A.K. ALLEN CORPORATION
MINEOLA, NEW YORK
REMEDIAL INVESTIGATION REPORT

Prepared For:

A.K. ALLEN CORPORATION
255 East 2nd Street
Mineola, New York, 11501

Prepared by:

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February 1996

CA RICH CONSULTANTS, INC.
CERTIFIED GROUND-WATER AND
ENVIRONMENTAL SPECIALISTS

February 13, 1996

Twomey, Latham, Shea & Kelley
33 West Second Street
Riverhead, New York 11901

Attention: Steven Latham, Esq.

Re: **Remedial Investigation Report**
A.K. Allen Corporation
Mineola, New York

Dear Mr. Latham:

Attached is a copy of the Remedial Investigation Report for the above-referenced Facility.

If you have any questions regarding this report, please do not hesitate to call our office.

Sincerely,

CA RICH CONSULTANTS, INC.

Eric A. Weinstock
Associate

Attachments

cc: Alton K. Allen
Mac Goldsmith

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A.K. Allen Company, Inc.
Mineola, New York

1.0 INTRODUCTION

The following Remedial Investigation Report has been prepared by CA RICH Consultants, Inc. (CA RICH) for the A.K. Allen Company, Inc. (A.K. Allen) for the purposes of addressing the environmental concerns of the Nassau County Department of Health (NCDH) pertaining to the A.K. Allen Facility located at 255 East Second Street, Mineola, New York (the Site). The remedial investigative work completed at the Site was conducted in accordance with NCDH approved Remedial Investigation Work Plan dated October 1994 (Ref. 1).

1.1 Site Description

The A.K. Allen Company, Inc. is a manufacturer of precision-machined metal cylinders and valves and has been in operation at 225 East Second Street since 1947. The existing Facility contains approximately 120,000 square feet of manufacturing, warehouse and office space situated on an approximately 195,000 square foot lot (Plate 1). The Site is bordered by other industrial properties to the north, east and west. The Long Island Rail Road (LIRR) right-of-way is located immediately south of the Site. The Site is currently sewered and serviced with municipal water provided by the Village of Mineola.

1.2 Background

On June 25, 1992 a representative of NCDH inspected the A. K. Allen Facility and collected three soil samples from the rear of the Site. The samples collected by the County were labeled with the prefix P-62592, corresponding to the date of collection, followed by the sequence in which the sample was collected. On June 30 and July 1, 1993, representatives of NCDH returned to the Site and collected an additional 13 soil samples. These samples were collected from the soil behind the drum storage area and the Long Island Rail Road (LIRR) right-of-way. On November 3, 1993, four additional samples were collected by NCDH and Ecocycle for waste characterization analysis. These samples begin with the prefix SP. Analytical results from the NCDH soil samples indicated detections of several halogenated volatile organic coompounds (VOCs) above NYSDEC clean-up standards. These included 1,1-dichloroethane, 1,1,1-trichloroethane, 1,1-dichloroethene, tetrachloroethene and trichloroethlyene. Non-halogenated VOCs, detected in samples collected by NCDH, which exceed NYSDEC clean-up levels, are toluene, ethylbenzene, o-xylene and naphthalene. Additionally, the VOCs N-proplybenzene, isopropylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene and n-butylbenzene were detected at significant levels, however, no NYSDEC clean-up guildlines are availible for these compounds. Metals analysis using the TCLP sampling method indicated the presence of cadmium above the NYSDEC clean-up levels. The location of all of these samples are illustrated on Plate 2. A summary of the results from these three sampling events is included in Appendix A.

1.3 Current and Future Land Use

The A.K. Allen Company facility is situated in a long-established industrial/commerical area of Nassau County. All of the adjoining properties to the north, east and west are occupied by either industrial or commerical operations. The land adjoining the southern property line is a right-of-way for the LIRR.

The geographic location of the A. K. Allen is zoned industrial/commerical and most likely will remain the same in the future. The LIRR is a major transportation corridor and, as such, will most likely always remain as the same land use classification. The other neighboring properties have a long history of industrial/commerical usage. The likelihood that these properties will be rezoned to residential usage in the foreseeable future is extremely unlikely.

2.0 STUDY AREA INVESTIGATION

2.1 Site Topography

The Site is relatively flat having an elevation of approximately 115 feet above mean sea level (MSL). Elevations within a 1/4-mile radius of the site gradually fluctuate between 100 feet and 115 feet above MSL and overall remain relatively flat within the area of the Site. The LIRR right-of-way runs along the southern perimeter of the Site and has an elevation of approximately 105 feet above mean sea level, forming a topographic low corridor through the area in which the site is located. Directly south of the LIRR the elevation increases back up to approximately 115 feet above MSL.

2.2 Site Geology

According to the United States Geologic Survey (USGS), in their document entitled *Hydrologic Framework of Long Island, New York by D.A. Smolensky, et. al.; @ 1989* (Ref. 2), the Site is situated upon unconsolidated coastal plain deposits of Cretaceous to Quaternary age. Glacial outwash soil deposits known as the Upper Glacial Aquifer of Long Island underlie the area in which the Site is located to a thickness of approximately 50 feet below grade.

In the area of the Site, the Upper Glacial Aquifer is underlain by approximately 500 feet of the fully saturated Magothy Formation, the principal water supply aquifer for most of Nassau County. The Magothy Formation is, in turn, underlain by approximately 150 feet of the Raritan Formation. The Raritan Formation is composed of the upper Raritan Clay, a regional confining layer, followed by approximately 250 feet of the more permeable Lloyd Sand. Underlying the Lloyd Sand is bedrock composed of igneous and metamorphic rocks of Precambrian age. A geologic cross section running north-south through the area of the Site is presented in Figure 1.

Site-specific geology encountered during the exploration program is characterized generally as unconsolidated glacial sediments consisting of medium to coarse-grained sands, as well as, interbedded fine grained sands, silts and clays to depths of 30 feet below land surface.

Review of the Nassau County Department of Public Works Map, entitled *Nassau County Water Table Elevation, @1992* (Ref. 3) indicates that the direction of shallow groundwater flow in the area of the Site is to the southwest.

The elevation of the water table occurring within the underlying upper glacial aquifer is approximately 55 to 60 feet below land surface. A regional water table map is presented in Figure 2.

2.3 Contamination and Areas of Concern

Based on the analytical results obtained during previous soil sampling events, compounds and constituents of concern included: the chlorinated and aromatic classes of volatile organic compounds (VOCs); semivolatile petroleum related polynuclear aromatic hydrocarbons (PAHs); and heavy metals. Areas of Concern (AOC) included; the drum storage area at the rear of Site; an area approximately 100 feet east of the drum storage area; soil along the embankment between the LIRR tracks and the Site; two (2) parking lot storm drains; and an interior floor drain.

3.0 FIELD ACTIVITIES

3.1 General

The scope of work included in the Remedial Investigation Work Plan was conducted on November 6 and 7, 1995 by CA RICH. Mr. Steven Silvers and Mr. Thomas Norris of NCDH were present at the Site on the morning of November 6, 1995.

3.2 Scope of Work

The scope of work conducted at the Site included the collection and analysis soil samples for the purposes of delineating the horizontal and vertical extent of contamination within the areas of concern. In addition, the collection and analysis of groundwater samples was performed for the purposes of identifying whether groundwater quality beneath the Site has been impacted.

3.3 Sampling Methodology and Protocols

Subsurface soil samples were collected using either the Geoprobe® core sampling technique or with a hand operated soil auger. Soil samples were field screened using an HNU® photoionization organic vapor detector and visually characterized and inspected for evidence of contamination (e.g. discoloration). Soil samples designated T-1 and T-8 represent background soil conditions at the Site. The two (2) groundwater samples were collected using the Geoprobe® groundwater sampling system.

All of the samples collected were maintained by CA RICH in coolers with ice, accompanied by a quality control/quality assurance trip blank for each sampling day. All samples were transported by CA RICH directly to Ecotest laboratories, Inc. (NYSDOH ID# 10320) in Babylon, NY.

4.0 SAMPLING AND ANALYSIS

4.1 Soil

As described in the Remedial Investigation Work Plan, soil sample locations were limited to the AOC identified in the previous investigations conducted by NCDH and included:

- the metal shavings drum storage area located in the rear parking lot and the adjacent LIRR embankment;
- an area approximately 100 feet east of the drum storage area and the adjacent LIRR embankment;
- two (2) storm drains; and
- an interior floor drain located in the western portion of the plant.

All sample locations are illustrated on Plate 2. Two additional abandoned floor drains exist in the eastern portion of the plant as described in our Work Plan. A geophysical survey performed to determine the plumbing of these two former drains revealed that they discharged to the driveway along the eastern side of the building. A copy of the survey is attached to this Report as Appendix B. The nearest storm drain down hill of these drains was included as a sampling location to determine if past discharges from these drains impacted the underlying soils.

The soil samples collected during this investigation were analyzed to identify the following groups of contaminants using the test methods listed below.

Contaminants	Test Method
Halogenated VOCs	EPA Method 8010
Aromatic VOCs	EPA Method 8020
Semivolatile Organic Compounds, PAHs	EPA Method 8270
RCRA Metals (eight)	EPA Methods, 6000 and 7000 series

Analytical results for the compounds detected using these test methods are summarized on Tables 1 through 3. A copy of the laboratory report sheets are included in Appendix C of this Report. Analytical results were compared to the New York State Department of Environmental Conservation (NYSDEC) TAGM (Ref. 4) for the purposes of identifying and delineating areas of contamination. NYSDEC TAGM soil clean-up objectives are also shown on the summary Tables.

4.1.1 Metal Shavings Drum Storage Area

A total of nine (9) soil borings, designated with the prefix B followed by the sequence in which the sample was collected, were advanced in this drum storage area (Plate 2). As illustrated on Figure 3, "oily" soil was observed in the upper 2 to 4 feet of borings B-1, 7, 8 and 13. Copies of the boring logs for this investigation are attached as Appendix F.

Chemical analysis of soil samples collected from borings B-1 and B-7 indicate levels of perchloroethene (PCE, a.k.a. tetrachloroethene) which exceed NYSDEC TAGM soil clean-up objectives. The highest concentrations of PCE were reported at a depth of 16 to 20 feet below grade and were observed in B-1 and B-7 at concentrations of 13,000 ppb and 22,000 ppb, respectively. The NYSDEC TAGM soil clean-up objective for PCE in soil is 1,400 ppb. Cadmium was detected in B-1 at 8-12 feet at a concentration of 2.9 ppm, which is above the current NYSDEC TAGM soil clean-up objective of 1.0 ppm, but corresponds with the Site background level established in sample T-8 of 2.9 ppm.

Chemical analysis of the soil collected from B-13 at a depth of 12 to 16 feet bls indicated the presence of chromium at 19 ppm, which is above NYSDEC TAGM soil clean-up objective of 10 ppm but below the Site background level established in sample T-1 of 22 ppm. Chemical analysis of the remaining soil boring samples collected in this area of the Site did not indicate levels of VOCs, metals or PAHs which exceed current NYSDEC TAGM soil clean-up objectives.

4.1.2 100 Feet East of the Drum Storage Area

A total of six (6) soil borings, designated with the prefix B followed by the sequence in which the sample was collected, were advanced approximately 100 feet east of the drum storage area (Plate 2). As illustrated on Figure 3, "oily" soil was observed in the upper 2 to 4 feet of borings B-2.

Chemical analysis of the soil collected from B-2 indicated levels of 1,1-Dichloroethane (1,1-DCA) and PCE exceed NYSDEC TAGM soil clean-up objectives. Reported concentrations 1,1-DCA (380 ppb) and PCE (1800 ppb) were observed in B-2 at a depth of 0 to 4 feet bls. The NYSDEC TAGM soil clean-up objective for 1,1-DCA and PCE in soil is 200 ppb and 1,400 ppb, respectively. The soil sample collected from B-2 at a depth of 8 to 12 feet bls revealed trace levels of PCE (38 ppb) and no reportable detections of 1,1-DCA.

Cadmium was detected in B-2 at 0-4 feet at a concentration of 1.8 ppm, which is above the current NYSDEC TAGM soil clean-up objective of 1.0 ppm, but below the Site background level established in T-8 of 2.9 ppm. Cadmium was also detected in B-4 at 8-12 feet at a concentration of 2.0 ppm. Chromium was detected in B-2 (0-4') at a concentration of 200 ppm, which exceeds the current NYSDEC TAGM soil clean-up objective for chromium of 10 ppm and the Site background level of 22 ppm. Chemical analysis of the remaining soil boring samples collected in this area of the Site did not indicate levels of VOCs, metals or PAHs which exceed current NYSDEC TAGM soil clean-up objectives.

4.1.3 Embankment between LIRR Tracks and the Site

A total of eight (8) shallow soil samples, designated T-1 through T-8, were collected from the embankment between the Site property boundary and the LIRR tracks. Soil samples collected from locations T-1 and T-8 have established background levels for many of the contaminants constituents of concern.

As illustrated on Plate 2, portions of the surficial soil on the slope are stained with petroleum. Soil sample T-2 indicated the detections of 1,1,1-Trichloroethane (1,1,1-TCA) at 1,400 ppb, which is above current NYSDEC TAGM soil clean-up objective of 800 ppb and . Soil samples T-2 and T-7 indicated the detection chromium at 32 ppm and 45 ppm, respectively. The Site background level for chromium as established in sample T-1 is 22 ppm. Soil samples T-5 and T-6 exhibited levels of: 1,1,1-TCA; Trichloroethylene (TCE); and PCE which exceed current NYSDEC TAGM soil clean-up objectives. Soil sample T-5 also observed a level of 1,1-DCA which exceeds the current NYSDEC TAGM soil clean-up objective. Cadmium and chromium were also detected above current NYSDEC TAGM soil clean-up objectives in soil samples T-5 and T-6.

4.1.4 Storm Drains

Sediments from two (2) parking lot storm drains, designated SD-01 and SD-02 (Figure 2), were sampled and analyzed for VOCs, PAHs, RCRA metals. Analytical results are summarized on Table 3.

Chemical analysis of the upper sediments within SD-01 collected from 12 to 13 feet indicated the detection of 1,1,1-TCA, chromium and several PAHs above current NYSDEC TAGM soil clean-up objectives. Chemical analysis of the sediment within SD-01, collected from 18 to 20 feet, indicated no detections of any compounds or constituents above current NYSDEC TAGM soil clean-up objectives.

Chemical analysis of the sediment within SD-02, collected from 3 to 4 feet, indicated no detections of any compounds or constituents above current NYSDEC TAGM soil clean-up objectives.

4.1.5 Interior Floor Drain

Sediments from the interior floor drain, designated FD-01, were sampled and analyzed for VOCs, PAHs, RCRA metals. Analytical results are summarized on Table 3.

Chemical analysis of the upper sediments within FD-01, collected from 4 to 5 feet, indicated the detections of 1,1-DCA and 1,1,1-TCA, cadmium, chromium, lead, mercury, and silver above current NYSDEC TAGM soil clean-up objectives. Chemical analysis of the sediment within SD-01, collected from 8 to 12 feet, indicated no detections of any constituents above current NYSDEC TAGM soil clean-up objectives.

4.2 Groundwater

As described in the Work Plan, groundwater samples were collected using the Geoprobe® groundwater sampling system from two areas. These areas include:

- the metal shavings drum storage area located in the rear parking lot; and
- the area approximately 100 feet east of this drum storage area

Collection of groundwater from one upgradient geoprobe point designated as GW-1 was attempted, however, the geoprobe rods encountered obstructions at several locations prior to reaching the water table. Data from 3 nearby upgradient NCDPW monitoring wells were obtained to supplement this upgradient point. A copy of our correspondence from NCDPW is attached to this Report as Appendix D.

The groundwater samples collected during this investigation were analyzed to identify the following groups of contaminants using the test methods listed below. Groundwater samples collected for metals analysis were field filtered to remove turbidity.

Contaminants	Test Method
Halogenated VOCs	EPA Method 8010
Aromatic VOCs	EPA Method 8020
RCRA Metals (eight)	EPA Methods, 6000 and 7000 series

Analytical results are summarized on Table 4. Analytical results were compared to the NYSDEC TOGS (Ref. 5). NYSDEC TOGS are also shown on summary Table 4.

Chemical analysis of the groundwater sample, designated GW-2, collected in the metal shavings drum storage area and in the vicinity of boring B-1 indicated the detection of PCE at 6 ppb, which is slightly above the current NYSDEC drinking water standard of 5 ppb. Detections of 1,2-DCA and 1,1,1-TCA were reported at the current NYSDEC drinking water standard of 5 ppb. Chemical analysis of GW-2 for metals did not indicated any detections above current NYSDEC drinking water standards.

Chemical analysis of groundwater sample, designated GW-3, collected in the vicinity of boring B-2 indicated no detections of VOCs or metals above current NYSDEC drinking water standards.

Chemical analysis provided by the NCDPW for three upgradient wells identified as N-8269, N-9940 and N-9941 indicate detections of PCE and 1,1,1-TCA. Groundwater sampling data for these three wells between 1986 and 1995 indicate detections of PCE ranging from 0.4 to 5.0 ppb, and 1,1,1-TCA ranging from 0.5 to 5.90 ppb.

This data confirms that these contaminants have historically been present in the upgradient groundwater flowing on to and under the Site. A complete copy of our correspondence with the NCDPW is included in Appendix D.

5.0 NATURE AND EXTENT OF CONTAMINATION

Based upon the results of this Remedial Investigation, the nature and extent of contamination at the Site has been defined both vertically and horizontally within each AOC.

5.1 Soil

5.1.1 Boring Locations (B-1 through B-14)

Drum Storage area

- Based upon analytical data collected by CA RICH and the NCDH, field observations and HNU readings an estimated 650 square-foot area of soil in the drum storage area may contain oily soil. The average depth of this oily soil is estimated to be 2 feet below grade. This translates to an estimated 48 cubic yards of potentially oily soil. Soil volume calculations are presented in Appendix E.

- The halogenated VOC PCE was detected at levels exceeding NYSDEC TAGM guidelines in the soils of the drum storage area to a depth of 20 feet below grade. The VOCs 1,1,1-TCA and 1,1-DCA were also detected in the drum storage area, however, these detections did not exceed NYSDEC TAGM guidelines.

- A soil sample collected from 29 to 31 feet below grade in this area revealed no detections above TAGM guidelines.

- No aromatic VOCs or SVOCs were detected in the deeper samples (greater than 4 feet below grade) collected for analysis in the drum storage area. Field observations indicate, however, that oily soils exist at depths of to 2-4 feet below grade.

- There were no detections of the eight RCRA metals above NYSDEC TAGM guidelines in the deeper samples from the drum storage area.

Area East of Drum Storage Area

- Based upon analytical data collected by CA RICH and the NCDH, field observations and HNU readings an estimated 100 square-foot area of soil in the area east of the drum storage area may contain oily soil. The average depth of oily soil is estimated to be 2 feet below grade. This translates to an estimated 7.5 cubic yards of potentially oil soil.

- The halogenated VOCs 1,1-DCA and PCE were detected in the soils east of the drum storage area at levels exceeding NYSDEC TAGM guidelines down to a depth of 4 feet below grade.

- The aromatic VOC toluene was detected in the 0 to 4 foot deep sample from boring B-2 at a concentration of 67 ppb. The NYSDEC TAGM guideline for toluene is 1,500 ppb.

- The analysis of soil collected from 8 to 12 feet below grade revealed no detections of VOCs above the TAGM guidelines.

- No SVOCs were detected in the samples collected for analysis in the area east of the drum storage area. Field observations indicate, however, that oily soils exist at depths of to 2-4 feet below grade.

- Chromium was detected in the 0 to 4 feet sample from boring B-2 at 200 ppb, which exceeds the NYSDEC TAGM for chromium of 10.0 or site background. Levels of chromium dropped to 6 ppb in the sample collected form 8-12 feet in this boring. There were no detections of the remaining seven RCRA metals above NYSDEC TAGM guidelines in the area east of the drum storage area.

5.1.2 Shallow Soil Samples (T-1 through T-8)

- Based upon analytical data collected by CA RICH and the NCDH, field observations and HNU readings an estimated 882 square-foot area along the LIRR embankment may contain oily soil. An average depth estimate of the oily soil along the embankment is 2 feet below grade. This translates to an estimated 65 cubic yards of potentially oily soil.

- The halogenated VOCs 1,1-DCA, 1,1,1-TCA TCE and PCE were detected at levels exceeding NYSDEC TAGM guidelines in the stained soils along the LIRR. The VOCs 1,1-DCE, 1,2-DCA, chloroform and chlorodibromomethane were also detected along the LIRR. However, these detections did not exceed NYSDEC TAGM guidelines. Samples collected from T-2, T-5, and T-6 indicated the highest concentrations of VOCs in this area.

- The aromatic VOCs toluene, ethylbenzene and total xylenes were detected in samples collected from along the LIRR. None of these compounds were detected above NYSDEC TAGM guidelines.

- Chromium was detected above NYSDEC TAGM guidelines in samples T-2, T-5 and T-7. Cadmium was detected above NYSDEC TAGM guidelines in samples T-5 and T-6.

5.1.3 Storm Drains

SD-01

- The bottom of the Storm Drain SD-01 is 12 feet below grade.

- Based upon analytical data collected by CA RICH and the NCDH, field observations and HNU readings an estimated 9 cubic yards of potentially contaminated soil exists at the bottom of this drain.

- The halogenated VOC 1,1,1-TCA was detected at a level exceeding NYSDEC TAGM guidelines in the sample from 12-13 feet. However, 1,1,1-TCA was not detected in the sample from 18-20 feet.

- No aromatic VOCs were detected in samples collected from SD-01.

- Seven SVOCs were detected at levels exceeding NYSDEC TAGM guidelines in the sample from 12-13 feet. However, all of these detections dropped below NYSDEC TAGM guidelines in the sample from 18-20 feet.

- Chromium was detected in the 12-13 foot sample at 66 ppb, which exceeds the site background level of 22 ppb. Levels of chromium decreased to 9 ppb in the sample from 18-20 feet. There were no detections of the remaining seven RCRA metals above NYSDEC TAGM guidelines in the area east of the drum storage area.

SD-02

- No Halogenated VOCs were detected in sample SD-02

- No aromatic VOCs were detected in samples collected from SD-02.

- There were no detections of the eight RCRA metals above NYSDEC TAGM guidelines in the sample from storm drain SD-02.

5.1.4 Interior Floor Drain

- Based upon analytical data collected by CA RICH and the NCDH, field observations and HNU readings an estimated 2 cubic yards of potentially contaminated soil exist at the bottom of this drain.

- The halogenated VOCs 1,1-DCA and 1,1,1-TCA were detected at levels exceeding NYSDEC TAGM guidelines in the sample from 4-5 feet below grade. However, there were no detections of VOCs in the sample from 8-12 feet.

- No aromatic VOCs were detected in samples collected from FD-01.

- No SVOCs were detected at levels exceeding NYSDEC TAGM guidelines in samples collected from FD-01.

- Cadmium, chromium, lead, mercury and silver were detected in the sample from 4-5 feet at levels exceeding the NYSDEC TAGM and site background for these metals. There were no detections of the eight RCRA metals above NYSDEC TAGM guidelines or site background in the sample from 8-12 feet.

5.2 Groundwater

GW-2

- The halogenated VOCs 1,2,-DCA, 1,1,1-TCA and PCE were detected in the groundwater sample GW-2. PCE was detected at 6 ppb, 1,2,-DCA and 1,1,1-TCA were both detected at 5 ppb. The NYSDEC TOGS values for each of these contaminants is 5 ppb.

- None of the aromatic VOCs analyzed were detected in the sample GW-2.

- There were no detections of the eight RCRA metals above NYSDEC TOGS values in GW-2.

GW-3

- None of the halogenated VOCs analyzed were detected in the sample GW-3.

- None of the aromatic VOCs analyzed were detected in the sample GW-3.

- There were no detections of the eight RCRA metals above NYSDEC TOGS values in GW-3.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The following conclusions have been developed for this Site based on the information available to date.

6.1.1 Source Areas and Soil Contamination

Four source areas or zones of soil contamination have been identified at this Site. These are:

- the metal shavings drum storage area located in the rear parking lot and the adjacent LIRR embankment;
- an area approximately 100 feet east of the drum storage area and the adjacent LIRR embankment;
- storm drain SD-1; and
- an interior floor drain FD-1.

6.1.2 Groundwater

Two in-situ groundwater samples were collected along the downgradient portion of the property. These samples were analyzed for halogentated VOCs using EPA Method 8010, aromatic VOCs using EPA Method 8020 and for the eight RCRA metals. In addition, groundwater data from 3 upgradient wells sampled by NCDPW was obtained.

Only one of the parameters included in the test methods employed exceeded a regulatory standard. PCE was detected a 6 ppb, 1 ppb above the NYSDEC TOGS of 5 ppb. Historically PCE has been detected in upgradient NCDPW wells at concentrations ranging from 0.4 to 5.0 ppb. This is less than a 1 ppb difference between the PCE concentration in the groundwater underlying the Site relative to the background concentrations of PCE in the vicinity of the Site.

6.2 Recommendations

Considering the current and projected future industrial usage of the site and the industrial nature of the area in which the Site is located, CA RICH recommends that the following Interim Remedial Measures (IRMs) be employed to address the source areas and soil contamination identified at the Site.

6.2.1 Excavation of Shallow Oily Soil

The upper 2 to 4 feet of soil in several of the borings performed during this investigation and on portions of the LIRR right-of-way were observed to be oily. As such, we recommend that this oily soil be excavated, stockpiled at a designated area under plastic sheeting and tested for waste characterization parameters. Based on the results of our field program, we estimate that a volume of approximately 120 cubic yards of shallow oily soil will require excavation.

The end point of the excavation in the drum storage area should be determined based on visual observations. The goal of this effort is to remove only the soil that is "oily" and not amenable to remediation using in-situ technologies. The end point of the excavation in the area east of the drum storage area should be confirmed with soil samples analyzed for volatile organics and RCRA metals. Once all of the oily soil is removed, the excavation should be lined with plastic sheeting and backfilled with clean sand. The fill placed over the embankment should be covered with a layer of gravel to prevent erosion. The fill placed in the parking lot should be covered with either asphalt or concrete. A conceptual post remediation cross section is displayed in Figure 4.

Once the excavation is completed and the waste characterization analysis is performed, the excavated soil should been properly disposed of off-site at a permitted Facility.

6.2.2 Vapor Extraction of Deeper Soil Containing Volatile Organics Compounds

The borings placed in the drum storage area revealed concentrations of VOCs above the NYSDEC clean up objectives at a depth of 20 feet below grade. The analysis of semivolatile organic compounds and metals in the deeper soils, however, do not exceed the clean up objectives. For these deeper zones of contamination (soil greater than 4 feet deep), we recommend the use of a Vapor Extraction System (VES) to treat these soils in place. As presented on Plate 3, we believe that the installation of 4 VES vents placed along the property line will effectively capture and remove the remaining VOCs in the subsurface soils. The vents should be installed at a spacing of 15 to 20 feet between each vent with screened sections from a depth of approximately 5 to 25 feet below grade

The VES vents should be connected to a header line which in-turn is connected to a regenerative blower. The exhaust should be treated on-site using activated carbon. An application for an air discharge permit, procedures for monitoring the vented soil vapor before and after the carbon units and a protocol for determining when the operation of the VES unit can be terminated will be required before installation of the system.

6.2.3 Excavation of Soils from Storm Drain SD-1 and Floor Drain FD-1

Our test results indicate that soil at the bottom of both of the above-mentioned drains are contaminated with VOCs, SVOCs and metals above the clean up objectives. In SD-1, however, the results for samples collected from 18 to 20 feet below grade were below the clean up objectives. Similarly, in floor drain FD-1 the results from the sample from 8 to 12 feet below grade did not exceed the clean up objectives. As such, we recommend that the contaminated soils from these two drains be removed using a vacuum device such as a "Super sucker" or a "Guzzler" and that these soils be stockpiled for off-site disposal in a similar fashion to the oily soil discussed in section 5.2.1. We estimate that a volume of approximately 11 cubic yards of soil from these drains will require off-site disposal.

7.0 REFERENCES

1. CA RICH, *Remedial Investigation Work Plan for A.K. Alan Company, Inc., Mineola, New York*, October 1994

2. USGS, *Hydrologic Framework of Long Island, New York*, D.A. Smolensky et. al:, 1989.

3. NCDPW, Nassau County Water Table Elevation Map, John M. Waltz, P.E:, 1992.

4. NYSDEC Technical and Administrative Guidance Memorandum, *Determination of Soil Cleanup Objectives an Cleanup Levels*; January 24, 1994

5. NYSDEC Technical and Operational Guidance Series, *Ambient Water Quality Standards and Guidance Values* © October 22, 1993.

Users/Eric/AKA-RIR/A.K.Allen@Rem.Report

TABLES

TABLE 1

Summary of Analytical Detections in Soil Boring Samples
A.K. Allen Company, Inc.
255 East Second Street, Mineola, NY

Sample I.D. Depth (ft.) Date	B-1 (8-12) 11/6/95	B-1 (18-20) 11/6/95	B-2 (0-4) 11/6/95	B-2 (8-12) 11/6/95	B-3 (8-12) 11/7/95	B-4 (8-12) 11/7/95	Trip Blank 11/6-7/95	NYSDEC * TAGM	NYSDEC* Eastern USA Background Levels
Volatile Organics (ug/Kg) **(EPA Method 8010/8020)**									
1,1-Dichloroethane	ND	ND	380	ND	ND	ND	ND	200	N/A
1,2-Dichloroethane	ND	ND	39	ND	ND	ND	ND	100	N/A
1,1,1-Trichloroethane	150	370	350	ND	ND	ND	ND	800	N/A
Trichloroethylene	ND	ND	33	ND	ND	ND	ND	700	N/A
Chlorodibromomethane	ND	ND	40	ND	ND	ND	ND	NG	N/A
Tetrachloroethene	9900	13000	1800	38	ND	ND	ND	1,400	N/A
Toluene	ND	ND	67	ND	ND	ND	ND	1,500	N/A
RCRA Metals (mg/Kg)									
Arsenic as As	1.2	1.1	6.4	1	1.5	0.94	NA	7.5 or SB	3-12
Barium as Ba	12	9.2	29	6.1	8.9	9.4	NA	300 or SB	15-600
Cadmium as Cd	2.9	0.17	1.8	<0.010	<0.010	2	NA	1.0 or SB	0.1-1.0
Chromium as Cr	6.8	5.6	200	6	3.6	4.9	NA	10.0 or SB	1.5-40
Lead as Pb	5.6	2.1	23	2.3	3.2	7	NA	200-500 or SB	200-500 **
Mercury as Hg	0.037	0.016	0.16	0.014	0.01	0.008	NA	0.1	0.001-0.2
Selenuim as Se	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	NA	2.0 or SB	0.1-3.9
Silver as Ag	<0.10	<0.10	0.49	<0.1	<0.10	<0.10	NA	SB	NV
Semi-Volatile PAHs (ug/Kg) **(EPA Method 8270)**	ND	ND	ND	ND	NA	ND	NA	N/A	N/A

ug/Kg: micrograms per Kilogram (parts per billion, ppb)
mg/Kg: milligrams per Kilogram (parts per million, ppm)
ND: Not Detected at or above Method Detection Limits
N/A: Not Applicable
NV: No Value established
NA: Not Analyzed
SB: Site Background (see Table 2, T-1 and T-8)

* *NYSDEC Division Technical and Administrative Guidance Memorandum Determination of Soil Cleanup Objectives and Cleanup Levels; 1/24/94*

** *Average background levels in metropolitan and urban areas*

Indicates levels that exceed NYSDEC TAGM Cleanup Objective and Site Background

Prepared by CA RICH CONSULTANTS, INC.

TABLE 1

Summary of Analytical Detections in Soil Boring Samples
A.K. Allen Company, Inc.
255 East Second Street, Mineola, NY

Sample I.D. Depth (ft.) Date	B-5 (8-12) 11/7/95	B-6 (4-8) 11/7/95	B-7 (16-20) 11/7/95	B-8 (8-12) 11/7/95	B-9 (4-8) 11/7/95	B-10 (8-12) 11/7/95	Trip Blank 11/7/95	NYSDEC * TAGM	NYSDEC* Eastern USA Background Levels
Volatile Organics (ug/Kg) **(EPA Method 8010/8020)**									
1,1-Dichloroethane	ND	ND	9	ND	ND	ND	ND	200	N/A
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	100	N/A
1,1,1-Trichloroethane	ND	ND	270	ND	ND	ND	ND	800	N/A
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	700	N/A
Chlorodibromomethane	ND	ND	ND	ND	ND	ND	ND	NG	N/A
Tetrachloroethene	ND	ND	22000	ND	ND	ND	ND	1,400	N/A
Toluene	ND	ND	ND	ND	ND	ND	ND	1,500	N/A
RCRA Metals (mg/Kg)									
Arsenic as As	1.2	1.5	2.2	0.7	1.3	0.82	NA	7.5 or SB	3-12
Barium as Ba	4.1	8.6	7.7	7.9	8.4	11	NA	300 or SB	15-600
Cadmium as Cd	<0.010	0.018	0.34	0.013	<0.010	<0.010	NA	1.0 or SB	0.1-1.0
Chromium as Cr	2.7	8.6	6.0	4.8	3.4	2.5	NA	10.0 or SB	1.5-40
Lead as Pb	1.8	2.4	3.7	2.0	2.2	1.9	NA	200-500 or SB	200-500 **
Mercury as Hg	0.008	<0.005	<0.005	<0.005	0.008	0.005	NA	0.1	0.001-0.2
Selenuim as Se	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	NA	2.0 or SB	0.1-3.9
Silver as Ag	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	NA	SB	NV
Semi-Volatile PAHs (ug/Kg) **(EPA Method 8270)**	NA	ND	ND	NA	ND	NA	NA	N/A	N/A

ug/Kg: micrograms per Kilogram (parts per billion, ppb)
mg/Kg: milligrams per Kilogram (parts per million, ppm)
ND: Not Detected at or above Method Detection Limits
N/A: Not Applicable
NV: No Value established
NA: Not Analyzed
SB: Site Background (see Table 2, T-1 and T-8)

* *NYSDEC Division Technical and Administrative Guidance Memorandum Determination of Soil Cleanup Objectives and Cleanup Levels; 1/24/94*

** *Average background levels in metropolitan and urban areas*

Indicates levels that exceed NYSDEC TAGM Cleanup Objective and Site Background

Prepared by CA RICH CONSULTANTS, INC.

TABLE 1

Summary of Analytical Detections in Soil Boring Samples
A.K. Allen Company, Inc.
255 East Second Street, Mineola, NY

Sample I.D. Depth (ft.) Date	B-11 (8-12) 11/7/95	B-12 (8-12) 11/7/95	B-13 (12-16) 11/7/95	B-14 (29-31) 11/7/95	Trip Blank 11/7/95	NYSDEC * TAGM	NYSDEC* Eastern USA Background Levels
Volatile Organics (ug/Kg) **(EPA Method 8010/8020)**							
1,1-Dichloroethane	ND	ND	29	ND	ND	200	N/A
1,2-Dichloroethane	ND	ND	ND	ND	ND	100	N/A
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	800	N/A
Trichloroethylene	ND	ND	ND	ND	ND	700	N/A
Chlorodibromomethane	ND	ND	ND	ND	ND	NG	N/A
Tetrachloroethene	ND	ND	6	5	ND	1,400	N/A
Toluene	ND	ND	ND	ND	ND	1,500	N/A
RCRA Metals (mg/Kg)							
Arsenic as As	0.66	1.5	1.6	0.7	NA	7.5 or SB	3-12
Barium as Ba	11	7.5	12	7	NA	300 or SB	15-600
Cadmium as Cd	0.028	<0.01	0.05	0.075	NA	1.0 or SB	0.1-1.0
Chromium as Cr	2.0	3.7	19.0	3.1	NA	10.0 or SB	1.5-40
Lead as Pb	2.6	1.6	2.7	1.2	NA	200-500 or SB	200-500 **
Mercury as Hg	0.005	0.008	0.01	0.006	NA	0.1	0.001-0.2
Selenuim as Se	<0.40	<0.40	<0.40	<0.40	NA	2.0 or SB	0.1-3.9
Silver as Ag	<0.10	<0.10	<0.10	<0.10	NA	SB	NV
Semi-Volatile PAHs (ug/Kg) **(EPA Method 8270)**	NA	NA	NA	NA	NA	N/A	N/A

ug/Kg: micrograms per Kilogram (parts per billion, ppb)
mg/Kg: milligrams per Kilogram (parts per million, ppm)
ND: Not Detected at or above Method Detection Limits
N/A: Not Applicable
NV: No Value established
NA: Not Analyzed
SB: Site Background (see Table 2, T-1 and T-8)

* *NYSDEC Division Technical and Administrative Guidance Memorandum Determination of Soil Cleanup Objectives and Cleanup Levels; 1/24/94*

** *Average background levels in metropolitan and urban areas*

Indicates levels that exceed NYSDEC TAGM Cleanup Objective and Site Background

Prepared by CA RICH CONSULTANTS, INC.

TABLE 2

Summary of Analytical Detections in Shallow Soil Samples
A.K. Allen Company, Inc.
255 East Second Street, Mineola, NY

Sample I.D. Depth (ft.) Date	T-1 (0-.25) 11/6/95	T-2 (1-1.5) 11/6/95	T-3 (1-1.5) 11/6/95	T-4 (1-1.5) 11/6/95	T-5 (1-1.5) 11/6/95	T-6 (1-1.5) 11/6/95	T-7 (1-1.5) 11/6/95	T-8 (0-.25) 11/6/95	Trip Blank 11/6/95	NYSDEC * TAGM	NYSDEC* Eastern USA Background Levels
Volatile Organics (ug/Kg) **(EPA Method 8010/8020)**											
1,1-Dichloroethene	ND	6	ND	ND	ND	ND	ND	ND	ND	400	N/A
1,1-Dichloroethane	ND	160	ND	ND	540	130	47	ND	ND	200	N/A
1,2-Dichloroethane	ND	25	ND	ND	ND	11	ND	ND	ND	100	N/A
Chloroform	ND	5	ND	ND	ND	ND	ND	18	ND	300	N/A
1,1,1-Trichloroethane	30	1400	ND	ND	9600	3100	510	140	ND	800	N/A
Trichloroethylene	ND	120	ND	ND	1200	880	100	18	ND	700	N/A
Chlorodibromomethane	ND	130	ND	ND	500	160	15	ND	ND	NG	N/A
Tetrachloroethene	86	260	ND	ND	4200	4300	410	120	ND	1,400	N/A
Toluene	ND	19	ND	ND	390	270	42	160	ND	1,500	N/A
Ethylebenzene	ND	ND	ND	ND	ND	20	ND	180	ND	5,500	N/A
Xylenes (total)	47	35	ND	ND	ND	550	75	790	ND	1,200	N/A
RCRA Metals (mg/Kg)											
Arsenic as As	3.8	3.2	0.88	1.6	7.0	4	3.3	9.1	NA	7.5 or SB	3-12
Barium as Ba	26	21	7.7	12	82	27	19	74	NA	300 or SB	15-600
Cadmium as Cd	0.81	0.5	0.34	0.19	6.4	1.5	0.72	2.9	NA	1.0 or SB	0.1-1.0
Chromium as Cr	22	32	4.1	18	260	11	45	19	NA	10.0 or SB	1.5-40
Lead as Pb	79	20	3.8	24	23	27	33	450	NA	200-500 or SB	200-500 **
Mercury as Hg	0.11	0.041	0.007	0.09	0.14	0.09	0.095	0.26	NA	0.1	0.001-0.2
Selenuim as Se	<0.40	<0.40	<0.40	<0.40	0.48	0.48	<0.40	0.88	NA	2.0 or SB	0.1-3.9
Silver as Ag	<0.10	<0.10	<0.10	<0.10	0.44	<0.10	<0.10	<0.10	NA	SB	NV

ug/Kg: micrograms per Kilogram (parts per billion, ppb)
mg/Kg: milligrams per Kilogram (parts per million, ppm)
ND: Not Detected at or above Method Detection Limits
NG: No Guideline is reported
NV: No Value established
NA: Not Analyzed
SB: Site Background (see Samples T-1 and T-8)

* *NYSDEC Division Technical and Administrative Guidance Memorandum Determination of Soil Cleanup Objectives and Cleanup Levels; 1/24/94*

** *Average background levels in metropolitan and urban areas*

Indicates levels that exceed NYSDEC TAGM Cleanup Objective and Site Background

Prepared by CA RICH CONSULTANTS, INC.

TABLE 3

Summary of Analytical Detections in Storm Drain and Floor Drain Sediment Samples
A.K. Allen Company, Inc.
255 East Second Street, Mineola, NY

Sample I.D. / Depth (ft.) / Date	SD-01 (12-13) 11/6/95	SD-01 (18-20) 11/6/95	SD-02 (3-4) 11/7/95	FD-01 (4-5) 11/7/95	FD-01 (8-12) 11/7/95	Trip Blank 11/6-7/95	NYSDEC * TAGM	NYSDEC* Eastern USA Background Levels
Volatile Organics (ug/Kg) (EPA Method 8010/8020)								
1,1-Dichloroethene	12	ND	ND	140	ND	ND	400	N/A
1,1-Dichloroethane	ND	ND	ND	380	ND	ND	200	N/A
1,1,1-Trichloroethane	5900	ND	ND	34000	ND	ND	800	N/A
Trichloroethylene	ND	ND	ND	ND	ND	ND	700	N/A
Chlorodibromomethane	ND	ND	ND	50	ND	ND	NG	N/A
Tetrachloroethene	50	ND	ND	500	ND	ND	1,400	N/A
Toluene	ND	ND	ND	ND	ND	ND	1,500	N/A
RCRA Metals (mg/Kg)								
Arsenic as As	3	0.78	1.7	4.0	0.42	NA	7.5 or SB	3-12
Barium as Ba	7	7.8	12	180	8.9	NA	300 or SB	15-600
Cadmium as Cd	0.45	0.08	0.61	24	0.04	NA	1.0 or SB	0.1-1.0
Chromium as Cr	66	9.0	11	1300	1.9	NA	10.0 or SB	1.5-40
Lead as Pb	69	3.0	180	990	2.2	NA	200-500 or SB	200-500 ***
Mercury as Hg	0.19	0.013	0.082	2.6	0.021	NA	0.1	0.001-0.2
Selenuim as Se	<0.40	<0.40	<0.40	<0.40	<0.40	NA	2.0 or SB	0.1-3.9
Silver as Ag	<0.10	<0.10	<0.10	35	<0.10	NA	SB	NV
Semi-Volatile PAHs (ug/Kg) (EPA Method 8270)								
Naphthalene	1,000	ND	NA	ND	ND	NA	13,000	N/A
Acenaphthene	4,800	ND	NA	ND	ND	NA	50,000	N/A
Fluorene	5,000	ND	NA	ND	ND	NA	50,000	N/A
Phenanthrene	49,000	99	NA	ND	ND	NA	50,000	N/A
Anthracene	10,000	30	NA	ND	ND	NA	50,000	N/A
Fluoranthene	48,000	140	NA	ND	ND	NA	50,000	N/A
Pyrene	50,000	110	NA	300	ND	NA	50,000	N/A
Benzo(a)anthracene	19,000	47	NA	ND	ND	NA	224 or MDL	N/A
Chrysene	18,000	53	NA	ND	ND	NA	400	N/A
Benzo(b)fluoranthrene **	15,000	43.5	NA	ND	ND	NA	1,100	N/A
Benzo(k)fluoranthrene **	15,000	43.5	NA	ND	ND	NA	1,100	N/A
Benzo(a)pyrene	17,000	44	NA	ND	ND	NA	61 or MDL	N/A
Dibenzo(a,h)anthracene	2,200	ND	NA	ND	ND	NA	14 or MDL	N/A
Indeno(1,2,3-cd)pyrene	5,900	30	NA	ND	ND	NA	3,200	N/A
Benzo(g,h,i)perylene	5,800	30	NA	ND	ND	NA	50,000	N/A

ug/Kg: micrograms per Kilogram (parts per billion, ppb)
mg/Kg: milligrams per Kilogram (parts per million, ppm)
ND: Not Detected at or above Method Detection Limits
N/A: Not Applicable
NV: No Value established
NA: Not Analyzed
SB: Site Background (see Table 2, T-1 and T-8)

* *NYSDEC Division Technical and Administrative Guidance Memorandum Determination of Soil Cleanup Objectives and Cleanup Levels; 1/24/94*
** *Unable to separate isomers, reported concentrations is half the total*
*** *Average background levels in metropolitan and urban areas*
Indicates levels that exceed NYSDEC TAGM Cleanup Objective and Site Background

MDL: Method detection Limit = 300 ug/Kg

Prepared by CA RICH CONSULTANTS, INC.

TABLE 4

Summary of Analytical Detections in Groundwater Samples
A.K. Allen Company, Inc.
255 East Second Street, Mineola, NY

Sample I.D. Date	GW-2 11/6/95	GW-3 11/6/95	Trip Blank 11/6/95	NYSDEC * TOGS
Volatile Organics (ug/L) **(EPA Method 601/602)**				
1,2-Dichloroethane	5	ND	ND	5
1,1,1-Trichloroethane	5	ND	ND	5
Tetrachloroethene	6	ND	ND	5
RCRA Metals Dissolved (mg/L)				
Arsenic as As	0.006	0.002	NA	25
Barium as Ba	0.22	0.1	NA	1,000
Cadmium as Cd	<0.001	<0.001	NA	10
Chromium as Cr	<0.02	<0.02	NA	50
Lead as Pb	<0.005	<0.005	NA	25
Mercury as Hg	<0.00025	<0.00025	NA	2
Selenuim as Se	<0.002	<0.002	NA	10
Silver as Ag	<0.01	<0.01	NA	50

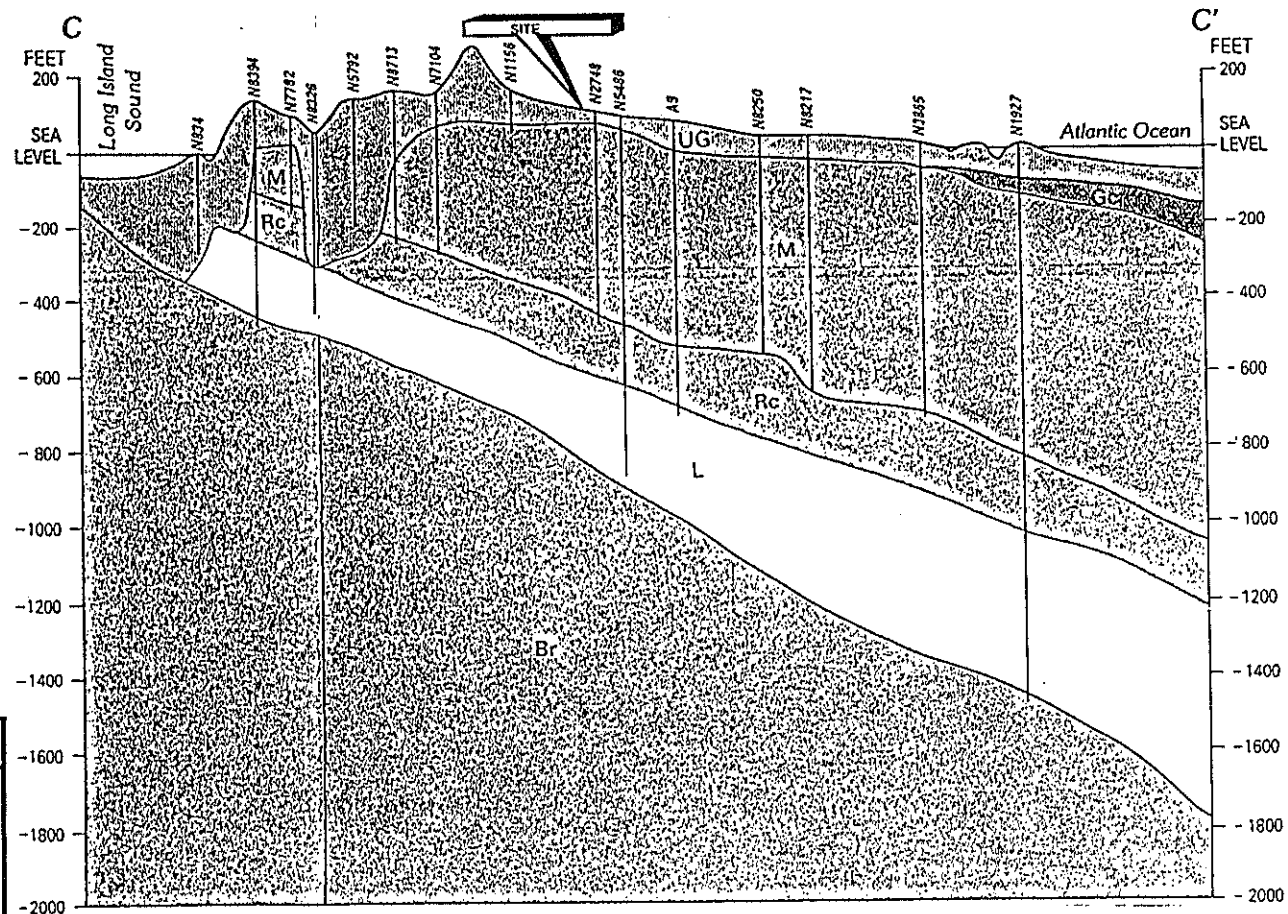
ug/L: micrograms per Liter (parts per billion, ppb)
mg/L: milligrams per Liter (parts per million, ppm)
ND: Not Detected at or above Method Detection Limits
NA: Not Analyzed

* *NYSDEC Division of Water Technical and Operational Guidance Series, Ambient Water Quality Standards and Guidance Values, 10/22/93*

Indicates levels that exceed NYSDEC TOGS

Prepared by CA RICH CONSULTANTS, INC.

FIGURES



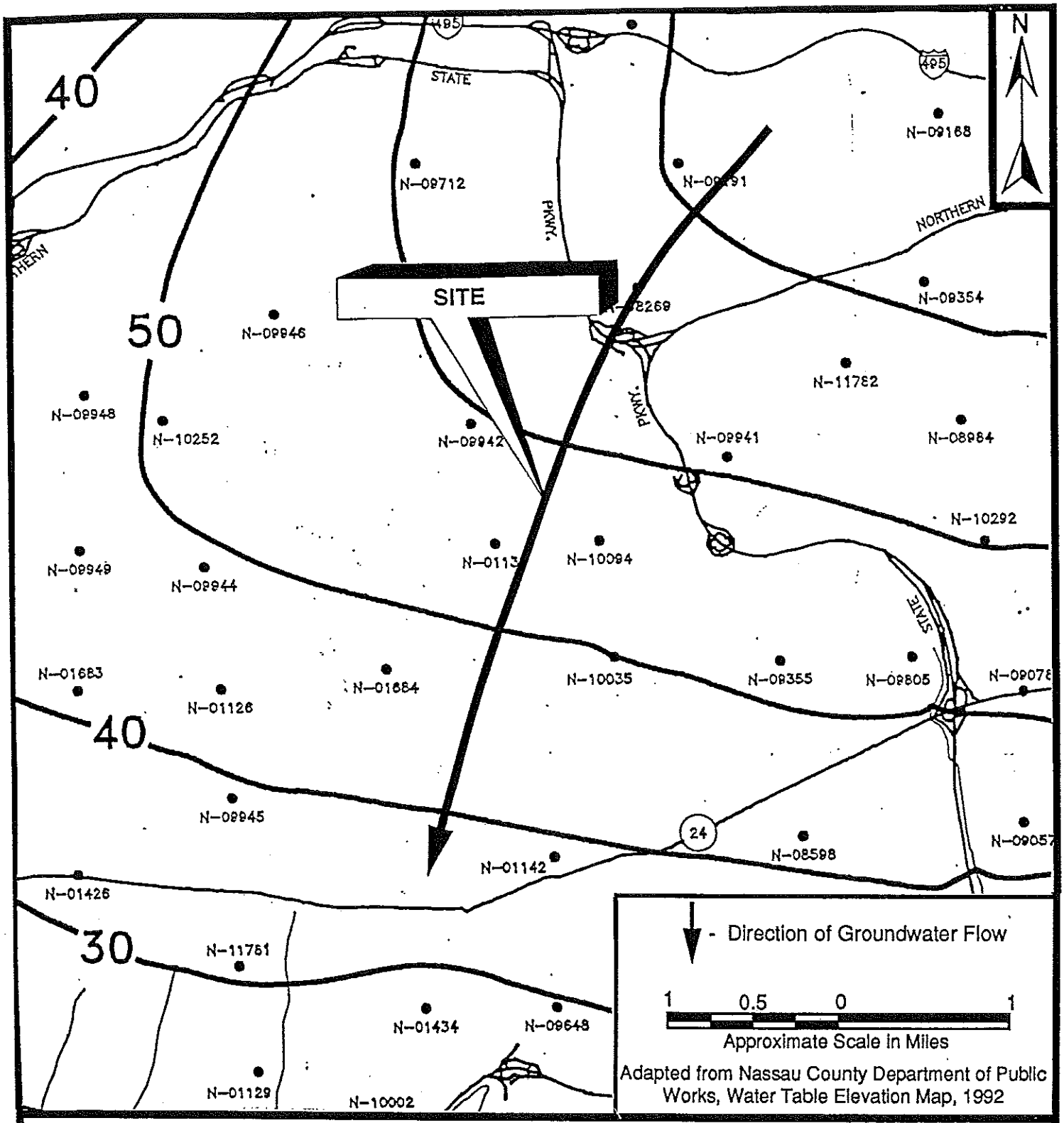
KEY

UG - Upper Glacial Aquifer
M - Magothy Aquifer
Rc - Raritan Confining Unit
L - Loyd Aquifer
Br - Bedrock

Adapted from Hydrologic Framework of Long Island, New York, D. A. Smolensky et. al., 1989

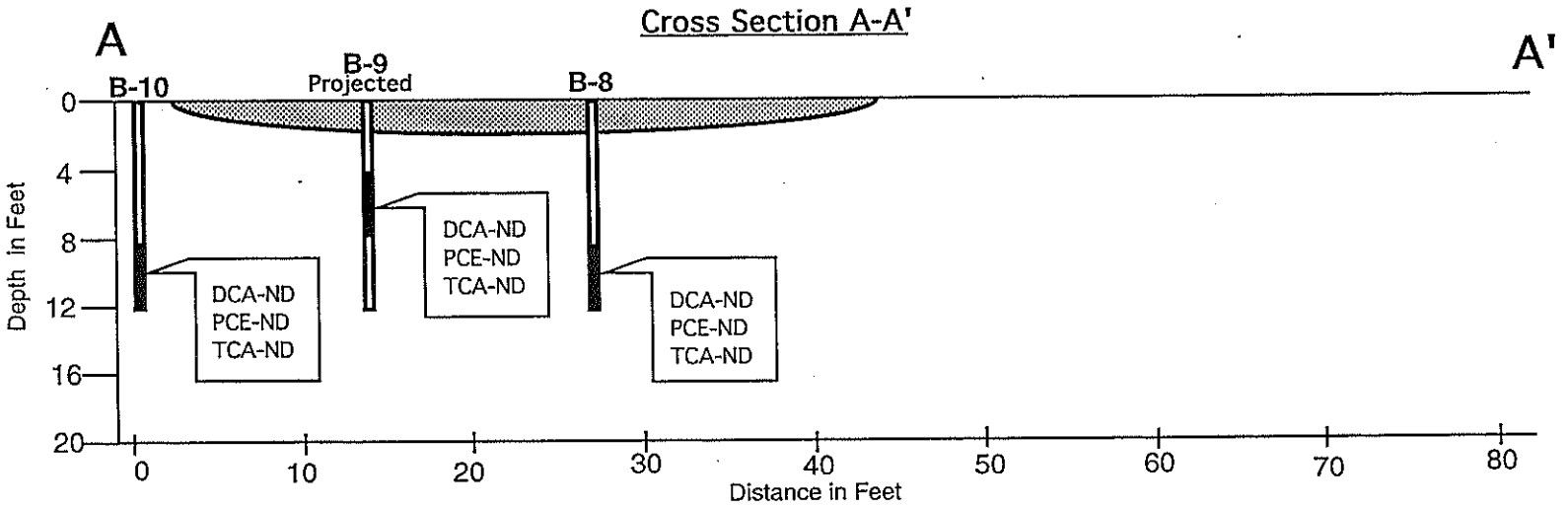
Geologic Cross Section Intersecting the Area of the Site

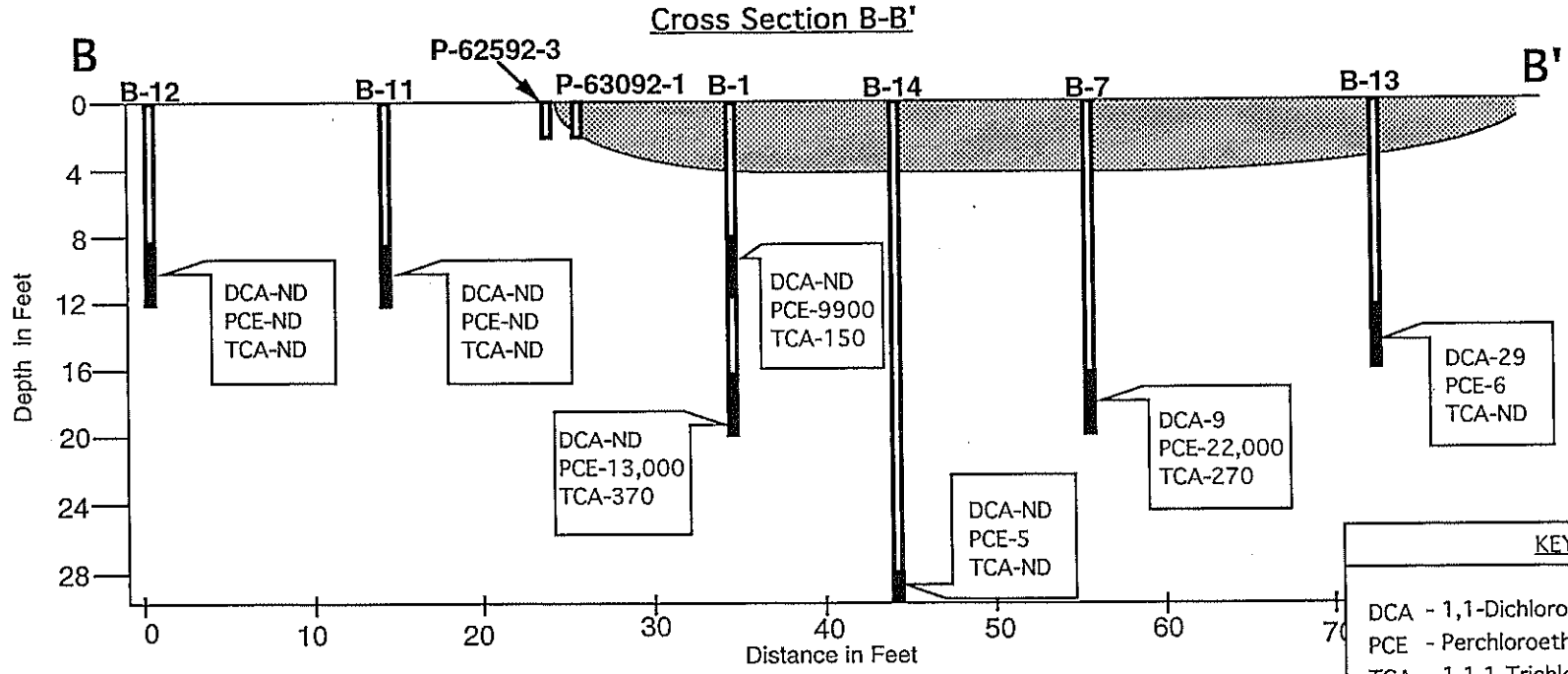
CA RICH CONSULTANTS, INC. **Certified Ground-Water and Environmental Specialists**	**A.K. Allen Corporation** **255 East 2nd Street** **Mineola, New York**	
404 Glen Cove Avenue, Sea Cliff, N.Y. 11579	**Prepared By:** NBG	**Date:** December 1994
	Reviewed By: EAW	**Figure:** 1



Water Table Contour Map

CA RICH CONSULTANTS, INC. Certified Ground-Water and Environmental Specialists	A.K. Allen Corporation 255 East 2nd Street Mineola, New York
404 Glen Cove Avenue, Sea Cliff, N.Y. 11579	Prepared By: NBG Date: December 1995
	Reviewed By: EAW Figure: 2





KEY

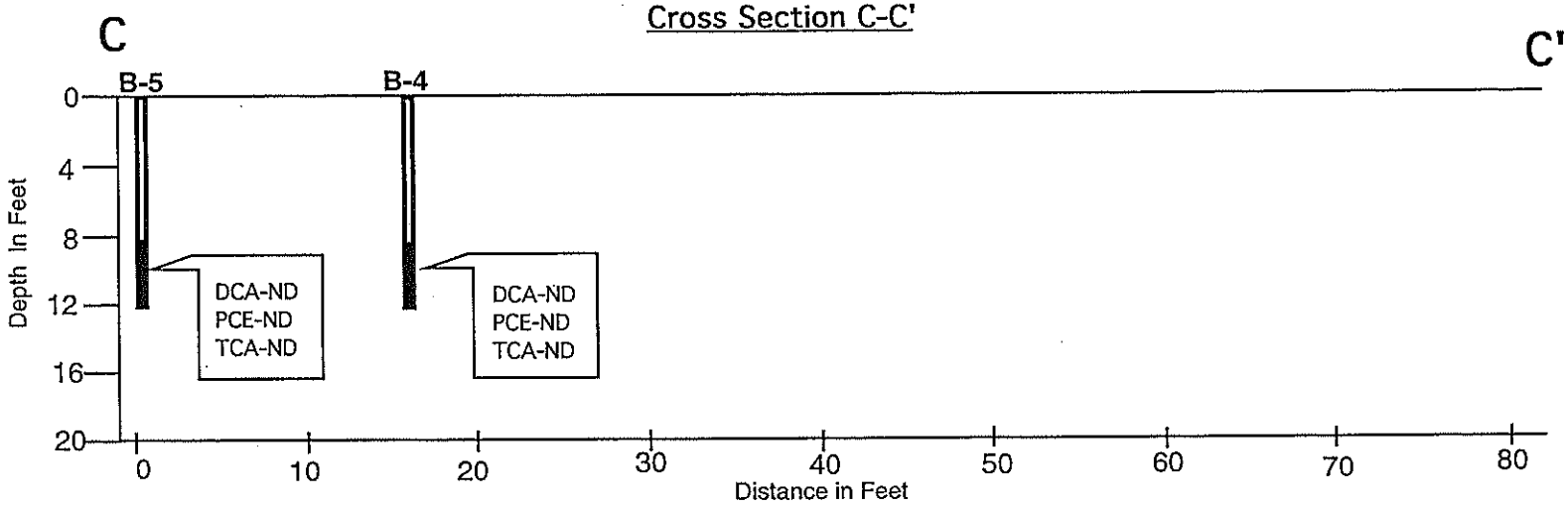
DCA - 1,1-Dichloroethane
PCE - Perchloroethene
TCA - 1,1,1-Trichloroethane
▌ - Indicates Sample Interval
▒ - Estimated zone of oily soil

NOTE: All concentrations reported in micrograms per kilogram (ug/Kg)

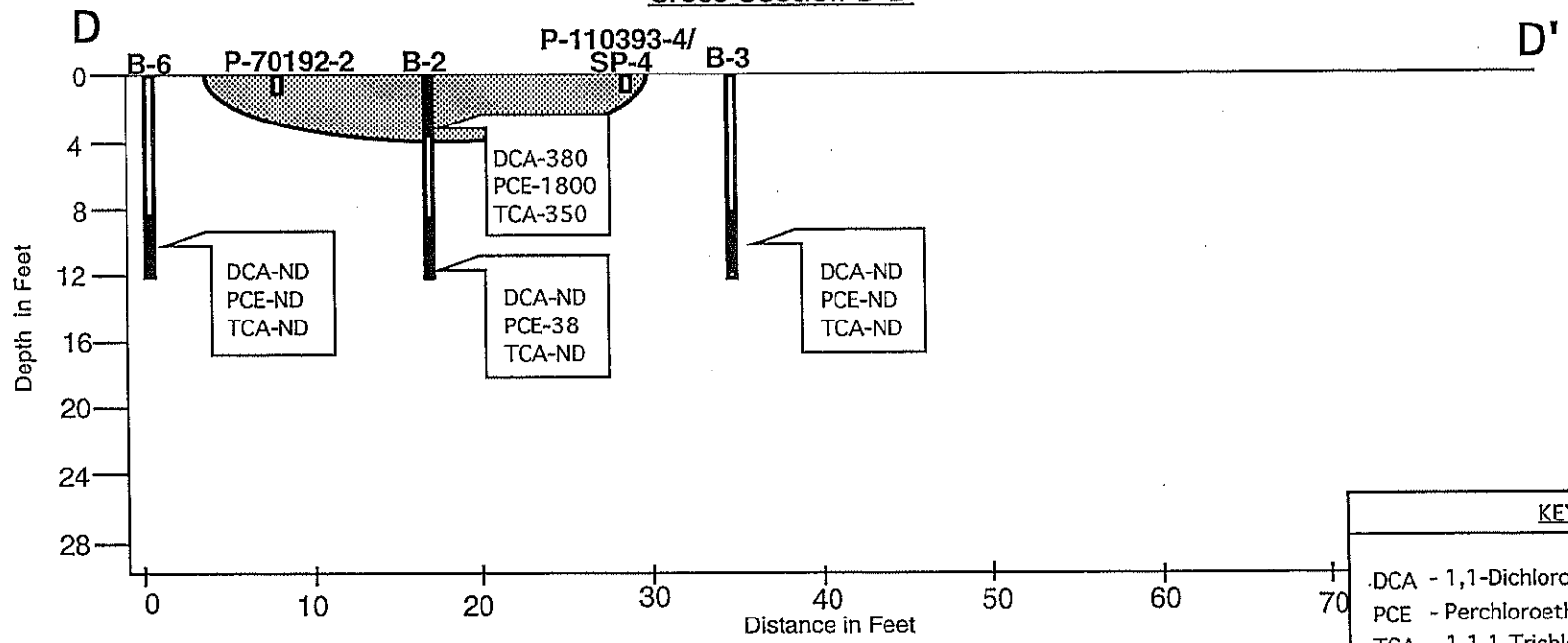
Fig. 3-Cross Sections Showing Concentrations of Contaminants of Concern
&
Estimated Zones of Oily Soil

Prepared by CA RICH CONSULTANTS, INC.

Cross Section C-C'



Cross Section D-D'



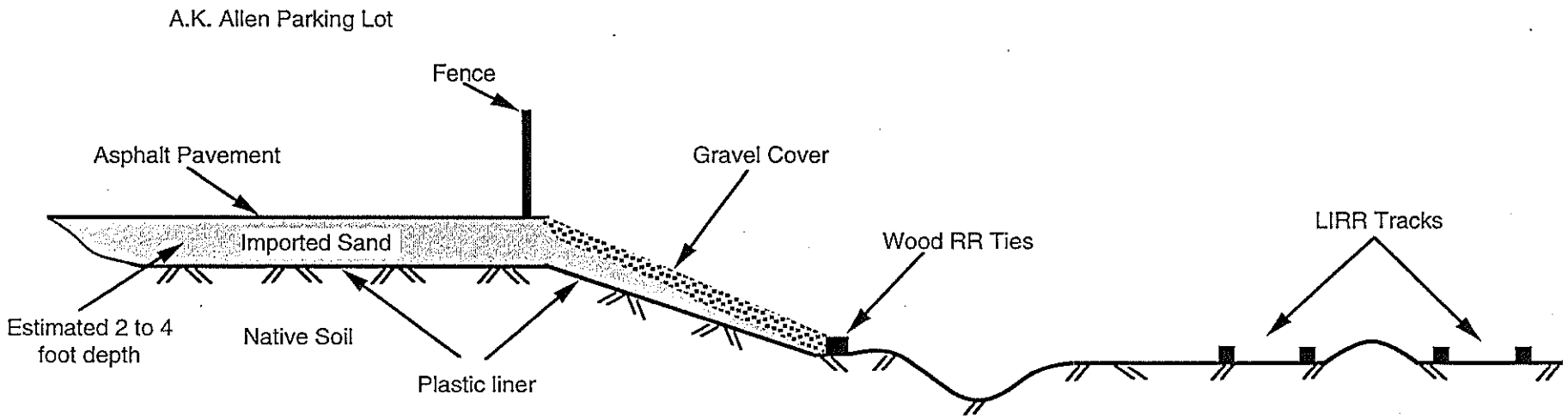
KEY

DCA - 1,1-Dichloroethane
PCE - Perchloroethene
TCA - 1,1,1-Trichloroethane
I - Indicates Sample Interval
- Estimated zone of oily soil

NOTE: All concentrations reported in micrograms per kilogram (ug/Kg)

Fig. 3-Cross Sections Showing Concentrations of Contaminants of Concern
&
Estimated Zones of Oily Soil

Prepared by CA RICH CONSULTANTS, INC.



Not to Scale

Conceptual Post Remediation Cross Section

CA RICH CONSULTANTS, INC.

Certified Ground-Water and Environmental Specialists

404 Glen Cove Avenue, Sea Cliff, N.Y. 11579

A.K. Allen Corporation
255 East 2nd Street
Mineola, New York

Prepared By:	**NBG**	**Date:**	**January 1996**
Reviewed By:	**EAW**	**Figure:**	**4**

Drawing I.D: USERS/NANCY/PROJECTS/ACTIVE/AK ALLEN/Post Remed. x-sec