

**Remediation Work Plan
Bon Ton Cleaners
1932 Ralph Avenue
Brooklyn, New York
Site Number V-00512-2
VCP Index Number W2-0916-02-03**

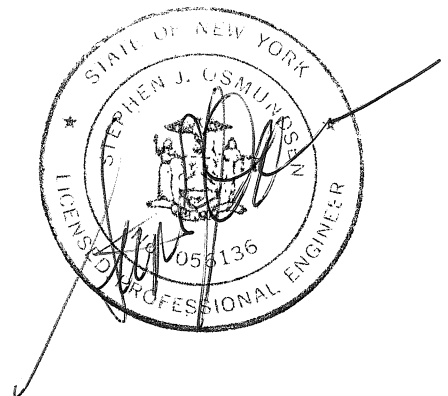
April 2004

Prepared for:

**Ralph Associates
980 Singleton Avenue
Woodmere, NY 11598**

Prepared by:

**CA RICH CONSULTANTS, INC.
17 Dupont Street
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April 2, 2004

NYSDEC
625 Broadway
Albany, NY 12233-7015

Attention: Jeffrey Dyber, P.E.

Re: **Remediation Work Plan for Bon Ton Cleaners**
1932 Ralph Avenue, Brooklyn, New York
Site Number V-00512-2; VCP Index Number W2-0916-02-03

Dear Mr. Dyber:


Attached are four copies of our Remediation Work Plan for the above-referenced site. In accordance with the Voluntary Cleanup Agreement, copies have been forwarded to the Division of Environmental Enforcement and to NYSDOH.

If there are any questions regarding this Remediation Work Plan, please do not hesitate to call our office.

Sincerely,

CA RICH CONSULTANTS, INC.


Stephen J. Osmundsen, P.E.
Senior Engineer


Eric A. Weinstock
Associate

cc: Burt Lewis
Miriam Villani, Esq
Guy Bobersky, P.E.
Gary Litwin
Rosalie Rusinko, Esq.

Attachments

Seal



TABLE OF CONTENTS

| <u>Section</u> | | <u>Page</u> |
|----------------|--|-------------|
| 1.0 | INTRODUCTION AND PURPOSE | 1 |
| 1.1 | Site Description and History | |
| 1.2 | Previous Soil & Groundwater Investigations | |
| 1.3 | Summary of Environmental Conditions | |
| | 1.3.1 Soil | |
| | 1.3.2 Soil Vapor | |
| | 1.3.3 Groundwater | |
| | 1.3.4 Sump Water | |
| | 1.3.5 Indoor Air | |
| 1.4 | Summary of Remedy | |
| | 1.4.1 Soil Vapor Extraction Well Design | |
| | 1.4.2 Soil Vapor Extraction System Design | |
| | 1.4.3 Installation of Vacuum Monitoring Points | |
| | 1.4.4 Air Sparging Point Design | |
| | 1.4.5 Air Sparging System Design | |
| | 1.4.6 Pilot Testing | |
| | 1.4.7 Up-gradient Multi-Cluster Well | |
| | 1.4.8 Sump Clean Out | |
| | 1.4.9 Design of Chemical Oxidation Injection Points | |
| | 1.4.10 Design of Chemical Oxidation Injection System | |
| | 1.4.11 Indoor Air Monitoring, Remediation System Monitoring and Equipment Termination Criteria | |
| 1.5 | Contemplated Use | |

| <u>Section</u> | <u>Page</u> | |
|----------------|--|----|
| 2.0 | ENGINEERING EVALUATION OF REMEDY | 10 |
| 2.1 | Remedial Action Selection | |
| 2.1.1 | Protection of Human Health and the Environment | |
| 2.1.2 | Standards, Criteria & Guidance (SCG) | |
| 2.1.3 | Short-Term Effectiveness & Impacts | |
| 2.1.4 | Long-Term Effectiveness & Impacts | |
| 2.1.5 | Reduction of Toxicity, Mobility or Volume | |
| 2.1.6 | Implementability | |
| 3.0 | PROJECT PLANS AND SPECIFICATIONS | 13 |
| 4.0 | INSTITUTIONAL CONTROLS | 13 |
| 5.0 | HEALTH AND SAFETY PLAN | 13 |
| 6.0 | QUALITY ASSURANCE / QUALITY ASSURANCE PLAN | 13 |
| 7.0 | REMEDIAL ACTION SCHEDULE | 13 |
| 8.0 | REPORTING | 14 |
| 9.0 | PROJECT ORGANIZATION | 14 |
| 10.0 | REFERENCES | 15 |

FIGURES

1. SITE PLAN
2. LOCATION OF PROPOSED SVE SYSTEM
3. SCHEMATIC PROFILE OF A TYPICAL SVE WELL
- 4a&b. LOCATIONS OF EXISTING AND PROPOSED VAPOR MONITORING POINTS
5. SCHEMATIC PROFILE OF A TYPICAL AS POINT
6. LOCATIONS OF PROPOSED AS POINTS
7. LOCATIONS OF PROPOSED INJECTION POINTS
8. SCHEMATIC PROFILE OF A TYPICAL INJECTION POINTS
- 9&10. WORK SCHEDULE

**Remediation Work Plan
Bon Ton Cleaners
1932 Ralph Avenue
Brooklyn, New York
Site Number V-00512-2**

1.0 INTRODUCTION AND PURPOSE

The following Remediation Work Plan was prepared by CA RICH Consultants, Inc. (CA RICH) on behalf of Ralph Associates, the owner of Flatlands Shopping Center (1900-1960 Ralph Avenue, Brooklyn, New York). This Remediation Work Plan was prepared in accordance with a Voluntary Cleanup Program (VCP) Agreement, Index Number W-20916-02-03 and the May 2002 VCP guidance document (Ref. 11). For the purposes of this Remediation Work Plan, the contaminants of concern are perchloroethene (a.k.a. PCE or tetrachloroethene) and its degradation products.

The Work Plan addresses the remediation of an area of the Upper Glacial Aquifer located in the central portion of the property below the present Bon Ton Cleaners. The estimated thickness of the Upper Glacial Formation at this location is approximately 200 feet (Ref. 1) and the depth to the water table is approximately 12 feet.

A series of previous investigations were performed at this site by ACT and CA RICH for refinancing purposes. The following is a partial list of these previous investigations which have been appended to Ref. 6.

| <u>Investigation</u> | <u>Date</u> |
|---|---------------|
| Phase II Environmental Site Assessment, 1890-1960 Ralph Avenue Brooklyn, New York (Ref. 2) | June 5, 2001 |
| Phase II Environmental Site Assessment, 1890-1960 Ralph Avenue Brooklyn, New York (Ref. 3) | July 23, 2001 |
| Investigation Work Plan Bon Ton Cleaners, 1932 Ralph Avenue Brooklyn, New York (Ref. 6) | October, 2002 |
| Supplemental Investigation Work Plan Bon Ton Cleaners, 1932 Ralph Avenue, Brooklyn, New York (Ref. 8) | May, 2003 |
| Investigation Report Bon Ton Cleaners, 1932 Ralph Avenue Brooklyn, New York (Ref. 10) | October, 2003 |

1.1 Site Description and History

The Flatlands Shopping Center consists of a parcel approximately 900 feet by 200 feet in size. The property contains one strip shopping center constructed in 1960. The ground surface around four sides of the building is improved with pavement. Paerdegat Basin, an inland extension of Jamaica Bay, is situated approximately 500 feet east of Bon Ton Cleaners. A Site Plan is included as Figure 1.

Bon Ton Cleaners occupies a unit approximately 25 feet wide by 75 feet in the central portion of the shopping center and has reportedly been a dry cleaners since 1960. The shopping center has always been serviced by public water and public sewers. The dry cleaning facility consists of a ground floor, which houses the dry cleaning machine and waste storage areas. There is also a basement area used to house the boiler, air compressor, vacuum unit and clothing storage.

The dry cleaning facility was inspected by CA RICH on September 17, 2001. During that visit, we observed a facility that appeared to be operating in accordance with industry standards. The operator was using a fourth generation dry cleaning machine with a spill pan and the machine was situated within a vapor barrier room. Bulk PCE was stored within the machine. Separator water and distillation bottoms were stored in dedicated, labeled containers. The operator had a waste disposal manifest from National Waste Clean, Inc. (NWC) on site dated August 30, 2001.

Bon Ton Cleaners is situated upon the Pleistocene aged glacial outwash soil deposits of Long Island at an elevation of approximately 20 feet above mean sea level. The depth of the water table occurring within the underlying Upper Glacial Formation is approximately 10 feet below land surface. The direction of groundwater flow is east, toward Paerdegat Basin as mapped in the Investigation Report (Ref. 10).

The Upper Glacial Formation is underlain at a depth of approximately 200 feet by the Pleistocene Gardiners Clay, a regional confining clay layer situated along the south shore of Long Island. This in turn is underlain by the Pleistocene Jameco Gravel, a moderately to highly permeable sand and gravel unit (Ref. 1).

The Cretaceous aged Magothy Formation, a moderately permeable unit composed of clay, silt, and sand underlies the Jameco Gravel. The Magothy Formation is, in turn, underlain by the Raritan Formation. The Raritan Formation is composed of the upper Raritan Clay, a regional confining layer, followed by the more permeable Lloyd Sand. The Lloyd Sand sits directly upon Precambrian crystalline bedrock.

Brooklyn is serviced by NYCDEP public water that is derived from surface water reservoirs located in upstate New York. Saltwater encroachment issues caused cessation of groundwater pumping for public water supply purposes in Kings County during the 1940's (Ref. 4).

1.2 Previous Soil & Groundwater Investigations

In connection with a refinancing effort, a series of previous investigations were performed at this site by ACT during June and July (Refs. 2 and 3). Copies of these reports, including the corresponding site maps and laboratory data, are appended to the Investigation Work Plan (Ref. 7).

A total of nine soil borings were installed and soil samples from these borings were screened with a Photo-Ionization Detector. The results of the screening effort indicated that boring SB-6, located in the central portion of the basement, displayed elevated levels of volatile organic compounds (VOCs). Laboratory results indicated that PCE did exist at this location at a concentration of 58 ug/kg. Another sample collected at boring location SB-8 contained 16 ug/kg. SB-8 is located in a common hallway southeast of Bon Ton Cleaners. All of these results are below the NYSDEC TAGM (Ref. 5) Cleanup Objective of 1,400 ug/kg.

During June and July 2001, 10 groundwater samples were collected at the site using temporary well points. The sample from location TW-4, located in the central portion of the basement, contained 1,394 ug/l of PCE. The NYSDEC groundwater standard for PCE is 5 ug/l. Location TW-3 is due west of TW-4 and did not contain PCE. Samples collected from locations TW-1, 2, 5 and 8 are all east of TW-4. These contained PCE at concentrations ranging between 103 and 345 ug/l.

1.3 Summary Of Environmental Conditions

During the winter 2002 and spring 2003, a subsurface investigation of the site was performed to determine the nature and extent of contamination at the Bon Ton Cleaners Site. A summary of the findings are presented below.

1.3.1 Soil

Minor detections of PCE were detected in several of the soil samples collected at the Site. The results are summarized on Table 1 and the locations are illustrated on Figure 2 of the Investigation Report (Ref.10). The highest detection, 259 ug/kg, was detected in VB-4, located in the basement. In each case, the detections were less than the NYSDEC TAGM (Ref. 5) guidance value of 1,400 ug/kg. The soil did not display any visual signs of staining indicative of a product release. As such, these detections are likely the results of PCE vapors trapped below the basement slab and pavement. Soil vapor analysis, however, has identified areas of elevated PCE below the basement floor. These readings are presented in the Investigation Report.

1.3.2 Soil Vapor

Soil vapor monitoring was performed at 5 locations in the basement of the shopping center during the Investigation. Elevated readings of PCE were detected in all 5 points with the highest readings measured at the Bon Ton Cleaners unit. The results are presented on Table 5 and Figure 12 of the Investigation Report (Ref. 10)

1.3.3 Groundwater

Phase I - The groundwater at the Site flows from the west to the east and towards Paerdegat Basin. The shallow up-gradient well (VW-1) contained low levels of PCE, less than the groundwater standard of 5 ug/L. Well VW-2S is located directly downgradient of the Facility and contained 761 ug/L of PCE. The duplicate sample from this well contained 891 ug/L, the highest PCE concentration at the Site. Wells VW-3, 4 and 5 are all shallow wells downgradient of the Facility and contained PCE at concentrations ranging from 22 to 320 ug/L. The NYSDEC TOGS (Ref. 7) groundwater standard for PCE is 5 ug/l.

Wells VW-2I and 2D were screened at 45 to 50 feet and 61 to 71 feet below grade at the same location as VW-2S. These wells contained much lower levels of PCE, but elevated levels of other compounds including trichloroethene and 1,1,1-trichloroethane. It appears that contamination from another source is flowing onto the property at depth and traveling towards Paerdegat Basin, a regional discharge area. The results are summarized on Table 2 of the Investigation Report (Ref.10).

Phase II – At the request of NYSDEC, a second phase of groundwater sampling was performed as a follow up to the initial well installation and sampling program using a Geoprobe sampling device. Groundwater samples taken from the up gradient location VGP-1 measured no detections of PCE. However, the groundwater samples taken from the same location VGP-1 at 50, 70 and 90 feet below grade all contained elevated levels of both trichloroethene (TCE) and 1,1,1,-trichloroethane (1,1,1-TCA) above the groundwater standard of 5ug/l confirming that contamination from another source is flowing onto the property at depth and traveling towards Paerdegat Basin, a regional discharge area. A similar suite of detections of VOCs was measured in VGP-3 and 5, which are located down gradient of the VGP-1. These results are presented in Table 4 of the Investigation Report (Ref.10).

1.3.4 Sump Water

A sample of the standing water in a floor sump located in the basement was also collected. This contained PCE, trichloroethene and elevated levels of cis-1,2 dichloroethene (1,2-DCE). Apparently, this water had been standing and degrading over time as demonstrated by the elevated levels of 1,2-DCE. It is important to note that the concrete lined sump contained standing water. At the time the soil samples were collected, the soil obtained along side of the sump was dry indicating the sump is likely watertight. The results are presented on Table 2 of the Investigation Report (Ref. 10)

1.3.5 Indoor Air

Indoor air samples were collected in the basement and ground floor portions of the neighboring units in the shopping center. The results from the Chinese restaurant and a vacant store that formerly housed a 60-Minute Photo and is now a Bakery exceeded the NYSDOH action level of 100 ug/m³ but were below the immediate action level of 1,000 ug/m³ (Ref. 10). The samples from the remaining units were below the NYSDOH action level of 100 ug/m³. The source of the detections in the Chinese restaurant and the Bakery are believed to be from the subsurface vapors below the Dry Cleaning Facility. The results are presented on Tables 3 & 6 and on Figures 7, 8, 14 & 15 of the Investigation Report (Ref. 10).

1.4 Summary Of Remedy

The remedy proposed for this Facility consists of two mechanical systems, chemical oxidation and cleanout of one concrete sump.

- A Soil Vapor Extraction (SVE) system is proposed to collect and treat the remaining PCE and its degradation products from the vadose zone below the Bon Ton Cleaners facility. Concurrent with the SVE system, an Air Sparging (AS) system is proposed to strip PCE and its degradation products from the shallow groundwater in the Upper Glacial Formation beneath the facility.
- Chemical oxidation using sodium permanganate is proposed to treat perchloroethene in the shallow groundwater below the parking lot east of the Bon Ton facility.
- One sump exists in the basement of the shopping center. This sump will be cleaned out and the water properly disposed.

1.4.1 Soil Vapor Extraction Well Design

The SVE system for this site will include SVE wells in four locations in the basement of the Property. Two of the wells will be located below the dry cleaning facility and two in the common hallway of the shopping center. The location of each of these SVE wells is presented on Figure 2 of this Work Plan and are subject to change based upon access, utility clearances and site conditions. The radius of influence (ROI) imposed by these four SVE wells will be determined by the results of a pilot test.

The SVE wells will be installed using a Bosch hammer, hand auger, and post-hole digger. A 4-foot section of 2-inch diameter, Schedule 40 PVC pipe will be installed. The pipe will have 0.050-inch slotted (50 slot) well screen along the bottom 2 feet and will be installed so that the screened section is set 1 to 3 feet below grade. Morie No. 4 sand will be placed around the well screens followed by a concrete seal.

There will be a 1-foot riser that will be used to connect the SVE wells to a header line that will in turn be connected to a blower. A schematic profile of a typical SVE well is presented on Figure 3.

Additional SVE wells will be installed, if needed, to remediate the entire soil gas plume beneath the site building.

1.4.2 Soil Vapor Extraction System Design

Each of the SVE wells will be completed with a regulating valve arranged such that each SVE screened section can be operated independently. The wells will then be connected to a 2-inch diameter header line that will terminate in the basement boiler room of Bon Ton Cleaners as shown on Figure 2.

Vacuum will be supplied by a regenerative blower. Actual specifications will be determined based on the results of a pilot test. The blower, moisture knock-out drum and associated equipment will be placed in the basement boiler room of the Bon Ton Cleaners. Two 55-gallon carbon drums will be placed downstream of the blower to treat the extracted soil vapor. The discharge values will be monitored and not allowed to exceed the exposure guidance of NYSDEC's DAR-1 (Air Guide-1) (Ref. 9).

The final design and equipment selection for the system will be determined based on the results of the pilot test. The pilot test will determine a vacuum radius of influence, the ratio of cubic feet per minute (cfm) per foot of screen, and the cfm capacity of the blower to be utilized in the system design.

A 2-inch discharge stack will be attached to the side of the building with the discharge point at a height of 8 feet above the existing building elevation. An electrical connection will be made directly from the blower to a utility panel in the basement.

1.4.3 Installation of Vacuum Monitoring Points

As part of the Supplemental Investigation Work Plan (Ref. 8), six borings were installed and completed as soil vapor monitoring points at the locations shown on Figure 12 of the Investigation Report (Ref. 10). The purpose of these points, in addition to performing a soil gas survey, will be to measure the area of influence (i.e. vacuum) created in the subsurface by the operation of the SVE system. These points will now be referred to as Vacuum Monitoring Points (VMPs).

An additional 3 interior and 4 exterior VMPs will be installed in the basements and sidewalks of the adjoining units as shown on Figures 4a and 4b to monitor the radius of influence of the SVE system. A six-inch length of 0.020-inch slotted (20 slot), one-inch diameter PVC screen followed by a six-inch long, one-inch diameter solid PVC pipe along with gravel will be placed in each interior borehole. The exterior VMPs will be constructed in a similar fashion with the slotted section set at 11.0 to 11.5 feet below grade. They will be finished at grade with one-inch slip caps and flush-mounted covers. A typical vacuum monitoring point profile is included as Figure 3.

1.4.4 Air Sparging Point Design

A total of three air sparging points will be installed. Two air sparging points will be installed outside, directly in front of the facility using a truck mounted Geoprobe 5410 Unit at the locations illustrated on Figure 4. These two points will consist of 1-inch diameter; schedule 40 PVC x 2-foot long 0.020-inch slotted (20 slot) PVC well screens connected to 1-inch diameter PVC pipe. The sparge points will be placed at 40 to 45 feet below the parking lot grade. A schematic profile of a typical AS point is presented on Figure 5. The third sparge point will be located in the basement boiler room area of Bon Ton Cleaners, directly below the existing dry cleaning machine and will be

installed using a Geoprobe remotely operated direct push machine. This sparge point will be constructed using a Geoprobe Model GW-15 well point and will be placed at 30 to 35 feet below the basement floor grade.

The locations of each of these air sparge points are presented on Figure 6 of this Report and are subject to change based on utility clearances and site conditions. The placement of these three sparge points incorporates a radius of influence (ROI) of approximately 20 feet depending on the final location of the wells which will be based on the results of a pilot test.

1.4.5 Air Sparging System Design

Air sparging will be achieved through the use of an on-site air compressor. The three air sparging points will be connected to an air compressor capable of developing the cfm and pressure needs determined in the pilot test discussed in section 1.4.6 of this document. The basis for the design will be the pressure required to displace the column of water in the sparge point and the head loss across the screened section of the point.

The selected air compressor will be placed in the basement along with the SVE blower. An electrical connection will be made directly from the air compressor to a utility panel in the basement.

Each of the air sparging points will be connected to the air compressor using 1/2-inch diameter nylon tubing placed in conduit extending from the sparge points and to the equipment room in the basement shown on Figure 2. A regulating valve will be installed to allow for adjustment of the operating pressure of the system.

1.4.6 Pilot Testing

A one-day on-site pilot test will be performed using a portable 3-horse power (hp) regenerative blower and a portable air compressor rated at 125 cfm and 10 pounds per square inch (psi).

One of the SVE wells in the basement will be used for the pilot test. The purpose of the pilot test is to confirm the flow rate at the SVE well needed to effect capture. Vacuum will be measured in the SVE wells and VMPs illustrated on Figures 2 and 4 using a hand held field magnehelic. A guideline of 0.10 inches of H₂O vacuum as measured in the field on a magnehelic will be used to determine the radius of influence of the SVE wells. Additional SVE wells may be added if deemed necessary based on the results of the pilot test and the units results of the indoor air survey illustrated on Figures 14 and 15 of the Investigation Report (Ref. 10).

One of the exterior AS points located in front of the Facility will be used to perform a AS pilot test. The AS pilot test will confirm the flow needed at each point to attain the radius of influence required for the remediation. The radius of influence of the sparge point will be measured by monitoring the dissolved oxygen and the water level of monitoring wells VW-2S, I, and D.

1.4.7 Up-gradient Multi-Cluster Well

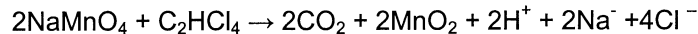
Installation of a clustered monitoring well adjacent to the location VW-1 will be performed. The wells should be screened at depths similar to existing wells VW-2I and 2D, 40 to 50 feet and 61 to 71 feet below grade. These new wells will be developed and sampled for halogenated VOCs including PCE, TCE and TCA.

1.4.8 Sump Clean Out

The water in the sump will be pumped out and properly disposed. The walls of the sump will then be painted with an industrial waterproof paint. The sump will be inspected quarterly while the SVE system is operating and the inspection report will be forwarded to the NYSDEC. During each inspection, the sump water will be tested for VOCs. If contaminated water continues to collect in the sump after painting, additional remedial measures meeting NYSDEC approval will be performed.

1.4.9 Design of Chemical Oxidation Injection Points

Permanganate is a strong oxidizer that has a long history of application for the control of odors at wastewater treatment plants. Recently, the application of permanganate directly to subsurface soils and groundwater has been proven successful for the remediation of selected chlorinated solvents. Once in contact with a chlorinated solvent, the permanganate converts the contaminant to harmless by-products as shown below:



(Permanganate + Perchloroethene → Carbon Dioxide Gas + Manganese Dioxide + Hydrogen ions + Sodium ions + Chlorine ions)

A total of ten permanganate injection points will be installed at the locations shown on Figure 7 using a Geoprobe™ type probing rig. Each point will consist of 1-inch diameter, flush-threaded, schedule 40 PVC pipe. The pipe will have 0.030-inch slots (30 slot) along the bottom 10 feet and will be installed such that the slotted section is 8 feet below and 2 feet above the water table as measured in the on-site monitoring wells. Each point will be completed with a flush-mounted cover. A schematic diagram of a typical injection point is presented on Figure 8.

1.4.10 Design of Chemical Oxidation Injection System

Bulk sodium permanganate will be purchased from the Carus Chemical Company at a concentration of 40% and in 5-gallon containers. Using a portable mixing tank placed in the back of a vehicle, 50-gallon doses of 5% sodium permanganate will be prepared by mixing 5 gallons of 40% sodium permanganate with 45 gallons of tap water.

The vehicle with the mixing tank will then driven to each of the injection points and a hose will be connected from the bottom of the tank to the top of the injection point. The 50-gallon dose will then be gravity fed into one injection point. This process will be repeated for each of the ten injection points.

1.4.11 Indoor Air Monitoring, Remediation System Monitoring and Equipment Termination Criteria

The following monitoring schedule has been developed for the operation of the SVE unit, the AS system and the chemical oxidation application. Evaluation of historical plots of the data generated during the operation of this equipment will be used to determine when it is appropriate to shut off the remediation equipment.

SVE Unit Monitoring and Termination Criteria - Once the SVE equipment has been installed and is ready to be placed into operation, an initial "base line" soil vapor sample will be collected of the untreated vapor stream between the exhaust side of the blower and the inlet side of the carbon canisters using sorbent tubes. The sample tubes will be sent to an ELAP-approved laboratory for

analysis of halogenated volatile organics using EPA Method 8260. If the sorbent tube cannot reach the desired detection levels, they may be substituted with summa canisters. In addition, an 10.2ev HNU™ or another appropriate PID will also be used to screen the amount of VOCs in the untreated vapor stream.

Total VOC measurements using a Photo Ionization Detector (PID) will be collected on a frequency of at least once per week during the first month the system is in full operation. After the first month, the NYSDEC will evaluate the PID readings to determine if these readings can be taken at a less frequency. PID readings will then be collected monthly or quarterly at the discretion of the NYSDEC. In addition to the PID readings, sorbent tube samples will be collected on a quarterly basis. All of these readings will be contributing to the evaluation of the cleanup progress.

As the operation of the SVE unit progresses, the PID and absorbent tube data will be plotted versus time of operation on graphs. Once the levels of total VOCs in the SVE wells decreases to a near constant or asymptotic concentration, operation of the system will be suspended. Graphs of the concentration of total VOCs versus time will be compiled after each round of quarterly monitoring.

The SVE also serves to capture off-gassing contaminants from the AS system. Therefore, regardless of the criteria described above, the SVE system will remain in operation as long as the AS system described in the next section is in operation.

Please note that the SVE system will run as long as the potential for sub-slab vapor intrusion exists. Once groundwater remediation has been accomplished, the equipment used in the SVE system will be reevaluated and resized to meet the goal of preventing vapor intrusion. The SVE system will not be shut down without the permission from the NYSDEC.

AS System Monitoring and Termination Criteria - The on-site multi-depth well cluster VW-2S, I & D will be monitored during the operation of this remediation system. Existing wells VW-1s and the new wells VW-1I and D will serve as up-gradient monitoring points. However, only the shallow water table wells containing PCE will serve as compliance wells for this project. Prior to start up of the AS system, "base-line" samples will be collected from wells VW-1S, I & D; VW-2S, I & D; VW-3; VW-4; and VW-5.

Prior to start up of the air sparge system, a base-line test will be performed. The depth to water in wells MW-2S, I & D will be recorded. The three air sparge points will then be turned on and depth to water will be measured from the wells mentioned above. Measurements will continue until the readings stabilize. The results from the air sparging start up will be forwarded to the NYSDEC.

The samples from well MW-1S, I, and D will serve as up-gradient monitoring wells to determine the quality of ground water entering the property from up-gradient areas. Once placed in full operation, the following wells: VW-1S, I & D; VW-2S, I & D; VW-3; VW-4; and VW-5 will be sampled on a quarterly basis and analyzed for halogenated volatile organics using EPA method 8260. Graphs of the concentration of total VOCs versus time will be compiled after each round of quarterly monitoring. The system will be kept in operation until the concentration of PCE and its degradation products meets the criteria established below.

The AS/SVE system will remain in operation until the groundwater samples from well VW-2S indicate that: 1) they meet the Standards, Criteria and Guidance (SCGs) for PCE and its degradation products; 2) the data shows that PCE and its degradation products have reached an asymptotic condition and the system is no longer effectively removing the contaminants of concern; or, 3) at the determination of the NYSDEC, the remaining groundwater containing contamination is coming from an upgradient source. The concentration of TCE and TCA will also

be monitored in the intermediate and deeper wells for reference, but are not compliance parameters for this project.

Chemical Oxidation – Prior to applying sodium permanganate to the injection points, a round of “base-line” groundwater samples will be collected from wells VW-1S, I & D; VW-2S, I & D; VW-3; VW-4; and VW-5. For the purposes of the chemical oxidation program, the concentration of PCE in wells VW-3, 4 and 5 will be evaluated before and after the application of the permanganate. Additional applications of permanganate will be applied until one of the following conditions have been achieved in these three wells.

The application of permanganate will continue until the groundwater samples from wells VW-3, 4 and 5 indicate that: 1) they meet the Standards, Criteria and Guidance (SCGs) for PCE and its degradation products; 2) the data shows that PCE and its degradation products have reached an asymptotic condition and the application is no longer effectively removing the contaminants of concern.

Indoor Air-Sampling – One of the goals of the SVE system is to prevent VOCs vapors from entering the tenant spaces. As part of the Investigation Report (Ref. 10) a round of indoor air-sampling was collected to establish a “base-line”. To supplement this work, a PCE badge samples will be collected from the basement and first floor of F.W. Kennelworth, (now Telco Stores) and Lester’s Fashions. Based on these results, additional units to the north may have to be sampled.

As a follow up to this, a network of indoor air monitoring points has been developed. Once the SVE system is in full operation, we will collect indoor air samples which includes the first floor and basement of all the stores that exhibit indoor air contaminant levels above background (non-detect). To date, PCE was detected in the following stores: Cingular (basement only), Baskin Robbins, Go Digital, Golden Krust, Gourmet China, and Total Furniture. Therefore, all of these stores and their basements shall be included in the monthly indoor air monitoring. If PCE is detected in Telco Stores, Lester’s Fashions and/or any store or basement north of these stores, they will also be added to the monthly air monitoring program. No samples will be collected within the cleaners as this is an active PCE plant and dry cleaned clothes are stored in the basement.

Summa canisters will be used at Go Digital, Golden Krust, Gourmet China, and Total Furniture. Perc badges will be used in all other locations. ELAP-certified (No. PH-0497) Severn Trent Laboratories will perform these analyses. We are requesting the laboratories analytical methods for both the Summa canisters and Perc badges to target a minimum detection limit of at least one part-per-billion by volume. The test results will be presented in ug/m³.

Perc badges will be exposed for a period of approximately 24-hours and then sealed. Once sealed, the badges will be delivered by an overnight courier to Severn Trent Laboratories for analysis of PCE. The badges will be analyzed using NYSDOH Method 311-9 and reported with a targeted lower detection limit of at least one part-per-billion by volume.

Sampling will be performed monthly for the first 3 months after the SVE system is turned on and the results will be provided to the NYSDEC and NYSDOH to evaluate. Based on this data the NYSDEC will determine if sampling frequency will either remain at one month for the remainder of the first year or be adjusted to quarterly. After the first year, the NYSDEC will determine the sampling frequency.

1.5 Contemplated Use

The property has been used as a shopping center since 1960. The contemplated future use is for this property to remain as a shopping center.

2.0 ENGINEERING EVALUATION OF REMEDY

In accordance with the NYSDEC VCP guidance document (Ref. 11), the following Engineering Evaluation of the propose remedy has be performed. For the purposes of this project, the Remedial Action Objectives (RAO) are to: 1) prevent PCE vapors from entering the tenant spaces and to remove PCE vapors from the subsurface soils; and 2) decrease the concentration of PCE in the shallow groundwater to NYS groundwater standards and prevent the migration of PCE from the Bon Ton Cleaners facility and towards Paerdegat Basin.

2.1 Remedial Action Selection

2.1.1 Protection of Human Health and the Environment

a. Does the proposed remedy achieve each of the remedial action objectives?

Yes, the SVE system will address the soil vapor issues and the AS and chemical oxidation program will address the groundwater issues.

b. Identify any special issues regarding protection of human health and the environment not addressed in 2.1 a.

The remediation system is designed to address contamination from Bon Ton Cleaners to a depth of 35 feet below grade and is not intended to treat deeper contamination flowing onto the property from up-gradient sources.

2.1.2 Standards, Criteria & Guidance (SCG)

a. List all of the major SCGs for the site.

The SCGs are:

| <u>Media</u> | <u>SCG</u> | <u>Value for PCE</u> |
|--------------|---|--|
| Groundwater | NYSDEC TOGS (Ref. 6) | 5 ug/L |
| Soil | NYSDEC TAGM (Ref. 5) | 1,400 ug/kg |
| Soil Gas | None available | |
| Outdoor Air | Air Guide 1 (Ref. 9) | AGC = 1.0 ug/m ³ SGC = 1,000 ug/m ³ |
| Indoor Air | Tetrachloroethene (Perc) in Indoor Air Fact Sheet | 100 ug/m ³ or background |

b. Does the proposed remedy comply with all of the SCGs? If not, identify, describe, and discuss.

The TOGS and the TAGM are the cleanup objectives for this site. We have achieved these SCGs at other sites with similar geology using the proposed technology. In the event these criteria cannot be reached, alternative criteria are included in section 1.4.11 of this work plan.

2.1.3 Short-Term Effectiveness & Impacts

a. Identify the risks to the community, workers, and environment that would result from the proposed remedy.

Sodium permanganate will be utilized and inserted in the chemical oxidation injection points as described in sections 1.4.9 and 1.4.10 and the air discharge from the SVE system are the only risks posed by the proposed remedies to the community, workers, and environment.

b. How will these risks be controlled?

| Sodium Permanganate | Air discharge from SVE system |
|---|---|
| <p>Direct contact with the sodium permanganate is the only posed risk to the community, workers and the environment. Sodium permanganate is very safe when properly applied. We will apply this chemical as recommended by the vendor's application instructions, which includes the following protective gear: coverall suits, rubber gloves, and goggles. When the chemical is applied the work area will be delineated with caution tape to keep the community at a distance. The chemical will also be diluted according to the vendor's instructions and will not pose a threat to the environment</p> | <p>Carbon canisters will be used treat the SVE discharge.</p> |

c. How effective and reliable are the controls?

| Sodium Permanganate | Air discharge from SVE system |
|--|--|
| <p>Protective clothing is very reliable since the chemical will not penetrate onto the workers skin. Since the area will be off limits to the community pedestrians will not be affected. Diluting the chemical before application is very effective in keeping the environment safe. In addition to these safeguards a fulltime health and safety officer will be enforcing the controls during the applications.</p> | <p>Carbon is very effective in treating the SVE discharge. Monitoring of the SVE discharge before, between and after the carbon units will ensure that they function reliably.</p> |

d. Will the proposed remedy achieve the RAOs in less than two years? If not, how long will it take?

We anticipate the duration of the cleanup at this time to be less than two years.

2.1.4 Long-Term Effectiveness & Impacts

a. Is the proposed remedy permanent or does it rely upon containment?

The proposed remedy is permanent.

b. Will the ability of the remedy to achieve RAOs lessen over time? If there is uncertainty, describe the factors involved.

No.

c. After completion, will there be any significant threats, exposure pathways, risks to the public or environment from remaining wastes or treated residuals?

No.

2.1.5 Reduction of Toxicity, Mobility or Volume

a. How much of the contamination will be treated for each media.

The objective of the remedy is to treat all of the contaminated groundwater below the Bon Ton Cleaners facility and parking lot to a depth of 35 feet as well as all of the contaminated soil and soil vapor below the facility.

b. Will the process be complete or partial? Is the treatment process reversible?

The processes are partial and intended to achieve the TAGMs or TOGS. The treatment processes are not reversible.

c. Will the mobility of the contaminants be reduced? Are there any uncertainties?

The remedy will not affect the mobility of the contaminants. The SVE system relies on the mobility of the vapors to remove the contamination. We are not aware of any uncertainties.

2.1.6 Implementability

a. Are there potential construction and O&M difficulties?

There is a lot of traffic in the parking lot of the shopping center.

b. How will these difficulties be overcome?

We will arrive at the site early in the morning and secure the work locations with traffic cones and caution tape.

c. Are services and materials readily available?

Yes.

d. Are there any problems coordinating with other agencies such as obtaining approvals or permits?

No.

3.0 PROJECT PLANS AND SPECIFICATIONS

Section 1.4 presents a detailed summary of the proposed remedy. We propose to perform a pilot test of one SVE well and one AS point as described in section 1.4.6 of this document. After this is completed, we will submit the Final Project Plans and Specifications. This will include: the results of the pilot test; a drawing of the proposed final layout of the SVE and AS system; the proposed final layout of the chemical oxidation injection points; calculations and specifications for the selected SVE blower and AS compressor.

4.0 INSTITUTIONAL CONTROLS

The following institutional controls will be implemented for this Site. 1) a deed restriction prohibiting the use of the groundwater underlying the Site for potable purpose until groundwater beneath the site meets New York State groundwater standards; and 2) the Volunteer will cause to be filed with the City Register, a Notice to give all parties who may have or acquire an interest in the Site notice of the environmental condition at the Site.

5.0 HEALTH AND SAFETY PLAN

A formal Health and Safety Plan will be submitted with the final Project Plans and Specifications.

6.0 QUALITY ASSURANCE / QUALITY CONTROL (QA/QC) PLAN

For laboratory QA/QC, we propose to use the existing QA/QC Plan that was included in the Voluntary Investigation Work Plan.

7.0 REMEDIAL ACTION SCHEDULE

The following schedule has been developed for this project and is illustrated on Figures 9 & 10.

Plans

| | |
|----------------------------------|------------|
| Submission Remediation Work Plan | April 2004 |
| NYSDEC approval of Work Plan | |

Field Activities

| | |
|---|---|
| Installation of SVE Wells, VMPs and AS Points to be used for Pilot Test | 60 days after DEC approval |
| Pilot Test for SVE and AS System | 30 days after installation of SVE wells and AS points |
| Installation of Injection Points | 60 days after DEC approval |
| Installation of Up-gradient Monitoring Wells | 60 days after DEC approval |
| Ordering and Procurement of Equipment | 30 days after approval of Plans & specifications |

| | |
|---|---|
| Installation of Equipment, Blower & Compressor | 60-90 days after approval of Plans & specifications |
| Cleanout of Sump | 60 days after DEC approval |
| Collection of pre-start up groundwater and indoor air samples | 1 week prior to start up |
| Application of Permanganate & System start up | 120 days after approval of Plans & specifications |

Report Preparation

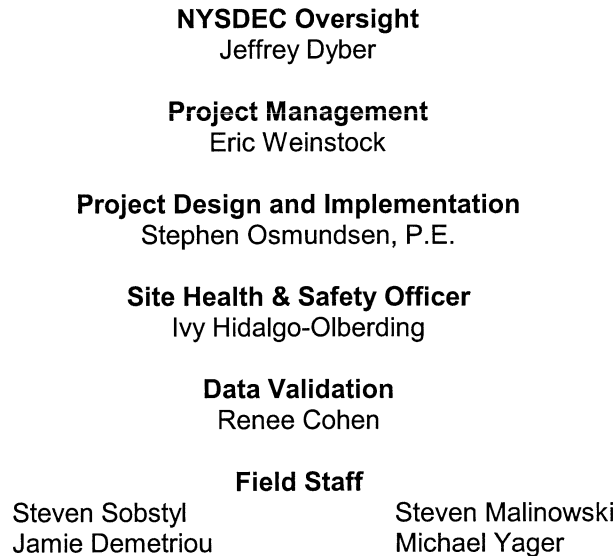
| | |
|---|--|
| Submission of Project Plans and Specifications | 30 days after completion of Pilot Test |
| Submission of Remediation Report including: Final Engineering Report, As-Built Drawings and an OM&M Plan. | 90 days after system start up |

8.0 REPORTING

Project Plans and Specifications will be prepared and submitted to the NYSDEC as described above. After the system has been installed and is in operation a Remediation Report will be prepared that will including a Final Engineering Report, As-Built Drawings and an OM&M Plan. The Remediation Report will be sign and sealed by a NYS Professional Engineer. Quarterly reports will be prepared as the SVE and AS systems remain in operation.

9.0 PROJECT ORGANIZATION

The following Organization Chart has been developed for this Project.

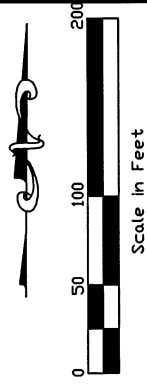
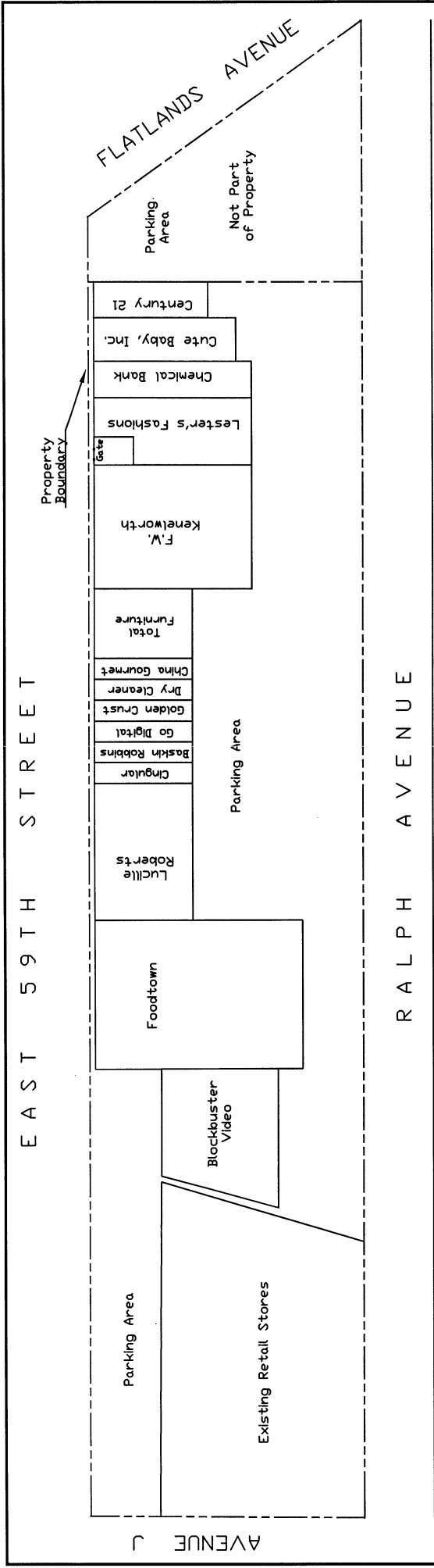


10.0 REFERENCES

1. D.A. Smolensky, H.T. Buxton, and P.K. Shernoff, (1989), Hydrologic Framework of Long Island, New York, USGS Hydrologic Investigations Atlas HA-709.
2. ACT, (June 5, 2001) Phase II Environmental Site Assessment, 1890-1960 Ralph Avenue Brooklyn, New York.
3. ACT, (July 23, 2001) Phase II Environmental Site Assessment, 1890-1960 Ralph Avenue Brooklyn, New York.
4. H.T. Buxton, J. Soren, A. Posner and P. Shernoff, (1981), Reconnaissance of Ground-Water Resources of Kings and Queens Counties, NY, USGS Open File Report 81-1186.
5. NYSDEC, January 24, 1994, Department's Technical And Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels.
6. NYSDEC, October 22, 1993, Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values.
7. CA RICH (October 2002), Investigation Work Plan Bon Ton Cleaners 1932 Ralph Avenue Brooklyn, New York, Site Number V-00512-2
8. CA RICH (May 2003), Supplemental Investigation Work Plan Bon Ton Cleaners 1932 Ralph Avenue Brooklyn, New York, Site Number V-00512-2
9. NYSDEC, (2000), New York State DAR-1 (Air Guide – 1) AGC/SCG Tables, Guidelines for the Control of Toxic Ambient Air Contaminants.
10. CA RICH (October 2003), Investigation Report Bon Ton Cleaners 1932 Ralph Avenue Brooklyn, New York, Site Number V-00512-2
11. NYSDEC, May 2002, Voluntary Cleanup Program Guide – Draft.

Users/Eric/docs/Ralph/RWP/Remediation Work Plan 3

FIGURES



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 17 Dupont Street, Plainview, New York 11803

SITE PLAN

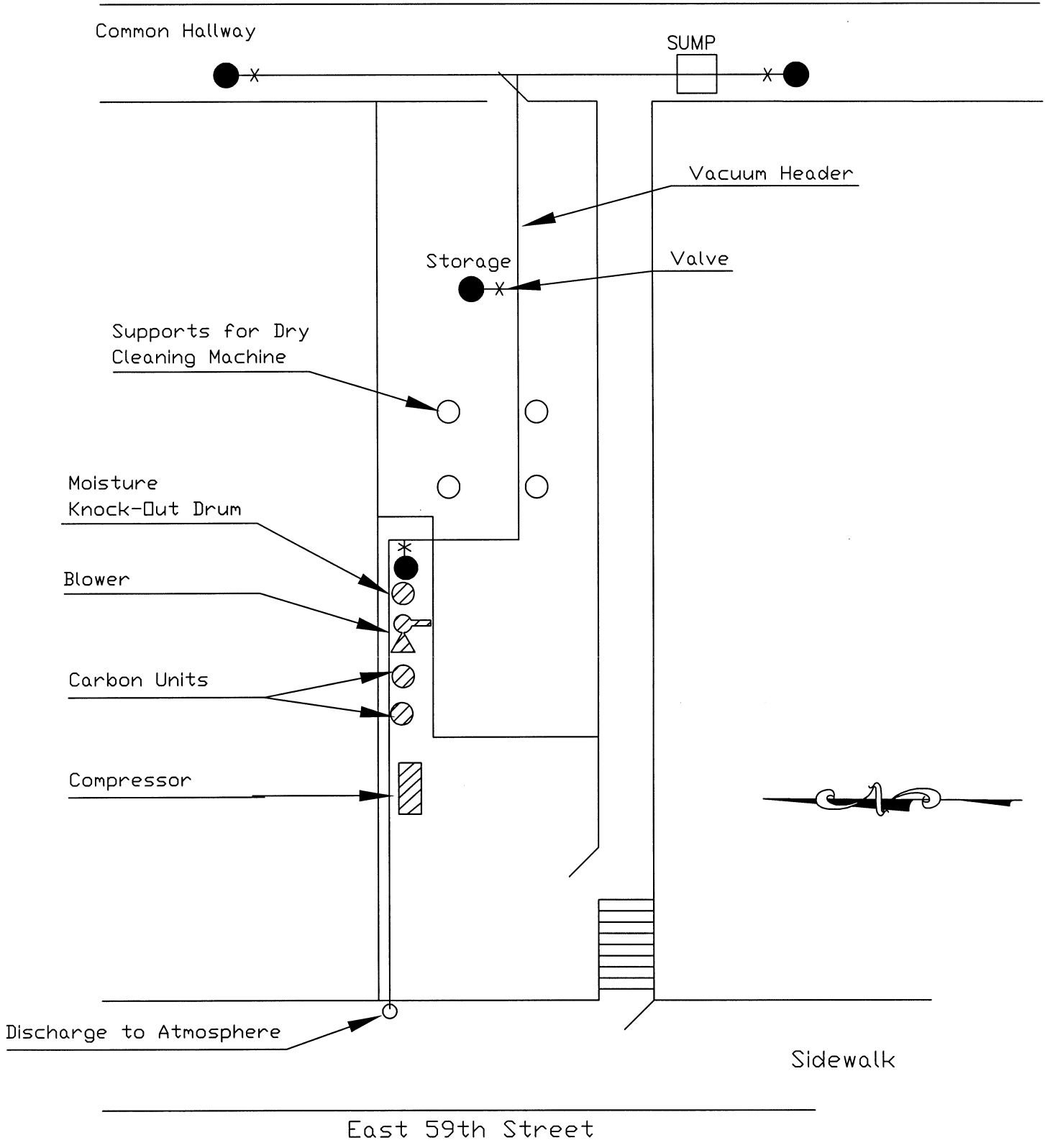
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|---------|-----------|-----------------|
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| | SCALE: | As Shown |
| FIGURE: | DRAWN BY: | S.T.M. |
| | REVISD: | 10/23/03 I.H.O. |
| DWG NO. | APPR. BY: | E.A.W. |
| | | |

1
 1142-1AB

BON TON CLEANERS
 1932 RALPH AVENUE
 FLATBUSH, NEW YORK

FLATBUSH AVENUE

Map adapted from Property survey by
 Montrose Surveying Co. LLP dated May 2, 2001
 and USGS Brooklyn Quadrangle 1979.



Key

● Soil Vapor Extraction Well

0 5 10 15 20

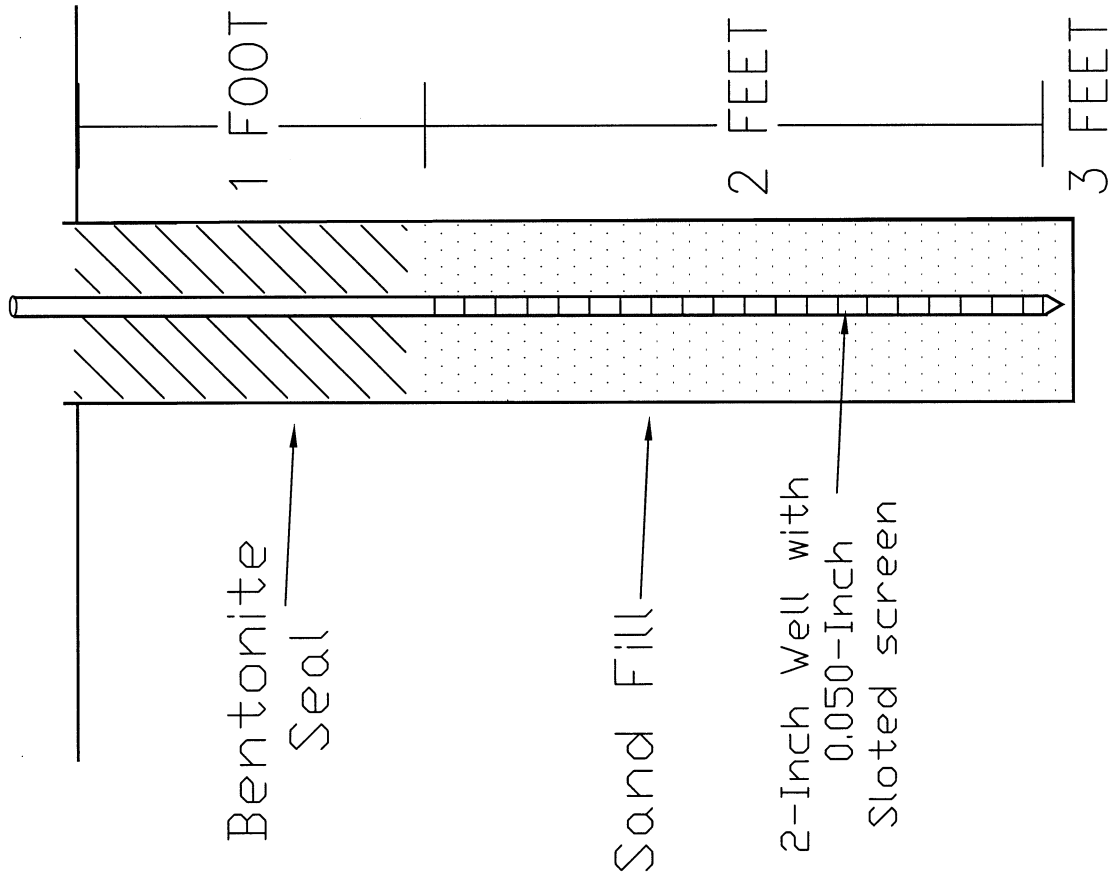
Approximate Scale in Feet

CA RICH CONSULTANTS, INC.

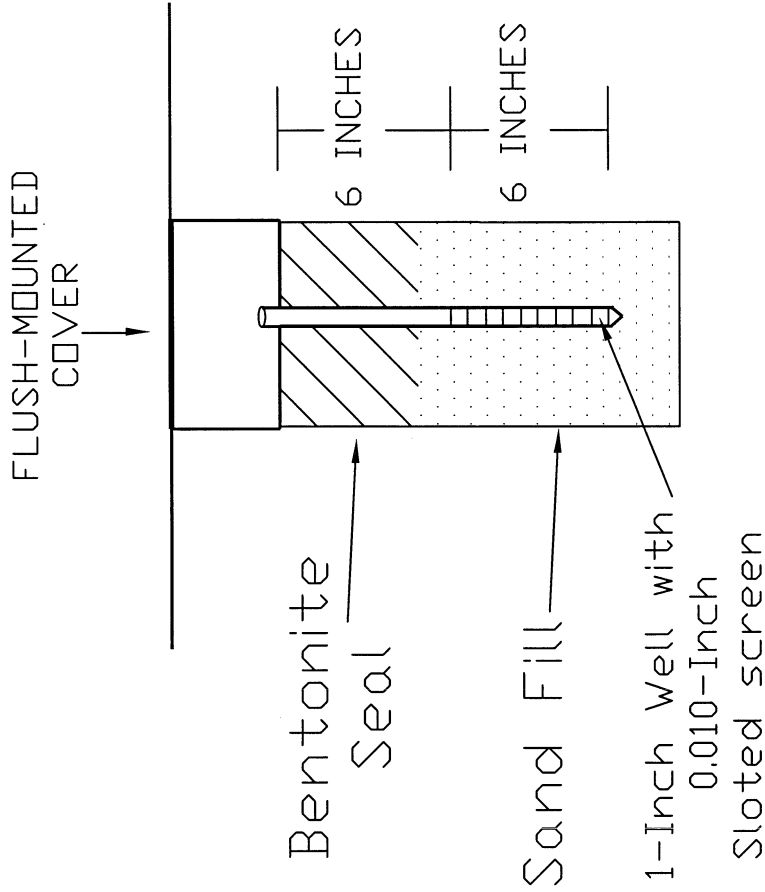
Certified Ground-Water and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

| | | |
|---|---|---------------------|
| TITLE: Location of Proposed Soil Vapor Extraction System | | DATE: 4/15/03 |
| REVISED: 01/15/04 I.H.O. | | SCALE: 1" = 10' |
| FIGURE: 2 | BON TON CLEANERS 1931 RALPH AVENUE FLATBUSH, NEW YORK | DRAWN BY: S.T.M. |
| DWG NO. 1142-1eb | | APPR. BY: E.A.W. |

SVE WELL



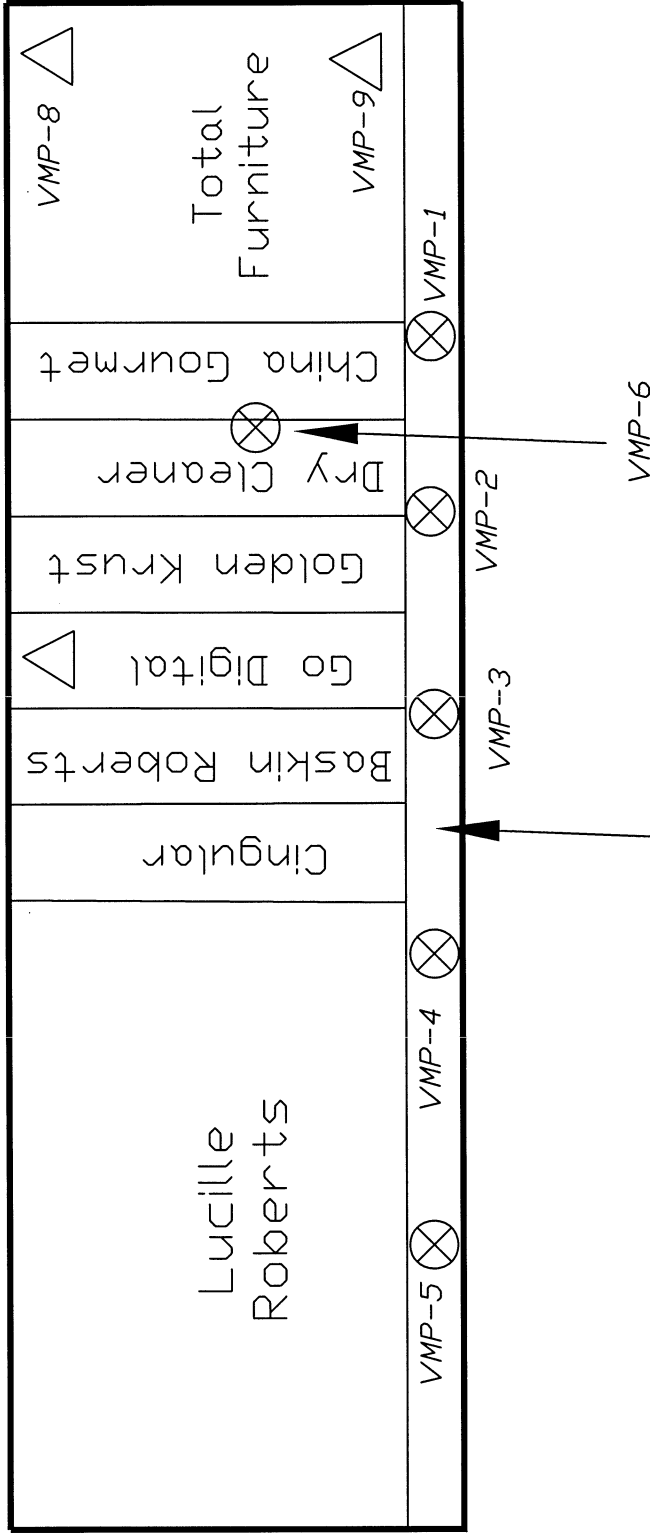
Vapor Monitoring Point



| | | |
|---|---|----------------------------|
| CA RICH CONSULTANTS, INC. | | DATE: 8/18/03 |
| Certified Ground-Water and Environmental Specialists 17 Dupont Street, Plainview, NY 11803 | | SCALE: Not To Scale |
| TITLE: SVE WELL and SOIL VACUUM MONITORING POINT | | DRAWN BY: D.H.W. |
| FIGURE: 3 | BON TON CLEANERS 1931 RALPH AVENUE FLATBUSH, NEW YORK | APPR BY: E.A.W. |
| DRAWING NO.: 1198 | | |



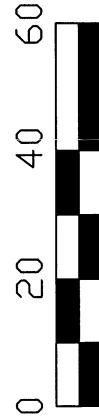
E A S T 5 9 T H S T R E E T
VMP-7



LEGEND

⊗ SOIL VAPOR POINT

△ PROPOSED SOIL VAPOR POINTS



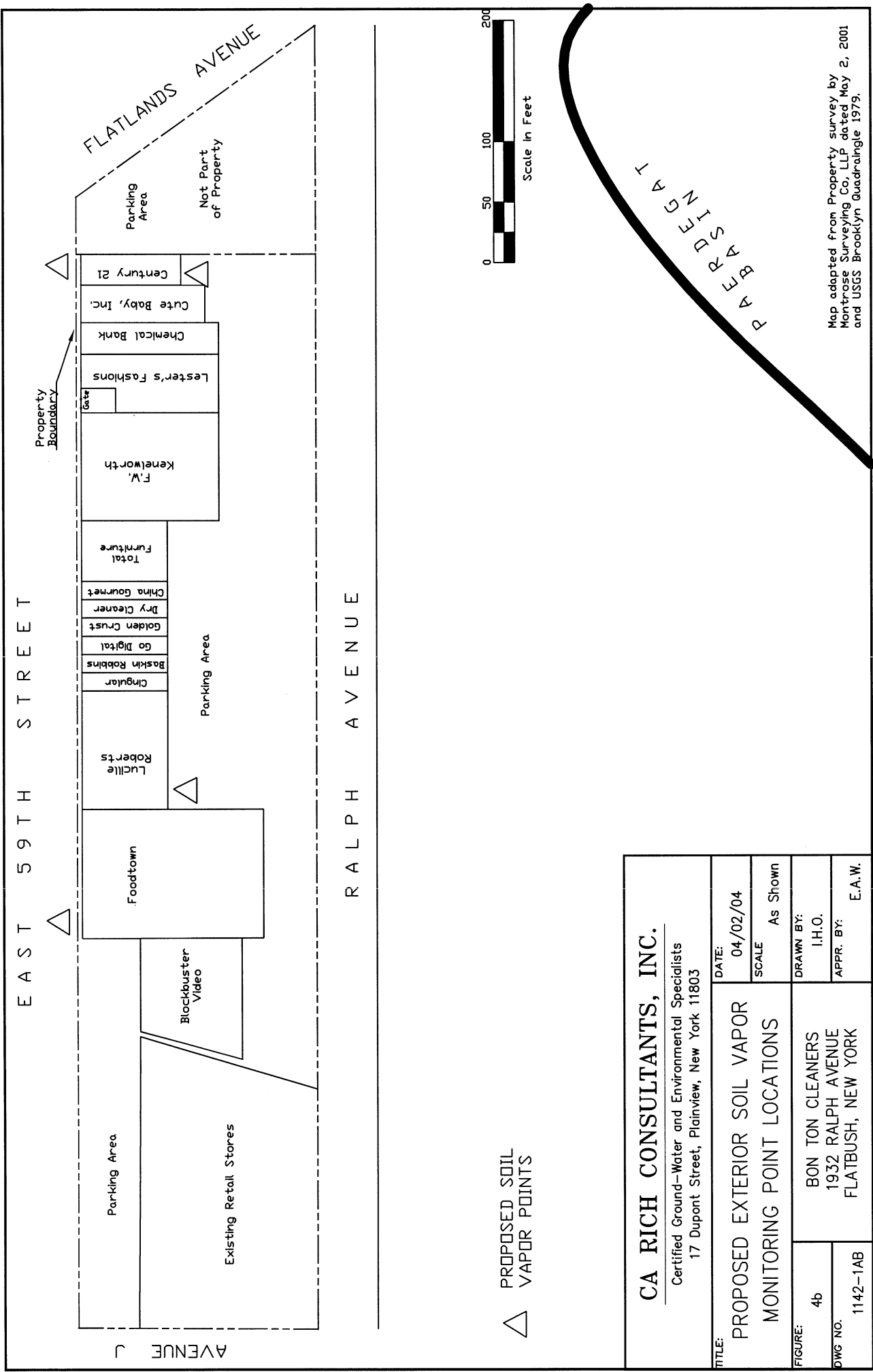
Scale in Feet

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17 Dupont Street, Plainview, New York 11803

| | |
|---|-------------------------|
| TITLE: EXISTING & PROPOSED SOIL VAPOR MONITORING POINT LOCATIONS | DATE: 4/15/03 |
| | SCALE: 1" = 30' |
| FIGURE: 4g | DRAWN BY: S.T.M. |
| DRAWING NO.: 1190-1A | APPR. BY: E.A.W. |

Map adapted from Property survey by Montrose Surveying Co, LLP dated May 2, 2001 and USGS Brooklyn Quadrangle 1979.



EAST 59TH STREET

FLATLANDS AVENUE

RALPH AVENUE

AVENUE J

Existing Retail Stores

Parking Area

Blockbuster Video

Foodtown

Lucille Roberts

Cingular

Baskin Robbins

Go Digital

Golden Crust

Dry Cleaner

China Gourmet

Total Furniture

F.W. Kenelworth

Lester's Fashions

Chemical Bank

Cute Baby, Inc.

Century 21

Parking Area

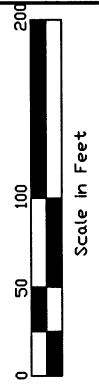
Parking Area

Not Part of Property

Property Boundary

Gate

△ PROPOSED SOIL VAPOR POINTS



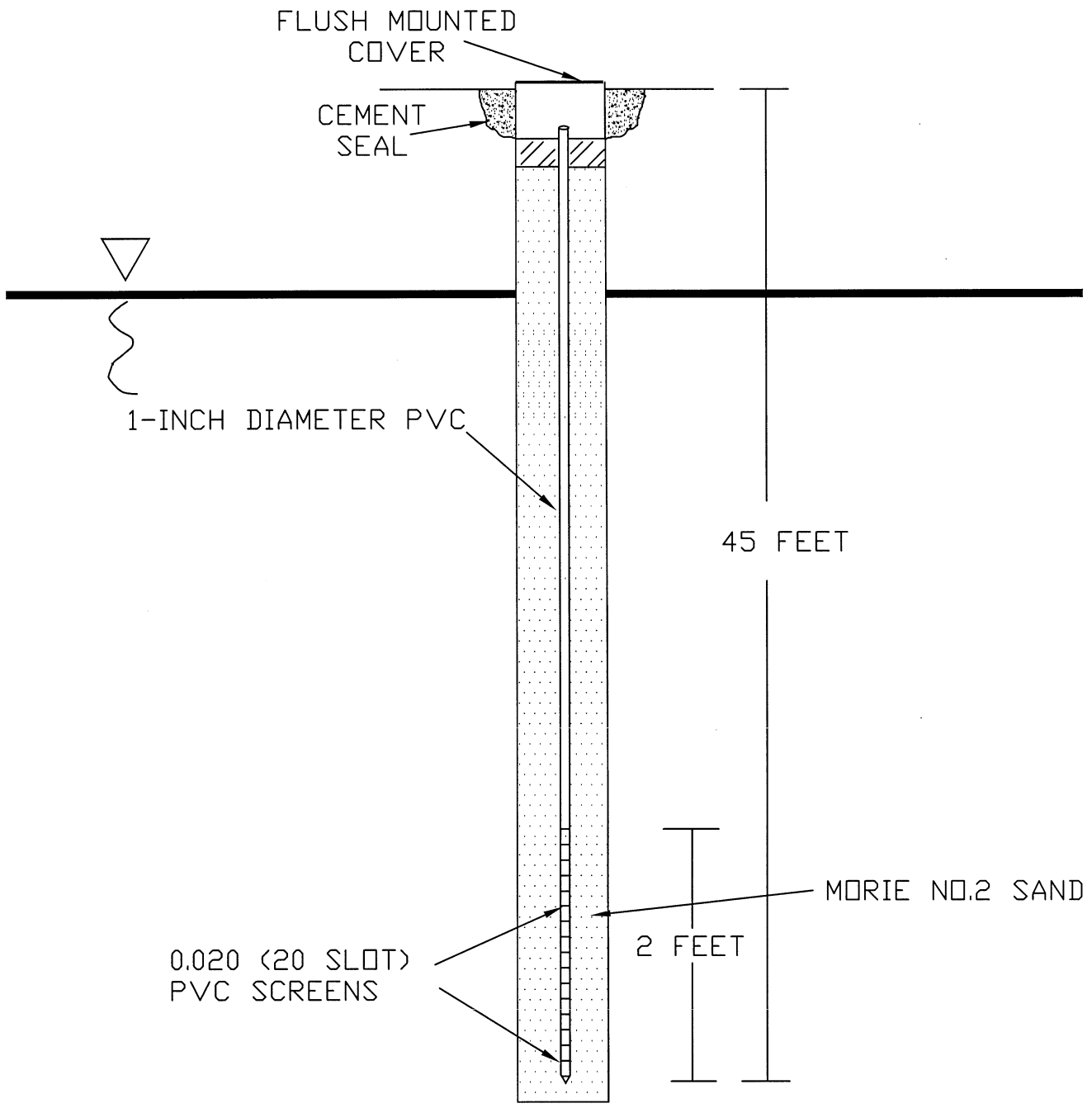
CA RICH CONSULTANTS, INC.

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17 Dupont Street, Plainview, New York 11803

| | | |
|-----------|---|---|
| TITLE: | PROPOSED EXTERIOR SOIL VAPOR MONITORING POINT LOCATIONS | |
| | DATE: | 04/02/04 |
| FIGURE: | 4b | BON TON CLEANERS 1932 RALPH AVENUE FLATBUSH, NEW YORK |
| | DWG NO. | 1142-1AB |
| DRAWN BY: | I.H.O. | E.A.W. |
| | APPR. BY: | |

Map adapted from Property survey by Montrose Surveying Co, LLP dated May 2, 2001 and USGS Brooklyn Quadrangle 1979.

TYPICAL AS WELL



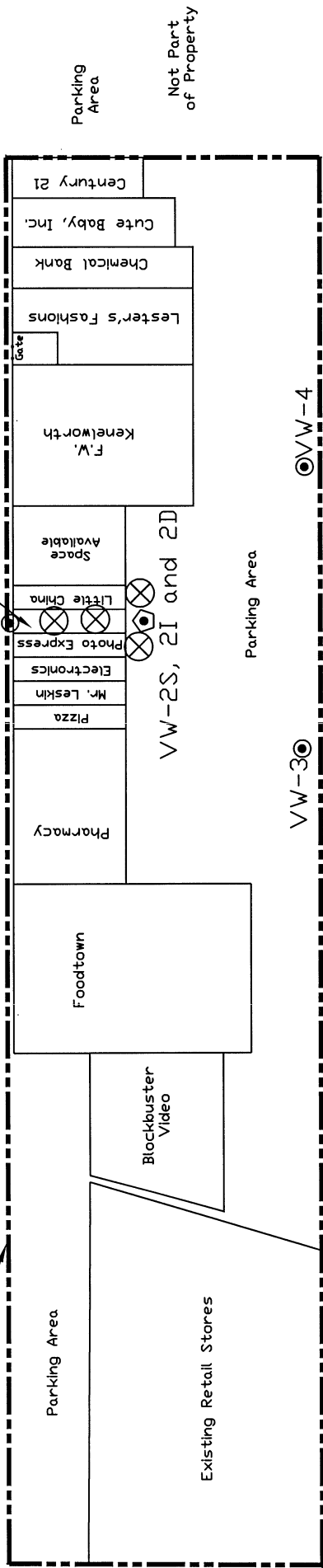
CA RICH CONSULTANTS, INC.

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 17 Dupont Street, Plainview, New York 11803

| | | |
|---------------------------|---|------------------------|
| TITLE: TYPICAL AS WELL | | DATE: 8/20/03 |
| FIGURE: 5 | | SCALE: Not To Scale |
| DRAWING NO: 1077-1A | BON TON CLEANERS 1931 RALPH AVENUE FLATBUSH, NEW YORK | DRAWN BY: D.H.W. |
| | | APPR. BY: E.A.W. |



EAST 59TH STREET VW-1 Bon Ton Dry Cleaners



Legend

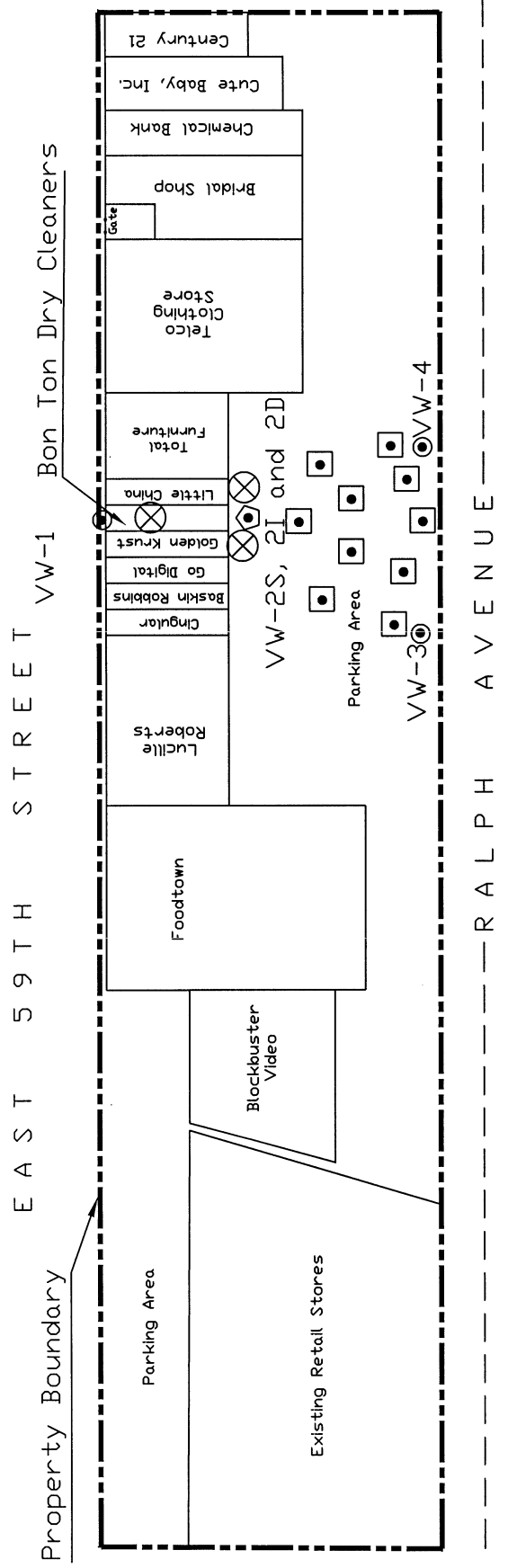
- ⊙ Existing On-Site Water Table Monitoring Well
- ⊕ Existing On-Site Multi Depth Cluster Well
- Existing Off-Site Water Table Monitoring Well
- ⊗ Sparge Points



Graphic Scale In Feet

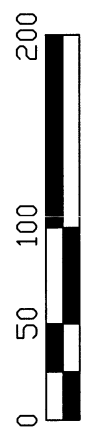
Note:
Map adapted from Property survey by Montrose Surveying Co, LLP dated May 2, 2001 and USGS Brooklyn Quadrangle 1979.

| | |
|---|---|
| CA RICH CONSULTANTS, INC. | |
| Certified Ground-Water and Environmental Specialists 17 Dupont Street, Plainview, New York 11803 | |
| TITLE: | Locations Of Proposed Air Sparge Points |
| DATE: | 11/25/03 |
| SCALE: | 1" = 100' |
| FIGURE: | 6 |
| DWG NO.: | 1199-1a |
| DRAWN BY: | RALPH ASSOCIATES 1932 RALPH AVENUE FLATBUSH, NEW YORK |
| APPR. BY: | S.T.M. E.A.W. |



Legend

- Existing On-Site Water Table Monitoring Well
- ⬢ Existing On-Site Multi Depth Cluster Well
- Existing Off-Site Water Table Monitoring Well
- ⊗ Sparge Points
- ◼ Injection Points

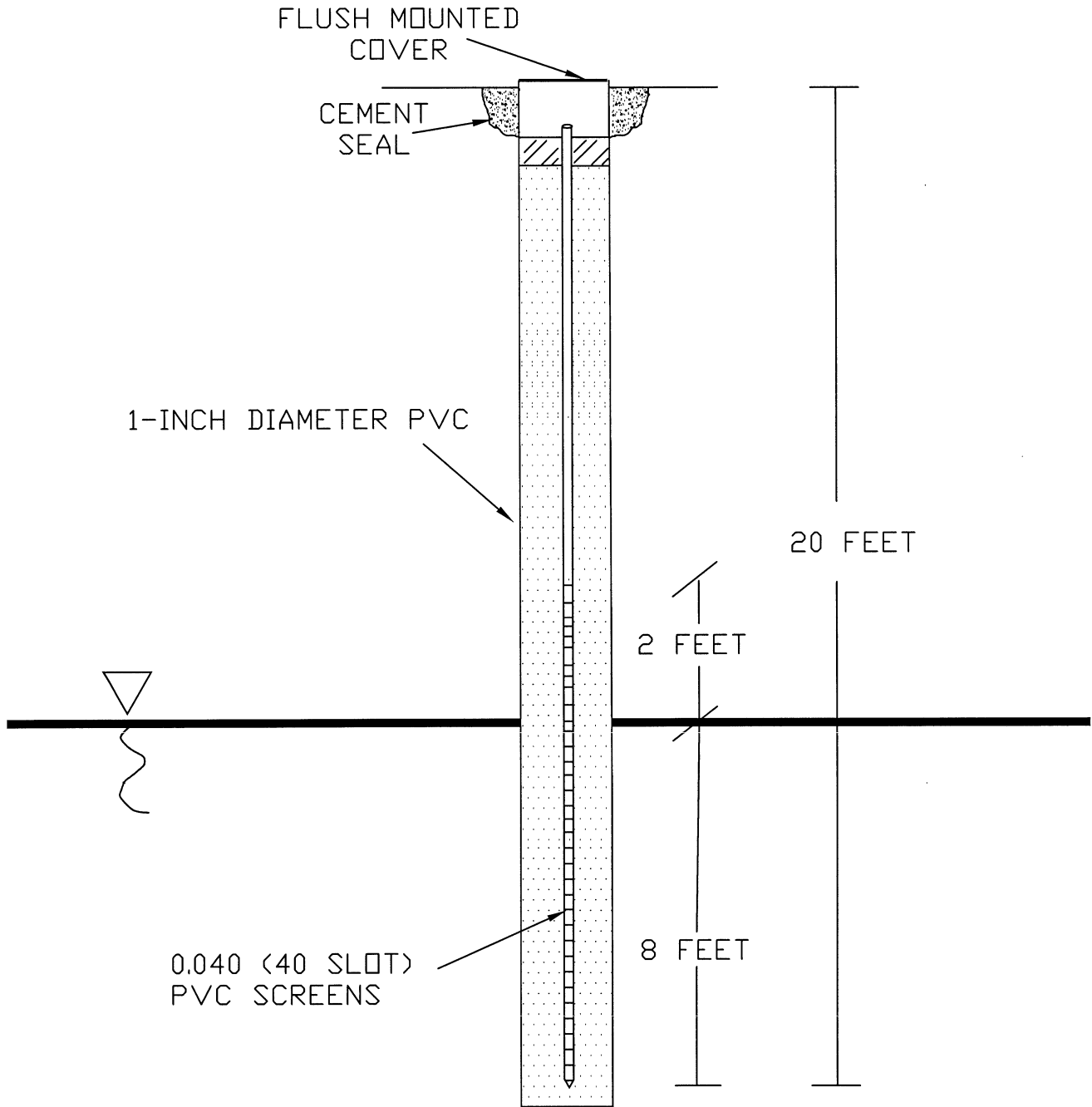


Graphic Scale In Feet

Note:
 Map adapted from Property survey by
 Montrose Surveying Co, LLP dated May 2,
 2001 and USGS Brooklyn Quadrangle 1979.

| | |
|---|---|
| CA RICH CONSULTANTS, INC. Certified Ground-Water and Environmental Specialists 17 Dupont Street, Plainview, New York 11803 | |
| TITLE: Proposed Chemical Oxidation Injection Point Locations | DATE: 11/25/03 |
| SCALE 1" = 100' | DRAWN BY: S.T.M. |
| FIGURE: 7 | APPR. BY: E.A.W. |
| DWG NO. 1199-1a | |
| REVISED: 03/29/04 I.H.O. | RALPH ASSOCIATES 1932 RALPH AVENUE FLATBUSH, NEW YORK |

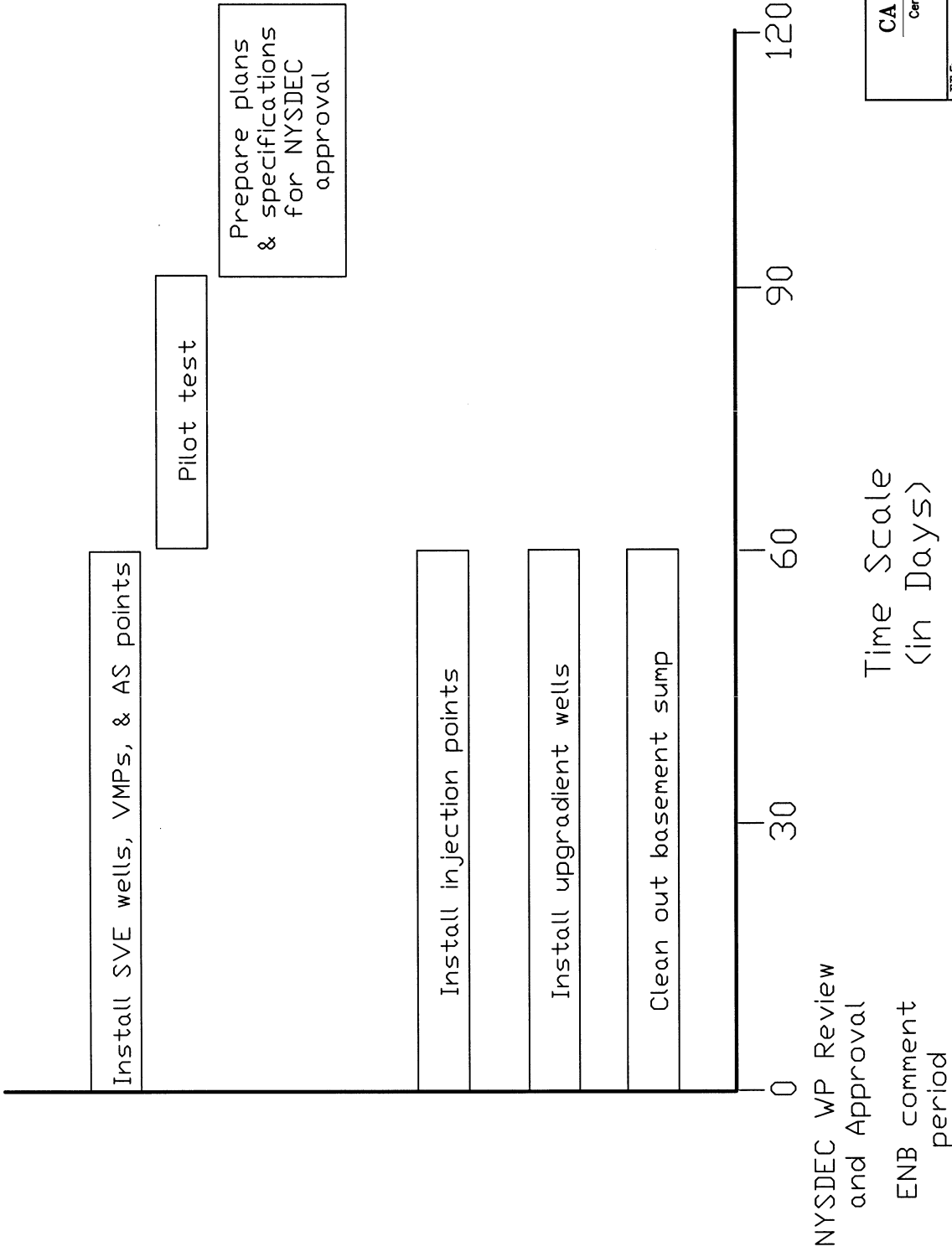
TYPICAL INJECTION POINT



CA RICH CONSULTANTS, INC.

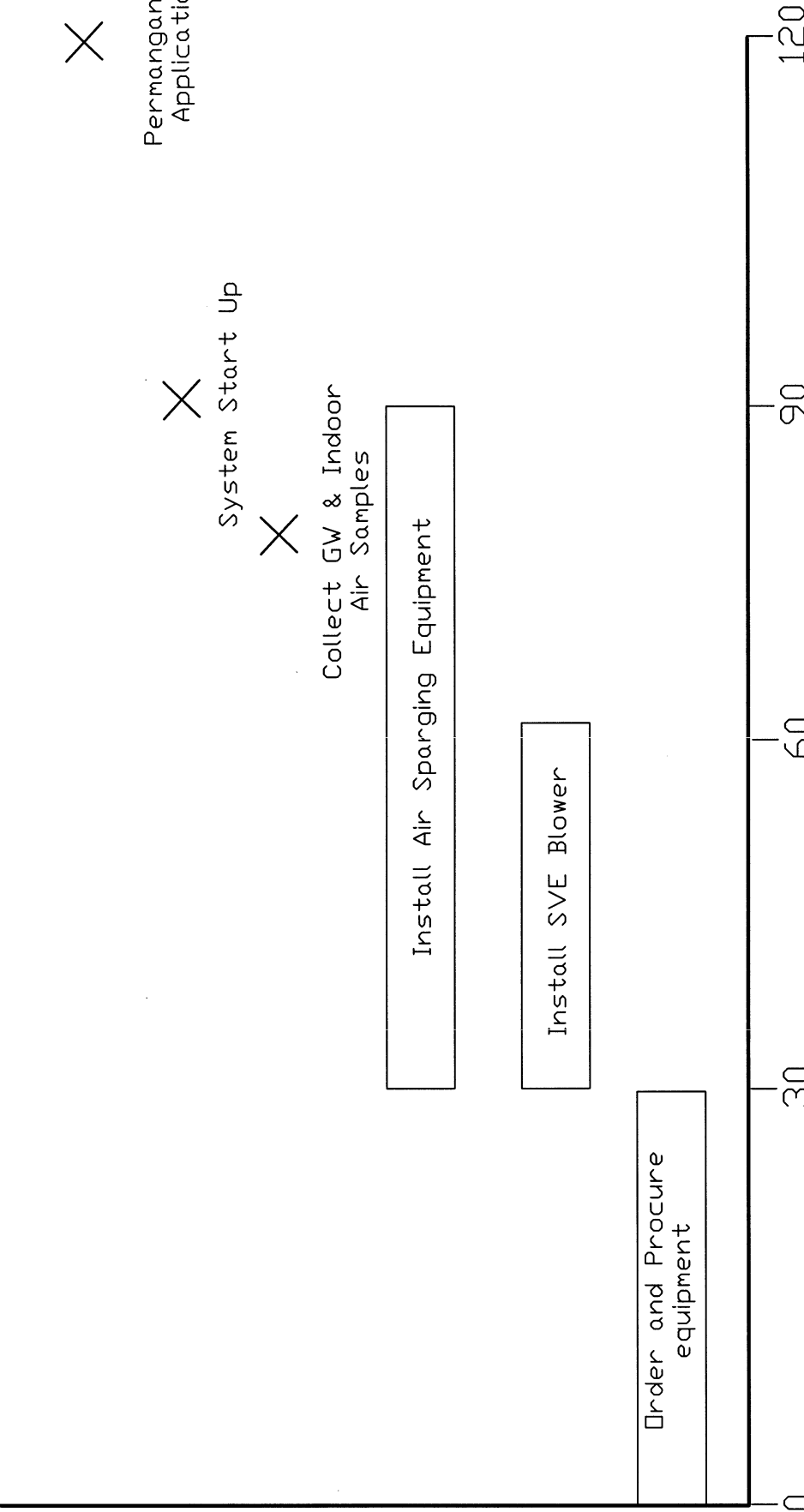
Certified Ground-Water and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

| | | |
|---------------------------------------|---|----------------------------|
| TITLE: TYPICAL INJECTION POINT | | DATE: 01/16/04 |
| | | SCALE: Not To Scale |
| FIGURE: 8 | BON TON CLEANERS 1931 RALPH AVENUE FLATBUSH, NEW YORK | DRAWN BY: I.H.O. |
| DRAWING NO: 1077-1A | | APPR. BY: E.A.W. |



NYSDEC WP Review and Approval
ENB comment period

| | |
|---|---|
| CA RICH CONSULTANTS, INC. Certified Ground-Water and Environmental Specialists 17 Dupont Street, Plainview, New York 11803 | |
| TITLE: | Work Schedule from WP Approval to Preparation of Plans & Specifications |
| DATE: | 03/29/04 |
| SCALE: | NA |
| FIGURE: | 9 |
| DWG NO.: | BON TON CLEANERS 1932 RALPH AVENUE FLATBUSH, NEW YORK |
| DRAWN BY: | I.H.O |
| APPR. BY: | E.A.W. |



NYSDEC Approval of Plans & Specifications

Time Scale (in Days)

Submission of Remediation Report including: Final Engineering Report, As-Built Drawings and an O&M Plan 90 days after system start up.

| | |
|--|------------------|
| CA RICH CONSULTANTS, INC. Certified Ground-Water and Environmental Specialists 17 Dupont Street, Plainview, New York 11803 | |
| TITLE: | 03/29/04 |
| DATE: | SCALE: NA |
| FIGURE: 10 | DRAWN BY: I.H.O. |
| DWG NO.: | APPR. BY: E.A.W. |
| Work Schedule from Approval of Plans & Specifications to Permanganate Application BON TON CLEANERS 1932 RALPH AVENUE FLATBUSH, NEW YORK | |