INTERIM REMEDIAL MEASURE WORK PLAN

FOR

ROSE CLEANERS
500 Lexington Avenue
Mount Kisco, New York 10549
Site No.: 3-60-059
Index No.: W3-0978-03-12

PREPARED FOR

NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
625 BROADWAY
ALBANY, NEW YORK 12233-7016

PREPARED BY

BEi

BERNINGER ENVIRONMENTAL, INC.

August 2007

TABLE OF CONTENTS

List of Figures

PROFESSIONAL ENGINEER'S CERTIFICATION

CERTIFICATION:

I hereby certify that I have personally reviewed this Interim Remedial Measure (IRM) developed for the subject property pursuant to the requirements of an executed Order on Consent (December 22, 2003) between the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation (DER), and LRB Cleaners, Inc., the Respondent. The site is located at 500 Lexington Avenue, Mt. Kisco, New York 10549, fully described at Dist. 80.64, Section 01, Lot 14 (see Figures 1 and 2). This work plan was prepared by Jill S. Haimson, PG, CGWP Project Manager under my supervision.

John Soderberg, P.E.

SEAL

_____

Signature:

New York State P.E. License No.

Dated: August , 2007

1.0 INTRODUCTION

The subject property is listed on the NYSDEC DER Registry of Inactive Hazardous Waste Disposal Sites in New York State as Site Number 3-60-059 with a Classification of 2 pursuant to ECL 27-1305. The site is located at 500 Lexington Avenue, Mt. Kisco, New York 10549, fully described at Dist. 80.64, Section 01, Lot 14.

The first phase of the Remedial Investigation (RI) of the Rose Cleaners Inactive Hazardous Waste Disposal Site (IHWDS) was performed pursuant to the requirements of an executed Order on Consent (December 22, 2003) between the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation (DER), and LRB Cleaners, Inc., the Respondent. Based upon the remedial investigation completed to date, BEI has identified significant supplemental investigatory data needs for this property. An addendum (supplemental) to the RI work plan was prepared and work is to be performed. However, as requested by the NYSDEC, an Interim Remedial Measure (IRM) work plan was to be prepared to address immediate concerns relative to shallow soils impacted by dry-cleaning volatile organic chemicals (VOCs) (specifically tetrachloroethene (PCE) and daughter products) delineated during prior RI study at the subject property. An IRM is proposed based upon the fact that:

- Sufficient delineation of site conditions has been completed; and
- Mitigation and/or the prevention of ongoing environmental impacts.

As both surficial, shallow unsaturated and saturated soil impacts have been identified, the IRM Work Plan includes a scope of work for the implementation of a combined remedial measure to address the aforementioned at areas delineated at the north, west and south sides of the building.

2.0 SHALLOW SOIL & GROUNDWATER CONTAMINATION

The RI soil sampling performed was biased toward the north side of the building and included other potential suspect areas such as the rear of the building, exterior to doors, exhaust fans, the historic dumpster location, etc. A total of thirteen soil borings were installed across the subject property. A total of twelve (12) soil samples were collected from the thirteen soil borings and analyzed for Target Compound List (TCL) VOCs by EPA Method 8260. Primarily tetrachloroethene was the compound present at the highest concentration of concern, with detections of typical daughter or breakdown VOCs such as 1,2-Dichloroethene (total) and trichloroethene. No vinyl chloride was present above method detection limits. (See Figures 2 and 3)

The following soil sampling locations reported concentrations of Tetrachloroethene/Total VOCs above the NYSDEC RSCOs at the depths indicated: SB-03 at 4-5 ft bgs with concentrations of 34,000/34,460 *u*g/kg; SB-04 at 4-5 ft bgs at concentrations of 1,600,000/1,683,170 *u*g/kg; SB-05 at 3-4 ft bgs with concentrations of 51,000/51,044 *u*g/kg; SB-06 at 3-4 ft bgs with concentrations of 15,000/15,022 *u*g/kg; SB-08 at 6-8 inches bgs with concentrations of 4,300/4,319 *u*g/kg; and SB-10 at 3-4 ft bgs with concentrations of 15,000/15,060 *u*g/kg. Although VOCs were present at SB-1, SB-2, SB-9, SB-11, SB-12 and SB-13, none were present at concentrations in excess of the respective RSCOs for PCE, TCE or 1,2-DCE .

One other VOC (acetone) was present at three soil sampling locations at the concentrations indicated: SB-1 (72 *u*g/kg); SB- 2 (54 *u*g/kg); and SB-4 (370 *u*g/kg). Only SB-4 had a reported concentration in excess of the RSCO for acetone of 200 *u*g/kg.

Of these soil sampling locations, SB-03 represents a sampling location, exterior, to the rear exhaust fans; SB-04 and SB-08 are located at the northwest corner of the building, with SB-05 and SB-06 located along the northern wall of the building, in the area of the former exhaust pipe. The location of SB-05 and SB-06 are proximate or coincident with the previous soil sampling locations by others that resulted in the state designation of Class 2 for this property. The SB-10 location is adjacent to

the historic dumpster area, along its west side. These data appear consistent with respect to the field evidence (PID screening, and other physical characteristics) as well as the overall patterns of site impacts indicated by soil gas analytical testing data. Of all soil sampling locations, the area of highest soil impacts was present at the SB-4 location. A summary of the delineation of these site conditions is depicted in Figures 2 and 3.

Prior to the RI, groundwater impacts had not been previously confirmed at the subject site. During the remedial investigation, groundwater samples were obtained within the same borehole as the soil samples to provide comparable data. Thirty groundwater samples were collected from 13 temporary monitoring wells completed at ten foot intervals below the groundwater table interface (e..g, 15-17 feet bgs and 25-27 feet bgs).

All but one (GW-9) of the groundwater sampling locations reported elevated concentrations of dry-cleaning related VOCs, above their respective NYSDEC Standards or Guidance Values (SGVs). PCE is the primary constituent present at the highest concentrations (up to 300,000 *u*g/L) with the exception of one sampling location (GW-1) at the northwest corner of the building wherein daughter products of PCE such as vinyl chloride predominated. The highest concentrations of PCE were present in the shallow groundwater samples collected at the northwest and north sides of the building consistent with the soil sampling data at these locations. Localized groundwater flow direction was confirmed to be to the northwest.

In summary, three main locations of shallow PCE contamination were delineated: the north side of the building, the dumpster area and the rear of the building, exterior to the door and exhaust vents. The RI report concluded that as surficial soil impacts have been identified, an interim remedial measure should be implemented to address the soil contamination. Therefore, this document was prepared to provide an Interim Remedial Measures(IRM) Work Plan (inclusive of address impacted soils and the select areas of shallow groundwater). A scope has already been set forth for supplemental delineation of on-site and off-site environmental conditions.

This IRM SI WP contains the following: a summary of previous site data; design and specifications for the installation of an active soil venting system to address Volatile Organic Compound (VOC) contamination in soil; the use of a bioremediation agent (Micro Bac) to address areas of shallow groundwater located in soil source areas and an evaluation of how the proposed remedy will achieve the remedial action objectives and evaluation factors set forth in 6NYCRR 375.

3.0 INTERIM REMEDIAL MEASURE NO. 1 - SOIL VAPOR EXTRACTION SYSTEM

In order to address impacts to soils within the three main locations of shallow PCE contamination (the north side of the building, the dumpster area and the rear of the building (exterior to the door and exhaust vents)), an active Soil Vapor Extraction (SVE) system is proposed for installation. This SVE system will be used to both remediate VOCs in unsaturated soils, as well as to provide some mitigation of the migration of soil vapor on-site and off-site. Additionally, soil excavated as a result of the installation of the SVE System will be transported for off-site disposal at an approved facility.

3.1 INSTALLATION OF SVE SYSTEM

In order to address soil impacts, it has been determined that a SVE system is one of the most feasible means of providing mitigation. As the depth to groundwater is very shallow (four to six feet below grade surface (bgs)), it is proposed to install a horizontal SVE system. Specifically, narrow trenches (1 foot wide) will be created to install 2-inch Schedule 40 PVC well screen to an approximate depth of two to three feet bgs in the areas of soil impacts. The base of the SVE well screens will be situated a minimum of two feet above the groundwater table interface. The well screens will be installed in the naturally permeable native sand lithology. If fine-grained soils are observed, a layer of sand gravel pack will be set around the horizontal well screen. The well screen will be constructed of either 0.02-inch slot with a filter fabric liner or 0.01-inch slot without filter fabric, based upon the particle size present surrounding same. The screen size and/or the need for filter fabric will be field determined based upon physical observation.

3.1.1 EXCAVATED SOIL REMOVAL

While installing the SVE piping in the area of the dumpster, excavated soils (1 foot wide for the entire length of each piping run) will be temporarily stock piled on top of and covered with plastic, awaiting proper off-site transport and disposal at an approved facility for treatment/destruction. Every effort will be made to pre-characterize soils for expedited transport and disposal. The

dumpster area is expected to generate approximately 15 to 20 tons of contaminated excavated soils for disposal. The trenches will be back filled with clean soils.

In the rear of the building where we have proposed a second SVE System these excavated soils will also be stock piled for disposal similar to the dumpster area soils. It is expected to generate another 15 to 20 tons of soil for disposal. The trenches will be back filled with clean soils after SVE piping installation.

On the north side of the building where the largest area of contamination exists, soils excavated for the SVE System will also be stock piled for off-site transport and disposal. The area is larger and it is expected that 30 to 40 tons of contaminated excavated soils will be generated for off-site transport and disposal. Additionally, we propose the excavation of more soils in this area between the creek and VES well location. Another 50 to 60 tons of contaminated excavated soils will be generated from this area for transport and disposal at an approved facility for treatment/destruction. The trenches will be back filled with clean soils. A total of 110 to 140 tons of contaminated soil is expected to be removed as a result of the installation of the SVE System.

3.1.2 SVE SYSTEM

Each of the horizontal SVE systems will consist of three or four legs of lateral screen piping. The legs of piping will be manifolded together at one end to form one uniform vacuum conduit. Solid PVC riser will be used to connect one end of the SVE system to a three horsepower (hp) vacuum blower and SVE system. The dimensions (length and width) of each of the SVE systems will be designed differently for each of the three areas of concern as follows:

Area	Dimension	Design	Depth
Dumpster Area	30 feet long x 18 ft wide	3 horizontal laterals spaced six feet apart	2 to 3 feet deep
Rear of Building	24 feet long x 18 ft wide	3 horizontal laterals spaced six feet apart	2 to 3 feet deep
Area North of Building	60 feet long x 40 ft wide	4 horizontal laterals spaced ten feet apart	2 to 3 feet deep

Based upon the lithology noted during the remedial investigation, and prior experience relative to the blower effectiveness, it can be reasonably assumed that each SVE "field" will have a minimum radius of influence (ROI) of approximately eight (8) feet from each of the exterior legs of PVC lateral pipes. Based upon prior delineation, soil impacts are isolated to a small lateral extent, that extends vertically into the groundwater aquifer. If a sufficient ROI is not achieved, then additional screened areas can be added. A pilot test will be performed around the area of each of the SVE systems to confirm the lateral extent of the vacuum, prior to the finalization of the design. Figure 3 depicts the proposed locations of the proposed SVE systems relative to the three areas of concern identified.

Each of the SVE systems will include an in-line sample port and airflow gauge installed in-line at one end of the system, close to the piping leading to the blower. The SVE piping will be extended to the vacuum blower unit, which will be located at the rear of the building. The SVE systems for the dumpster area and the area near the rear of the building will share one blower. The SVE system to be located on the north site of the building will be constructed with its own 3 hp vacuum blower, also located at the rear of the building.

The PVC piping will be connected to the blower intake. Piping will be used to connect the blower outlet or exhaust to a two-inch diameter air stack. Due to anticipated high concentrations of VOCs expected in the soil gas effluent, treatment is expected to be required. Based upon the concentrations in soil, BEI proposes to use technology such as a catalytic oxidizer and/or vapor phase carbon to treat the air effluent prior to discharge. The final air stack will extend to a height of approximately ten (10) feet above the highest roof line (dry cleaner) allowing venting to the atmosphere. No residual concentrations of VOCs in soil gas (air) effluent are anticipated after treatment; however, any minute concentrations present will undergo sufficient levels of dilution at that height above the building. These efforts will be coordinated with NYSDEC.

Based on the other SVE systems installed in similar projects, BEI proposes using a GAST explosion-proof blower or equivalent to create the vacuum for the SVE systems. The blowers will be located

in an enclosure. The blower unit will be wired to an existing electric sub-panel and operated by a control box located on the exterior of the dry cleaners. An alarm or system fault light will be installed at a visible area within the first floor to indicate times that the system becomes inoperable due to equipment malfunction or power outages. A pressure gauge will also be included as a supplemental warning device of system malfunction or failure.

3.2 VAPOR BARRIER

Subsequent to the installation of the horizontal SVE system within the three areas of concern, a 10-mil polyethylene sheeting vapor barrier will be installed encompassing the entire foot print of the screened interval. The sides of the vapor barrier will be tied-in to the sides of the trench excavation required for the installation of the system. In this manner, the potential short circuiting of the vapor barrier will be controlled. The small quantity of soil removed for the installation of trenches will be placed back into the excavation area under the vapor barrier.

3. 3 POST-INSTALLATION TESTING

Routine airflow and concentration sampling of the SVE systems will occur on a monthly basis. BEI staff will go to the site to collect airflow and bulk air concentration data. Airflow calculations for the SVE Systems will be generated using inline airflow rates and VOC concentration data collected near each of the SVE systems. In order to collect air concentration measurements, the SVE system will be temporarily shut down to eliminate the vacuum on the system piping. Within 20 seconds of system shut-down, total VOC measurements will be measured with a Photoionization detector

(PID) via a sample port installed in the solid PVC piping. Once air concentration measurements have been recorded, the system will be returned to normal operation.

BEI will generate a database to store all data acquired during monitoring. Semi-annual reports to the Department will include routine airflow and VOC concentration data collected during each monitoring event. Reports will also detail any system repairs or alterations that occurred between sampling events.

3.4 OPERATION, MAINTENANCE AND MONITORING OF SVE SYSTEM

When mitigation systems are implemented at a site, the operation, maintenance and monitoring (OM&M) protocols for the systems are typically set forth in a site-specific OM&M plan. Routine maintenance will commence within 6 months after the system becomes operational. During routine maintenance, the following activities will be conducted:

a. A visual inspection of the complete system (e.g., vent fan, piping, warning device, labeling on systems, etc.);
b. Identification and repair of leaks; and
c. Inspection of the exhaust or discharge point to verify no air intakes have been located nearby.

As necessary, preventive maintenance (e.g., replacing vent fans), repairs and/or adjustments will be made to the system to ensure its continued effectiveness at mitigating exposures related to soil vapor intrusion. The need for preventive maintenance will depend upon the life expectancy and warranty for the specific part, as well as visual observations over time. The need for repairs and/or adjustments will depend upon the results of a specific activity compared to that obtained when system operations were initiated. If significant changes are made to the system or when the systems performance is unacceptable, the system may need to be redesigned and restarted.

Operation and maintenance of the SVE will also be performed by BEI on a monthly basis. Monthly inspections will consist of observation and documentation of system component operations and conditions. BEI will establish a point of contact with the property manager in the event that the system becomes inoperable ("system fault condition"). If a major repair requires the system to be offline for longer than a 24-hour period, the representative of the owner will contact the NYSDEC to discuss the problem and offer a schedule for repair.
In addition to the routine OM&M activities described here, the building's owner and tenants will be given information packages that explain the systems operation, maintenance and monitoring. Therefore, at any time during the systems operation, the buildings owner or tenants may check that the system is operating properly.

3.5 TERMINATION OF SVE OPERATIONS

The SVE will not be turned off without prior approval from the State, except in emergency

situations. The SVE will remain operational until it is no longer needed to address current or potential exposures related to soil vapor intrusion. Termination of the mitigation system will comply with the procedures discussed in the NYSDOH guidance and with NYSDEC and NYSDOH concurrence. A petition for the termination of the SVE operation would be based upon the following:

a. Residual subsurface sources of contamination, if any, of VOCs in subsurface vapors have been remediated based upon an evaluation of appropriate post-remedial sampling results;
b. Residual contamination, if any, in subsurface vapors is not expected to affect indoor air quality significantly based upon indoor air, outdoor air and sub-slab vapor sampling results;
c. Residual contamination, if any, in subsurface vapors is not expected to affect indoor air quality significantly when the SVE is turned off based upon indoor air, outdoor air and sub-slab vapor sampling results at representative structures: and
c. There is no "rebound" effect that requires additional mitigation efforts observed when the SVE system is turned off for prolonged periods of time. This determination is based upon indoor air, outdoor air and sub-slab vapor sampling from the building over a time period, which will depend upon site-specific conditions.

BEI will work with the property owner to make such a determination if any one of the above conditions has been satisfied and both the NYSDEC and NYSDOH will be petitioned on this matter for concurrence prior to system termination.

3.6 ANNUAL CERTIFICATION

SVEs are considered engineering controls. Therefore, depending upon the remedial program, submission of an annual certification to the State is required. This certification will be prepared and submitted by a professional engineer or environmental professional acceptable to the State and affirm that the engineering controls are in place, are performing properly and remain effective. This requirement will remain in effect until the State provides notification, in writing, that this certification is no longer needed.

4.0 INTERIM REMEDIAL MEASURE NO.2 - BIOREMEDIATION VIA MICRO-BAC

4.1 BIOREMEDIATION AGENT

In addition to addressing impacted soils, a limited IRM is also proposed that consists of the treatment of shallow groundwater in-situ using a bioremediation technology formulated by Micro-Bac International, Inc. This consists of the injection of natural bacteria specifically targeted for the contaminant groups such as chlorinated compounds inclusive of PCE. The Micro-Bac remediation products are natural, non-pathogenic, and are not genetically engineered. Micro-Bac's M-1000 products are natural bacteria developed specifically to supply safe, simple remedies for the clean-up of contaminated soils and groundwater. M-1000 microbes provide the following: faster remediation, thorough degradation, anaerobic capacity, higher than normal biological activity and more resistance to toxins. As necessary, nutrients are added in specific phases of the bioremediation projects; Micro-Bac's eight nutrient packages are specifically designed for use with M-1000 to enhance remediation success.

Micro-Bac Usage M-1000® consists of live, specifically selected biologicals and biochemicals, along with a supply of balanced nutrients in a ready-to-use liquid medium. The Micro-Bac Usage M-1000® products can be applied *in situ* or *ex situ*, as part of a bioreactor process, in landfarms, in biopiles, in pump and treat scenarios and in numerous other ways. For soil applications, the product can be sprayed, or the soil can be reduced to a slurry and circulated with added products. For vadose zone or groundwater applications, the product can be applied in wells or infiltration galleries. Often the addition of specially-formulated nutrients can be used to augment the activity of the product in conditions where macro nutrients such as carbon, nitrogen or phosphate are limited. In this instance, BEI is proposing to inject same into small diameter injection wells to treat the shallow saturated zone.

Case studies have been performed on several sites in New York to address PCE and petroleum contamination in soil and groundwater. NYSDEC Spill closure was achieved for a petroleum-contaminated site in Mount Kisco, New York (see Attachments).

4.2 APPLICATION OF MICRO-BAC

In summary, three main locations of shallow PCE soil contamination were delineated: the north side of the building, the dumpster area and the rear of the building, exterior to the door and exhaust vents. These areas have also been delineated as source areas yielding groundwater contamination. Therefore, the application of Micro-Bac in these areas, in addition to the use of SVE for soil contamination should constitute an excellent IRM.

Based upon rough calculations of the areal extent of the soil contamination, the following two-inch monitoring wells are proposed for installation for injection of Micro-Bac:

- Dumpster area - 30 feet long by 18 feet wide (3-4 wells);
- Rear of building - 24 feet long by 18 feet wide (3-4 wells); and
- Area to north of building - 60 feet long by 40 feet wide (6 wells).

Injections would be applied through 2-inch diameter 0.20 slot screen set into the upper four feet of groundwater via the Geoprobe direct push drilling system. The Micro-Bac M-1000H* microbial solution as it is most beneficial to apply will be pumped into each of the wells to enhance the area of influence. The volume of each injection area has been set at 5 -gallons of bacteria followed by 20 gallons of nutrients. The injection volumes would be pre-calculated per area prior to injection mobilization. Up to 15 gallons of Tri-Phasic (nutrient mixture) will be injected one and two weeks later, separately, after the initial injection.

The M-1000H* is injected full strength. Tri-Phasic12 must be diluted with 50-55 gallons of water per 1 gallon jug of nutrients. Both the M-1000H* and Tri-Phasic12 can be treated, prior to injection, with the addition of 2% potassium chloride which will assist in causing the fine-grained soils such as clay not to swell. This will keep any existing pathways open for greater penetration of the bacteria and nutrients. A minimum temperature of 50° Fahrenheit is needed for best treatment results.

4.3 HASP & ENGINEERING CONTROLS

The site specific Health and Safety Plan developed for the RI will be used for the IRM. The plan will be adhered to by all personnel involved in the IRM. Incorporated into the plan is a section on community health and safety with measures to ensure the public living and working near the site,

including facility employees or visitors, are protected from exposure to site contaminants during intrusive activities or on-site treatment actions.

According to correspondence provided by Micro-Bac, the USEPA does not require the regulation of the naturally occurring bacteria in use for this project. Therefore, no specific health and safety protocols are required relative to same. A Material Safety Data Sheet is provided as an attachment.

The following provides a summary of the engineering controls which will be maintained during the conduct of the IRM field activities, as necessary.

Dust Monitoring/Suppression
Some dust may be generated during the installation of small diameter trenches for the installation of the SVE systems. No dust will be generated as only geoprobe borings and small diameter monitoring wells will be installed. As necessary, especially during the installation of trenches, fugitive dust levels will be monitored at several locations at the property in accordance with the project Community Air Monitoring Plan (CAMP) in order to protect on-site personnel and the surrounding community.

Fencing
During the IRM activities, fencing will be utilized to secure the three areas of concern from outside intrusions. The fence will be maintained as part of post-IRM activities.

4.4 MONITORING OF IRM

After VOC soil gas effluent concentrations are reduced to residual concentrations, a plan for the installation of soil borings will be proposed. Soil samples will be collected in each of three areas of concern in order to verify the remaining concentrations of VOCs. Dependent upon the results of this testing, the NYSDEC will be petitioned for the appropriate response action at that time.

In order to evaluate the groundwater IRM, a select number of representative application wells will be used for the collection of groundwater samples, in addition to the existing monitoring well network. Groundwater samples will be collected for Target Compound List Volatile Organic

Compounds by EPA Method 8260 plus Tentatively Identified Compounds (TICs) at 90 days after application in order to ascertain the need for additional treatment.

PROJECT SCHEDULE

Upon approval of the IRM work plan, the installation of the SVE system will be completed within 45 days. Within 30 days of the approval, BEI can begin to perform the Micro-Bac application. It is anticipated that the overall IRM will take up to fourteen days to complete. Groundwater monitoring will be conducted on a quarterly basis. Soil borings and soil sampling will be performed when necessary. Receipt of certified laboratory data in these tasks will require up to 45 days; with an additional 30 days for data usability analysis. A final report will be issued within 60 days of receipt of validated testing data packages.

5.0 EVALUATION OF PROPOSED IRMS

5.1 EVALUATION OF REMEDIAL ALTERNATIVES

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375 Section 1.10, which governs the remediation of environmental restoration projects in New York State. The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection as follows:

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of the remedial alternative's ability to protect public health and the environment. The installation of engineering controls such as a SVE has been recognized for a long time as the foremost means of achieving protection of public health, relative to the reduction of VOC soil contamination and to control subsurface vapor migration. Significant research on the successfulness of SVE has been performed and it is a valid presumptive remedy. Furthermore, this technology is specifically recommended for use as per the *Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH, February 2005) and the Radon Mitigation Standards (USEPA 402-R-03-078).* Additionally, the off-site disposal of excavated soil and the reduction of soil impacts via SVE will also serve to reduce the overall contaminant loading to groundwater, also protective of human health and the environment.
An IRM that includes the use of Micro-Bac to address PCE and contamination in shallow groundwater also provides a supplemental mitigative measure protective of human health and the environment.

2. Compliance with New York State Standards. Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the NYSDEC has determined to be applicable on a case-specific basis. The installation and operation of a SVE,

removal of excavated soils and the use of a bioremediation agent fully complies with the New York State SCGs relative to VOC source control for both soil and groundwater as they will serve to mitigate or remove the potential for current and/or future potential exposure pathways. The remainder of the criteria set forth in Part 375 are five "primary balancing criteria" and are used to compare the positive and negative aspects of the remedial strategy.

3. Short-term Effectiveness. This criterion relates to the potential short-term adverse impacts of the remedial action upon the community, the workers and the environment during the construction and/or implementation of the SVE. As the SVE systems, removal of limited soils and Mico-Bac Injection will be completed inside of two weeks and community air monitoring will be conducted to ensure the protection of on-site workers, no short-term adverse impacts were identified relative to the workers, community or the environment.

4. Long-term Effectiveness and Permanence. This criterion is used to evaluate the long-term effectiveness of the remedial alternative after implementation. The following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls. As both a SVE system, limited soil removal and Micro-Bac injection has been selected to address VOC contamination in soil and groundwater, the magnitude of remaining environmental risks will continue to decrease. The adequacy of the SVE system (properly installed, operated, monitored, and maintained) to remediate VOCs in soil, to control of sub slab vapors, in addition to its reliability over time, are both considered to be excellent, due to the long-term track record established. Micro-Bac injection case studies have been performed on several sites in New York to address PCE and petroleum contamination in soil and groundwater. NYSDEC Spill closure was even achieved for a petroleum-contaminated site in Mount Kisco, New York.

5. Reduction of Toxicity, Mobility or Volume. The ability of the proposed IRMs to permanently and/or significantly reduce the toxicity, mobility or volume of the wastes is required to be

evaluated. The use of a SVE system, limited soil removal and implementation of Micro-Bac injection is specifically designed to reduce VOC concentrations in soil and groundwater, thus limit the mobility of the VOCs migrating in the environment and reduction of volume and toxicity over time. Monitoring and ongoing maintenance of the IRMs provides the ability to measure changes in concentrations.

6. Implementability. The technical and administrative feasibility of implementing the remedial alternative must be considered. Again, as SVE system and soil removal is a widely used application for VOC-contaminated soil, and injection technology is well advanced, implementability of the construction of the proposed IRM is considered to be excellent.

7. Cost-Effectivness. Capital costs and operation, maintenance, and monitoring costs are also part of the evaluation criteria. The construction of a SVE is considered to be extremely cost-effective relative to the impracticality of removing soil, given the quantity of soil projected and its F-series listed waste characterization. The injection of Micro-Bac for the reduction of VOCs in groundwater is very cost effective relative to other higher infrastructure in-situ and ex-situ treatment processes.

8. Community Acceptance - As the installation of a SVE system and the use of Micro-Bac injection will generally not result in activities noticeable or that will significantly affect the surrounding community, and as these methods proposed within the IRMs are generally considered to be a widely accepted presumptive remedy, community acceptance should be high.

Therefore, the installation of a SVE system, limited soil removal and the use of Micro-Bac injection at the subject property satisfies the threshold criteria and provides an excellent balance relative to the remainder of the criteria cited in Part 375.

PROFESSIONAL ENGINEER'S CERTIFICATION

CERTIFICATION:

I hereby certify that I have personally reviewed this Interim Remedial Measure (IRM) developed for the subject property pursuant to the requirements of an executed Order on Consent (December 22, 2003) between the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation (DER), and LRB Cleaners, Inc., the Respondent. The site is located at 500 Lexington Avenue, Mt. Kisco, New York 10549, fully described at Dist. 80.64, Section 01, Lot 14 (see Figures 1 and 2). This work plan was prepared by Jill S. Haimson, PG, CGWP Project Manager under my supervision.

John Soderberg, P.E.

Signature:

SEAL

8/29/07

New York State P.E. License No.

049975

Dated: August 29, 2007

FIGURES

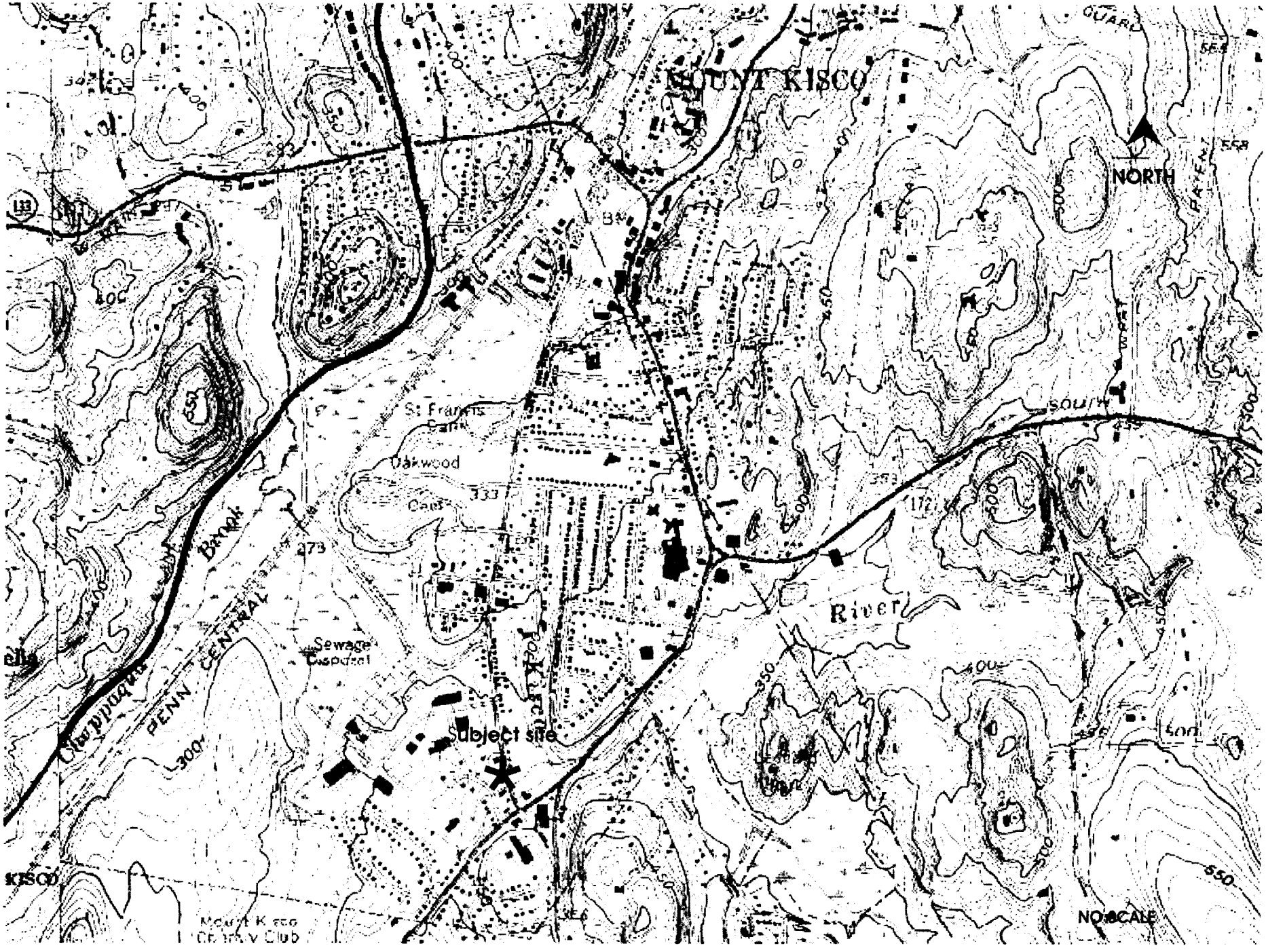
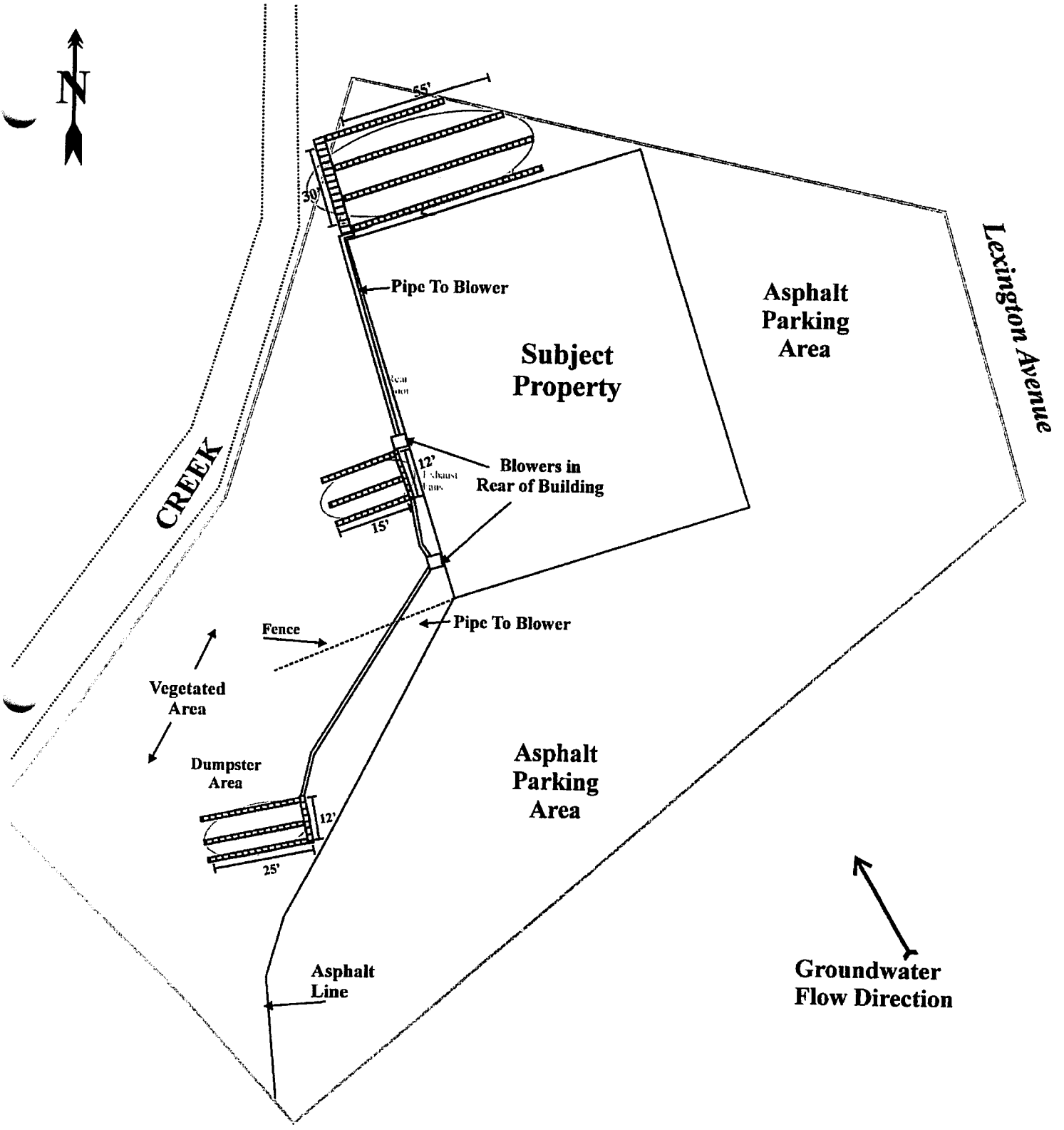


FIGURE 1 - SITE LOCATION AND TOPOGRAPHY



igure 3- Areas of Concern and Proposed SVE Systems

Rose Cleaners
500 Lexington Avenue
Mt. Kisco, New York

BEI BERNINGER ENVIRONMENTAL, INC.
groundwater consultants and geologists
90 B Knickerbocker Avenue
Bohemia, New York 11716
Phone # (631) 589-6521
Fax # (631) 589-6528

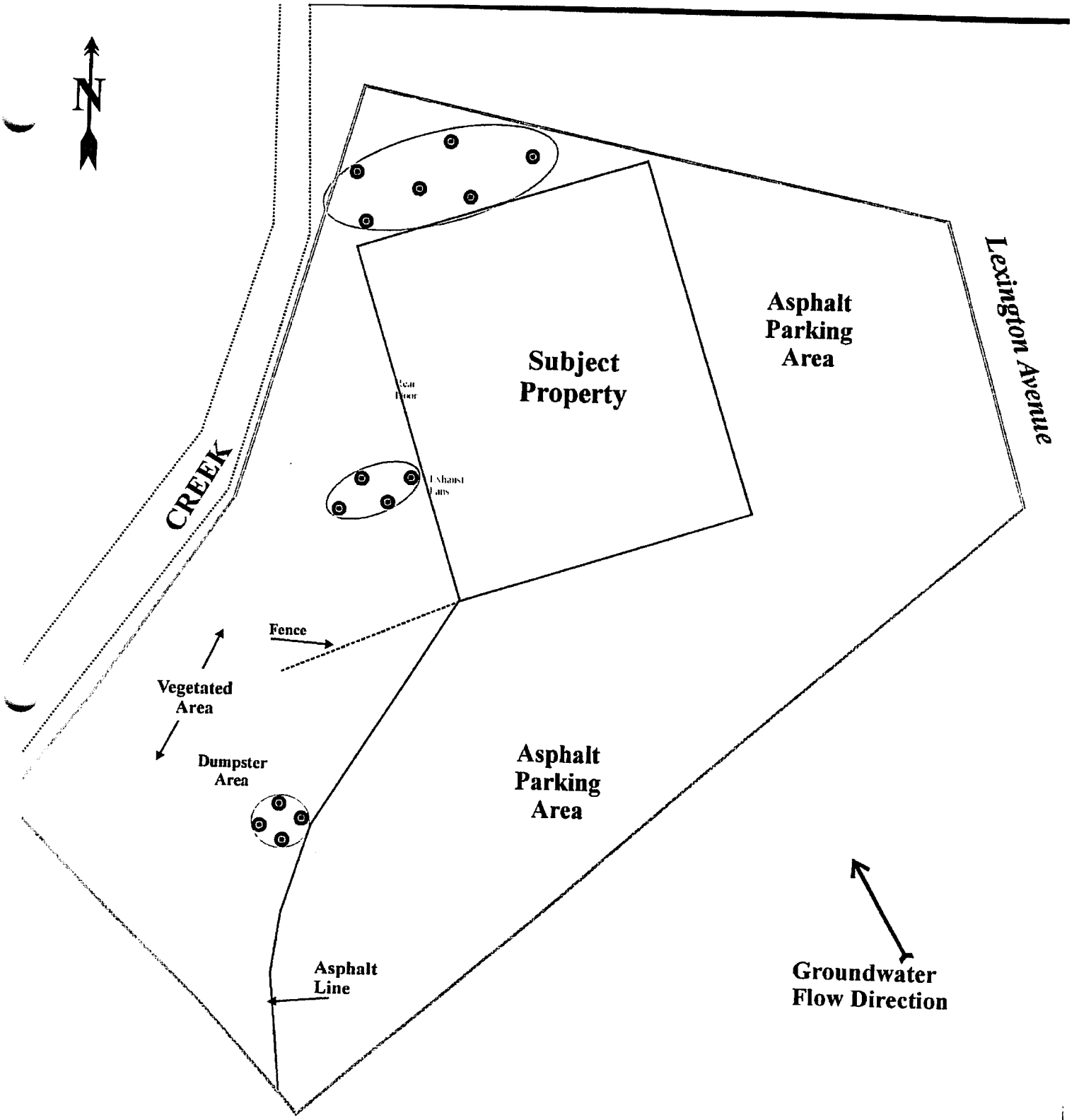


Figure 4- Proposed Micro-Bac Injection Wells

Rose Cleaners
500 Lexington Avenue
Mt. Kisco, New York

groundwater consultants and geologists
90 B Knickerbocker Avenue
Bohemia, New York 11716
Phone # (631) 589-6521
Fax # (631) 589-6528

ATTACHMENTS

MICRO-BAC INTERNATIONAL, INC.
3200 N. IH 35
ROUND ROCK, TEXAS 78681-2410
PH.(512)310-9000 FAX (512)310-8800

LABORATORY REPORT

Date Received:	**07-16-07**	**Lab Sample #:**	**2331**
Sample Site:	**Rose Cleaners North Side SB-4**	**Client:**	**Berninger Environmental**
Address:	**500 Lexington Ave, Mt. Kisco, NY**	**Date Completed:**	**07-24-07**

Treatment Rating: Good with M-1000H* + OSNF #1

Sample Description: On July 16, 2007, Micro-Bac International received a sample for bioremediation testing. The sample was a fairly dry, dark grey soil with a small amount of organic material and small rocks present. The sample had a strong solvent-like chemical odor. The pH was approximately 6.4 after hydration.

Testing: The sample was set up with the bacterial products listed in the table below. A small amount of water was added to each sample to facilitate treatment. A control consisting of sample and water alone was also set up. The samples were allowed to incubate at 25° C for seven days. At the end of the incubation period, the samples were examined microscopically with the following results:

Results Summary

Product Tested	Number of Bacteria Present	Activity
M-1000H*	Low to Fair	Fair
M-1000H* + OSNF #1	Good to Very Good	Fair
M-1000PCB	Low to Fair	Poor to Fair
M-1000PCB + OSNF #1	Good	Fair
Control	Low	Poor

At the end of the incubation period, the odor was greatly reduced in all of the treated samples. There were no other changes in the physical characteristics in any of the samples after testing.

Please feel free to contact us if any additional information is needed. Thank you.

Test Performed By RSR & JUR

Report Prepared By JUR

Judy Ritchie, Laboratory Manager

cc: Dennis Ray Schneider, Ph.D.

M-1000H★
Biodegradation Lab Study

SUBSTANCE: PCE Contaminated water

TESTING: Groundwater samples were obtained to perform a four week biodegradation study. The study was conducted such that each sampling point had a sterilized sample, a control sample, and test samples with bacteria only, with nutrients only, and with bacteria and nutrients.

The samples were incubated at 35°C in containers sealed to minimize any volatilization. Samples were analyzed by U.S. EPA method 8260 for volatile organics.

RESULTS: The following compounds were found in the samples: 2-butanone, acetone, benzene, ethylbenzene, m,p xylenes, methylene chloride, 0-xylenes, t1,2 dichloroethene, tetrachloroethene (PCE), toluene, and trichloroethene. No vinyl chloride was detected in any sample prior to treatment.

The principal contaminants found were 2-butanone (methyl ethyl ketone) at 12,000 micrograms per liter and tetrachlorethene (PCE) at 49,000 micrograms per liter. All other contaminants were in the in the 200 micrograms per liter or less range. Volatilization appeared to be minimal as levels of 2-butanone and methylene chloride in the control were maintained throughout the incubation period.

Good evidence for biodegradation of the various pollutants was found. The M-1000H★ treated samples consistently produced levels lower than the uninoculated controls. The level of biodegradation ranged from >99% for 2-butanone to >97% for tetrachloroethene by week four. (see table below)

		2-butanone	tetrachloroethene
	Starting concentrations	12,000	49,000
Day 7	Control	10,000	17,000
	Bacteria	<100	4,000
Day 14	Control	14,000	270
	Bacteria	<100	11
Day 21	Control	9,200	27
	Bacteria	<100	<5
Day 28	Control	12,000	210
	Bacteria	<100	<5

Methylene chloride exhibited the least amount of biodegradation (19% decline), and by week four was the only pollutant out of eleven still detected in the samples. Vinyl chloride was not detected in any of the samples following treatment.