a drill rig, loose clothing will be secured and the boom position will be checked.

O'Brien & Gere personnel will remain upwind from the vehicle exhausts to the extent practicable unless required by sampling work. The breathing zone will be periodically monitored for volatile organic vapors using a PID during soil gas sampling and monitoring well installation.

Subsequent monitoring and respirator wear will be in accordance with Section 6 of this HASP.

The drilling subcontractor will be required to inspect chains, lines, cables, and high-pressure lines daily for weak spots, frays, and other signs of wear. The drilling subcontractor will be required to make repairs as necessary. To avoid contact with overhead lines, the drilling subcontractor will be required to lower the drill rig boom prior to moving the rig. The drilling subcontractor will be required to verify the location of underground utilities with both the local power and utility companies prior to drilling. Overhead and underground utilities will be considered "live" until verified otherwise.

2.3. Off-site ground water monitoring well installation and development

The off-site ground water investigation will consist of monitoring well installation for the collection of ground water samples. The physical hazards of this operation are similar to those discussed in Section 2.2, and are primarily associated with operation of the drill rig and contact with potentially contaminated soil and water.

2.4. Ground water sampling

The physical hazards of ground water sampling are similar to those discussed in Section 2.2, and are primarily associated with contact with potentially contaminated soil and water.

Back strain can be prevented by employing proper lifting and bailing techniques. Heavy equipment, such as pumps and generators, will only be lifted with the legs, preferably using two or three personnel.

2.5. Soil vapor sampling

If results of the ground water sampling indicate that a potential soil vapor pathway exists, exterior soil gas samples will be collected at up to 25 locations.

Discrete samples of soil gas will be collected using a dedicated soil gas sampling implant installed at a depth of four feet below ground surface at each location. This task presents no additional hazards other than those described as general site hazards in Section 2.1 above, and the general PPE requirements presented in that section apply to this task.

2.6. Sub-slab vapor sampling, indoor air sampling and background air sampling

The collection of surface soil samples may involve contact with potentially contaminated environmental media. This task presents no additional hazards other than those described as general site hazards in Section 2.1 above, and the general PPE requirements presented in that section apply to this task.

2.7. Sample and field equipment handling

This task presents no additional hazards other than those described as general site hazards in Section 2.1 above, and the general PPE requirements presented that section apply to this task.

2.8. Survey of sample locations

This task presents no additional hazards other than those described as general site hazards in Section 2.1 above, and the general PPE requirements presented that section apply to this task.

(This page intentionally left blank)

3. Personnel training

3.1. Site workers

O'Brien & Gere employees performing the activities listed in the RIWP must have completed a training course of at least 40 hours meeting the requirements of 29 CFR 1910.120(e) for safety and health at hazardous waste operations. If the course was completed more than 12 months before the date of site work, completion of an approved, 8-hour, refresher course on health and safety at hazardous waste operations is required.

3.2. Management and supervisors

In addition to the requirements described in Section 3.1 for O'Brien & Gere site workers, field supervisors performing on-site operations must have completed a training course of at least 8-hour duration meeting the requirements of 29 CFR 1910.120(e) on supervisor responsibilities for safety and health at hazardous waste operations.

3.3. Emergency response personnel

O'Brien & Gere employees who respond to emergencies involving health and safety hazards must be trained in how to respond to such emergencies in accordance with the provisions of 29 CFR 1910.120(l). Skills such as cardiopulmonary resuscitation (CPR), mouth-to-mouth rescue breathing and basic first aid skills may be necessary. Off-site personnel who respond to emergencies on site will be briefed on potential site hazards by the SSHC before being permitted to enter the buffer and exclusion zones.

3.4. Site-specific training

Site-specific training will be provided to O'Brien & Gere employees and reviewed before implementing field assignments. O'Brien & Gere personnel will be briefed daily by the Site Supervisor or by the SSHC as to the potential hazards that may be encountered during that day. Topics will include:

- Availability of this HASP
- General site hazards and specific hazards in the work areas

- Selection, use, testing, and care of the body, eye, hand, foot and respiratory protective equipment being worn and the limitations of each
- Emergency response procedures and requirements
- Emergency notification procedures and evacuation routes to be followed
- Procedures for obtaining emergency assistance and medical attention.

3.5. Training certification

A record of employee training completion will be maintained by the SSHC for each on-site O'Brien & Gere employee who is trained. This record will include the dates of the completion of worker training, supervisor training, refresher training, emergency response training, and site-specific training for on-site O'Brien & Gere employees.

4. Personnel protection

The basic level of personal protective equipment (PPE) to be used during field activities associated with implementation of the site characterization is OSHA Level D. PPE may be upgraded based on air monitoring results or at the discretion of the Project Manager and based on recommendations of the SSHC. A downgrade of PPE must be approved by the SSHC and the Project Manager.

If the SSHC determines that field measurements or observations indicate that a potential exposure is greater than the protection afforded by the equipment or procedures specified in this or other sections of this HASP, the work will be stopped. O'Brien & Gere personnel will be removed from the site until the exposure has been reduced or the level of protection has been increased.

O'Brien & Gere respirator users have been trained, medically approved and fit tested to use respiratory protection. Respirators issued are approved for protection against dust and organic vapors by the National Institute for Occupational Safety and Health (NIOSH). Respirators are issued for the exclusive use of one worker and will be cleaned and disinfected after each use by the worker. Respirator users must check the fit of the respirator before each day's use to see that it seals properly. The respirator must seal against the face so that the wearer receives air only through the air purifying cartridges attached to the respirator. No facial hair that interferes with the effectiveness of a respirator will be permitted on personnel required to wear respiratory PPE. Cartridges and filters for air-purifying respirators in use will be changed at the end of each workday that an air-purifying respirator is worn, unless the SSHC determines that a change is not necessary. The user will inspect the integrity of air-purifying respirators daily and record the inspection per the O'Brien & Gere Quality Assurance Manual.

4.1. Protective equipment description

The level of personal protective equipment is categorized as Level A, B, C, or D, based upon the degree of protection required. For each level, hard hats will be required if dangers related to overhead objects may be present. For drilling activities, hard hats will be worn at all times. For other tasks, hard hats will be worn as necessary.

The following is a brief summary of the levels that may be used on this site.

Level C - The concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air-purifying respirators are met. The following constitute Level C equipment:

- NIOSH approved full-face air purifying respirator with organic vapor/acid gases cartridges and P100 filters
- Chemical-resistant clothing (polyethylene coated overalls, chemical-splash suit, disposable chemical-resistant overalls) with ankles and cuffs taped closed
- Gloves, outer, nitrile, chemical-resistant
- Gloves, inner, nitrile, chemical-resistant
- Shoes, with steel toe and shank meeting ANSI requirements
- Boots, outer neoprene or Chemical resistant (latex or neoprene) boot covers
- Hearing protection, if necessary
- Hard hat, if necessary
- Face shield when not wearing a full-face respirator.

Modified Level D - A work uniform providing additional skin protection when respiratory protection is not necessary. The following constitute Modified Level D equipment:

- Chemical-resistant clothing (polyethylene coated overalls, chemical-splash suit, disposable chemical-resistant overalls) with ankles and cuffs taped closed
- Gloves, outer, nitrile, chemical-resistant
- Gloves, inner, nitrile, chemical-resistant
- Shoes, with steel toe and shank meeting ANSI requirements
- Boots, outer neoprene or chemical resistant (latex or neoprene) boot covers
- Hearing protection, if necessary
- Hard hat, if necessary
- Escape mask (optional)
- Face shield when not wearing other eye protection

Level D - A work uniform affording minimal protection, used for nuisance contamination only. The following constitute Level D equipment:

- Coveralls or other appropriate work clothing
- Shoes, with steel toe and shank meeting ANSI requirements
- Optional chemical resistant boot covers
- Safety glasses or chemical splash goggles
- Gloves, nitrile if handling wet materials
- Hearing protection, if necessary
- Hard hat, if necessary
- Escape mask (optional).

4.2. Protective equipment failure

If an individual experiences a failure or other alteration of PPE that may affect its protective ability, that person is to leave the work area immediately. The Project Manager or the SSHC must be notified and, after reviewing the situation, is to determine the effect of the failure on the continuation of on-going operations. If the Project Manager or the SSHC determines that the failure affects the safety of workers, the work site, or the surrounding environment, workers are to be evacuated until corrective actions have been taken. The SSHC will not allow re-entry until the equipment has been repaired or replaced and the cause of the failure has been identified.

(This page intentionally left blank)

5. Medical monitoring

5.1. Medical surveillance program

O'Brien & Gere has implemented a medical monitoring program in accordance with 29 CFR 1910.120. The O'Brien & Gere program is designed to monitor and reduce health risks to employees potentially exposed to hazardous materials and to provide baseline medical data for each employee involved in work activities. It is also designed to determine the employee's ability to wear personal protective equipment such as chemical resistant clothing and respirators.

Medical examinations are administered on a post-employment and annual basis and as warranted by symptoms of exposure or specialized activities. The examining physician is required to make a report to O'Brien & Gere of any medical condition that would increase the employee's risk when wearing a respirator or other PPE. O'Brien & Gere maintain site personnel medical records as required by 29 CFR 1910.120 and by 29 CFR 1910.1020, as applicable.

O'Brien & Gere employees performing the activities listed in the Work Plan of this document have or will receive medical tests as regulated by 29 CFR 1910.120. Where medical requirements of 29 CFR 1910.120 overlap those of 29 CFR 1910.134, the more stringent of the two will be enforced.

5.2. Respirator clearance

Employees who wear or may wear respiratory protection have been provided respirators as required by 29 CFR 1910.134. This standard requires that an individual's ability to wear respiratory protection be medically certified before performing designated duties.

(This page intentionally left blank)

6. Air monitoring

Unidentified organic vapors may be present in the investigation areas at the Sites. Real time monitoring of these substances may be conducted on-site by, or under the supervision of, the SSHC. The SSHC will evaluate whether the personal protective measures employed during field activities are appropriate and will modify the protective measures accordingly. The SSHC will be responsible to maintain monitoring instruments throughout the investigation.

Personal monitoring must be conducted in the breathing zone and, if workers are wearing respiratory protective equipment, outside the face piece.

6.1. Field instrumentation and sampling

Field health and safety air sampling for the remedial investigation will consist of organic vapor monitoring using a photoionization detector (PID) (Section 6.1.1) according to provisions of Section 2 and Table 2-1.

6.1.1. Photoionization detector

The air will be monitored with a portable PID equipped with a 10.2 electron volt detector (check to make sure this is the appropriate detector for the COPCs at this site) to detect the presence and concentration of organic vapors before sampling and during intrusive field activities (monitoring well installations and soil gas sampling). PID monitoring is conducted in the *work zone*.

PID monitoring will be initiated before starting sampling and intrusive field activities and, if the action levels are exceeded, continuously in the breathing zone of the worker collecting the samples. If the PID readings are less than 5 ppm then monitoring will be completed at a frequency of approximately every 15 minutes.

Personnel monitoring samples will be collected in the breathing zone and, if workers are wearing respiratory protective equipment, outside the face piece. The sampling strategies may change if work tasks or operations change. Monitoring instruments will be checked for appropriate response, in accordance with the manufacturer's instructions, before use each sampling day.

Hazard Monitored: Many organic and some inorganic gases and vapors.

Application: Detects the presence and total concentration of many organic and some inorganic gases and vapors.

Detection Method: Ionizes molecules using UV radiation, produces a current that is proportional to the number of ions present.

General Care and Maintenance: Recharge daily or replace the battery. Regularly clean the lamp window. Regularly clean and maintain the instrument and its accessories. Turn the function switch to "stand-by" and allow the instrument to "warm up" for 5 min.

Typical Operating Time: Approximately 10 hours, or 5 hours with strip chart recorder.

6.2. Action levels

Action levels presented in this section are intended primarily for the protection of workers implementing the RI activities. The action levels are used to assess when activities should stop, when site evacuation is necessary, to select emergency response levels, and to change PPE levels. The action levels are listed in Table 6-1 below.

6.2.1. Organic vapors

Organic vapors may be released during intrusive activities such as well installation and sample collection. A PID will be used to detect the presence of organic vapors.

PID monitoring

The breathing zone will be monitored continuously when VOC levels in the sampling zone exceed 5 ppm above background. Actions, such as keeping the sampling upwind of motors and fuel areas will be implemented to reduce potential interference due to vapors that may be associated with motor operation.

PPE will upgraded to Level C, which includes air purifying respirators and chemical resistant clothing (Section 4), when the VOC concentration in the respective breathing zone exceeds 5 ppm above background as indicated on the PID. If the measured VOC concentration is greater than or equal to 50 ppm above background, the workers will leave that work area.

Table 6-1. *Vapor monitoring requirements*

Total VOC Concentration (ppm)	Method	Monitoring zone	Monitoring requirements	PPE
<5	PID	Work zone	Continue working with periodic monitoring (i.e., 15 minutes).	Level D
≥5 to 10	PID	Work zone	Monitor at 15-minute intervals in the work zone. Check Downwind VOC levels.	Upgrade to Level C, which includes an air-purifying respirator.
10-50	PID	Work zone	Monitor continuously in the work zone. During outdoor sampling activities, monitor at 15-minute intervals downwind of the work zone.	Level C.
>50	PID	Work zone	Vacate area	Vacate area.
< 5	PID	Downwind of Work Zone	Work may continue but monitor downwind VOC levels every 15 minutes until Work Area VOC levels are <5 ppm.	Level D
≥ 5	PID	Downwind of Work Zone	Stop work until downwind VOC levels are <5 ppm	Level C

6.3. Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for VOCs and particulates 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 NYSDOH has supplied a generic CAMP, suggested as sufficient to cover many, if not most sites; 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 will be determined in consultation with NYSDOH.

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for 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 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.

6.3.1. VOC monitoring, response levels, and actions

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

6.3.2. 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/m3) 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/m3 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/m3 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/m3 of the upwind level and in preventing visible dust migration.

Readings will be recorded and will be available for NYSDEC and NYSDOH personnel to review.

7. Site control

7.1. Site security

Site security will be monitored and controlled by the Site Supervisor or the SSHC. Their duties will include limiting access to the work area to authorized personnel, overseeing project equipment and materials, and overseeing work activities. The procedures specified below will be followed to control access to each work site to prevent persons who may be unaware of site conditions from exposure to hazards. Work area control procedures may be modified as required by site conditions.

7.2. Site control

Work zones will be required during site activities identified in this HASP. The following two categories of work zones will be established at each sampling point: an exclusion zone and a buffer zone. The remainder of the site will be the support zone.

7.2.1. Exclusion zone

The exclusion zone is where sampling activities are conducted. The SSHC will identify this zone. The exclusion zone must be at least 30 feet in diameter and centered on the work activities.

7.2.2. Buffer zone

The buffer zone contains personnel and equipment decontamination stations and staging areas for samples. The buffer zone will be located upwind of the work activities. It will only be large enough to contain equipment and personnel necessary to keep potentially contaminated media and materials in the immediate work area.

7.2.3. Support zone

The remainder of the area is defined as the support zone. The support zone contains support facilities, extra equipment, transport vehicles, and additional personnel and equipment necessary to manage and perform work activities.

7.3. Site access procedures

Access during field activities will be limited to those personnel required. Such personnel are anticipated to include, but will not necessarily be limited to, O'Brien & Gere employees or subcontractors and those representatives as designated by NYSDEC or local agencies. Site access will be monitored by the SSHC, who will maintain a log-in sheet. The log will include O'Brien & Gere and other personnel on the site, their arrival and departure times and their destination on the site.

7.4. Site communications

A cellular telephone will be used during activities to facilitate communications for emergency response and other purposes and to serve as the primary off-site communication network.

7.5. Confined space entry

No entry of permit-required confined spaces is expected while O'Brien & Gere personnel perform the tasks listed in the RIWP. A confined space is defined as a space that has limited or restricted means for entry (*e.g.*, tanks, vessels, silos, storage bins, hoppers, vaults, and pits) and is not designed for continuous employee occupancy.

8. Decontamination

8.1. Personnel decontamination procedures

The SSHC will be responsible for supervising the proper use and decontamination of PPE. The SSHC will also establish and monitor the decontamination line.

Decontamination involves scrubbing with a soap and water solution followed by rinses with potable water. Decontamination will take place on a decontamination pad. Dirt, oil, grease, or other foreign materials that are visible will be removed from surfaces. Scrubbing with a brush may be required to remove materials that adhere to the surfaces. Splash protection garments will be washed with soap and potable water before removal. Non-disposable garments will be air dried before storage. Wastewater from personnel decontamination will be disposed of with the wastewater from equipment decontamination. Respirators will be sanitized as well as decontaminated each day before re-use. The manufacturer's instructions will be followed to sanitize the respirator masks.

The following decontamination protocol, or one providing the same level of decontamination, will be followed:

Station 1: Equipment Drop

Provide an area covered with a plastic drop cloth. Deposit equipment used on-site including tools, sampling devices and containers, monitoring instruments, radios and clipboards on the plastic drop cloth. During hot weather, a cool down station with chairs, fans, and replenishing beverages may be set up in this area.

Station 2: Outer Garment, Boots, and Gloves Wash and Rinse

Establish a wash station for gloves, boots, and the protective suit (when worn). Scrub outer boots, outer gloves, and protective suit with detergent and water. Rinse with potable water.

Station 3a: Outer Boot and Glove Removal

Provide seating for use during the removal and collection of outer boots. Remove outer boots. Deposit them in a container with a plastic liner. If the boots are to be reused after cleaning, place them in a secure location near the work site. Provide a location for removal, collection, and

disposal of outer gloves. Remove the outer gloves. Deposit them in a container for disposal.

Station 3b: Filter or Cartridge Exchange

This station will be established only if respirators are worn. The worker's respirator cartridges and filters can be exchanged, new outer gloves and outer boots donned, and joints taped at this station. From here the worker can return to work duties in the exclusion zone.

Station 4: Outer Garment Removal

This station will only be provided if a protective outer garment is worn. Provide a bench to sit on during the removal of the protective garment. If the garment is disposable, deposit it in a container with a plastic liner; otherwise, hang it up to air dry.

Station 5: Respirator Removal

This station will be established only if respirators are worn. Remove the respirator. Avoid touching the face with gloved fingers. Deposit the respirator on a plastic sheet.

Station 6: Inner Glove Removal

Remove and dispose of inner gloves. Deposit them in a container with a plastic liner. If the gloves are to reused, place them in a secure location near the work site, preferably in a plastic container.

Station 7: Field Wash

Provide a place for a field wash. Wash hands and face thoroughly.

8.2. Emergency decontamination procedures

Although no contact with chemicals that present a hazard is anticipated during the field program, this section has been included in case of an emergency. The extent of emergency decontamination depends on the severity of the injury or illness and the nature of the contamination. Minimum decontamination will consist of detergent washing, rinsing and removal of contaminated outer clothing and equipment. If time does not permit the completion of all of these actions, it is acceptable to remove the contaminated clothing without washing. If the situation is such that the contaminated clothing cannot be removed, the person should be given required first aid treatment, and then wrapped in plastic or a blanket prior to transport to medical care. If heat stress is a factor in the victim's illness/injury, outer clothing will be removed from the victim immediately

8.3. Monitoring equipment decontamination procedures

Sampling equipment used for health monitoring purposes will be cleaned of visible contamination and debris before initial use on site, between uses, and after final use. Monitoring equipment that contacts contaminated media will be decontaminated after each use by a low phosphate detergent brushing followed by a clean water rinse. After decontamination, monitoring equipment will be stored separately from personal protective equipment. Decontaminated or clean equipment not in use will be covered with plastic and stored in a designated storage area in the support zone.

8.4. Decontamination supplies

The following supplies will be available on site for the decontamination of personnel and equipment:

- Plastic drop cloths
- Plastic bags or DOT-approved fiberboard drums to collect non-reusable protective clothing
- Plastic wash tubs
- Soft bristled long-handle brushes
- DOT-approved drums or appropriate other containers, to collect wash and rinse water
- Hand spray units for decontamination
- Soap, water, alcohol wipes, and towels to wash hands, faces, and respirators
- Washable tables and benches or chairs.

8.5. Collection and disposition of contaminated materials

Cuttings and field decontamination wastes are to be collected, drummed, and disposed of in accordance with the procedures in the RIWP. Investigation derived waste will be managed as described in the RIWP.

8.6. Refuse disposal

Site refuse will be contained in appropriate areas or facilities. Trash from the project will be properly disposed.

(This page intentionally left blank)

9. Emergency response

9.1. Notification of site emergencies

In an emergency, site personnel will signal distress either by yelling or with three blasts from a horn (*e.g.*, vehicle horn, air horn). The SSHC, Site Supervisor, or the Project Manager will be notified as soon as practicable of the nature and extent of the emergency.

The nearest emergency care facility is the South Nassau Community Hospital Emergency Room, located at 1 Healthy Way in Oceanside, NY (1.72 miles away), shown on Figure 9-1 below.

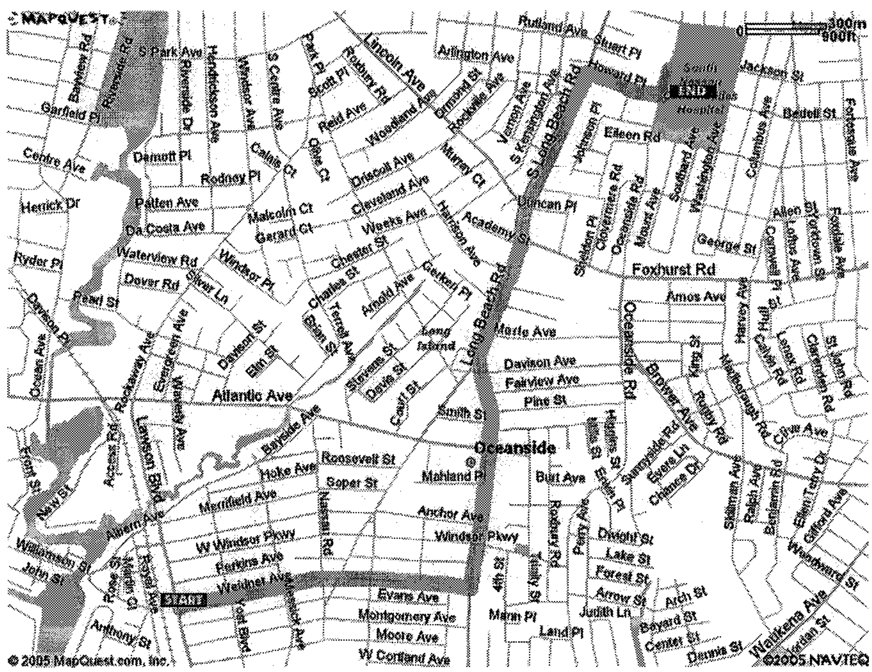


Figure 9-1. *Directions from site to South Nassau Community Hospital*

Directions to South Nassau Community Hospital from the site are provided in Table 9-1 below:

Table 9-1. *Directions to South Nassau Community Hospital*
Emergency Room
1 Healthy Way, Oceanside, NY 11572 US
Phone: 516-632-3900

Directions	Approx. Distance
1: Start out going NORTH on LAWSON BLVD toward WEIDNER AVE.	<0.1 miles
2: Turn RIGHT onto WEIDNER AVE.	0.6 miles
3: Turn LEFT onto LONG BEACH RD.	1.2 miles
4: Turn RIGHT onto HOWARD PL.	0.1 miles
5: Turn LEFT onto OCEANSIDE RD.	<0.1 miles
6: Turn RIGHT onto OSWALD CT.	<0.1 miles
7: End at South Nassau Community Hospital ER	

Should someone be transported to a hospital or doctor, a copy of this HASP should be provided as information for medical personnel.

Table 9-2, located below, contains emergency telephone numbers. This table will be kept with the portable telephone and updated as needed by the SSHC. The portable telephone will be used to notify off-site personnel of emergencies. The operating condition of this telephone will be determined daily before initiation of activities.

Table 9-2. *Emergency Response Contact List*

Railroad Cleaners and Hercules Machine Sales Sites

Agency	***Contact/Function***	***Phone Number***
Nassau County Police Dept.	Report Incidents	911
NYS Police Dept.	Report Incidents	911 or 1-800-342-4357
Columbia Engine Company	Report Fire	911
South Nassau Community Hospital 1 Healthy Way Oceanside, NY 11572	Main Information	516-632-3900
USEPA Emergency Response Team		212-340-6656
CHEMTREC	Chemical Emergencies	1-800-424-9300
NYSDEC Albany, NY	Emergency	1-800-342-9296
Emergency NYSDEC Project Contact	Jeffrey L. Dyber	1-518-402-9621
Oil Spill		1-800-457-7362
Poison Control Center		1-800-336-6997
Chemical Emergency Advice		1-800-424-9300
National Spill Response Center		1-800-424-8802

9.2. Responsibilities

The SSHC is responsible for responding to, or coordinating the response of off-site personnel to, emergencies. In the event of an emergency, the SSHC will direct notification and response, and will assist the Site Supervisor in arranging follow-up actions. Upon notification of an exposure incident, the SSHC will call the hospital, fire, and police emergency response personnel for recommended medical diagnosis, treatment if necessary, and transportation to the hospital.

Before the start of investigation activities at the Sites, the SSHC will:

1. Confirm that the following safety equipment is available: eyewash station, first aid supplies, and a fire extinguisher

2. Have a working knowledge of the O'Brien & Gere safety equipment.

3. Confirm the most direct route to South Nassau Community Hospital (Table 9-1) is prominently posted with the emergency telephone numbers (Table 9-2).

4. Confirm that employees who will respond to emergencies have been appropriately trained.

Before work may resume following an emergency, used emergency equipment must be recharged, refilled, or replaced and government agencies must be notified as required.

The Project Manager, assisted by the SSHC and the Site Supervisor, must investigate the incident as soon as possible. The Project Manager will evaluate whether and to what extent exposure actually occurred, the cause of exposure, and the means to prevent similar incidents. The resulting report must be signed and dated by the Project Manager, the SSHC, and the Site Supervisor.

9.3. Accidents and injuries

In case of an accident or injury, workers will immediately implement emergency isolation measures to assist those who have been injured or exposed and to protect others from hazards. Upon notification of an exposure incident, the SSHC will contact emergency response personnel who can provide medical diagnosis and treatment. If necessary, immediate medical care will be provided by personnel trained in first aid procedures. Other on-site medical or first aid response to an injury or illness will be provided only by personnel competent in such matters. In addition, the O'Brien & Gere Corporate Associate for Safety and Health

will be notified within 24-hours of an accident involving O'Brien & Gere personnel and/or its subcontractors.

9.4. Safe refuge

Before commencing site activities, the SSHC will identify the location that will serve as the place of refuge for O'Brien & Gere workers in case of an emergency evacuation. During an emergency evacuation, personnel in the exclusion zone should evacuate the work area for their own safety and to prevent hampering rescue efforts. Following an evacuation, the SSHC will account for site personnel.

9.5. Fire fighting procedures

A fire extinguisher meeting the requirements of 29 CFR Part 1910 Subpart L, as a minimum, will be available in the support zone during on-site activities. This is intended to control small fires. When a fire cannot be controlled with the extinguisher, the exclusion zone will be evacuated, and the fire department will be contacted immediately. The SSHC or the Site Supervisor will evaluate when to contact the fire department.

9.6. Emergency equipment

The following equipment, selected based on potential site hazards, will be maintained in the support zone for safety and emergency response purposes:

- Fire extinguisher
- First aid kit
- Eye wash bottles.

9.7. Emergency site communications

Hand and verbal signals will be used at the site. Portable telephones will be available during site activities for emergency response communications.

9.8. Security and control

Work zone security and control during emergencies, accidents, and incidents will be monitored by the SSHC or the Site Supervisor. The duties of the SSHC or the Site Supervisor include limiting access to the

work zones to authorized personnel and overseeing emergency response activities.

(This page intentionally left blank)

10. Special precautions and procedures

The activities listed in the FAP may expose personnel to both chemical and physical hazards. The hazards associated with specific site activities are discussed in Section 2. The potential for exposure to hazardous situations will be significantly reduced through the use of air monitoring, PPE, hazard awareness training, and administrative and engineering controls. Other general hazards that may be present on a hazardous waste work site are discussed below.

10.1. Heat stress

The timing and location of this project may be such that heat stress could pose a threat to the health and safety of site personnel. The SSHC will implement work and rest regimens so that O'Brien & Gere personnel do not suffer adverse effects from heat. These regimens will be developed by the SSHC following the guidelines in the 1997 edition of the American Conference of Governmental Industrial Hygienists (ACGIH) *Threshold Limit Values for Physical Agents in the Work Environment.* Special clothing and an appropriate diet and fluid intake will be recommended to O'Brien & Gere personnel involved in the activities specified in Section 2 to further reduce this hazard. In addition, ice and fluids will be provided as appropriate in the support zone.

10.2. Cold injury

The timing and location of this project may be such that cold injury could pose a threat to the health and safety of site personnel. Factors that influence the development of a cold related injury include ambient temperatures, wind velocity and wet clothing and skin. The SSHC will implement work and rest regimens so that O'Brien & Gere personnel do not suffer adverse effects from cold. These regimens will be developed by the SSHC following the guidelines in the 1997 edition of the ACGIH *Threshold Limit Values for Physical Agents in the Work Environment.* Special clothing and an appropriate diet and fluid intake will be recommended to O'Brien & Gere Engineers personnel involved in the activities specified in Section 2 to further reduce this hazard. In addition, fluids will be provided as appropriate in the support zone.

10.3. Heavy machinery/equipment

O'Brien & Gere employees performing site activities may use or work near operating heavy equipment and machinery. Respiratory protection and protective eyewear may be worn during portions of work activities. Since this protective equipment reduces peripheral vision of the wearer, O'Brien & Gere personnel should exercise extreme caution near operating equipment and machinery to avoid physical injury to themselves or others.

10.4. Additional safety practices

The following are important safety precautions that will be enforced during the completion of the activities listed in Section 2:

1. Contact with potentially contaminated surfaces should be avoided whenever possible. Workers should minimize walking through puddles, mud, or other discolored surfaces; kneeling on ground; and leaning, sitting, or placing equipment on drums, containers, vehicles, or the ground.

2. Medicine and alcohol can mask the effects of exposure to certain compounds. Consumption of prescribed drugs must be at the direction of a physician.

3. O'Brien & Gere personnel and equipment in the work areas will be minimized consistent with effective site operations.

4. Unsafe or inoperable equipment left unattended will be identified by a "DANGER, DO NOT OPERATE" tag.

5. Activities in the exclusion zone will be conducted using the "Buddy System." The Buddy is another worker fully dressed in the appropriate personal protective equipment who can perform the following activities:

   - Provide partner with assistance
   - Observe partner for sign of chemical or heat exposure
   - Periodically check the integrity of partner's PPE
   - Notify others if emergency help is needed.

6. The HASP will be reviewed frequently for its applicability to the current and upcoming operations and activities.

10.5. Daily log contents

The Project Manager and the SSHC will establish a system appropriate to the remedial investigation areas that will record, at a minimum, the following information:

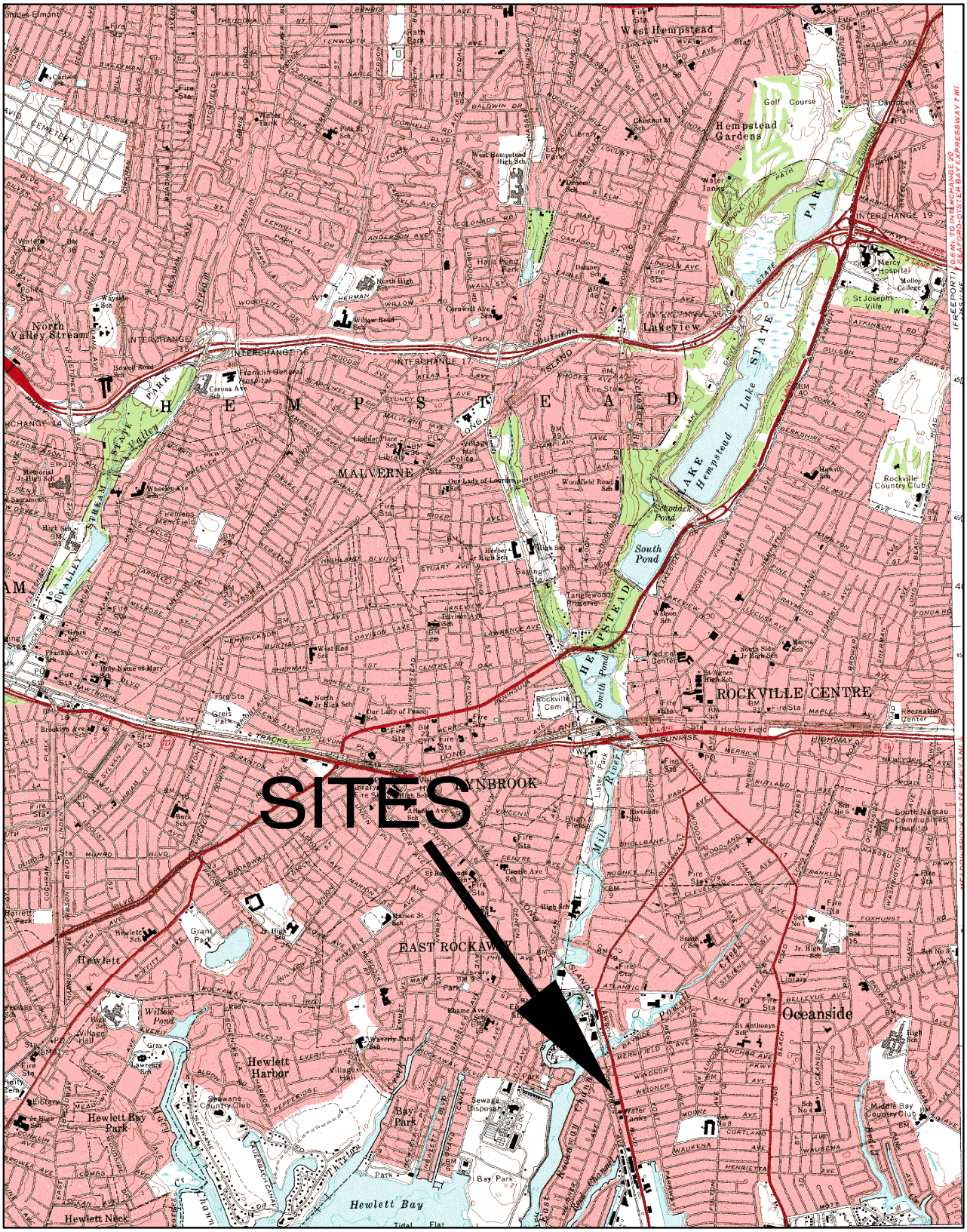
1. O'Brien & Gere personnel and other personnel conducting the site activities, their arrival and departure times, and their destination at the investigation areas

2. Incidents and unusual activities that occur on the site such as, but not limited to, accidents, breaches of security, injuries, equipment failures and weather related problems

3. Changes to the Work Plan and the HASP

4. Daily Information such as:

    - Work accomplished and the current site status
    - Air monitoring results



O'BRIEN & GERE ENGINEERS INC.

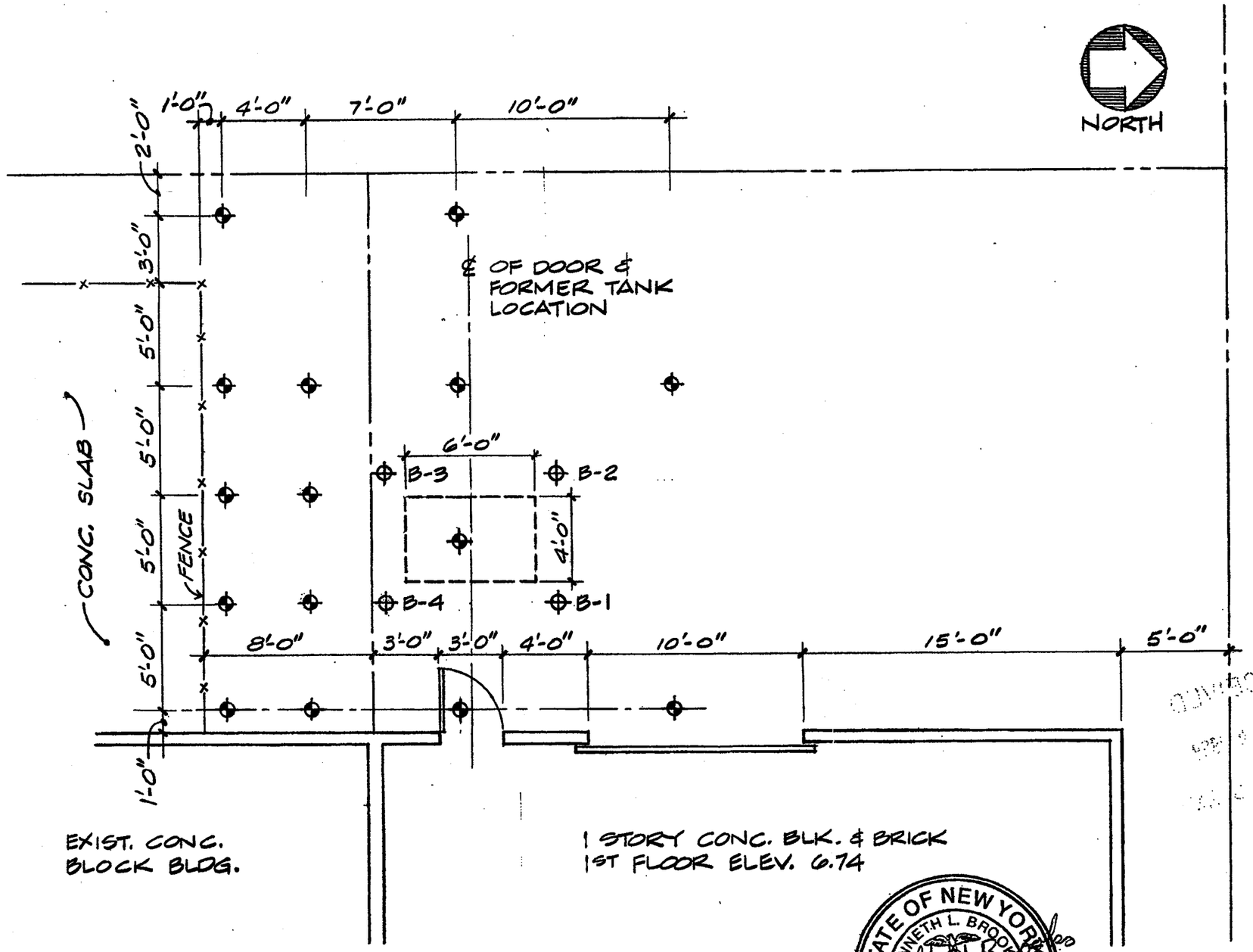
FIGURE 1-1
Site Location Map
Railroad Dry Cleaners and
Hercules Machine Sales
Oceanside, New York

FILE NO.	10653/37556
DATE	January 2006
DWG NO.	Rev. 1

Exhibits

Exhibit 1

Historical Sample Locations



LEGEND

- ⊕ PHASE I SAMPLE LOCATION
- ⊕ PHASE II SAMPLE LOCATION

STATE OF NEW YORK
KENNETH L. BROOKS
LICENSED PROFESSIONAL ENGINEER
No. 64922

JOB NO. 88-069-02

RAIL ROAD DRIVE-IN CLEANERS

PHASE II SAMPLING LOCATIONS

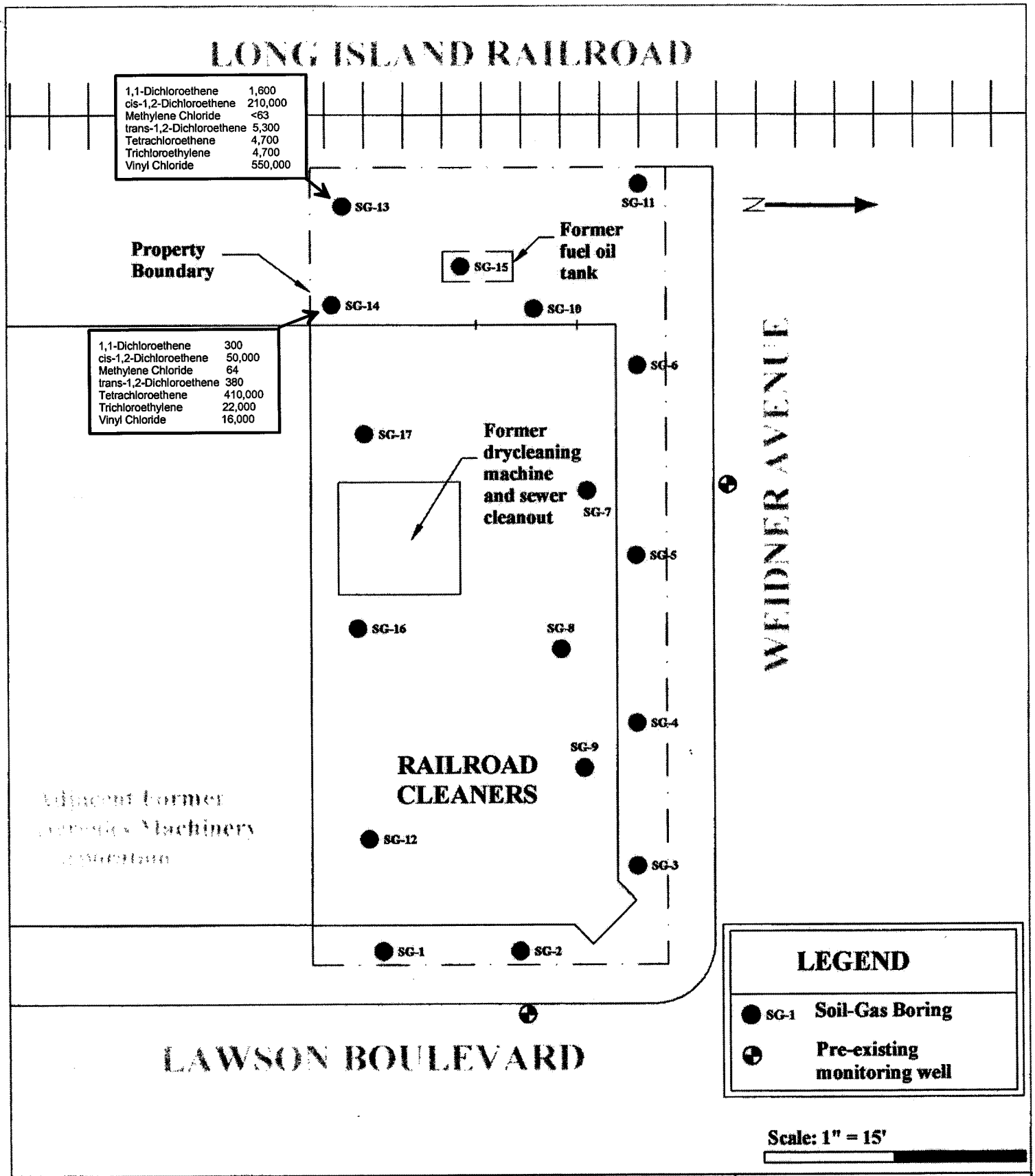
RICHARD D. GALLI P.E.,P.C.
52 BROADWAY - GREENLAWN, NY 11740

DR AXC	SCALE 3/16"=1'-0"	DWG. NO. 2
CKD KLB	DATE 7-11-89	
APPD KLB		

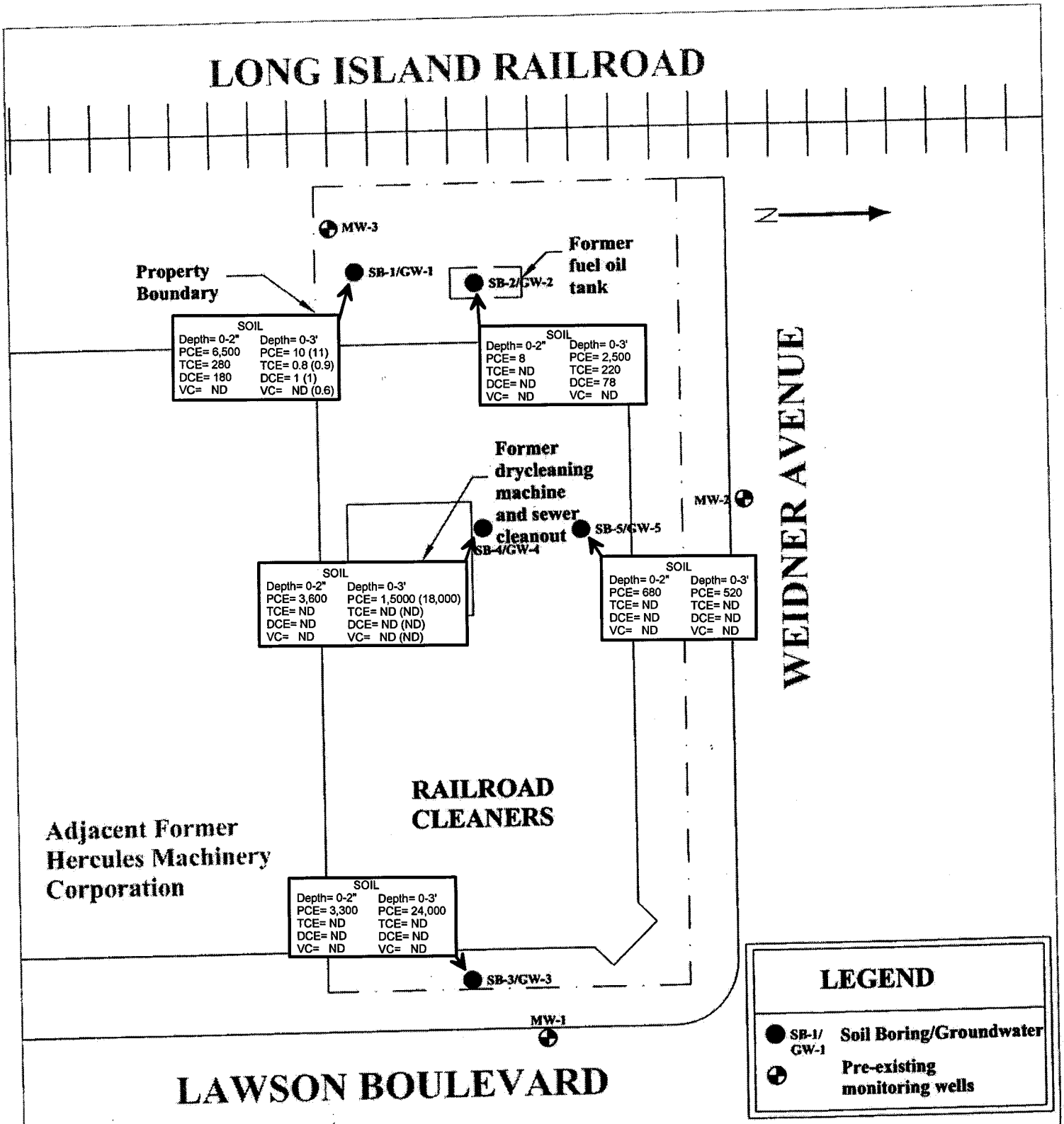
N30251

Exhibit 2

EEA, Inc. Historical Sample Locations



EEA, Inc. *55 Hilton Avenue* *Garden City, New York* *(516) 746-4400*	**Site Location Plan** Railroad Cleaners 3180 Lawson Boulevard Oceanside, New York	**Figure 1** Drawn By: FI Date: 10/1/03 | Job No. 02730



EEA, Inc.

55 Hilton Avenue
Garden City, New York
(516) 746-4400

Site Location Plan

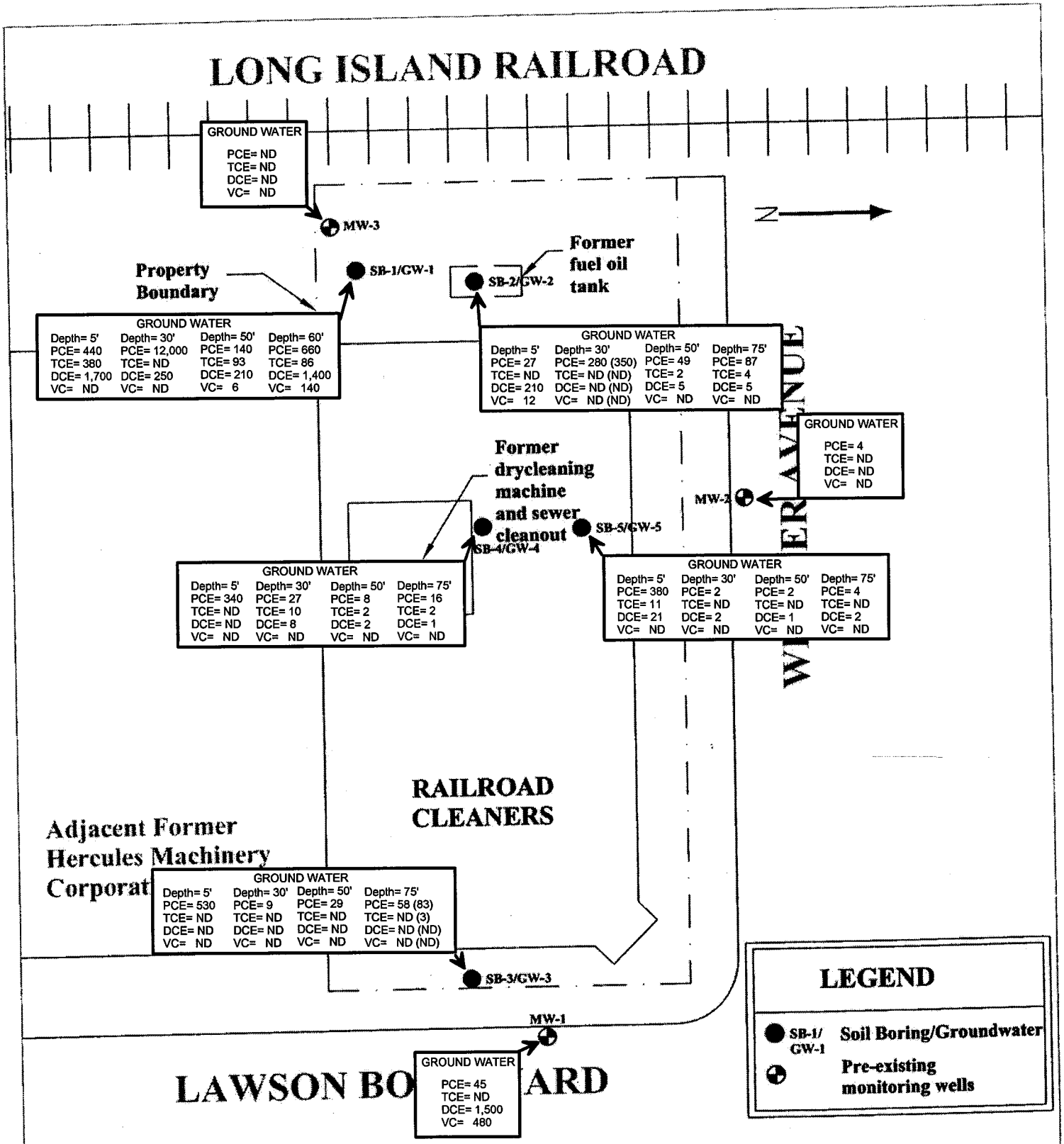
Railroad Cleaners
3180 Lawson Boulevard
Oceanside, New York

Figure 1

Drawn By: FI

Date: 06/21/03

Job No. 02730



EEA, Inc.

55 Hilton Avenue
Garden City, New York
(516) 746-4400

Site Location Plan

Railroad Cleaners
3180 Lawson Boulevard
Oceanside, New York

Figure 1

Drawn By: FI

Date: 06/21/03

Job No. 02730

Exhibit 3

CA Rich Consultants, Inc.
Investigation Results

TABLE 1

Summary of Soil Gas Survey Results

Hercules Dry Cleaning Equipment, Inc. & David Goldman
3188 Lawson Boulevard
Oceanside, NY 11527

Date Sampled	Sample ID	Appx. Depth	Matrix	Ambient Background	Total Organic Vapor
10/8/2003	SG-1	18"	Soil Gas	2.0	2.1
10/8/2003	SG-2	18"	Soil Gas	2.3	2.4
10/8/2003	SG-3	18"	Soil Gas	2.5	20.0
10/8/2003	SG-4	18"	Soil Gas	3.0	3.2
10/8/2003	SG-5	18"	Soil Gas	0.9	12.8
10/8/2003	SG-6	18"	Soil Gas	2.6	51.5
10/8/2003	SG-7	18"	Soil Gas	1.8	5.3
10/8/2003	SG-8	18"	Soil Gas	2.0	8.6
10/8/2003	SG-9	18"	Soil Gas	1.6	16.0
10/8/2003	SG-10	18"	Soil Gas	2.6	9.0
10/8/2003	SG-11	18"	Soil Gas	1.0	3.9
10/8/2003	SG-12	18"	Soil Gas	1.2	32.2
10/8/2003	SG-13	18"	Soil Gas	2.1	185.0
10/8/2003	SG-14	18"	Soil Gas	2.5	1150.0
10/8/2003	SG-15	18"	Soil Gas	10.2	663.0
10/8/2003	SG-16	18"	Soil Gas	13.0	56.0
10/8/2003	SG-17	18"	Soil Gas	11.3	1487.0
10/8/2003	SG-18	18"	Soil Gas	15.5	126.0
10/8/2003	SG-19	18"	Soil Gas	12.8	41.6
10/8/2003	SG-20	18"	Soil Gas	7.2	203.0
10/8/2003	SG-21	18"	Soil Gas	11.6	1220.0
10/8/2003	SG-22	18"	Soil Gas	11.9	>600.0

Total Organic Vapor measured in ppm (parts per million)
Using a Minirae 2000 PID