SOIL VAPOR EXTRACTION AND AIR SPARGE REMEDIAL ACTION WORK PLAN

Former Duralab Property
Brooklyn, New York

April 21, 1998

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1.0 INTRODUCTION

Roux Associates, Inc. (Roux Associates), on behalf of Federal Express Corporation (Federal Express), has prepared this Remedial Action Work Plan (RAWP) for the former Duralab Equipment Corporation (Duralab) property in Brooklyn, New York (Site). The purpose of the RAWP is to present the remedial program to address soil and ground-water contamination identified at the Site. Prior to performing this work, Federal Express will enter into the New York State Department of Environmental Conservation (NYSDEC) Voluntary Cleanup Program (VCP). Federal Express has made a long-term commitment to develop this property into a major distribution facility in Brooklyn, New York. As part of the redevelopment process, Federal Express performed several environmental site assessments (ESAs) to evaluate the environmental conditions at the Site. The results of these ESAs (which are presented in more detail in Section 3.0) indicated that a localized hot spot, along with lesser impacted ground-water, is present at the Site. This hot spot primarily consists of trichloroethene (TCE), which is the constituent of concern in both soil and ground water.

To address the soil and ground-water contamination at the Site, a soil vapor extraction and air sparging (SVE/AS) system will be installed, operated and maintained. These processes are described in detail in Section 4.0. This remedial system is intended to remove the majority of the mass of soil and ground-water contamination, which would then be followed by a demonstration through a human health risk assessment (RA) that the residual contamination does not pose a risk to human health. It is anticipated that the remedial system will be operative for approximately six months to remove the major portion of the contamination at the Site.

The remainder of this RAWP includes:

- Section 2.0 - Site Background and Setting;
- Section 3.0 - Previous Environmental Site Assessments (ESAs);
- Section 4.0 - Remedial Design; and
- Section 5.0 - Schedule.

2.0 SITE BACKGROUND AND SETTING

The former Duralab property is located in the Canarsie Section of Brooklyn, New York (Figure 1). The former Duralab property is bordered by Farragut Road, East 108th Street, and a commercial building across East 105th Street to the south, east and west, respectively, while the Long Island Railroad right of way borders the Site to the north (Figure 2). The property is approximately 8.5 acres in size and contains a 165,500 square foot building. The building was built in 1971 with an addition constructed in 1986.

The property is owned by the City of New York. It was leased by Duralab Equipment Corporation from 1971 to 1997 under a ground lease with the City of New York, and was utilized as a cabinet manufacturing facility. In 1997, Duralab ceased operations, and the leasehold estate under the ground lease was purchased by CARGEX Brooklyn Limited Partnership. A detailed description of the manufacturing processes and potential chemicals of concern associated with operation of the property were provided in the Phase I ESA, which is summarized in Section 3.0.

Federal Express is currently working to redevelop the former Duralab property into a major distribution facility in Brooklyn, New York. Federal Express will be subleasing the property from CARGEX Brooklyn Limited Partnership. As part of the redevelopment process, Federal Express retained several environmental consultants to determine the environmental conditions at the Site. A description of the scope and results of the ESAs performed at the Site is provided in Section 3.0.

Pursuant to its sublease with CARGEX Brooklyn Limited Partnership, Federal Express has agreed to remediate certain environmental conditions at the Site through participation in the New York State Voluntary Cleanup Program.

3.0 PREVIOUS ENVIRONMENTAL SITE ASSESSMENTS (ESAs)

This section provides a summary of the scope and key findings of the ESAs performed at the Site on behalf of Federal Express.

3.1 Phase I ESA

In May 1997, Law Environmental Consultants, Inc. (LAW) conducted a Phase I ESA to evaluate the Site for potential environmental concerns. The scope and results of the Phase I ESA were reported in "Report Of Phase I Environmental Site Assessment", dated May 20, 1997. A summary of the scope and results is provided below.

LAW performed a review of available regulatory information, a study of the previous land use and development, and a reconnaissance of the Site and surrounding area.

The results of the Phase I ESA concluded that:

- an empty 1,000 gallon TCE aboveground storage tank (AST) was present within the building;
- the TCE was used in an on-site vapor degreaser to remove oils from cabinets in preparation for painting;
- the spent TCE would collect in a concrete sump of the vapor degreaser and then be pumped through a still for recycling or reuse in the vapor degreaser;
- no TCE was observed in the still or degreaser during the Site visit;
- during the Site visit, paints, TCE, motor oil, grease, and various maintenance material (e.g., lubricants) were observed within the former production areas of the building. These materials were placed in containers that were observed on the concrete floor. Staining of the concrete was not observed;
- a regulatory database search indicated that the Site was listed on the Resource Conservation and Recovery Information System List as a large quantity generator of hazardous waste and on the Chemical Bulk Storage List as using one 1,000 gallon AST for the storage of TCE; and

- no responses were received from the NYSDEC, New York City Department of Environmental Protection or the New York City Fire Department as of the report date regarding Freedom of Information Act requests regarding subsurface soil and ground-water conditions, violations and presence of USTs at this Site.

Based on the Phase I results, LAW recommended that an assessment of the potential impact to soil and ground water be conducted in the vicinity of the 1,000 gallon TCE AST.

3.2 Phase II ESA

In May 1997, LAW conducted a Phase II ESA at the Site based on the results of the Phase I ESA. The purpose of this ESA was to evaluate soil and ground water quality in the vicinity of the TCE AST. The scope and results of the Phase II ESA were reported in "Report Of Phase II Environmental Site Assessment", dated June 10, 1997. A summary of the scope and results is provided below.

Ten soil borings were drilled and sampled beneath the floor slab of the building in the vicinity of the former TCE AST and vapor degreaser. The soil samples collected were screened in the field for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID). A sample from each soil boring was collected and analyzed for VOCs using USEPA Method 8240. Additionally, five soil borings were drilled and sampled beneath the floor slab of the building in the vicinity of the sump adjacent to the former TCE AST, as well as near the former ovens, the former paint booths and the former vapor degreaser. Three of the five soil borings were completed as 1-inch diameter Geoprobe™ micro-monitoring wells. Ground-water samples were collected from the Geoprobe™ micro-monitoring wells, and analyzed for VOCs using USEPA Method 8240.

During the course of the work, the soil samples were inspected and the subsurface materials were found to be comprised of brown fine sands with some silt and gravel. The water levels collected indicated that ground water was at approximately 11 ft below the floor slab.

The soil quality results indicated that only two VOCs (TCE and cis-1,2-dichloroethene) were detected. The TCE ranged from not detected to 326 micrograms per kilogram (µg/kg), while cis-1,2-dichloroethene ranged from not detected to 58.2 µg/kg. The concentration of TCE detected was significantly below its NYSDEC Recommended Soil Cleanup Objective (RSCO) of 700 µg/kg. Please note that there is no NYSDEC RSCO for cis-1,2-dichloroethene.

The ground-water quality results also indicated that only two VOCs (i.e., TCE and cis-1,2 dichloroethene) were detected, which was consistent with the soil quality results. The TCE ranged from 98.1 to 4,090 micrograms per liter (µg/L), while cis-1,2-dichloroethene ranged from 30.1 to 2,120 µg/L.

3.3 Additional Subsurface Investigation - Phase II ESA

In June 1997, LAW conducted an additional Phase II ESA at the Site based on the results of the initial Phase II ESA. The purpose of this ESA was to further define the extent of VOCs in soil and ground water onsite and to evaluate the potential for off-site migration. The scope and results of the additional Phase II ESA were reported in "Report Of Additional Subsurface Investigation - Phase II Environmental Site Assessment," dated July 15, 1997. A summary of the scope of work performed and the results of this work is provided below.

Twelve soil borings were drilled and sampled throughout the Site. The soil samples collected were screened in the field for the presence of VOCs using a PID. A total of seven soil samples were analyzed for VOCs using USEPA Method 8240. Six of the 12 soil borings (B-24, B-26, B-28, B-30, B-33 and B-34) were completed as 1-inch diameter Geoprobe™ micro-monitoring wells, and the remaining six soil borings had a temporary screen installed for a one time ground-water collection. Ground-water samples were collected from the Geoprobe™ micro-monitoring wells, and analyzed for VOCs using USEPA Method 8240.

The soil samples were inspected and the materials were found to be comprised of red-brown fine sands with some silt and gravel. No discoloration, staining or odors were noted during the inspection. Water-level measurements were taken as part of this work and ground water was encountered between 7 to 11 ft below grade.

The soil quality results indicated that no VOCs were detected.

The ground-water quality results indicated that four VOCs (i.e., TCE, cis-1,2-dichloroethene, trans-1,2-dichloroethene and tetrachloroethene [PCE]) were detected at the Site. The TCE ranged from not detected to 1,490 µg/L, while cis-1,2-dichloroethene ranged from not detected to 1,010 µg/L. The two remaining VOCs detected (i.e., trans-1,2-chloroethene and PCE) were detected in only Monitoring Well LMW-25. The trans-1,2-dichloroethene was detected at 9.05 µg/L, while the PCE was detected at 6.05 µg/L.

After completion of the additional Phase II ESA, David J. Sutton, on behalf of JAFCI Management, Inc. (representatives for the current property owner), submitted an August 7, 1997 letter to the NYSDEC Commissioner (John P. Cahill) regarding the a potential on-site environmental concern associated with the 1,000 gallon TCE AST. The letter states that the July 15, 1997 Phase II report was also submitted to the NYSDEC. Additionally, the letter states that qualified bids were being solicited to further investigate the potential concerns and to evaluate the remedial options. The NYSDEC responded in an August 14, 1997 letter that it is understood that the property owner is taking an active role to investigate and remediate potential soil and ground-water contamination as part of the redevelopment of the property for Federal Express. The NYSDEC expressed that the appropriate method of handling the remediation is to enter into the NYSDEC's VCP.

3.4 Pre-Design Study

In January 1998, Roux Associates was retained by Federal Express to review the previous ESAs and to design and construct a remedial system to remove the VOCs detected in the ground water. This work was conducted in advance of Federal Express entering into the NYSDEC VCP. After

review of the data generated to date, Roux Associates identified several data gaps. These data gaps were addressed as part of a Pre-Design Study prior to initiating design of a remedial system for the contamination detected at the Site. A detailed description of the scope of work and results of the Pre-Design Study is provided below.

The data gaps identified by Roux Associates were:

- the existence/use of any underground storage tanks (USTs) onsite;
- the construction/use of the floor drain near the degreaser;
- the use of an apparent condensate line near the degreaser;
- the ground-water elevations and flow direction at the Site;
- soil VOC concentrations in areas not previously investigated, which were potential source areas, including:
  - below the sump adjacent to the former TCE AST;
  - below the former TCE fill port on the outside of the building;
  - within the degreaser sump;
  - below the apparent condensate line;
  - adjacent to the floor drain; and
  - the vicinity of existing Monitoring Well LMW-5; and
- the ground-water VOC concentrations throughout the Site.

In January 1998, Roux Associates performed a soil and ground-water investigation to fill the above-mentioned data gaps. The investigation was completed in February 1998.

3.4.1 Pre-Design Study Scope of Work

A total of six soil borings (i.e., SB-1 through SB-6) were drilled and sampled from grade to the water table, which was typically encountered at approximately 10 ft below grade. The soil borings were drilled and sampled using the Geoprobe™ method. The locations of the six soil borings are shown in Figure 2. The soil samples collected were inspected in the field for

contamination (e.g., staining, odors). Each soil sample collected was screened in the field for VOCs using a PID. A maximum of two soil samples were collected from five of the six soil borings (except at SB-2) for laboratory analysis. The soil samples were analyzed for VOCs using the NYSDEC Analytical Services Protocol (ASP) Method 95-1. Ground-water samples were also collected and analyzed for VOCs from the soil borings. Please note that no soil samples were collected from SB-2 (within the degreaser sump) because the thickness of the concrete base was so great that it prevented the field staff from completing a concrete core. After it was confirmed that the subsurface soil could not be accessed in this location, an inspection of the sump was conducted that found that the concrete was intact (i.e., there were no cracks or holes).

In addition to the soil borings, two monitoring wells (MW-1 and MW-2) were installed to better define the existing ground-water contamination at the Site. The monitoring wells were installed using a hollow-stem auger rig. The wells consisted of 2-inch diameter PVC well casing and screen. The wells were completed in accordance with the NYSDEC monitoring well installation guidelines. After well completion, the wells were developed using a submersible pump. The purge water was contained in two 55-gallon drums.

Water levels were measured in each monitoring well at the Site. Prior to sampling ground water from the monitoring wells and soil borings, a minimum of three well casing (or boring hole) volumes were purged. This water was also placed into the 55-gallon drums. Ground water at eight existing wells, the two new wells and each soil boring, was then sampled and analyzed for VOCs using the NYSDEC ASP Method 95-1.

Other tasks completed as part of the scope of work included:

- inspection of the floor drain adjacent to the former vapor degreaser to determine its termination point using a pipe locator;
- submission of Freedom of Information Act requests to the NYSDEC and the New York City Fire Department regarding the presence of USTs at the Site; and
- performance of waste characterization sampling on the drill cuttings and the purge water to determine the proper disposal method.

3.4.2 Pre-Design Study Results

The soil samples were inspected and the materials were found to be comprised of fine to medium sand with minor amounts of silt and gravel. The geological logs for the soil borings and monitoring wells performed during the pre-design study are presented in Appendix A. Consistent with other work, ground water was encountered at approximately 10 ft bls, and, as shown in Figure 3, was determined to be flowing in a southeast direction towards Fresh Creek Basin.

The soil quality results (Table 1) indicated that the soil at soil boring SB-3 adjacent to the floor drain slightly exceeded the NYSDEC RSCO for TCE. No other VOCs exceeded the NYSDEC RSCOs in any of the remaining soil samples collected at the Site.

The ground-water quality results (Table 2) indicated that an area approximately 200 ft by 200 ft contains TCE at concentrations that exceed 100 µg/L (Figure 4).

The results of the floor drain tracing did not identify where the drain pipe terminated due to interference with metal reinforcing bars within the concrete slab.

Responses to the FOIA requests indicated that there were no records of existing USTs at the Site.

The results of the waste characterization indicated that the soil generated during the investigation was non-hazardous and the purge water was hazardous. The soil and water were removed from the Site by Maimee Express, Inc. and disposed at the City Environmental, Inc. facility in Detroit, Michigan on March 20, 1998. The disposal documentation is provided in Appendix B.

Based on the ground-water results, a subsequent ground-water investigation was performed by drilling another soil boring approximately 20 feet east of Monitoring Well MW-1 to further delineate the horizontal extent of ground-water contamination. Additionally, ground-water samples were collected adjacent to monitoring well MW-2 to establish if the ground-water contamination level changed with depth.

The ground-water results approximately 20 ft east of MW-1 indicated that VOCs have migrated slightly beyond MW-1. The ground-water results adjacent to monitoring well MW-2 indicated that TCE concentrations decreased several orders of magnitude with depth. The geology in this area of Brooklyn typically consists of fill materials (approximately 10 ft thick) overlying less permeable material such as peat or clay that grades into sand and gravel. Based on the observations at MW-2 and our knowledge of the geology of the area, it is likely that the majority of the ground-water contamination is present in the top ten feet of ground water.

4.0 REMEDIAL DESIGN

This section details how Federal Express intends to address remediation of the contaminated soil and ground water identified at the Site after entering into agreement with the NYSDEC under the VCP. The proposed remediation is discussed below.

4.1 Remedial Objectives

The remedial objectives for the system developed as part of this RAWP are:

- to degrade and remove the organics, specifically TCE, in the localized hot spot area, which is located in the vicinity of the former vapor degreaser; and
- to remediate the contaminated ground water as delineated in Figure 4 to levels determined during the RA.

This remedial objective will be met through the use of a full-scale SVE/AS system. The remedial program is intended to eliminate any potential ongoing VOC sources within the localized hot spot and cause mass-reduction of VOCs in ground water. Prior to the completion of these remediation efforts, a RA will be performed determine the residual contamination concentrations that do not pose a threat to human health and to determine when natural attenuation would be effective in remediation of residual, dissolved VOCs in ground water.

4.2 Proposed Remedy

The proposed remedy to remediate the localized hot spot area and ground water includes the use of SVE and AS. The SVE and AS processes are discussed in detail below.

4.2.1 SVE Process

SVE would be utilized to remove the high concentrations of TCE from the impacted soil within the localized hot spot area. This process would remove volatile organic vapors from the subsurface soil by drawing air through the contaminated soil. In addition, the movement of air through the subsurface will enhance the natural biodegradation occurring at the source area soil. This process is known as "bioventing." Concurrently, SVE will be used to capture VOCs

generated through the remediation of the contaminated ground water as described in the description of the AS process in the following section. The SVE proposed system is described in detail in Section 4.9.

4.2.2 AS Process

AS will be utilized to enhance removal of organics from the impacted soil and ground water. AS operates as a flow of pressurized atmospheric air is applied to air sparge wells to direct a flow of air into the saturated zone. As the air is forced through the ground water and the VOCs volatilize into the air stream. The air stream then migrates upward into the unsaturated zone stripping organics from the soil and, in turn, is recovered by an SVE well network via an induced low pressure zone created by the SVE system. The proposed AS system is described in detail in Section 4.9.

4.3 Remediation of Localized Hot Spot and Impacted Ground Water

It is anticipated that it will take six months to remediate both the localized hot spot area and contaminated ground water at the Site. This estimated schedule of remediation will be revisited, and revised as necessary, subsequent to the review of the data generated from the pilot study described in the following section.

4.4 Pilot Study Approach And Procedures

A limited pilot study is proposed to be conducted at the area of proposed remediation prior to construction and installation of a full-scale SVE/AS remedial system. The pilot study would include the installation of a full-sized pilot system including an SVE well, an AS well, additional monitoring points and SVE/AS equipment to determine the pneumatic and remedial response of the impacted areas to the use of SVE and AS. Upon installation of the pilot system, a pilot test will be performed. The results generated from this pilot test will then be evaluated. As part of this evaluation, the proposed full-scale remedial system presented in this RAWP will be reviewed and optimized, as necessary. It is anticipated that the SVE and AS wells and SVE/AS equipment used during the pilot study will subsequently be incorporated as part of the full-scale remedial

system. The SVE and AS wells proposed to be used for this pilot study, as shown on Figure 5, are respectively, SVE-1 and AS-12. The following sections provide details of the pilot study including:

- a description of the pilot wells to be drilled and installed;
- a description of the SVE/AS pilot test systems; and
- a detailed procedure for implementing the pilot study.

4.4.1 Proposed Pilot Test Wells, Borings and Monitoring Points

There is one SVE well (SVE-1) proposed for the pilot test. SVE-1 will be installed using the hollow-stem auger method and will consist of a 2-inch diameter well constructed as shown in Figure 7.

One AS well (AS-12) is proposed for the pilot test and will be installed in proximity to SVE-1 well to generate the maximum contaminant loading at the SVE well. AS-12 will be installed using the Geoprobe™ method and will consist of a 1-inch diameter well constructed as shown in Figure 9.

There are a total of four monitoring points proposed for measuring performance of the SVE and AS systems pilot test. The monitoring points will be installed radially, approximately 5, 10, 15 and 25 feet from well SVE-1. This monitoring point layout will be utilized to assess the effect of the soil strata on the subsurface pneumatic response during tests at SVE-1 and AS-12. All of the proposed monitoring points will be fitted with a plug and valve to allow vacuum and pressure response to be measured with a hand-held gauge. The 2-inch monitoring points will be installed using the hollow-stem auger method and constructed of 2-inch diameter, Schedule 40 PVC risers and 0.020-inch slot PVC screens. The screens will be installed 5 feet above and below the water table. The annular space will be gravel packed to one to two feet above the screened portion of each point. A bentonite pellet seal and cement/bentonite grout will be placed above the gravel to seal each monitoring point.

4.4.2 Pilot System

The proposed components of the pilot system are discussed in detail below.

SVE System

Subsurface soil vapor will be extracted from SVE pilot well (SVE-1) using an SVE extraction blower. The SVE blower will have the capability to deliver 300 cubic feet per minute (cfm) at a vacuum of 60 inches of water column and will be equipped with the following:

- regenerative type SVE blower;
- moisture separator;
- in-line inlet particulate filter;
- pressure indicator;
- pressure switch;
- sample port; and
- interconnecting piping for soil vapor and dilution air.

The SVE blower housing, impeller and cover will be constructed of spark-proof die-cast aluminum. The SVE blower package will include an inlet silencer to reduce the noise level. The moisture separator will be provided to remove condensate, if any, from the extracted soil vapor stream, and will include a manual drain valve. The in-line filter will remove particulates from the air stream to protect the SVE blower. Vacuum gauges will be provided to monitor the operating conditions. A sample port will be provided for soil vapor sampling from the SVE blower outlet. The flow rate will be measured using an air velocity meter. An air dilution valve will be provided on the SVE blower inlet piping, which will allow control of the total extraction air flow by increasing the vacuum on the inlet of the SVE blower and by changing the flow rate of the dilution air.

The SVE blower inlet piping will be connected to the SVE well (SVE-1) and the dilution air inlet will draw in atmospheric air through a vent pipe. The extracted vapor from the SVE blower will be discharged to the atmosphere and periodically monitored with a PID. Wind direction and the

potential for nuisance odors to impact neighboring properties will also be monitored during the pilot testing. If potential for a nuisance odor condition develops, the pilot testing will be suspended or appropriate odor control measures will be implemented (e.g., use of vapor phase carbon or other measures).

AS System

Ambient air will be injected into the pilot AS well (AS-12) using an air injection blower. The proposed blower system will have the capability to deliver 50 cfm at a pressure of 15 pounds per square inch (psi) and will be equipped with the following:

- positive displacement AS blower;
- in-line inlet filter;
- pressure indicator;
- pressure switch;
- temperature indicator; and
- interconnecting piping and valves.

The in-line inlet filter will remove particulates from the air stream to protect the AS blower. Pressure and temperature indicators will be utilized to monitor the operating conditions. An air bypass valve will be utilized on the outlet piping to allow control of the total air flow to the AS well during the test. A flow measurement port will be provided in the piping on the AS blower discharge. Flow rate will be determined using an air velocity meter.

4.4.3 Implementation of the Pilot Study

The SVE/AS pilot study will be implemented as follows:

- install SVE-1 and AS-12 and the four monitoring points;
- conduct pre-pilot baseline testing at SVE and AS wells and monitoring points;
- perform pilot test at SVE and AS wells; and
- review and optimize, if necessary, the full-scale remedial design.

Pre-pilot baseline testing will consist of measuring one round of water-level elevations, along with one round of dissolved oxygen measurements utilizing portable field measuring equipment in all of the proposed pilot wells and monitoring points.

An SVE/AS pilot test will be conducted to evaluate subsurface flow characteristics, collect the necessary data to evaluate pneumatic performance of the soil vapor extraction well and characterize the vapor extracted during the pilot testing.

The pilot test will be performed utilizing a step test procedure. During the pilot test, the following measurements will be recorded:

- soil vapor flow rate at the SVE blower;
- dilution air flow rate at the SVE blower;
- injection air flow rate at the AS blower;
- applied vacuum at the SVE well;
- applied pressure at the AS well;
- vacuum and pressure response at the monitoring points;
- percent of the lower explosive limit (LEL) and the concentration of total volatile organic compounds (TVOCs) at the SVE blower discharge;
- water-level elevations in the SVE and AS wells, and each monitoring point; and
- dissolved oxygen in ground water at each monitoring point.

The SVE blower exhaust will be monitored for TVOCs, percent LEL, and dissolved oxygen concentrations. These will be monitored for health and safety purposes as well as to characterize the extracted soil vapor. The TVOC concentrations will be measured with a PID. The percent LEL and dissolved oxygen concentrations will be measured with a lower explosive limit/oxygen meter.

4.4.4 Step Testing

As described above, the pilot test will be performed utilizing a step test procedure. The step testing procedure will consist of withdrawing soil vapor from the SVE test well, SVE 1, at different applied vacuums (in increments of 20 inches of water column) for a duration of 6 hours, and recording the corresponding changes in soil vapor flow rate, and any other changes in operating conditions. During the step test, the vacuum applied at SVE-1 for each step will be adjusted with the manual dilution air valve which will control the rate of soil vapor extraction by increasing or decreasing the amount of dilution air.

4.4.5 Determination of Pneumatic Response

In order to determine the effective radius of influence (EROI) of the SVE or AS well at a particular operating condition, the steady state vacuum and pressure responses at the monitoring points will be monitored.

The EROI of the SVE system will be dependent on the vacuum response measured at the monitoring points during the SVE/AS pilot test.

The EROI for the AS system will depend on the following factors that will be monitored within the monitoring points during the SVE/AS pilot test:

- pressure response;
- dissolved oxygen concentration; and
- water-level elevation.

Monitored changes of these parameters will be evaluated along with any measurable increase of extracted soil vapor VOC concentration to assist in determination of the EROI.

4.4.6 Extracted Soil Vapor Sampling

Extracted soil vapor sampling is necessary to evaluate the effectiveness of the SVE/AS pilot system and to determine the air emission control requirements of a full-scale system. Monitoring will also be conducted to determine the effects that changes in operating conditions may have on

the extracted soil vapor. For example, attempts to minimize short-circuiting by reducing the extraction flow rate may result in lower TVOC concentrations. However, increasing the SVE/AS flow rate may also result in diffusion or volatilization limiting conditions and/or increase the impacts of preferential pathways, thereby reducing the TVOC concentration.

The characteristics of the extracted soil vapor are critical in selection and sizing of an emission control technology and determining whether controls are required. High concentrations of VOCs could prohibit the use of activated carbon and in some cases high concentrations of VOCs could cause oxidation type control systems to operate with excessive amounts of dilution air to maintain a minimum of 25 percent of the LEL, which would result in the need for supplemental fuel to maintain a proper level of performance.

The extracted soil vapor will be characterized by the use of portable field monitoring devices supplemented by laboratory analysis to establish a correlation between field empirical data and analytical results. Field monitoring of TVOCs is not compound-specific, but is intended to provide a real-time estimate of the extracted soil vapor characteristics and to quantify the effects that a change in operating conditions may have on TVOC concentration with time. Vapor sampling will be conducted at the SVE pilot system exhaust blower.

In addition to field analysis, samples will be collected for laboratory analysis. During the pilot test, two samples taken from the SVE blower will be analyzed for the full spectrum of VOCs according to with United Stated Environmental Protection Agency (USEPA) Method TO-14. Tedlar sample bags will be used to collect these samples. The extracted soil vapor sample, which will also be taken from the SVE blower discharge, may include a combination of atmospheric air (dilution air) and extracted soil vapor. The flow rate of both dilution air and extracted soil vapor will be measured and used to calculate a dilution factor, which is the ratio of total blower discharge and extracted soil vapor flow rates. The VOC concentration in the SVE blower discharge would then be multiplied by the dilution factor to determine the VOC concentration in

the extracted soil vapor. During the pilot test, two samples will be taken of the extracted soil vapor from the SVE well, SVE-1, (one sample after steady state conditions have been reached) and one sample at the end of the test.

4.5 Points of Compliance

This section describes the points of soil and ground-water compliance to be used for performance monitoring of the full-scale remedial system.

4.5.1 Soil Compliance

Although subsurface soil concentrations onsite are either already below or slightly exceeding RSCOs, the remedial system will attempt to eliminate any potential ongoing VOC sources from the localized hot spot area. Upon the completion of these remediation efforts, a RA will be performed to confirm that the residual contamination does not pose a threat to human health. It should be noted that soil remediation will not be focused on meeting a numerical standard for the ultimate protection of potable water. Instead, mass reduction will be targeted for the protection of construction workers who might come in contact with subsurface soils during future construction activities. After ascertaining the current risks associated with exposures that could occur during construction, remedial goals can be based on overall mass reduction to demonstrate that current or future encounters pose no potential risk.

4.5.2 Ground-Water Compliance

Ground-water samples will be collected and analyzed for VOCs in accordance USEPA Method 8260 on a monthly basis to monitor the performance of the full-scale remedial system and the progress of ground-water remediation efforts. The SVE/AS wells will be kept in operation until the majority of the mass load of the dissolved VOC in ground water is remediated. When the mass load of VOCs have been remediated (i.e. ground-water contamination levels do not decrease over successive monitoring periods) or when an asymptotic condition is reached, an RA will be performed to confirm that the residual contamination does not pose a threat to human health. It should be noted that the focus of the remedial system will be on source removal and

reducing the mass of VOCs present in ground water on-site to a level where it can be demonstrated that there is no current or future potential risk, and natural attenuation will be effective in remediation of residual, dissolved VOCs in ground water.

4.7 Contractors and/or Consultants

The primary consultant performing the work described in this RAWP is Roux Associates along with Remedial Engineering, P.C. (Remedial Engineering). Roux Associates and Remedial Engineering will be responsible for all design efforts required as well as for inspection of the installation work. The pilot and full-scale remedial system construction work will be supervised and inspected by the project team. After the completion of construction, the SVE/AS system will also be operated and maintained by the project team staff.

4.8 Site Plan

Site plans and details for the construction of the full-scale remedial system, SVE/AS equipment, and SVE and AS wells are included in Figures 5 through 14. These figures include the locations of the SVE/AS equipment and SVE/AS wells.

4.9 Design Standards and Technical Specifications

The components of the full-scale remedial system we have assumed will be necessary will include the following which will incorporate the pilot test equipment:

- three 2-inch SVE wells;
- twelve 2-inch AS wells;
- one 300 cfm, SVE blower with thermal overload protection;
- one 50 cfm, AS blower with thermal overload protection;
- one NEMA 4 common SVE/AS control panel;
- two manual dilution air/blow-off valves;
- two particulate filters;
- one high vacuum and pressure switch;

- four vacuum/two pressure indicators;
- one 10-gallon capacity moisture separator with high liquid level switch, manual drain; and
- two 350-pound carbon adsorption drums for off-gas controls.

The following subsections describe these remedial system components in detail.

Please note, the actual EROI will be evaluated by performance of the pilot study as described in Section 4.4 The proposed SVE and AS well arrangement will be optimized in accordance with the findings of the pilot study.

4.9.1 SVE Wells

The full-scale remedial system proposed for the localized hot spot area and the impacted ground water consists of a total of three SVE wells located as shown in Figures 5 and 6. At the design air flow rate of 100 CFM per SVE well, the well arrangement is expected to be capable of achieving a minimum EROI of 90 feet at each SVE well. This flow rate is expected to sufficiently capture vapor phase organics from within the entire area to be sparged. In addition, the depicted EROI for each SVE well overlaps with that of adjacent SVE wells, providing adequate coverage of the impacted ground water as depicted in Figure 6. The anticipated combined EROI expected when the SVE wells are operating together is also depicted in Figure 6 and is based on the inferred additive effect of SVE from multiple SVE well locations. The SVE wells will be installed using the hollow-stem auger method and constructed as shown in Figure 7.

4.9.2 AS Wells

The full-scale remedial system proposed for the source area consists of a total of twelve AS wells located as shown in Figure 8. At the design air flow rate of 4 CFM per AS well, the well arrangement is expected to be capable of achieving a minimum EROI of 45 feet at each SVE well. This air flow rate is expected to provide sufficient coverage within the entire area to be sparged. The AS wells will be installed using the Geoprobe™ method and constructed as shown in Figure 9.

4.9.3 SVE and AS Recovery Piping

Individual recovery piping from each SVE and AS well will consist of PVC piping and will include throttling valves to independently control the extraction/sparge rates from each well and assist in balancing the system.

Separate PVC pipe systems will be used to convey the soil vapor to the SVE blower unit and off-gas control system and to convey ambient air to the AS wells. The SVE piping will also be constructed of steel at the outlet of the extraction blower and the outlet of the AS blower due to the high temperatures associated with the blower discharges. The piping layout for the entire SVE/AS system is shown in Figure 10.

4.9.4 SVE Blower

A maximum flow rate of 100 cfm has been assumed for the full-scale remedial system SVE wells, for a total of 300 cfm. This will be achieved by use of a blower capable of extracting the proposed 300 scfm at 60 inches of water column. The skid mounted blower system will also include a particulate filter and a moisture separator with the nominal capacity of 10 gallons.

4.9.5 AS Blower

A minimum AS flow rate of 4 cfm has been assumed for the 12 full-scale remedial system AS wells. This will be achieved by use of a blower capable of injecting a minimum of 50 cfm at 15 psi. The skid mounted blower system will also include a particulate filter.

4.9.6 Vapor Phase Carbon Off-Gas Controls

It is assumed that vapor phase carbon drums will be utilized to control the off-gas recovered through the SVE blower. The drums will be placed along side the SVE blower and moisture separator and will be accessible for replacement when required.

4.10 Process and Instrumentation and Electrical Diagrams

The process and instrumentation diagrams for the full-scale remedial system are presented in Figures 13 and 14. The process and instrumentation diagram schematically shows the arrangement of the SVE/AS process equipment as discussed in the previous section.

The electrical schematic diagram for the full-scale remedial system is presented in Figure 15. The electrical schematic shows the following:

- existing main electrical power panel;
- power sub panel;
- conduit and electrical wiring; and
- electrical power disconnect switches.

4.11 Set-Up Plans

As part of full-scale remedial system construction and operation, all required permits and registrations will be obtained. The required permits, approvals and registrations will include:

- New York City construction permits or approvals;
- New York City air discharge registration; and
- any other applicable local, State and Federal permits and registrations.

4.12 By-Product Disposal

By-products generated by the operation of the full-scale remedial system will include:

- treated air emissions discharged to the atmosphere;
- spent granular activated carbon; and
- condensate from the SVE inlet moisture separator.

Discharge of treated air emissions will be governed by air emissions permit guidelines issued by NYSDEC for the remedial system. Spent carbon will be removed and replaced, as necessary, in accordance with the requirements of the carbon supplier. All handling, transportation and disposal of condensate will be consistent with applicable local, State and Federal requirements.

4.13 Health and Safety Plan

Work performed as part of construction of the remedial system will be performed in accordance with all applicable Occupational Safety and Health Administration (OSHA) requirements for general construction activities, as well as the existing Roux Associates' Site-Specific Health and Safety Plan (HASP). All contractors utilized on this project for intrusive construction activities will be required to comply with the HASP or submit their own plan consistent with the requirements of OSHA.

4.14 Contingency Plan

In the event of an unexpected incident involving hazardous materials, the SVE/AS system will be shut off and appropriate personnel will be notified. As applicable, contingency procedures will be implemented.

4.15 Operation and Maintenance Plan

As part of the full-scale remedial design, an Operation and Maintenance (O&M) Manual will be compiled for the SVE/AS system. The O&M Manual will consist of the literature provided by the individual equipment manufacturers to document the requirements for operating and maintaining all components of the remedial system. In addition, the O&M manual will consist of a detailed operating log for the remedial system. This log will be updated weekly by the system operator. The operating log will be prepared to provide a standard format for detailing pertinent operations information which will include at a minimum:

- SVE/AS system performance monitoring;
- records of sampling and analysis performed; and
- inspection comments.

The operating logs for the remedial system will be maintained at the Site during the operation of the remedial system. Operation and maintenance activities, to be described in detail in the O&M Manual, for the all components of the full-scale remedial system are discussed below.

4.15.1 General Operation and Maintenance

General O&M will include the following:

- check system operating status and power;
- check the integrity of all equipment, hoses, fittings and piping;
- check the security of equipment and wells; and
- coordinate and perform condensate disposal as required.

4.15.2 Full-Scale Remedial System Operation and Maintenance

The O&M for both the SVE and AS components of the full-scale remedial system will include the following:

- record vacuum and pressure (pre and post particulate filter);
- record air flow rate;
- drain moisture separator and record volume;
- perform mechanical check on blowers; and
- make flow adjustments to SVE blower and AS well head flow valves as necessary to optimize influent mix.

4.15.3 Vapor Phase Carbon Drum Operation and Maintenance

The O&M for the carbon system will include:

- perform effluent air sampling as required;
- measure organics concentrations using a PID at the influent and effluent to the system; and
- perform manufacturer recommended maintenance on mechanical equipment.

4.16 Monthly Progress Report

As part of the full-scale remedial system operation, a monthly progress report will be prepared and submitted to Federal Express as a record of the progress of activities. The monthly progress report will provide a standard format for information on construction activities to be maintained which will include:

- the name of the field representative;

- the date;
- the remedial system conditions;
- the equipment on-site; and
- the details of the work performed.

4.17 Noise Control

The proposed location of the SVE/AS equipment would be in an enclosed active parking lot, subject to varying amounts of pedestrian and vehicular traffic. To reduce the noise created by the equipment, the blowers will be provided with inlet silencers. The equipment proposed is designed to achieve a maximum noise level of approximately 90 dBA.

4.18 Security Procedures

To maintain the security of the system and equipment a fence will be installed around the perimeter of the equipment located outside the main building, as shown on Figure 10. The SVE/AS blowers will be protected by equipment manufacturer supplied belt/shaft shields.

4.19 Shutdown, Closure and Post Closure Requirements

The full-scale remedial system will be operated and maintained, as necessary, to degrade and remove organics from the source area soil and contaminated ground water as determined during the RA. The system will be operated, modified, shut-down and/or closed in compliance with the performance monitoring described in Section 4.5.2 and in accordance with the criteria determined during the RA. Post closure monitoring will involve sampling of all remedial system wells monthly for two quarterly reporting periods to establish if contamination levels rise again with the remedial system no longer in operation. Once remedial objectives have been reached, the remedial system operation will be concluded and a Closure Report will be prepared for submission to the NYSDEC. Following the post closure monitoring period, the remedial system will be decommissioned and removed from the Site. SVE wells, AS wells, and monitoring points will be abandoned in place by filling with cement-bentonite grout per NYSDEC requirements.

5.0 SCHEDULE

Construction of the SVE/AS system is projected to commence in the summer of 1998, pending approval from the NYSDEC. The construction, operation and evaluation of the pilot system is expected to require two to four weeks. Construction of the full-scale remedial system is estimated to require an additional two to four weeks after evaluation of the pilot data.

Respectfully submitted,

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Table 1. Summary of Volatile Organic Compounds Detected in Soil, Duralab Property, Brooklyn, New York.

Concentrations in µg/kg	NYSDEC RSCOs (µg/kg)	Sample Designation: SB-1 Sample Depth (ft bls): 0-1 Date Sampled: 1/20/98	SB-1 2-4 1/20/98	SB-3 4-6 1/20/98	SB-3 10-12 1/20/98	SB-3R 10-12 1/20/98
Chloromethane	--	10 U	10 U	1,200 U	10 U	10 U
Bromomethane	--	10 U	10 U	1,200 U	10 U	10 U
Vinyl Chloride	200	10 U	10 U	1,200 U	10 U	10 U
Chloroethane	1,900	10 U	10 U	1,200 U	10 U	10 U
Methylene Chloride	100	6 J	2 J	**270** J	10 U	10 U
Acetone	200	52 B	16 B	**2,700**	**230 EB**	100 B
Carbon Disulfide	2,700	10 U	10 U	1,200 U	10 U	10 U
1,1-Dichloroethene	400	10 U	10 U	1,200 U	10 U	10 U
1,1-Dichloroethane	200	10 U	10 U	1,200 U	10 U	10 U
1,2-Dichloroethene (total)	300	10 U	10 J	1,200 U	10 U	10 U
Chloroform	300	10 U	10 U	1,200 U	10 U	10 U
1,2-Dichloroethane	100	10 U	10 U	1,200 U	10 U	10 U
2-Butanone	300	12 B	2 JB	1,200 U	2 JB	2 JB
1,1,1-Trichloroethane	800	10 U	10 U	1,200 U	10 U	10 U
Carbon Tetrachloride	600	10 U	10 U	1,200 U	10 U	10 U
Bromodichloromethane	--	10 U	10 U	1,200 U	10 U	10 U
1,2-Dichloropropane	--	10 U	10 U	1,200 U	10 U	10 U
cis-1,3-Dichloropropene	--	10 U	10 U	1,200 U	10 U	10 U
Trichloroethene	700	60	180	**980 J**	20	12
Dibromochloromethane	--	10 U	10 U	1,200 U	10 U	10 U
1,1,2-Trichloroethane	--	10 U	10 U	1,200 U	10 U	10 U
Benzene	60	10 U	10 U	1,200 U	10 U	10 U
trans-1,3-Dichloropropene	--	10 U	10 U	1,200 U	10 U	10 U
Bromoform	--	10 U	10 U	1,200 U	10 U	10 U
4-Methyl-2-Pentanone	1,000	6 J	10 U	1,200 U	10 U	10 U
2-Hexanone	--	2 J	10 U	1,200 U	10 U	10 U
Tetrachloroethene	1,400	10 U	1 J	1,200 U	10 U	10 U
1,1,2,2-Tetrachloroethane	600	10 U	10 U	1,200 U	10 U	10 U
Toluene	1,500	5 J	1 J	1,200 U	25	11
Chlorobenzene	1,700	10 U	10 U	1,200 U	10 U	10 U
Ethylbenzene	5,500	2 J	10 U	1,200 U	1 J	0.4 J
Styrene	--	10 U	10 U	1,200 U	10 U	10 U
Xylene (total)	1,200	22	10 U	1,200 U	9 J	3 J

µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
U - Indicates compound was not detected
J - Estimated value
B - Analyte detected in blank sample
R - Replicate sample
NYSDEC RSCOs - New York State Department of Environmental Conservation Recommended Soil Cleanup Objectives
Bold - Data highlighted in Bold represent detections that exceed the NYSDEC RSCOs

Table 1. Summary of Volatile Organic Compounds Detected in Soil, Duralab Property, Brooklyn, New York.

Concentrations in µg/kg	NYSDEC RSCOs (µg/kg)	Sample Designation: SB-4 Sample Depth (ft bls): 0-2 Date Sampled: 1/20/98	SB-5 6-8 1/20/98	SB-5 8-10 1/20/98	SB-6 0-2 1/20/98	SB-6 6-8 1/20/98
Chloromethane	--	10 U	10 U	10 U	10 U	10 U
Bromomethane	--	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	200	10 U	10 U	10 U	10 U	10 U
Chloroethane	1,900	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	100	10 U	10 U	10 U	10 U	10 U
Acetone	200	130 B	42 B	6 JB	42 JB	1 JB
Carbon Disulfide	2,700	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	400	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	200	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	300	10 U	10 U	10 U	10 U	63
Chloroform	300	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	100	10 U	10 U	10 U	10 U	10 U
2-Butanone	300	2 JB	15 B	10 U	10 U	10 U
1,1,1-Trichloroethane	800	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	600	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	--	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	--	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	--	10 U	10 U	10 U	10 U	10 U
Trichloroethene	700	37	10 U	10 U	410	120
Dibromochloromethane	--	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	--	10 U	10 U	10 U	10 U	10 U
Benzene	60	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	--	10 U	10 U	10 U	10 U	10 U
Bromoform	--	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	1,000	10 U	10 U	10 U	10 U	10 U
2-Hexanone	--	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	1,400	10 U	10 U	10 U	10 U	1 J
1,1,2,2-Tetrachloroethane	600	10 U	10 U	10 U	10 U	10 U
Toluene	1,500	11	10 U	10 U	10 U	10 U
Chlorobenzene	1,700	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	5,500	10 U	10 U	10 U	10 U	10 U
Styrene	--	10 U	10 U	10 U	10 U	10 U
Xylene (total)	1,200	2 J	10 U	10 U	10 U	10 U

µg/kg - Micrograms per kilogram
ft bls - Feet below land surface
U - Indicates compound was not detected
J - Estimated value
B - Analyte detected in blank sample
R - Replicate sample
NYSDEC RSCOs - New York State Department of Environmental Conservation Recommended Soil Cleanup Objectives
Bold - Data highlighted in Bold represent detections that exceed the NYSDEC RSCOs

Table 2. Summary of Volatile Organic Compounds Detected in Ground Water, Duralab Property, Brooklyn, New York.

Concentrations in µg/L	Sample Designation: / Date Sampled:	NYSDEC Ambient Water-Quality Standards (µg/L)	LMW-17 1/28/98	LMW-21 1/28/98	LMW-23 1/28/98	LMW-25 1/28/98	LMW-27 1/28/98
Chloromethane		--	100 U	10 U	10 U	100 U	10 U
Bromomethane		5	50 U	5.0 U	5.0 U	50 U	5.0 U
Vinyl Chloride		2	20 U	2.0 U	2.0 U	20 U	2.0 U
Chloroethane		5	50 U	5.0 U	5.0 U	50 U	5.0 U
Methylene Chloride		5	50 U	5.0 U	5.0 U	50 U	5.0 U
Acetone		50	100 U	7 J	10	100 U	10 U
Carbon Disulfide		--	100 U	1 J	1 J	100 U	10 U
1,1-Dichloroethene		5	50 U	5.0 U	5.0 U	50 U	5.0 U
1,1-Dichloroethane		5	50 U	5.0 U	5.0 U	50 U	5.0 U
1,2-Dichloroethene (total)		5	**400**	5.0 U	5.0 U	**780**	**6**
Chloroform		7	70 U	7.0 U	7.0 U	70 U	7.0 U
1,2-Dichloroethane		--	50 U	5.0 U	5.0 U	50 U	5.0 U
2-Butanone		50	100 U	10 U	10 U	100 U	10 U
1,1,1-Trichloroethane		5	50 U	5.0 U	5.0 U	50 U	5.0 U
Carbon Tetrachloride		5	50 U	5.0 U	5.0 U	50 U	5.0 U
Bromodichloromethane		50	100 U	10 U	10 U	100 U	10 U
1,2-Dichloropropane		--	50 U	5.0 U	5.0 U	50 U	5.0 U
cis-1,3-Dichloropropene		5	50 U	5.0 U	5.0 U	50 U	5.0 U
Trichloroethene		5	**1,100**	3 J	**21**	**1,300**	**16**
Dibromochloromethane		50	100 U	10 U	10 U	100 U	10 U
1,1,2-Trichloroethane		5	50 U	5.0 U	5.0 U	50 U	5.0 U
Benzene		0.7	7.0 U	0.70 U	0.70 U	7.0 U	0.70 U
trans-1,3-Dichloropropene		5	50 U	5.0 U	5.0 U	50 U	5.0 U
Bromoform		50	100 U	10 U	10 U	100 U	10 U
4-Methyl-2-Pentanone		--	100 U	10 U	10 U	100 U	10 U
2-Hexanone		50	100 U	10 U	10 U	100 U	10 U
Tetrachloroethene		5	50 U	5.0 U	5.0 U	50 U	5.0 U
1,1,2,2-Tetrachloroethane		5	50 U	5.0 U	5.0 U	50 U	5.0 U
Toluene		5	50 U	5.0 U	5.0 U	50 U	5.0 U
Chlorobenzene		5	50 U	5.0 U	5.0 U	50 U	5.0 U
Ethylbenzene		5	50 U	5.0 U	5.0 U	50 U	5.0 U
Styrene		5	50 U	5.0 U	5.0 U	50 U	5.0 U
Xylene (total)		5	50 U	5.0 U	5.0 U	50 U	5.0 U

µg/L - Micrograms per liter
U - Indicates compound was not detected
J - Estimated value
B - Analyte detected in blank sample
Bold - Data highlighted in bold represent detections that exceed the NYSDEC Ambient Water-Quality Standards
NYSDEC - New York State Department of Environmental Conservation

Table 2. Summary of Volatile Organic Compounds Detected in Ground Water, Duralab Property, Brooklyn, New York.

Concentrations in µg/L	Sample Designation: / Date Sampled:	NYSDEC Ambient Water-Quality Standards (µg/L)	LMW-29 1/28/98	LMW-32 1/28/98	MW-1 1/28/98	MW-2 1/28/98	MW-2/R 1/28/98
Chloromethane		--	10 U	10 U	50 U	20,000 U	20,000 U
Bromomethane		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
Vinyl Chloride		2	2.0 U	2.0 U	10 U	4,000 U	4,000 U
Chloroethane		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
Methylene Chloride		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
Acetone		50	21	10 U	**57 B**	20,000 U	20,000 U
Carbon Disulfide		--	10 U	9 J	50 U	20,000 U	20,000 U
1,1-Dichloroethene		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
1,1-Dichloroethane		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
1,2-Dichloroethene (total)		5	5.0 U	**14**	**180**	10,000 U	10,000 U
Chloroform		7	7.0 U	7.0 U	35 U	14,000 U	14,000 U
1,2-Dichloroethane		--	5.0 U	5.0 U	25 U	10,000 U	10,000 U
2-Butanone		50	10 U	10 U	50 U	20,000 U	20,000 U
1,1,1-Trichloroethane		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
Carbon Tetrachloride		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
Bromodichloromethane		50	10 U	10 U	50 U	20,000 U	20,000 U
1,2-Dichloropropane		--	5.0 U	5.0 U	25 U	10,000 U	10,000 U
cis-1,3-Dichloropropene		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
Trichloroethene		5	2 J	**89**	**500**	**240,000**	**280,000**
Dibromochloromethane		50	10 U	10 U	50 U	20,000 U	20,000 U
1,1,2-Trichloroethane		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
Benzene		0.7	0.70 U	0.70 U	3.5 U	1,400 U	1,400 U
trans-1,3-Dichloropropene		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
Bromoform		50	10 U	10 U	50 U	20,000 U	20,000 U
4-Methyl-2-Pentanone		--	10 U	10 U	50 U	20,000 U	20,000 U
2-Hexanone		50	10 U	10 U	50 U	20,000 U	20,000 U
Tetrachloroethene		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
1,1,2,2-Tetrachloroethane		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
Toluene		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
Chlorobenzene		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
Ethylbenzene		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
Styrene		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U
Xylene (total)		5	5.0 U	5.0 U	25 U	10,000 U	10,000 U

µg/L - Micrograms per liter
U - Indicates compound was not detected
J - Estimated value
B - Analyte detected in blank sample
Bold - Data highlighted in bold represent detections that exceed the NYSDEC Ambient Water-Quality Standards
NYSDEC - New York State Department of Environmental Conservation

Table 2. Summary of Volatile Organic Compounds Detected in Ground Water, Duralab Property, Brooklyn, New York.

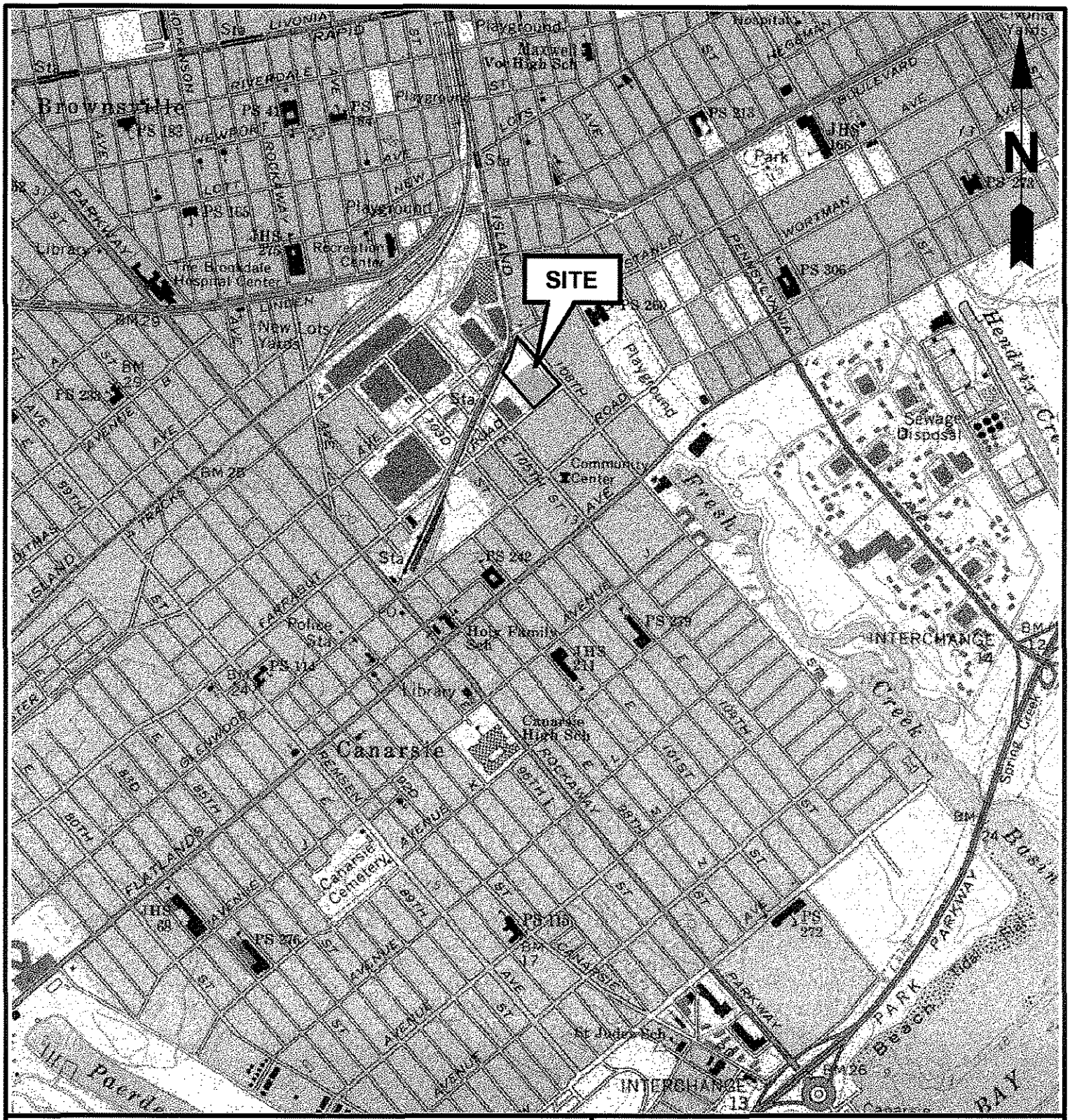
Concentrations in µg/L	Sample Designation: / Date Sampled:	NYSDEC Ambient Water-Quality Standards (µg/L)	SB-1W 1/20/98	SB-3W 1/20/98	SB-5W 1/20/98	SB-6W 1/20/98	SB-7W 2/24/98
Chloromethane		--	10 U	10 U	10 U	10 U	10 U
Bromomethane		5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride		2	2 U	**20**	1 J	**13**	3
Chloroethane		5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylene Chloride		5	**6 J**	**6 J**	1 J	3 J	5.0 U
Acetone		50	50 B	**310 B**	22 B	18 JB	10 U
Carbon Disulfide		--	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene		5	5.0 U	5.0 U	5.0 U	5.0 U	0.4 J
1,1-Dichloroethane		5	5.0 U	5.0 U	5.0 U	5.0 U	0.4 J
1,2-Dichloroethene (total)		5	**17**	**19 J**	**220**	**200**	**65**
Chloroform		7	7 U	7 U	7 U	7 U	7.0 U
1,2-Dichloroethane		--	5 U	5 U	5 U	5 U	5.0 U
2-Butanone		50	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane		5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon Tetrachloride		5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane		50	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane		--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene		5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene		5	**230**	**780**	**130**	**370**	**35**
Dibromochloromethane		50	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane		5	5.0 U	5.0 U	5.0 U	5.0 U	0.3 J
Benzene		0.7	0.7 U	0.7 U	0.7 U	0.7 U	0.2 J
trans-1,3-Dichloropropene		5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform		50	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone		--	6 J	10 U	10 U	10 U	10 U
2-Hexanone		50	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene		5	0.6 J	2 J	0.4 J	1 J	0.4 J
1,1,2,2-Tetrachloroethane		5	5.0 U	5.0 U	5.0 U	5.0 U	1 JB
Toluene		5	3 J	6 J	1 J	12 J	0.7 J
Chlorobenzene		5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Ethylbenzene		5	5.0 U	0.5 J	5.0 U	0.6 J	0.3 J
Styrene		5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Xylene (total)		5	2 J	2 J	5.0 U	3 J	2 J

µg/L - Micrograms per liter
U - Indicates compound was not detected
J - Estimated value
B - Analyte detected in blank sample
Bold - Data highlighted in bold represent detections that exceed the NYSDEC Ambient Water-Quality Standards
NYSDEC - New York State Department of Environmental Conservation

Table 2. Summary of Volatile Organic Compounds Detected in Ground Water, Duralab Property, Brooklyn, New York.

Concentrations in µg/L	NYSDEC Ambient Water-Quality Standards (µg/L)	Sample Designation: SB-8W/25' Date Sampled: 2/24/98	SB-8W/35' 2/24/98	SB-8W/35'/R 2/24/98	SB-8W/45' 2/24/98	SB-8W/55' 2/24/98
Chloromethane	--	10 U	10 U	10 U	10 U	10 U
Bromomethane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl Chloride	2	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Chloroethane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylene Chloride	5	1 J	**8 J**	**7 J**	**18 J**	4 J
Acetone	50	12 JB	10 U	10 U	**140 JB**	10 U
Carbon Disulfide	--	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	5	1 J	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	5	3 J	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethene (total)	5	4 J	**12 J**	**16 J**	**10 J**	3 J
Chloroform	7	7.0 U	7.0 U	7.0 U	7.0 U	7.0 U
1,2-Dichloroethane	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Butanone	50	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon Tetrachloride	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	50	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	--	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	5	**260**	**1,000**	**1,200**	**4,900**	**1,300**
Dibromochloromethane	50	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene	0.7	0.70 U	0.70 U	0.70 U	0.70 U	0.70 U
trans-1,3-Dichloropropene	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	50	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	--	10 U	10 U	10 U	10 U	10 U
2-Hexanone	50	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5	0.5 J	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	5	0.7 J	2 J	2 J	4 J	1 J
Chlorobenzene	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Ethylbenzene	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Xylene (total)	5	2 J	5.0 U	5.0 U	5.0 U	5.0 U

µg/L - Micrograms per liter
U - Indicates compound was not detected
J - Estimated value
B - Analyte detected in blank sample
Bold - Data highlighted in bold represent detections that exceed the NYSDEC Ambient Water-Quality Standards
NYSDEC - New York State Department of Environmental Conservation



NEW YORK

QUADRANGLE LOCATION

Title:

SITE LOCATION MAP

FORMER DURALAB PROPERTY
BROOKLYN, NEW YORK

Prepared For:

FEDERAL EXPRESS CORPORATION

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by:	SG	Date:	3/98	FIGURE
Prepared by:	RK	Scale:	1"=2000'	1
Project Mgr:	S.G.	Status:	Final	
File No:	F0211118	Project:	44402Y	

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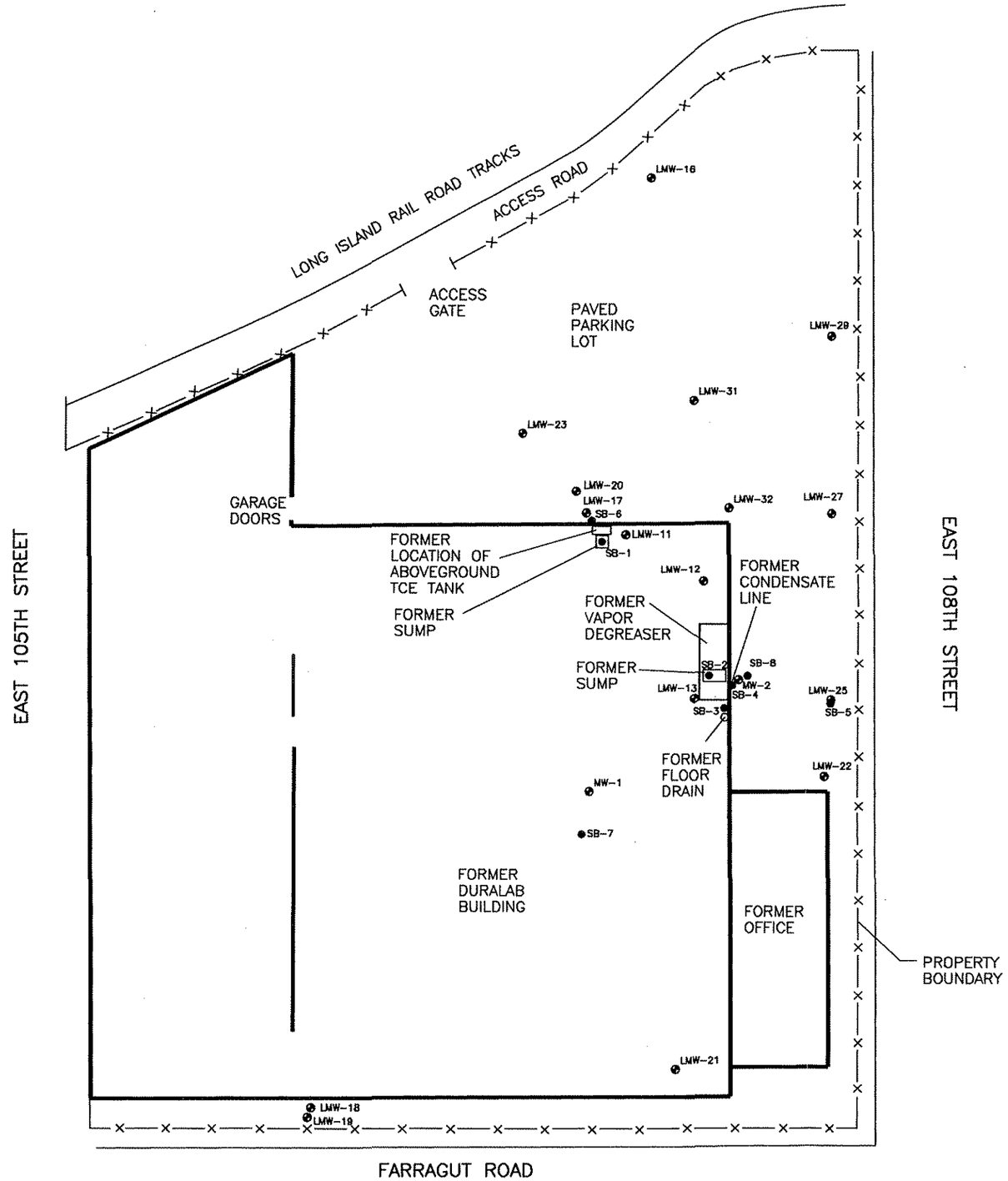

LEGEND:

—×—×—	CHAIN LINK FENCE
MW-1	LOCATION AND DESIGNATION OF MONITORING WELL
SB-1	LOCATION AND DESIGNATION OF SOIL BORING
TCE	TRICHLOROETHENE

80' 0 80'

Title:

SITE PLAN

REMEDIAL ACTION WORK PLAN
FORMER DURALAB PROPERTY
BROOKLYN, NEW YORK

Prepared For: FEDERAL EXPRESS CORPORATION
ONE CENTURY DRIVE
PARSIPPANY, NEW JERSEY

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: J.M.	Date: 3/98	FIGURE
Prepared by: R.K.	Scale: As Shown	2
Project Mgr: S.J.G.	Status: Final	
File No: F0211101	Project: 44402Y	

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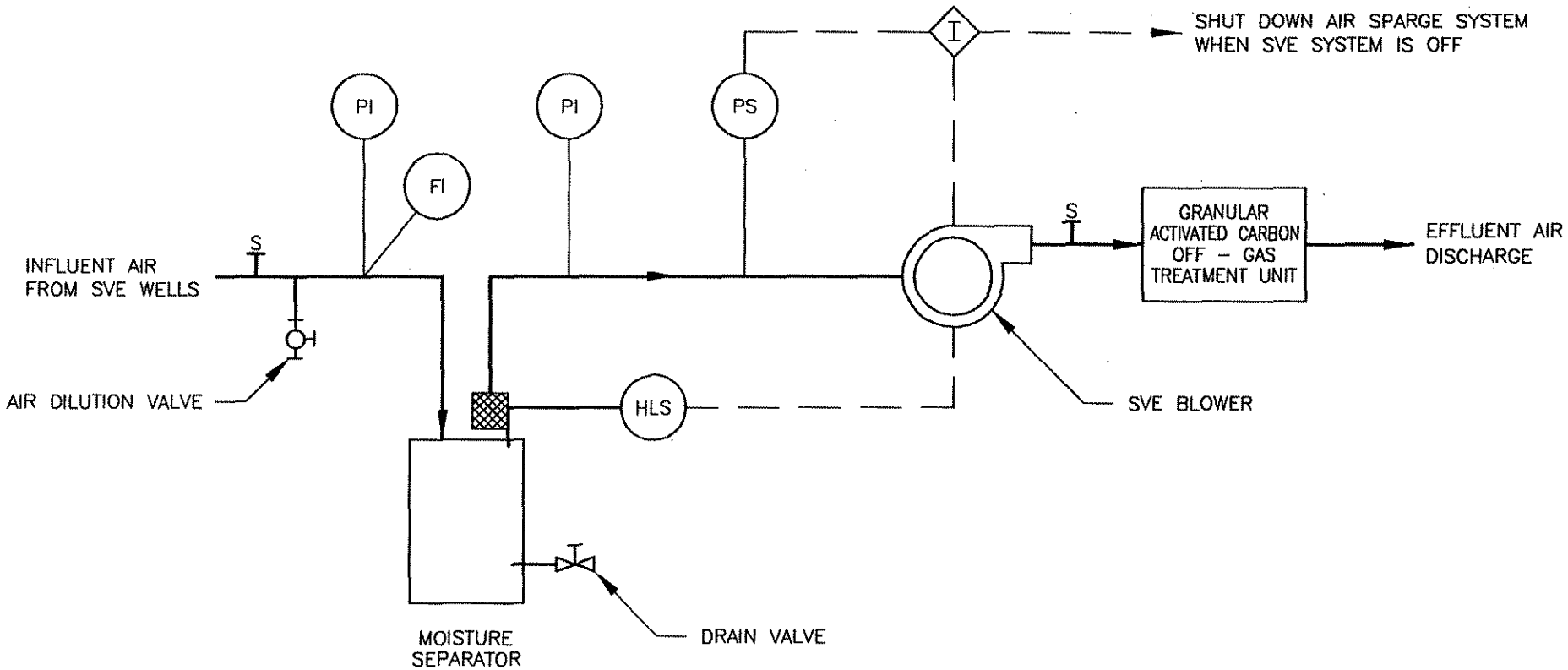


LEGEND

FI	FLOW INDICATOR	I	INTERFACE
PI	PRESSURE INDICATOR		PARTICULATE FILTER
PS	PRESSURE SWITCH		AIR LINE
			SIGNAL LINE
HLS	HIGH LEVEL SENSOR	S	SAMPLE PORT

Title:

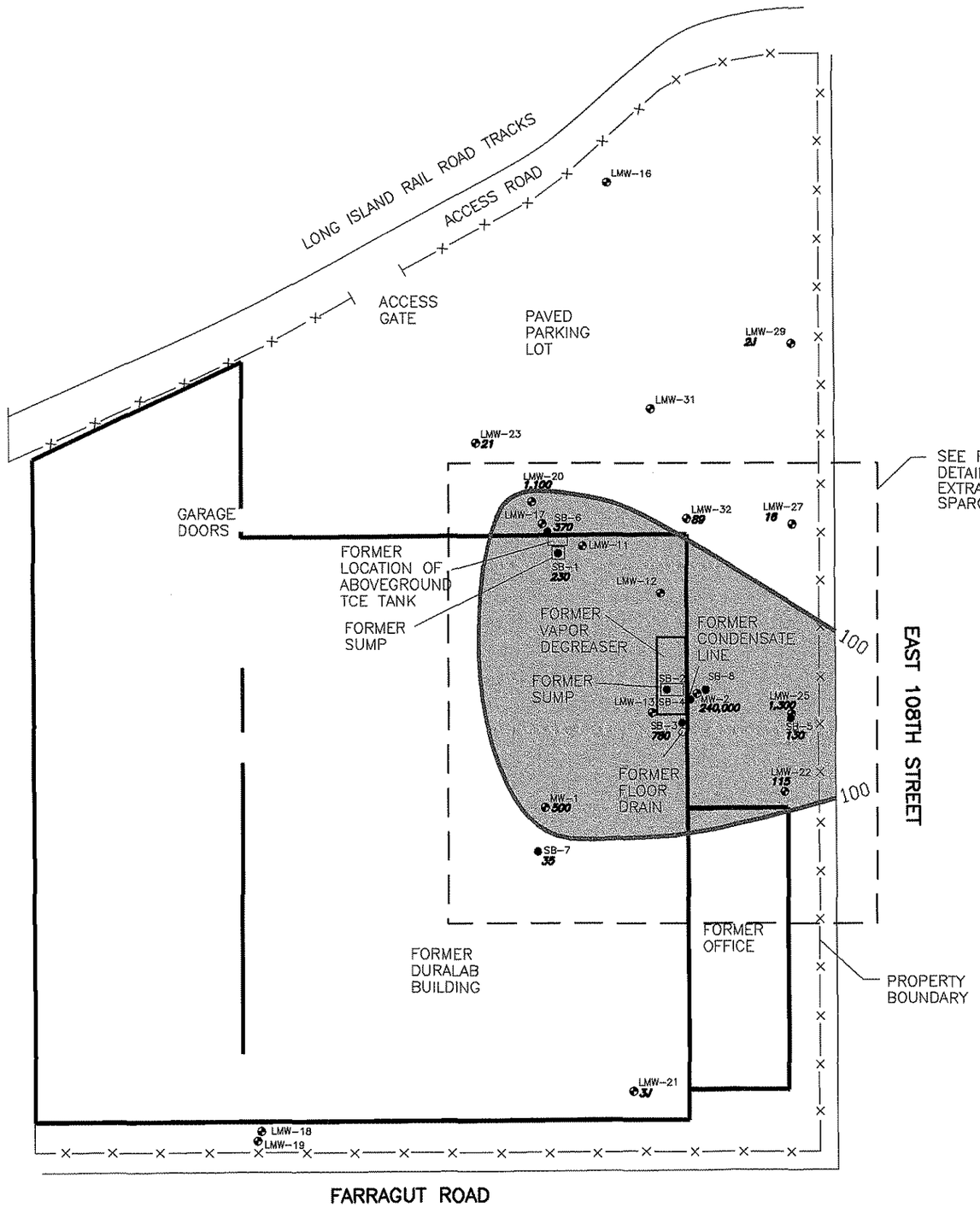
PROCESS AND INSTRUMENTATION SVE SYSTEM DIAGRAM

REMEDIAL ACTION WORK PLAN
ACTION ALTERNATIVES – FORMER
DURALAB PROPERTY BROOKLYN, NEW YORK

Prepared For:
FEDERAL EXPRESS CORPORATION
ONE CENTURY DRIVE
PARSIPPANY, NEW JERSEY

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: W.F.	Date: 2/98	FIGURE
Prepared by: R.R.	Scale: NONE	3
Project Mgr: S.J.G.	Status: FINAL	
File No.: F0211114	Project: 44402Y	



LEGEND:

—×—×—	CHAIN LINK FENCE
MW-1	LOCATION AND DESIGNATION OF MONITORING WELL
SB-1	LOCATION AND DESIGNATION OF SOIL BORING
	APPROXIMATE EXTENT OF AREA OF REMEDIATION
TCE	TRICHLOROETHENE
35	TCE CONCENTRATIONS IN MICROGRAMS PER LITER (ug/L)
100	LINE OF EQUAL TCE CONCENTRATIONS IN ug/L
J	ESTIMATED VALUE

80' 0 80'

Title:

TRICHLOROETHENE DETECTED IN GROUND WATER JANUARY 19 AND 28, 1998 AND FEBRUARY 24, 1998

REMEDIAL ACTION WORK PLAN
FORMER DURALAB PROPERTY
BROOKLYN, NEW YORK

Prepared For: FEDERAL EXPRESS CORPORATION
ONE CENTURY DRIVE
PARSIPPANY, NEW JERSEY

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: J.M.	Date: 3/98	FIGURE
Prepared by: R.K.	Scale: As Shown	4
Project Mgr: S.J.G.	Status: Final	
File No: F0211102	Project: 44402Y	

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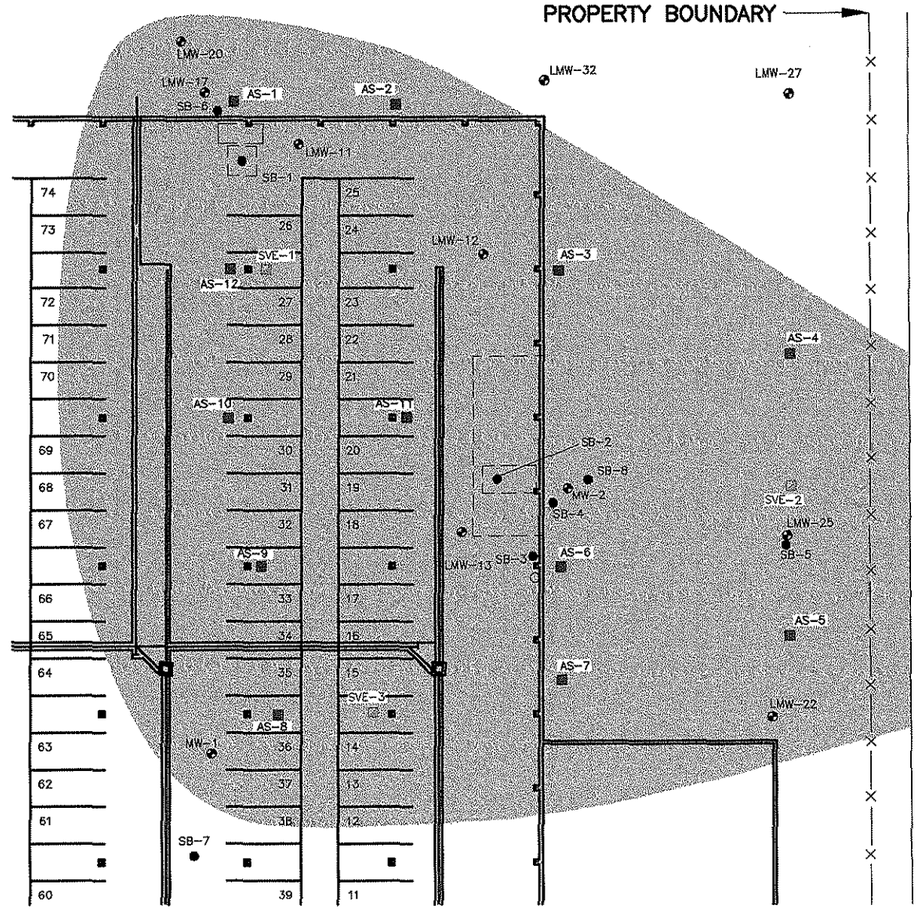

LEGEND:

- CHAIN LINK FENCE
- FORMER BUILDING STRUCTURE
- MW-1 — LOCATION AND DESIGNATION OF EXISTING MONITORING WELL
- SB-1 — LOCATION AND DESIGNATION OF FORMER SOIL BORING
- APPROXIMATE EXTENT OF SOURCE AREA
- SVE-1 — LOCATION AND DESIGNATION OF PROPOSED SVE WELL
- AS-1 — LOCATION AND DESIGNATION OF PROPOSED AIR SPARGE WELL

NOTE:

1. SITE PLAN ADAPTED FROM "NEW (PARTIAL FLOOR PLAN ONE," ENGINEERING DESIGN ASSOCIATES, JUNE 1997. REVISED NOVEMBER 1997 AS PART OF THE PROPOSED RENOVATION FOR THE FEDERAL EXPRESS CITY STATION FACILITY (FORMER DURALAB PROPERTY.)

40' 0 40'

Title:

PROPOSED SOIL VAPOR EXTRACTION AND AIR SPARGE WELL SITE PLAN

REMEDIAL ACTION WORK PLAN
FORMER DURALAB PROPERTY
BROOKLYN, NEW YORK

Prepared For: FEDERAL EXPRESS CORPORATION
ONE CENTURY DRIVE
PARSIPPANY, NEW JERSEY

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: O.R.	Date: 3/98	FIGURE
Prepared by: R.K.	Scale: As Shown	5
Project Mgr: S.J.G.	Status: Final	
File No: F0211113	Project: 44402Y	

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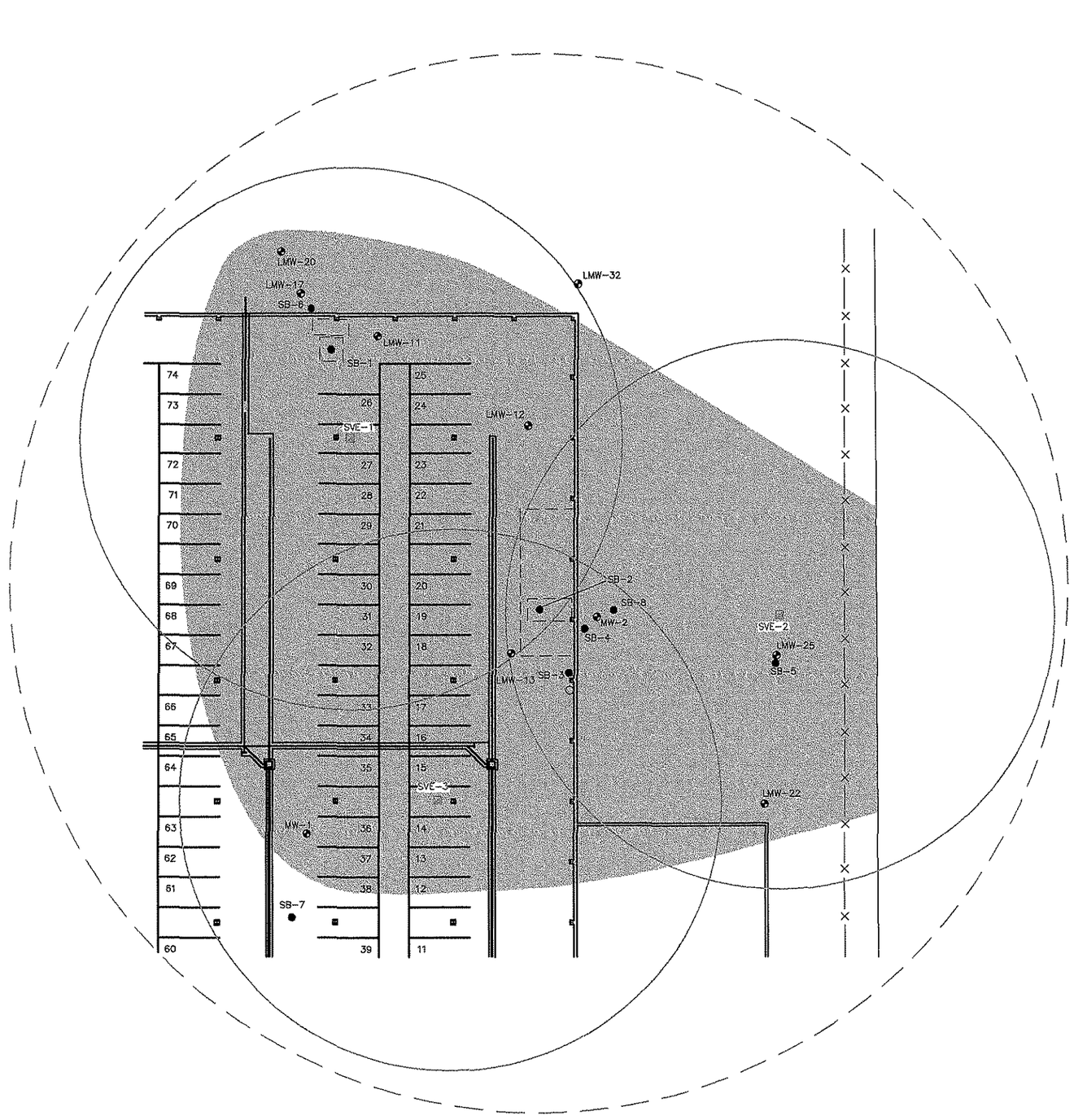

LEGEND:

- CHAIN LINK FENCE
- FORMER BIULDING STRUCTURE
- MW-1 — LOCATION AND DESIGNATION OF EXISTING MONITORING WELL
- SB-1 — LOCATION AND DESIGNATION OF FORMER SOIL BORING
- APPROXIMATE EXTENT OF SOURCE AREA
- SVE-1 — LOCATION AND DESIGNATION OF PROPOSED SVE WELL
- ANTICIPATED SVE WELL RADIUS OF INFLUENCE
- ANTICIPATED COMBINED SVE WELL RADIUS OF INFLUENCE

NOTE:

1. SITE PLAN ADAPTED FROM "NEW (PARTIAL FLOOR PLAN ONE," ENGINEERING DESIGN ASSOCIATES, JUNE 1997. REVISED NOVEMBER 1997 AS PART OF THE PROPOSED RENOVATION FOR THE FEDERAL EXPRESS CITY STATION FACILITY (FORMER DURALAB PROPERTY.)

40' 0 40'

Title:
ANTICIPATED SOIL VAPOR EXTRACTION WELL RADIUS OF INFLUENCE FOR THE REMEDIATION SYSTEM

REMEDIAL ACTION WORK PLAN
FORMER DURALAB PROPERTY
BROOKLYN, NEW YORK

Prepared For: FEDERAL EXPRESS CORPORATION
ONE CENTURY DRIVE
PARSIPPANY, NEW JERSEY

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: O.R.	Date: 3/98	FIGURE
Prepared by: R.K.	Scale: As Shown	6
Project Mgr: S.J.G.	Status: Final	
File No: F0211112	Project: 44402Y	

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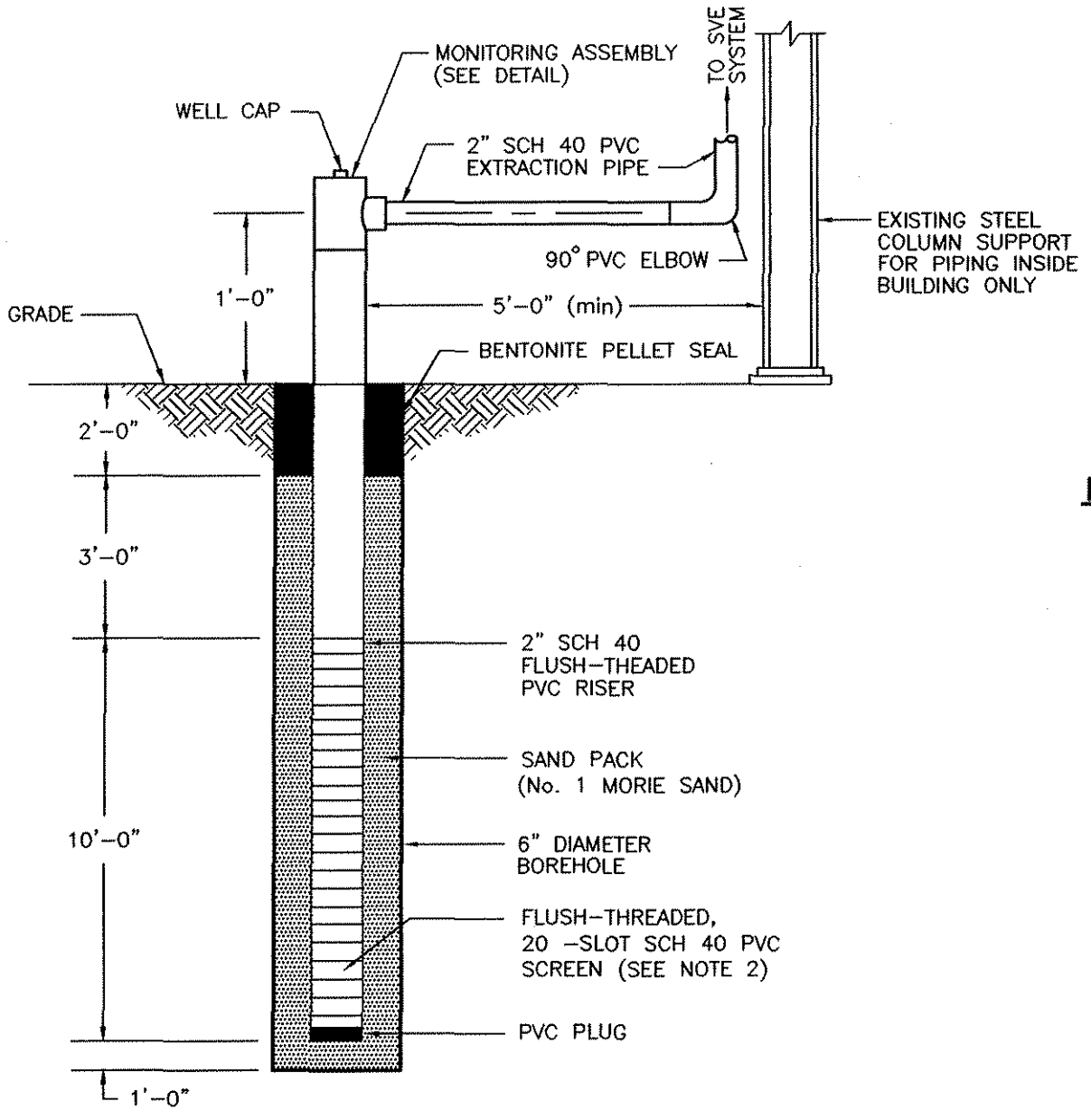
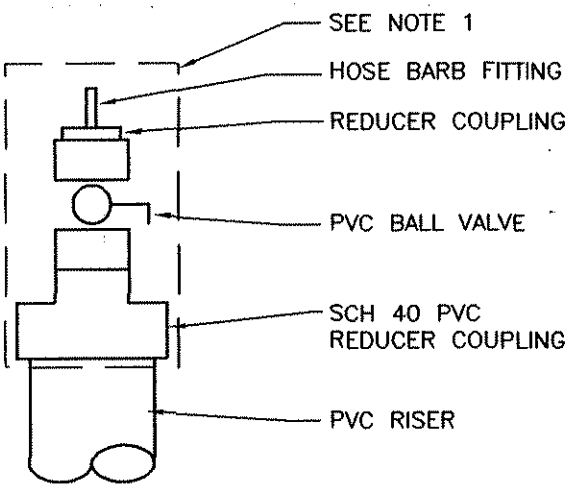


SOIL VAPOR EXTRACTION WELL DETAIL (TYPICAL)

N.T.S.



MONITORING ASSEMBLY DETAIL

N.T.S.

NOTES:

1. THE MONITORING ASSEMBLY WILL BE INSTALLED IN PLACE OF THE WELL CAP DURING MONITORING EVENTS
2. THE FINAL SCREEN DEPTHS AND LENGTHS OF THE SVE WELLS MAY VARY DEPENDING ON ACTUAL FIELD OBSERVANCES OF DEPTH TO GROUND WATER AND DEPTH OF ANY CONFINING LAYERS
3. SUPPORT PIPING IN FIELD AS NECESSARY

Title:

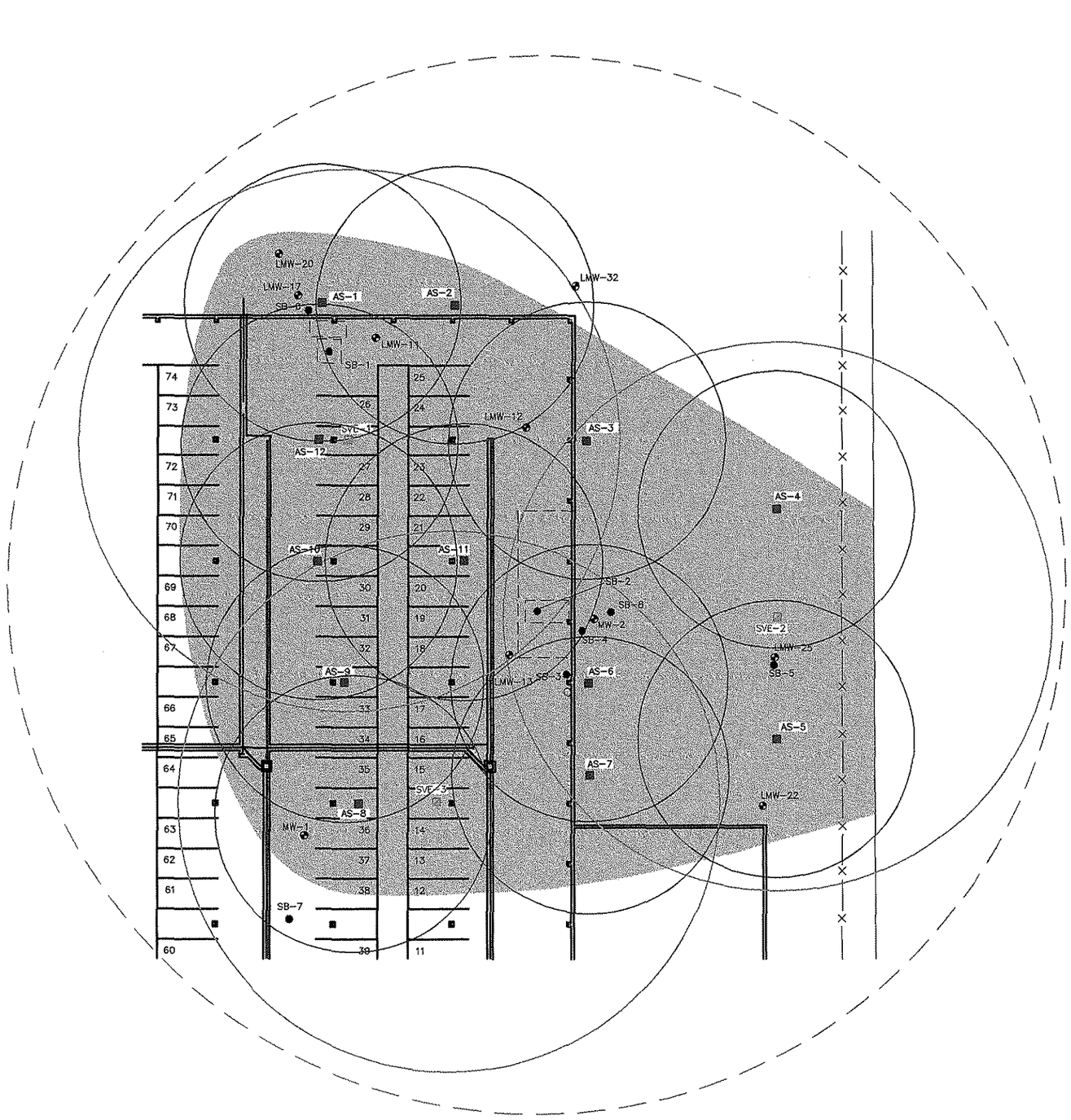
PROPOSED SOIL VAPOR EXTRACTION WELL DETAILS

REMEDIAL ACTION WORK PLAN
FORMER DURALAB PROPERTY
BROOKLYN, NEW YORK

Prepared For:
FEDERAL EXPRESS CORPORATION
ONE CENTURY DRIVE
PARSIPPANY, NEW JERSEY

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: O.R.	Date: 3/98	FIGURE
Prepared by: W.G.	Scale: NONE	7
Project Mgr: S.J.G.	Status: Final	
File No: F0211108	Project: 44402Y	



LEGEND:

- CHAIN LINK FENCE
- FORMER BIULDING STRUCTURE
- MW-1 — LOCATION AND DESIGNATION OF EXISTING MONITORING WELL
- SB-1 — LOCATION AND DESIGNATION OF FORMER SOIL BORING
- APPROXIMATE EXTENT OF SOURCE AREA
- SVE-1 — LOCATION AND DESIGNATION OF PROPOSED SVE WELL
- AS-1 — LOCATION AND DESIGNATION OF PROPOSED AIR SPARGE WELL
- ANTICIPATED SVE WELL RADIUS OF INFLUENCE
- ANTICIPATED COMBINED SVE WELL RADIUS OF INFLUENCE
- ANTICIPATED AS WELL RADIUS OF INFLUENCE

NOTE:

1. SITE PLAN ADAPTED FROM "NEW (PARTIAL FLOOR PLAN ONE," ENGINEERING DESIGN ASSOCIATES, JUNE 1997. REVISED NOVEMBER 1997 AS PART OF THE PROPOSED RENOVATION FOR THE FEDERAL EXPRESS CITY STATION FACILITY (FORMER DURALAB PROPERTY.)

40' 0 40'

Title:

ANTICIPATED RADIUS OF INFLUENCE OF SOIL VAPOR EXTRACTION AND AIR SPARGE WELLS

REMEDIAL ACTION WORK PLAN
FORMER DURALAB PROPERTY
BROOKLYN, NEW YORK

Prepared For: FEDERAL EXPRESS CORPORATION
ONE CENTURY DRIVE
PARSIPPANY, NEW JERSEY

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: O.R.	Date: 3/98	FIGURE	
Prepared by: R.K.	Scale: As Shown		8
Project Mgr: S.J.G.	Status: Final		
File No: F0211111	Project: 44402Y		

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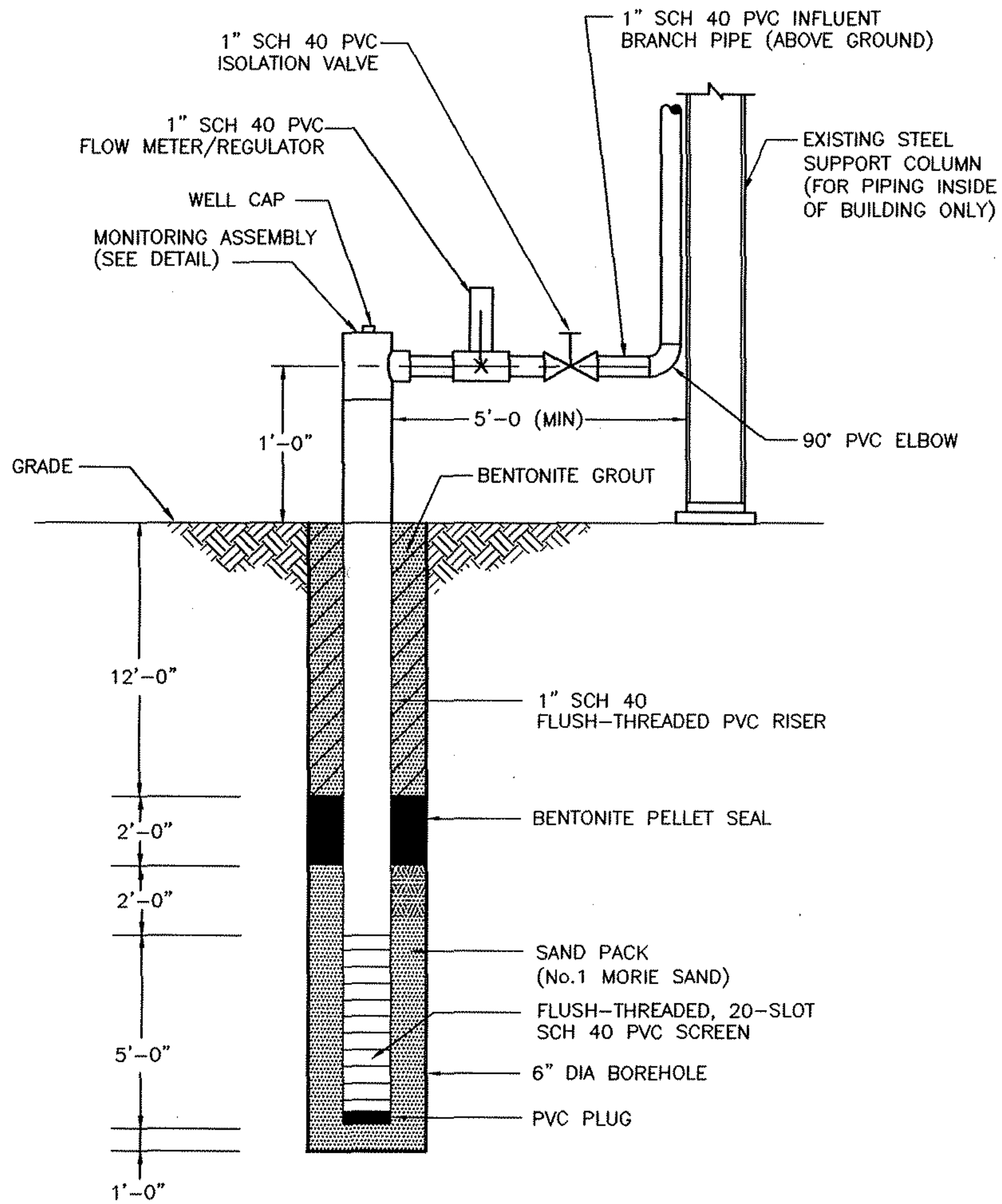
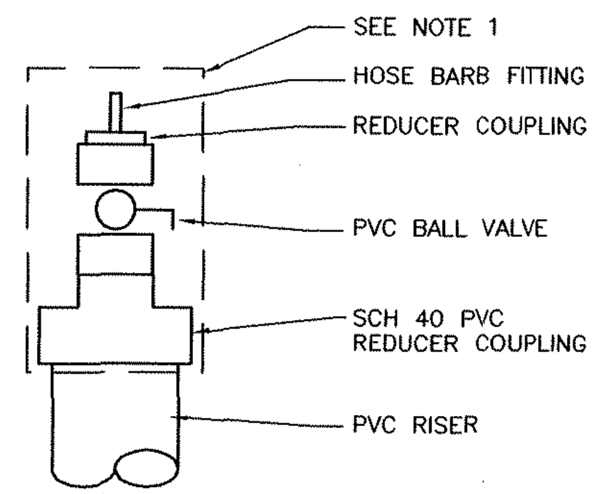


AIR SPARGE WELL DETAIL
(TYPICAL)
N.T.S.



MONITORING ASSEMBLY DETAIL
N.T.S.

NOTES:

1. THE MONITORING ASSEMBLY WILL BE INSTALLED IN PLACE OF THE WELL CAP DURING MONITORING EVENTS.
2. THE FINAL SCREEN DEPTHS FOR SPECIFIC AIR SPARGE WELLS MAY VARY DEPENDING ON ACTUAL FIELD OBSERVANCES OF THE DEPTH TO GROUND WATER AND DEPTH OF ANY CONFINING LAYER.
3. SUPPORT PIPING IN THE FIELD AS NECESSARY

Title:

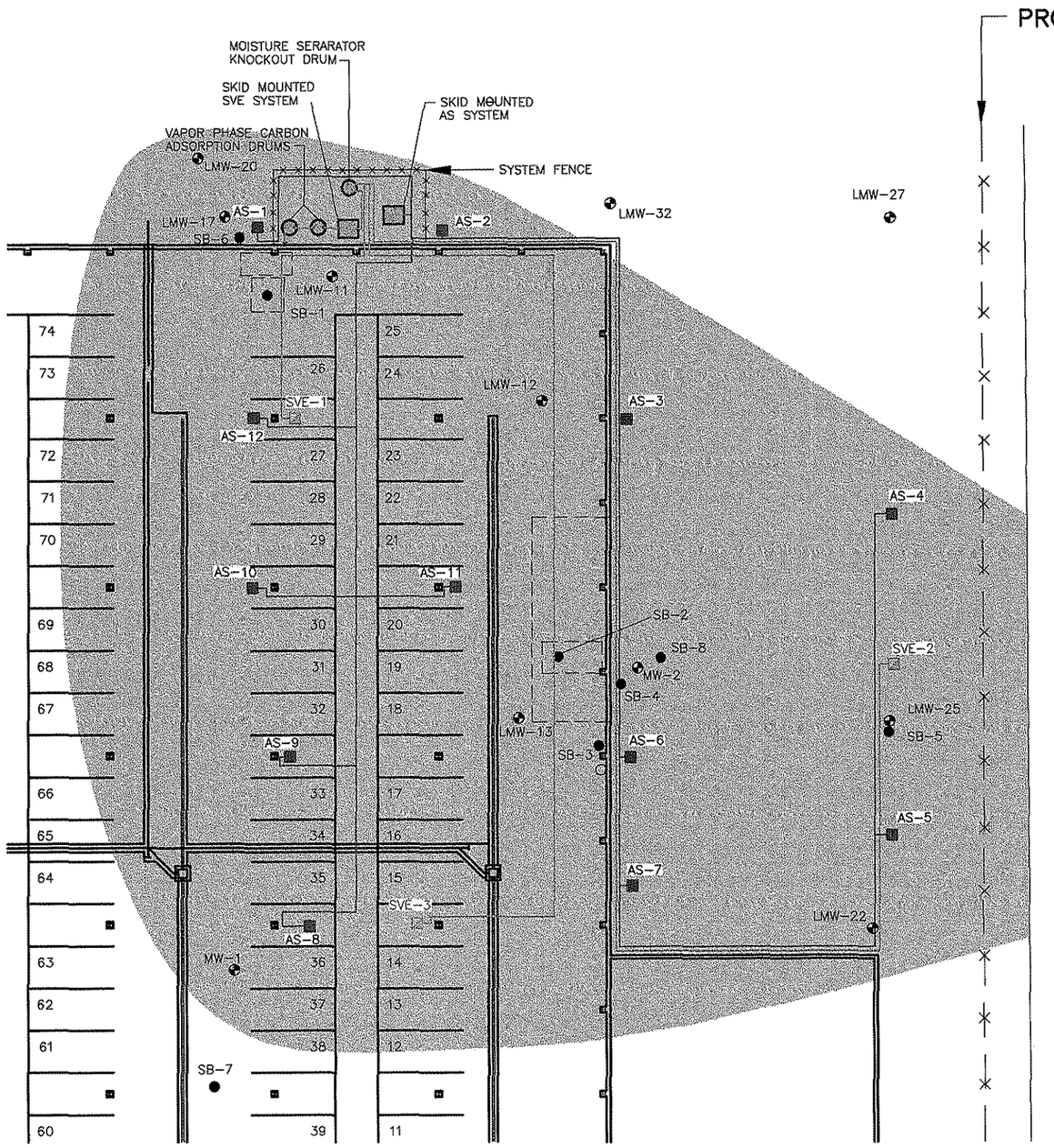
PROPOSED AIR SPARGE WELL DETAILS

REMEDIAL ACTION WORK PLAN
FORMER DURALAB PROPERTY
BROOKLYN, NEW YORK

Prepared For:
FEDERAL EXPRESS CORPORATION
ONE CENTURY DRIVE
PARSIPPANY, NEW JERSEY

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: O.R.	Date: 3/98	FIGURE
Prepared by: G.M.	Scale: NONE	9
Project Mgr: S.J.G.	Status: Final	
File No: F0211110	Project: 44402Y	



LEGEND:

—×—×—	CHAIN LINK FENCE
———	FORMER BIULDING STRUCTURE
MW-1	LOCATION AND DESIGNATION OF EXISTING MONITORING WELL
SB-1	LOCATION AND DESIGNATION OF FORMER SOIL BORING
	APPROXIMATE EXTENT OF SOURCE AREA
SVE-1	LOCATION AND DESIGNATION OF PROPOSED SVE WELL
AS-1	LOCATION AND DESIGNATION OF PROPOSED AIR SPARGE WELL
AS	AIR SPARGE
SVE	SOIL VAPOR EXTRACTION
———	2" SCH 40 PVC SVE PIPING
———	2" SCH 40 PVC AS PIPING

NOTE:

1. SITE PLAN ADAPTED FROM "NEW (PARTIAL FLOOR PLAN ONE," ENGINEERING DESIGN ASSOCIATES, JUNE 1997. REVISED NOVEMBER 1997 AS PART OF THE PROPOSED RENOVATION FOR THE FEDERAL EXPRESS CITY STATION FACILITY (FORMER DURALAB PROPERTY.)

30' 0 30'

Title: **SOIL VAPOR EXTRACTION AND AIR SPARGE SYSTEM, ABOVE GROUND PIPING AND EQUIPMENT LAYOUT**

REMEDIAL ACTION WORK PLAN
FORMER DURALAB PROPERTY
BROOKLYN, NEW YORK

Prepared For: FEDERAL EXPRESS CORPORATION
ONE CENTURY DRIVE
PARSIPPANY, NEW JERSEY

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: O.R.	Date: 4/98	FIGURE
Prepared by: R.K.	Scale: As Shown	10
Project Mgr: S.J.G.	Status: Final	
File No: F0211117	Project: 44402Y	

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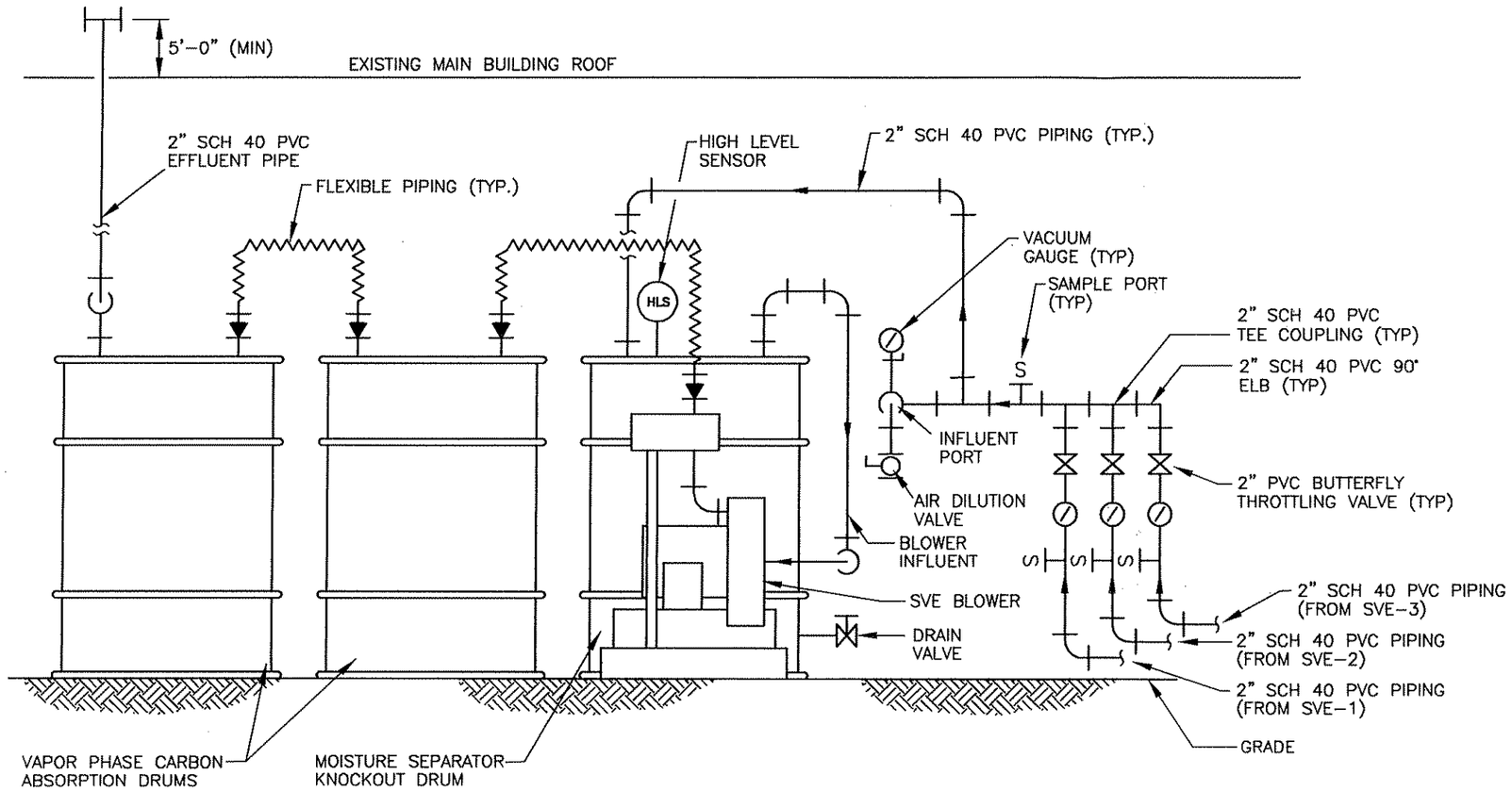
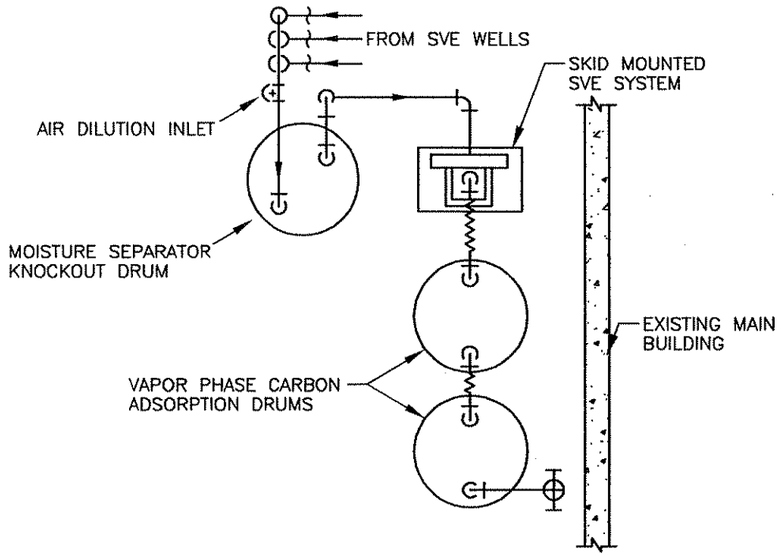


SECTION

SOIL VAPOR EXTRACTION (SVE) SYSTEM EQUIPMENT

N.T.S.



PLAN

SVE SYSTEM EQUIPMENT

N.T.S.

Title: PROPOSED SOIL VAPOR EXTRACTION EQUIPMENT SECTION AND PLAN

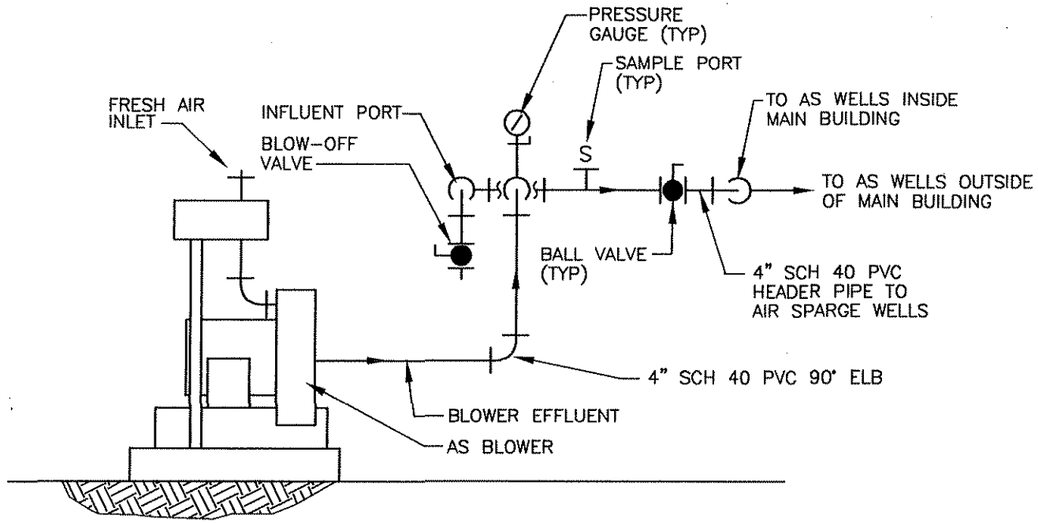
REMEDIAL ACTION WORK PLAN
FORMER DURALAB PROPERTY
BROOKLYN, NEW YORK

Prepared For:

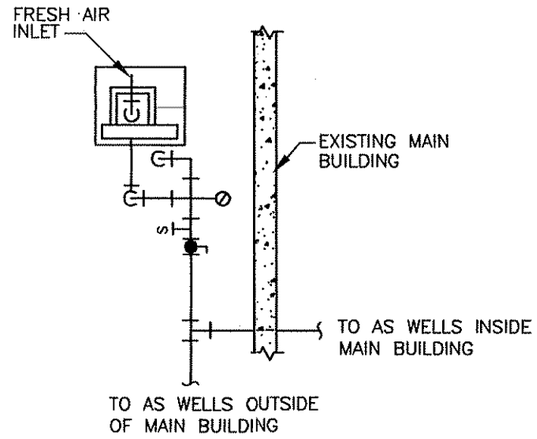
FEDERAL EXPRESS CORPORATION
ONE CENTURY DRIVE
PARSIPPANY, NEW JERSEY

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: O.R.	Date: 3/98	FIGURE
Prepared by: G.M.	Scale: NONE	11
Project Mgr: S.J.G.	Status: DRAFT	
File No.: F0211106	Project: 44402Y	



SECTION
AIR SPARGE SYSTEM EQUIPMENT
N.T.S.



PLAN
AIR SPARGE SYSTEM EQUIPMENT
N.T.S.

Title:
PROPOSED AIR SPARGE EQUIPMENT
SECTION AND PLAN

REMEDIAL ACTION WORK PLAN
FORMER DURALAB PROPERTY
BROOKLYN, NEW YORK

Prepared For:
FEDERAL EXPRESS CORPORATION
ONE CENTURY DRIVE
PARSIPPANY, NEW JERSEY

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: O.R.	Date: 3/98	FIGURE
Prepared by: G.M.	Scale: NONE	12
Project Mgr: S.J.G.	Status: Final	
File No.: F0211109	Project: 44402Y	

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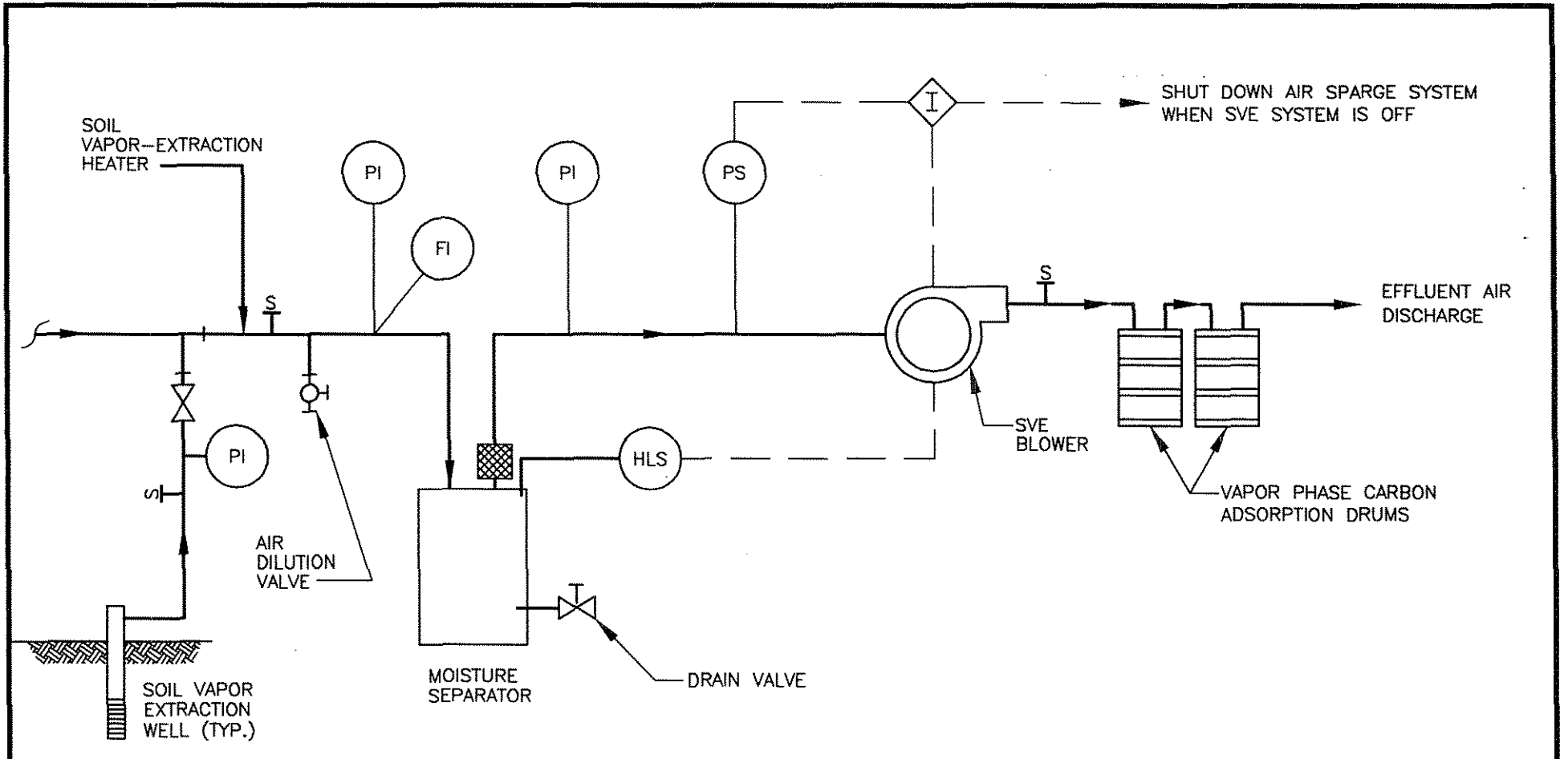

LEGEND

FI	FLOW INDICATOR	I	INTERFACE
PI	PRESSURE INDICATOR		PARTICULATE FILTER
			AIR LINE
PS	PRESSURE SWITCH		SIGNAL LINE
		S	SAMPLE PORT
HLS	HIGH LEVEL SWITCH		BUTTERFLY VALVE

Title:

PROPOSED SOIL VAPOR EXTRACTION PROCESS AND INSTRUMENTATION DIAGRAM

REMEDIAL ACTION WORK PLAN
FORMER DURALAB PROPERTY
DURALAB PROPERTY BROOKLYN, NEW YORK

Prepared For:

FEDERAL EXPRESS CORPORATION
ONE CENTURY DRIVE
PARSIPPANY, NEW JERSEY

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: W.F.	Date: 3/98	FIGURE	
Prepared by: W.G.	Scale: NONE	13	
Project Mgr: S.J.G.	Status: Final		
File No.: F0211115	Project: 44402Y		

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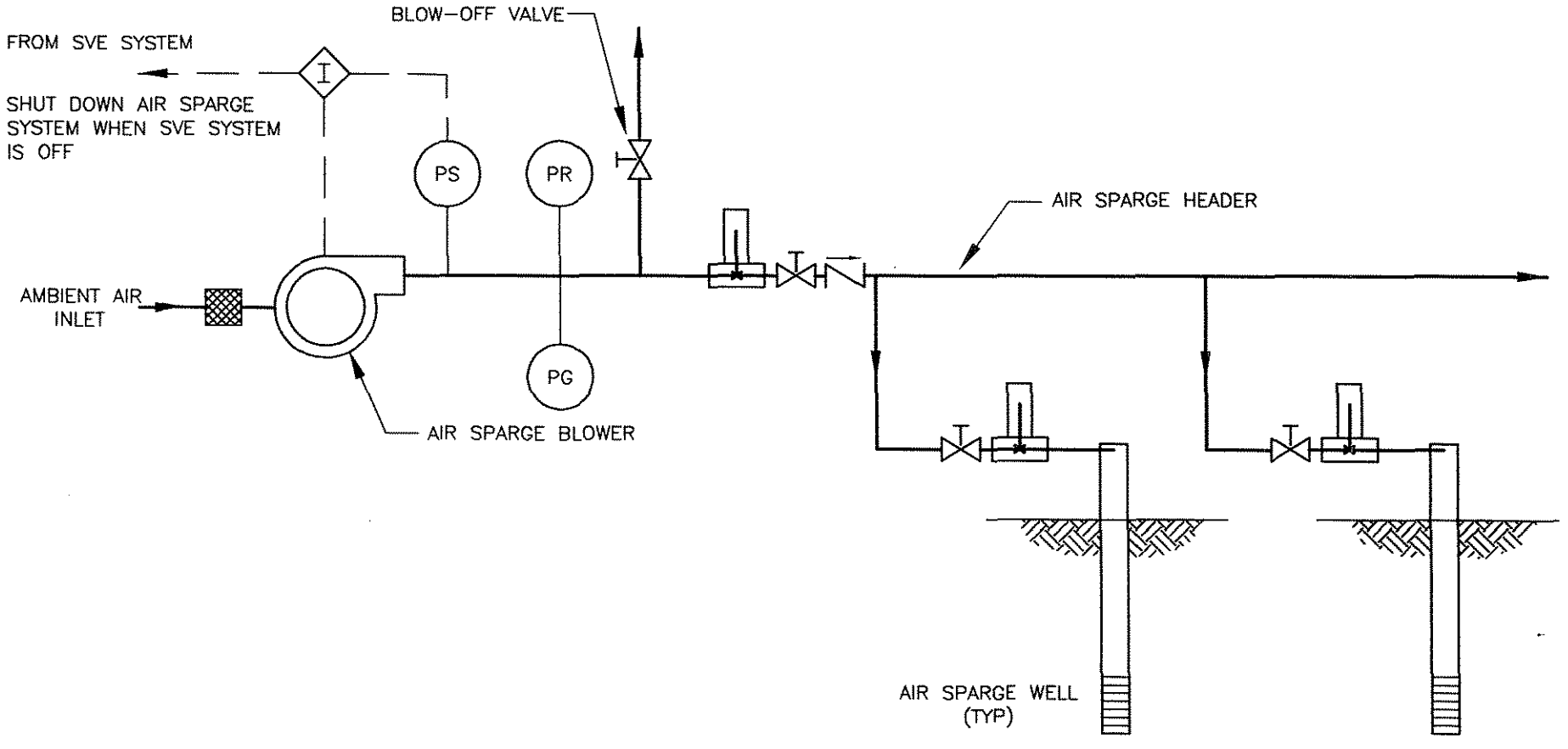


LEGEND

- FLOW METER/REGULATOR
- PS — PRESSURE SWITCH
- PR — PRESSURE REGULATOR
- PG — PRESSURE GAUGE
- INTERFACE
- PARTICULATE FILTER
- ISOLATION VALVE
- CHECK VALVE
- AIR LINE
- SIGNAL LINE

Title:

PROPOSED AIR SPARGE PROCESS AND INSTRUMENTATION DIAGRAM

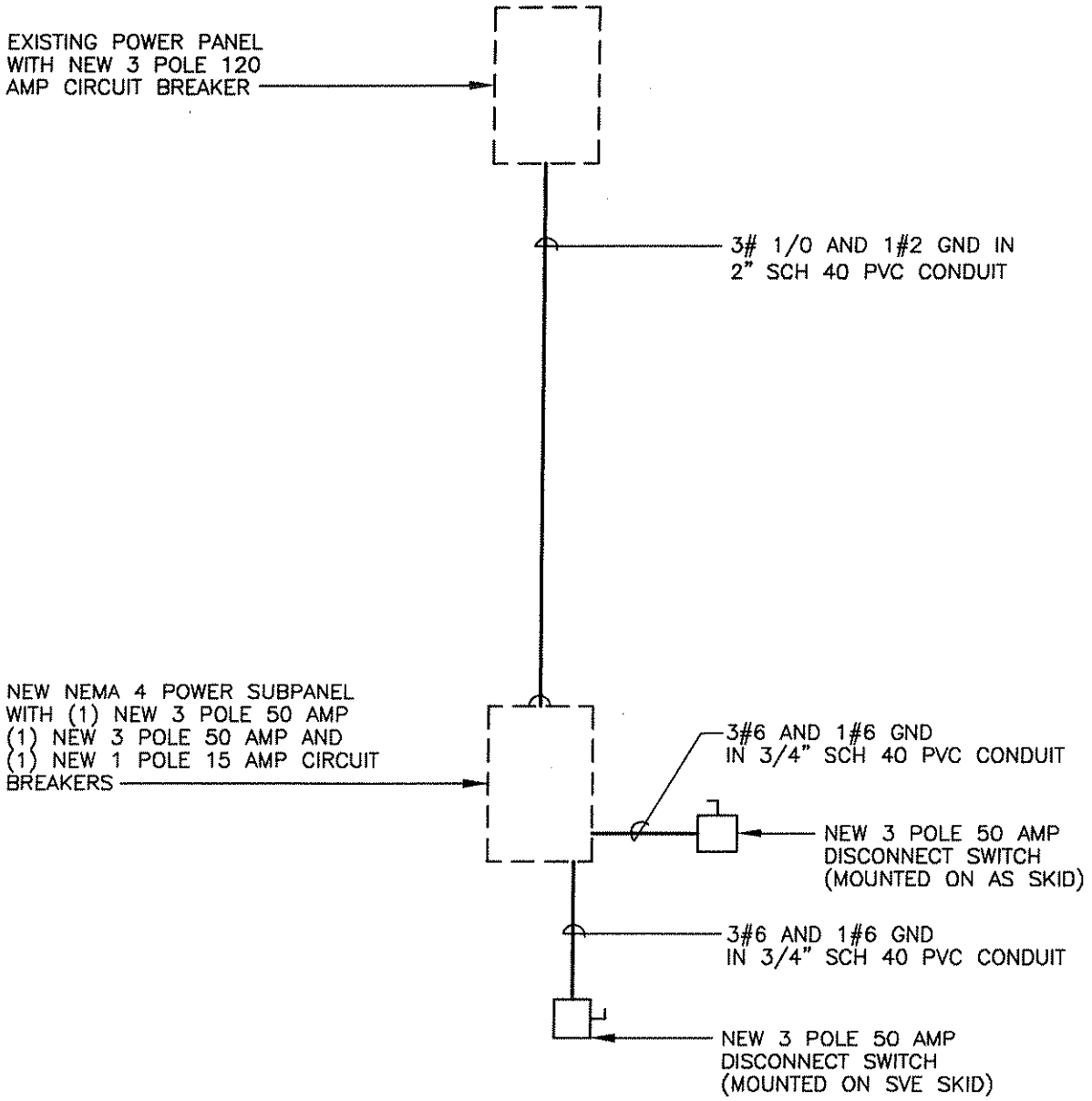
REMEDIAL ACTION WORK PLAN
FORMER DURALAB PROPERTY
BROOKLYN, NEW YORK

Prepared For:
FEDERAL EXPRESS CORPORATION
ONE CENTURY DRIVE
PARSIPPANY, NEW JERSEY

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: O.R.	Date: 3/98
Prepared by: W.G.	Scale: NONE
Project Mgr: S.J.G.	Status: DRAFT
File No.: F0211107	Project: 444402Y

FIGURE 14



NOTES:

1. ELECTRICAL WIRING SHALL BE PROVIDED WITH SEAL OFF FITTINGS IN ACCORDANCE WITH THE ELECTRICAL CODE REQUIREMENTS.
2. ELECTRIC WIRING SHALL BE INSTALLED IN ACCORDANCE WITH THE MOST STRINGENT REQUIREMENT OF THE NATIONAL ELECTRIC CODE, STATE OR LOCAL ANGENCIES.

Title:

SOIL VAPOR EXTRACTION/AIR SPARGE SYSTEM ELECTRICAL SCHEMATIC DIAGRAM

REMEDIAL ACTION WORK PLAN
FORMER DURALAB PROPERTY
BROOKLYN, NEW YORK

Prepared For: FEDERAL EXPRESS CORPORATION
ONE CENTURY DRIVE
PARSIPPANY, NEW JERSEY

ROUX
ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: O.R.	Date: 3/98	FIGURE
Prepared by: W.G.	Scale: NONE	15
Project Mgr: S.J.G.	Revision: FINAL	
File No: F0211116	Project: 44402Y	

N:\F\44402Y\F021111\F0211116.DWG

APPENDIX A

Geologic Logs

ROUX

Project: **Federal Express Canarsie, Brooklyn**	**Log of Well No. MW-1**
Date Started: **1/19/98** Completed: **1/19/98**	Measuring Point Elevation: **99.97** Total Depth: **22.0 ft**
Logged By: **Jeff Makowski** Checked By: **Rob T.**	Water Level During Drilling: **10.4 ft** Post-Development: **10.4 ft**
Drilling Co: **ADT** Driller: **Anton Gallas**	Casing: **2 - Inch PVC** Drill Bit Diameter: **8.2 inch**
Drilling Method: **Hollow-Stem Auger**	Perforation: **20 Slot Screen** from **7 feet** to **22 feet**
Drilling Equipment: **Mobile Drill B-57**	Pack: **#2 Morie Sand** from **4 feet** to **22 feet**
Sampler: **Auger**	Seal: **Bentonite Pellets** from **3 feet** to **4 feet**
	Grout from **1 foot** to **3 feet**

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Monitoring Well Construction	Sampler	Blows per 6"	PID (ppm)	REMARKS
	CONCRETE	CONCRETE				0.0	Installed well cemented from 0 to 1 foot below land surface within a flushmount curb box No odors or staining
	Brown medium Silty SAND; trace Gravel (fill); Dry	FILL					Installed well grouted from 1 foot to 3 feet below land surface Installed well plugged with bentonite from 3 feet to 4 feet below land surface
5	Brown medium Silty SAND; trace Gravel (fill); Dry to Moist	FILL				0.0	No odors or staining Installed well packed with #2 Morie Sand from 4 feet to 22 feet below land surface
10	Brown fine to medium SAND; Moist to Wet	SM				0.0	Water encountered at 10.36 feet below land surface No odors or staining
15	Brown fine to medium SAND; Wet	SM				0.0	No odors or staining
20						0.0	
							Bottom of well at 22 feet below grade
25							

ROUX

Project: **Federal Express Canarsie, Brooklyn**	Log of Well No. **MW-2**
Date Started: **1/19/98** Completed: **1/19/98**	Measuring Point Elevation: **99.33** Total Depth: **22.0 ft**
Logged By: **Jeff Makowski** Checked By: **Rob T.**	Water Level During Drilling: **9.8 ft** Post-Development: **9.8 ft**
Drilling Co: **ADT** Driller: **Anton Gallas**	Casing: **2 - Inch PVC** Drill Bit Diameter: **8.2 inch**
Drilling Method: **Hollow-Stem Auger**	Perforation: **20 Slot Screen** from **7 feet** to **22 feet**
Drilling Equipment: **Mobile Drill B-57**	Pack: **#2 Morie Sand** from **4 feet** to **22 feet**
Sampler: **Auger**	Seal: **Bentonite Pellets** from **3 feet** to **4 feet**
	Grout from **1 foot** to **3 feet**

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Monitoring Well Construction	Sampler Blows per 6"	PID (ppm)	REMARKS
	ASPHALT	ASPHALT			0.0	Installed well cemented from 0 to 1 foot below land surface within a flushmount curb box No odors or staining
	Brown medium Silty SAND; trace Gravel (fill); Dry	FILL				Installed well grouted from 1 foot to 3 feet below land surface Installed well plugged with bentonite from 3 feet to 4 feet below land surface
5	Brown medium Silty SAND; trace Gravel (fill); Dry to Moist	FILL			0.0	No odors or staining Installed well packed with #2 Morie Sand from 4 feet to 22 feet below land surface
10	Brown fine to medium SAND; Wet	SM			0.0	Water encountered at 9.77 feet below land surface No odors or staining
15	Brown fine to medium SAND; Wet	SM			0.0	No odors or staining
20					0.0	
						Bottom of well at 22 feet below grade
25						

ROUX

Project: **Federal Express Canarsie, Brooklyn**	Log of Soil Boring No. **SB-1**
Logged By: **Jeff Makowski** Checked By: **Rob T.**	Date Started: **1/19/98** Date Completed: **1/19/98**
Drilling Co: **ADT**	Drill Bit Diameter: **2 Inch** Total Depth: **4.0 ft**
Driller: **Sean Miller**	Backfill Material: **Cuttings** from **0 ft** to **4 ft**
Drilling Method: **Geoprobe**	Sampler: **4 Foot Macrocore**
Drilling Equipment: **4 Foot Macrocore**	Depth to Water at Time of Drilling: **Not Encountered**

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Light brown medium Silty SAND; little Concrete (fill); Moist	FILL			0.0	Boring completed within sump. Sample from 0 to 1 foot submitted to laboratory for VOC analysis
	CONCRETE	CONCRETE				
	Brown to dark brown medium Silty SAND (fill); Wet	FILL			9.0	Sample from 2 to 4 feet submitted to laboratory for VOC analysis
						Water sample collected for VOC analysis from standing water within sump
5						Refusal encountered at 4 feet below grade
10						
15						
20						
25						

ROUX

Project: **Federal Express Canarsie, Brooklyn**		**Log of Soil Boring No. SB-3**	
Logged By: **Jeff Makowski**	Checked By: **Rob T.**	Date Started: **1/19/98**	Date Completed: **1/19/98**
Drilling Co: **ADT**		Drill Bit Diameter: **2 Inch**	Total Depth: **14.0 ft**
Driller: **Sean Miller**		Backfill Material: **Cuttings**	from **0.5 ft** to **14 ft**
Drilling Method: **Geoprobe**		Sampler: **4 Foot Macrocore**	
Drilling Equipment: **4 Foot Macrocore**		Depth to Water at Time of Drilling: **12.3** feet	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler Blows per 6"	PID (ppm)	REMARKS
	CONCRETE	CONCRETE			Concrete floor restored from 0 to 0.5 feet below land surface
	Brown medium Silty SAND; little Concrete (fill); Dry	FILL		30.1	
	Brown medium Silty SAND; little Gravel (fill); Dry	FILL		180.2	
5	Brown medium Silty SAND; trace Gravel (fill); Dry	FILL		283.1	Sample from 4 to 6 feet submitted to laboratory for VOC analysis
	Brown medium Silty SAND (fill); Moist	FILL		190.4	Water sample collected for VOC analysis
				106.1	
10	Brown fine to medium SAND; Moist	SM		84.7	Sample from 10 to 12 feet submitted to laboratory for VOC analysis
	Brown fine to medium SAND; Moist to Wet	SM		20.6	Water encountered at 12.3 feet below land surface
					Bottom of boring at 14 feet below grade
15					
20					
25					

ROUX

Project: Federal Express Canarsie, Brooklyn		Log of Soil Boring No. SB-4	
Logged By: Jeff Makowski	Checked By: Rob T.	Date Started: 1/19/98	Date Completed: 1/19/98
Drilling Co: ADT		Drill Bit Diameter: 2 Inch	Total Depth: 2.0 ft
Driller: Sean Miller		Backfill Material: Cuttings	from 0 ft to 2 ft
Drilling Method: Geoprobe		Sampler: 4 Foot Macrocore	
Drilling Equipment: 4 foot Macrocore		Depth to Water at Time of Drilling: Not Encountered	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Dark brown Silty SAND; trace Gravel (fill); Moist	FILL			0.0	Sample from 0 to 2 feet submitted to laboratory for VOC analysis
						Bottom of boring at 2 feet below grade
5						
10						
15						
20						
25						

ROUX

Project: **Federal Express Canarsie, Brooklyn**		**Log of Soil Boring No. SB-5**	
Logged By: **Jeff Makowski**	Checked By: **Rob T.**	Date Started: **1/19/98**	Date Completed: **1/19/98**
Drilling Co: **ADT**		Drill Bit Diameter: **2 Inch**	Total Depth: **12.0 ft**
Driller: **Sean Miller**		Backfill Material: **Cuttings**	from **0 ft** to **12 ft**
Drilling Method: **Geoprobe**		Sampler: **4 Foot Macrocore**	
Drilling Equipment: **4 foot Macrocore**		Depth to Water at Time of Drilling: **10.2** feet	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	Dark brown medium Silty SAND; little Concrete; trace broken Red Brick (fill); Dry	FILL			0.0	
	Dark brown medium Silty SAND; little Concrete (fill); Dry	FILL			0.0	Water sample collected for VOC analysis
5	Dark brown to grey SILT; little medium Sand; trace broken Red Brick (fill); Moist	FILL			5.1	
	Grey SILT; little medium Sand; trace broken Red Brick (fill); Moist	FILL			10.3	Sample from 6 to 8 feet submitted to laboratory for VOC analysis
	Brown fine to medium SAND; little Silt; Moist	SM			10.5	Sample from 8 to 10 feet submitted to laboratory for VOC analysis
10	Brown fine to medium SAND; Wet	SM			0.0	Water encountered at 10.2 feet below land surface
						Bottom of boring at 12 feet below grade
15						
20						
25						

ROUX

Project: **Federal Express Canarsie, Brooklyn**		**Log of Soil Boring No. SB-6**	
Logged By: **Jeff Makowski**	Checked By: **Rob T.**	Date Started: **1/19/98**	Date Completed: **1/19/98**
Drilling Co: **ADT**		Drill Bit Diameter: **2 Inch**	Total Depth: **10.0 ft**
Driller: **Sean Miller**		Backfill Material: **Cuttings**	from **0.5 ft** to **10 ft**
Drilling Method: **Geoprobe**		Sampler: **4 Foot Macrocore**	
Drilling Equipment: **4 Foot Macrocore**		Depth to Water at Time of Drilling: **8.5** feet	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler	Blows per 6"	PID (ppm)	REMARKS
	ASPHALT	ASPHALT				Asphalt restored from 0 to 0.5 feet below land surface
	Brown medium Silty SAND; little Gravel (fill); Moist	FILL			28.9	Sample from 0 to 2 feet submitted to laboratory for VOC analysis
	Brown medium Silty SAND (fill); Moist	FILL			3.5	
5	Brown medium Silty SAND; little broken Red Brick (fill); Moist	FILL			12.0	Water sample collected for VOC analysis
	Brown fine to medium SAND; trace Silt; Moist	SM			15.7	Sample from 6 to 8 feet submitted to laboratory for VOC analysis
	Brown fine to medium SAND; Moist to Wet	SM			4.2	Water encountered at 8.5 feet below land surface
10						Bottom of boring at 10 feet below grade
15						
20						
25						

ROUX

Project: Federal Express Canarsie, Brooklyn		Log of Soil Boring No. SB-7	
Logged By: Jeff Makowski	Checked By: Rob T.	Date Started: 2/24/98	Date Completed: 2/24/98
Drilling Co: ADT		Drill Bit Diameter: 2 Inch	Total Depth: 12.0 ft
Driller: Lloyd		Backfill Material: Cuttings	from 0.5 ft to 12 ft
Drilling Method: Geoprobe		Sampler: 4 Foot Macrocore	
Drilling Equipment: 4 Foot Macrocore		Depth to Water at Time of Drilling: 11.0 feet	

Depth (feet)	LITHOLOGIC DESCRIPTION	Lithology	Sampler Blows per 6"	PID (ppm)	REMARKS
	CONCRETE	CONCRETE			Concrete floor restored from 0 to 0.5 feet below land surface
	Reddish-brown medium Silty SAND; little broken Red Brick; trace Concrete (fill); Dry	FILL		0.0	
5	Brown to grey medium Silty SAND; trace broken Red Brick (fill); Dry	FILL		0.0	Water sample collected for VOC analysis
	Brown medium SAND; trace Gravel; Moist to Wet	SW		0.0	
10					Water encountered at 11 feet below land surface
					Bottom of boring at 12 feet below grade
15					
20					
25					

APPENDIX B

Waste Disposal Documentation

DEQ WASTE MANAGEMENT DIVISION
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

DO NOT WRITE IN THIS SPACE
ATT. ☐ DIS. ☐ REJ. ☐ PR. ☐

Part 121 of Act 451, 1994, as amended

Failure to file may subject you to criminal and/or civil penalties under Sections 324.11151 or 324.12118 MI

Please print or type. Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N Y D 0 0 1 2 3 6 5 2 0 — Manifest Document No.
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Federal Express Corporation
P.O. Box 727 (Env. Engineering); Memphis, TN 38194
4. Generator's Phone (516 232-2600

A. State Manifest Document Number MI 7062718
B. State Generator's ID
C. State Transporter's ID
D. Transporter's Phone
E. State Transporter's ID
F. Transporter's Phone
G. State Facility's ID
H. Facility's Phone

5. Transporter 1 Company Name: Maumee Express, Inc.
6. US EPA ID Number: N J D 9 8 6 6 0 7 3 8 0
7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address
City Environmental Inc.
1923 Frederick Street
Detroit, MI 48211
10. US EPA ID Number: M I D 9 8 0 9 9 1 5 6 6

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID NUMBER).	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ, Hazardous Waste Liquid, N.O.S., 9, NA3082, III (Trichloroethylene)	X	XX3	DM	XX120	G	D040
b. Non RCRA, Non DOT Regulated Material (Non Hazardous Soil)		XX3	DM	X1500	B	NONE
c.						
d.						

J. Additional Descriptions for Materials Listed Above
A.App# 23092H ERG#171 Site Address:
B.App# 23031L 107-123 Farragut Rd.
Brooklyn, NY
State # AA998B NT-

K. Handling Codes

15. Special Handling Instructions and Additional Information
Emergency Contact: Capitol Environmental Services (800) 560-2374

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment OR; if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: AARON WERBIN — Signature: [signature] — Date: Month 03 Day 30 Year 98

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Willie Gonzalez — Signature: [signature] — Date: Month 03 Day 31 Year 98

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: Edward Hawkins — Signature: [signature] — Date: Month 04 Day 06 Year 98

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: John Leonard — Signature: [signature] — Date: Month 04 Day 06 Year 98

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete. DESIGNATED FACILITY TO GENERATOR

GENERATOR — TRANSPORTER — FACILITY

ALL SPILLS MUST BE REPORTED TO THE MICHIGAN POLLUTION EMERGENCY ALERTING SYSTEM, IN MICHIGAN AT 1-800-292-4706 OR OUT OF STATE AT 517-373-7660; AND THE NATIONAL RESPONSE CENTER AT 1-800-424-8802 24 HOURS PER DAY.