# 2350 Fifth Avenue

## Site #2-31-004

**MANHATTAN, NEW YORK**

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## Remedial Investigation Work Plan

## Part 1 - Background Data

**AKRF Project Number: 08010**

**Prepared for:**

2350 Fifth Avenue Corporation
309 East 94th Street, Ground Floor
New York, NY 10128


**Prepared by:**

AKRF

**AKRF, Inc.**
440 Park Avenue South
New York, NY 10016
212-696-0670


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# 1.0 SITE DESCRIPTION AND HISTORY

## 1.1 Site Description

The site is located in the Harlem section of Manhattan. It is bounded by Fifth Avenue on the east, West 141$^{st}$ Street on the south, a garage and paved parking area on the west, and West 142$^{nd}$ Street on the north. (See Figure 1 for the project site location.) The western boundary of the site is about 50 feet east of Chisum Place. The site extends about 200 feet north-south and about 345 feet east-west. The Harlem River is 100 to 200 feet to the east of the site.

The site is occupied by a building comprising three connected sections: a two-story section along Fifth Avenue, a three-story section in the center of the site, and a one-story section to the west. There are high-rise residential buildings on the blocks to the west, south, and southeast of the site. The Harlem River Drive is to the northeast, and a National Guard Armory occupies the block to the north, between West 142$^{nd}$ and West 143$^{rd}$ Streets.

## 1.2 Site History

The site and most of the surrounding area was vacant in 1893. (See Historical Sanborn Maps, Appendix A.) The site was still mostly vacant in 1909, with only a stone yard on West 142$^{nd}$ Street. Much of the surrounding area was occupied by contractor's yards and stables at that time.

The existing building was originally constructed as an ice cream factory by the Bordens Ice Cream Company. The three-story section was built in 1923; the two-story section was built in 1932; and the one-story section was built in 1950. The floor slab at the western end of the building (in the one-story section built in 1950) was constructed with various layers of insulating materials related to the original use of the building as a refrigerated ice cream plant. At the westernmost section of the building, there was most typically a layer of tarpaper directly under the slab, with a thin (two inches or less) layer of cork underneath. Under the cork was a layer of Styrofoam eight to ten inches thick. Under the Styrofoam was a layer of fill, more tarpaper, and another concrete slab about four inches thick. There was fill beneath this slab, and at some locations brick and/or other concrete slabs were encountered within the fill. These were probably remains of earlier structures. An area just east of the section with the cork/Styrofoam insulation had a thicker layer of cork four to ten inches thick under the slab, but no Styrofoam.

Following its use as an ice cream factory, the building was occupied by a commercial laundry from 1970 to 1994. The laundry operated under a variety of names including Budge-Wood Service, Bluebird Laundry, and Swiss-American Laundry. The facility included a dry cleaning operation utilizing tetrachloroethene (PCE) as a cleaning solvent. The dry cleaning operation was located near the northern side of the one-story portion of the building, just west of the West 142$^{nd}$ Street loading dock. PCE was stored in the same area. The operations initially used first-generation machines with separate washers and dryers. Around 1984, these were replaced by second-generation machines, which were single units that perform all of the washing, extraction, and drying operations. It was likely that most of the on-site leaks and spills of PCE were associated with the use of the first generation machines, which involved more handling of PCE than the later machines. The facility had an U.S. Environmental Protection Agency (EPA) ID number as a generator of hazardous waste (NYD071026173).

There is one closed-in-place underground fuel oil tank on the site, located under the West 142$^{nd}$ Street loading dock, immediately to the east of the former dry cleaning area. The only below-grade space in the building is the former boiler room for the laundry operation, located on the north side of the three-story section of the building, just west of the fire exit opening onto West 142$^{nd}$ Street. This area was originally a loading dock that was excavated to create a boiler room when the building became a laundry. In the remainder of the building, the floors are about four feet higher than street grade.

In 1995-1996, most of the ground floor of the building, with the exception of the far western portion, was renovated for use as a New York City public school. This portion of the building was occupied as a school for a period in the fall of 1997 and was later used by a church for services, offices, and classes. The church left the building in December 2004. The remainder of the building was renovated in 2001 for use as a self storage facility. An office was constructed next to the West 141st Street loading docks and storage units were constructed in the western portion of the ground floor and on the second and third floors. In February 2006, the self storage facility expanded into the former school portion of the building. However, the self storage facility is currently not using this space. See Figure 2 for the current site plan. Figure 2 also shows the presumed locations of the foundation walls of the three original structures that comprise the building. No foundation plans for the buildings could be obtained.

The surrounding area was mostly occupied by garages, auto repair shops, and light manufacturing in the 1930's through the 1950's, with the exception of the block directly north of the site, where the Fifth Avenue Armory was constructed between 1921 and 1933. The Delano Village residential development, which occupies the area to the south and east of the site, was constructed in 1957-1959. At that time, a portion of West 141st Street was closed and demapped, and a new street, Chisum Place, was constructed just west of the site.

Facilities in the immediate vicinity of the site that have been generators of hazardous waste include the armory (Facility ID NY0000452995) which generated 110 gallons of spent halogenated solvents used in degreasing (F001 waste) in 1994; D. Shultz Co. located at 44 West 143rd Street, directly west of the armory (Facility ID NYD980779524) which generated 165 gallons of spent halogenated solvents in 1986; and KLP Inc. at 588 Lenox Avenue at 140th Street (Facility ID NYD981481484) which generated 1,335 pounds of spent halogenated solvents in 1996.

# 2.0 PRIOR STUDIES

Prior investigations included the collection of core samples, and soil, groundwater, and soil gas samples at the site and at off-site locations. The core sampling locations are shown on Figure 3. The locations of soil, groundwater, and soil gas sampling performed as part of the Preliminary Site Assessment (PSA), Remedial Investigation (RI) Phase I, and Supplemental RI are depicted on Figure 4. The scope and methodology of previous investigations are summarized below and the results are discussed in Section 5.0 "Soil Contamination", Section 6.0 "Groundwater", Section 7.0 "Soil Gas", and Section 8.0 "Indoor Air.

## 2.1 Initial Investigations

The first studies in the building were performed in October 1996 by Roy F. Weston, Inc. on behalf of the New York City School Construction Authority (SCA). Indoor air samples were collected using Summa canisters at various locations within the renovated portion of the first floor of the building. The air samples were analyzed for volatile organic compounds (VOCs) by method TO-14. An initial round of air sampling found levels of PCE ranging from 17 to 71 parts per billion (ppb). Weston attempted to remove the PCE by "baking" the building – raising the temperature to 85 ºF for 48 hours and then ventilating the building for 48 hours. This reduced the PCE levels to 1.8 to 19 ppb. However, after eight days the levels had rebounded and ranged from 17 to 210 ppb.

The building owner retained Riverpoint, Inc. to investigate the source of the PCE vapors. Riverpoint performed air testing activities from December 1996 through February 1997. Their results are reported in a "Preliminary Report on Perchloroethene" dated February 23, 1997. Riverpoint first performed air sampling within the building using the same procedure as Weston. This showed ambient concentrations similar to those reported in SCA's testing program. Air Recon was then retained to perform on-site air analyses using a portable gas chromatograph with electron capture detector. Extensive air testing found that the highest PCE concentrations were present in and near floor drains and other penetrations of the floor slab. Levels of PCE ranging from 13,000 to 22,000 ppb were measured in the air in a hole drilled through the floor near the northern end of the school. This suggested that the PCE was coming from the area beneath the floor, primarily through penetrations in the floor slab.

In April 1997, holes were bored through the floor at 30 locations (see Figures 3A-3E), and samples of the sub-slab materials were collected at various depths. There was no report documenting this investigation, only the logs of the borings and the analytical results were completed (See Appendix B). However, it was known that the samples were collected using a concrete corer to collect continuous cores of subsurface materials, and were analyzed on-site using a portable GC/MS (Gas Chromatography/Mass Spectrometry). Despite the non-standard methods of sample collection and analysis, the distribution of PCE concentrations found in this investigation was entirely consistent with the known former dry cleaning operations in the building.

Figure 3A shows levels of PCE within the sub-slab insulating materials and Figures 3B through 3E show PCE levels within soil at various depths below the floor grade within the building. (The floor grade is about three feet above the grade of the adjacent sidewalk. Results from borings at sidewalk grade were adjusted to be consistent with the indoor boring locations.) Location C-3, at the site of the former dry cleaning machinery, showed the highest levels of PCE in the soil and was also the only location where PCE was present from just below the floor slab to a depth of 20 feet below grade. The only other locations where PCE was detected in soil at concentrations greater than one part per million (ppm) were at C4, C-6, C-8, C-9, and C-29, which were all in or directly adjacent to the dry cleaning area, and at C-15, which was located next to one of the loading docks. PCE contamination within the sub-slab insulation was detected over a wider area around the former dry cleaning area, extending as far as location C-17 to the southwest.

In the 1998 PSA described below, sampling was performed in the vicinity of cores C-3 and C-8. Comparing the analysis results from the PSA with the 1997 Riverpoint data indicated that the earlier data was subject to two types of systematic errors resulting from the use of the corer to collect the samples. PCE levels in strata with the highest concentrations were underreported, probably because of the heat and disturbance involved in the collection of the cores. PCE levels detected below the strata with high PCE concentrations appeared to be overreported due to cross-contamination. The 1997 data was therefore primarily useful at providing a qualitative delineation of the horizontal extent of contamination in the soil and subslab insulation.

## 2.2 Preliminary Site Assessment (PSA) Methodology

The Preliminary Site Assessment (PSA) was performed in January/February 1998 in accordance with the requirements of the consent order issued by New York State Department of Environmental Conservation (NYSDEC) dated July 3, 1997. The PSA was aimed at characterizing the soils and hydrogeology at the project site and at assessing the horizontal and vertical extent of any soil and groundwater contamination. The PSA was performed in accordance with the PSA Work Plan dated November 1997, and as modified by the letter from Richard Gardineer of NYSDEC dated December 12, 1997. The results are reported in the Preliminary Site Assessment Report prepared by AKRF, Inc. (AKRF) dated March 1998.

Soil boring and monitoring well locations are shown in Figure 4. Soil samples were collected from four boring locations B-1, B-2, M-2, and M-3. Another boring, B-3, was intended to be advanced in the loading dock to the east of the former dry cleaning area, but could not be completed because of insufficient clearance around the fuel oil tank, which was located under the loading dock area. Groundwater samples were collected from six monitoring well locations M-1 through M-6.

All samples were containerized and stored in accordance with U.S. EPA and NYSDEC sampling protocols. Each container was properly sealed, labeled, and placed in a refrigeration unit for transport to the laboratory. A chain of custody was maintained throughout the field sampling, transport of samples to the laboratory, and during lab analysis. All samples were sent to Nytest Environmental Inc., a New York State Department of Health (NYSDOH) Environmental Laboratory Analysis Program (ELAP)-approved laboratory certified for analyses using the most recent Analytical Services Protocol (ASP). Laboratory data was in compliance with NYSDEC ASP Category B deliverable format.

### 2.2.1 PSA - Soil Sampling

Soil samples were obtained with a 24-inch long, two-inch in diameter steel split-spoon sampler that was driven through the subsurface soils ahead of a hollow-stem (4.25-inch inside diameter) auger that bores into the soil to just above the desired sampling depth. The split-spoon sampler was driven through the next two feet of soil to obtain the surface sample. Following the completion of sampling, all borings except for the ones that were converted to groundwater monitoring wells, were backfilled and sealed immediately.

Soil samples were field screened for organic vapors by head-space analysis using a photoionization detector (PID). Continuous soil samples were collected at two-foot intervals down to the groundwater interface and one additional sample was collected from the two-foot interval below the groundwater interface.

Soil samples collected from B-1, B-2, M-2, and M-3 were analyzed in accordance with NYSDEC ASP Category B for VOCs using Method 95-1, for semivolatile organic compounds (SVOCs) using Method 95-2, for Target Analyte List (TAL) metals, and for Target Compounds List (TCL) pesticides and polychlorinated biphenyls (PCBs).

### 2.2.2 PSA - Groundwater Sampling

The monitoring well locations in the PSA were based on the presumption that groundwater flow was towards the east or southeast. The monitoring wells were drilled using a hollow-stemmed auger and consisted of two-inch Schedule 40 PVC casing in a 6¼-inch augered hole. A 10-foot PVC screen (0.020 inch slot) was installed in the top eight feet of groundwater. In wells M-2 and M-3, which were intended for soil vapor permeability testing, 15 feet of screen was used, extending seven feet above the groundwater surface. A filter pack of sand (US Std sieve sizes 30 to 8) was placed in the annular space around the screens and was extend two feet above the screen.

The annular area around the well casing was sealed with bentonite pellets for an interval of two feet above the filter pack. Grout consisting of a cement and bentonite mixture or an anti-shrink mixture, was then extend from the bentonite pellet seal to a level of two feet below ground. The remaining annular space was sealed with a concrete cap and well apron (expanding cement). A locking well cap was installed upon completion of the well.

The wells were developed by pumping the day after they were drilled using dedicated PVC tubing. The wells were developed until the turbidity of the water sample, as measured by a nephelometer, became less than 50 Nephelometric Turbidity Units (NTU) or at least 15 well volumes of groundwater had been pumped out. The new wells were not sampled for at least seven days after development.

Prior to sampling the new wells, water levels were measured using an electronic water level indicator. A dedicated bailer or a submersible sample pump was used for sample collection. A minimum of three well volumes was purged from the well before sampling. Samples were not collected until the water was visually free of suspended materials and the pH, temperature, and conductivity readings had stabilized.

Groundwater samples were analyzed in accordance with NYSDEC ASP Category B for VOCs using Method 95-1, for SVOCs using Method 95-2, for TAL metals, for TCL pesticides and PCBs, and for total dissolved solids.

## 2.3 Remedial Investigation (RI) Phase I

Groundwater monitoring performed as part of the PSA found no off-site groundwater contamination. However, because the groundwater flow direction appeared to be more to the north than expected, none of the off-site wells were directly downgradient of the source area. Additional monitoring wells M-7 and M-8 were installed as part of the Remedial Investigation (RI) Phase I in April 2002 at two locations on the north side of West 142nd Street, in presumed downgradient direction as shown in Figure 4. Soil sampling was performed at these locations to assess soil conditions near the groundwater interface downgradient from the source. Groundwater samples were collected from four monitoring well locations: M-2 and M-3 near the source area; and M-7 and M-8 downgradient of the source area. Soil boring and well installation, and soil and groundwater sampling was conducted using similar methodology as for the PSA described in Section 2.2.1 and Section 2.2.2.

All samples were containerized and stored in accordance with U.S. EPA and NYSDEC sampling protocols. Each container was properly sealed, labeled, and placed in a refrigeration unit for transport to the laboratory. A chain of custody was maintained throughout the field sampling, transport of samples to the laboratory, and during lab analysis. All samples were sent to a NYSDOH ELAP-approved laboratory certified for analyses using the most recent ASP. Laboratory data was in compliance with NYSDEC ASP Category B deliverable format.

### 2.3.1 RI Phase I - Soil Sampling

Soil borings were completed at two locations (M-7 and M-8) as shown in Figure 4. The purpose of these borings was to assess soil conditions near the groundwater interface downgradient from the source.

After augering to approximately four feet above the groundwater interface, split spoon samples were collected every two feet to a depth of two feet below the groundwater interface. Soil samples were collected with a 24-inch long, two-inch in diameter steel split-spoon sampler that was driven through the subsurface soils ahead of a hollow-stem (4.25-inch inside diameter) auger that bores into the soil to just above the desired sampling depth. The split-spoon sampler was driven through the next two feet of soil to obtain the surface sample.

Soil samples were field screened for organic vapors by head-space analysis using a PID. The sample exhibiting the highest level of organic vapors was submitted to the laboratory and analyzed for VOCs in accordance with NYSDEC ASP Category B Method 95-1.

### 2.3.2 RI Phase I - Groundwater Sampling

Soil borings M-7 and M-8 were converted to monitoring wells located directly downgradient of the PCE source area based on the groundwater elevations measured as part of the PSA.

The monitoring wells were drilled using a hollow-stemmed auger and consisted of two-inch Schedule 40 PVC casing in a 6¼-inch augered hole. A 10-foot PVC screen (0.020 inch slot) was installed in the top eight feet of groundwater. A filter pack of sand (US Std sieve sizes 30 to 8) was placed in the annular space around the screens and was extend two feet above the screen.

The annular area around the well casing was sealed with bentonite pellets for an interval of two feet above the filter pack. Grout consisting of a cement and bentonite mixture or an anti-shrink mixture, was then extend from the bentonite pellet seal to a level of two feet below ground. The remaining annular space was sealed with a concrete cap and well apron (expanding cement). A locking well cap was installed upon completion of the well.

The wells were developed by pumping the day after they were drilled using dedicated PVC tubing. The wells were developed until the turbidity of the water sample, as measured by a nephelometer, became less than 50 NTU or at least 15 well volumes of groundwater had been pumped out. The new wells were not sampled for at least seven days after development.

The two new wells M-7 and M-8, as well as the two wells near the source area, M-2 and M-3, were sampled. The groundwater samples were analyzed for VOCs in accordance with NYSDEC ASP B Method 95-1 and for chloride, sulfide, nitrite, dissolved organic carbon, and total dissolved solids.

## 2.4 Additional Off-Site Investigation

Because of the presence of contaminants in off-site groundwater, additional testing was required to perform an off-site exposure assessment and to develop the data required for remedial design. The supplemental investigation to the RI Phase I included the installation of new groundwater monitoring wells further downgradient to the north of the site. Prior to installation of the new monitoring wells, soil gas sampling was performed to determine the best locations for the wells.

### 2.4.1 Soil Gas Survey

The soil gas probes were installed on August 3, 2006 and sampling was performed on August 8, 2006 in accordance with the approved protocol. Two soil gas probes were installed on the south side of West 143$^{rd}$ Street (SG-1 and SG-2) and three probes on the north side of West 142$^{nd}$ Street (SG-3 through SG-5) as shown on Figure 4.

The armory building between West 142$^{nd}$ and West 143$^{rd}$ Streets contained a lower level that was partially below grade. It was estimated that the floor slab was about six feet below grade. Consequently, one soil gas sample was collected at each location at a depth of six feet below grade. Soil gas sampling points were installed using a stainless steel probe, consisting of a drive point and internal perforated sampling point with a retractable tip, connected to Teflon sampling tubing. The sampling tubing extended from the sampling port through a drive casing to above grade. Each sampling point consisted of a Geoprobe Model No. AT86255 stainless steel wire screen sampling implant.

Soil gas sampling points were installed using the following procedures:

1. A patch of sidewalk was cored or cut and removed at each location.
2. A new, clean 3/16-inch inside diameter Teflon tubing was inserted into the sampling probe.
3. A two-inch diameter hand auger was advanced to a depth of two to three feet below grade to clear subsurface utilities.
4. The soil gas sampler was placed in the resulting soil boring and driven to six feet below grade.
5. The soil gas sampler was backfilled with six inches of clean sand filter pack to prevent intake clogging.
6. The drive casing was retracted to expose the three-inch perforated sampling port.
7. The sampler drive casing was removed leaving the sampling tubing and tip in the boring.
8. The remaining boring annulus was filled with hydrated bentonite chips to grade to provide a seal to ensure the collection of a representative sample and to prevent short-circuiting via the surface.
9. A two-inch diameter flush-mount road box set was installed within the sidewalk and let stabilize.

Soil gas samples were collected at each location on August 8, 2006. Sampling was performed using the following procedure:

1. A two-foot by two-foot six-mil plastic shroud was installed over the sampling point, sealed to the sidewalk using duct tape along the perimeter, and the Teflon soil gas sampling tubing pulled through the shroud to allow for sampling collection.
2. The tracer was introduced into the sampling shroud by inserting new tubing connected to a helium tank.
3. A new flexible hose was installed to a peristaltic pump and the Teflon sampling tubing connected to the hose. The other end (discharge end) of the flexible tubing was connected to a one-liter Tedlar bag. The soil gas sampler was purged of approximately three sampler volumes by activating the pump to completely fill the Tedlar bag. The purge rate was 0.1 liters per minute or less.
4. The sample within the Tedlar bag was analyzed using a calibrated PID and a helium detector (Marks Model No. 9822 or equivalent). In the case that elevated concentrations of helium were detected, the surface seal was inspected, and if necessary, hydrated bentonite was added to the seal.
5. After purging the soil gas sampler, the sample tubing was disconnected from the peristaltic pump and connected to the inlet of a labeled Summa canister with a flow regulator calibrated for sample collection over a 30-minute period of time, which correlated to a flow rate of approximately 0.033 liters per minute. The vacuum reading from the vacuum gauge on the canister was recorded at the beginning of the sampling period. The valve of the canister was opened and the time was recorded in the field book.
6. At the end of the sampling period and prior to the vacuum gauge returning to ambient pressure, the valve was closed, the flow-rate controllers and vacuum gauges were removed, the caps were installed on the canisters, and the time recorded.

7. Canisters were placed in shipping containers for transportation to the laboratory.

All Summa canisters were submitted to Severn Trent Laboratories Burlington in Colchester, Vermont for analysis of VOCs using EPA Method TO-15.

### 2.4.2 Additional Off-Site Investigation – Groundwater

The additional off-site groundwater investigation was performed to establish a groundwater flow map of the area and to assess off-site groundwater quality.

The new groundwater monitoring wells were installed on October 19 and 20, 2006 on the south side of West 143rd Street close to the soil gas locations SG-1 and SG-2. Previous soil borings have found that the fill material which constitutes the surface soil in the area of the site was underlain by a layer of organic clay, the surface of which was generally just below the groundwater level. These conditions were present at the proposed well location M-9 (near SG-2) and M-10 (near SG-1) and cluster wells were constructed – a shallower well with a five-foot screen above the organic clay layer and a deeper well with a five-foot screen below the organic clay layer. The cluster wells would determine whether there was any difference between the very shallow groundwater above the clay layer, and the groundwater in and below the clay layer. The groundwater investigation included sampling of all existing wells installed as part of the PSA, RI on this off-site investigation (M-1 through M-8, and the shallow and deep wells at M-9 and M-10). Well installation and sampling was conducted using similar methodology as described in Section 2.3.1 and Section 2.3.2. Both the existing and new wells were sampled between November 7 and 14, 2006.

The deep and shallow cluster wells were installed a few feet apart. The monitoring wells were drilled using a hollow-stemmed auger. Split spoon samples were continuously collected to the bottom of the well and soil samples were characterized. Two-inch Schedule 40 PVC casing was installed with five-foot 20-slot PVC screens in each well. The screens were positioned just above the clay layer in the shallow well and just below the clay layer in the deep well. At M-9, the screens were installed at a depth of 6.5 to 11.5 feet below grade in the shallow well and from 15 to 20 feet below grade in the deep well. At M-10, the shallow well screen was installed at a depth of 7.5 to 12.5 feet below grade and in the deep well from 21 to 26 feet below grade. Filter pack sand was placed in the annular space around the screen and extended above the screen. The annular area around the well casing was sealed with bentonite pellets for an interval of about two feet above the filter pack. In the deep wells, the annular area around the well casing at the depth of the clay layer was also sealed with bentonite pellets to prevent groundwater flow through the clay layer. Sand and concrete were used to secure the well to the ground surface. Boring and well construction logs are included in Appendix C.

The four new wells M-9 (shallow), M-9 (deep), M-10 (shallow), and M-10 (deep), as well as the eight wells installed during the PSA and RI (M-1 through M-8) were sampled in accordance with U.S. EPA's Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures (EPA/840/S-95/504, April 1996) that allows for collection of a representative sample. All sampling equipment was decontaminated before its use. All samples were containerized and stored in accordance with U.S. EPA and NYSDEC sampling protocols. Each container was properly sealed, labeled, and placed in a refrigeration unit for transport to the laboratory. A chain of custody was maintained throughout the field sampling, transport of samples to the laboratory, and during lab analysis. All samples were sent to Severn Trent Laboratories, Inc., a NYSDOH ELAP-approved laboratory certified for analyses using the most recent ASP. The groundwater samples were analyzed for VOCs using U.S. EPA SW-846 Method 8260. Laboratory data was in compliance with NYSDEC ASP Category B deliverable format.

# 3.0 SUBSURFACE CONDITIONS

Based on the U.S. Geological Survey Central Park Quadrangle map, the project site lies at an elevation of approximately 10 feet or less above the National Geodetic Vertical Datum of 1929, an approximation of mean sea level. The Viele Map (Sanitary & Topographical Map of the City and Island of New York, 1865), which shows the original shoreline and watercourses in Manhattan (see Figure 5) depicts most of the area of the site as part of the Harlem River, except for the western end, which is wetland. U.S. Geological Survey studies show bedrock at about elevation -40 feet (approximately 50 feet below grade) at the eastern end of the site, and at elevation -20 feet (30 feet below grade) at the western end of the site. Borings performed as part of the PSA discussed in Section 2.2 indicated that the fill layer under the building was approximately eight to twelve feet thick. The fill contained demolition debris (brick, concrete, and wood fragments), ash, and coal fragments. Beneath the fill was a layer of organic clay which was at least eight feet thick near Fifth Avenue but tapers to a foot or two thick towards the western end of the site.

In the 1998 PSA and 2002 RI Phase I studies, continuous split spoon samples were only collected and logged down to the groundwater surface. Since the surface fill layer extends below the groundwater surface, the boring logs generally show only the fill and not the underlying strata, so there is not enough data to prepare a geological cross-section of the site. AKRF has requested data on any borings in the area of the site from the New York City Department of Design and Construction, which maintains records of borings for sewer construction and other city construction projects.

Borings performed in 2006 on West 143$^{rd}$ Street as part of the Additional Off-site Investigation were logged to below organic clay layer. Figure 6 shows a geological cross-section on West 143$^{rd}$ Street.

The Harlem River is located approximately 250 feet east of the project site. Groundwater in New York County is not used as a source of potable water and no water supply wells are located in the area. As part of the 2006 Additional Off-site Investigation, groundwater levels were measured in all wells on November 14, 2006. Well elevations were surveyed by Montrose Surveying Company, LLP. Groundwater elevations are shown in Table 1 and on Figure 7. The groundwater surface was irregular and approximately seven to nine feet below grade. In the two new cluster wells, the groundwater surface was higher in the shallow wells screened above the organic clay layer than in the deeper wells. This indicated that shallow groundwater was perched. Groundwater elevations in the wells installed within the building appeared to be anomalous. It was expected that groundwater in the area would generally flow northeastward, towards the Harlem River. However, the measurements of groundwater elevation did not show a simple single flow direction. The observations in the new and existing monitoring wells indicate that groundwater flow was generally towards West 142$^{nd}$ Street and eastward along 142$^{nd}$ Street towards the Harlem River. Thus the gradient on the site was generally towards the northeast, and the gradient on the block to the north (the armory site) was towards the south. Local groundwater flow may be influenced by the presence of building foundations and utilities, and variations in the fill material.

# 4.0 INTERIM REMEDIAL MEASURES

The initial interim remedial measures (IRM), performed in 1997, were aimed at preventing impacts on the air within the building. The IRM consisted of three measures: removal of contaminated insulating material; installation of a shallow soil vapor extraction system; and sealing all penetrations through the slab. The implementation of the IRM was described in Interim Remedial Measures Report, Intermediate School 120, 2350 Fifth Avenue, New York, New York by AKRF Engineering, P.C. dated September 1997.

## 4.1 Removal of Contaminated Insulating Material

The removal of contaminated insulating material under the slab at the western end of the building (in the area not included as part of the school) was aimed at eliminating the major reservoir of PCE under the building. The concrete slab was broken up into pieces for removal, except for a strip bordering the walls, which was retained to provide structural stability. The concrete pieces were stored in a covered dumpster, and disposed of as ordinary demolition debris. A total of 12 20-yard dumpster loads of concrete debris were removed.

As each section of floor slab was removed, cork and/or Styrofoam insulation was removed from the space below the slab. The material was stored in a covered dumpster and transported off-site for disposal. To permit faster removal, the material was not analyzed, but was assumed to exceed the land disposal restriction level of six parts per million of PCE. A total of 21 30-yard dumpster loads of contaminated insulation were removed. The material was transported by Hazardous Transport Group Inc. (EPA ID #NJD000692061) to Michigan Disposal Inc. of Belleville, Michigan (EPA ID #MID000724831). Figure 8 shows the areas where insulation material was removed and where it still exists, and Figure 9 shows typical cross-sections of the floors in those areas.

## 4.2 Sub-Slab Vapor Extraction System

Installation of a shallow soil vapor extraction system in the six-inch deep layer between the old building slab and the new floor slab of the school was intended to remove PCE remaining in the insulation under the old floor slab, and, by maintaining a negative pressure in the space beneath the floor, prevent any further infiltration of vapors into the building.

Renovation of the building for use as a school included pouring a new concrete floor slab over about a six inch layer of sand and gravel placed on the old floor slab. Drain pipes were installed beneath the floor by cutting trenches through both the new and old floor slabs, backfilling around the pipes with clean sand and gravel material, and then restoring the upper floor slab. The drain pipe areas provided a direct connection through which vapors from the insulation under the old slab could diffuse upwards into the space between the old and new slabs.

A pilot test was performed to determine the feasibility of installing horizontal vapor extraction wells between the floor slabs, and to determine the area over which a negative sub-slab pressure could be maintained. A package soil vapor extraction unit was installed on the old loading dock on the 142nd Street side of the building. The blower exhaust was connected to an activated carbon collection system (Carbtrol G-2) containing 170 pounds of activated carbon and rated for a maximum flow rate of 300 cubic feet per minute (cfm).

The extraction wells for the pilot test were installed by coring through the south wall of the loading dock area a few inches above the floor to access the inter-slab space beneath the hallway outside the cafeteria. This area is directly adjacent to the former location of the dry cleaning machines, and earlier testing had indicated that insulation under this area contained PCE. Once the inter-slab space was accessed, a horizontal boring was advanced by manually drilling with augers driven by an electric drill-hammer. It was found that a hole could be readily drilled through the sand and gravel layer, but it was difficult to keep it clear of cuttings so an extraction well could be installed. Two short lengths of extraction well were installed extending about five feet south of the south wall of the loading dock. The wells consisted of two-inch perforated PVC pipe.

The effect of the extraction wells was assessed by measuring the difference in pressure between the air in the school and in the inter-slab space. The measurements were performed by drilling a one-inch diameter hole through the upper floor slab. A tube was placed in the hole extending into the fill in the sub-slab space and was sealed in place with grout. The tube was then connected to a manometer with a range of 0 to 3 inches water column (W.C.).

It was found that the blower produced a vacuum of about 15 inches W.C. in the extraction wells, and this produced a drop in the inter-slab pressure of about 0.1 inch W.C. at a distance of 30 feet from the well. However, the drop off in the vacuum with distance was inconsistent, apparently reflecting the non-homogeneous nature of the space between the slabs. Also, the air flow was greater than expected, exceeding the 100 cfm limit of the range of the flow meter. This suggests that the slab was not well sealed, and air could enter the sub-slab space relatively easily

Based on the results of the pilot test, the sub-slab soil vapor extraction system was designed and constructed as shown in Figure 10. Six horizontal vapor extraction wells were installed: four extending in from the west wall of the renovated area and two extending in from the south wall of the loading dock. The wells extending in from the west wall were installed a distance of about 30 feet using a specially-constructed horizontal drilling rig. A casing was advanced just behind the drill bit. It was necessary to use some water to wash out the cuttings from the casing, but most of the water washed out of the casing with only a minimum remaining in the sub-slab space.

The blower system for the long-term remediation was installed at the same location as the pilot system. This system was manufactured by Product Recovery Management of Durham, NC. It is similar to the pilot system but lacks a moisture condenser, since no water had been collected by the collector in the pilot system. This system also includes an alarm system which triggers an audible and visible alarm in the school principal's office and in the custodian's office if the blower goes off for any reason. The manometers used to monitor the sub-slab pressure for the pilot test were replaced by magnahelic pressure gauges for the long-term system.

In August 1998, MW-3, the well at the former dry cleaning location, was attached to the soil vapor extraction system. This well was completed as part of the PSA and constructed with a screened section running up to just below the floor so it could serve as a vapor extraction well. A measurement taken at that time indicated that high levels of PCE (over 500 ppm) were being extracted from the well. This well was incorporated as part of the IRM system.

### 4.3 Sealing Penetrations

The initial indoor air investigation performed by Riverpoint found that the highest PCE concentrations were present in and near floor drains and other penetrations of the floor slab. As part of the IRM all penetrations through the slab including utilities and spaces around floor drains or cleanouts were sealed. These included:

- The holes left by the coring done as part of the April 1997 site investigation. These were sealed with concrete.
- Spaces around floor drains and cleanouts. These were sealed using a silicone or latex sealant.
- Other leaks through the floor. Several penetrations were found in the kitchen, including spaces around water pipes serving a work island, and a hole in the floor behind the door of the room leading off the kitchen to the west of the freezer. The larger holes were sealed with concrete and smaller cracks were sealed with silicone or latex sealant.

# 5.0 SOIL CONTAMINATION

## 5.1 Volatile Organic Compounds in Soil Samples

VOC concentrations in soil samples collected in the PSA and RI Phase I are shown in Table 2. The soil analyses performed in the PSA, detected PCE levels exceeding the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4046 recommended soil cleanup objective (RSCO) of 1400 ppb at two sampling locations: M-3, in the former dry cleaning area, and M-2, approximately 20 feet northeast of the former dry cleaning area. At sampling location M-3, all the samples from just below the slab down to a depth of 12 feet below grade exceeded the RSCO for PCE. The highest concentration was detected at a depth of 8 to 10 feet below grade, which was approximately at the groundwater surface and just above the native silt and organic clay. The sample from a depth of 12 to 14 feet below grade, which was within the organic clay layer, contained a much lower concentration of PCE, well below the cleanup objective. This indicated that the organic clay acted as a barrier to the downward movement of the PCE. At sampling location M-2, the only sample exceeding the RSCO for PCE was from a depth of 9 to 11 feet, at the top of the native silt and organic clay. Because PCE could not readily penetrate the organic clay material, it had apparently spread out laterally at that depth.

Additional monitoring wells M-7 and M-8 were installed as part of the RI Phase I in April 2002 at two locations on the north side of West 142nd Street as shown in Figure 4. Soil sampling was performed at these locations to assess soil conditions near the groundwater interface downgradient from the source. Low PCE levels were detected in the two soil samples collected from 10 to 12 feet below ground surface at M-7 (12 ppb) and M-8 (2 ppb). These levels were well below the TAGM 4046 soil cleanup objectives of 1400 ppb.

## 5.2 Other Analytes in Soil Samples

The fill material on the site was observed to contain ash and demolition debris. The soil analyses performed in the PSA showed above-background levels of analytes associated with these types of fill materials polycyclic aromatic hydrocarbons (PAHs) and metals, including lead, mercury, copper, zinc, and barium (see Tables 3, 4, and 5). Traces of pesticides or PCBs at levels well below the cleanup guidelines were detected in several samples.

# 6.0 GROUNDWATER

## 6.1 Volatile Organic Compounds in Groundwater Samples

VOC concentrations in groundwater samples collected in the PSA, RI Phase I, and supplemental investigation are shown in Table 6 and on Figure 11. Groundwater samples collected during the PSA contained PCE and its decomposition products (trichloroethene, dichloroethene, and vinyl chloride) only in two monitoring wells (M-2 and M-3) in and adjacent to the former dry cleaning area. PCE and its decomposition products were detected at approximately 1,100 ppb in the sample collected from M-3 and at about 230 ppb in the sample collected form M-2, where most of the analytes found in M-2 were present in the form of vinyl chloride, the ultimate product of anaerobic decomposition of PCE. This indicated that the PCE had undergone considerable degradation before it reached M-2. The only other VOCs detected in groundwater were low levels of benzene, toluene, ethylbenzene, and xylene in the sample collected from M-1, located in the courtyard to the northwest of the site. This suggested a source of gasoline contamination off-site to the southwest. Historic Sanborn insurance maps depicted a number of garages with gasoline tanks that were formerly present in that area.

The findings of the groundwater investigation performed as part of the Phase I RI in the monitoring wells near the source area (M-2 and M-3) and along West 142nd Street (M-7 and M-8) in 2002, indicated that PCE and its decomposition products (vinyl chloride, dichloroethene, and trichloroethene) were detected at levels above the Class GA groundwater standards in the samples collected at M-2, M-3, and M-7. No VOCs were detected in M-8. The highest level of vinyl chloride (200 ppb) was detected in M-3 and the highest level of dichloroethene in M-7 indicating that PCE had undergone considerable degradation before reaching the downgradient well across West 142nd Street.

The findings of the additional off-site groundwater investigation performed in November 2006, indicated that PCE and/or its decomposition products were detected in samples from four monitoring wells: M-3, which was in the original source area, M-2, which was also inside the building close to the original source area, M-7, which was on the north side of West 142nd Street, and M-9 Shallow, which was on the south side of West 143rd Street. In M-9 Shallow, PCE was detected at an estimated concentration of 0.54 µg/L, which was just above the analysis detection limit. No decomposition products were detected in the sample from M-9 Shallow. Acetone, methylene chloride, and 2-butanone were detected in several samples and in laboratory method blanks. These compounds are considered to be laboratory artifacts. The table below summarizes the compounds detected in the samples from M-2, M-3, and M-7, along with the analyses of earlier samples collected from these wells and described above. Wells M-2 and M-3 were sampled when they were installed in 1998, and again when additional groundwater studies were performed in 2002. Well M-7 was previously sampled when it was installed in 2002.

<table>
<tr><th colspan="9">Tetrachloroethene And Decomposition Products In Groundwater Samples (µg/L)</th></tr>
<tr><td></td><td colspan="3">M-2</td><td colspan="3">M-3</td><td colspan="2">M-7</td></tr>
<tr><td>Compound</td><td>Feb-98</td><td>Apr-02</td><td>Nov-06</td><td>Feb-98</td><td>Apr-02</td><td>Nov-06</td><td>Apr-02</td><td>Nov-06</td></tr>
<tr><td>Vinyl Chloride</td><td>180</td><td>13</td><td>14</td><td>71</td><td>200</td><td>13</td><td>U</td><td>37</td></tr>
<tr><td>trans-1,2-Dichloroethene</td><td rowspan="2">7</td><td>U</td><td>U</td><td rowspan="2">180</td><td>77</td><td>U</td><td>58</td><td>13</td></tr>
<tr><td>cis-1,2-Dichloroethene</td><td>2</td><td>1.5</td><td>490</td><td>7.3</td><td>2100</td><td>480</td></tr>
<tr><td>Trichloroethene</td><td>3</td><td>U</td><td>U</td><td>56</td><td>6</td><td>0.72</td><td>U</td><td>U</td></tr>
<tr><td>Tetrachloroethene</td><td>48</td><td>0.8</td><td>U</td><td>800</td><td>75</td><td>12</td><td>U</td><td>U</td></tr>
</table>

**Note:** cis and trans 1,2-dichloroethene were reported as total 1,2-dichloroethene in 1998 analyses.

Total concentrations of chlorinated compounds have decreased significantly over time in all monitoring wells. In the current analyses, PCE was detected only in the sample from M-3, in the original source area. The PCE concentration in this well has declined by over 98 percent compared to the original sampling in 1998. In both of the wells in the building (M-2 and M-3) the compound detected at the highest concentration was vinyl chloride, which represents the final stage of decomposition of PCE under anaerobic conditions. In both wells vinyl chloride concentrations had decreased over 90 percent from peak levels. In the sample from monitoring well M-7, on the north side of West 142nd Street, the predominant compound was cis-1,2-dichloroethene, as it was when the well was previously sampled in 2002. The concentration of dichloroethene had decreased by about 75 percent since that time. No PCE or decomposition products were detected in the sample from M-8, which was located approximately 120 feet downgradient from M-7.

## 6.2 Other Analytes in Groundwater Samples

The results of the PSA groundwater analyses for analytes other than VOCs are shown in Tables 7, 8, 9, and 10. The samples collected during the PSA from all of the wells except M-3 contained levels of chloride and total dissolved solids which met the definition of saline water under New York State water regulations. Very high sodium levels were also observed, as expected for saline water.

The analyte, 4-Methylphenol (p-cresol), was detected in the sample obtained from monitoring well M-5, near the southeast corner of the site. The sample also contained traces of several pesticides. Metal concentrations in the filtered groundwater samples met Class GA (drinking water) standards with the exception of iron and magnesium. The unfiltered samples contain higher levels of metals because of the presence of suspended particulate matter.

## 7.0 SOIL GAS

The findings of the soil gas survey performed in August 2006, indicated that levels of PCE in excess of 100 $\mu g/m^3$ were detected at three locations: SG-1, SG-2, and SG-3 (see Table 11). At location SG-1 the initial sample showed low levels of PCE, but a second sample (DUP-1) showed higher levels. No PCE decomposition products (trichloroethene, dichloroethene, or vinyl chloride) were detected in any of the samples. Low levels of petroleum hydrocarbons were also detected in most samples, with the highest levels in the sample collected from SG-2.

The soil gas analysis results did not correlate with the previous groundwater analysis. The groundwater investigation performed in the monitoring wells along West 142nd Street in 2002 detected no PCE in well M-7, but elevated levels of dichloroethene, a PCE decomposition product. This was consistent with earlier groundwater analyses which showed that most of the PCE in the groundwater had decomposed to trichloroethene, dichloroethene, or vinyl chloride. There was a layer of peaty soil beneath the site which created favorable conditions for anaerobic decomposition, and most of the PCE spilled at the site was believed to date from prior to 1985. Nonetheless, the soil gas was found to contain PCE and no decomposition products. In addition, petroleum hydrocarbons like the ones detected in the soil gas were not detected in the groundwater samples.

## 8.0 INDOOR AIR

As described in Section 2.1 "Initial Investigations", ambient air monitoring was first performed in the building in October 1996. Several rounds of air testing performed prior to the implementation of the IRM found levels of PCE in the building air generally exceeding 17 ppb and ranging as high as 210 ppb.

As part of the IRM, an air monitoring program was implemented within the building. Air sampling was conducted in five locations (see Figure 12) selected to reflect those areas where the highest levels of PCE and its decomposition products were found in the initial rounds of sampling prior to January 1997. The sampling was performed using six liter SUMMA passivated canisters in accordance with USEPA test method TO-14 or later TO-15. Samples were collected over an eight-hour period with the building HVAC system in normal operation during sample collection.

Table 12 summarizes air testing performed since June 1997. PCE was detected in low to trace levels in most samples since the sampling started. Only one round of air samples collected within the building since implementation of the IRM showed PCE levels exceeding the NYSDOH Indoor Residential Guidelines of 15 ppb (100 $\mu g/m^3$). That was the September 13, 1997 sampling event.

After the sub-slab vapor extraction system was turned off in April 2005, air monitoring was performed in April 2005, May 2005, August 2005, February 2006, and December 2006. No exceedances of the Residential Guideline were detected. The highest PCE concentration was measured at 7.4 ppb in room 112 during the August 21, 2005 sampling event.

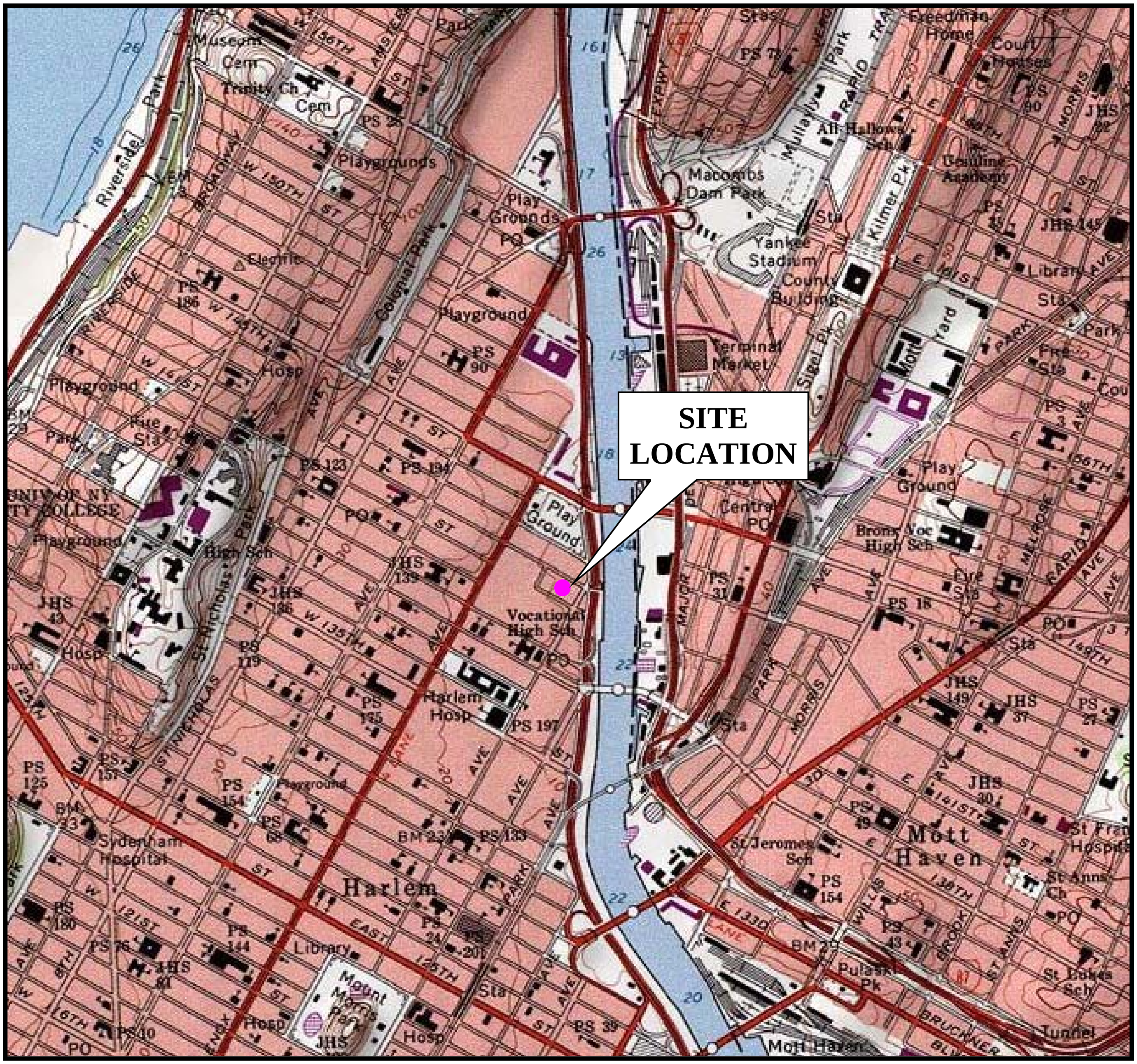
Although ambient levels of PCE in the indoor air have been well below the residential guideline, they still exceed background levels. The old boiler room adjacent to West 142nd Street, which is the only subgrade space in the building, was suspected as a potential pathway for vapors to enter the building. When the air in this space was sampled in the initial investigations in 1997, 287 ppb of PCE was found, with higher levels in the sump pit (569 ppb) and around an abandoned drain pipe on the south wall (647 ppb). The space around the drain pipe was sealed as part of the IRM actions.

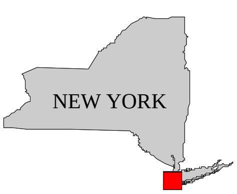
Air in the old boiler room was sampled in February 2006. A PCE level of 48 ppb was detected, with lower levels of PCE decomposition products (see Table 12). The sump was sealed up, the room was ventilated, and then the air was resampled in August 2006. This sampling event, which was performed in hot weather after a heavy rain, showed much higher levels of chlorinated compounds in the air in the old boiler room. When the air in the old boiler room was retested in December 2006, the levels had decreased.

# 9.0 REFERENCES

1. AKRF, Inc.: *Vapor Extraction System Operation and Maintenance Plan, Intermediate School 120 – 2350 Fifth Avenue, New York, NY*; August 1997.
2. AKRF, Inc.: *Interim Remedial Measures Report – 2350 Fifth Avenue, New York, NY*; September 1997.
3. AKRF, Inc.: *Preliminary Site Assessment Work Plan – 2350 Fifth Avenue, New York, NY*; Revised November 1997.
4. AKRF, Inc.: *Preliminary Site Assessment Report – 2350 Fifth Avenue, New York, NY*; March 1998.
5. AKRF, Inc.: *Interim Remedial Measures Work Plan – 2350 Fifth Avenue, New York, NY*; Revised January 2001.
6. AKRF, Inc.: *Focused Remedial Investigation Work Plan – 2350 Fifth Avenue, New York, NY*; Revised March 2001.
7. AKRF, Inc.: *Interim Remedial Investigation Report – 2350 Fifth Avenue, New York, NY*; December 2003.
8. Riverpoint, Inc.: *Preliminary Report on Perchloroethene*; February 23, 1997.

# FIGURES




SCALE IN FEET

0'  1000'  2000'  4000'

SCALE: 1"=2000'

N

SOURCE:
7.5 MINUTE SERIES USGS TOPOGRAPHIC MAP
QUADRANGLE: CENTRAL PARK, NY 1995

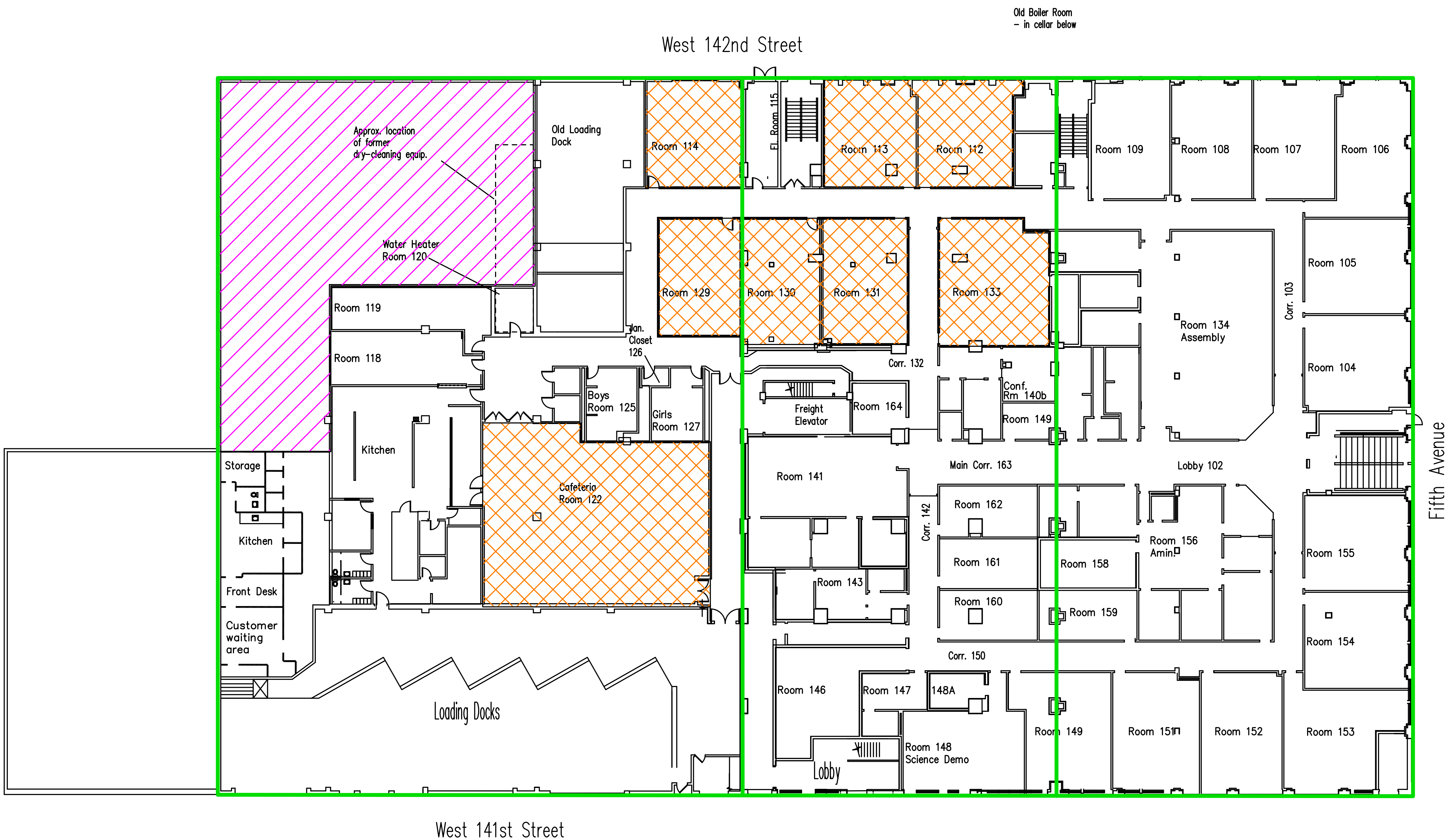
**2350 5th AVENUE**
NEW YORK, NEW YORK

**PROJECT SITE LOCATION**

AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

| | |
|---|---|
| DATE | **02.07.07** |
| PROJECT No. | **08010** |
| SCALE | **AS SHOWN** |
| FIGURE | **1** |

© 2007 AKRF, Inc. Environmental Consultants M:\AKRF Project Files\08010 - 2350 Fifth Ave (AKA 141st St & Fifth Avenue)\Figures\08010 fig 1 loc map.pub




0' 15' 30' 60'
SCALE IN FEET

**LEGEND:**

STORAGE LOCKERS IN USE

STORAGE LOCKERS CURRENTLY NOT IN USE

PRESUMED LOCATIONS OF BUILDING FOUNDATION WALLS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2350 5th AVENUE
NEW YORK, NEW YORK

**CURRENT SITE PLAN**

DATE
2.2.07

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08010

SCALE
1"30'

FIGURE
2


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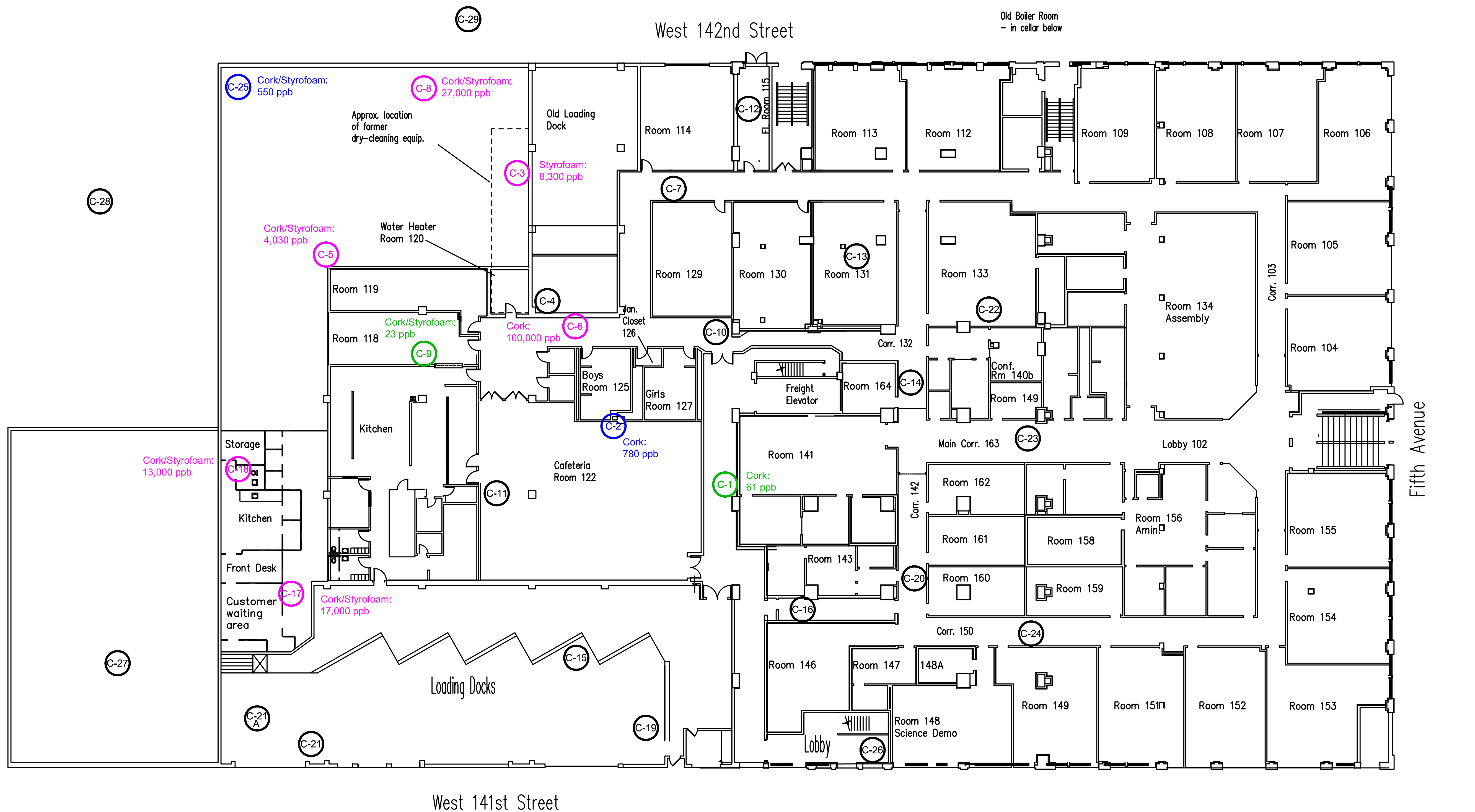


0' 15' 30' 60'
SCALE IN FEET

**LEGEND:**

| | |
|---|---|
| C-1 | NO INSULATION |
| C-1 | INSULATION WITH LOW LEVELS OF CONTAMINATION (<100 PPB) |
| C-1 | INSULATION WITH MEDIUM LEVELS OF CONTAMINATION (100 TO 1,000 PPB) |
| C-1 | INSULATION WITH ELEVATED LEVELS OF CONTAMINATION (>1,000 PPB) |

PPB = PARTS PER BILLION

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# 2350 FIFTH AVENUE, NEW YORK, NY
# 1997 CORE SAMPLES - MAXIMUM PCE LEVELS IN SUB-SLAB INSULATION

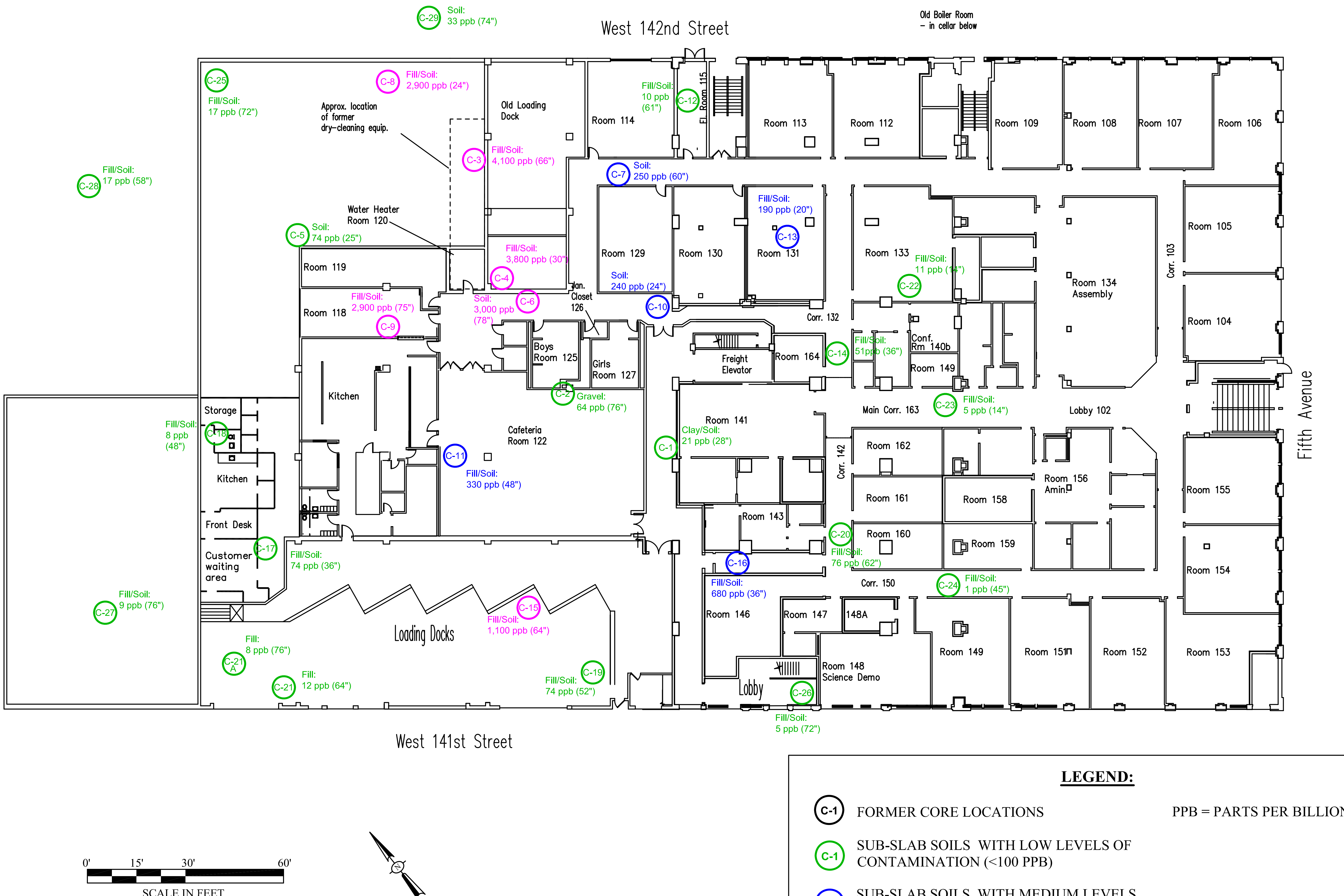
DATE 06.28.07

PROJECT NO. 08010

SCALE 1"=30'

FIGURE 3A

© 2007 AKRF, Inc. Environmental Consultants M:AKRF Project Files\08010 - 2350 Fifth Ave (AKA 141st St & Fifth Avenue)\Figures\08010 fig 3A-3E Core Samples-Revised RW July 2007.dwg




## LEGEND:

C-1 FORMER CORE LOCATIONS

PPB = PARTS PER BILLION

C-1 SUB-SLAB SOILS WITH LOW LEVELS OF CONTAMINATION (<100 PPB)

C-1 SUB-SLAB SOILS WITH MEDIUM LEVELS OF CONTAMINATION (100 TO 1,000 PPB)

C-1 SUB-SLAB SOILS WITH ELEVATED LEVELS OF CONTAMINATION (>1,000 PPB)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2350 FIFTH AVENUE, NEW YORK, NY

1997 CORE SAMPLES - MAXIMUM PCE LEVELS IN SHALLOW SOIL SAMPLES (0-79 INCHES)

DATE 06.28.07

PROJECT NO. 08010

SCALE 1"=30'

FIGURE 3B


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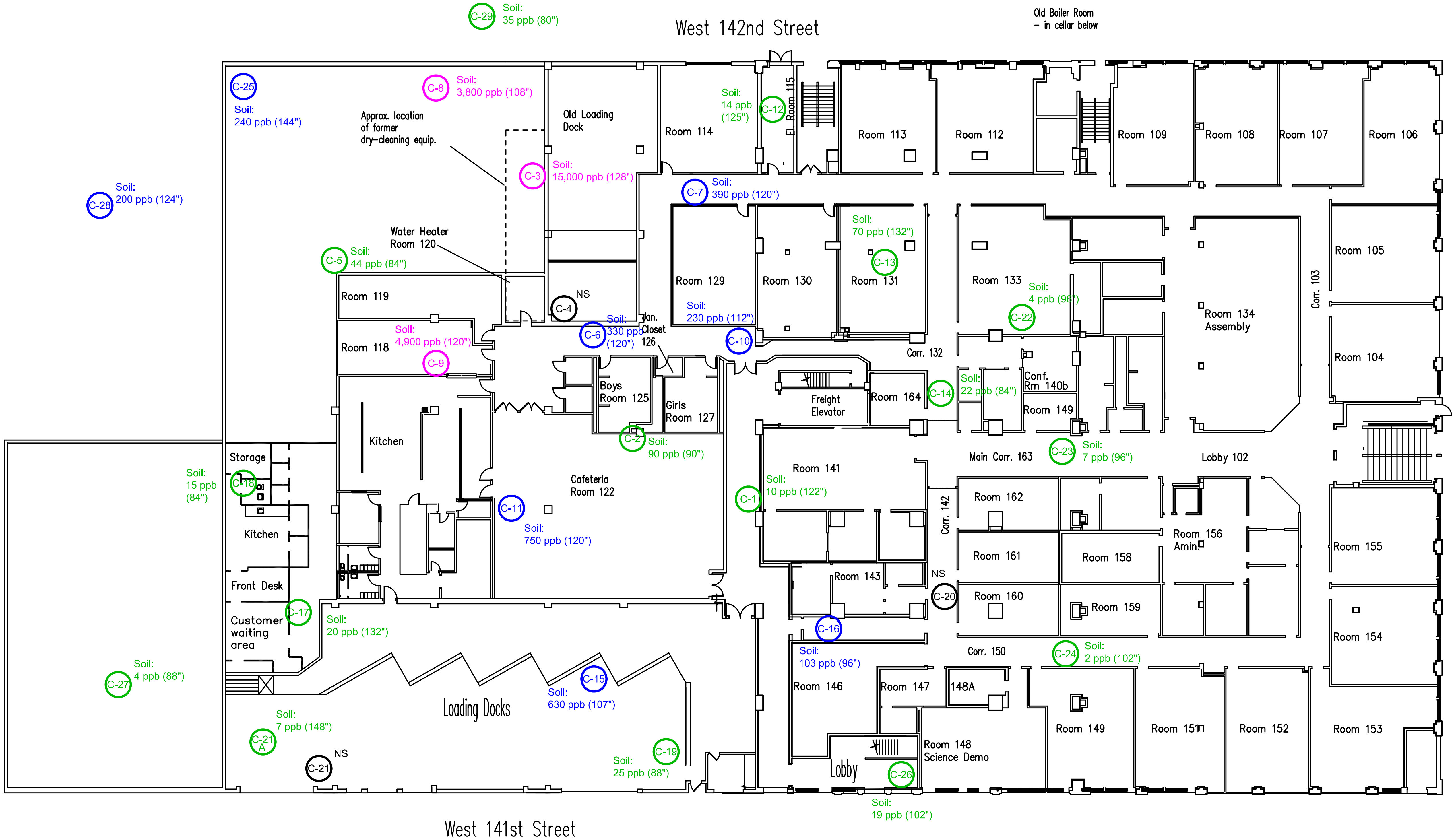



**LEGEND:**

C-1 FORMER CORE LOCATIONS

C-1 SUB-SLAB SOILS WITH LOW LEVELS OF CONTAMINATION (<100 PPB)

C-1 SUB-SLAB SOILS WITH MEDIUM LEVELS OF CONTAMINATION (100 TO 1,000 PPB)

C-1 SUB-SLAB SOILS WITH ELEVATED LEVELS OF CONTAMINATION (>1,000 PPB)

PPB = PARTS PER BILLION

NS = NOT SAMPLED


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## 2350 FIFTH AVENUE, NEW YORK, NY

## 1997 CORE SAMPLES - MAXIMUM PCE LEVELS IN INTERMEDIATE SOIL SAMPLES (80-149 INCHES)

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SCALE 1"=30'

FIGURE 3C

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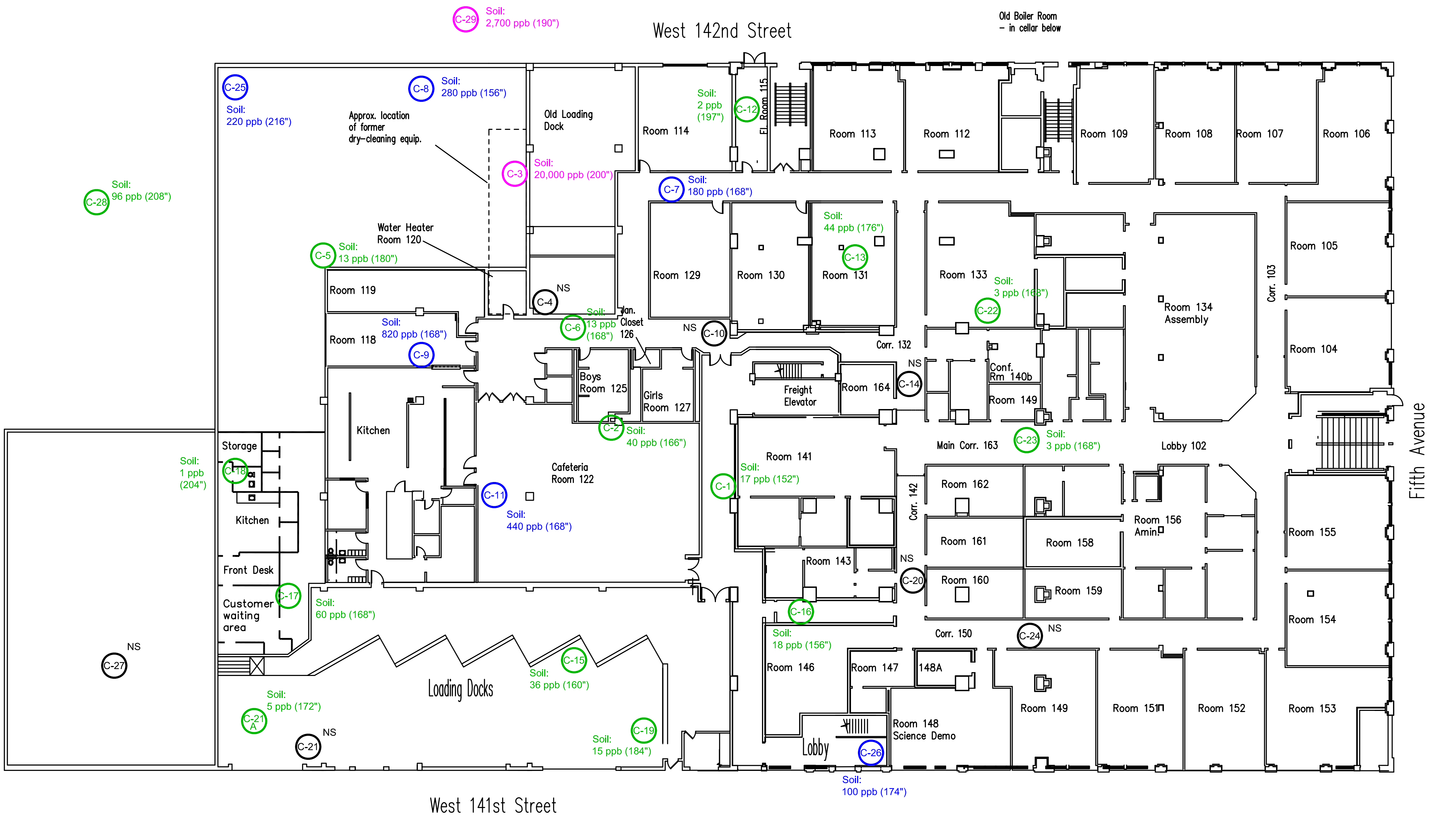



**LEGEND:**

- C-1 FORMER CORE LOCATIONS
- C-1 SUB-SLAB SOILS WITH LOW LEVELS OF CONTAMINATION (<100 PPB)
- C-1 SUB-SLAB SOILS WITH MEDIUM LEVELS OF CONTAMINATION (100 TO 1,000 PPB)
- C-1 SUB-SLAB SOILS WITH ELEVATED LEVELS OF CONTAMINATION (>1,000 PPB)

PPB = PARTS PER BILLION

NS = NOT SAMPLED

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# 2350 FIFTH AVENUE, NEW YORK, NY

## 1997 CORE SAMPLES - MAXIMUM PCE LEVELS IN INTERMEDIATE SOIL SAMPLES (150-219 INCHES)

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PROJECT NO. 08010

SCALE 1"=30'

FIGURE 3D

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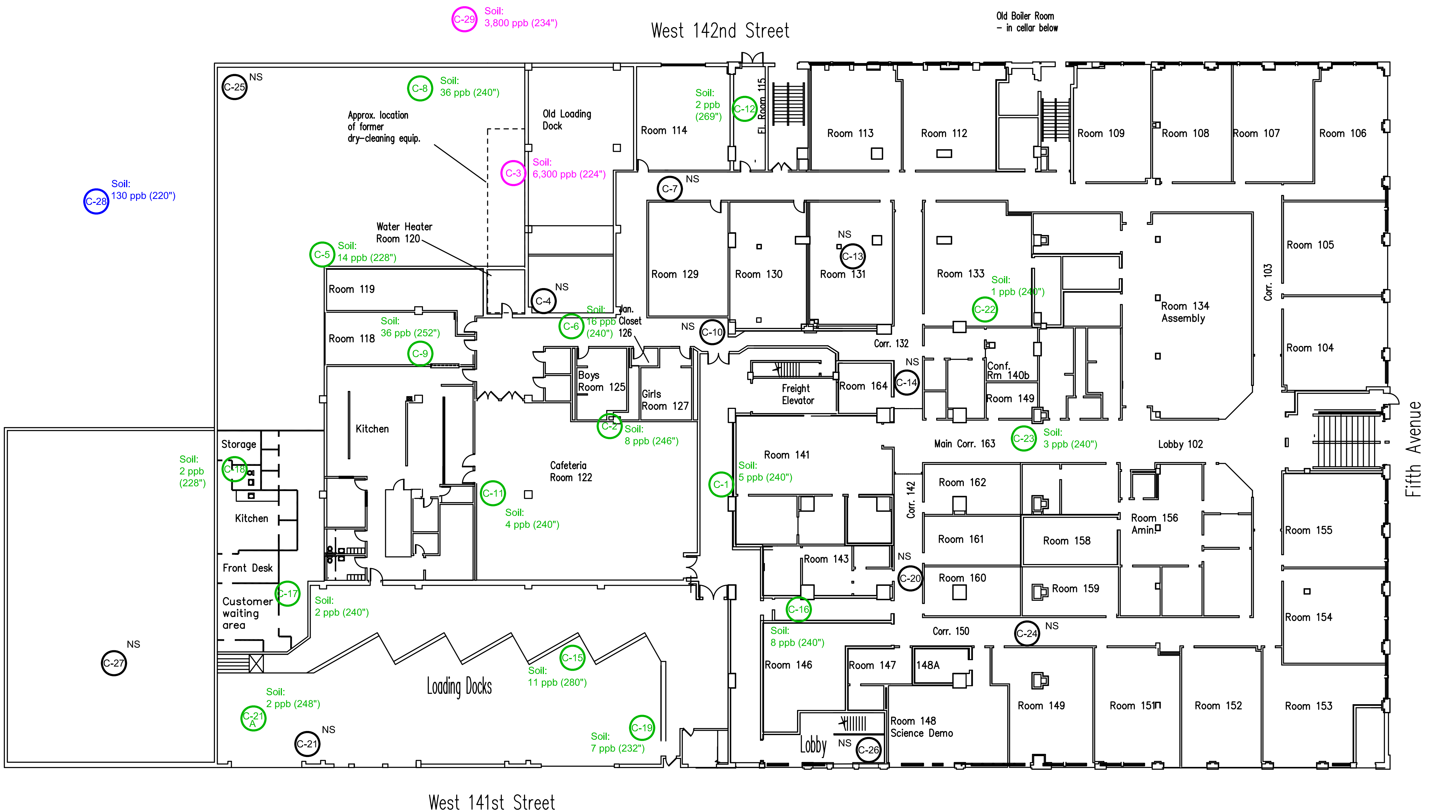


0' 15' 30' 60'
SCALE IN FEET

**LEGEND:**

C-1 FORMER CORE LOCATIONS

C-1 SUB-SLAB SOILS WITH LOW LEVELS OF CONTAMINATION (<100 PPB)

C-1 SUB-SLAB SOILS WITH MEDIUM LEVELS OF CONTAMINATION (100 TO 1,000 PPB)

C-1 SUB-SLAB SOILS WITH ELEVATED LEVELS OF CONTAMINATION (>1,000 PPB)

PPB = PARTS PER BILLION

NS = NOT SAMPLED

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2350 FIFTH AVENUE, NEW YORK, NY

1997 CORE SAMPLES - MAXIMUM PCE LEVELS IN DEEP SOIL SAMPLES (220-296 INCHES)

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PROJECT NO. 08010

SCALE 1"=30'

FIGURE 3E

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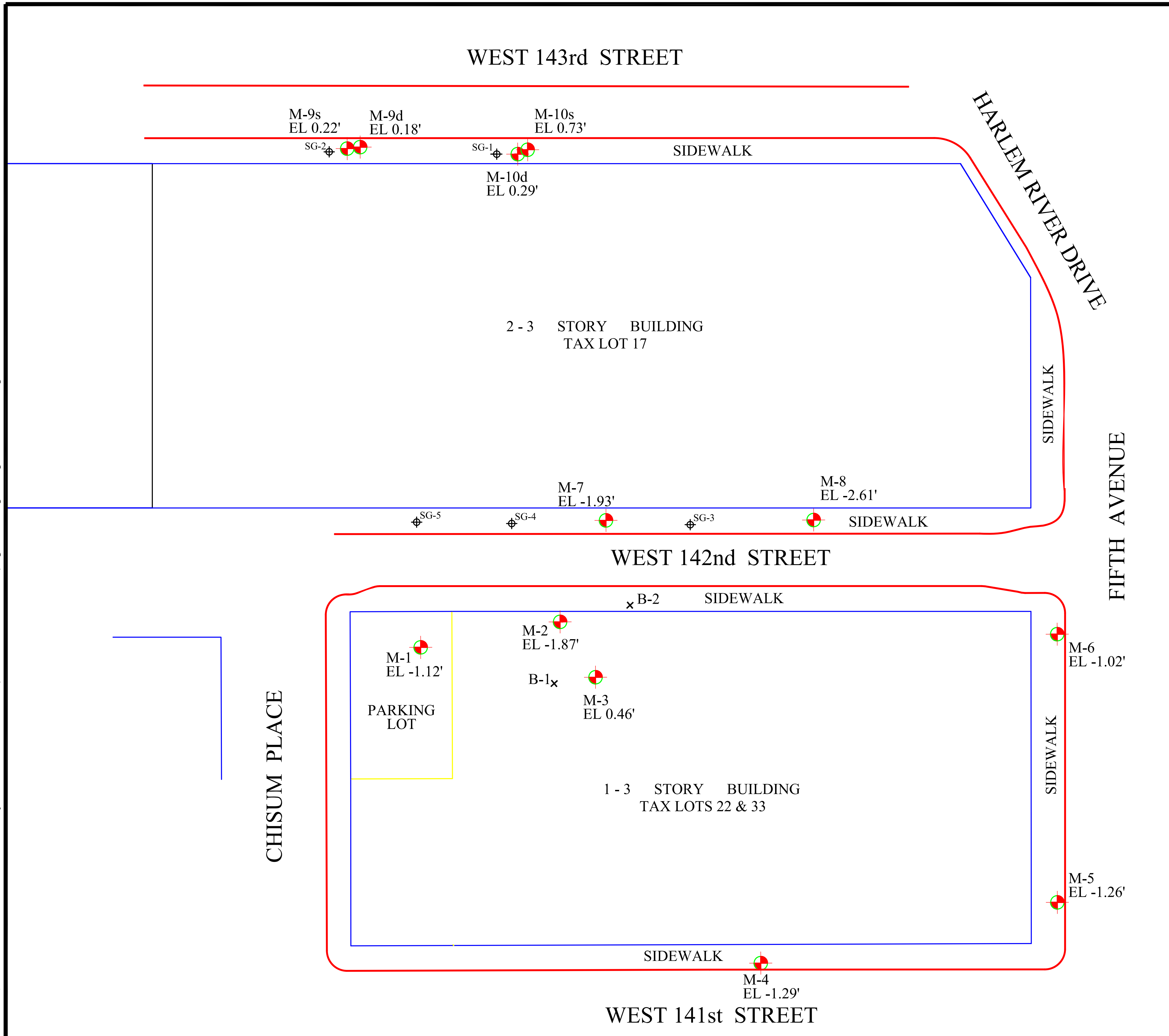
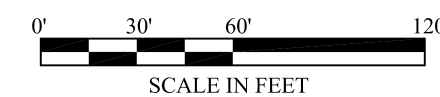



**GENERAL NOTES:**

1. BASE MAP PROVIDED BY MONTROSE LOCATIONS SURVEYED BY SURVEYED IN DEC 2006

2. ELEVATIONS AND ESTABLISHED GRADES SHOWN HEREON REFER TO THE BOROUGH OF MANHATTAN TOPOGRAPHICAL BUREAU DATUM WHICH IS 2.75 FEET ABOVE MEAN SEA LEVEL AT SANDY HOOK N.J. AS ESTABLISHED BY THE U.S COAST AND GEODETIC SURVEY IN 1929.




**LEGEND:**

M-5 EL -1.26' MONITORING WELL

B-1 BORING LOCATION

SG-3 SOIL GAS LOCATION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**BORING, WELL, AND SOIL GAS LOCATIONS FROM PSA, RI, AND SUPPLEMENTAL RI**

**2350 5th Avenue**

NEW YORK, NEW YORK

DATE
**02.07.07**

PROJECT NO.
**08010**

SCALE
**1"=60'**

FIGURE
**4**

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**2350 5th AVENUE**
NEW YORK, NEW YORK

**VIELE MAP**

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440 Park Avenue South, New York, N.Y. 10016

DATE
**1.29.07**

PROJECT No.
**08010**

SCALE
**NTS**

FIGURE
**5**

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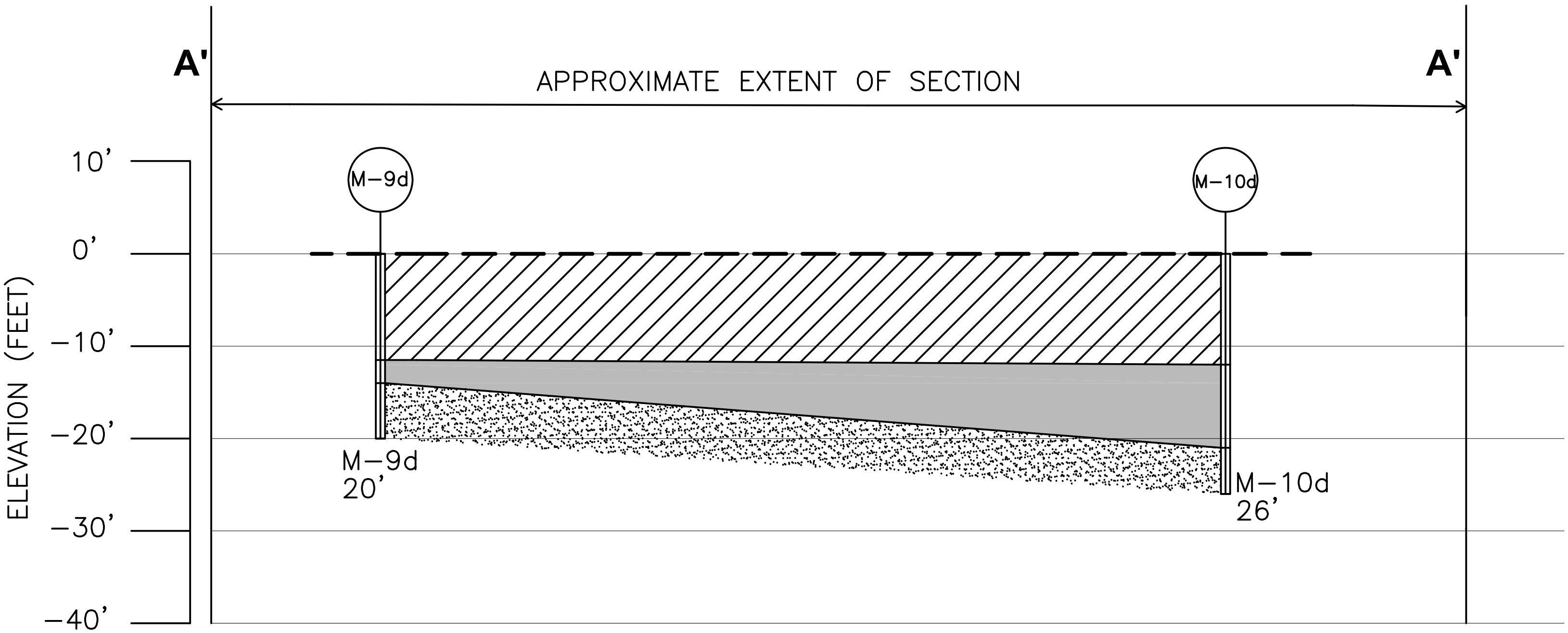
## PLAN VIEW

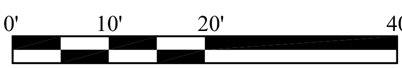



## SECTION A-A'

**GENERAL NOTES:**

1. BASE MAP PROVIDED BY MONTROSE
LOCATIONS SURVEYED BY SURVEYED IN DEC 2006

2. ELEVATIONS AND ESTABLISHED GRADES SHOWN HEREON REFER TO THE BOROUGH OF MANHATTAN TOPOGRAPHICAL BUREAU DATUM WHICH IS 2.75 FEET ABOVE MEAN SEA LEVEL AT SANDY HOOK N.J. AS ESTABLISHED BY THE U.S COAST AND GEODETIC SURVEY IN 1929.




SCALE IN FEET (1"=20')

**LEGEND:**

- SURFACE ELEVATION
- FILL
- GREY CLAY
- SAND
- M-9d EL 0.18' DEEP MONITORING WELL LOCATION

**2350 5th Avenue**

NEW YORK, NEW YORK

**GEOLOGICAL CROSS SECTION A-A'**

AKRF

Environmental Consultants

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| | |
|---|---|
| DATE | **7.18.07** |
| PROJECT No. | **08010** |
| SCALE | **AS SHOWN** |
| FIGURE | **6** |

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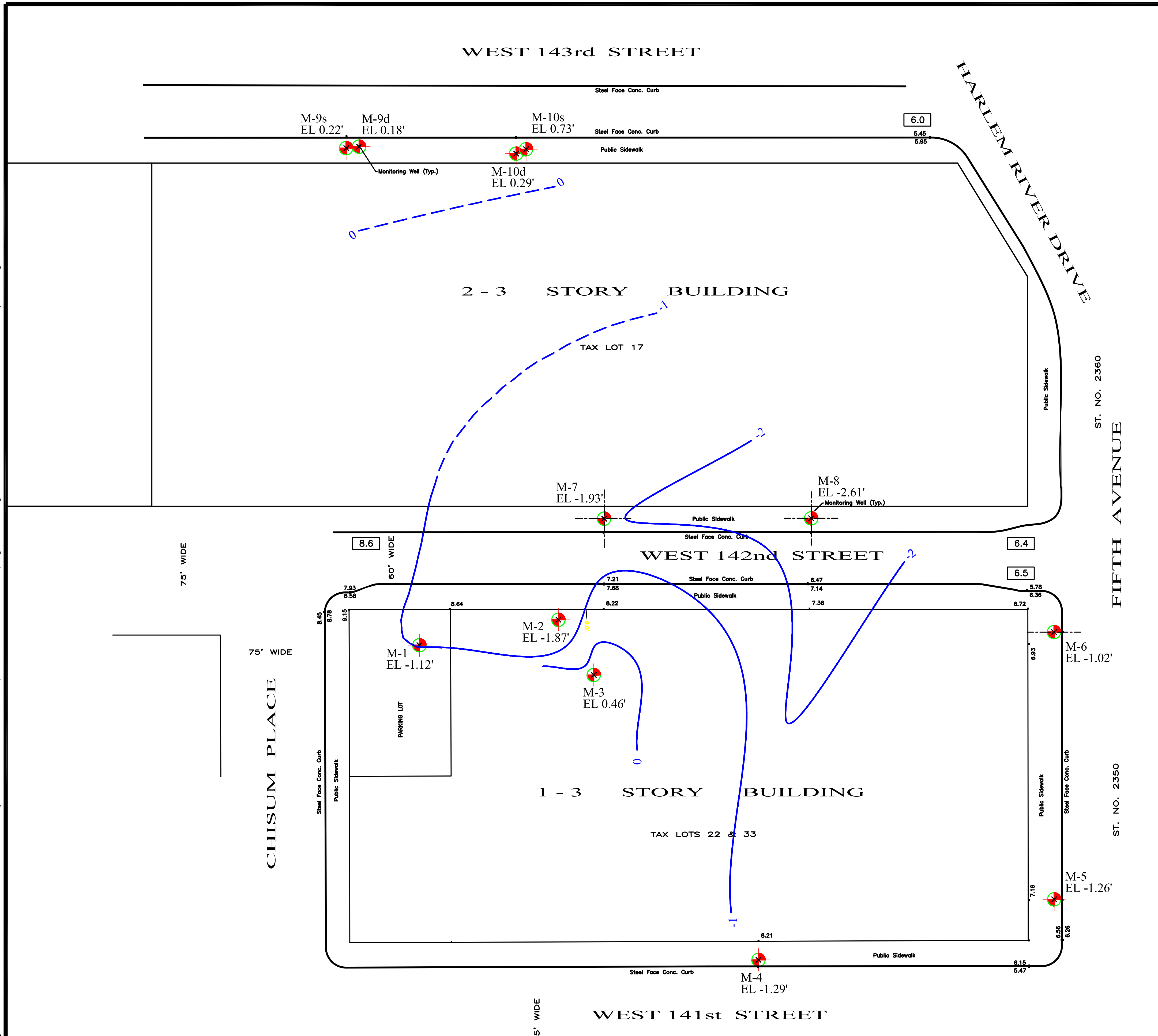


GENERAL NOTES:

1. BASE MAP PROVIDED BY MONTROSE LOCATIONS SURVEYED IN DECEMBER 2006.

2. WATER TABLE ELEVATIONS BY AKRF 11/14/06.

3. ELEVATIONS AND ESTABLISHED GRADES SHOWN HEREON REFER TO THE BOROUGH OF MANHATTAN TOPOGRAPHICAL BUREAU DATUM WHICH IS 2.75 FEET ABOVE MEAN SEA LEVEL AT SANDY HOOK N.J. AS ESTABLISHED BY THE U.S COAST AND GEODETIC SURVEY IN 1929.

0' 30' 60' 120'

SCALE IN FEET

**LEGEND:**

M-5 EL -1.26' MONITORING WELL

6.0 LEGAL GRADE

-1 GROUNDWATER ELEVATION CONTOURS (DASHED WHERE INFERRED)

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2350 5th Avenue
NEW YORK, NEW YORK

GROUNDWATER ELEVATIONS

DATE 7.18.07

PROJECT NO. 08010

SCALE 1"=60'

FIGURE 7

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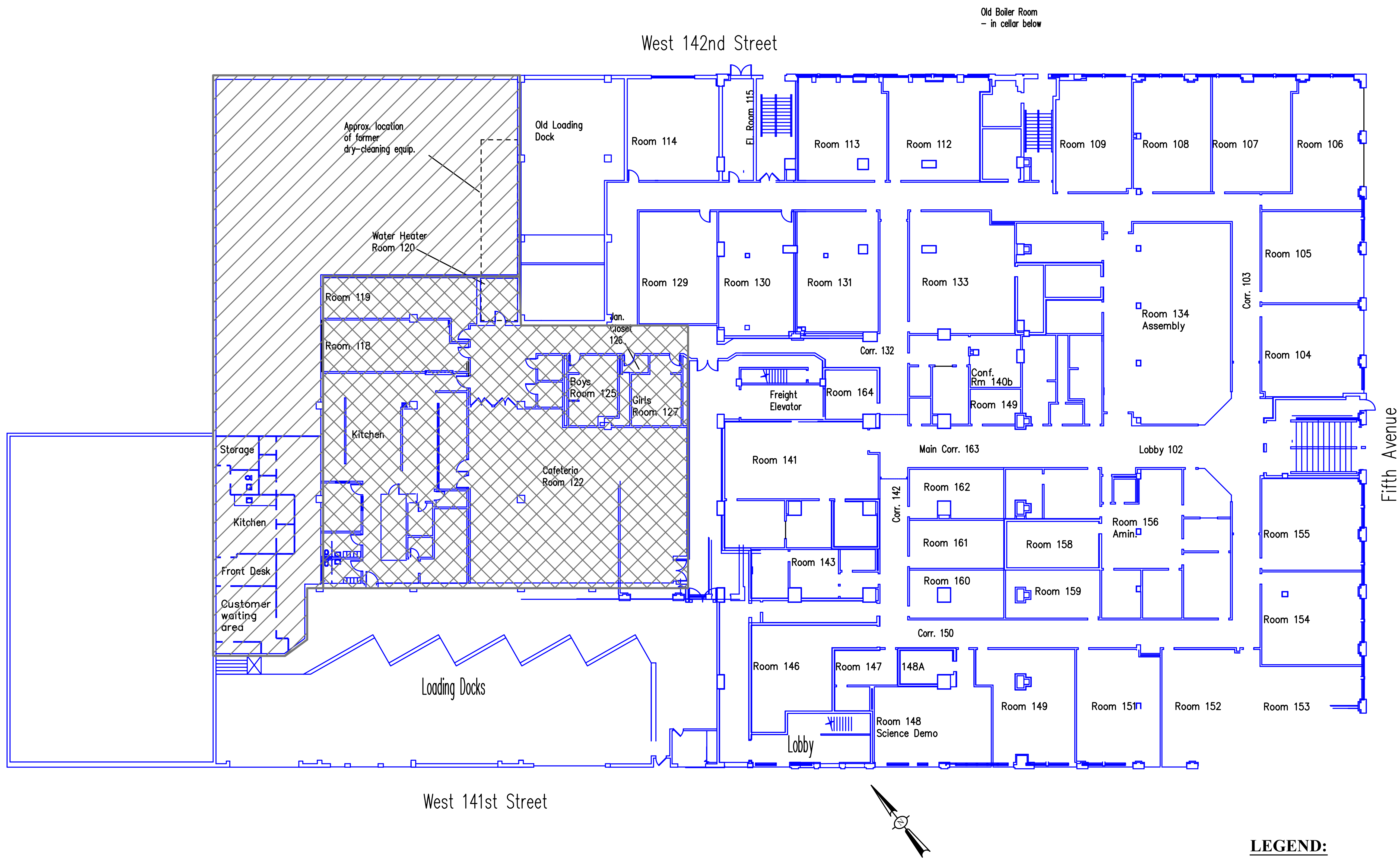
# AREAS OF SUB-SLAB INSULATION

2350 5th AVENUE
NEW YORK, NEW YORK




0' 15' 30' 60'
SCALE IN FEET

**LEGEND:**

INSULATION REMOVED

INSULATION
REMAINING

DATE
7.18.07

PROJECT NO.
08010

SCALE
1"30'

FIGURE
8

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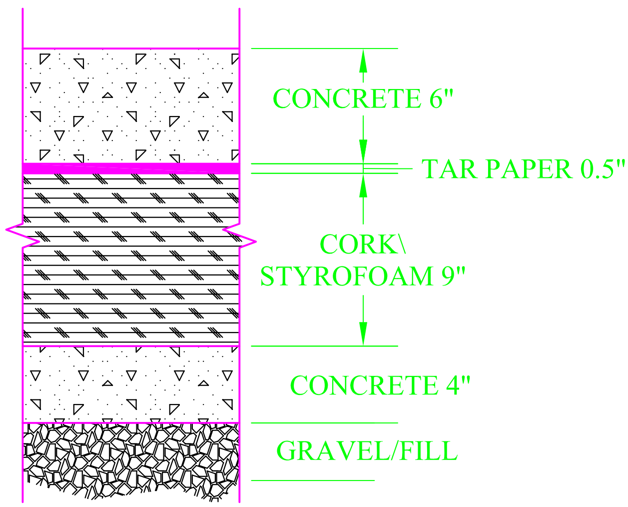
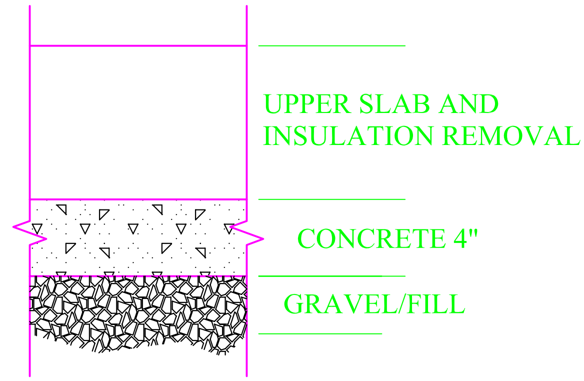
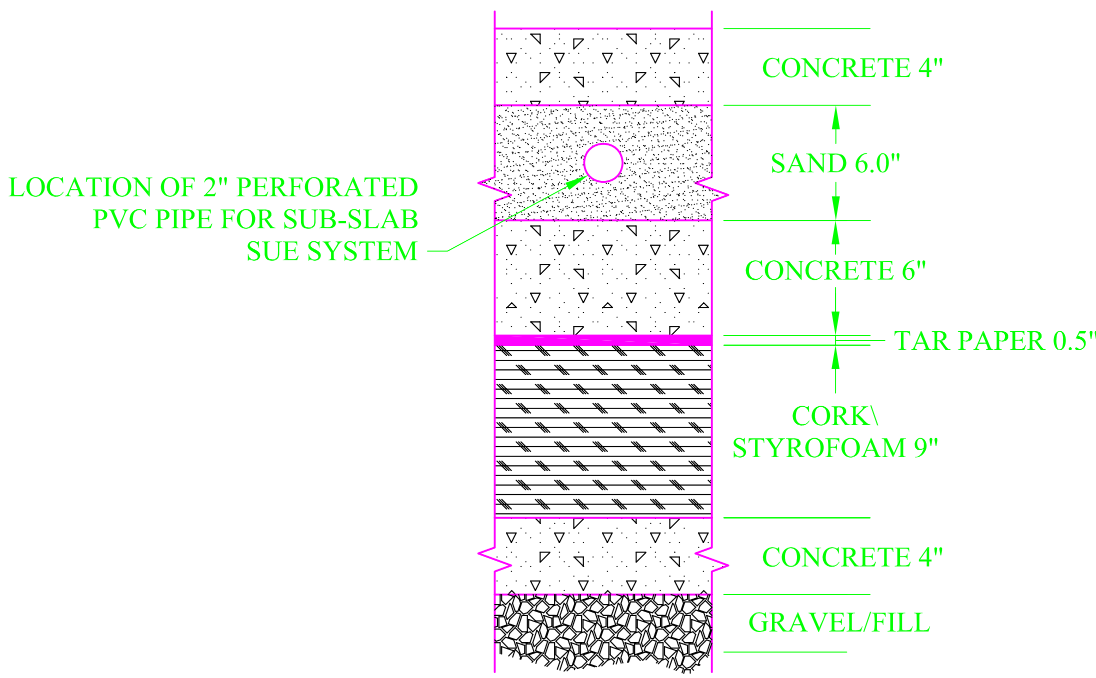



**TYPICAL ORIGINAL FLOOR**




**REMEDIATED AREA FLOOR**




**FORMER SCHOOL AREA FLOOR**

**2350 5TH AVENUE**
NEW YORK, NEW YORK

**CROSS SECTION OF INSULATED FLOORS**

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| | |
|---|---|
| DATE | 7.18.07 |
| PROJECT No. | 08010 |
| SCALE | NTS |
| FIGURE | 9 |

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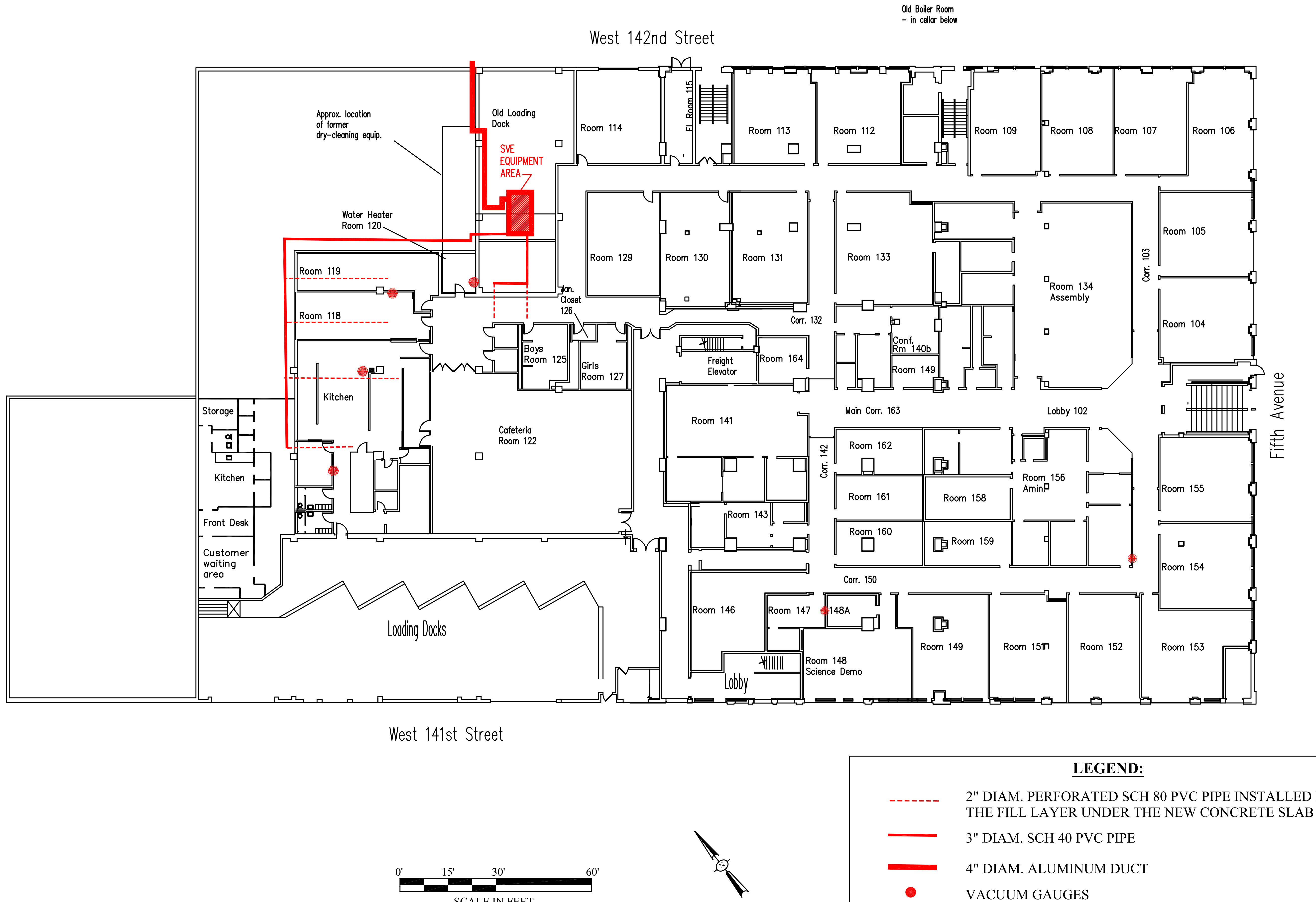


**LEGEND:**

- 2" DIAM. PERFORATED SCH 80 PVC PIPE INSTALLED IN THE FILL LAYER UNDER THE NEW CONCRETE SLAB
- 3" DIAM. SCH 40 PVC PIPE
- 4" DIAM. ALUMINUM DUCT
- VACUUM GAUGES
- ALARMS

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2350 5th AVENUE
NEW YORK, NEW YORK

VAPOR EXTRACTION SYSTEM

DATE
7.18.07

PROJECT NO.
08010

SCALE
1"30'

FIGURE
10

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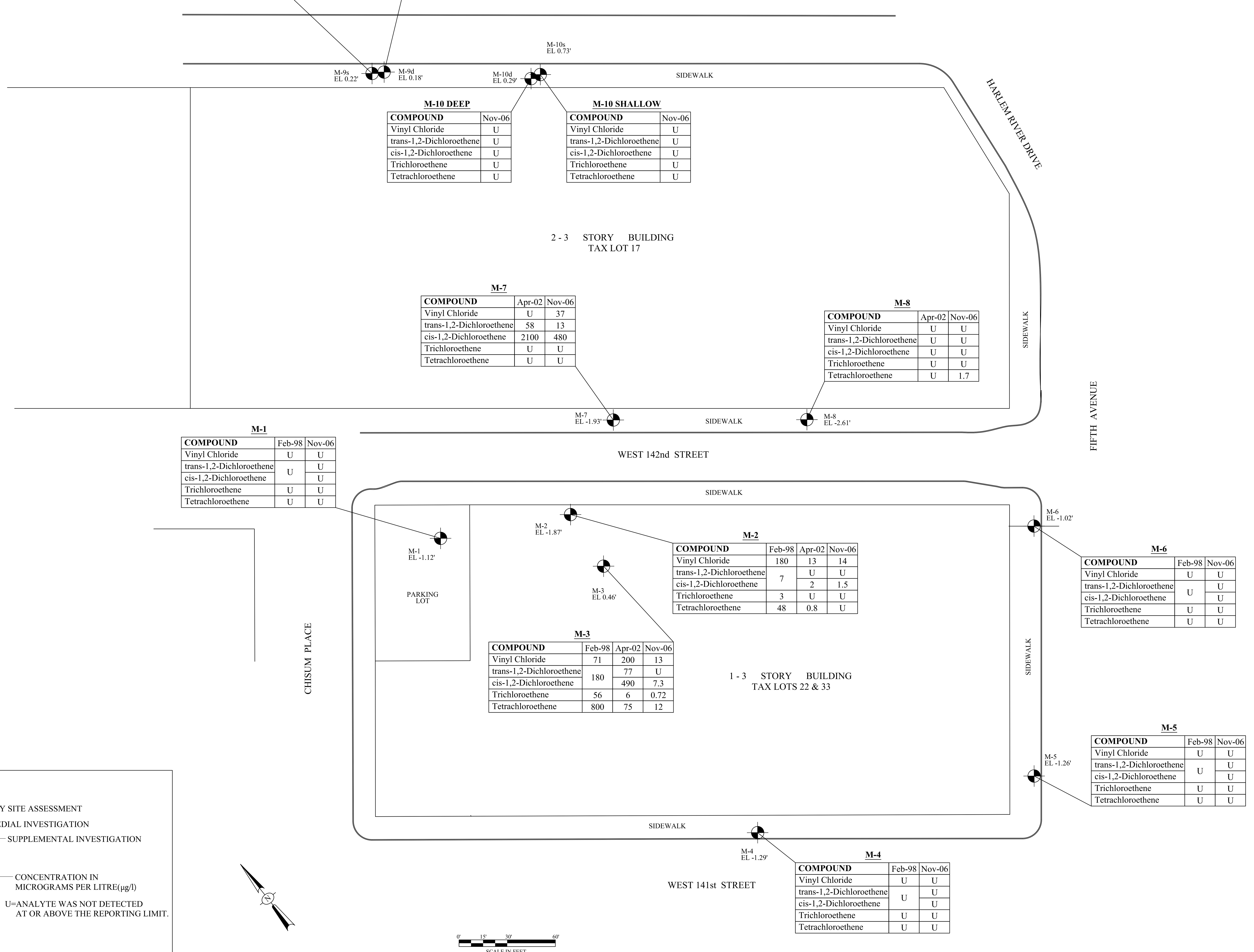


**M-9 SHALLOW**

| COMPOUND | Nov-06 |
|---|---|
| Vinyl Chloride | U |
| trans-1,2-Dichloroethene | U |
| cis-1,2-Dichloroethene | U |
| Trichloroethene | U |
| Tetrachloroethene | 0.54 |

**M-9 DEEP**

| COMPOUND | Nov-06 |
|---|---|
| Vinyl Chloride | U |
| trans-1,2-Dichloroethene | U |
| cis-1,2-Dichloroethene | U |
| Trichloroethene | U |
| Tetrachloroethene | U |

**M-10 DEEP**

| COMPOUND | Nov-06 |
|---|---|
| Vinyl Chloride | U |
| trans-1,2-Dichloroethene | U |
| cis-1,2-Dichloroethene | U |
| Trichloroethene | U |
| Tetrachloroethene | U |

**M-10 SHALLOW**

| COMPOUND | Nov-06 |
|---|---|
| Vinyl Chloride | U |
| trans-1,2-Dichloroethene | U |
| cis-1,2-Dichloroethene | U |
| Trichloroethene | U |
| Tetrachloroethene | U |

**M-7**

| COMPOUND | Apr-02 | Nov-06 |
|---|---|---|
| Vinyl Chloride | U | 37 |
| trans-1,2-Dichloroethene | 58 | 13 |
| cis-1,2-Dichloroethene | 2100 | 480 |
| Trichloroethene | U | U |
| Tetrachloroethene | U | U |

**M-8**

| COMPOUND | Apr-02 | Nov-06 |
|---|---|---|
| Vinyl Chloride | U | U |
| trans-1,2-Dichloroethene | U | U |
| cis-1,2-Dichloroethene | U | U |
| Trichloroethene | U | U |
| Tetrachloroethene | U | 1.7 |

**M-1**

| COMPOUND | Feb-98 | Nov-06 |
|---|---|---|
| Vinyl Chloride | U | U |
| trans-1,2-Dichloroethene | U | U |
| cis-1,2-Dichloroethene | | U |
| Trichloroethene | U | U |
| Tetrachloroethene | U | U |

**M-2**

| COMPOUND | Feb-98 | Apr-02 | Nov-06 |
|---|---|---|---|
| Vinyl Chloride | 180 | 13 | 14 |
| trans-1,2-Dichloroethene | 7 | U | U |
| cis-1,2-Dichloroethene | | 2 | 1.5 |
| Trichloroethene | 3 | U | U |
| Tetrachloroethene | 48 | 0.8 | U |

**M-6**

| COMPOUND | Feb-98 | Nov-06 |
|---|---|---|
| Vinyl Chloride | U | U |
| trans-1,2-Dichloroethene | U | U |
| cis-1,2-Dichloroethene | | U |
| Trichloroethene | U | U |
| Tetrachloroethene | U | U |

**M-3**

| COMPOUND | Feb-98 | Apr-02 | Nov-06 |
|---|---|---|---|
| Vinyl Chloride | 71 | 200 | 13 |
| trans-1,2-Dichloroethene | 180 | 77 | U |
| cis-1,2-Dichloroethene | | 490 | 7.3 |
| Trichloroethene | 56 | 6 | 0.72 |
| Tetrachloroethene | 800 | 75 | 12 |

**M-5**

| COMPOUND | Feb-98 | Nov-06 |
|---|---|---|
| Vinyl Chloride | U | U |
| trans-1,2-Dichloroethene | U | U |
| cis-1,2-Dichloroethene | | U |
| Trichloroethene | U | U |
| Tetrachloroethene | U | U |

**M-4**

| COMPOUND | Feb-98 | Nov-06 |
|---|---|---|
| Vinyl Chloride | U | U |
| trans-1,2-Dichloroethene | U | U |
| cis-1,2-Dichloroethene | | U |
| Trichloroethene | U | U |
| Tetrachloroethene | U | U |

**LEGEND:**

WELL LOCATION — PRELIMINARY SITE ASSESSMENT — REMEDIAL INVESTIGATION — SUPPLEMENTAL INVESTIGATION

**M-2**

| COMPOUND | Feb-98 | Apr-02 | Nov-06 |
|---|---|---|---|
| Vinyl Chloride | 180 | 13 | 14 |
| trans-1,2-Dichloroethene | 7 | U | U |
| cis-1,2-Dichloroethene | | 2 | 1.5 |
| Trichloroethene | 3 | U | U |
| Tetrachloroethene | 48 | 0.8 | U |

CONCENTRATION IN MICROGRAMS PER LITRE(μg/l)

U=ANALYTE WAS NOT DETECTED AT OR ABOVE THE REPORTING LIMIT.

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**2350 5th AVENUE**
NEW YORK, NEW YORK

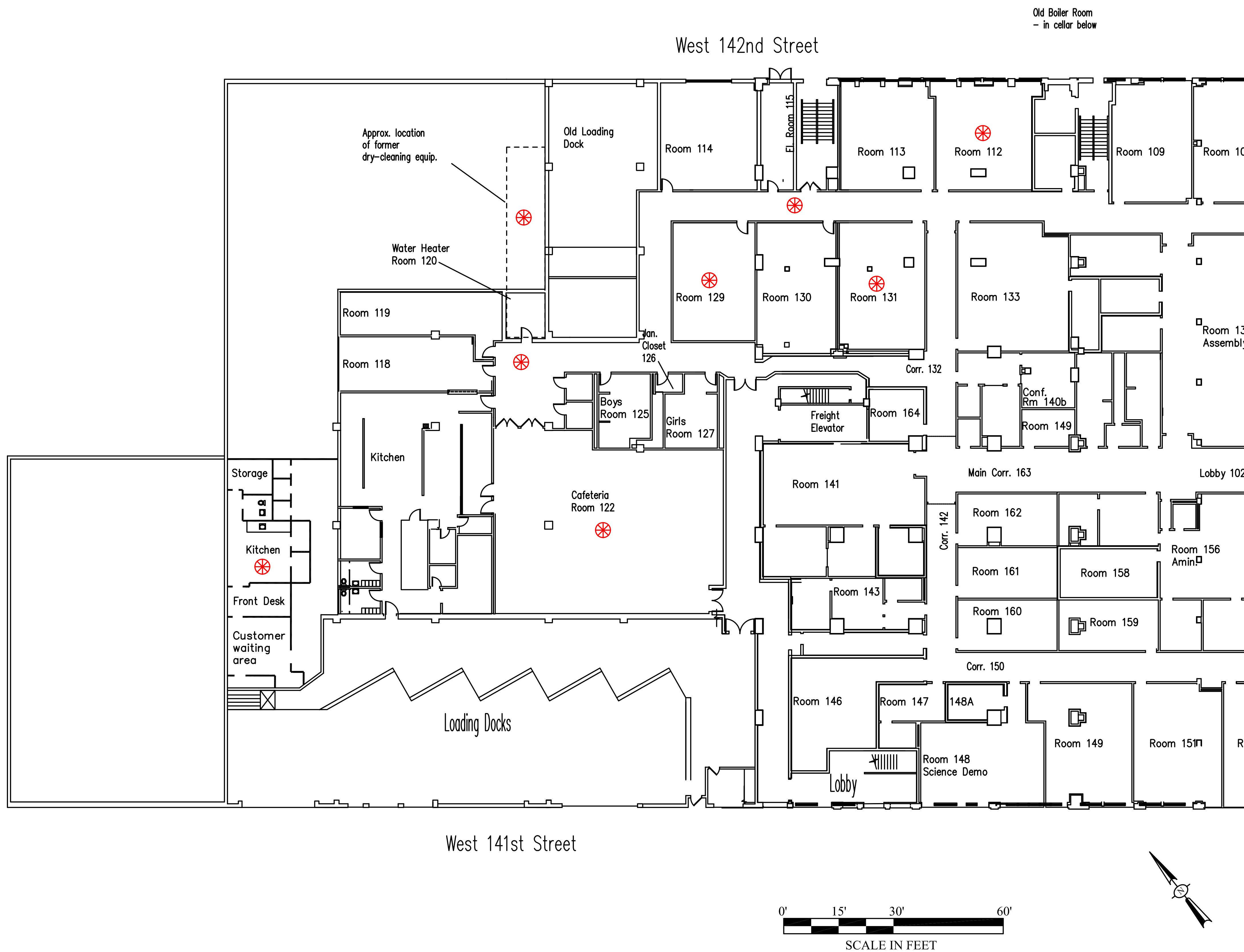
**VOC CONCENTRATIONS IN GROUNDWATER SAMPLES**

DATE **7.18.07**

SCALE **1"=30'**

PROJECT No. **08010**

FIGURE **11**




**LEGEND:**

AIR SAMPLING LOCATION

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2350 5th AVENUE
NEW YORK, NEW YORK

**INDOOR AIR SAMPLING LOCATIONS**

DATE
7.18.07

PROJECT NO.
08010

SCALE
1"30'

FIGURE
12

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# TABLES

**Table 1**
**2350 Fifth Avenue, New York, NY**
Supplemental Remedial Investigation
*Groundwater Elevations*

| Wells | Top of Casing (TOC) (feet elevation) | Water Table (feet below TOC) *11/14/2006* | Water Table (feet elevation) *11/14/2006* |
|---|---|---|---|
| **M-1** | 8.39 | 9.51 | -1.12 |
| **M-2** | 10.58 | 12.45 | -1.87 |
| **M-3** | 10.79 | 10.33 | 0.46 |
| **M-4** | 7.28 | 8.57 | -1.29 |
| **M-5** | 6.37 | 7.63 | -1.26 |
| **M-6** | 6.37 | 7.39 | -1.02 |
| **M-7** | 7.77 | 9.7 | -1.93 |
| **M-8** | 6.96 | 9.57 | -2.61 |
| **M-9 shallow** | 7.42 | 7.2 | 0.22 |
| **M-9 deep** | 7.81 | 7.63 | 0.18 |
| **M-10 shallow** | 6.26 | 5.53 | 0.73 |
| **M-10 deep** | 7.11 | 6.82 | 0.29 |

**Notes:**
All elevations refer to the Borough of Manhattan Topographical Bureau Datum, which is 2.75 feet above mean sea level at Sandy Hook N.J. as established by the U.S. Coast and Geodetic Survey in 1929.

**Table 2a**
**2350 Fifth Avenue, New York, NY**
Preliminary Site Assessment - Soil Analytical Data
*Volatile Organic Compounds*

| **Sample ID**<br>**Boring Location**<br>**Sample Depth (feet)**<br>**Date Sampled**<br>**Units** | **NYSDEC TAGM # 4046 Recommended Soil Cleanup ug/kg (ppb)** | **B-1 (2-4')**<br>B-1<br>2-4'<br>Jan-98<br>ug/kg (ppb) | **B-1 (4-6')**<br>B-1<br>4-6'<br>Jan-98<br>ug/kg (ppb) | **B-1 (6-8')**<br>B-1<br>6-8'<br>Jan-98<br>ug/kg (ppb) | **B-1 (8-10')**<br>B-1<br>8-10'<br>Jan-98<br>ug/kg (ppb) | **B-1 (10-12')**<br>B-1<br>10-12'<br>Jan-98<br>ug/kg (ppb) | **B-2 (0-2')**<br>B-2<br>0-2'<br>Jan-98<br>ug/kg (ppb) | **B-2 (2-4')**<br>B-2<br>2-4'<br>Jan-98<br>ug/kg (ppb) | **B-2 (5-7')**<br>B-2<br>5-7'<br>Jan-98<br>ug/kg (ppb) |
|---|---|---|---|---|---|---|---|---|---|
| ***Volatile Organic Compounds*** | | | | | | | | | |
| Chloromethane | -- | U | U | U | U | U | U | U | U |
| Bromomethane | -- | U | U | U | U | U | U | U | U |
| Vinyl Chloride | 200 | U | U | U | U | U | U | U | U |
| Chloroethane | 1,900 | U | U | U | U | U | U | U | U |
| Methylene Chloride | 100 | 4 JB | 5 JB | 5 JB | 5 JB | 6 JB | 6 JB | 4 JB | 6 JB |
| Acetone | 200 | 27 | 10 J | 20 | 26 B | 180 | U | 6 JB | 9 JB |
| Carbon Disulfide | 2,700 | U | U | U | U | U | U | U | U |
| 1,1-Dichloroethene | 400 | U | U | U | U | U | U | U | U |
| 1,1-Dichloroethane | 100 | U | U | U | U | U | U | U | U |
| 1,2-Dichloroethene (total) | 250 | 2 J | 3 J | 6 J | 7 J | U | 7 J | 2 J | 14 J |
| Chloroform | 300 | 8 J | U | 4 J | 7 J | 58 | U | U | U |
| 1,2-Dichloroethane | 100 | U | U | U | U | U | U | U | U |
| 2-Butanone | 300 | U | U | U | U | U | U | U | U |
| 1,1,1-Trichloroethane | 800 | U | U | U | U | U | U | U | U |
| Carbon Tetrachloride | 600 | U | U | U | U | U | U | U | U |
| Bromodichloromethane | -- | U | U | U | U | U | U | U | U |
| 1,2-Dichloropropane | -- | U | U | U | U | U | U | U | U |
| Cis-1,3-dichloropropene | -- | U | U | U | U | U | U | U | U |
| Trichloroethene | 700 | 4 J | 9 J | 6 J | 11 J | U | 7 J | 3 J | 5 J |
| Dibromochloromethane | -- | 3 J | U | U | U | U | U | U | U |
| 1,1,2-Trichloroethane | -- | U | U | U | U | U | U | U | U |
| Benzene | 60 | U | U | U | U | U | U | U | U |
| Trans-1,3-Dichloropropene | -- | U | U | U | U | U | U | U | U |
| Bromoform | -- | U | U | U | U | U | U | U | U |
| 4-Methyl-2-Pentanone | 1,000 | U | U | U | U | U | U | U | U |
| 2-Hexanone | -- | U | U | U | U | U | U | U | U |
| Tetrachloroethene | 1,400 | 150 | 36 | 45 | 22 | 4 J | 430 | 140 | 180 |
| 1,1,2,2-Tetrachloroethane | 600 | U | U | U | U | U | U | U | U |
| Toluene | 1,500 | 12 | U | U | U | U | U | U | U |
| Chlorobenzene | 1,700 | U | U | U | U | U | U | U | U |
| Ethylbenzene | 5,500 | 2 J | U | U | U | U | U | U | U |
| Styrene | -- | U | U | U | U | U | U | U | U |
| Xylenes (total) | 1,200 | 38 | 4 J | U | U | U | U | U | U |

**Notes:**
NYSDEC TAGM = New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum
ug/kg = microgram per kilogram
ppb = parts per billion
U = Undetected
J = Estimated Value, below quantification limit
B = Compound found in the blank
D = Value from sample run at a secondary dilution

**Table 2a**
**2350 Fifth Avenue, New York, NY**
Preliminary Site Assessment - Soil Analytical Data
*Volatile Organic Compounds*

| Sample ID<br>Boring Location<br>Sample Depth (feet)<br>Date Sampled<br>Units | NYSDEC TAGM # 4046 Recommended Soil Cleanup ug/kg (ppb) | B-2 (9-11')<br>B-2<br>9-11'<br>Jan-98<br>ug/kg (ppb) | B-2 (10-12')<br>B-2<br>10-12'<br>Jan-98<br>ug/kg (ppb) | M-2 (0.5-2.5')<br>M-2<br>0.5-2.5'<br>Jan-98<br>ug/kg (ppb) | M-2 (2.5-4.5')<br>M-2<br>2.5-4.5'<br>Jan-98<br>ug/kg (ppb) | M-2 (5-7')<br>M-2<br>5-7'<br>Jan-98<br>ug/kg (ppb) | M-2 (7-9')<br>M-2<br>7-9'<br>Jan-98<br>ug/kg (ppb) | M-2 (9-11')<br>M-2<br>9-11'<br>Jan-98<br>ug/kg (ppb) | M-3 (0.5-2')<br>M-3<br>0.5-2'<br>Jan-98<br>ug/kg (ppb) |
|---|---|---|---|---|---|---|---|---|---|
| ***Volatile Organic Compounds*** | | | | | | | | | |
| Chloromethane | -- | U | U | U | U | U | U. | U | U |
| Bromomethane | -- | U | U | U | U | U | U | | U |
| Vinyl Chloride | 200 | U | U | U | U | U | U | U | U |
| Chloroethane | 1,900 | U | U | U | U | U | U | U | U |
| Methylene Chloride | 100 | 44 JB | 6 JB | 5 JB | 5 JB | 6 JB | 6 JB | 4 JB | 7 JB |
| Acetone | 200 | 36 JB | 180 | 13 | 11 J | 14 | 28 B | 15 | 10 |
| Carbon Disulfide | 2,700 | U | U | U | U | U | U | U | U |
| 1,1-Dichloroethene | 400 | U | U | U | U | U | U | . U | U |
| 1,1-Dichloroethane | 100 | U | U | U | U | U | U | U | U |
| 1,2-Dichloroethene (total) | 250 | U | U | 3 J | 4 J | 2 J | U | 42 | 17 |
| Chloroform | 300 | U | 58 | 3 J | U | 4 J | 8 J | 4 J | 3 J |
| 1,2-Dichloroethane | 100 | U | U | U | U | U | U | U | U |
| 2-Butanone | 300 | U | U | U | U | U | U | U | U |
| 1,1,1-Trichloroethane | 800 | U | U | U | U | U | U | U | U |
| Carbon Tetrachloride | 600 | U | U | U | U | U | U | U | U |
| Bromodichloromethane | -- | U | U | U | U | U | U | U | U |
| 1,2-Dichloropropane | -- | U | U | U | U | U | U | U | U |
| Cis-1,3-dichloropropene | -- | U | U | U | U | U | U | U | U |
| Trichloroethene | 700 | U | U | 7 J | 26 J | 3 J | 11 J | 130 | 34 |
| Dibromochloromethane | -- | U | U | U | U | U | U | U | U |
| 1,1,2-Trichloroethane | -- | U | U | U | U | U | U | U | U |
| Benzene | 60 | U | U | U | U | U | U | U | U |
| Trans-1,3-Dichloropropene | -- | U | U | U | U | U | U | U | U |
| Bromoform | -- | U | U | U | U | U | U | U | U |
| 4-Methyl-2-Pentanone | 1,000 | U | U | U | U | U | U | U | U |
| 2-Hexanone | -- | U | U | U | U | U | U | U | U |
| Tetrachloroethene | 1,400 | 77 | 4 J | 610 | 570 | 110 | 100 | 22000 | **20000** |
| 1,1,2,2-Tetrachloroethane | 600 | U | U | U | U | U | U | U | U |
| Toluene | 1,500 | U | U | 1 J | 3 J | U | U | U | 2 J |
| Chlorobenzene | 1,700 | U | U | U | U | U | U | U | U |
| Ethylbenzene | 5,500 | U | U | 1J | U | U | U | U | U |
| Styrene | -- | U | U | U | U | U | U | U | U |
| Xylenes (total) | 1,200 | 19 J | U | U | 4 J | 28 | 6 J | U | 2 J |

**Notes:**
NYSDEC TAGM = New York State Department of E
ug/kg = microgram per kilogram
ppb = parts per billion
U = Undetected
J = Estimated Value, below quantification limit
B = Compound found in the blank
D = Value from sample run at a secondary dilution

**Table 2a**
**2350 Fifth Avenue, New York, NY**
Preliminary Site Assessment - Soil Analytical Data
*Volatile Organic Compounds*

| Sample ID<br>Boring Location<br>Sample Depth (feet)<br>Date Sampled<br>Units | NYSDEC TAGM # 4046 Recommended Soil Cleanup ug/kg (ppb) | M-3 (3-5')<br>M-3<br>3-5'<br>Jan-98<br>ug/kg (ppb) | M-3 (6-8')<br>M-3<br>6-8'<br>Jan-98<br>ug/kg (ppb) | M-3 (8-10')<br>M-3<br>8-10'<br>Jan-98<br>ug/kg (ppb) | M-3 (10-12')<br>M-3<br>10-12'<br>Jan-98<br>ug/kg (ppb) | M-3 (12-14')<br>M-3<br>12-14'<br>Jan-98<br>ug/kg (ppb) |
|---|---|---|---|---|---|---|
| ***Volatile Organic Compounds*** | | | | | | |
| Chloromethane | -- | U | U | U | U | U |
| Bromomethane | -- | U | U | U | U | U |
| Vinyl Chloride | 200 | U | 1 J | 8 J | **510** | 19 |
| Chloroethane | 1,900 | U | U | U | U | U |
| Methylene Chloride | 100 | 5 JB | 5 JB | 5 JB | 8 JB | 9 JB |
| Acetone | 200 | 7 JB | 8 JB | 6 B | 71 B | 22 B |
| Carbon Disulfide | 2,700 | U | U | U | 3 J | U |
| 1,1-Dichloroethene | 400 | U | U | U | U | U |
| 1,1-Dichloroethane | 100 | U | U | U | U | U |
| 1,2-Dichloroethene (total) | 250 | 31 | 87 | **1700 JD** | **2300** | 82 |
| Chloroform | 300 | U | 3 J | U | 21 | 9 J |
| 1,2-Dichloroethane | 100 | U | U | U | U | U |
| 2-Butanone | 300 | U | U | U | U | U |
| 1,1,1-Trichloroethane | 800 | U | U | U | U | U |
| Carbon Tetrachloride | 600 | U | U | U | U | U |
| Bromodichloromethane | -- | U | U | U | U | U |
| 1,2-Dichloropropane | -- | U | U | U | U | U |
| Cis-1,3-dichloropropene | -- | U | U | U | U | U |
| Trichloroethene | 700 | 36 | 79 | **1600 JD** | 240 | 4 J |
| Dibromochloromethane | -- | U | U | U | U | U |
| 1,1,2-Trichloroethane | -- | U | U | U | U | U |
| Benzene | 60 | U | U | U | U | U |
| Trans-1,3-Dichloropropene | -- | U | U | U | U | U |
| Bromoform | -- | U | U | U | U | U |
| 4-Methyl-2-Pentanone | 1,000 | U | U | U | U | U |
| 2-Hexanone | -- | U | U | U | U | U |
| Tetrachloroethene | 1,400 | **6300** | **10000** | **84000** | **11000** | 140 |
| 1,1,2,2-Tetrachloroethane | 600 | U | U | U | U | U |
| Toluene | 1,500 | U | U | 1 J | 2 J | U |
| Chlorobenzene | 1,700 | U | U | 2 J | U | U |
| Ethylbenzene | 5,500 | U | U | U | U | U |
| Styrene | -- | U | U | U | U | U |
| Xylenes (total) | 1,200 | 1 J | U | U | U | U |

**Notes:**
NYSDEC TAGM = New York State Department of E
ug/kg = microgram per kilogram
ppb = parts per billion
U = Undetected
J = Estimated Value, below quantification limit
B = Compound found in the blank
D = Value from sample run at a secondary dilution

## Table 2b

**2350 Fifth Avenue, New York, NY**

Remedial Investigation - Soil Analytical Data

*Volatile Organic Compounds*

| Sample ID | NYSDEC TAGM # 4046 | M-7 (10-12') | M-7D (10-12') | M-8 (10-12') | BLIND(M-8 10-12') | FB | TB |
|---|---|---|---|---|---|---|---|
| Boring Location | Recommended | M-7 | M-7 | M-8 | M-8 | -- | -- |
| Sample Depth (feet) | Soil Cleanup | 10-12' | 10-12' | 10-12' | 10-12' | -- | -- |
| Date Sampled | Objective | 3/26/2002 | 3/26/2002 | 3/26/2002 | 3/26/2002 | 3/26/2002 | 3/26/2002 |
| Dilution | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Units | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/l (ppb) | ug/l (ppb) |
| ***Volatile Organic Compounds*** | | | Duplicate Sample of M-7 | | Duplicate Sample of M-8 (10-12') | Field Blank | Trip Blank |
| Chloromethane | -- | 1 U | 1 U | 1 U | 1 U | 0.9 U | 0.9 U |
| Bromomethane | -- | 3 U | 3 U | 3 U | 3 U | 2 U | 2 U |
| Vinyl Chloride | 200 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.3 U | 0.3 U |
| Chloroethane | 1900 | 0.9 U | 0.9 U | 0.9 U | 0.9 U | 4 U | 4 U |
| Methylene Chloride | 100 | 2 UB | 2 UB | 2 U | 2 UB | 0.2 U | 0.2 U |
| Acetone | 200 | 34 B | 52 B | 35 B | 41 B | 0.9 UB | 3 JB |
| Carbon Disulfide | 2700 | 5 J | 4 J | 0.3 UB | 5 J | 0.3 U | 0.3 U |
| Vinyl Acetate | -- | 4 U | 4 U | 4 U | 4 U | 0.7 U | 0.7 U |
| 1,1-Dichloroethene | 400 | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.6 U |
| 1,1-Dichloroethane | 200 | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.3 U | 0.3 U |
| cis-1,2-Dichloroethene | -- | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.3 U | 0.3 U |
| trans-1,2-Dichloroethene | 300 | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.3 U | 0.3 U |
| Chloroform | 300 | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.9 U | 0.9 U |
| 1,2-Dichloroethane | 100 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.3 U | 0.3 U |
| 2-Butanone | 300 | 9 J | 17 | 4 U | 4 U | 0.4 UB | 0.4 UB |
| 1,1,1-Trichloroethane | 800 | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.2 U | 0.2 U |
| Carbon Tetrachloride | 600 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.2 U |
| Bromodichloromethane | -- | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.2 U | 0.2 U |
| 1,2-Dichloropropane | -- | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.3 U | 0.3 U |
| cis-1,3-Dichloropropene | -- | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.3 U | 0.3 U |
| Trichloroethene | 700 | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.8 U | 0.8 U |
| Dibromochloromethane | -- | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.2 U |
| 1,1,2-Trichloroethane | -- | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.2 U | 0.2 U |
| Benzene | 60 | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.3 U | 0.3 U |
| trans-1,3-Dichloropropene | -- | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.2 U | 0.2 U |
| Bromoform | -- | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.2 U | 0.2 U |
| 4-Methyl-2-Pentanone | 1000 | 4 U | 4 U | 4 U | 4 U | 0.4 U | 0.4 U |
| 2-Hexanone | -- | 5 U | 5 U | 5 U | 5 U | 0.8 U | 0.8 U |
| Tetrachloroethene | 1400 | 12 | 10 | 2 J | 20 | 0.3 U | 0.3 U |
| Toluene | 1500 | 0.5 J | 0.5 J | 0.6 U | 0.6 U | 0.3 U | 0.3 U |
| 1,1,2,2-Tetrachloroethane | 600 | 1 U | 1 U | 1 U | 1 U | 0.3 U | 0.3 U |
| Chlorobenzene | 1700 | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.2 U | 0.2 U |
| Ethylbenzene | 5500 | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.3 U | 0.3 U |
| Styrene | -- | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.2 U | 0.2 U |
| Xylene (total) | 1200 | 1 U | 1 U | 1 U | 1 U | 0.5 U | 0.5 U |

**Notes:**

NYSDEC TAGM = New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum
ug/kg = microgram per kilogram
ug/l = microgram per liter
ppb = parts per billion

U = Analyte not detected at or above reporting limit (RL)
J = Estimated Value below RL or tentatively identified compound
B = Compound found in the blank

**Table 3**
**2350 Fifth Avenue, New York, NY**
Preliminary Site Assessment - Soil Analytical Data
*Semi-Volatile Organic Compounds*

| Sample ID | NYSDEC TAGM | B-1 (2-4') | B-1 (4-6') | B-1 (6-8') | B-1 (8-12') | B-2 (0`-2') | M-2 (0.5'-2.5') | M-2 (2.5'-4.5') | M-3 (0.5'-2') | M-3 (8'-10') | M-3 (12'-14') |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Boring Location** | **# 4046** | B-1 | B-1 | B-1 | B-1 | B-2 | M-2 | M-2 | M-3 | M-3 | M-3 |
| **Sample Depth (feet)** | **Recommended** | 2-4' | 4-6' | 6-8' | 8-12' | 0-2' | 0.5-2.5' | 2.5-4.5' | 0.5-2' | 8-10' | 12-14' |
| **Date Sampled** | **Soil Cleanup** | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 |
| **Units** | **ug/kg (ppb)** | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) |
| ***Semi-Volatile Organic Compounds*** | | | | | | | | | | | |
| Phenol | 30 or MDL | U | U | U | U | U | U | U | U | U | U |
| bis(2-Chloroethyl)Ether | -- | U | U | U | U | U | U | U | U | U | U |
| 2-Chlorophenol | 800 | U | U | U | U | U | U | U | U | U | U |
| 1,3-Dichlorobenzene | -- | U | U | U | U | U | U | U | U | U | U |
| 1,4-Dichlorobenzene | -- | U | U | U | U | U | U | U | U | U | U |
| 1,2-Dichlorobenzene | -- | U | U | U | U | U | U | U | U | U | U |
| 2-Methylphenol | 100 or MDL | U | U | U | **370 J** | U | U | U | U | U | U |
| 2,2' -oxybis (1-Chloropropane) | -- | U | U | U | U | U | U | U | U | U | U |
| 4-Methylphenol | 900 | U | U | U | U | U | U | U | U | U | 510 J |
| N-Nitroso-Di-n-Propylamine | -- | U | U | U | U | U | U | U | U | U | U |
| Hexachloroethane | -- | U | U | U | U | U | U | U | U | U | U |
| Nitrobenzene | 200 or MDL | U | U | U | U | U | U | U | U | U | U |
| Isophorone | 4,400 | U | U | U | U | U | U | U | U | U | U |
| 2-Nitrophenol | 330 or MDL | U | U | U | U | U | U | U | U | U | U |
| 2,4-Dimethylphenol | -- | U | U | U | U | U | U | U | U | U | U |
| bis(-2-Chloroethoxy)Methane | -- | U | U | U | U | U | U | U | U | U | U |
| 2,4-Dichlorophenol | 400 | U | U | U | U | U | U | U | U | U | U |
| 1,2,4-Trichlorobenzene | -- | U | U | U | U | U | U | U | U | U | U |
| Naphthalene | 13,000 | 290 J | 160 J | U | 100 J | 170 J | 51 J | 65 J | 88 J | 47 J | 73 J |
| 4-Chloroaniline | 220 or MDL | U | U | U | U | U | U | U | U | U | U |
| Hexachlorobutadiene | -- | U | U | U | U | U | U | U | U | U | U |
| 4-Chloro-3-methylphenol | 240 or MDL | U | U | U | U | U | U | U | U | U | U |
| 2-Methylnaphthalene | 35,400 | 230 J | 65 J | U | 46 J | 90 J | 38 J | 49 J | 46 J | U | U |
| Hexachlorocyclopentadiene | -- | U | U | U | U | U | U | U | U | U | U |
| 2,4,6-Trichlorophenol | -- | U | U | U | U | U | U | U | U | U | U |
| 2,4,5-Trichlorophenol | 100 | U | U | U | U | U | U | U | U | U | U |
| 2-Chloronaphthalene | -- | U | U | U | U | U | U | U | U | U | U |
| 2-Nitroaniline | 430 or MDL | U | U | U | U | U | U | U | U | U | U |
| Dimethylphtalate | 2,000 | U | U | U | U | U | U | U | U | U | U |
| Acenaphthylene | 41,000 | 56 J | 67 J | U | U | 100 J | U | 52 J | 280 J | 64 J | U |
| 2,6-Dinitrotoluene | 1,000 | U | U | U | U | U | U | U | U | U | U |
| 3-Nitroaniline | 500 or MDL | U | U | U | U | U | U | U | U | U | U |
| Acenaphthene | 50,000 | 110 J | 100 J | U | 110 J | 370 J | 78 J | 62 J | 44 J | U | U |
| 2,4-Dinitrophenol | 200 or MDL | U | U | U | U | U | U | U | U | U | U |
| 4-Nitrophenol | 100 or MDL | U | U | U | U | U | U | U | U | U | U |
| Dibenzofuran | 6,200 | 120 J | 98 J | U | 69 J | 160 J | U | 52 J | 59 J | U | U |
| 2,6-Dinitrotoluene | -- | U | U | U | U | U | U | U | U | U | U |
| Diethylphthalate | 7,100 | U | U | U | U | U | U | U | U | U | U |
| 4-Chlorophenyl-phenyether | -- | U | U | U | U | U | U | U | U | U | U |
| Fluorene | 50,000 | 120 J | 100 J | U | 120 J | 310 J | U | 74 J | 86 J | U | U |
| 4-Nitroaniline | -- | U | U | U | U | U | U | U | U | U | U |
| 4,6-Dinitro-2-methylphenol | -- | U | U | U | U | U | U | U | U | U | U |
| N-Nitrosodiphenylamine (1) | -- | U | U | U | U | U | U | U | U | U | U |

**Table 3**

**2350 Fifth Avenue, New York, NY**

Preliminary Site Assessment - Soil Analytical Data

*Semi-Volatile Organic Compounds*

| **Sample ID**<br>**Boring Location**<br>**Sample Depth (feet)**<br>**Date Sampled**<br>**Units** | **NYSDEC TAGM**<br>**# 4046**<br>**Recommended**<br>**Soil Cleanup**<br>**ug/kg (ppb)** | **B-1 (2-4')**<br>B-1<br>2-4'<br>Jan-98<br>ug/kg (ppb) | **B-1 (4-6')**<br>B-1<br>4-6'<br>Jan-98<br>ug/kg (ppb) | **B-1 (6-8')**<br>B-1<br>6-8'<br>Jan-98<br>ug/kg (ppb) | **B-1 (8-12')**<br>B-1<br>8-12'<br>Jan-98<br>ug/kg (ppb) | **B-2 (0`-2')**<br>B-2<br>0-2'<br>Jan-98<br>ug/kg (ppb) | **M-2 (0.5'-2.5')**<br>M-2<br>0.5-2.5'<br>Jan-98<br>ug/kg (ppb) | **M-2 (2.5'-4.5')**<br>M-2<br>2.5-4.5'<br>Jan-98<br>ug/kg (ppb) | **M-3 (0.5'-2')**<br>M-3<br>0.5-2'<br>Jan-98<br>ug/kg (ppb) | **M-3 (8'-10')**<br>M-3<br>8-10'<br>Jan-98<br>ug/kg (ppb) | **M-3 (12'-14')**<br>M-3<br>12-14'<br>Jan-98<br>ug/kg (ppb) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Semi-Volatile Organic Compounds*** | | | | | | | | | | | |
| 4-Bromophenyl-phenylether | -- | U | U | U | U | U | U | U | U | U | U |
| Hexachlorobenzene | 410 | U | U | U | U | U | U | U | U | U | U |
| Pentachlorophenol | 1000 or MDL | U | U | U | U | U | U | U | U | U | U |
| Phenanthrene | 50,000 | 1300 | 1300 | 310 J | 850 | 2700 | 510 | 1200 | 1100 | 230 J | 210 J |
| Anthracene | 50,000 | 270 J | 190 J | 51 J | 220 J | 770 | 110 J | 310 J | 250 J | 69 J | 56 J |
| Carbazole | -- | 110 J | 110 J | U | 67 J | 360 J | 48 J | 83 J | 130 J | U | U |
| Di-n-butylphthalate | 8,100 | U | U | U | U | U | | U | U | U | U |
| Fluoranthene | 50,000 | 1100 | 1300 | 350 J | 1100 | 3700 D | 1000 | 1600 | 1900 | 510 | 240 J |
| Pyrene | 50,000 | 940 | 1200 | 290 J | 920 | 3100 D | 1200 | 1400 | 1600 | 450 | 210 J |
| Butylbenzylphthalate | 50,000 | U | U | U | U | U | U | U | U | U | U |
| Benzo(a)anthracene | 224 or MDL | **520** | **570** | 160 J | **500** | **2000** | **680** | **830** | **1100** | **240 J** | 99 J |
| 3,3'-Dichlorobenzidine | -- | U | U | U | U | 280 U | U | U | U | U | U |
| Chrysene | 400 | **610** | **660** | 180 J | **520** | **2000** | **750** | **910** | **1200** | 290 J | 100 J |
| bis(2-Ethylhexyl)phthalate | 50,000 | 1100 | 1600 | 970 | 740 | 280 J | 440 | 750 | 920 | 580 | 290 J |
| Di-n-octylphthalate | 50,000 | U | U | U | U | U | U | U | U | U | U |
| Benza(b)fluoranthene | 224 | **450** | **550** | 140 J | **430** | **1700** | **710** | **740** | **1300** | **340 J** | 89 J |
| Benzo(k)fluoranthene | 224 | **480** | **410** | 120 J | **290 J** | **1200** | **520** | **590** | **1100** | **340 J** | 63 J |
| Benzo(a)pyrene | 61 or MDL | **440** | **440** | **130 J** | **330 J** | **1300** | **670** | **590** | **1000** | **310 J** | **76 J** |
| Indeno(1,2,3-cd)pyrene | 3,200 | 410 | 380 | 95 J | 250 J | 1100 | 610 | 390 | 450 | 160 J | 70 J |
| Dibenz (a,h) anthracene | 14 or MDL | U | U | U | U | U | U | U | U | U | U |
| Benzo(g,h,i)perylene | 50,000 | 450 | 410 | 120 J | 250 J | 1200 | 720 | 370 | 410 | 150 J | 83 J |
| Total Carcinogenic PAHs | 10,000 | 1370 | 1400 | 390 | 1050 | 4480 | 1900 | 1920 | 3400 | 990 | 228 |
| Total Non-Carcinogenic PAHs | 500,000 | 5886 | 5932 | 1396 | 4486 | 15610 | 5067 | 6482 | 7454 | 1970 | 1042 |

**Notes:**

NYSDEC TAGM = New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum
ug/kg = microgram per kilogram
ppb = parts per billion
U = Undetected
J = Estimated Value, below quantification limit
D = Value from sample run at a secondary dilution

## Table 4
## 2350 Fifth Avenue, New York, NY
Preliminary Site Assessment - Soil Analytical Data
*Target Analyte List Metals*

| **Sample ID** | | **B-1 (2-4')** | **B-1 (4-6')** | **B-1 (6-8')** | **B-1 (8-12')** | **B-2 (0-2')** | **M-2 (0.5-2.5')** | **M-2 (2.5-4.5')** | **M-3 (0.5-2')** | **M-3 (8-10')** | **M-3 (12-14')** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Boring Location** | **Eastern USA** | B-1 | B-1 | B-1 | B-1 | B-2 | M-2 | M-2 | M-3 | M-3 | M-3 |
| **Sample Depth (feet)** | **Background*** | 2-4' | 4-6' | 6-8' | 8-12' | 0-2' | 0.5-2.5' | 2.5-4.5' | 0.5-2' | 8-10' | 12-14' |
| **Date Sampled** | | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 |
| **Units** | **mg/kg (ppm)** | mg/kg (ppm) | mg/kg (ppm) | mg/kg (ppm) | mg/kg (ppm) | mg/kg (ppm) | mg/kg (ppm) | mg/kg (ppm) | mg/kg (ppm) | mg/kg (ppm) | mg/kg (ppm) |
| ***Metals*** | | | | | | | | | | | |
| Aluminum | 33,000 | 9670 | 8460 | 7710 | 6960 | 5060 | 9100 | 8370 | 7100 | 6860 | 6920 |
| Antimony | -- | 0.72 B | 0.46 B | 0.37 B | 1.2 B | U | 1.2 B | 0.72 B | 1.3 B | 0.87 B | 0.71 B |
| Arsenic | 3-12 | 6.1 | 3.4 | 3.5 | **18.9** | 3.5 | 5 | 3.1 | 6.6 | 6.5 | 3.4 |
| Barium | 15-600 | 127 | 71.2 | 72.7 | 106 | 105 | **2164** | 147 | 98.5 | 176 | 62.4 |
| Beryllium | 0-1.75 | 0.46 B | 0.39 B | 0.4 B | 0.39 B | 0.35 B | 0.41 B | 0.36 B | 0.41 B | 0.41 B | 0.39 B |
| Cadmium | 0.1-1.0 | **1.3** | 0.32 B | 0.32 B | 0.55 B | 0.45 B | 0.65 | 0.6 | 0.6 | 0.47 B | 0.34 B |
| Calcium | 130-35,000 | 26700 | 11200 | **44200** | 11100 | **102000** | 25000 | 22500 | 27800 | 12800 | 5680 |
| Chromium | 1.5-40 | 21.8 | 16.9 | 19.1 | 17.3 | 9.3 | 30.9 | 25.7 | 20.9 | 17.4 | 15.6 |
| Cobalt | 2.5-60 | 7.1 | 6.5 | 5.7 | 7.2 | 3.1 B | 8.5 | 7.6 | 6.4 | 6.9 | 4.4 B |
| Copper | 1-50 | 37.5 | 21.3 | 20 | **52** | 31.6 | 48.6 | 36.1 | 40.4 | 189 | 20.2 |
| Iron | 2000-550,000 | 18200 | 15900 | 13500 | 20600 | 9090 | 18600 | 14900 | 19500 | 19400 | 11700 |
| Lead | -- | 177 | 107 | 91.1 | 282 | 87.7 | 345 | 153 | 212 | 1010 | 152 |
| Magnesium | 100-5,000 | 3660 | 2980 | 3580 | 2730 | **48500** | 4800 | 4360 | 4040 | 2770 | 2960 |
| Manganese | 50-5,000 | 280 | 359 | 306 | 322 | 470 | 294 | 313 | 307 | 317 | 150 |
| Mercury | 0.001-0.2 | **0.6** | **0.41** | **0.29** | **0.96** | **0.45** | **0.78** | **0.32** | **0.51** | **0.79** | 0.14 |
| Nickel | 0.5-25 | 14.9 | 12.7 | 12.5 | 15.5 | 7.8 | 21.6 | 19 | 15.3 | 13.9 | 10.2 |
| Potassium | 3,500-43,000 | 1420 | 1010 | 1120 | 857 | 799 | 2940 | 2790 | 1430 | 1410 | 1030 |
| Selenium | 0.1-3.9 | 1 | 0.7 | 0.94 | **9.4** | U | 0.88 | 0.73 | 1.1 | 1.6 | U |
| Silver | -- | 1.3 | U | U | U | U | U | 0.47 B | U | 0.25 B | U |
| Sodium | 6,000-9,000 | 373 B | 227 B | 338 B | 275 B | 292 B | 737 | 521 | 746 | 380 B | 410 B |
| Thallium | -- | U | U | U | U | 0.22 U | U | U | U | U | U |
| Vanadium | 1-300 | 19.9 | 18 | 17.4 | 20.8 | 15.6 | 30.8 | 27.5 | 23.6 | 20.8 | 16.2 |
| Zinc | 9-50 | **193** | **80.1** | **59.4** | **128** | **97.5** | **300** | **212** | **124** | **179** | **76.4** |

**Notes:**
mg/kg = milligram per kilogram
ppm = parts per million
* = From New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum #4046
U = Undetected
B=Analytical results between instrument detection limit (IDL) and contract required detection limit (CRDL)

**Table 5**
**2350 Fifth Avenue, New York, NY**
Preliminary Site Assessment - Soil Analytical Data
*Pesticides and Polychlorinated Biphenyls*

| **Sample ID** | **NYSDEC TAGM** | **B-1 (2-4')** | **B-1 (4-6')** | **B-1 (6-8')** | **B-1 (8-12')** | **B-2 (0`-2')** | **M-2 (0.5'-2.5')** | **M-2 (2.5'-4.5')** | **M-3 (0.5'-2')** | **M-3 (8'-10')** | **M-3 (12'-14')** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Boring Location** | **# 4046** | B-1 | B-1 | B-1 | B-1 | B-2 | M-2 | M-2 | M-3 | M-3 | M-3 |
| **Sample Depth (feet)** | **Recommended** | 2-4' | 4-6' | 6-8' | 8-12' | 0-2' | 0.5-2.5' | 2.5-4.5' | 0.5-2' | 8-10' | 12-14' |
| **Date Sampled** | **Soil Cleanup** | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 | Jan-98 |
| **Units** | **ug/kg (ppb)** | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) | ug/kg (ppb) |
| ***Pesticides*** | | | | | | | | | | | |
| alpha-BHC | 110 | 1.2 JB | U | U | U | U | U | U | U | U | U |
| beta-BHC | 200 | 0.97 JP | U | U | U | U | U | U | U | U | U |
| delta-BHC | 300 | U | U | U | U | U | U | U | U | U | U |
| gamma-BHC (Lindane) | 60 | U | U | U | U | U | U | U | U | U | U |
| Heptachlor | 100 | U | U | U | U | U | U | U | U | U | U |
| Aldrin | 41 | U | U | U | U | U | U | U | U | U | U |
| Heptachlor Epoxide | 20 | U | U | U | U | 1.2 JP | U | U | U | U | U |
| Endosulfan I | 900 | U | U | U | U | U | U | U | U | U | U |
| Dieldrin | 44 | U | U | U | U | U | U | U | U | U | U |
| 4, 4' -DDE | 2,100 | U | U | U | U | 3.7 P | U | U | U | U | U |
| Endrin | 100 | U | U | U | U | 7.5 P | U | U | U | U | U |
| Endosulfan II | 900 | U | U | U | U | U | U | U | U | U | U |
| 4, 4' -DDD | 2,900 | U | U | U | U | U | U | U | U | U | U |
| Endosulfan Sulfate | 1,000 | U | U | U | U | U | U | U | U | U | U |
| 4, 4' -DDT | 2,100 | U | U | U | U | 21 | U | U | U | U | U |
| Methoxychlor | -- | U | U | U | U | U | U | U | U | U | U |
| Endrin Ketone | -- | 2.8 JPX | U | U | U | 3.4 JP | 5.8 P | U | 11 | U | U |
| Endrin Aldehyde | -- | 4.6 X | U | U | U | U | U | U | U | U | U |
| alpha-Chlordane | 540* | U | U | U | U | 4.6 P | U | U | U | U | U |
| gamma-Chlordane | 540* | U | U. | U | U | U | U | U | U | U | U |
| Toxaphene | -- | U | U | U | U | U | U | U | U | U | U |
| ***Polychlorinated Biphenyls*** | | | | | | | | | | | |
| Aroclor - 1016 | ** | U | U | U | U | U | U | U | U | U | U |
| Aroclor - 1221 | ** | U | U | U | U | U | U | U | U | U | U |
| Aroclor - 1232 | ** | U | U | U | U | U | U | U | U | U | U |
| Aroclor - 1242 | ** | U | U | U | U | U | U | U | U | U | U |
| Aroclor - 1248 | ** | U | U | U | U | U | U | U | U | U | U |
| Aroclor - 1254 | ** | 54 | U | U | U | U | U | U | U | U | U |
| Aroclor - 1260 | ** | 34 JP | U | U | U | U | U | U | U | U | U |

**Notes:**
NYSDEC TAGM = New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum
ug/kg=microgram per kilogram
ppb=parts per billion
* Total Chlordane
** Total PCBs 1000 ppb surface, 10000 ppb subsurface
U=Undetected
J=Estimated value below quantitation limit
P=Greater than 25% difference in detected concentrations between two GC columns

**Table 6a**
**2350 Fifth Avenue, New York, NY**
Preliminary Site Assessment - Groundwater Analytical Data
*Volatile Organic Compounds*

| **Sample ID**<br>**Screen Interval (feet)**<br>**Date Sampled**<br>**Units** | **Class GA Standard**<br>**ug/l (ppb)** | **Class GA Guidance Value**<br>**ug/l (ppb)** | **M-1**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-2**<br>10 - 20'<br>Feb-98<br>ug/l (ppb) | **M-3**<br>12 - 22'<br>Feb-98<br>ug/l (ppb) | **M-4**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-5**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-6**<br>10 - 20'<br>Feb-98<br>ug/l (ppb) |
|---|---|---|---|---|---|---|---|---|
| ***Volatile Organic Compounds*** | | | | | | | | |
| Chloromethane | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Bromomethane | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Vinyl Chloride | 5 | -- | 10 U | **180** | **71** | 10 U | 10 U | 10 U |
| Chloroethane | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Methylene Chloride | 5 | -- | 2 JB | 2 JB | 2 JB | 4 JB | **5 JB** | 2 JB |
| Acetone | -- | -- | 10 U | 3 J | 3 J | 2 J | 5 J | 2 J |
| Carbon Disulfide | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 1,1-Dichloroethene | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 1,1-Dichloroethane | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 1,2-Dichloroethene (total) | 5 | -- | 10 U | **7 J** | **180** | 10 U | 10 U | 10 U |
| Chloroform | 7 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 1,2-Dichloroethane | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2-Butanone | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 1,1,1-Trichloroethane | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Carbon Tetrachloride | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Bromodichloromethane | -- | 50 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 1,2-Dichloroproparte | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Cis-1,3-dichloropropene | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Trichloroethene | 5 | -- | 10 U | **3 J** | **56** | 10 U | 10 U | 10 U |
| Dibromochloromethane | -- | 50 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 1,1,2-Trichloroethane | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Benzene | 0.7 | -- | **18** | 10 U | 10 U | 10 U | 10 U | 10 U |
| Trans-1,3-Dichloropropene | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Bromoform | -- | 50 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 4-Methyl-2-Pentanone | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2-Hexanone | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Tetrachloroethene | 5 | -- | 10 U | **48** | **800 D** | 10 U | 10 U | 10 U |
| 1,1;2,2-Tetrachloroethene | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Toluene | 5 | -- | **8 J** | 10 U | 10 U | 10 U | 10 U | 10 U |
| Chlorobenzene | -- | 5 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Ethylbenzene | 5 | -- | 2 J | 10 U | 10 U | 10 U | 10 U | 10 U |
| Styrene | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Xylenes (total) | 5 | -- | **16** | 10 U | 10 U | 10 U | 10 U | 10 U |

**Notes:**
Class GA = Groundwater effluent limitations.
ug/l=microgram per liter
ppb=parts per billion
J=Estimated Value, below quantification limit
U=Undetected
B=Compound found in the blank
D=Value from sample run at a secondary dilution

## Table 6b
## 2350 Fifth Avenue, New York, NY
Remedial Investigation - Groundwater Analytical Data
*Volatile Organic Compounds*

| Sample ID | NYSDEC Class GA | M-2 | M-3 | BLIND (M-3) | M-7 | M-8 | M-8D | FB | TRIP BLANK |
|---|---|---|---|---|---|---|---|---|---|
| Screen Interval (feet) | Ambient Water Quality | 10 - 20' | 12 - 22' | 12 - 22' | 10 - 20' | 10 - 20' | 10 - 20' | -- | -- |
| Date Sampled | Standards and | 04/08/02 | 04/08/02 | 04/08/02 | 04/08/02 | 04/08/02 | 04/08/02 | 04/08/02 | 04/08/02 |
| Dilution | Guidance Values | 1.0 | 5.0 | 5.0 | 20.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Units | ug/l (ppb) | ug/l (ppb) | ug/l (ppb) | ug/l (ppb) | ug/l (ppb) | ug/l (ppb) | ug/l (ppb) | ug/l (ppb) | ug/l (ppb) |
| ***Volatile Organic Compounds*** | | 3 | | Duplicate Sample of M-3 | | | Duplicate Sample of M-8 | Field Blank | Trip Blank |
| Chloromethane | 5 | 0.9 U | 4 U | 4 U | 18 U | 0.9 U | 0.9 U | 0.9 U | 0.9 U |
| Vinyl Chloride | 2 | **13** | **200** | **170** | 6 U | 0.3 U | 0.3 U | 0.3 U | 0.3 U |
| Bromomethane | 5 | 2 U | 8 U | 8 U | 34 U | 2 U | 2 U | 2 U | 2 U |
| Chloroethane | 5 | 4 U | 20 U | 20 U | 80 U | 4 U | 4 U | 4 U | 4 U |
| 1,1-Dichloroethene | 5 | 0.6 U | 3 U | 3 U | 12 U | 0.6 U | 0.6 U | 0.6 U | 0.6 U |
| Carbon Disulfide | 50 | 0.3 U | 2 U | 2 U | 6 U | 0.3 U | 0.3 U | 0.3 U | 0.3 U |
| Acetone | 50 | 0.9 U | 4 U | 4 U | 18 U | 0.9 U | 0.9 U | 0.9 U | 0.9 U |
| Methylene Chloride | 5 | 0.2 U | 1 U | 1 U | 4 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| trans-1,2-Dichloroethene | 5 | 0.3 U | **77** | **62** | **58 J** | 0.3 U | 0.3 U | 0.3 U | 0.3 U |
| 1,1-Dichloroethane | 5 | 0.3 U | 2 U | 2 U | 6 U | 0.3 U | 0.3 U | 0.3 U | 0.3 U |
| Vinyl Acetate | -- | 0.7 U | 4 U | 4 U | 14 U | 0.7 U | 0.7 U | 0.7 U | 0.7 U |
| cis-1,2-Dichloroethene | 5 | 2 J | **490** | **440** | **2100** | 0.3 U | 0.3 U | 0.3 U | 0.3 U |
| 2-Butanone | 50 | 0.4 U | 2 U | 2 U | 8 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U |
| Chloroform | 7 | 0.2 U | 1 U | 1 U | 4 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| 1,1,1-Trichloroethane | 5 | 0.2 U | 1 U | 1 U | 4 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Carbon Tetrachloride | 5 | 0.2 U | 1 U | 1 U | 4 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Benzene | 1 | 0.3 U | 2 U | 2 U | 6 U | 0.3 U | 0.3 U | 0.3 U | 0.3 U |
| 1,2-Dichloroethane | 0.6 | 0.3 U | 2 U | 2 U | 6 U | 0.3 U | 0.3 U | 0.3 U | 0.3 U |
| Trichloroethene | 5 | 0.8 U | **6 J** | **6 J** | 16 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| 1,2-Dichloropropane | 1 | 0.3 U | 2 U | 2 U | 6 U | 0.3 U | 0.3 U | 0.3 U | 0.3 U |
| Bromodichloromethane | 50 | 0.2 U | 1 U | 1 U | 4 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| cis-1,3-Dichloropropene | 0.4 | 0.3 U | 2 U | 2 U | 6 U | 0.3 U | 0.3 U | 0.3 U | 0.3 U |
| 4-Methyl-2-Pentanone | -- | 0.4 U | 2 U | 2 U | 8 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U |
| Toluene | 5 | 0.3 U | 2 U | 2 U | 6 U | 0.3 U | 0.3 U | 0.3 U | 0.3 U |
| trans-1,3-Dichloropropene | 0.4 | 0.2 U | 1 U | 1 U | 4 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| 1,1,2-Trichloroethane | 1 | 0.2 U | 1 U | 1 U | 4 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Tetrachloroethene | 5 | 0.8 J | **75** | **56** | 6 U | 0.3 U | 0.3 U | 0.3 U | 0.3 U |
| 2-Hexanone | 50 | 0.8 U | 4 U | 4 U | 16 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U |
| Dibromochloromethane | 50 | 0.2 U | 1 U | 1 U | 4 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Chlorobenzene | 5 | 0.2 U | 1 U | 1 U | 4 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Ethylbenzene | 5 | 0.3 U | 2 U | 2 U | 6 U | 0.3 U | 0.3 U | 0.3 U | 0.3 U |
| Styrene | 5 | 0.2 U | 1 U | 1 U | 4 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| 1,1,2,2-Tetrachloroethane | -- | 0.2 U | 1 U | 1 U | 4 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Bromoform | 50 | 0.3 U | 2 U | 2 U | 6 U | 0.3 U | 0.3 U | 0.3 U | 0.3 U |
| Xylene (total) | 5 | 0.5 U | 2 U | 2 U | 10 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |

**Notes:**

NYSDEC = New York State Department of Environmental Conservation
Class GA = Groundwater effluent limitations.
ppb = parts per billion
ug/l = microgram per liter
U = Analyte not detected at or above reporting limit (RL)
J = Estimated Value below reporting limit or tentatively identified compound

## Table 6c
## 2350 Fifth Avenue, New York, NY
Supplemental Remedial Investigation - Groundwater Analytical Data

*Volatile Organic Compounds*

| **Sample ID** | **NYSDEC Class GA** | **M-1** | **DUP** | **M-2** | **M-3** | **M-4** | **M-5** | **M-6** | **M-7** |
|---|---|---|---|---|---|---|---|---|---|
| **Screen Interval (feet)** | **Ambient Water Quality** | 10 - 18 | 10 - 18 | 10 - 20 | 12 - 22 | 10 - 18 | 10 - 18 | 10 - 20 | 10 - 20 |
| **Date Sampled** | **Standards and** | 11/14/2006 | 11/14/2006 | 11/13/2006 | 11/13/2006 | 11/10/2006 | 11/13/2006 | 11/9/2006 | 11/9/2006 |
| **Dilution** | **Guidance Values** | 5 | 5 | 1 | 1 | 1 | 1 | 1 | 5 |
| **Units** | **ug/L (ppb)** | ug/l (ppb) | ug/l (ppb) | ug/l (ppb) | ug/l (ppb) | ug/l (ppb) | ug/l (ppb) | ug/l (ppb) | ug/l (ppb) |
| ***Volatile Organic Compounds*** | | | Duplicate Sample of M-1 | | | | | | |
| Chloromethane | 5 | 2.5 U | 2.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 2.5 U |
| Vinyl chloride | 2 | 4 U | 4 U | **14** | **13** | 0.8 U | 0.8 U | 0.8 U | **37 M** |
| Bromomethane | 5 | 6 U | 6 U | 1.2 U | 1.2 U | 1.2 U | 1.2 U | 1.2 U | 6 U |
| Chloroethane | 5 | 4 U | 4 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 4 U |
| 1 1-Dichloroethene | 5 | 3.5 U | 3.5 U | 0.7 U | 0.7 U | 0.7 U | 0.7 U | 0.7 U | 3.5 U |
| Carbon disulfide | 50 | 4.5 U | 4.5 U | 0.9 U | 0.9 U | 0.9 U | 0.9 U | 0.9 U | 4.5 U |
| Acetone | 50 | 15 JB | 14 JB | 5.1 JB | 1.9 JB | 2.1 JB | 6.1 JB | 1.7 JB | 18 JB |
| Methylene chloride | 5 | 2.7 JB | 3 JB | 0.4 UB | 0.4 U | 0.4 UB | 0.72 J | 0.4 UB | 2.6 JB |
| trans-1 2-Dichloroethene | 5 | 2.5 U | 2.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 UM | **13 J** |
| Methyl-tert-butyl-ether (MTBE) | 10 | 2.1 J | 2 J | 0.3 U | 0.3 U | 0.3 U | 0.3 U | 0.3 U | 1.5 U |
| 1 1-Dichloroethane | 5 | 3 U | 3 U | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 3 U |
| cis-1 2-Dichloroethene | 5 | 3 U | 3 U | 1.5 J | **7.3** | 0.6 U | 0.6 U | 0.6 UM | **480** |
| 2-Butanone (MEK) | 50 | 6 UB | 6 UB | 1.2 UB | 1.2 UB | 1.2 UB | 1.2 UB | 1.2 UB | 6 UB |
| Chloroform | 7 | 3.5 U | 3.5 U | 0.7 U | 0.7 U | 0.7 U | 0.7 U | 0.7 U | 3.5 U |
| 1 1 1-Trichloroethane | 5 | 2 U | 2 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 2 U |
| Carbon tetrachloride | 5 | 5 U | 5 U | 1 U | 1 U | 1 U | 1 U | 1 U | 5 U |
| Benzene | 1 | 2 U | 2 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 2 U |
| 1 2-Dichloroethane | 0.6 | 3 U | 3 U | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 3 U |
| Trichloroethene | 5 | 3.5 U | 3.5 U | 0.7 U | 0.72 J | 0.7 U | 0.7 U | 0.7 U | 3.5 U |
| 1 2-Dichloropropane | 1 | 4.5 U | 4.5 U | 0.9 U | 0.9 U | 0.9 U | 0.9 U | 0.9 U | 4.5 U |
| Bromodichloromethane | 50 | 2 U | 2 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 2 U |
| cis-1 3-Dichloropropene | 0.4 | 2.5 U | 2.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 2.5 U |
| 4-Methyl-2-pentanone (MIBK) | NA | 3.5 U | 3.5 U | 0.7 U | 0.7 U | 0.7 U | 0.7 U | 0.7 U | 3.5 U |
| Toluene | 5 | 1.5 U | 1.5 U | 0.3 U | 0.3 U | 0.3 U | 0.3 U | 0.3 U | 1.5 U |
| trans-1 3-Dichloropropene | 0.4 | 4 U | 4 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 4 U |
| 1 1 2-Trichloroethane | 1 | 3 U | 3 U | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 0.6 U | 3 U |
| Tetrachloroethene | 5 | 2.5 U | 2.5 U | 0.5 U | **12** | 0.5 U | 0.5 U | 0.5 U | 2.5 U |
| 2-Hexanone | 50 | 4 U | 4 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 4 U |
| Dibromochloromethane | 50 | 2.5 U | 2.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 2.5 U |
| Chlorobenzene | 5 | 2 U | 2 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 2 U |
| Ethylbenzene | 5 | 5 U | 5 U | 1 U | 1 U | 1 U | 1 U | 1 U | 5 U |
| Styrene | 5 | 2.5 U | 2.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 2.5 U |
| Bromoform | 50 | 4 U | 4 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 0.8 U | 4 U |
| 1 1 2 2-Tetrachloroethane | 5 | 2 U | 2 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 2 U |
| Xylenes (total) | 5 | 5 U | 5 U | 1 U | 1 U | 1 U | 1 U | 1 U | 5 U |

**Notes:**

NYSDEC = New York State Department of Environmental Conservation

Class GA = Groundwater effluent limitations.

ug/l=micrograms per liter

ppb=parts per billion

U=Analyte was not detected at or above the reporting limit (RL)

J=Results is an estimated value below the RL or a tentatively

B=Compound was found in the blank

M=Manually integrated compound

**Table 6c**
**2350 Fifth Avenue, New York, NY**
Supplemental Remedial Investigation - Groundwater Analytical Data
*Volatile Organic Compounds*

| Sample ID | NYSDEC Class GA | M-8 | | M-9 SHALLOW | | M-9 DEEP | | M-10 SHALLOW | | M-10 DEEP | | FB-1 | | TB-1 | | TB-2 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Screen Interval (feet) | Ambient Water Quality | 10 - 20 | | 6.5 - 11.5 | | 15 - 20 | | 7.5 - 12.5 | | 20 - 25 | | -- | | -- | | -- | |
| Date Sampled | Standards and | 11/9/2006 | | 11/7/2006 | | 11/7/2006 | | 11/7/2006 | | 11/7/2006 | | 11/7/2006 | | 11/9/2006 | | 11/13/2006 | |
| Dilution | Guidance Values | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | |
| Units | ug/L (ppb) | ug/l (ppb) | | ug/l (ppb) | | ug/l (ppb) | | ug/l (ppb) | | ug/l (ppb) | | ug/l (ppb) | | ug/l (ppb) | | ug/l (ppb) | |
| | | | | | | | | | | | | Field Blank | | Trip Blank | | Trip Blank | |
| ***Volatile Organic Compounds*** | | | | | | | | | | | | | | | | | |
| Chloromethane | 5 | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U |
| Vinyl chloride | 2 | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U |
| Bromomethane | 5 | 1.2 | U | 1.2 | U | 1.2 | U | 1.2 | U | 1.2 | U | 1.2 | U | 1.2 | U | 1.2 | U |
| Chloroethane | 5 | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U |
| 1 1-Dichloroethene | 5 | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U |
| Carbon disulfide | 50 | 0.9 | U | 0.9 | U | 0.92 | J | 0.9 | U | 0.9 | U | 0.9 | U | 0.9 | U | 0.9 | U |
| Acetone | 50 | 1.4 | UB | 6.6 | JB | 4.5 | JB | 1.4 | UB | 10 | B | 1.4 | UB | 2 | JB | 1.9 | JB |
| Methylene chloride | 5 | 0.4 | UB | 0.4 | UB | 0.44 | JB | 0.4 | UB | 0.4 | UB | 0.64 | JB | **8** | **B** | **7.6** | **B** |
| trans-1 2-Dichloroethene | 5 | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U |
| Methyl-tert-butyl-ether (MTBE) | 10 | 0.44 | J | 0.54 | J | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U |
| 1 1-Dichloroethane | 5 | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U |
| cis-1 2-Dichloroethene | 5 | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U |
| 2-Butanone (MEK) | 50 | 1.2 | U | 1.2 | U | 1.2 | U | 1.2 | U | 1.2 | U | 1.2 | U | 1.7 | J | 1.5 | J |
| Chloroform | 7 | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U |
| 1 1 1-Trichloroethane | 5 | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U |
| Carbon tetrachloride | 5 | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| Benzene | 1 | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U |
| 1 2-Dichloroethane | 0.6 | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U |
| Trichloroethene | 5 | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U |
| 1 2-Dichloropropane | 1 | 0.9 | U | 0.9 | U | 0.9 | U | 0.9 | U | 0.9 | U | 0.9 | U | 0.9 | U | 0.9 | U |
| Bromodichloromethane | 50 | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U |
| cis-1 3-Dichloropropene | 0.4 | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U |
| 4-Methyl-2-pentanone (MIBK) | NA | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U | 0.7 | U |
| Toluene | 5 | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U | 0.3 | U |
| trans-1 3-Dichloropropene | 0.4 | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U |
| 1 1 2-Trichloroethane | 1 | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U | 0.6 | U |
| Tetrachloroethene | 5 | 1.7 | J | 0.54 | J | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U |
| 2-Hexanone | 50 | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U |
| Dibromochloromethane | 50 | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U |
| Chlorobenzene | 5 | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U |
| Ethylbenzene | 5 | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |
| Styrene | 5 | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U | 0.5 | U |
| Bromoform | 50 | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U | 0.8 | U |
| 1 1 2 2-Tetrachloroethane | 5 | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U | 0.4 | U |
| Xylenes (total) | 5 | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U | 1 | U |

**Notes:**

NYSDEC = New York State Department of Environmental Conservation
Class GA = Groundwater effluent limitations.
ug/l=micrograms per liter
ppb=parts per billion
U=Analyte was not detected at or above the reporting limit (RL)

J=Results is an estimated value below the RL or a tentatively
B=Compound was found in the blank
M=Manually integrated compound

**Table 7**

**2350 Fifth Avenue, New York, NY**

Preliminary Site Assessment - Groundwater Analytical Data

*Semi-Volatile Organic Compounds*

| **Sample ID**<br>**Screen Interval (feet)**<br>**Date Sampled**<br>**Units** | **Class GA Standard**<br>**ug/l (ppb)** | **Class GA Guidance Value**<br>**ug/l (ppb)** | **M-1**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-2**<br>10 - 20'<br>Feb-98<br>ug/l (ppb) | **M-3**<br>12 - 22'<br>Feb-98<br>ug/l (ppb) | **M-4**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-5**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-6**<br>10 - 20'<br>Feb-98<br>ug/l (ppb) |
|---|---|---|---|---|---|---|---|---|
| ***Semi-Volatile Organic Compounds*** | | | | | | | | |
| Phenol | 1 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| bis(2-Chloroethyl)Ether | 1 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2-Chlorophenol | 1 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 1,3-Dichlorobenzene | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 1,4-Dichlorobenzene | 4.7 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 1,2-Dichlorobenzene | 4.7 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2-Methylphenol | 1 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2,2' -oxybis (1-Chloropropane) | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 4-Methylphenol | 1 | -- | 10 U | 10 U | 10 U | 10 U | **26** | 10 U |
| N-Nitroso-Di-n-Propylamine | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Hexachloroethane | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Nitrobenzene | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Isophorone | -- | 50 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2-Nitrophenol | 1 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2,4-Dimethylphenol | 1 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| bis(-2-Chloroethoxy)Methane | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2,4-Dichlorophenol | 4.7 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 1,2,4-Trichlorobenzene | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Naphthalene | -- | 10 | 10 U | 1 J | 10 U | 10 U | 1 J | 10 U |
| 4-Chloroaniline | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Hexachlorobutadiene | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 4-Chloro-3-methylphenol | 1 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2-Methylnaphtbalene | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Hexachlorocyclopentadiene | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2,4,6-Trichlorophenol | 1 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2,4,5-Trichlorophenol | 1 | -- | 25 U | 25 U | 25 U | 25 U | 25 U | 25 U |
| 2-Chioronaphthalene | -- | 10 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2-Nitroaniline | 5 | -- | 25 U | 25 U | 25 U | 25 U | 25 U | 25 U |
| Dimethylphthalate | -- | 50 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Acenaphthlyene | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2,6-Dinitrotoluene | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 3-Nitroaniline | 5 | -- | 25 U | 25 U | 25 U | 25 U | 25 U | 25 U |
| Acenaphthene | -- | 20 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2,4-Dinitrophenol | 1 | -- | 25 U | 25 U | 25 U | 25 U | 25 U | 25 U |
| 4-Nitrophenol | 1 | -- | 25 U | 25 U | 25 U | 25 U | 25 U | 25 U |
| Dibenzofuran | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 2,4-Dinitrotoluene | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Diethylphthalate | -- | 50 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 4-Chlorophenyl-phenyether | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Fluorene | -- | 50 | 10 U | 10 U | 10 U | 10 U | 2 J | 10 U |
| 4-Nitroaniline | 5 | -- | 25 U | 25 U | 25 U | 25 U | 25 U | 25 U |
| 4,6-Dinitro-2-methylphenol | 1 | -- | 25 U | 25 U | 25 U | 25 U | 25 U | 25 U |
| N-Nitrosodiphenylamine (1) | -- | 50 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 4-13romophenyl-phenylether | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |

**Table 7**
**2350 Fifth Avenue, New York, NY**
Preliminary Site Assessment - Groundwater Analytical Data
*Semi-Volatile Organic Compounds*

| **Sample ID**<br>**Screen Interval (feet)**<br>**Date Sampled**<br>**Units** | **Class GA Standard**<br>**ug/l (ppb)** | **Class GA Guidance Value**<br>**ug/l (ppb)** | **M-1**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-2**<br>10 - 20'<br>Feb-98<br>ug/l (ppb) | **M-3**<br>12 - 22'<br>Feb-98<br>ug/l (ppb) | **M-4**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-5**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-6**<br>10 - 20'<br>Feb-98<br>ug/l (ppb) |
|---|---|---|---|---|---|---|---|---|
| ***Semi-Volatile Organic Compounds*** | | | | | | | | |
| Hexachlorobenzene | -- | 0.35 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Pentachlorophenol | 1 | -- | 25 U | 25 U | 25 U | 25 U | 25 U | 25 U |
| Phenanthrene | -- | 50 | 10 U | 2 J | 2 J | 10 U | 7 J | 10 U |
| Anthracene | -- | 50 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Carbazole | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Di-n-butylphthalate | 50 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Fluoranthene | -- | 50 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Pyrene | -- | 50 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Butylbenzylphthalate | -- | 50 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| 3,3'-Dichlorobenzidine | 5 | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Benzo(a)anthracene | -- | 0.002 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Chrysene | -- | 0.002 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| bis(2-Ethylhexyl)phthalate | 50 | -- | 2 JB | 1 JB | 10 U | 3 JB | 6 JB | 2 JB |
| Di-n-octylphthalate | -- | 50 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Benzo(b)fluoranthene | -- | 0.002 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Benzo(k)fluoranthene | -- | 0.002 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Benzo(a)pyrene | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Indeno(1,2,3-cd)pyrene | -- | 0.002 | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Dibenz (a,h) anthracene | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Benzo(g,h,i)perylene | -- | -- | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |

**Notes:**
Class GA = Groundwater effluent limitations.
ug/l=microgram per liter
ppb=parts per billion
U=Undetected
J=Below Method Dectection Limit
B=Compound found in the blank

**Table 8a**

**2350 Fifth Avenue, New York, NY**

Preliminary Site Assessment - Groundwater Analytical Data

*Target Analyte List Metals - Total (unfiltered)*

| **Sample ID<br>Screen Interval (feet)<br>Date Sampled<br>Units** | **Class GA Standard<br>ug/l (ppb)** | **Class GA Guidance Value<br>ug/l (ppb)** | **M-1**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-2**<br>10 - 20'<br>Feb-98<br>ug/l (ppb) | **M-3**<br>12 - 22'<br>Feb-98<br>ug/l (ppb) | **M-4**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-5**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-6**<br>10 - 20'<br>Feb-98<br>ug/l (ppb) |
|---|---|---|---|---|---|---|---|---|
| ***Metals (unfiltered)*** | | | | | | | | |
| Aluminum | -- | -- | 1340 | 54700 | 229000 | 3150 | 1090 | 133 B |
| Antimony | -- | 3 | U | **11.9 B** | **7.2 B** | U | U | U |
| Arsenic | 25 | -- | 1.9 B | **68.3** | **71.1** | 8 B | 6.4 B | U |
| Barium | 1000 | -- | 252 | **1450** | **1750** | 276 | 117 B | 676 |
| Beryllium | -- | 3 | U | **3.1 B** | **15** | 0.1 B | U | 0.73 B |
| Cadmium | 10 | -- | U | 1.5 B | U | U | U | 0.47 B |
| Calcium | -- | -- | 232000 | 183000 | 30600 | 104000 | 144000 | 231000 |
| Chromium | 50 | -- | 3.1 B | **144** | **426** | 6.9 B | 3.1 B | U |
| Cobalt | -- | -- | 2.1 B | 43.4 B | 137 | 3.1 B | 1.9 B | U |
| Copper | 200 | -- | 17.1 B | **475** | **734** | 24.9 B | 13.5 B | 6.1 B |
| Iron | 500 | -- | **29100** | **167000** | **636000** | **12500** | **5190** | 252 |
| Lead | 25 | -- | **121** | **3520** | **1170** | **287** | 5.9 | 0.74 B |
| Magnesium | -- | 35000 | **50600** | **57900** | **78500** | 18700 | **187000** | **121000** |
| Manganese | 300 | -- | **956** | **1830** | **2670** | **743** | **668** | **425** |
| Mercury | 2 | -- | 0.56 | **19.9** | **11.4** | **2.1** | U | U |
| Nickel | -- | -- | 1.7 B | 94.9 | 314 | 5.8 B | 27.4 B | 2.7 |
| Potassium | -- | -- | 48000 E | 46200 E | 44600 E | 14700 E | 117000 E | 60900 E |
| Selenium | 10 | -- | U | **11.3** | 5.7 | U | U | U |
| Silver | 50 | -- | 0.89 B | 1.4 B | 0.82 B | U | 1.4 B | 0.8 B |
| Sodium | 20000 | -- | **317000** | **348000** | **127000** | **263000** | **2050000** | **1270000** |
| Thallium | -- | 4 | 19 | U | **4.5 B** | U | U | U |
| Vanadium | -- | -- | 4.4 | 144 | 552 | 10.6 | 4.6 B | U |
| Zinc | 300 | -- | 127 | **2130** | **1210** | 276 | 47.6 | 193 B |

**Notes:**

Class GA = Groundwater effluent limitations.
ug/l=microgram per liter
ppb=parts per billion
U=Undetected
B=Analytical results between instrument detection limit (IDL) and contract required detection limit (CRDL)
E=Estimated value because of interference

## Table 8b
## 2350 Fifth Avenue, New York, NY
Preliminary Site Assessment - Groundwater Analytical Data
*Target Analyte List Metals - Dissolved (filtered)*

| **Sample ID**<br>**Screen Interval (feet)**<br>**Date Sampled**<br>**Units** | **Class GA Standard**<br>**ug/l (ppb)** | **Class GA Guidance Value**<br>**ug/l (ppb)** | **M-1**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-2**<br>10 - 20'<br>Feb-98<br>ug/l (ppb) | **M-3**<br>12 - 22'<br>Feb-98<br>ug/l (ppb) | **M-4**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-5**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-6**<br>10 - 20'<br>Feb-98<br>ug/l (ppb) |
|---|---|---|---|---|---|---|---|---|
| ***Metals (filtered)*** | | | | | | | | |
| Aluminum | -- | -- | 9.3 B | U | 15.2 B | 8 B | 11.1 B | 12.5 B |
| Antimony | -- | 3 | U | U | U | U | U | U |
| Arsenic | 25 | -- | U | 1.8 B | U | U | 1.1 B | U |
| Barium | 1000 | -- | 100 B | 146 B | 166 B | 156 B | 109 B | 657 |
| Beryllium | -- | 3 | U | U | U | U | U | U |
| Cadmium | 10 | -- | U | U | U | U | U | U |
| Calcium | -- | -- | 228000 | 152000 | 23700 | 99600 | 151000 | 234000 |
| Chromium | 50 | -- | U | U | 1.1 B | U | U | U |
| Cobalt | -- | -- | U | 1.3 B | U | U | 1.4 B | U |
| Copper | 200 | -- | 7.4 | 4.4 B | 12.1 B | 8.8 B | 4.4 B | 3.1 B |
| Iron | 500 | -- | **2040** | **13000** | 76.3 B | 47.7 B | **1200** | 45.7 B |
| Lead | 25 | -- | 0.7 | U | U | U | U | U |
| Magnesium | -- | 35000 | **49900** | **46400** | **42100** | 18500 | **203000** | **122000** |
| Manganese | 300 | -- | **887** | **899** | 195 | **674** | **692** | **423** |
| Mercury | 2 | -- | U | U | U | U | U | U |
| Nickel | -- | -- | U | 2.1 B | 4 B | 2.2 B | 8.1 B | 4.5 B |
| Potassium | -- | -- | 48400 E | 43000 E | 32600 E | 15300 E | 150000 E | 47100 BE |
| Selenium | 10 | -- | U | U | U | U | U | U |
| Silver | 50 | -- | U | U | U | U | 1.4 B | U |
| Sodium | 20000 | -- | **322000 E** | **344000 E** | **240000E** | **265000 E** | **2660000 E** | **1270000 E** |
| Thallium | -- | 4 | U | U | U | U | U | U |
| Vanadium | -- | -- | U | U | 21.6 B | U | 1.7 B | U |
| Zinc | 300 | -- | 34.9 | 24.4 | 23.9 | 30.9 | 29.9 | 13.7 B |

**Notes:**
Class GA = Groundwater effluent limitations.
ug/l=microgram per liter
ppb=parts per billion
U=Undetected
B=Analytical results between instrument detection limit (IDL) and contract required detection limit (CRDL)
E=Estimated value because of interference

**Table 9**
**2350 Fifth Avenue, New York, NY**
Preliminary Site Assessment - Groundwater Analytical Data
*Pesticides and Polychlorinated Biphenyls*

| **Sample ID**<br>**Screen Interval (feet)**<br>**Date Sampled**<br>**Units** | **Class GA Standard**<br>**ug/l (ppb)** | **Class GA Guidance Value**<br>**ug/l (ppb)** | **M-1**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-2**<br>10 - 20'<br>Feb-98<br>ug/l (ppb) | **M-3**<br>12 - 22'<br>Feb-98<br>ug/l (ppb) | **M-4**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-5**<br>10 - 18'<br>Feb-98<br>ug/l (ppb) | **M-6**<br>10 - 20'<br>Feb-98<br>ug/l (ppb) |
|---|---|---|---|---|---|---|---|---|
| ***Pesticides*** | | | | | | | | |
| alpha-BHC | -- | -- | U | U | U | U | U | U |
| beta-BHC | -- | -- | U | U | U | U | U | U |
| delta-BHC | -- | -- | U | U | U | U | 0.033 JP | U |
| gamma-BHC (Lindane) | -- | -- | U | U | U | U | U | U |
| Heptachlor | -- | -- | U | U | U | U | U | U |
| Aldrin | -- | -- | U | U | U | U | 0.13 P | U |
| Heptachlor Epoxide | -- | -- | U | U | U | U | 0.096 P | U |
| Endorsulfan I | -- | -- | U | U | U | U | U | U |
| Dieldrin | -- | -- | U | U | U | U | U | U |
| 4, 4' -DDE | -- | -- | U | U | U | U | U | U |
| Endrin | -- | -- | U | U | U | U | U | U |
| Endosulfan II | -- | -- | U | U | U | U | U | U |
| 4, 4' -DDD | -- | -- | U | U | U | U | U | U |
| Endosulfan Sulfate | -- | -- | U | U | U | U | U | U |
| 4, 4' -DDT | -- | -- | U | U | U | U | 0.05 JP | U |
| Methoxychlor | 35 | -- | U | U | U | U | U | U |
| Endrin Ketone | -- | -- | U | U | U | U | U | U |
| Endrin Aldehyde | -- | -- | U | U | U | U | U | U |
| alpha-Chlordane | 0.1 | -- | U | U | U | U | **0.18 P** | U |
| gamma-Chlordane | 0.1 | -- | U | U | U | U | U | U |
| Toxaphene | -- | -- | U | U | U | U | U | U |
| ***Polychlorinated Biphenyls*** | | | | | | | | |
| Aroclor - 1016 | 0.1* | -- | U | U | U | U | U | U |
| Aroclor - 1221 | 0.1* | -- | U | U | U | U | U | U |
| Aroclor - 1232 | 0.1* | -- | U | U | U | U | U | U |
| Aroclor - 1242 | 0.1* | -- | U | U | U | U | U | U |
| Aroclor - 1248 | 0.1* | -- | U | U | U | U | U | U |
| Aroclor - 1254 | 0.1* | -- | U | U | U | U | U | U |
| Aroclor - 1260 | 0.1* | -- | U | U | U | U | U | U |

**Notes:**
Class GA = Groundwater effluent limitations.
ug/l=microgram per liter
ppb=parts per billion
U=Undetected
J=Estimated value below quantitation limit
P=Greater than 25% difference in detected concentrations between two GC columns

## Table 10a
## 2350 Fifth Avenue, New York, NY
Preliminary Site Assessment - Groundwater Analytical Data
*Additional Parameters*

| **Sample ID**<br>**Screen Interval (feet)**<br>**Date Sampled**<br>**Units** | **Class GA Standard**<br>**mg/l (ppm)** | **Class GA Guidance Value**<br>**mg/l (ppm)** | **M-1**<br>10 - 18'<br>Feb-98<br>mg/l (ppm) | **M-2**<br>10 - 20'<br>Feb-98<br>mg/l (ppm) | **M-3**<br>12 - 22'<br>Feb-98<br>mg/l (ppm) | **M-4**<br>10 - 18'<br>Feb-98<br>mg/l (ppm) | **M-5**<br>10 - 18'<br>Feb-98<br>mg/l (ppm) | **M-6**<br>10 - 20'<br>Feb-98<br>mg/l (ppm) |
|---|---|---|---|---|---|---|---|---|
| ***Cloride and Total Dissolved Solids*** | | | | | | | | |
| Chloride | 250 | -- | **558** | **475** | 175 | **280** | **2750** | **2400** |
| Total Dissolved Solids | 1000 | -- | **1640** | **1490** | 844 | **1000** | **5080** | **4390** |

**Notes:**
Class GA = Groundwater effluent limitations.
mg/l=milligram per liter
ppm=parts per million

## Table 10b
## 2350 Fifth Avenue, New York, NY

Remedial Investigation - Groundwater Analytical Data

*Additional Parameters*

| **Sample ID** | **NYSDEC Class GA** | **M-2** | **M-3** | **BLIND (M-3)** | **M-7** | **M-8** | **M-8D** | **FB** | **TRIP BLANK** |
|---|---|---|---|---|---|---|---|---|---|
| **Screen Interval (feet)** | **Ambient Water Quality** | 10 - 20' | 12 - 22' | 12 - 22' | 10 - 20' | 10 - 20' | 10 - 20' | -- | -- |
| **Date Sampled** | **Standards and** | 04/08/02 | 04/08/02 | 04/08/02 | 04/08/02 | 04/08/02 | 04/08/02 | 04/08/02 | 04/08/02 |
| **Dilution** | **Guidance Values** | 1.0 | 5.0 | 5.0 | 20.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| **Units** | **mg/l (ppm)** | mg/l (ppm) | mg/l (ppm) | mg/l (ppm) | mg/l (ppm) | mg/l (ppm) | mg/l (ppm) | mg/l (ppm) | mg/l (ppm) |
| ***Additional Compounds*** | | | | Duplicate Sample of M-3 | | | | Field Blank | Trip Blank |
| Chloride | 250 | **350** | 160 | NA | 200 | **510** | NA | NA | NA |
| Nitrite as N (N02-N) | 1 | 0.002 U | 0.002 U | NA | 0.002 U | 0.01 U | NA | NA | NA |
| Sulfide | 0.05 | 0.36 U | 0.36 U | NA | **0.4 B** | **2.5** | NA | NA | NA |
| Solids, Total Dissolved | 1000 | **1300** | 710 | NA | 840 | **1500** | NA | NA | NA |
| Solids, Total Volatile | -- | 71 | 113 | NA | 159 | 169 | NA | NA | NA |
| Total Organic Carbon | 0.1 | **12** | **7.7** | NA | **7.8** | **7.9** | NA | NA | NA |
| Dissolved Iron | 0.3 | **21000** | **5660** | NA | **45400** | **74900** | NA | NA | NA |

**Notes:**

NYSDEC = New York State Department of Environmental Conservation
Class GA = Groundwater effluent limitations.
mg/l=milligram per liter
ppm=parts per million
U=Undetected
NA=Not Analyzed

# Table 11
## 2350 Fifth Avenue, New York, NY
Supplemental Remedial Investigation - Off-site Soil Gas Analytical Data

*Volatile Organic Compounds*

| Sample ID | NYSDOH Indoor Air Guideline (2005)* and/or NYSDOH Mean Background Indoor Air Concentrations (1997) | SG-1 | | DUP-1 | | SG-2 | | SG-3 | | SG-4 | | SG-5 | | FIELDBLANK-1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Depth (feet) | | 6' | | 6' | | 6' | | 6' | | 6' | | 6' | | 6' | |
| Sampling Date | | 8/8/2006 | | 8/8/2006 | | 8/8/2006 | | 8/8/2006 | | 8/8/2006 | | 8/8/2006 | | 8/8/2006 | |
| Dilution Factor | | 1 | | 1 | | 5 | | 20 | | 1 | | 1 | | 1 | |
| Units | ug/m$^3$ | ug/m$^3$ | | ug/m$^3$ | | ug/m$^3$ | | ug/m$^3$ | | ug/m$^3$ | | ug/m$^3$ | | ug/m$^3$ | |
| ***Volatile Compounds (GC/MS)*** | | | | Duplicate Sample of SG-1 | | | | | | | | | | Field Blank | |
| Dichlorodifluoromethane | <1 | **2.8** | | **4** | | 12 | U | 49 | U | **3.3** | | **3.3** | | **2.9** | |
| 1,2-Dichlorotetrafluoroethane (Freon 114) | -- | 1.4 | U | 1.4 | U | 7 | U | 28 | U | 1.4 | U | 1.4 | U | 1.4 | U |
| Chloromethane (Methyl chloride) | -- | 1.2 | | 1 | U | 5.2 | U | 21 | U | 1.4 | | 1.3 | | 1.3 | |
| Vinyl Chloride | <1 | 0.51 | U | 0.51 | U | 2.6 | U | 10 | U | 0.51 | U | 0.51 | U | 0.51 | U |
| 1,3-Butadiene | -- | 1.1 | U | 1.1 | U | 5.5 | U | 22 | U | 1.1 | U | 1.1 | U | 1.1 | U |
| Bromomethane (Methyl bromide) | -- | 0.78 | U | 0.78 | U | 3.9 | U | 16 | U | 0.78 | U | 0.78 | U | 0.78 | U |
| Chloroethane (ethyl chloride) | -- | 1.3 | U | 1.3 | U | 6.6 | U | 26 | U | 1.3 | U | 1.3 | U | 1.3 | U |
| Bromoethene | -- | 0.87 | U | 0.87 | U | 4.4 | U | 17 | U | 0.87 | U | 0.87 | U | 0.87 | U |
| Trichlorofluoromethane (Freon 11) | -- | 1.6 | | 3.9 | | 5.6 | U | 22 | U | 2.1 | | 1.9 | | 1.5 | |
| 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon TF) | -- | 1.5 | U | 1.5 | U | 7.7 | U | 31 | U | 1.5 | U | 1.5 | U | 1.5 | U |
| 1,1-Dichloroethene | <1 | 0.79 | U | 0.79 | U | 4 | U | 16 | U | 0.79 | U | 0.79 | U | 0.79 | U |
| Acetone (2-propanone) | -- | 17 | | 48 | | 93 | | 240 | U | 26 | | 29 | | 12 | U |
| Isopropyl Alcohol | -- | 12 | U | 12 | U | 61 | U | 250 | U | 12 | U | 16 | | 12 | U |
| Carbon disulfide | -- | 2.6 | | 14 | | 47 | | 31 | U | 1.6 | U | 1.8 | | 1.6 | U |
| 3-Chloropropene (allyl chloride) | -- | 1.6 | U | 1.6 | U | 7.8 | U | 31 | U | 1.6 | U | 1.6 | U | 1.6 | U |
| Methylene Chloride | 3.5 or 60* | 1.7 | U | 1.7 | U | 8.7 | U | 35 | U | 1.7 | U | **3.5** | | 1.7 | U |
| Tertiary butyl alcohol (TBA) | -- | 15 | U | 15 | U | 76 | U | 300 | U | 15 | U | 15 | U | 15 | U |
| MTBE (Methyl tert-butyl ether) | -- | 1.8 | U | 1.8 | U | 9 | U | 36 | U | 1.8 | U | 1.8 | U | 1.8 | U |
| 1,2-Dichloroethene (trans) | -- | 0.79 | U | 0.79 | U | 4 | U | 16 | U | 0.79 | U | 0.79 | U | 0.79 | U |
| n-Hexane | -- | 1.8 | U | 1.8 | U | 8.8 | U | 35 | U | 10 | | 3 | | 1.8 | U |
| 1,1-Dichloroethane | <1 | 0.81 | U | 0.81 | U | 4 | U | 16 | U | 0.81 | U | 0.81 | U | 0.81 | U |
| 1,2-Dichloroethene (total) | -- | 0.79 | U | 0.79 | U | 4 | U | 16 | U | 0.79 | U | 0.79 | U | 0.79 | U |
| 2-Butanone (Methyl ethyl ketone) | -- | 2.1 | | 5 | | 7.4 | U | 29 | U | 2.2 | | 3.2 | | 1.9 | |
| 1,2-Dichloroethene (cis) | <1 | 0.79 | U | 0.79 | U | 4 | U | 16 | U | 0.79 | U | 0.79 | U | 0.79 | U |
| Tetrahydrofuran | -- | 15 | U | 15 | U | 74 | U | 290 | U | 15 | U | 15 | U | 15 | U |
| Chloroform | <4.8 | 2.4 | | **27** | | 4.9 | U | 20 | U | 0.98 | | 0.98 | U | 0.98 | U |
| ** 1,1,1-Trichloroethane | -- | 1.1 | | 13 | | 5.5 | U | 22 | U | 1.1 | U | 1.1 | U | 1.1 | U |
| Cyclohexane | -- | 0.69 | U | 0.69 | U | 3.4 | U | 14 | U | 2.1 | | 0.69 | U | 0.69 | U |
| Carbon tetrachloride | -- | 1.3 | U | 1.3 | U | 6.3 | U | 25 | U | 1.3 | U | 1.3 | U | 1.3 | U |
| 2,2,4-Trimethylpentane | -- | 25 | | 93 | | 460 | | 24 | | 23 | | 13 | | 0.93 | U |
| Benzene | 2.5 | 1 | | 1.2 | | 3.2 | U | 13 | U | **6.1** | | 2.4 | | 0.64 | U |
| 1,2-Dichloroethane | -- | 0.81 | U | 0.81 | U | 4 | U | 16 | U | 0.81 | U | 0.81 | U | 0.81 | U |
| n-Heptane | -- | 0.82 | U | 0.82 | U | 4.1 | U | 16 | U | 5.3 | | 2.1 | | 0.82 | U |
| Trichloroethene (TCE) | 5* | 1.1 | U | 1.1 | U | 5.4 | U | 21 | U | 1.1 | U | 1.1 | U | 1.1 | U |
| 1,2-Dichloropropane | -- | 0.92 | U | 0.92 | U | 4.6 | U | 18 | U | 0.92 | U | 0.92 | U | 0.92 | U |
| 1,4-Dioxane | -- | 18 | U | 18 | U | 90 | U | 360 | U | 18 | U | 18 | U | 18 | U |
| Bromodichloromethane | -- | 1.3 | U | 1.3 | U | 6.7 | U | 27 | U | 1.3 | U | 1.3 | U | 1.3 | U |
| 1,3-Dichloropropene (cis) | -- | 0.91 | U | 0.91 | U | 4.5 | U | 18 | U | 0.91 | U | 0.91 | U | 0.91 | U |
| 4-Methyl-2-pentanone (MIBK) | -- | 2 | U | 2 | U | 10 | U | 41 | U | 2 | U | 2 | U | 2 | U |
| ** Toluene | -- | 6.4 | | 17 | | 36 | | 20 | | 25 | | 11 | | 1.7 | |
| 1,3-Dichloropropene (trans) | -- | 0.91 | U | 0.91 | U | 4.5 | U | 18 | U | 0.91 | U | 0.91 | U | 0.91 | U |
| 1,1,2-Trichloroethane | -- | 1.1 | U | 1.1 | U | 5.5 | U | 22 | U | 1.1 | U | 1.1 | U | 1.1 | U |
| Tetrachloroethene (PCE) | 100* | 16 | | **250** | | **750** | | **3100** | | 68 | | 58 | | 1.4 | U |

**Table 11**
**2350 Fifth Avenue, New York, NY**
Supplemental Remedial Investigation - Off-site Soil Gas Analytical Data
*Volatile Organic Compounds*

| **Sample ID** | **NYSDOH Indoor Air Guideline** | **SG-1** | | **DUP-1** | | **SG-2** | | **SG-3** | | **SG-4** | | **SG-5** | | **FIELDBLANK-1** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Depth (feet)** | **(2005)* and/or NYSDOH Mean** | 6' | | 6' | | 6' | | 6' | | 6' | | 6' | | 6' | |
| **Sampling Date** | **Background Indoor Air** | 8/8/2006 | | 8/8/2006 | | 8/8/2006 | | 8/8/2006 | | 8/8/2006 | | 8/8/2006 | | 8/8/2006 | |
| **Dilution Factor** | **Concentrations (1997)** | 1 | | 1 | | 5 | | 20 | | 1 | | 1 | | 1 | |
| **Units** | **$ug/m^3$** | $ug/m^3$ | | $ug/m^3$ | | $ug/m^3$ | | $ug/m^3$ | | $ug/m^3$ | | $ug/m^3$ | | $ug/m^3$ | |
| ***Volatile Compounds (GC/MS)*** | | | | Duplicate Sample of SG-1 | | | | | | | | | | Field Blank | |
| Methyl Butyl Ketone | -- | 2 | U | 2 | U | 10 | U | 41 | U | 2 | U | 2 | U | 2 | U |
| Dibromochloromethane | -- | 1.7 | U | 1.7 | U | 8.5 | U | 34 | U | 1.7 | U | 1.7 | U | 1.7 | U |
| 1,2-Dibromoethane | -- | 1.5 | U | 1.5 | U | 7.7 | U | 31 | U | 1.5 | U | 1.5 | U | 1.5 | U |
| Chlorobenzene | -- | 0.92 | U | 0.92 | U | 4.6 | U | 18 | U | 0.92 | U | 0.92 | U | 0.92 | U |
| Ethylbenzene | 2.2 | 2.1 | | **8.3** | | **17** | | **26** | | **4.3** | | 2 | | 0.87 | U |
| Xylene (m,p) | <10 | 6.1 | | **33** | | **56** | | **56** | | **13** | | 6.5 | | 2.2 | U |
| Xylene (o) | 2.5 | 2.4 | | **13** | | **21** | | **32** | | **5.2** | | **2.5** | | 0.87 | U |
| Xylene (m&p) | -- | 8.7 | | 48 | | 78 | | 91 | | 20 | | 9.1 | | 0.87 | U |
| Styrene | -- | 0.85 | U | 2.1 | | 9.8 | | 17 | | 0.85 | U | 0.85 | U | 0.85 | U |
| Bromoform | -- | 2.1 | U | 2.1 | U | 10 | U | 41 | U | 2.1 | U | 2.1 | U | 2.1 | U |
| 1,1,2,2-Tetrachloroethane | -- | 1.4 | U | 1.4 | U | 6.9 | U | 27 | U | 1.4 | U | 1.4 | U | 1.4 | U |
| 4-Ethyltoluene (p-Ethyltoluene) | -- | 2.9 | | 24 | | 27 | | 20 | U | 6.9 | | 4.1 | | 0.98 | U |
| 1,3,5-Trimethylbenzene | -- | 1.1 | | 11 | | 11 | | 20 | U | 2.3 | | 1.3 | | 0.98 | U |
| 2-Chlorotoluene (o-Chlorotoluene) | -- | 1 | U | 1.6 | | 5.2 | U | 21 | U | 1 | U | 1 | U | 1 | U |
| 1,2,4-Trimethylbenzene | 5 | 3.7 | | **39** | | **38** | | 20 | U | **7.9** | | 4.6 | | 0.98 | U |
| 1,3-Dichlorobenzene | -- | 1.2 | U | 1.2 | U | 6 | U | 24 | U | 1.2 | U | 1.2 | U | 1.2 | U |
| 1,4-Dichlorobenzene | <2 | 1.2 | U | **2.5** | | 6 | U | 24 | U | 1.2 | U | 1.2 | U | 1.2 | U |
| 1,2-Dichlorobenzene | -- | 1.2 | U | 1.2 | U | 6 | U | 24 | U | 1.2 | U | 1.2 | U | 1.2 | U |
| 1,2,4-Trichlorobenzene | -- | 3.7 | U | 3.7 | U | 19 | U | 74 | U | 3.7 | U | 3.7 | U | 3.7 | U |
| Hexachlorobutadiene | -- | 2.1 | U | 2.1 | U | 11 | U | 43 | U | 2.1 | U | 2.1 | U | 2.1 | U |
| Total hydrocarbons | -- | 51.8 | | 243.6 | | 680.0 | | 251.0 | | 96.4 | | 48.4 | | 8.8 | |

**Notes:**
NYSDOH = New York State Department of Health
GC/MS = Gas Chromatography/Mass Spectrometry
* = New York State Department of Health Indoor Air Guideline (NYSDOH, 2005)
$ug/m^3$ = micrograms per cubic meter
U = Compound analyzed but not detected at a concentration above the reporting limit.

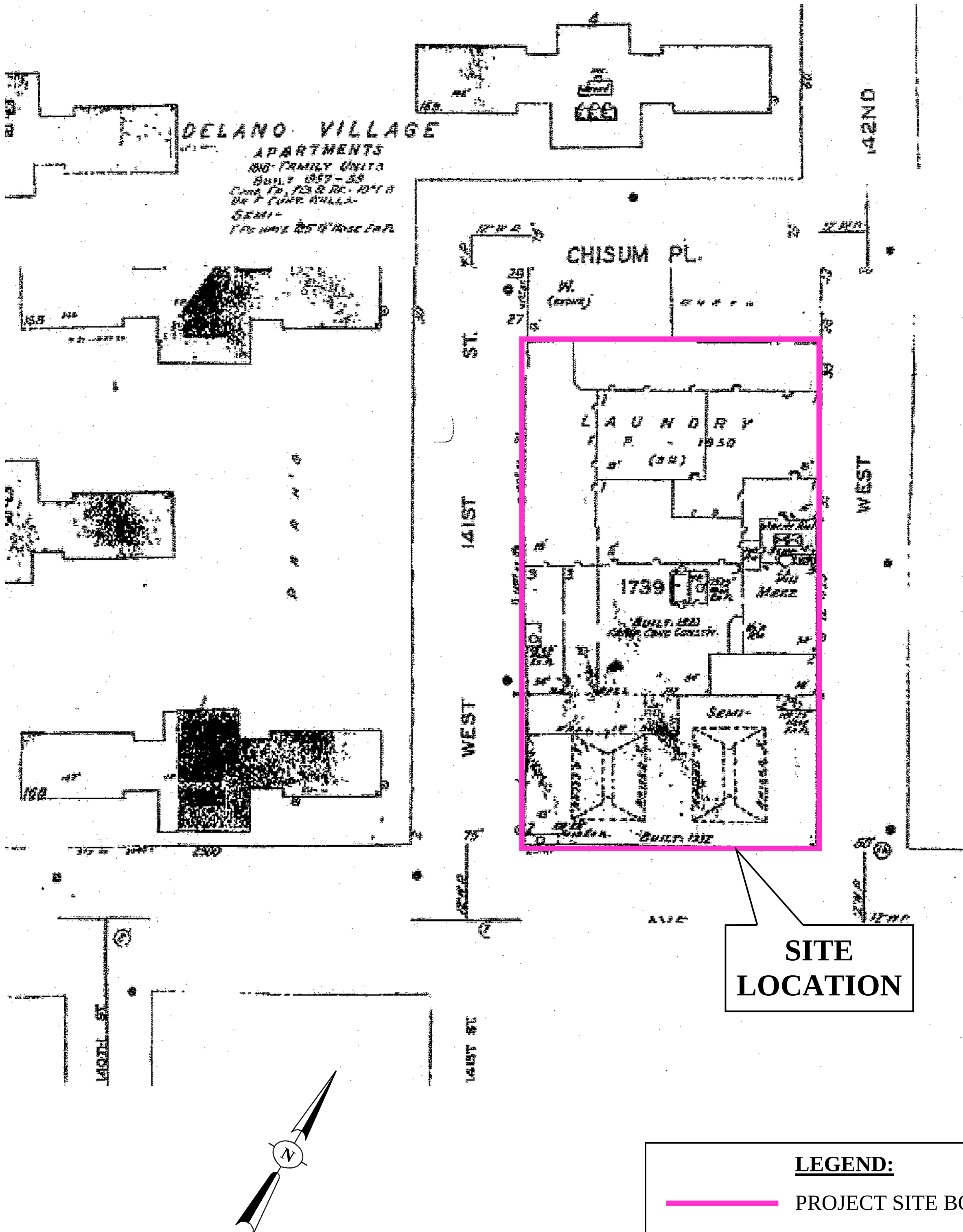
**Table 12**
**2350 Fifth Avenue, New York, NY**
Indoor Air Sampling Analytical Data
*Tetrachloroethene*

| Date of Sampling Event | Room 112 ppbV | Room 131 ppbV | Room 129 ppbV | Hallway (outside cafeteria/Room 118) ppbV | Cafeteria ppbV | Room 151 ppbV | Roof near Fifth Ave. ppbV | Corridor (outside Room 129) ppbV | Sales Office ppbV |
|---|---|---|---|---|---|---|---|---|---|
| 6/30/1997 | 5.66 | 2.31J/2.33[D] | 3 | 6.34 | 10.4 | 1.43J | 0.294J | -- | -- |
| 7/18/1997 | 4.5 | 3.38 | 3.01/2.89[D] | 6.75 | 9.63 | 2.16 | -- | -- | -- |
| 9/13/1997 | 19 | 14.5/16.8[D] | 16.1 | 8.3 | 7.7 | 5.93 | ND | -- | -- |
| 10/2/1997 | 11.5 | 9.37/9.03(9.34)[D]* | 8.90(8.46)* | 3.47 | 3.3 | 2.92 | 0.32J | -- | -- |
| 8/13/1998 | 9.2/8.9[D] | 6.0/5.9[D] | 5.9 | 7.1 | 7 | -- | -- | -- | -- |
| 8/23/1999 | 9.8 | 3.6 | 2.5 | 6.2 | 5.5 | -- | -- | -- | -- |
| 11/27/2001 | 2.2 | 0.84 | 0.71 | 0.43 | 0.37 | -- | -- | -- | -- |
| 4/22/2002 | 1.8 | 0.28 | 0.27 | 0.36 | 0.4 | -- | -- | -- | -- |
| 1/13/2003 | 2.2 | 0.98/1.0[D] | 0.57 | ND | ND | -- | -- | -- | -- |
| 5/5/2003 | 1.4 | 0.5 | 0.44/0.46[D] | 0.38 | 0.32 | -- | -- | -- | -- |
| 8/23/2004 | 2.1 | ND | ND | 0.44 | ND | -- | -- | -- | -- |
| 4/21/2005 | 5.8 | 6.5 | 10 | 8 | 4.5 | -- | -- | -- | -- |
| 5/20/2005 | 2.2 | 6.7 | 11 | 9 | 5.5 | -- | -- | -- | -- |
| 8/21/2005 | 7.4 | ND | ND | ** | ND | -- | -- | -- | -- |
| 2/18/2006 | 2.8 | 2.5 | 2.7 | 2.2 | 0.22 | -- | -- | -- | -- |
| 12/15/2006 | 6.1 | 1 | 1.3 | 0.63 | 0.48 | -- | -- | 0.63 | -- |
| 1/26/2007 | 12 | 0.29 | 0.34 | 5.6 | 3.9 | -- | -- | 6 | 2 |

**Notes:**
[D] = Duplicate sample
* = Sample reanalyzed
** = The laboratory reported that the sample from the corridor next to Room 118 was compromised due to an instrument malfunction and the results could not be reported.
ND = Not detected, belw estimated quantitation limit
J=Estimated value below quantitation limit

# APPENDIX A

# HISTORICAL SANBORN MAPS




**LEGEND:**

PROJECT SITE BOUNDARY

**2350 5th AVENUE**
NEW YORK, NEW YORK

**1996 SANBORN MAP**

AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

DATE
**1.31.07**

PROJECT No.
**08010**

SCALE
**NTS**

FIGURE

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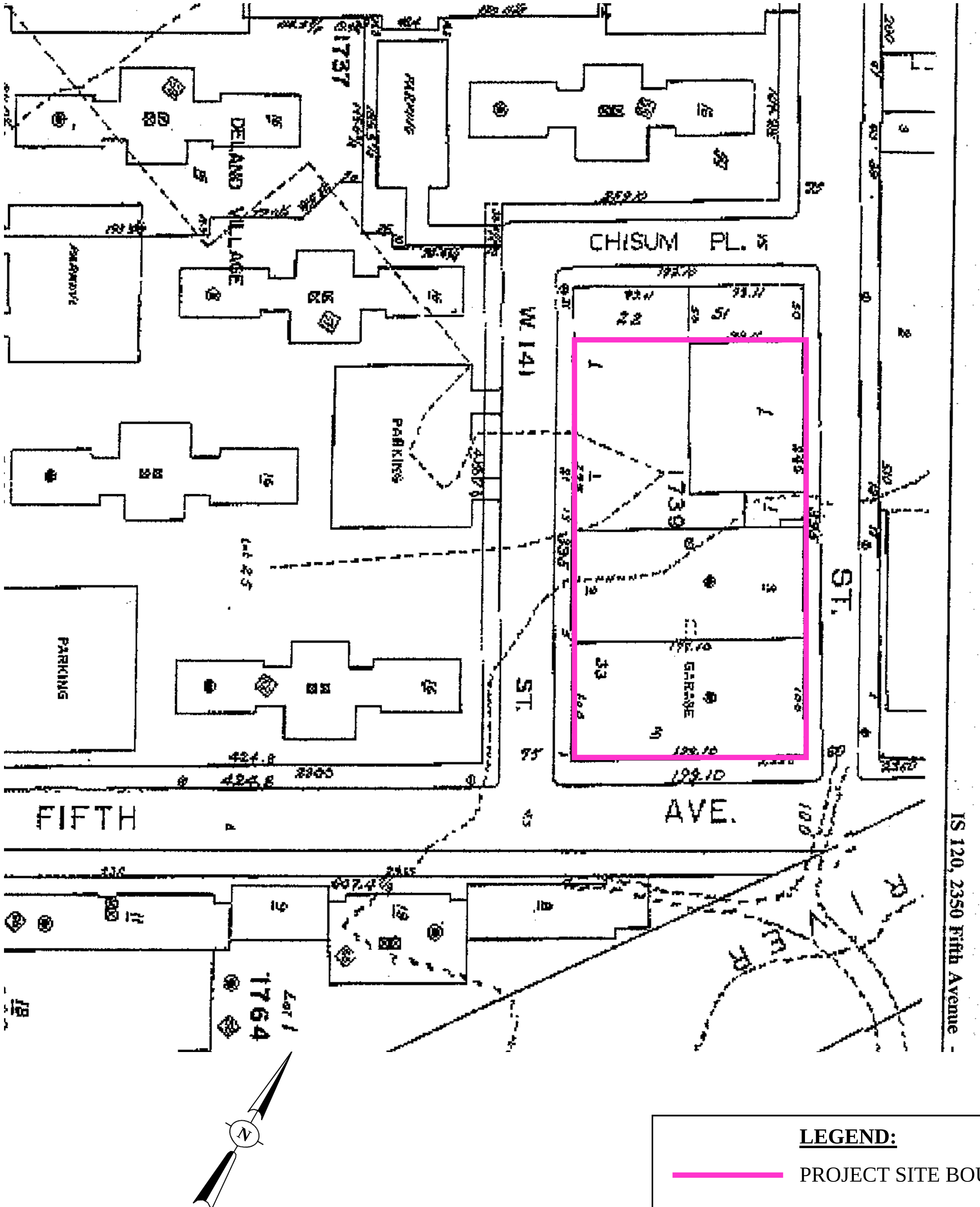


**LEGEND:**

PROJECT SITE BOUNDARY

**2350 5th AVENUE**
NEW YORK, NEW YORK

**1976 SANBORN MAP**

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FIGURE

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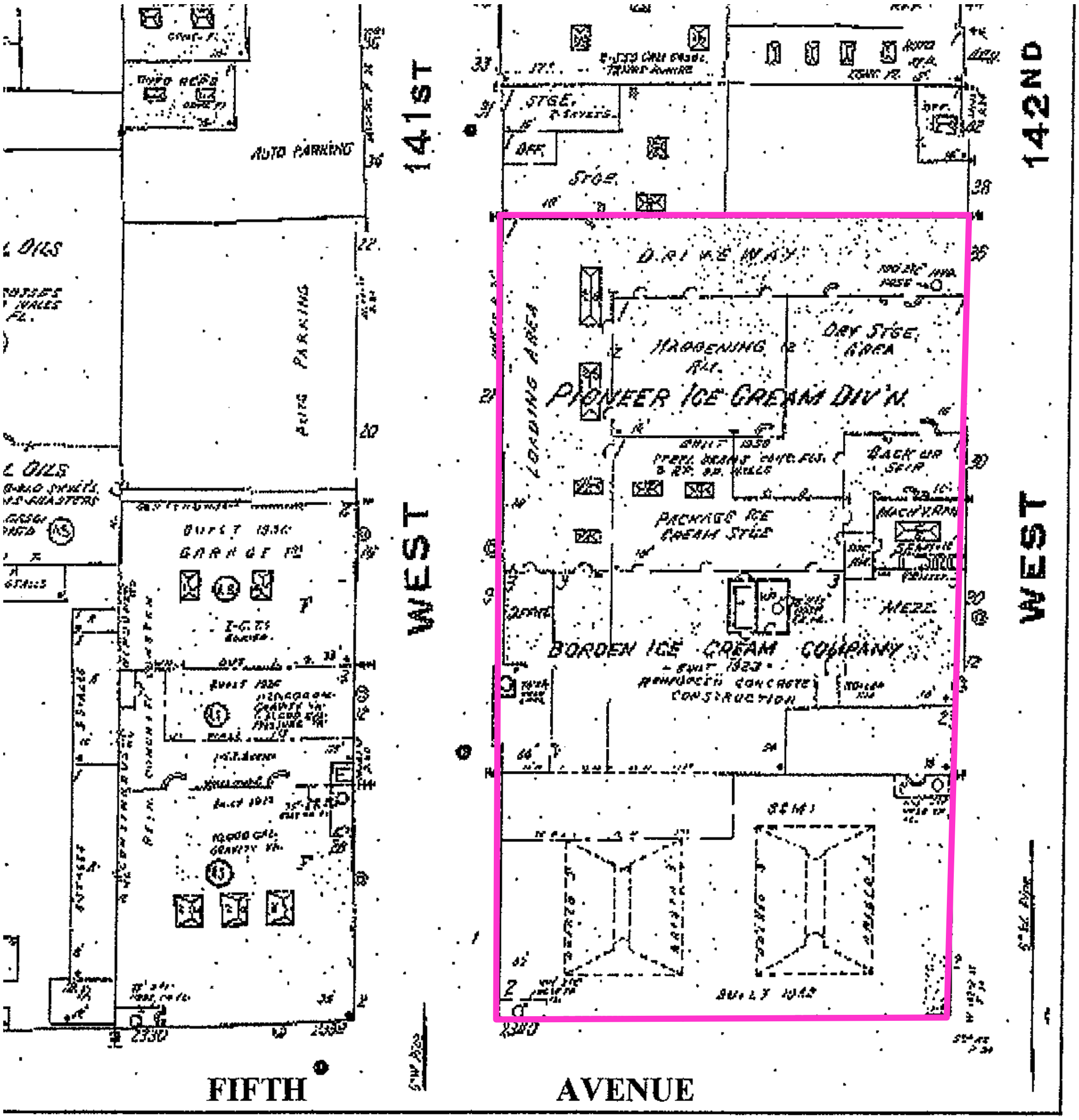


**FIGURE II-4**
**1951 SANBORN MAP**

**LEGEND:**

PROJECT SITE BOUNDARY

**2350 5th AVENUE**
NEW YORK, NEW YORK

**1951 SANBORN MAP**

AKRF
Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

| | |
|---|---|
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| SCALE | NTS |
| FIGURE | |

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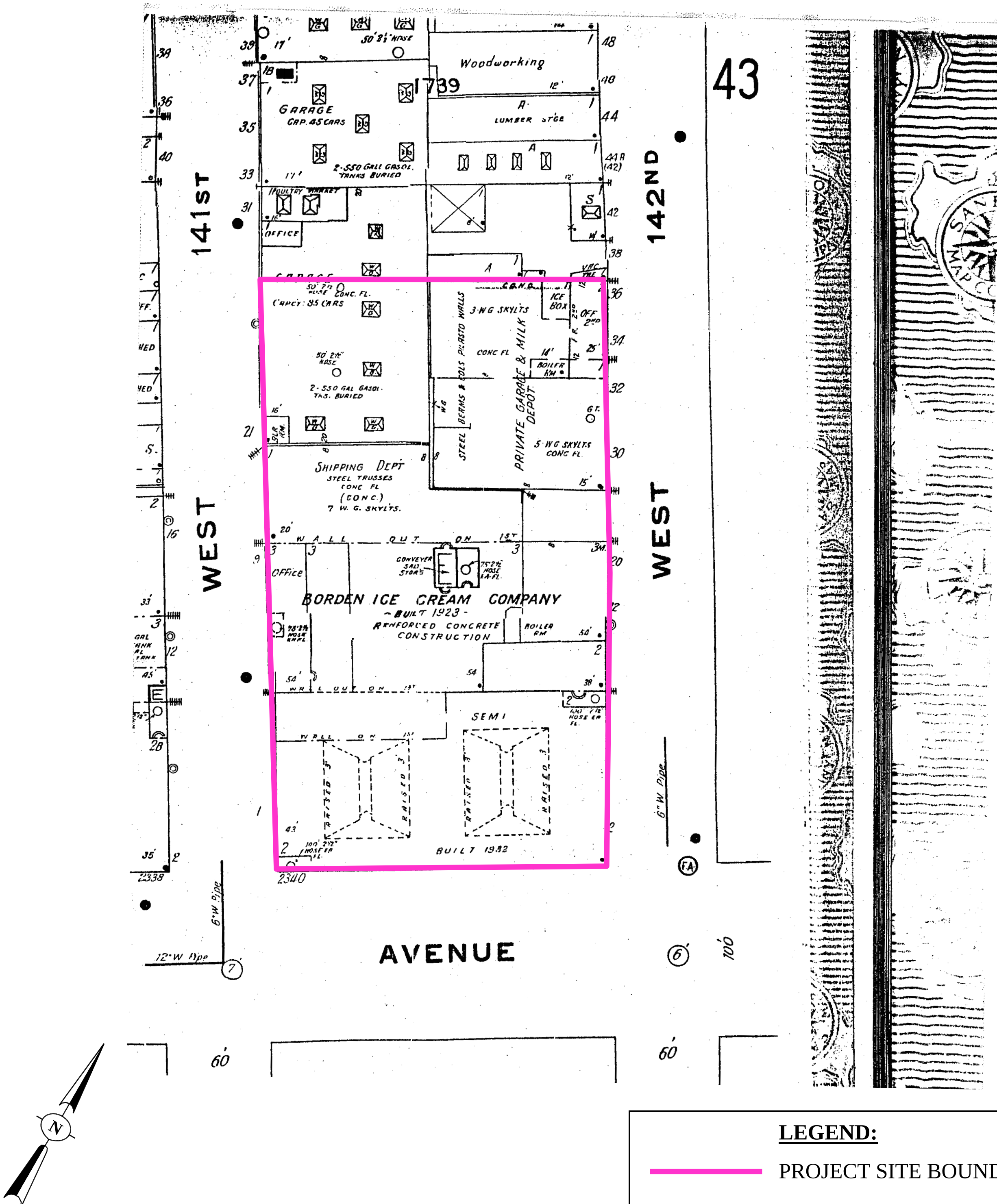


**LEGEND:**

PROJECT SITE BOUNDARY

**2350 5th AVENUE**
NEW YORK, NEW YORK

**1939 SANBORN MAP**

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| | |
|---|---|
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| SCALE | **NTS** |
| FIGURE | |

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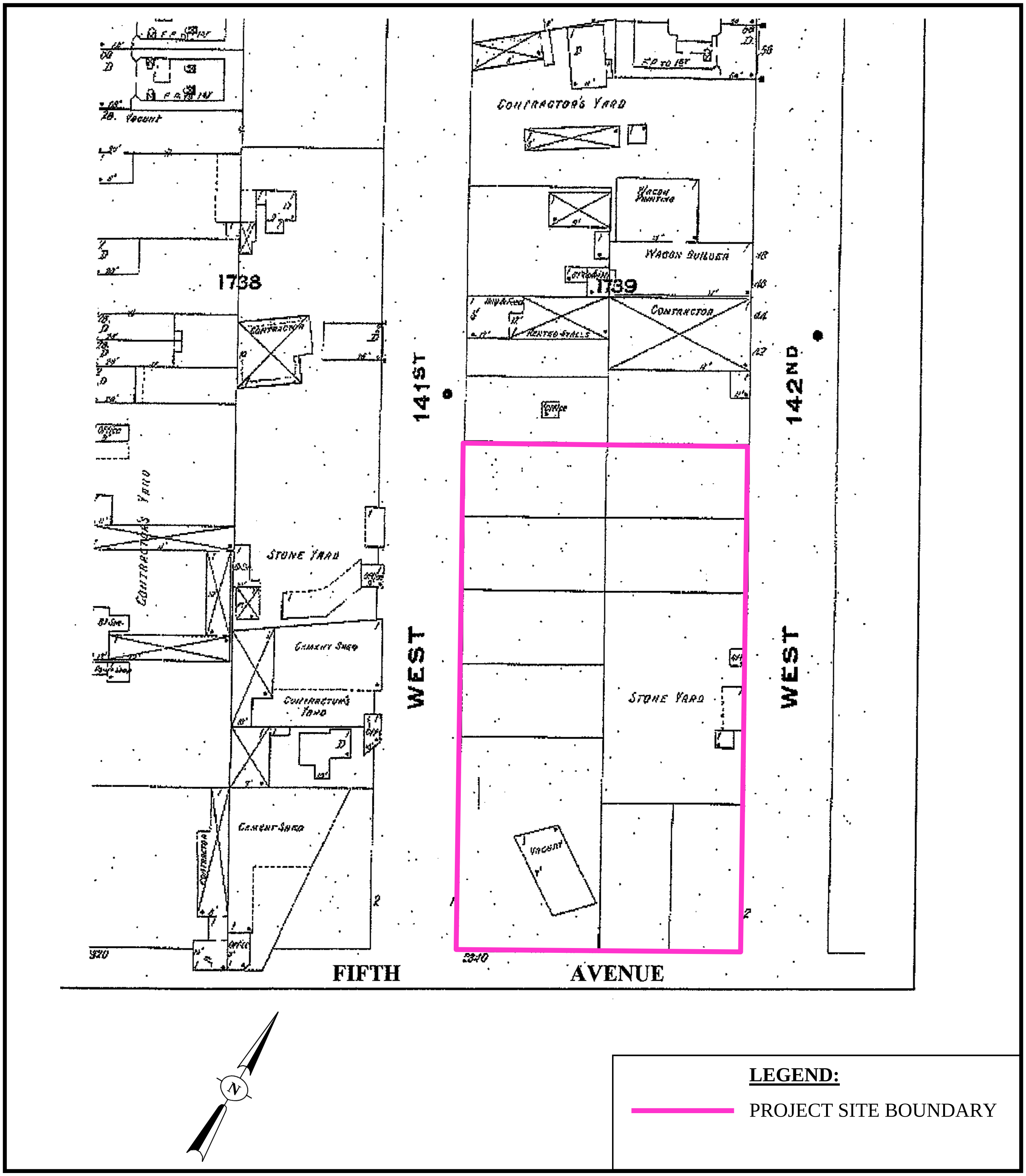


**2350 5th AVENUE**
NEW YORK, NEW YORK

**1909 SANBORN MAP**

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FIGURE

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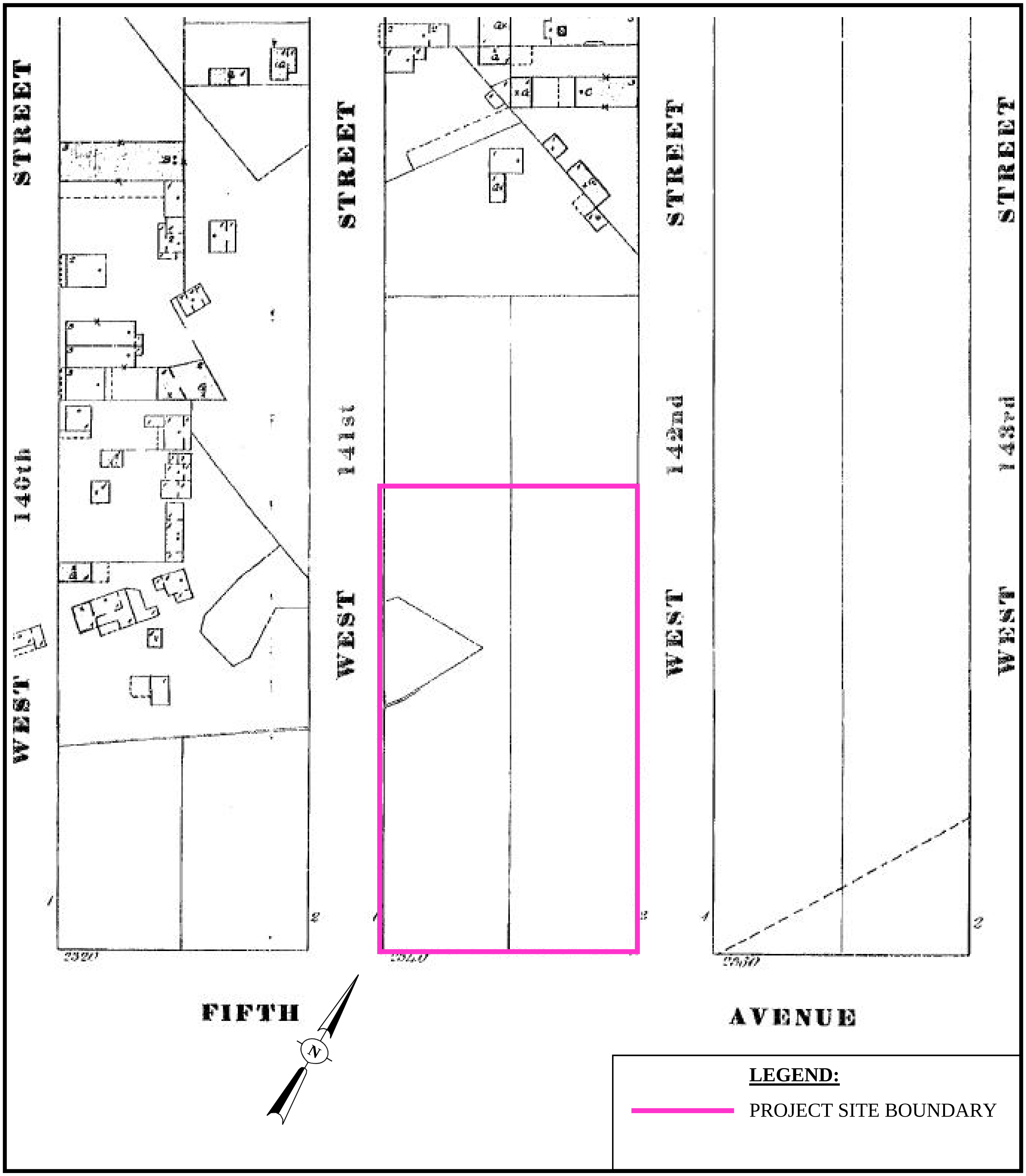


**2350 5th AVENUE**
NEW YORK, NEW YORK

**1893 SANBORN MAP**

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Environmental Consultants
440 Park Avenue South, New York, N.Y. 10016

| | |
|---|---|
| DATE | **1.31.07** |
| PROJECT No. | **08010** |
| SCALE | **NTS** |
| FIGURE | |

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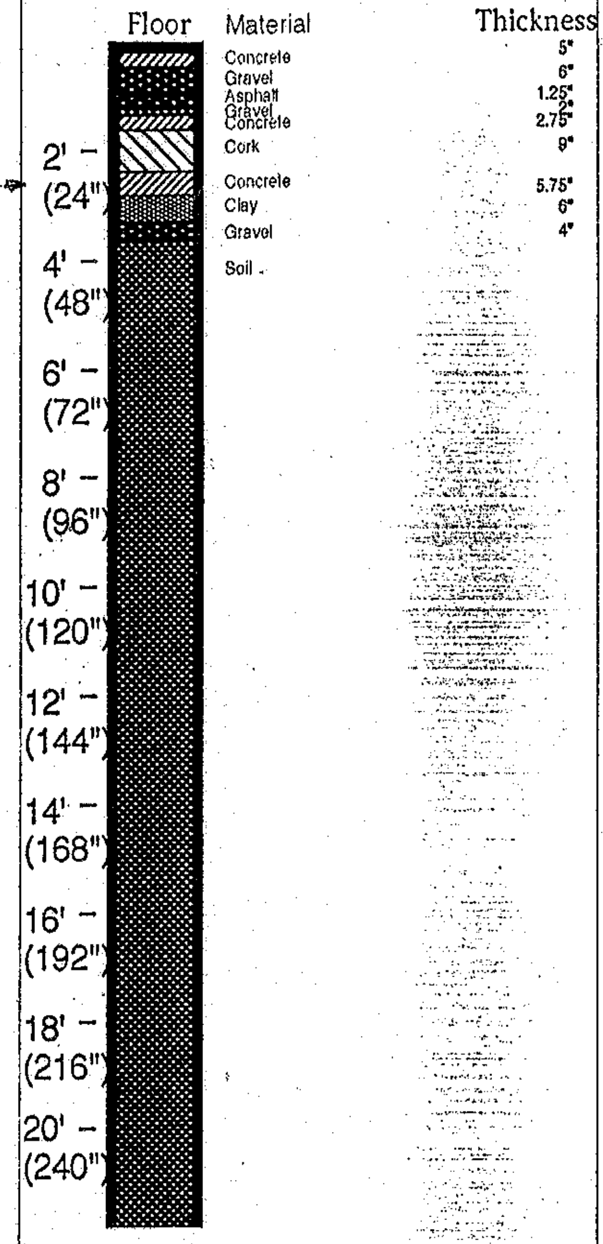
# APPENDIX B

# LOGS AND DATA FROM 1997 CORES

Location Number: C-1




Area: Hallway by elevator

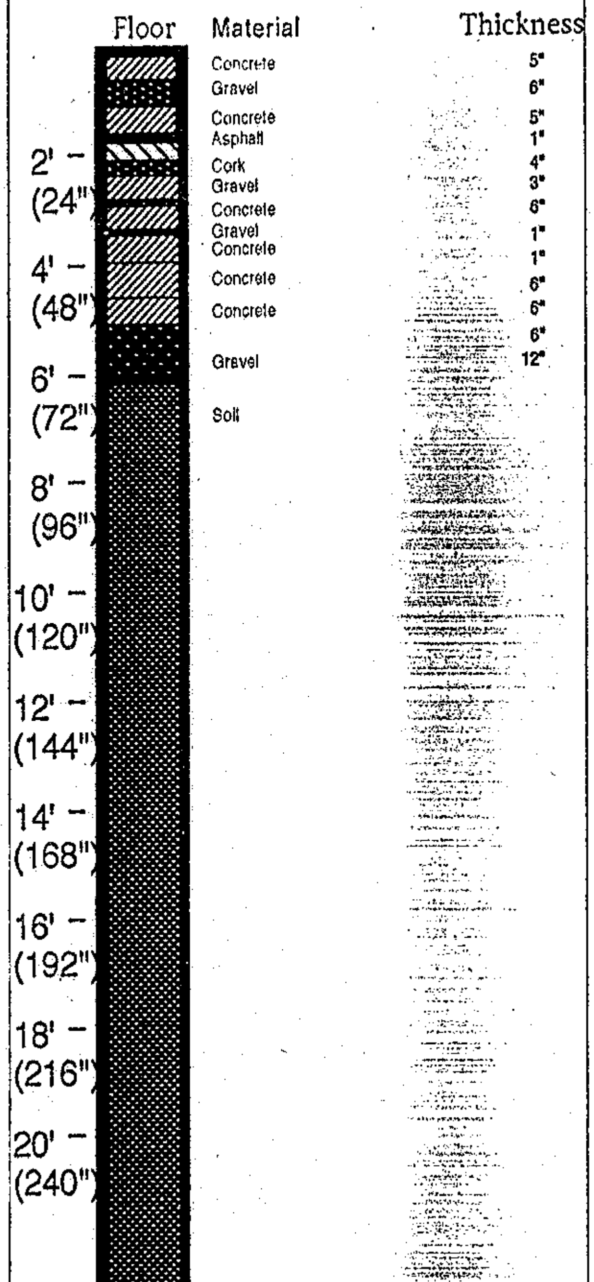
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Cork | 22 | 61 |
| Clay | 28 | 21 |
| Soil | 66 | 14 |
| Soil | 84 | 6.4 |
| Soil | 96 | 6.3 |
| Soil | 102 | 3.8 |
| Soil | 115 | 3.3 |
| Soil | 122 | 10 |
| Soil | 152 | 17 |
| Soil | 190 | 8 |
| Soil | 240 | 5 |

Sample Collection date(s): 4/2/97 - 4/4/97

* micrograms per kilo

Location Number: C-2




Area: Cafeteria by north wall

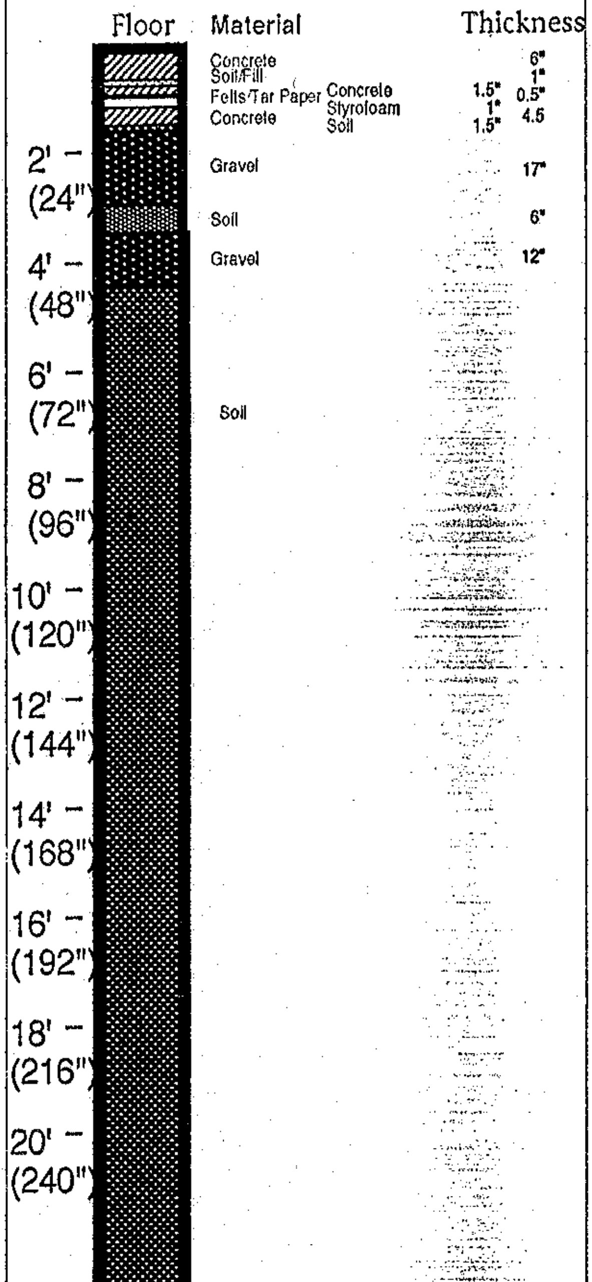
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Cork | 19 | 780 |
| Gravel | 76 | 64 |
| Soil | 90 | 90 |
| Soil | 114 | 88 |
| Soil | 128 | 80 |
| Soil | 140 | 50 |
| Soil | 166 | 40 |
| Soil | 190 | 32 |
| Soil | 212 | 37 |
| Soil | 246 | 8 |

Sample Collection date(s): 4/3/97 - 4/4/97

*- micrograms per kilo

Location Number: C-3




Area: Former location of dry-cleaning equipment

Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Soil | 15 | 1,900 |
| Styro-foam | 18 | 8,300 |
| Soil | 24 | 1,900 |
| Soil | 54 | 1,300 |
| Soil | 60 | 1,200 |
| Soil | 66 | 4,100 |
| Soil | 80 | 4,500 |
| Soil | 104 | 1,500 |
| Soil | 128 | 15,000 |
| Soil | 152 | 16,000 |
| Soil | 176 | 15,000 |
| Soil | 200 | 20,000 |
| Soil | 224 | 6,300 |
| Soil | 260 | 2,000 |

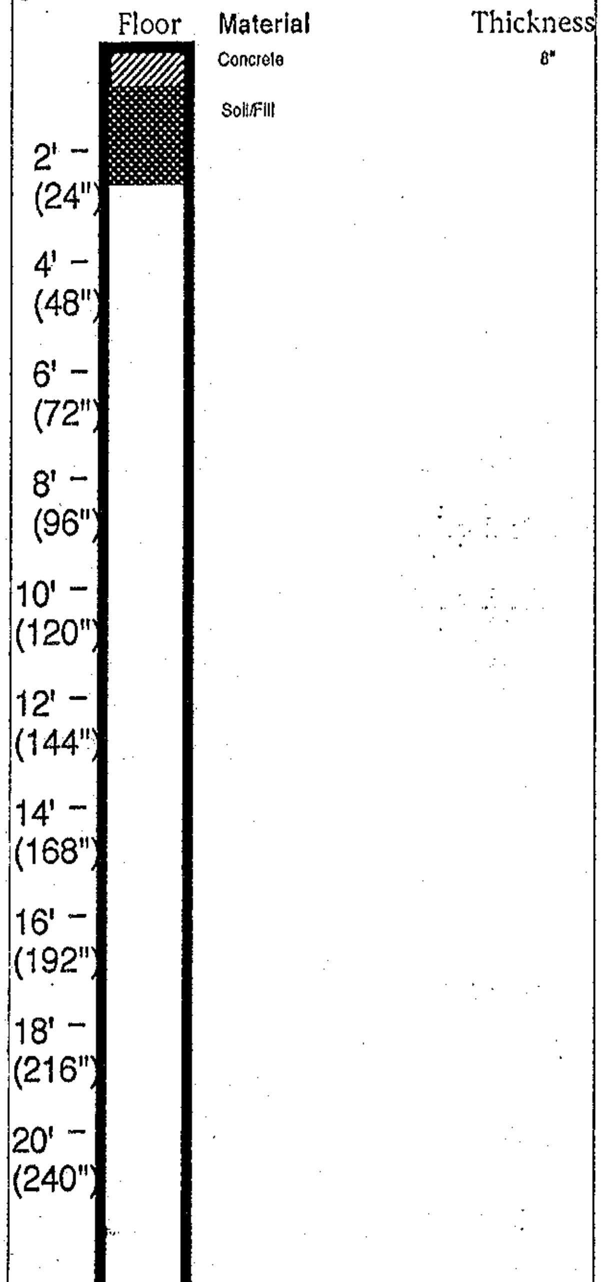
The floor of this area is approx. 8" below floor of school. The depths above have been corrected to reflect depths below floor of school.

Sample Collection date(s): 4/3/97 - 4/7/97

* micrograms per kilo

Location Number: C-4

This hole was abandoned due to its close proximity to piping.




Area: Old garage

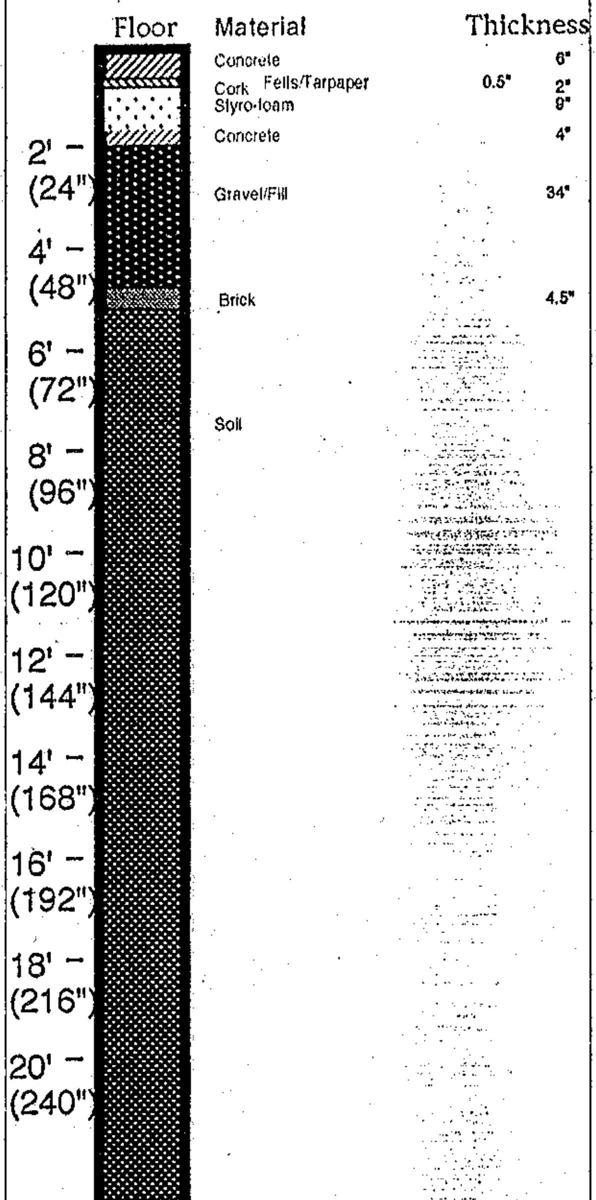
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Soil | 30" | 3,800 |

Sample Collection date(s): 4/4/97

* micrograms per kilo

Location Number: C-5




Area: North-west section of former dry-cleaning area

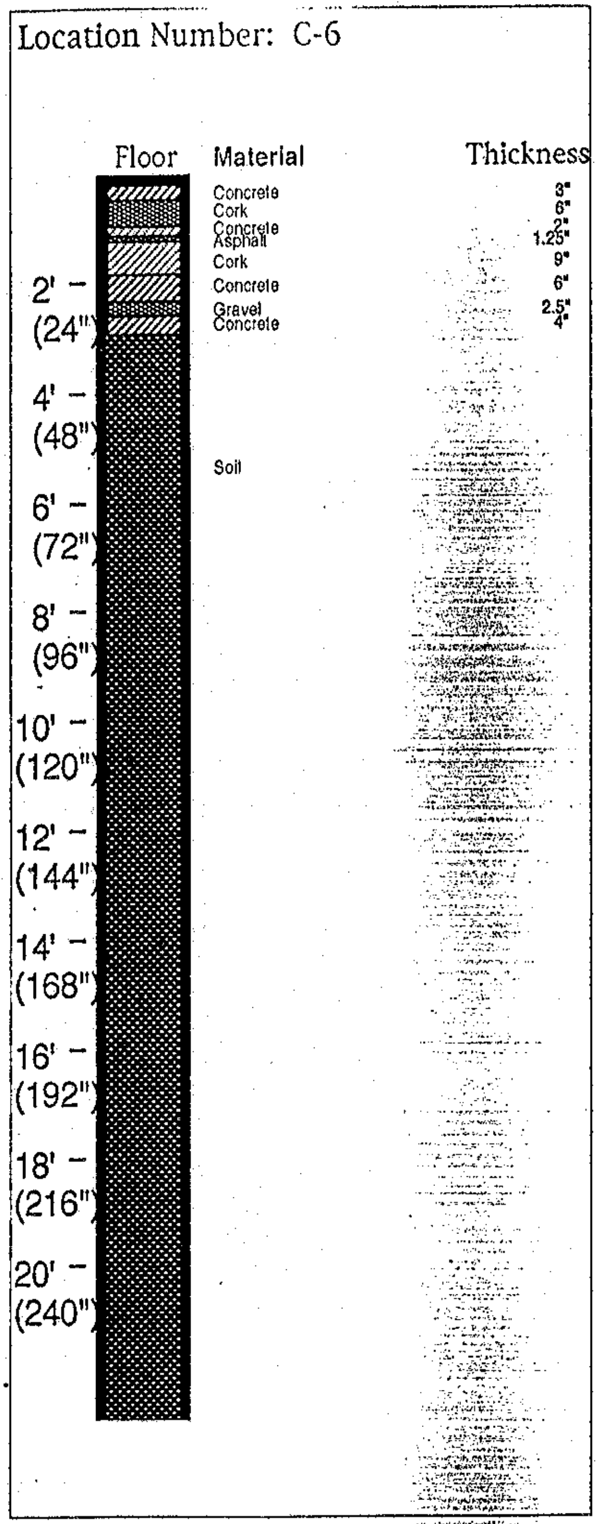
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Styro-foam | 8 | 4,030 |
| Cork Soil | 25¼ 10 | 1,440 -74 |
| Soil | 34 | 30 |
| Soil | 54 | 20 |
| Soil | 84 | 44 |
| Soil | 96 | 13 |
| Soil | 108 | 24 |
| Soil | 132 | 32 |
| Soil | 156 | 10 |
| Soil | 180 | 13 |
| Soil | 204 | 10 |
| Soil | 228 | 14 |
| Soil | 252 | 12 |

90 days depth

Sample Collection date(s): 4/7/97 - 4/8/97

* micrograms per kilo




Area: Hallway by hot water heater room

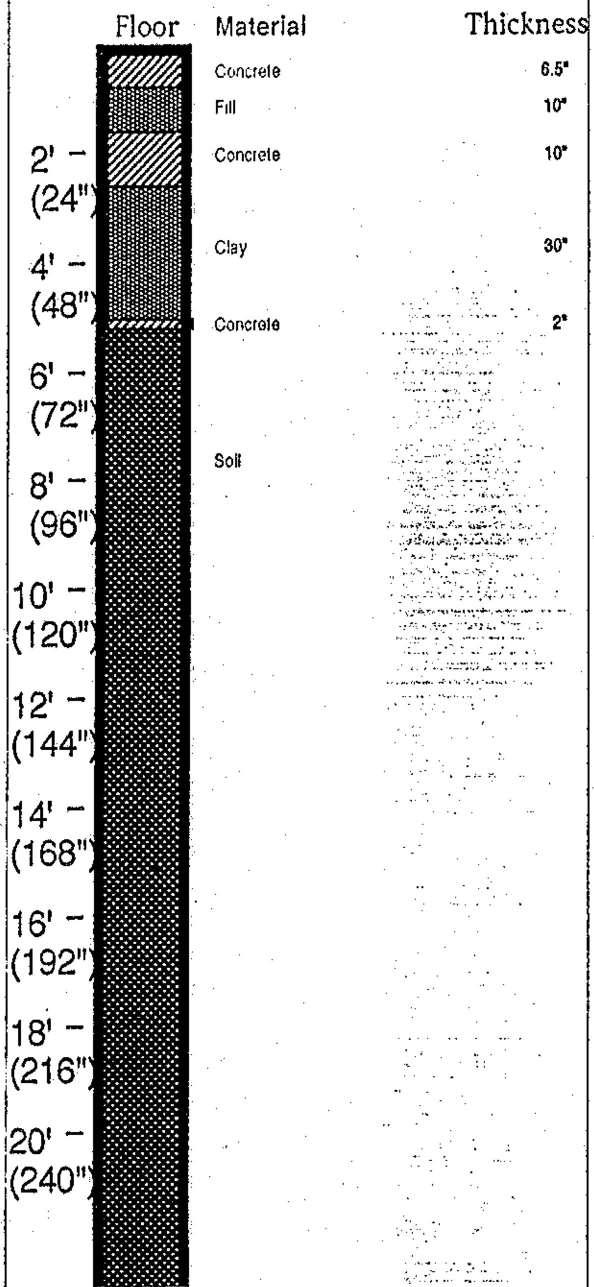
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Cork | 14" | 1,000,000 X |
| Soil | 34 | 90 |
| Soil | 78 | 3,000 |
| Soil | 120 | 330 |
| Soil | 144 | 13 |
| Soil | 168 | 13 |
| Soil | 192 | 11 |
| Soil | 216 | 11 |
| Soil | 240 | 16 |

Sample Collection date(s): 4/7/97 - 4/8/97

* micrograms per kilo

Location Number: C-7




Sample Collection date(s): 4/7/97 - 4/9/97

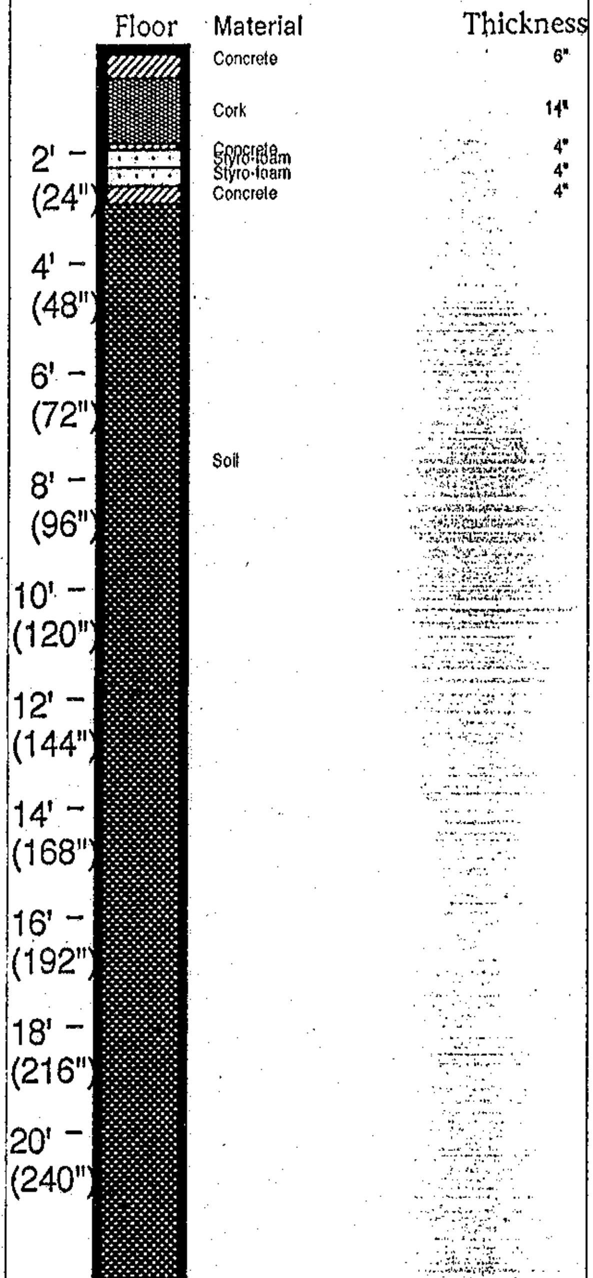
Area: Hallway by Room 129
room
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Soil | 30 | 39 |
| Soil | 60 | 250 |
| Soil Soil | 74 96 | 76 220 |
| Soil | 120 | 390 |
| Soil | 144 | 56 |
| Soil | 168 | 180 |

This hole was abandoned at 168" due to large amounts of refusal, making further drilling very difficult.

* micrograms per kilo

Location Number: C-8




Area: North of former dry-cleaning equipment

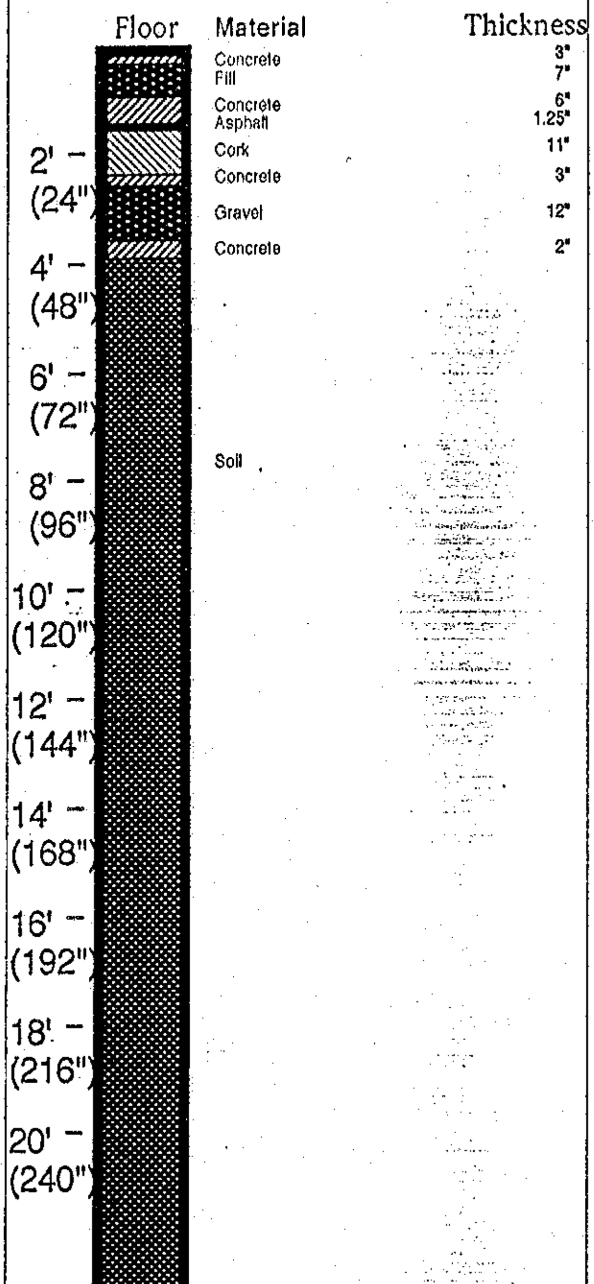
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Cork | 7.5 | 3,000 |
| Styro-foam, 1st layer | 9 | 410 |
| Styro-foam, 2nd layer | 13 | 27,000 |
| Fill | 24" | 2,900 |
| Fill | 36" | 1,000 |
| Soil | 60" | 500 |
| Soil | 108 | 3,800 |
| Soil | 132 | 730 |
| Soil | 156 | 280 |
| Soil | 180 | 260 |
| Soil | 216 | 150 |
| Soil | 240 | 36 |

Sample Collection date(s): 4/9/97

* micrograms per kilo

Location Number: C-9




Area: Room 118 by south wall

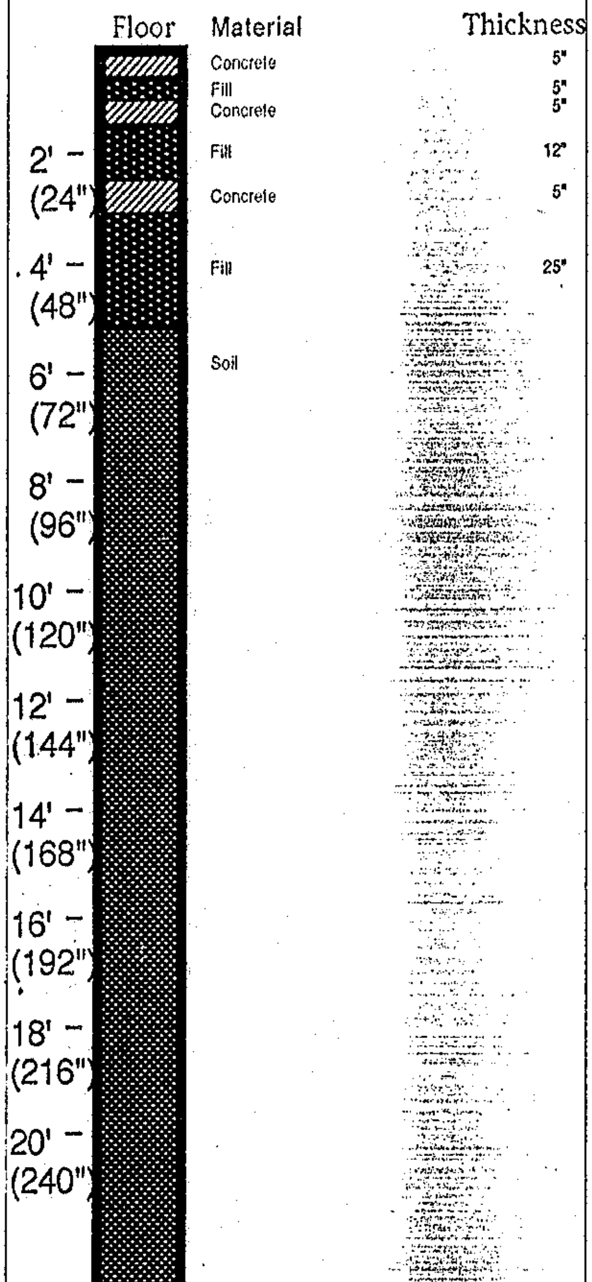
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Cork-1st layer | 16 | 16 |
| Styro-foam, 2nd layer | 20 | 23 |
| Fill | 53 | 430 |
| Soil | 69 | 620 |
| Soil | 75 | 2,900 |
| Soil | 96 | 3,800 |
| Soil | 120 | 4,900 |
| Soil | 144 | 940 |
| Soil | 168 | 820 |
| Soil | 192 | 690 |
| Soil | 216 | 170 |
| Soil | 252 | 36 |

Sample Collection date(s): 4/8/97 - 4/9/97

* micrograms per kilo

Location Number: C-10




Sample Collection date(s): 4/10/97

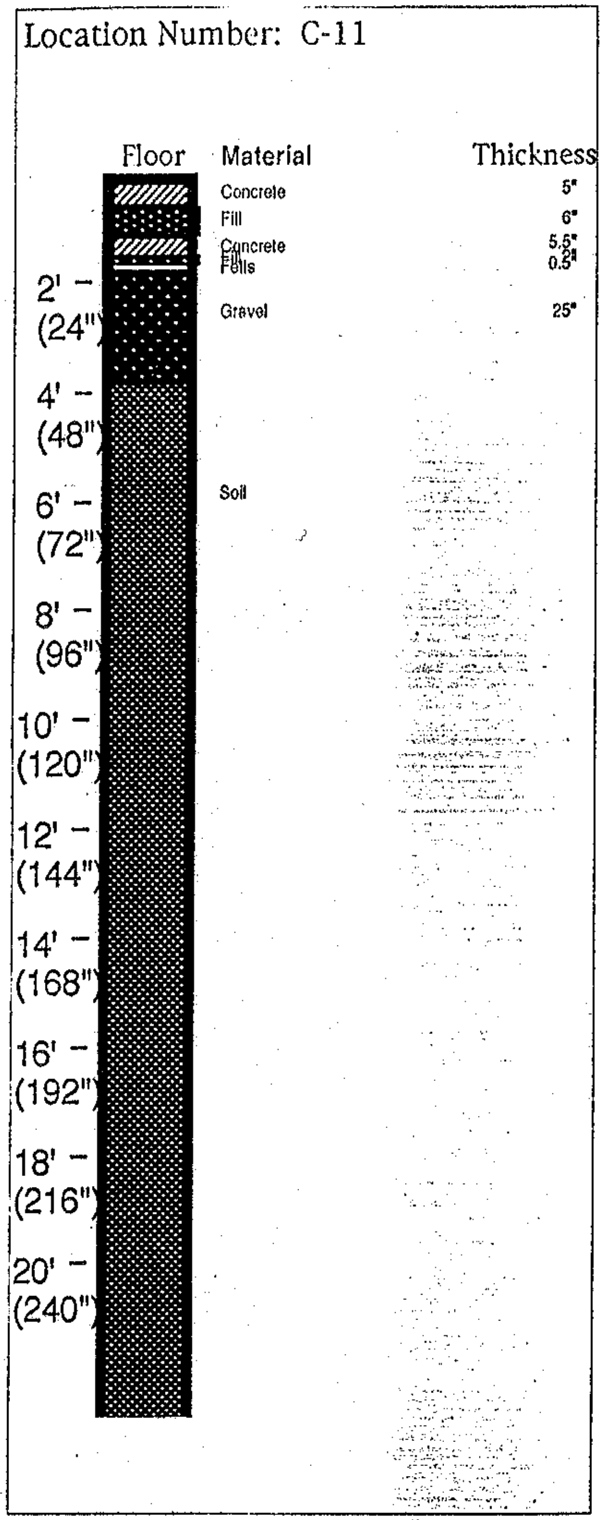
Area: Hallway north of freight elevator

Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Soil | 24 | 240 |
| Soil | 48 | 200 |
| Soil | 64 | 200 |
| Soil | 79 | 180 |
| Soil | 88 | 210 |
| Soil | 112 | 230 |
| Soil | 120 | 130 |

This hole was abandoned at 120" due to large amounts of refusal, making further drilling very difficult.

* micrograms per kilo




Area: Cafeteria next to kitchen

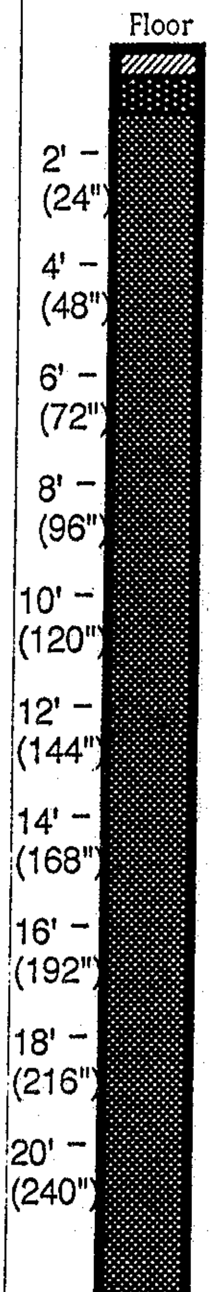
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 18 | 230 |
| Fill | 48 | 330 |
| Soil | 72 | 230 |
| Soil | 96 | 400 |
| Soil | 120 | 750 |
| Soil | 144 | 410 |
| Soil | 168 | 440 |
| Soil | 192 | 140 |
| Soil | 216 | 6 |
| Soil | 240 | 4 |

Sample Collection date(s): 4/11/97

* micrograms per kilo

Location Number: C-12




| Material | Thickness |
|---|---|
| Concrete | 5" |
| Fill | 8" |
| Soil | |

Note:
The floor of the electrcal room is approx. 53" below the floor of
the school. The depths recorded in the results chart have been corrected to reflect depths below the floor of the school.

Area: Electrical Room

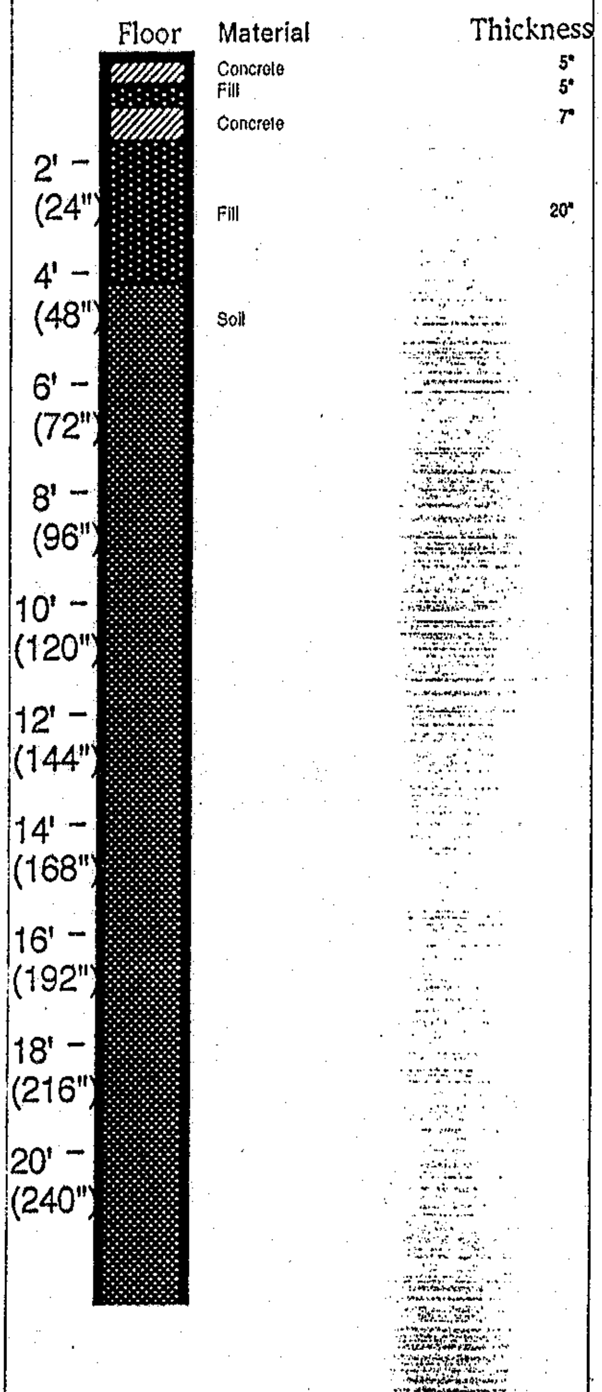
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 61 | 10 |
| Soil | 77 | 5 |
| Soil | 90 | 7 |
| Soil | 103 | 8 |
| Soil | 125 | 14 |
| Soil | 149 | 10 |
| Soil | 173 | <1 |
| Soil | 197 | 2 |
| Soil | 223 | <1 |
| Soil | 245 | <1 |
| Soil | 269 | 2 |
| Soil | 293 | <1 |

Sample Collection date(s): 4/10/97 - 4/11/97

* micrograms per kilo

Location Number: C-13




Area: Room 131

Bulk Samples

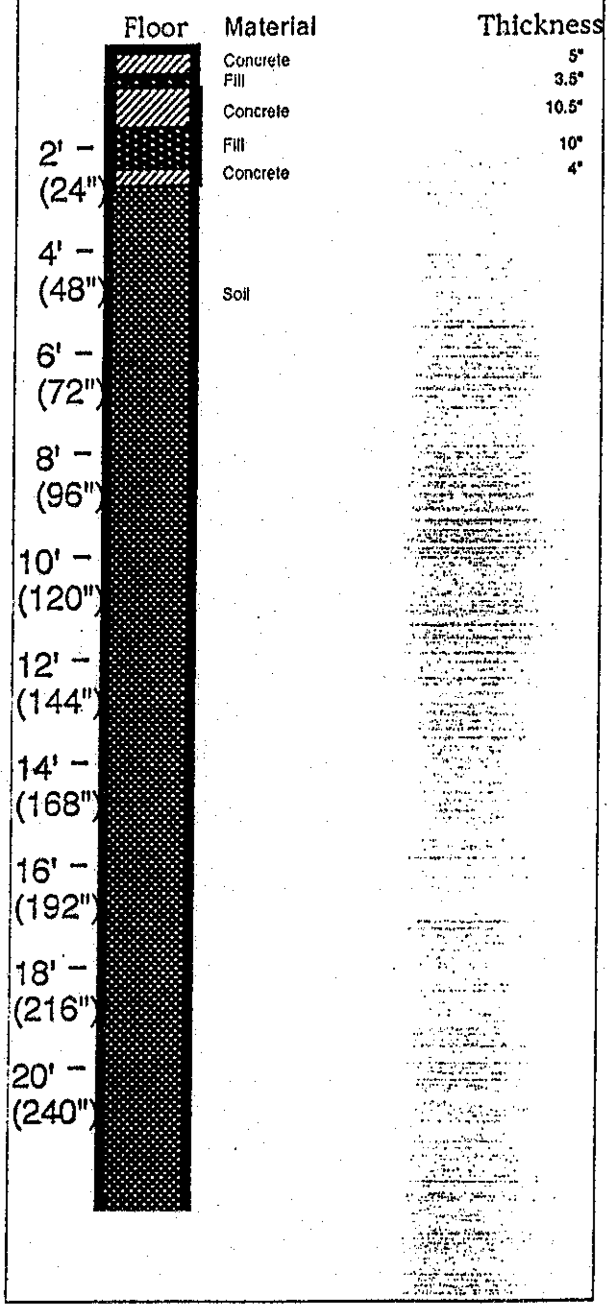
| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 12 | 55 |
| Fill | 20 | 190 |
| Soil | 48 | 160 |
| Soil | 103 | 68 |
| Soil | 132 | 70 |
| Soil | 156 | 13 |
| Soil | 176 | 44 |

This hole was abandoned at 176" due to large amounts of refusal, making further drilling very difficult.

Sample Collection date(s): 4/11/97 - 4/14/97

* micrograms per kilo

Location Number: C-14




Area: Hallway by book store room

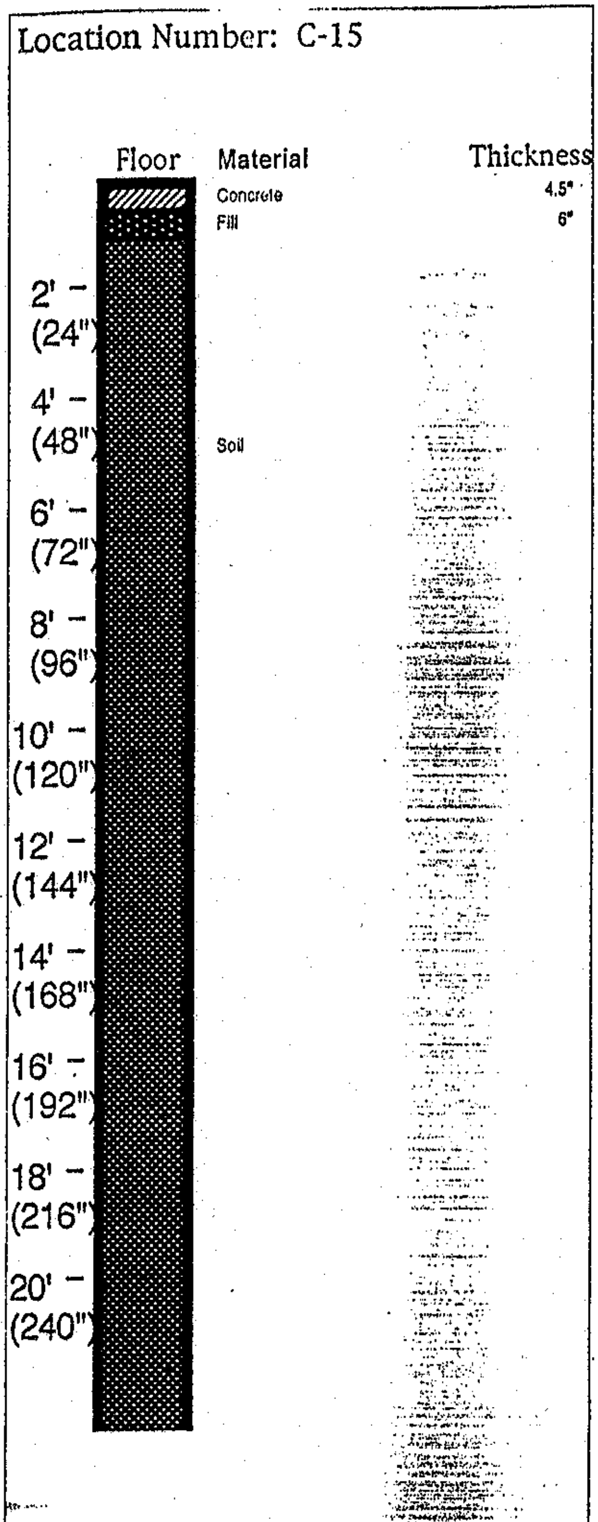
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 10 | 9 |
| Fill | 24 | 37 |
| Soil | 36 | 51 |
| Soil | 60 | 16 |
| Soil | 81 | 8 |
| Soil | 84 | 22 |
| Soil | 100 | 19 |
| Soil | 96 | 13 |
| Soil | 108 | 12 |
| Soil | 120 | 5 |
| Soil | 144 | <1 |

This hole was abandoned at 144" due to large amounts of refusal, making further drilling very difficult.

Sample Collection date(s): 4/11/97 - 4/16/97

* micrograms per kilo




Area: Loading dock, bay 2

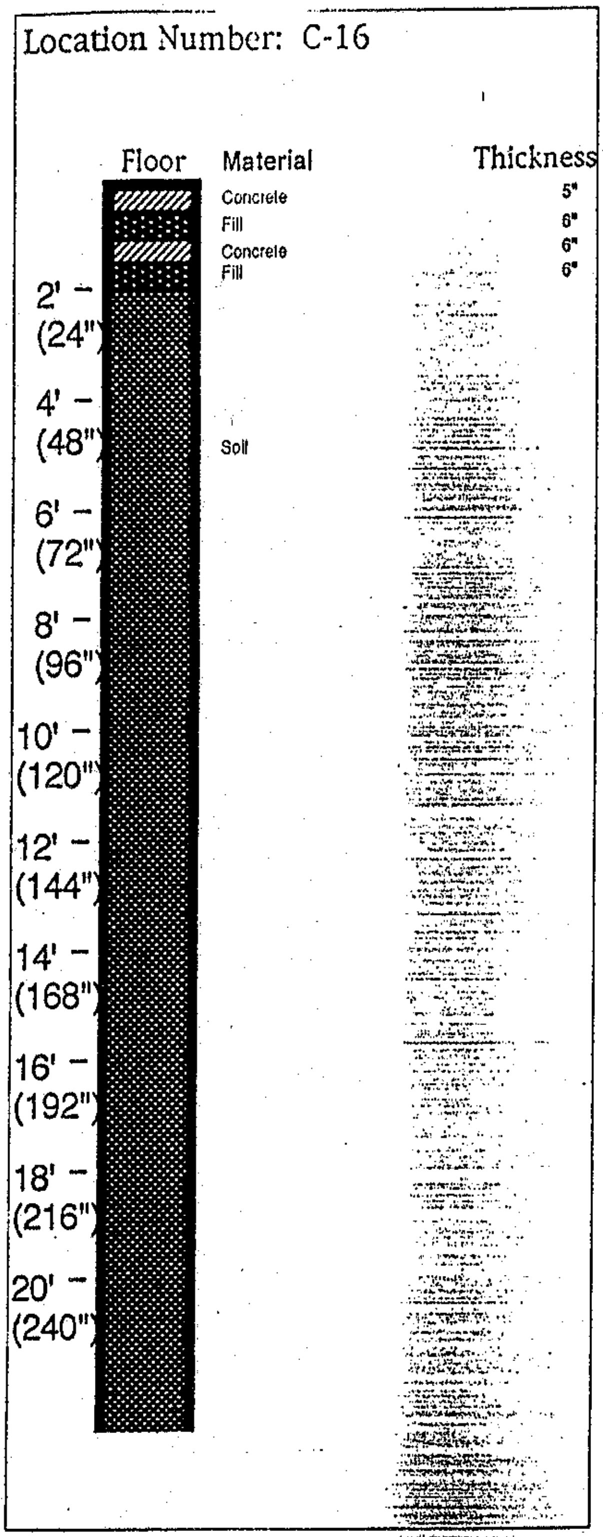
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 48 | 27 |
| Fill | 64 | 1,100 |
| Soil | 79 | 660 |
| Soil | 107 | 630 |
| Soil | 136 | 460 |
| Soil | 160 | 36 |
| Soil | 184 | 21 |
| Soil | 208 | 2 |
| Soil | 232 | 8 |
| Soil | 256 | 7 |
| Soil | 280 | 11 |

The floor of the loading dock is approx. 40" below floor of school. The depths above have been corrected to reflect depths below floor of school.

Sample Collection date(s): 4/11/97 - 4/12/97

*micrograms per kilo



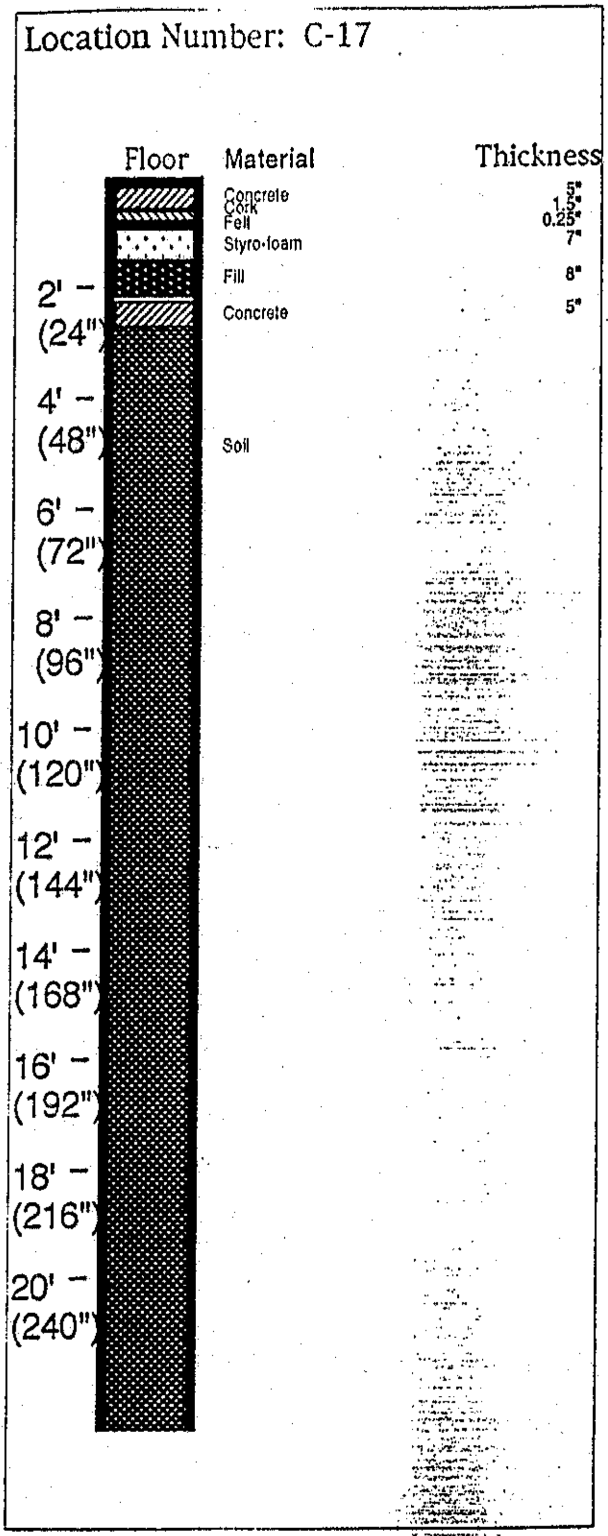

Sample Collection date(s): 4/12/97 - 4/15/97

Area: Exit Hallway

Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 36 | 680 |
| Soil | 54 | 440 |
| Soil | 84 | 32 |
| Soil | 90 | 33 |
| Soil | 96 | 103 |
| Soil | 108 | 47 |
| Soil | 132 | 52 |
| Soil | 156 | 18 |
| Soil | 180 | 3 |
| Soil | 204 | <1 |
| Soil | 228 | 8 |
| Soil | 240 | 8 |

* micrograms per kilo




Area: Loading dock, south

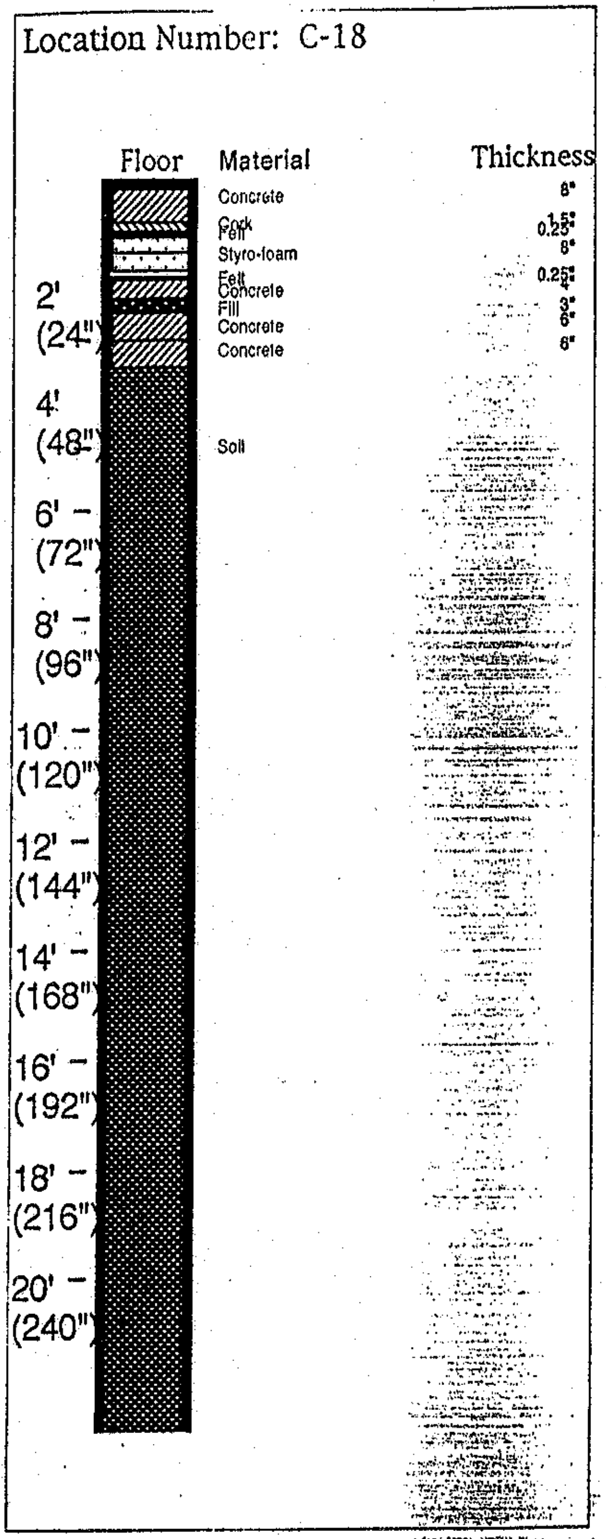
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Cork | 10 | 2,900 |
| Styro-foam, 1st layer | 12 | 17,000 |
| Styro-foam, 2nd layer | 16 | 11,000 |
| Fill | 36 | 74 |
| Soil | 60 | 22 |
| Soil | 120 | 6 |
| Soil | 132 | 20 |
| Soil | 144 | 19 |
| Soil | 168 | 60 |
| Soil | 192 | 14 |
| Soil | 216 | 8 |
| Soil | 240 | 2 |

adjust height

Sample Collection date(s): 4/12/97 - 4/14/97

* micrograms per kilo



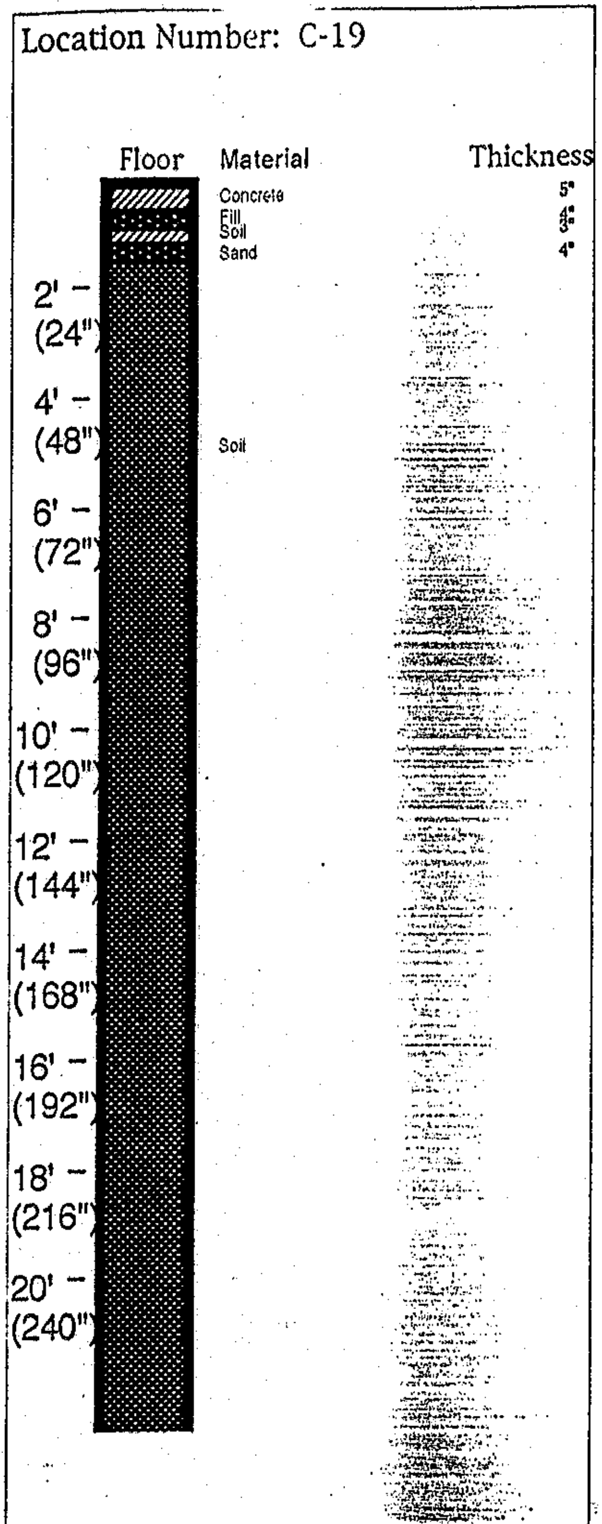

Area: Storage

Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Cork | 8 | 13,000 |
| Styro-foam, 1st layer | 12 | 5,000 |
| Styro-foam, 2nd layer | 16 | 2,700 |
| Fill | 24 | 8 |
| Fill | 36 | <1 |
| Soil | 48 | 8 |
| Soil | 54 | <1 |
| Soil | 84 | 15 |
| Soil | 108 | 5.3 |
| Soil | 132 | <1 |
| Soil | 156 | <1 |
| Soil | 180 | 1 |
| Soil | 204 | 1 |
| Soil | 228 | 2 |
| Soil | 252 | <1 |

Sample Collection date(s): 4/12/97 - 4/14/97

* micrograms per kilo




Sample Collection date(s): 4/14/97

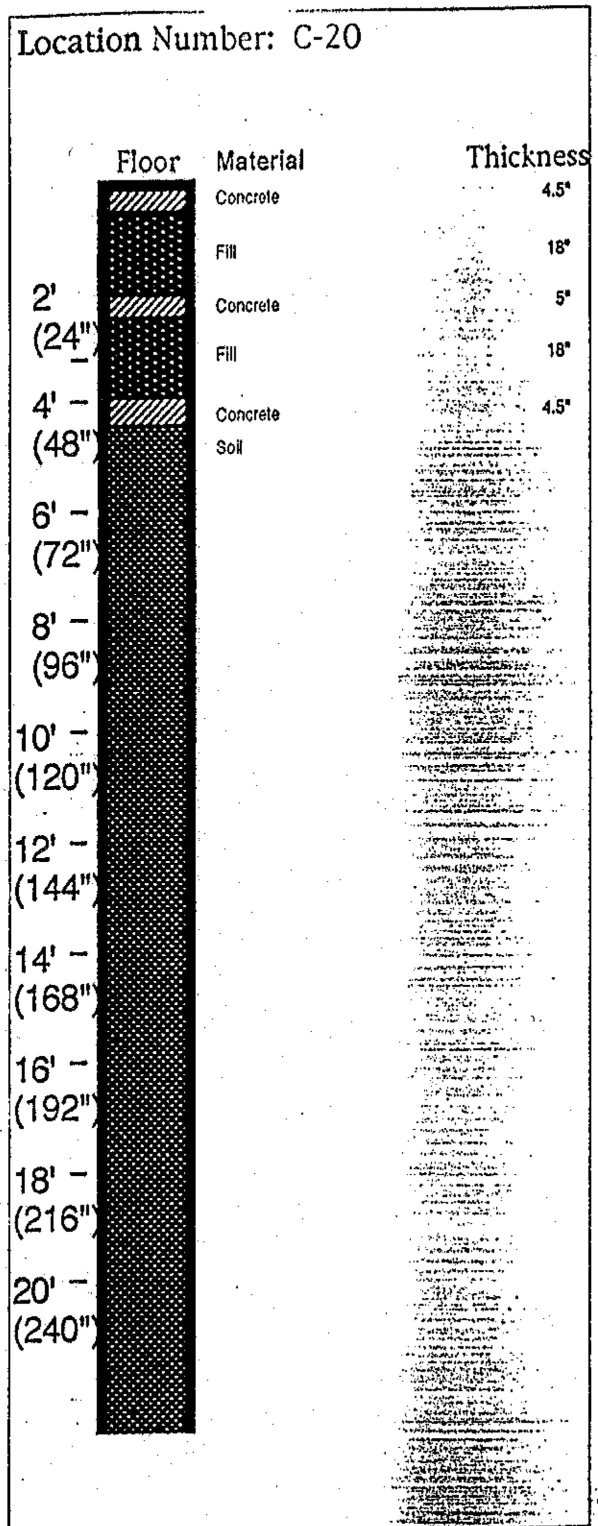
Area: Loading dock, east

Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 52 | 74 |
| Soil | 88 | 25 |
| Soil | 142 | 21 |
| Soil | 160 | 9 |
| Soil | 184 | 15 |
| Soil | 208 | 7 |
| Soil | 232 | 7 |
| Soil | 256 | 4 |
| Soil | 280 | 3 |

The floor of the loading dock is approx. 40" below floor of school. The depths above have been corrected to reflect depths below floor of school.

* micrograms per kilo




Area: Hallway by Room 160

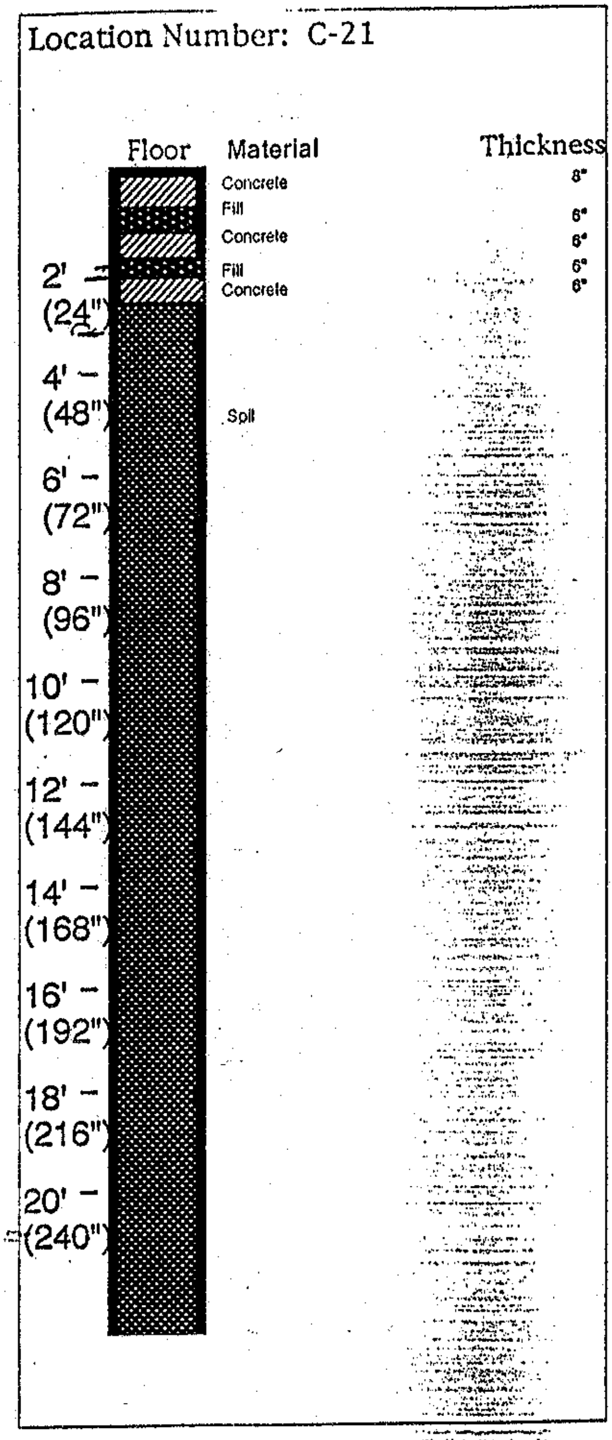
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 12 | 43 |
| Soil | 50 | 33 |
| Soil | 62 | 76 |

This hole was abandoned at 62" due to large amounts of refusal, making further drilling very difficult.

Sample Collection date(s): 4/14/97 - 4/16/97

* micrograms per kilo




Area: Loading dock, south west

Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 52 | 1 |
| Fill | 64 | 12 |

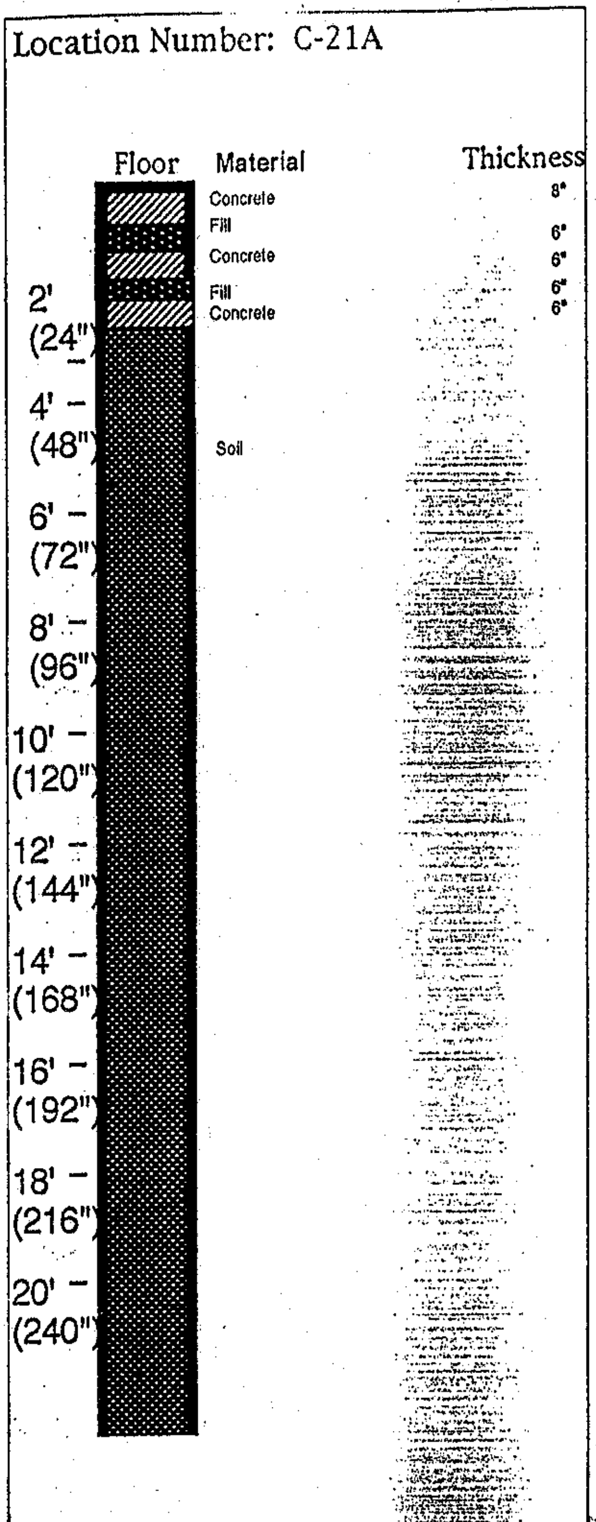
This hole was abandoned at 48" due to large amounts of refusal, making further drilling very difficult.

New hole, C-21A, drilled approx 5' north of C-21.

The floor of the loading dock is approx. 40" below floor of school. The depths above have been corrected to reflect depths below floor of school.

Sample Collection date(s): 4/12/97 - 4/14/97

* micrograms per kilo




Area: Loading dock, south west

Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 52 | 2 |
| Fill | 76 | 8 |
| Soil | 100 | 6 |
| Soil | 148 | 7 |
| Soil | 172 | 5 |
| Soil | 196 | 3 |
| Soil | 220 | 2 |
| Soil | 248 | 2 |
| Soil | 272 | <1 |
| Soil | 296 | 1 |

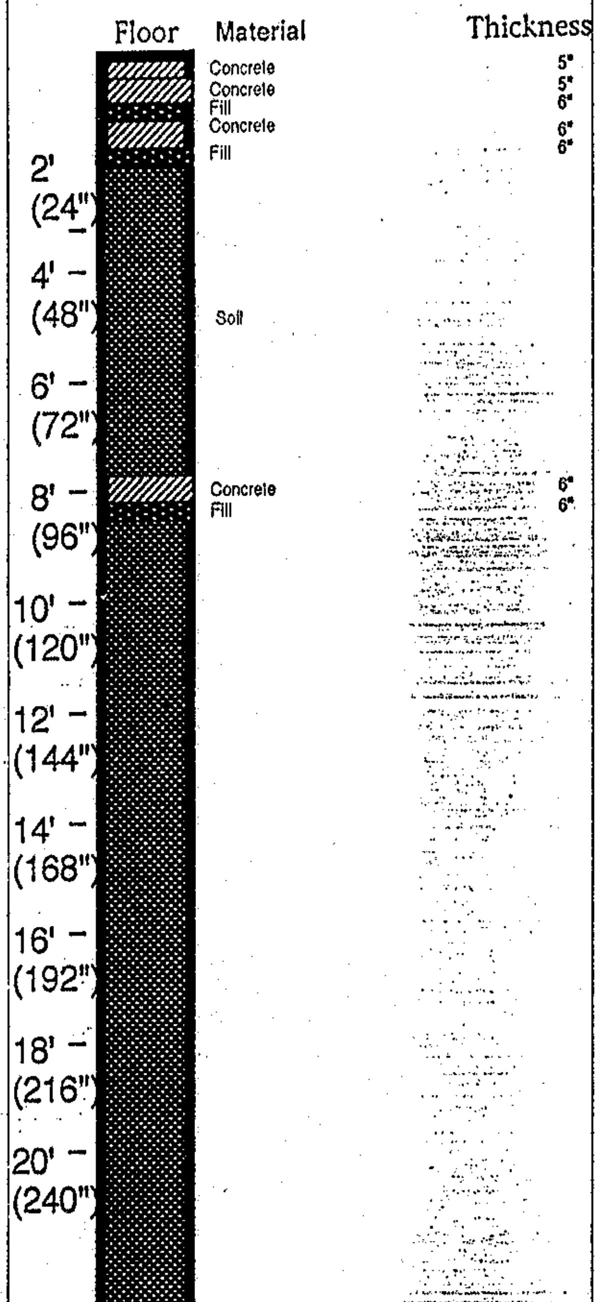
New hole, C-21A, drilled approx 5' north of C-21.

The floor of the loading dock is approx. 40" below floor of school. The depths above have been corrected to reflect depths below floor of school.

Sample Collection date(s): 4/16/97

* micrograms per kilo

Location Number: C-22




Area: Room 133

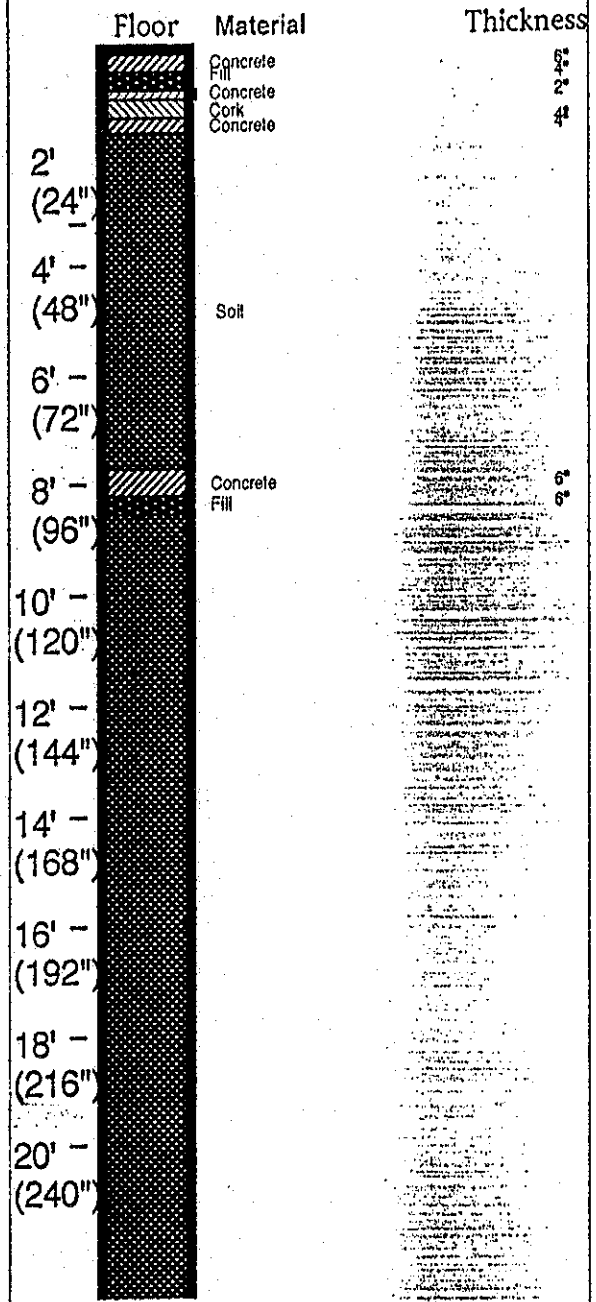
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 14 | 11 |
| Soil | 60 | 10 |
| Soil | 78 | <1 |
| Soil | 96 | 4 |
| Soil | 108 | 1 |
| Soil | 120 | <1 |
| Soil | 144 | 1 |
| Soil | 168 | 3 |
| Soil | 192 | 1 |
| Soil | 216 | 1 |
| Soil | 240 | 1 |

Sample Collection date(s): 4/15/97 - 4/16/97

* micrograms per kilo

Location Number: C-23




Area: Hallway by Room 138

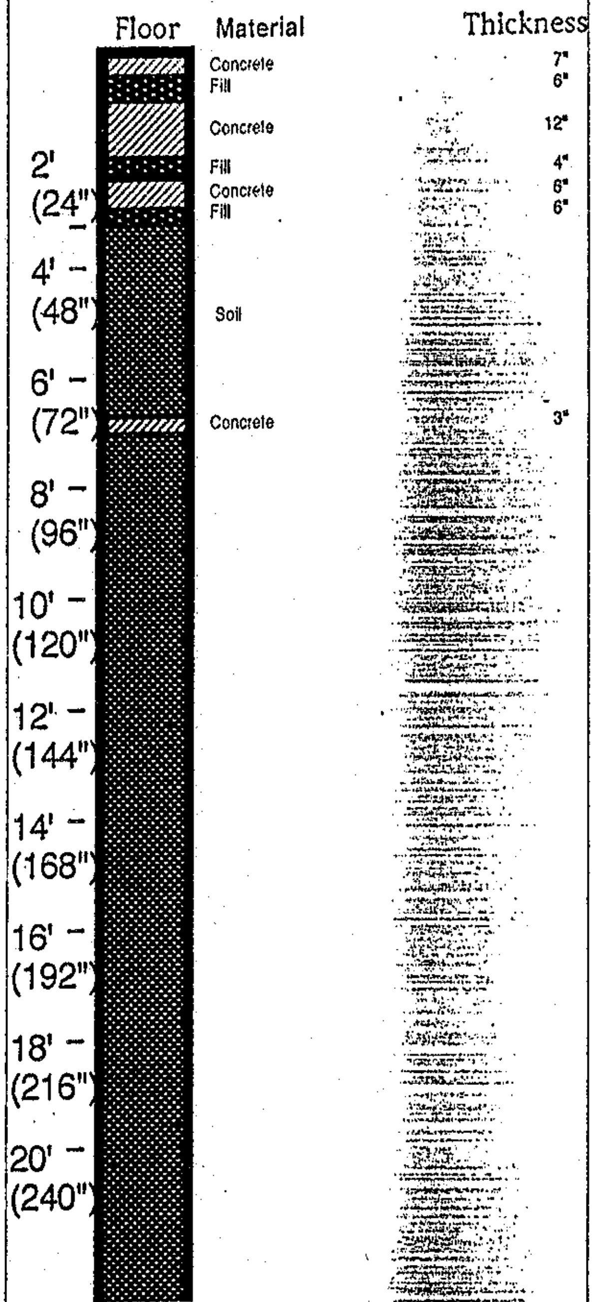
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 14 | 5 |
| Soil | 48 | 3 |
| Soil | 72 | 4 |
| Soil | 96 | 7 |
| Soil | 120 | 3 |
| Soil | 144 | 4 |
| Soil | 168 | 3 |
| Soil | 192 | <1 |
| Soil | 216 | 2 |
| Soil | 240 | 3 |
| Soil | | |

Sample Collection date(s): 4/12/97 - 4/14/97

* micrograms per kilo

Location Number: C-24




Area: Hallway by Room 149

Bulk Samples

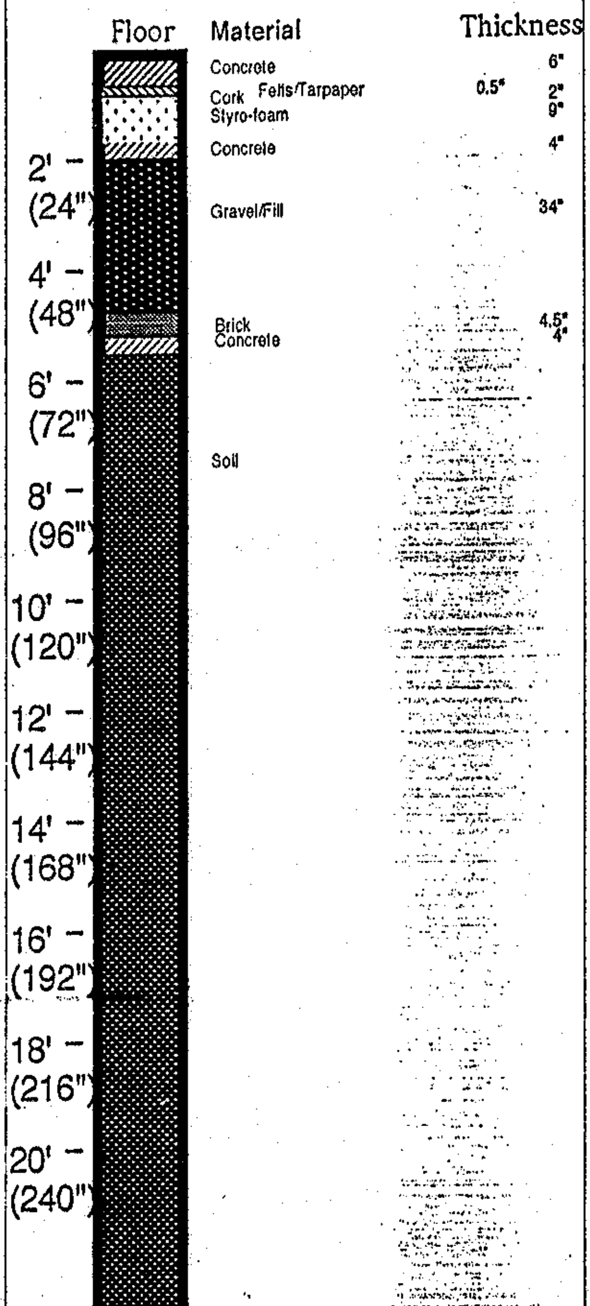
| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 12 | <1 |
| Soil | 45 | 1 |
| Soil | 72 | <1 |
| Soil | 96 | 1 |
| Soil | 102 | 2 |

????

Sample Collection date(s): 4/15/97 - 4/16/97

* micrograms per kilo

Location Number: C-25




Area: Shanty area, North

Bulk Samples

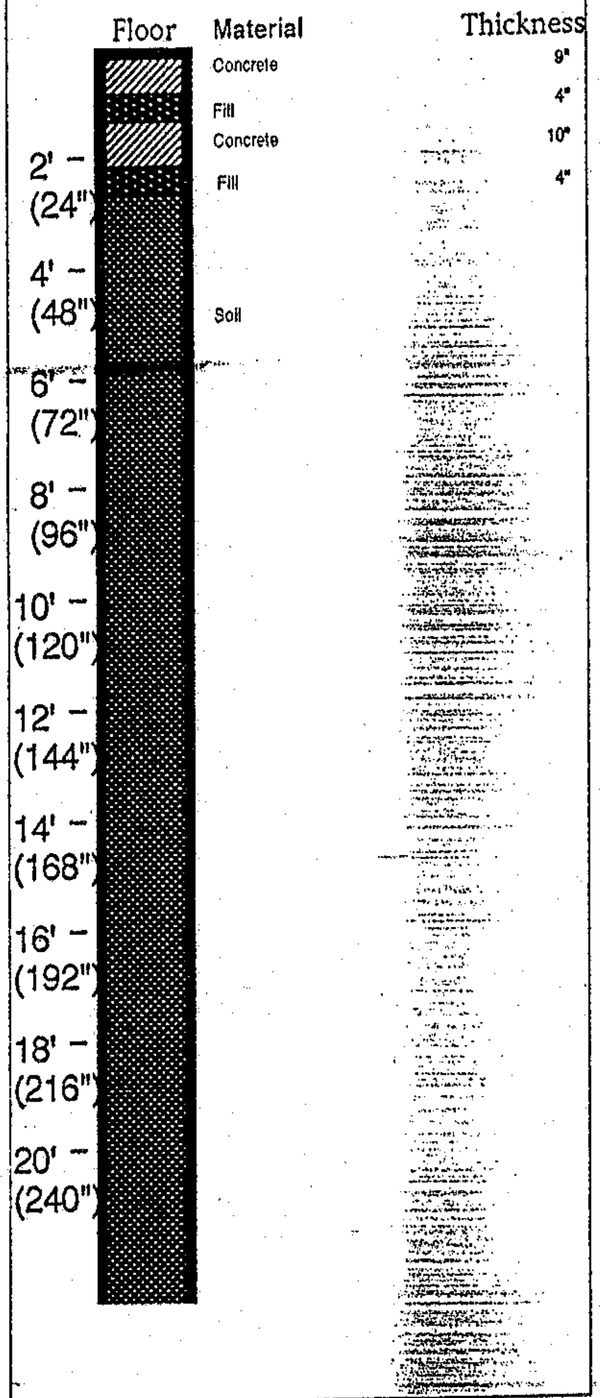
| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Cork | 8 | 93 |
| Styro-foam, 1st layer | 12 | 550 |
| Styro-foam, 2nd layer | 15 | 160 |
| Fill | 24 | 14 |
| Soil | 42 | 5 |
| Soil | 66 | 6 |
| Soil | 72 | 17 |
| Soil | 96 | 95 |
| Soil | 120 | 190 |
| Soil | 144 | 240 |
| Soil | 168 | 58 |
| Soil | 192 | 210 |
| Soil | 216 | 220 |

Height adjusted

Sample Collection date(s): 4/16/97 - 4/17/97

* micrograms per kilo

Location Number: C-26




Sample Collection date(s): 4/16/97 - 4/17/97

Area: Lobby, 141st Street

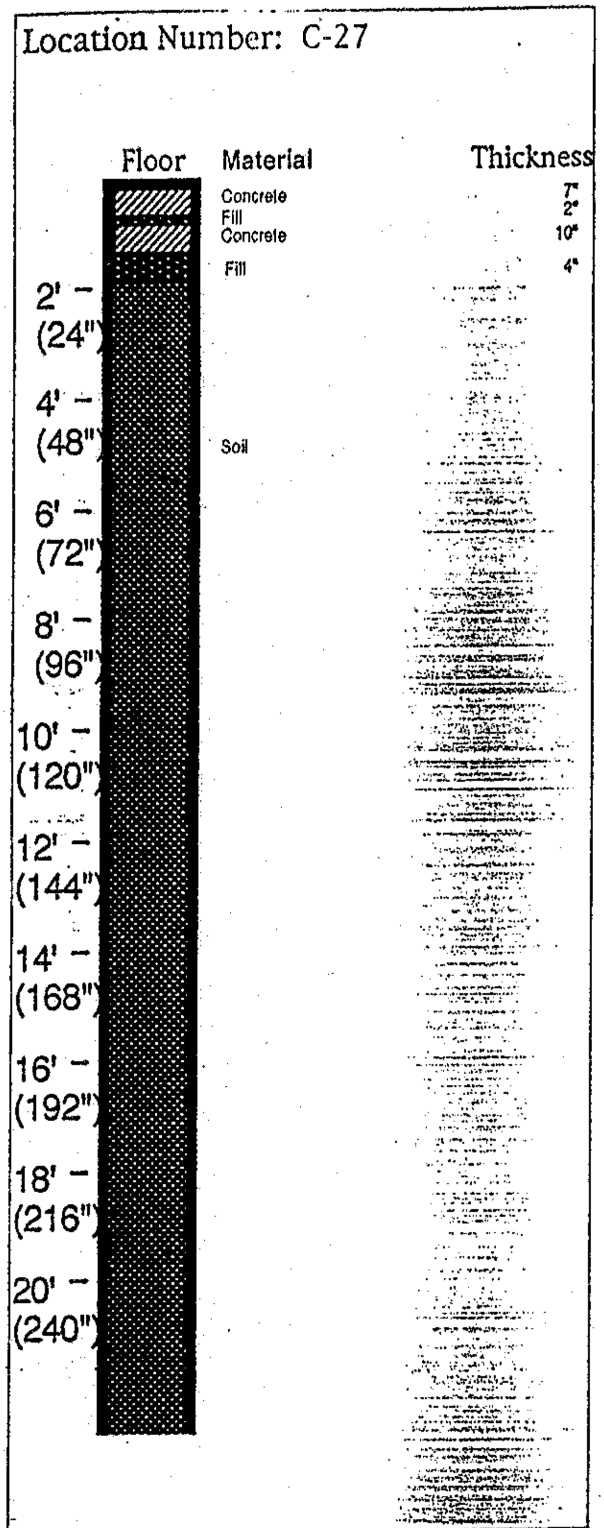
Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| - Fill | 72 | 5 |
| Fill | 90 | 18 |
| Soil | 102 | 19 |
| Soil | 174 | 100 |
| Soil | 180 | 36 |

The floor of the lobby is approx. 60" below floor of school. The depths above have been corrected to reflect depths below floor of school.

This hole was abandoned at 180" due to large amounts of refusal, making further drilling very difficult.

* micrograms per kilo




Area: Parking garage

Bulk Samples

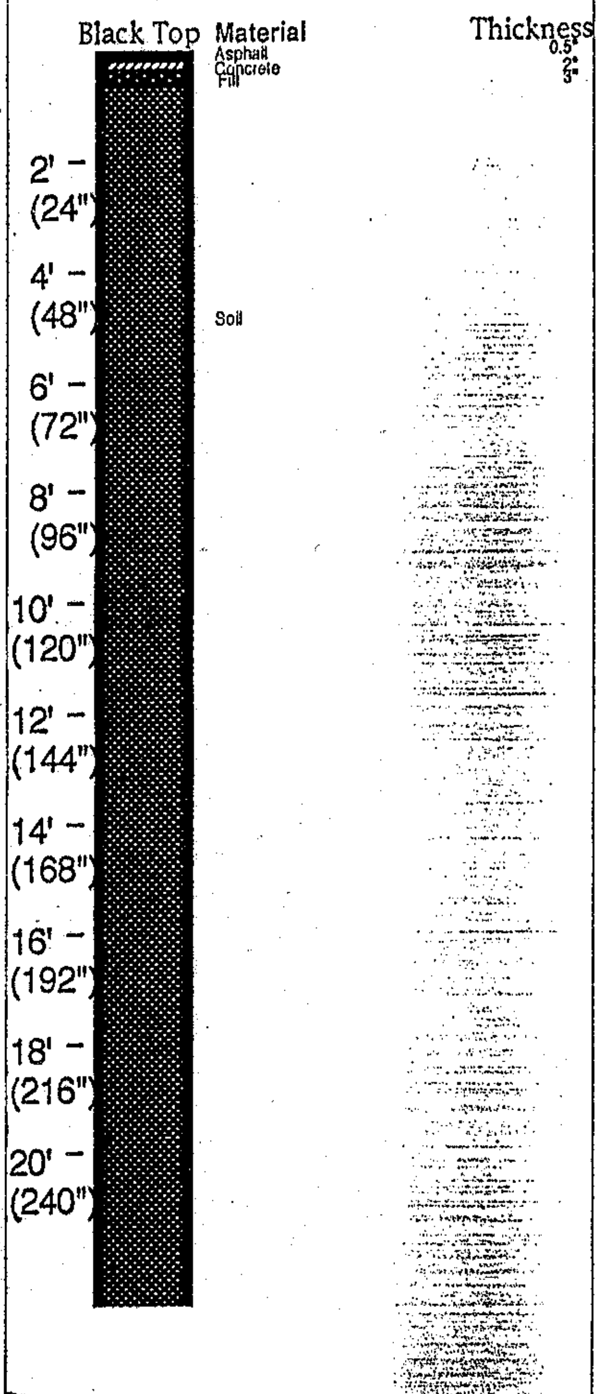
| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 76 | 9 |
| Soil | 88 | 4 |
| Soil | 100 | 3 |

The floor of the parking garage is approx. 40" below floor of school. The depths above have been corrected to reflect depths below floor of school.

Sample Collection date(s): 4/17/97

* micrograms per kilo

Location Number: C-28




Sample Collection date(s): 4/17/97

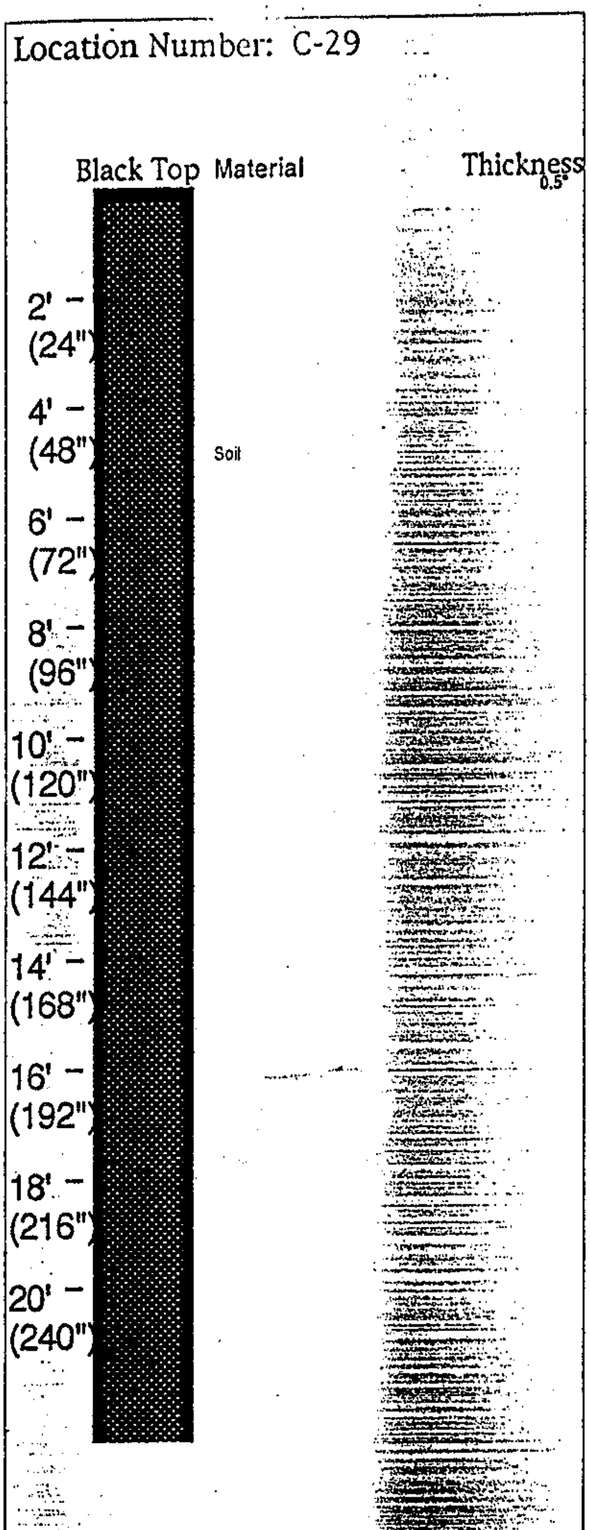
* micrograms per kilo

Area: Courtyard

Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Fill | 58 | 17 |
| Soil | 76 | 7 |
| Soil | 88 | 130 |
| Soil | 124 | 200 |
| Soil | 160 | 72 |
| Soil | 208 | 96 |
| Soil | 220 | 130 |
| Soil | 256 | 45 |
| Soil | 280 | 27 |

The surface of the courtyard is approx. 40" below floor of school. The depths above have been corrected to reflect depths below floor of school.




Area: Tree planter, West 142nd St.

Bulk Samples

| Material Description | Depth (inches) | Results ppb(weight)* |
|---|---|---|
| Soil | 74 | 33 |
| Soil | 80 | 35 |
| Soil | 98 | 33 |
| Soil | 128 | 23 |
| Soil | 152 | 16 |
| Soil | 176 | 25 |
| Soil | 190 | 2,700 |
| Soil | 234 | 3,800 |

The surface of the planter is approx. 50" below floor of school. The depths above have been corrected to reflect depths below floor of school.

Sample Collection date(s): 4/17/97

* micrograms per kilo

# APPENDIX C

# SUPPLEMENTAL INVESTIGATION BORING AND WELL CONSTRUCTION LOGS

| **AKRF, Inc.** | **2350 Fifth Avenue, New York, NY** | **Boring No.** M-9 **deep** |
|---|---|---|
| | **AKRF Project Number : 08010-0021** | **Sheet 1 of 1** |

| Environmental Consultants | | |
|---|---|---|
| 440 Park Avenue South, 7th Fl. New York, NY 10016 | | |

| | | | |
|---|---|---|---|
| **Drilling Method:** | Track-Mounted Hollow Stem Auger Rig | **Drilling** | |
| **Sampling Method:** | Split Spoon | **Start** | **Finish** |
| **Driller :** | ADT | **Time: 09:15** | **Time: 11:10** |
| **Weather:** | rainy, approx. 65° Fahrenheit | **Date: 10-20-06** | **Date: 10-20-06** |
| **Sampler:** | AKRF/Robin Hughes | | |

| Depth (feet) | Recovery (Inches) | Soil Type | Surface Condition: Concrete (7" thick) | PID Reading (ppm) | Odor | Moisture | Samples Collected for Lab Analysis |
|---|---|---|---|---|---|---|---|
| 2 - 3 | 6" | | Brown coarse-fine SAND, some gravel, trace brick | 0 | None | Dry | |
| 4 - 5 | 3" | | Red BRICK pieces | 0 | None | Dry | |
| 6 - 7 | 5" | | Brown coarse-fine SAND, some gravel and rock pieces, trace silt | 0 | None | Dry | |
| 8 - 9 | 4" | | Brown coarse-fine SAND, some gravel, trace silt | 0.2 | None | Dry | |
| 10 - 11 | 4" | | Brown coarse-fine SAND, some gravel and rock pieces, trace brick, trace silt, trace clay | 0.7 | None | Dry | |
| 12 - 13 | 21" | | Top 5": Brown coarse-fine SAND, some gravel, trace brick<br>Center 7": Grey CLAY with roots<br>Bottom 8": Brown-reddish medium-fine SAND with roots | 1.8 | None | Dry | |
| 14 - 15 | 18" | | Top 7": Brown-grey CLAY with some coarse-fine sand<br>Bottom 9": Brown-reddish medium-fine SAND | 0.2 | None | Wet | |
| 16 - 17 | 10" | | Top 6": Brown coarse-fine SAND, trace brick, trace gravel, trace rock pieces<br>Bottom 4": Brown-reddish medium-fine SAND | 0.4 | None | Wet | |
| 18 - 19 | 24" | | Brown-reddish medium-fine SAND | 0.6 | None | Wet | |
| 20 | | | Auger to 20 feet. No split spoon sample collected. | | | | |

End of Boring at 20 feet.

**Notes:**
Installed deep monitoring well with 5-foot screen from 20-15', riser from 15' to the top, sand from 20-14', bentonite seal from 11-14', and sand to top.

# AKRF, Inc.

Environmental Consultants

440 Park Avenue South, 7th Fl. New York, NY 10016

**2350 Fifth Avenue, New York, NY**

**AKRF Project Number : 08010-0021**

**Boring No. M-10 deep**

**Sheet 1 of 1**

| | |
|---|---|
| **Drilling Method:** | Track-Mounted Hollow Stem Auger Rig |
| **Sampling Method:** | Split Spoon |
| **Driller :** | ADT |
| **Weather:** | partly cloudy, approx. 70° Fahrenheit |
| **Sampler:** | AKRF/Robin Hughes |

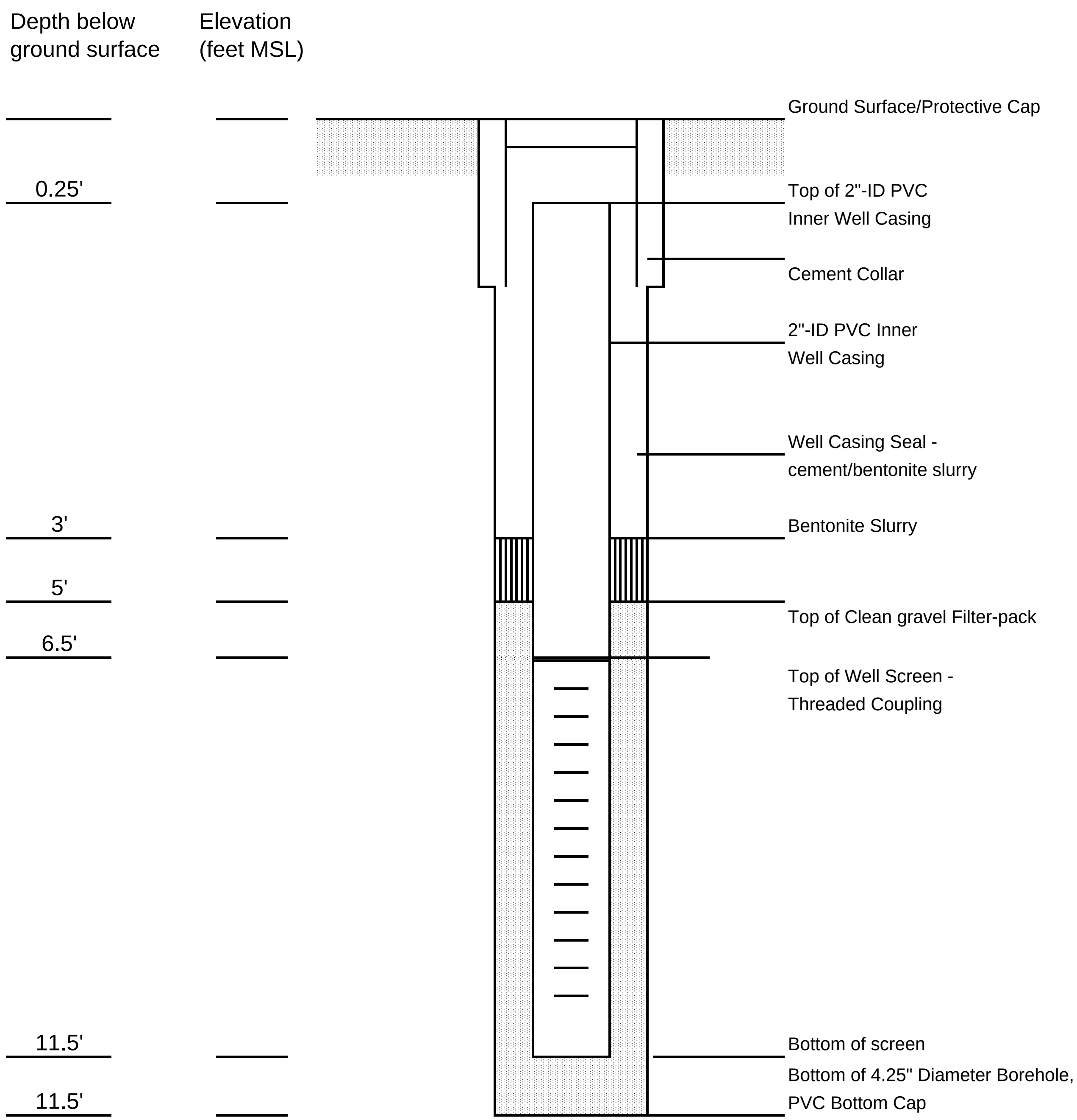
| **Drilling** | |
|---|---|
| **Start** | **Finish** |
| **Time: 09:35** | **Time: 12:25** |
| **Date: 10-19-06** | **Date: 10-19-06** |

| Depth (feet) | Recovery (Inches) | Soil Type | Surface Condition: Concrete (8" thick) | PID Reading (ppm) | Odor | Moisture | Samples Collected for Lab Analysis |
|---|---|---|---|---|---|---|---|
| 2 - 3 | 8" | | Brown medium-fine silty SAND, trace brick, trace gravel, trace clay | 4.7 | None | Dry | |
| 4 - 5 | 4" | | Brown medium-fine silty SAND, trace brick, trace gravel, trace coal<br>1-inch brown clay at 4 feet with PID=25 ppm | 2.8<br>25 | None | Dry | |
| 6 - 7 | 5" | | Brown medium-fine silty SAND, trace brick, trace gravel, trace coarse sand, trace clay | 26.9 | None | Dry | |
| 8 - 9 | 6" | | Brown fine silty SAND, some clay, trace gravel<br>water table at about 8.5 feet | 1.1 | None | Dry<br>Wet | |
| 10 - 11 | 4" | | Brown coarse-fine silty SAND, trace gravel, trace brick | 15.7 | None | Wet | |
| 12 - 13 | 24" | | 11-12': Brown medium-fine SAND<br>12-13': Grey CLAY | 2.1 | None | Wet | |
| 14 - 15 | 24" | | 13'-13.5': Grey coarse-fine SAND, some brick pieces and gravel<br>13.5'-14': Grey CLAY<br>14'-14.5': Grey coarse-fine SAND, trace gravel<br>14.5'-15': Grey CLAY | 0.7 | None | Wet | |
| 16 - 17 | 18" | | 15.5'-16': Grey CLAY<br>16'-16.5': Black PEAT with strong odor and high PID=235 ppm<br>14.5'-15': Grey-black CLAY | 2.1<br>235<br>4.8 | None<br>Strong odor<br>None | Wet | |
| 18 - 19 | 21" | | Top 12": Grey CLAY<br>Center 6": Black PEAT with strong odor and high PID=310 ppm<br>Bottom 2": Light-grey CLAY, some medium-fine sand | 5.4<br>310<br>8.7 | None<br>Strong odor<br>None | Wet | |
| 20 - 21 | 18" | | Top 12": Grey CLAY<br>Center 6": Black PEAT with strong odor and high PID=195 ppm<br>Bottom 2": Light-grey silty SAND | 4.7<br>195<br>40 | None<br>Strong odor<br>None | Wet | |
| 22 - 23 | 24" | | Top 12": Grey medium-fine SAND<br>at 22': 3-inch clay and peat with PID=15 ppm<br>Bottom 12": Grey medium-fine SAND | 9.7<br>15<br>9.7 | None | Wet | |
| 24 - 25 | 24" | | Top 3": Grey CLAY and PEAT with PID=16.5 ppm<br>Bottom 21": Grey medium-fine SAND | 16.5<br>0.5 | None | Wet | |
| 26 | | | Auger to 26 feet. No split spoon sample collected. | | | | |

End of Boring at 26 feet.

**Notes:**
Installed deep monitoring well with 5-foot screen from 26-21', riser from 21' to the top, sand from 26-18', bentonite seal from 18-15', and sand to top.

| | | | |
|---|---|---|---|
| PROJECT: | 08010-141st Street & 5th Ave | WELL PURPOSE: | Monitoring Well |
| LOCATION: | 143rd Street | DRILLING METHOD: | Hollow Stem Auger |
| WELL NUMBER: | M-9 shallow | DRILLING CONTRACTOR: | ADT |
| DATE: | October 20, 2006 | DEVELOPMENT DATE: | |
| PERMIT NUMBER: | | STATIC DEPTH TO WATER: | |
| COORDINATES: | | REMARKS: | |

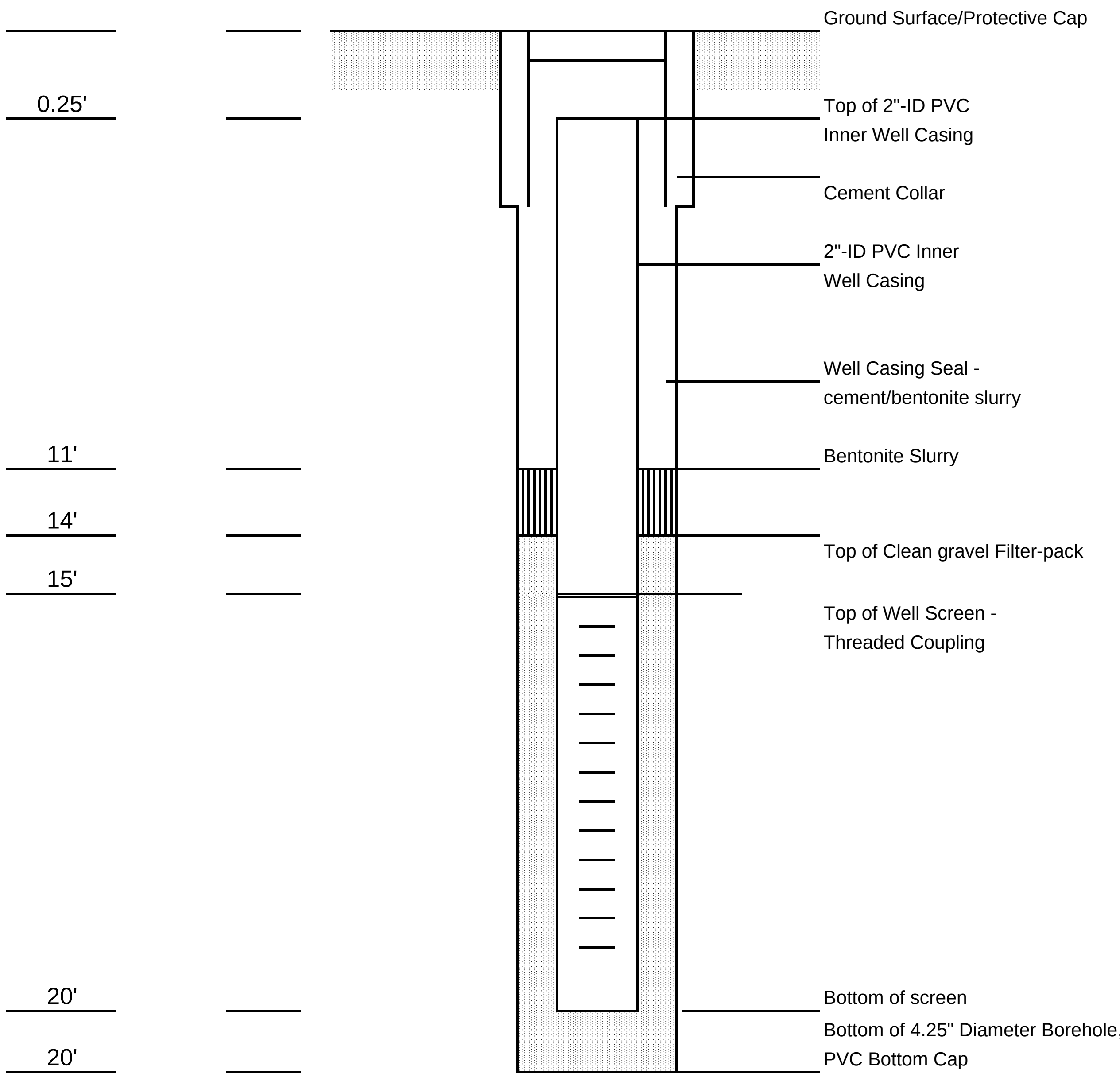



NOT TO SCALE

| | | | |
|---|---|---|---|
| PROJECT: | 08010-141st Street & 5th Ave | WELL PURPOSE: | Monitoring Well |
| LOCATION: | 143rd Street | DRILLING METHOD: | Hollow Stem Auger |
| WELL NUMBER: | M-9 deep | DRILLING CONTRACTOR: | ADT |
| DATE: | October 20, 2006 | DEVELOPMENT DATE: | |
| PERMIT NUMBER: | | STATIC DEPTH TO WATER: | |
| COORDINATES: | | REMARKS: | |

Depth below ground surface

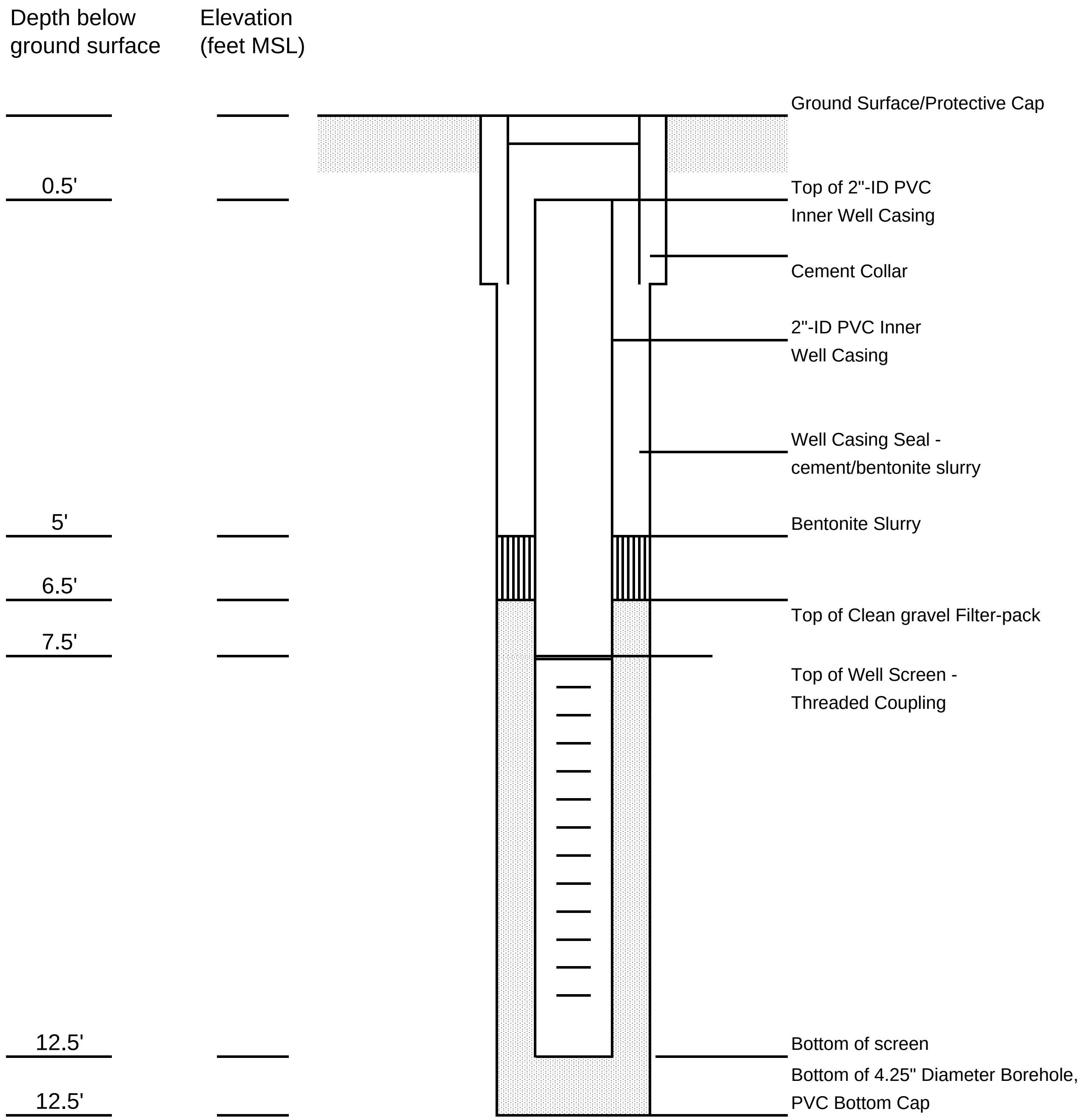
Elevation (feet MSL)




NOT TO SCALE

PROJECT: 08010-141st Street & 5th Ave
LOCATION: 143rd Street
WELL NUMBER: M-10 shallow
DATE: October 19, 2006
PERMIT NUMBER:
COORDINATES:

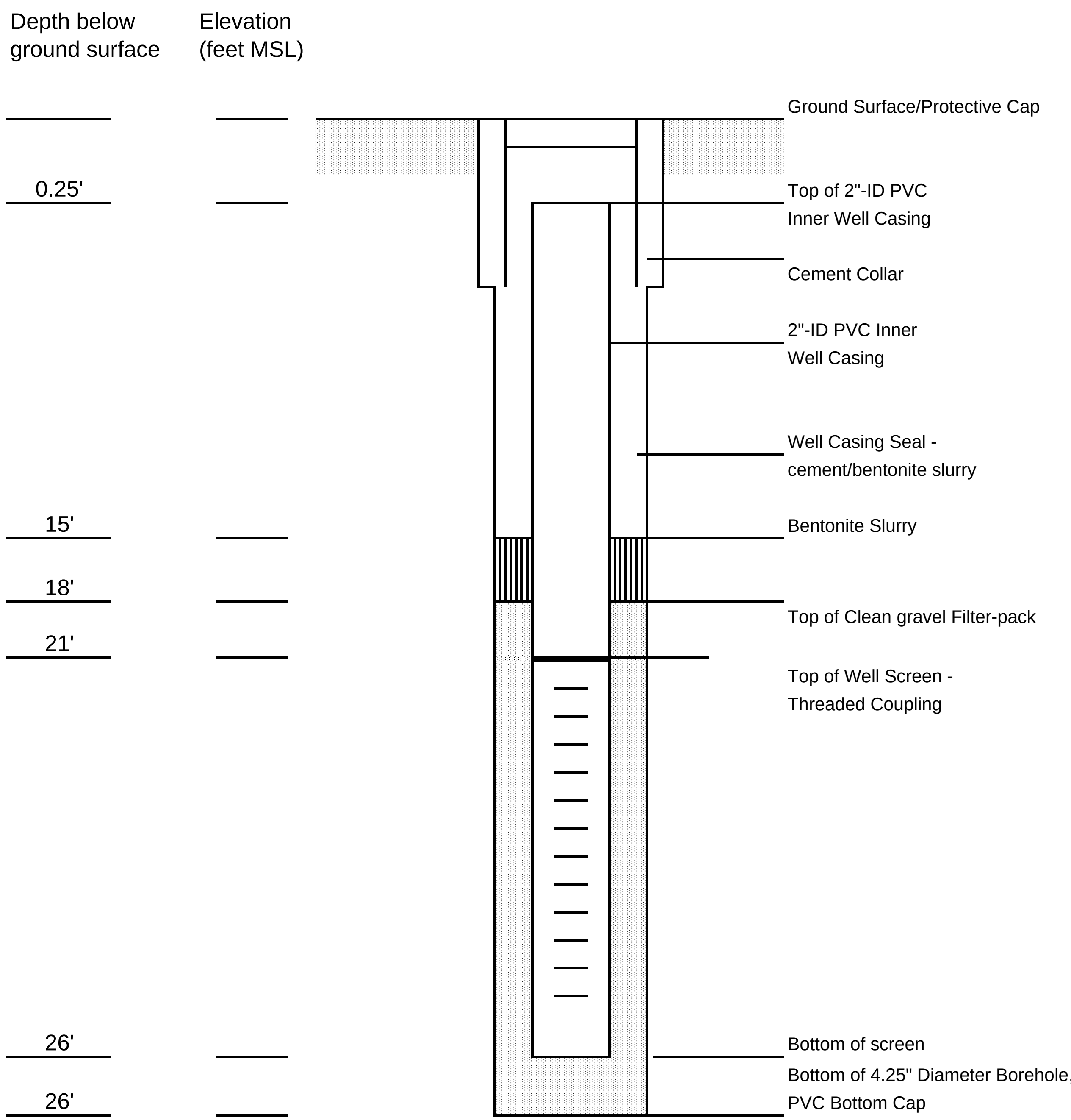
WELL PURPOSE: Monitoring Well
DRILLING METHOD: Hollow Stem Auger
DRILLING CONTRACTOR: ADT
DEVELOPMENT DATE:
STATIC DEPTH TO WATER:
REMARKS:




NOT TO SCALE

PROJECT: 08010-141st Street & 5th Ave
LOCATION: 143rd Street
WELL NUMBER: M-10 deep
DATE: October 19, 2006
PERMIT NUMBER:
COORDINATES:

WELL PURPOSE: Monitoring Well
DRILLING METHOD: Hollow Stem Auger
DRILLING CONTRACTOR: ADT
DEVELOPMENT DATE:
STATIC DEPTH TO WATER:
REMARKS:




NOT TO SCALE

# 2350 Fifth Avenue

## Site #2-31-004

**MANHATTAN, NEW YORK**

---

## Remedial Investigation Work Plan

## Part 2 – Work Plan

**AKRF Project Number: 08010**

**Prepared for:**

2350 Fifth Avenue Corporation
309 East 94th Street, Ground. Floor
New York, NY 10128

**Prepared by:**


AKRF

**AKRF, Inc.**
440 Park Avenue South
New York, NY 10016
212-696-0670


---

**REVISED JULY 2007**

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# FIGURES



# APPENDICES

# 1.0 FIELD PROGRAM

The subsurface investigation will include the completion of 34 soil borings, the installation of three monitoring well clusters and four deep wells, and the installation of nine sub-slab soil gas probes. The locations of the soil borings are based on the results of the original subsurface study performed by Riverpoint in 1997. That study provided a qualitative assessment of the horizontal extent of soil contamination around the source area. Borings performed as part of the Preliminary Site Assessment (PSA) indicated that outside of the immediate source area, most soil contamination was located at or below the groundwater surface. Subsequent groundwater sampling suggests that there has been significant biodegradation and natural attenuation of the contaminants within the groundwater. However, analyses of both soil gas and indoor air show the presence of primarily tetrachloroethene (PCE) with little or no degradation products. It is likely that the soil gas is associated with some residual source of undegraded PCE in the vadose zone. The objectives of the field-sampling program are thus:

- To determine the nature and extent of soil contamination in and around the source area, in both the vadose zone and below the groundwater surface;
- To confirm the results of prior groundwater testing; and,
- To attempt to locate the source of the contaminants found in the soil gas and to monitor soil gas contamination.

## 1.1 Soil Investigation

Thirty-four soil borings will be completed to characterize subsurface soils and collect soil samples for laboratory analysis. Two of the soil borings will be completed at deep monitoring well locations (M-11d and M-12d) using a hollow-stem auger (HSA) rig. The remaining soil borings (SB-1 through SB-32) will be advanced using a direct push probe (DPP). Soil boring locations are depicted on Figure 12. Soil borings will be completed according to procedures described in Section 3.1 of the Quality Assurance Project Plan (QAPP) included in Appendix A. Soil sample collection and handling will be performed in accordance with Sections 4.1 and 4.6 of the QAPP.

### 1.1.1 Soil Boring Installation using Direct Push Probe (DPP)

Thirty-two soil borings (SB-1 through SB-32) will be advanced using a DPP drill rig. All boring locations are either within the building or on the adjacent sidewalk. A concrete drill will be used to penetrate the overlying concrete. At locations SB-1 through SB-6, SB-11, SB-17, and SB-26 through SB-32 multiple concrete slabs may be present and cork or Styrofoam insulation is expected at locations SB-1 through SB-5.

The borings will be advanced to a depth of five feet below the surface of the organic clay layer. If field screening indicates that volatile organic compound (VOC) contamination extends deeper than five feet below the surface of the organic clay layer, then the boring will be continued until clean soil is encountered. Soil samples will be collected on a continuous basis using a four-foot long, two-inch diameter, macrocore piston rod sampler fitted with an acetate liner. Each sample will be split lengthwise and logged by AKRF field personnel. Two soil samples will be selected from each probe for laboratory analysis based on photoionization detector (PID) response and visual and olfactory indications of contamination. The depth intervals of samples collected will be determined based on trends observed in the field (i.e., contamination limited to vadose/saturated zone; no contamination observed; contamination observed in a particular depth layer). In the absence of evidence of contamination, soil samples will be collected from the vadose zone immediately above the water table and from the top of the organic clay layer.

### 1.1.2 Soil Borings Installation and Sampling using Hollow-Stem Auger (HSA)

Soil samples will be collected from two of the deep monitoring well locations (M-11d and M-12d) using a 6.25-inch outside diameter HSA and a truck-mounted drill rig. The HSA rig will be used to core through any existing asphalt or concrete surface.

Soil samples will be collected on a continuous basis by driving a split spoon sampler into the subsurface at two-foot intervals until a depth of five feet below the surface of the organic layer. Each sample will be split lengthwise and logged by AKRF field personnel. Two soil samples will be collected from each soil boring for laboratory analysis. If no evidence of contamination (visual, odor, or PID readings) is apparent in any boring location, soil samples will be collected from the vadose zone immediately above the water table and from the top of the organic clay layer. If evidence of contamination is noted, one of the two soil samples will be collected from the interval where evidence is noted.

The soil samples slated for analysis will be collected into laboratory-supplied containers, sealed and labeled and placed in a chilled cooler. Samples will be shipped to the laboratory with appropriate chain of custody documentation. The samples will be analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory following New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocol (ASP) Category B deliverables. Samples will be analyzed for Target Compounds List (TCL) VOCs by EPA Method 8260. In addition to the laboratory analysis of the field samples, quality control samples will be collected at a frequency of one sample per every 20 field samples as described in Section 4.5 of the QAPP. Four equipment field blanks and four blind duplicate samples will be collected and analyzed for TCL VOCs by EPA Method 8260.

Each borehole will be grouted with bentonite-cement slurry upon completion. All non-dedicated sampling equipment will decontaminated between samples (macrocores and split spoons) and will be decontaminated prior to and following each soil boring location (probe rods and augers) as described in Section 3.4 of the QAPP. Drill cuttings, plastic samples sleeves, and decontamination water will be containerized in 55-gallon drums and handled as described in Section 3.5 of the QAPP.

## 1.2 Groundwater Investigation

A total of ten monitoring wells, including three shallow and seven deep wells, will be installed to characterize and delineate groundwater contamination. Monitoring well clusters will be installed at three locations (MW-11d/s, MW-12d/s, and MW-13d/s) and will comprise a shallow well screened above the organic clay layer, and a deep well screened below the organic clay layer. The four deep wells (M-3d, M-4d, M-5d, and M-6d) will be installed adjacent to the existing shallow well monitoring well locations (M-3, M-4, M-5, and M-6) and will be screened below the organic clay layer. Locations of the proposed wells are depicted on Figure 13 along with locations of existing wells.

### 1.2.1 Monitoring Well Installation and Development

The ten new wells will be installed using 6.25-inch outside diameter hollow stem augers and a truck-mounted drill rig. The HSA rig will be used to core through any existing asphalt or concrete surface. Wells will be installed and developed according to the procedure laid out in Section 3.2 of the QAPP. The wells will be constructed with two-inch diameter PVC. The shallow wells will have five feet of screen installed immediately above the organic clay layer and the deep wells will have five feet of screen installed immediately below the bottom of the organic clay layer. Following well installation, each monitoring well will be developed via over-pumping, or surging and pumping, or until at least three well volumes have been evacuated. The purge water will be monitored for turbidity and water quality indicators.

Drilling augers will be decontaminated prior to and following installation of each well using a steam cleaner or pressure washer as described in Section 3.4 of the QAPP. Drill cuttings, well development water, and decontamination water will be containerized in 55-gallon steel drums and handled as described in Section 3.5 of the QAPP.

### 1.2.2 Groundwater Sampling

The new monitoring wells will not be sampled until at least one week following initial development. Groundwater samples will be collected from the new and existing wells using the Low flow sampling techniques, following procedures outlined in Section 4.2 of the QAPP. Groundwater samples will be handled as described in Section 4.6 of the QAPP.

The groundwater samples will be collected into laboratory-supplied containers, sealed and labeled and placed in a chilled cooler. Samples will be shipped to the laboratory with appropriate chain of custody documentation. The samples will be analyzed by a NYSDOH ELAP-certified laboratory following NYSDEC ASP Category B deliverables. Samples will be analyzed for Target Compounds List (TCL) VOCs by EPA Method 8260. In addition to the laboratory analysis of the field samples, quality control samples will be collected at a frequency of one sample per every 20 field samples as described in Section 4.5 of the QAPP. One equipment field blank and one blind duplicate sample will be collected and analyzed for TCL VOCs by EPA Method 8260.

All non-dedicated sampling equipment (e.g., submersible pumps and oil/water interface probe) will be decontaminated between sampling locations as described in Section 3.4 of the QAPP. Purge and decontamination water will be placed in 55-gallon drums and handled as described in Section 3.5 of the QAPP.

### 1.2.3 Monitoring Well Survey

At the completion of sampling activities, the newly-installed monitoring wells will be surveyed by a New York State-licensed surveyor. Three elevation measurements will be taken at each well location: the elevation of the ground beside the well; the elevation on the rim of the gate box or protective casing; and the elevation of the top of PVC casing.

## 1.3 Soil Gas Survey

The soil gas survey consists of the installation and sampling of nine soil gas probes (SG-6 thought SG-14) from under the slab in the southern and eastern portion of the site. Seven soil gas probes will be installed within the building, where multiple concrete slabs may be present. The remaining two soil gas sampling locations are located in the loading dock area on the south side of the building and on the sidewalk on the north side of the building. Grade level at those locations are approximately three feet below the inside soil gas locations. The sampling locations are shown on Figure 14.

### 1.3.1 Soil Gas Probe Installation and Sampling

Soil probe installation will be completed according to procedures described in Section 3.3 of the QAPP. A stainless steel probe, consisting of a drive point and internal perforated sampling point with a retractable tip will be advanced to an approximate depth of 6 feet below grade. The probe will be connected to Teflon sampling tubing that will extended from the sampling port through a drive casing to above grade. Following overnight stabilization of the flush-mount road box, one soil gas sample will be collected at each location according to NYSDOH guidelines and as outlined in Section 4.3 of the QAPP. Prior to sampling soil gas, a tracer test will be performed to assure tightness of the surface seal.

The soil gas samples will be collected into laboratory-supplied Summa canisters, sealed and labeled as described in Section 4.6 of the QAPP. Samples will be shipped to the laboratory with appropriate chain of custody documentation. The samples will be analyzed by a NYSDOH ELAP-certified laboratory following NYSDEC ASP Category B deliverables. Samples will be analyzed for VOCs by EPA Method TO-15 plus tentatively identified compounds (TICs). In addition to the laboratory analysis of the field samples, quality control samples will be collected at a frequency of one sample per every 20 field samples as described in Section 4.5 of the QAPP. One blind duplicate sample and one ambient air sample will be collected and analyzed for VOCs by EPA Method TO-15 plus TICs.

Following soil gas sampling, all non-dedicated sampling equipment (e.g., stainless steel sampling probe and hand auger) will be decontaminated between sampling locations as described in Section 3.4 of the QAPP.

# 2.0 REPORTING REQUIREMENTS

## 2.1 Progress Report

A monthly progress report, describing the activities conducted during the respective month as outlined in this work plan, will be submitted to the NYSDEC by the 10$^{th}$ day of the following month. The progress reports will include the following:

- Activities relative to the site during the previous reporting period and those anticipated for the next reporting period;
- Description of approved activity modifications including changes of work scope and/or schedule;
- Sampling results received following internal data review and validation, as applicable; and,
- Update of schedule including percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays.

## 2.2 Site Investigation Report

Upon completion of all field work and receipt of laboratory analytical results, a Remedial Investigation Report (RIR) will be prepared that will: document field activities; present field and laboratory data; evaluate exposure and risks to human health; and discuss conclusions and recommendations drawn from the results of the investigation.

#### 2.2.1 Description of Field Activities

This chapter of the RIR report will describe the field methods used to characterize the site conditions, including: sampling techniques; field screening equipment; drilling and excavation equipment; monitoring well installation procedures; and management of investigation-derived waste.

#### 2.2.2 Soil Quality

The RIR report will include a chapter on soil quality that presents field and laboratory data from the soil boring survey. The chapter will include a description of soil characteristics. Field and laboratory analytical results will be presented and compared with regulatory standards and/or guidance values. Figures will be provided that illustrate soil boring locations along with corresponding detected concentrations. Soil boring logs and laboratory analytical reports will be provided as attachments.

#### 2.2.3 Groundwater Quality

This chapter will present groundwater monitoring results. Well survey data and water level measurements will be used to create a groundwater contour map and determine groundwater flow direction. Groundwater analytical results will be presented in the body of the report and on figures, and the detected concentrations will be compared to regulatory standards and/or guidance values. Groundwater sampling logs and laboratory analytical reports will be provided as attachments.

#### 2.2.4 Soil Gas Quality

The RIR report will include a chapter on soil gas quality that presents field and laboratory data from the soil gas survey. Laboratory analytical results will be presented and compared with regulatory guidance values. Figures will be provided that illustrate soil gas locations along with corresponding detected concentrations. Laboratory analytical reports will be provided as attachments.

#### 2.2.5 Qualitative Human Health Exposure Assessment

The RIR will include a qualitative human health exposure assessment to characterize the exposure setting, identify exposure pathways, and evaluate contaminant fate and transport to determine if human receptors would be potentially affected by on-site contamination. The exposure assessment will be based upon the receptor survey and data collected as part of the site investigation including the following:

- Comparison of contaminant concentrations in environmental media with typical background levels;
- Concentrations of contaminants in environmental media; and
- Field and laboratory data, including extent of NAPL in soil and groundwater.

### 2.3 Schedule of Work

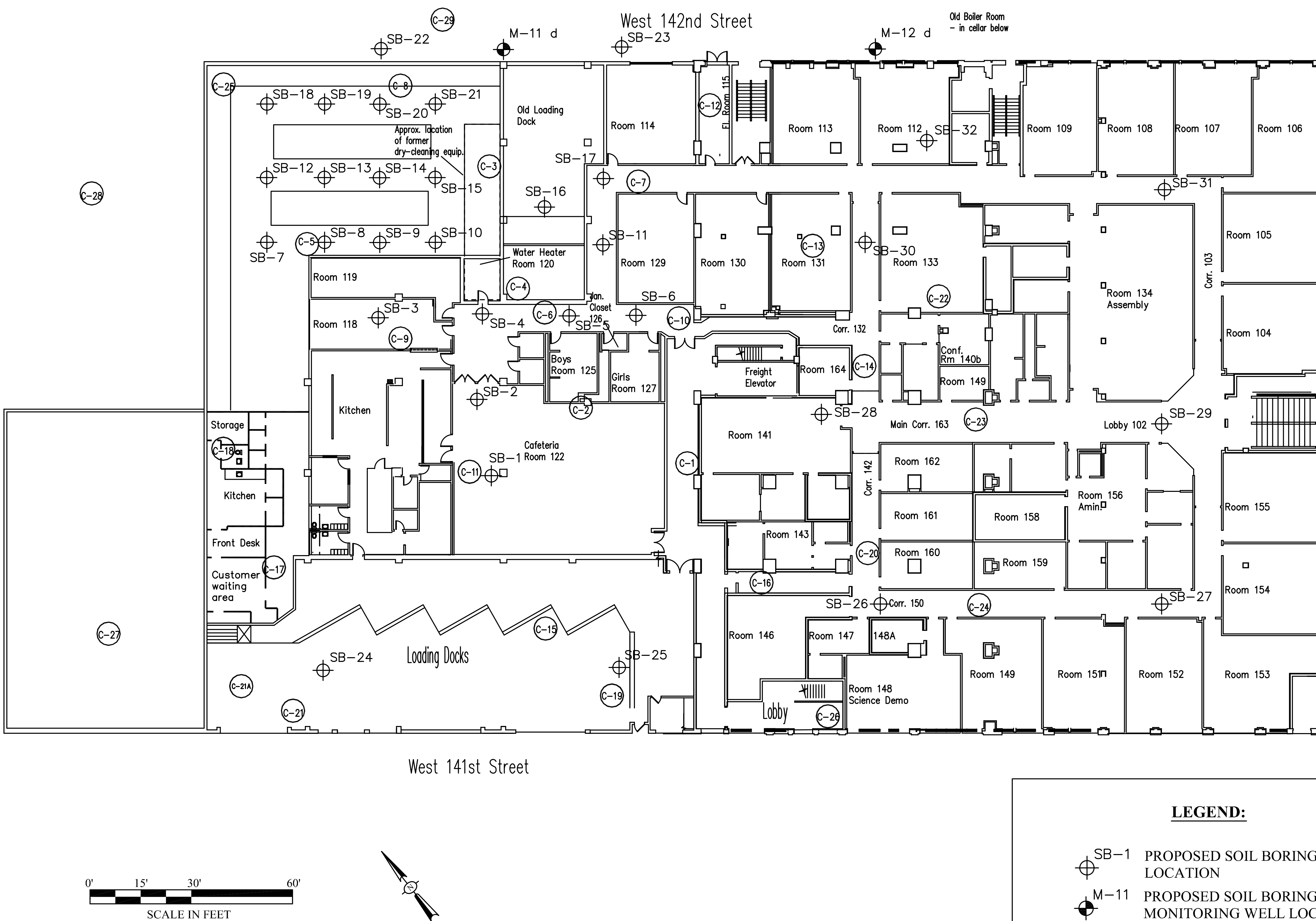
A tentative schedule for implementing the Remedial Investigation Work Plan is provided below:

***Table 2 - Supplementary Remedial Investigation Schedule***

| Week after start-up | Activity |
|---|---|

| | |
|---|---|
| 1 | Soil boring and monitoring well installation and development |
| 2 | Soil borings |
| 2 | Soil borings and soil gas survey |
| 3 | Soil gas survey |
| 4 | Monitoring wells sampling |
| 5 | Monitoring wells sampling |
| 6-7 | Prepare RIR and RAP. |

# FIGURES




**LEGEND:**

| | |
|---|---|
| SB-1 | PROPOSED SOIL BORING LOCATION |
| M-11 | PROPOSED SOIL BORING AND DEEP MONITORING WELL LOCATION |
| C-26 | FORMER CORE DRILLING LOCATIONS |

AKRF Environmental Consultants
440 Park Avenue South, New York, NY 10016

# 2350 5TH AVENUE
NEW YORK, NEW YORK

## PROPOSED SOIL BORING LOCATIONS

DATE 06.18.07

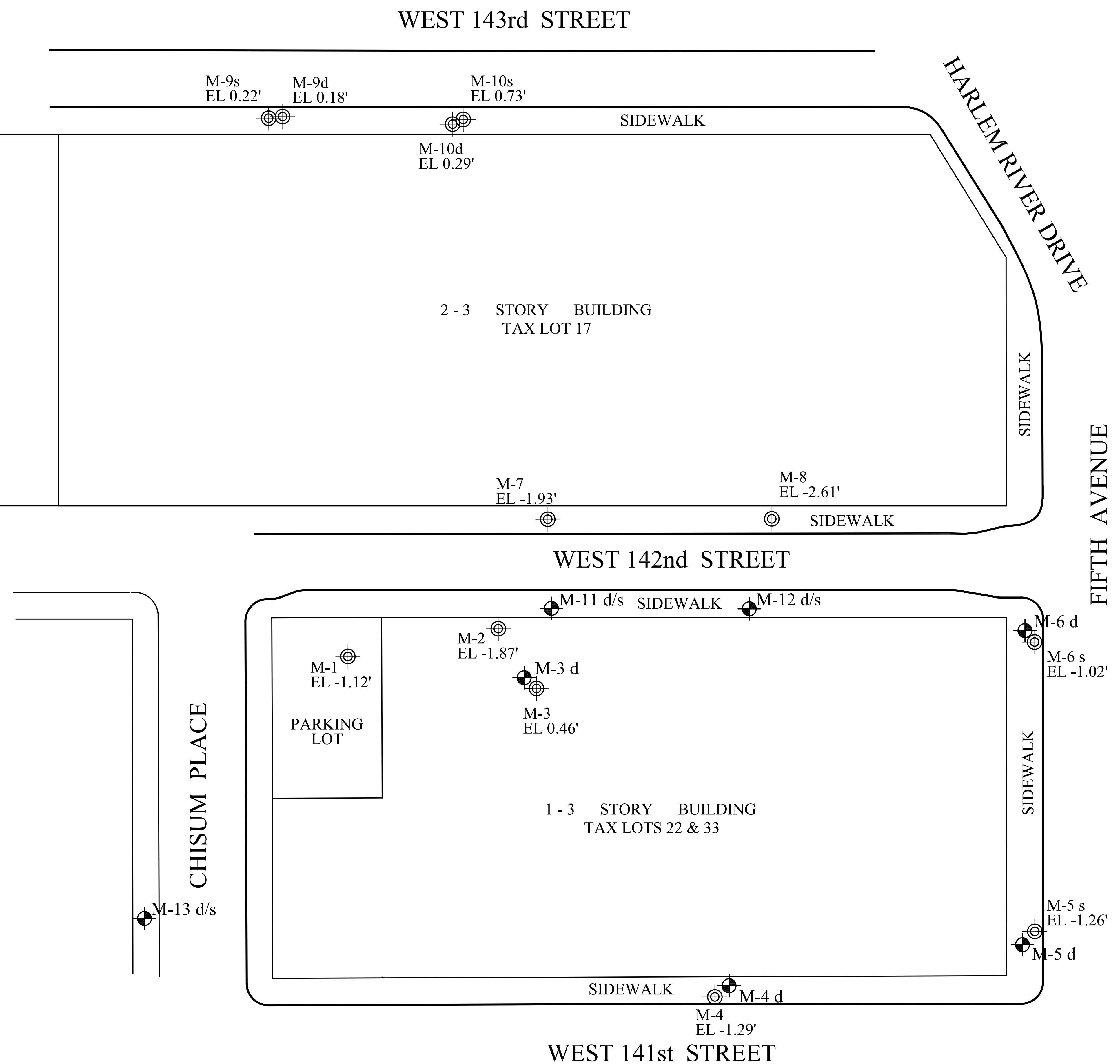
PROJECT NO. 08010

SCALE 1"=30'

FIGURE 12

© 2007 AKRF, Inc. Environmental Consultants M:\AKRF Project Files\08010 - 2350 Fifth Ave (AKA 141st St & Fifth Avenue)\Figures\08010 fig 12 Proposed Soil Sample Locations-revised.dwg

11X17 Land., 7/3/2007 8:48:42 AM, Ledger




**GENERAL NOTES:**

1. BASE MAP PROVIDED BY MONTROSE LOCATIONS SURVEYED BY SURVEYED IN DEC 2006

2. ELEVATIONS AND ESTABLISHED GRADES SHOWN HEREON REFER TO THE BOROUGH OF MANHATTAN TOPOGRAPHICAL BUREAU DATUM WHICH IS 2.75 FEET ABOVE MEAN SEA LEVEL AT SANDY HOOK N.J. AS ESTABLISHED BY THE U.S COAST AND GEODETIC SURVEY IN 1929.

0' 30' 60' 120'

SCALE IN FEET

**LEGEND:**

M-1
EL -1.12' EXISITING MONITORING WELL LOCATION

M-11 d/s PROPOSED DEEP (D) AND SHALLOW (S) MONITORING WELL LOCATION

AKRF
Environmental Consultants
440 Park Avenue South, New York, NY 10016

**2350 5th Avenue**
NEW YORK, NEW YORK

**EXISITNG AND PROPOSED MONITORING WELL LOCATIONS**

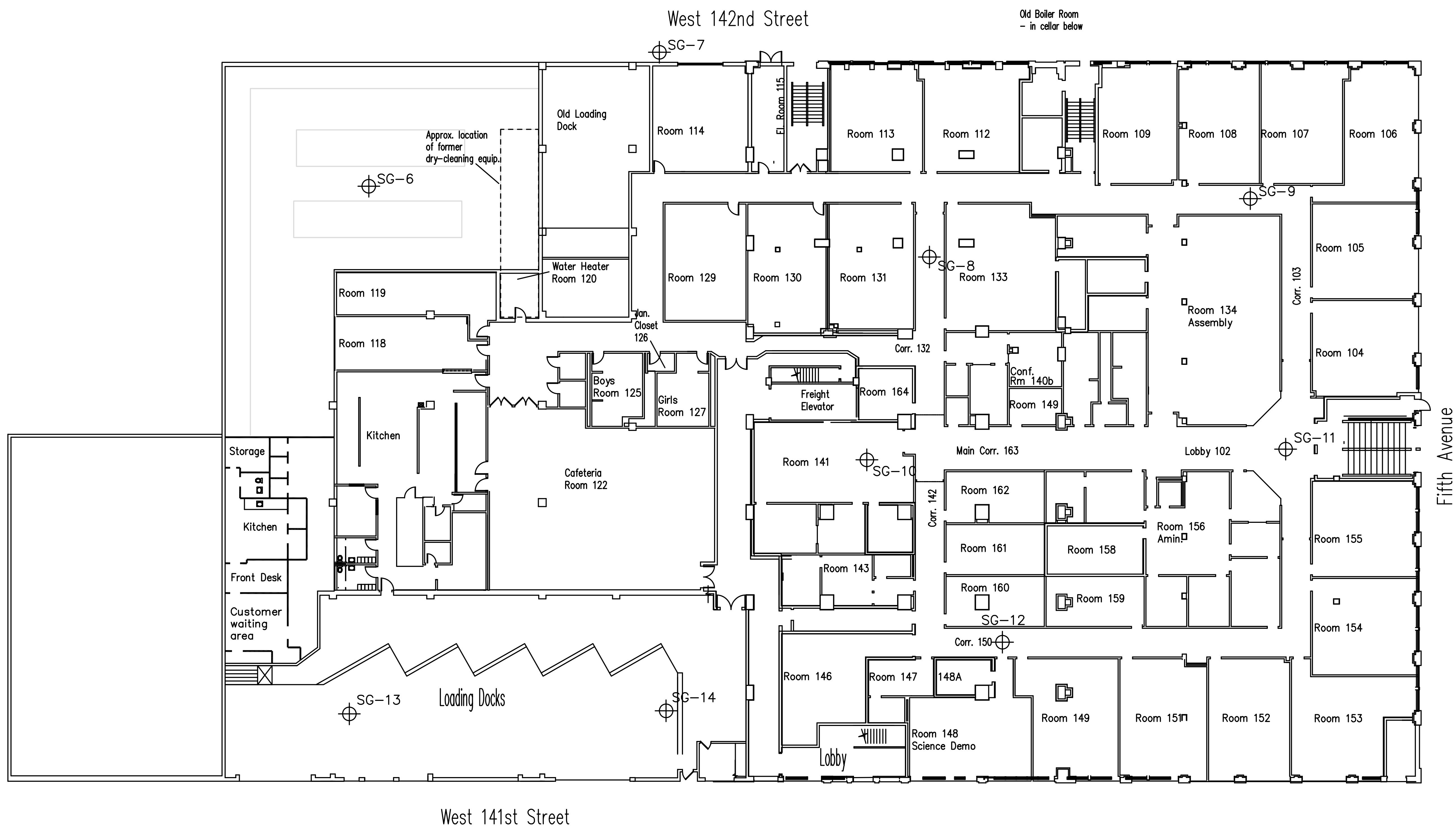
DATE
**07.03.07**

PROJECT NO.
**08010**

SCALE
**1"=60'**

FIGURE
**13**

© 2007 AKRF, Inc. Environmental Consultants M:\AKRF Project Files\08010 - 2350 Fifth Ave (AKA 141st St & Fifth Avenue)\Figures\08010 fig 13 Proposed Well Locations-revised.dwg




0' 15' 30' 60'

SCALE IN FEET

**LEGEND:**

SG–6 PROPOSED SOIL GAS LOCATION

AKRF
Environmental Consultants
440 Park Avenue South, New York, NY 10016

2350 5TH AVENUE
NEW YORK, NEW YORK

**PROPOSED SOIL GAS LOCATIONS**

DATE
06.18.07

PROJECT NO.
08010

SCALE
1"=30'

FIGURE
14

© 2007 AKRF, Inc. Environmental Consultants M:\AKRF Project Files\08010 - 2350 Fifth Ave (AKA 141st St & Fifth Avenue)\Figures\08010 fig 14 Proposed Soil Sample Locations.dwg

# APPENDIX A

# QUALITY ASSURANCE PROJECT PLAN

# 2350 Fifth Avenue

## Site #2-31-004

**MANHATTAN, NEW YORK**

## Quality Assurance Project Plan

**AKRF Project Number: 08010**

**Prepared for:**

2350 Fifth Avenue Corporation
309 East 94th Street, Ground. Floor
New York, NY 10128

**Prepared by:**


**AKRF, Inc.**
440 Park Avenue South
New York, NY 10016
212-696-0670


**REVISED JULY 2007**

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# TABLES



# ATTACHMENTS

# 1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) describes the protocols and procedures that will be followed during implementation of the Remedial Investigation Work Plan (RIWP) at the 2350 Fifth Avenue site at West 141st Street and Fifth Avenue in Manhattan. The objective of the QAPP is to provide for Quality Assurance (QA) and maintain Quality Control (QC) of environmental investigative, sampling and remedial activities conducted under the RIWP. Adherence to the QAPP will ensure that defensible data will be obtained during the investigation and remediation.

# 2.0 PROJECT TEAM

The project team will be drawn from AKRF professional and technical personnel and AKRF's subcontractors. All field personnel and subcontractors will have completed a 40-hour training course and updated 8-hour refresher course that meet the Occupational Safety and Health Administration (OSHA) requirements of 29 CFR Part 1910. The following sections describe the key project personnel and their responsibilities.

## 2.1 Project Director

The project director will be responsible for the general oversight of all aspects of the project, including scheduling, budgeting, data management and decision-making regarding the field program. The project director will communicate regularly with all members of the AKRF project team, the New York State Department of Environmental Conservation (NYSDEC), and 2350 Fifth Avenue Corporation to ensure a smooth flow of information between involved parties. Andrew Rudko, Ph.D., will serve as the project director for the RIWP. Dr. Rudko's resume is included in Attachment A.

## 2.2 Project Manager

The project manager will be responsible for directing and coordinating all elements of the RIWP. The project manager will prepare reports and participate in meetings with 2350 Fifth Avenue Corporation and/or the NYSDEC. Robin Hughes will serve as the project manager for the RIWP. Ms. Hughes' resume is included in Attachment A.

## 2.3 Field Team Leader

The field team leader will be responsible for supervising the daily sampling and health and safety activities in the field and will ensure adherence to the work plan and HASP. He/She will report to the Project Manager on a regular basis regarding daily progress and any deviations from the work plan. The field team leader will be a qualified, responsible person, able to act professionally and promptly during soil disturbing activities.

## 2.4 Project Quality Assurance/Quality Control Officer

The Quality Assurance/Quality Control (QA/QC) Officer will be responsible for adherence to the QAPP. The QA/QC Officer will review the procedures with all personnel prior to commencing any fieldwork and will conduct periodic site visits to assess implementation of the procedures. The QA/QC officer will also be responsible for preparing a Data Usability Summary Report (DUSR) for soil, soil gas and groundwater analytical results, as described in Section 5.0 of this QAPP. Marcus Simons will serve as the QA/QC officer for the RIWP. Mr. Simons's resume is included in Attachment A.

### 2.5 Laboratory Quality Assurance/Quality Control Officer

The laboratory QA/QC officer will be responsible for quality control procedures and checks in the laboratory and ensuring adherence to laboratory protocols. He/she will track the movement of samples from the time they are checked in at the laboratory to the time that analytical results are issued. He/she will conduct a final check on the analytical calculations and sign off on the laboratory reports. The laboratory QA/QC officer will be determined upon selection of a contract laboratory or laboratories for the RIWP.

## 3.0 STANDARD OPERATING PROCEDURES

The following sections describe the standard operating procedures (SOPs) for the investigative activities included in the RIWP. During these operations, safety monitoring will be performed as described in the project Health and Safety Plan (HASP) and all field personnel will wear appropriate personal protective equipment.

### 3.1 Soil Borings

Soil boring procedures using a direct-push probe (DPP) and a hollow stem auger (HSA) rig are described below.

#### 3.1.1 Soil Boring Installation using Direct Push Probe (DPP)

Soil borings will be completed according to the following procedure:

1. Advance borings using a DPP.
2. Use the DPP rig or a concrete drill to core through any existing asphalt or concrete surface.
3. Drive four-foot long, two-inch diameter, stainless steel macrocore piston rod sampler fitted with an acetate liner through subsurface.
4. Collect soil samples using macrocore sampler and as described in Section 4.1 of this QAPP.
5. Grout borehole with bentonite-cement slurry upon completion.
6. Decontaminate all non-dedicated sampling equipment between samples (macrocores), and prior to and following each soil boring location (probe rods) as described in Section 3.4 of this QAPP.
7. Containerize and handle all drill cuttings, plastic samples sleeves, and decontamination water as described in Section 3.5 of this QAPP.

#### 3.1.2 Soil Boring Installation using Hollow-Stem Auger (HSA)

Soil borings will be completed according to the following procedure:

1. Advance borings using a HSA rotary rig with 6.25-inch outside diameter augers.
2. Use the HSA rig to core through any existing asphalt or concrete surface.
3. Drive stainless steel, 24-inch split-spoon sampler through subsurface ahead of auger.
4. Collect soil samples using split-spoon samplers and as described in Section 4.1 of this QAPP.

5. Grout borehole with bentonite-cement slurry upon completion.
6. Decontaminate all non-dedicated sampling equipment between samples (split spoons), and prior to and following each soil boring location (augers) as described in Section 3.4 of this QAPP.
7. Containerize and handle drill cuttings and decontamination water as described in Section 3.5 of this QAPP.

### 3.2 Monitoring Well Installation and Development

Monitoring wells will be installed and developed according to the following procedure:

1. Advance borings using a HSA rotary rig with 6.25-inch outside diameter augers.
2. Use the HSA rig to core through any existing asphalt or concrete surface.
3. Measure the depth to water in the open hole using a Solinst® Water Table Meter – Model 101 or equivalent.
4. Place PVC riser with a five-foot length of PVC 0.02-slotted screen at the bottom of the borehole. In determining the amount of screen that will be located beneath the water table, the elevation of the seasonal water table will be considered. The well screen will be situated to provide sufficient water in the well for sampling at all times and to limit sample collection close to the base of the well.
5. Install No. 1 sand filter pack around the well screen to a depth of one to two feet above the top of the screen.
6. Install a bentonite seal to a depth of one to two feet above the filter pack.
7. Backfill the remainder of the annular space using a bentonite-cement grout.
8. Complete the well with a locking cap flush-with-grade curb box set in concrete. Provide a concrete apron around the curb box to direct run-off away from the well.
9. Decontaminate the augers prior to and following installation of each well as described in Section 3.4 of this QAPP.
10. Document well installation data (location, depth, construction details, water level measurements) in the field logbook or on field data sheets
11. Following well installation, the ten new wells will be developed according to the following procedure:
12. Measure the depth to water using an oil/water interface probe and the total depth of the well using a weighted tape. Use these measurements to calculate the length of the water column. Calculate the volume of water in the well using 0.163 volumes per foot of water column (gallons) as the conversion factors for a 2-inch diameter well.
13. For the first five minutes of well development, develop the well using a submersible pump and re-circulate the water back into the well to create maximum agitation. This method is intended to remove fines from the sand pack, the adjacent formation and from the well.
14. After the first five minutes of well development, develop the well using a submersible pump and discharge the water to five-gallon buckets. Transfer water from the buckets to 55-gallon drums designated for well development water.

15. During development, collect periodic samples and analyze for turbidity and water quality indicators (pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity) with measurements collected approximately every five minutes.
16. Continue developing the well until turbidity is less than 50 nephelometric turbidity units (NTUs) for three successive readings and until water quality indicators have stabilized to within 10% for pH, temperature and specific conductivity for three successive readings, or until three well volumes have been purged from the well.
17. Document the volume of water removed and any other observations made during well development in the field logbook or on field data sheets.
18. Decontaminate all equipment prior to and following development at each well location as described in Section 3.4 of this QAPP.
19. Containerize and handle all well development water, decontamination, and purge water as described in the Section 3.5 of this QAPP.

Monitoring well sampling procedures are described in Section 4.2 of this QAPP.

## 3.3 Soil Gas Probe Installation

Soil gas probes will be installed using the procedures described below:

1. Core or cut and remove a patch of the concrete slab at each location.
2. Insert new, clean 3/16-inch inside diameter Teflon tubing to the sampling probe.
3. Install and prepare the soil gas sampler for each interval in accordance with the following procedures:
4. Advance a 2-inch diameter hand auger to a depth of 2 to 3 feet below grade to clear subsurface utilities.
5. Place the soil gas sampler in the resulting soil boring and drive to 4 feet below grade.
6. Backfill the soil gas sampler with 6-inches of clean sand filter pack to prevent intake clogging.
7. Retract the drive casing to expose the three-inch perforated sampling port.
8. Remove sampler drive casing leaving the sampling tubing and tip in the boring.
9. Fill the remaining boring annulus with hydrated bentonite chips to grade to provide a seal to ensure the collection of a representative sample and prevent short-circuiting via the surface.
10. Install a 2-inch diameter flush-mount road box set within the concrete slab and let stabilize overnight.
11. Decontaminate all equipment prior to and following each location as described in Section 3.4 of this QAPP.

Soil gas sampling procedures are described in Section 4.3 of this QAPP.

## 3.4 Decontamination of Sampling Equipment

All sampling equipment will be either dedicated or decontaminated between sampling locations. The decontamination procedure will be as follows:

1. Scrub using tap water/Simple Green® mixture and bristle brush.

2. Rinse with tap water.
3. Scrub again with tap water/ Simple Green® and bristle brush.
4. Rinse with tap water.
5. Rinse with distilled water.
6. Air-dry the equipment, if possible.

Decontamination will be conducted on plastic sheeting (or equivalent) that is bermed to prevent discharge to the ground and will be handled as described in Section 3.5.

### 3.5 Management of Investigation Derived Waste

All investigation-derived waste (IDW) will be containerized in Department of Transportation (DOT)-approved 55-gallon drums. The drums will be sealed at the end of each work day and labeled with the date, the well or boring number(s), the type of waste (i.e., drill cuttings; development water or purge water) and the name of an AKRF point-of-contact. Soil samples collected from soil borings and monitoring well installation activities will be used for waste characterization of soils, since such data would be biased towards areas which are expected to be most contaminated. Notwithstanding, additional waste characterization soil samples will be collected, if warranted. All drums will be labeled "pending analysis" until laboratory data is available. All IDW will be disposed of or treated according to applicable local, state and federal regulations.

## 4.0 SAMPLING AND LABORATORY PROCEDURES

### 4.1 Soil Sample Collection

Soil borings will be installed as described in Section 3.1 of this QAPP. Soil sampling will be conducted according to the following procedures:

- Characterize the sample according to the modified Burmister soil classification system and describing any evidence of contamination (e.g., oil-like or tar-like non-aqueous phase liquid, staining, sheens, odors; and screening for organic vapors using a photoionization detector (PID)).
- If advancing soil borings, collect an aliquot of soil from each sampling location and place in labeled sealable plastic bags. Place the plastic bags in a chilled cooler to await selection of samples for laboratory analysis. If performing endpoint sampling or characterization sampling, soil can be placed directly in laboratory-supplied sample jars.
- After selecting which samples will be analyzed in the laboratory, fill the required laboratory-supplied sample jars with the soil from the selected sampling location or labeled sealable plastic bags. Seal and label the sample jars as described in Section 4.6 of this QAPP and place in an ice-filled cooler.
- Decontaminate any soil sampling equipment between sample locations as described in Section 3.4 of this QAPP.
- Record boring number, sample depth and sample observations (evidence of contamination, PID readings, soil classification) in field log book and boring log data sheet, if applicable.

## 4.2 Monitoring Well Sampling

Monitoring wells will be installed and developed as described in Section 3.2 of this QAPP. Groundwater samples will be collected at least one week following well development. Low flow sampling techniques will be used, as described in U.S. EPA's Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers [EPA 542-S-02-001, May 2002]. Sampling will be conducted according to the following procedure:

- Prepare the sampling area by placing plastic sheeting over the well. Cut a hole in the sheeting to provide access to the well cover.
- Remove the locking cap and measure the vapor concentrations in the well with a PID.
- Measure the depth to water and total well depth, and check for the presence of light non-aqueous phase liquid (LNAPL) or dense non-aqueous phase liquid (DNAPL) using an oil/water interface probe. Measure the thickness of NAPL, if any, and record in field book and well log. Collect a sample of NAPL using a disposable plastic weighted bailer or similar collection device. Groundwater samples will not be collected from wells containing measurable NAPL.
- Use the water level and total well depth measurements to calculate the length of the mid-point of the water column within the screened interval. For example, for a shallow well where the total depth is 15 feet, screened interval is 5 to 15 feet, and depth to water is 7 feet, the mid-point of the water column within the screened interval would be 11 feet. Similarly for a deep well where the total depth is 40 feet, screened interval is 30 to 40 feet, and depth to water is 15 feet, the mid-point of the water column within the screened interval would be 35 feet.
- Connect dedicated tubing to either a submersible or bladder pump and lower the pump such that the intake of the pump is set at the mid-point of the water column within the screened interval of the well. Connect the discharge end of the tubing to the flow-through cell of a Hydrolab Quanta multi-parameter (or equivalent) meter. Connect tubing to the output of the cell and place the discharge end of the tubing in a five-gallon bucket.
- Activate the pump at the lowest flow rate setting of the pump.
- Measure the depth to water within the well. The pump flow rate may be increased such that the water level measurements do not change by more than 0.3 feet as compared to the initial static reading. The well-purging rate should be adjusted so as to produce a smooth, constant (laminar) flow rate and so as not to produce excessive turbulence in the well. The expected targeted purge rate will be around 500 mil/minute and will be no greater than 3.8 liters/minute.
- Transfer discharged water from the 5-gallon buckets to 55-gallons drums designated for well-purge water.
- During purging, collect periodic samples and analyze for water quality indicators (e.g., turbidity, pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity) with measurements collected approximately every five minutes.
- Continue purging the well until turbidity is less than 50 NTU and water quality indicators have stabilized to the extent practicable. The criteria for stabilization will be three successive readings for the following parameters and criteria:

*Table 1*
*Stabilization Criteria*

| Parameter | Stabilization Criteria |
|---|---|
| PH | +/- 0.1 pH units |
| Specific Conductance | +/- 3% mS/cm |
| ORP/Eh | +/- 10mV |
| Turbidity | <50 NTU |
| Dissolved Oxygen | +/- 0.3 mg/l |

Notes: mS/cm = millisievert per centimeter
mV = millivolts
NTU = nephthalometric turbidity units
mg/l = milligrams per liter

- If the water quality parameters do not stabilize and/or turbidity is greater than 50 NTU within two hours, purging may be discontinued. Efforts to stabilize the water quality for the well must be recorded in the field book, and samples may then be collected as described herein.
- After purging, disconnect the tubing to the inlet of the flow-through cell. Collect groundwater samples directly from the discharge end of the tubing and place into the required sample containers as described in Section 4.4 of this QAPP. Label the containers as described in Section 4.6 of this QAPP and place in a chilled cooler.
- Collect one final field sample and analyze for turbidity and water quality parameters (pH, temperature, dissolved oxygen, reduction-oxidation potential, and specific conductivity).
- Once sampling is complete, remove the pump and tubing from the well. Disconnect the tubing and place it back in the well for reuse during the next sampling event. Dispose of the sample filter in a 55-gallon drum designated for disposable sampling materials and PPE.
- Decontaminate the pump, oil/water interface probe, flow-through cell, and plastic filter chamber as described in Section 3.4 of this QAPP.
- Record all measurements (depth to water, depth to NAPL, water quality parameters, turbidity), calculations (well volume) and observations in the project logbook and field data sheet, if applicable.

### 4.3 Soil Gas Sampling

Following installation of the soil gas probe described in Section 3.3 of this QAPP, soil gas sampling will be conducted according to the following procedure:

1. Install a 2-foot by 2-foot 6-mil plastic shroud over sampling point, seal to the concrete slab using duct tape along the perimeter, and pull the Teflon soil gas sampling tubing through the shroud to allow for sampling collection.
2. Introduce tracer into sampling shroud by inserting new tubing connected to a helium tank.
3. Install new flexible hose to a peristaltic pump and connect the Teflon sampling tubing to the hose. Connect the other end (discharge end) of the flexible tubing to a 1-liter Tedlar bag. Purge the soil gas sampler of approximately three sampler volumes by activating the pump to completely fill the Tedlar bag. The purge rate will be 0.1 liters per minute or less.

4. Analyze the sample within Tedlar bag using a calibrated PID and a helium detector (Marks Model No. 9822 or equivalent.) If elevated concentrations of helium are detected, inspect surface seal, and if necessary, add hydrated bentonite to seal.
5. After purging the soil gas sampler, disconnect the sample tubing from the peristaltic pump and connect it to the inlet of a labeled Summa canister fitted with a 0.2 liter/minute reflow regulator. Record the vacuum reading from the vacuum gauge on the canister at the beginning of the sampling period. Open the valve of the canister and record the time in the field book.
6. At the end of the sampling period and prior to the vacuum gauge returning to ambient pressure, close valve, remove flow-rate controllers and vacuum gauges, install caps on canisters, and record time.
7. Place canisters in shipping containers for transportation to laboratory.
8. Decontaminate all sampling equipment between sampling locations as described in Section 3.4 of this QAPP.

## 4.4 Laboratory Methods

A New York State certified laboratory will perform all analytical work. The laboratory will operate a Quality Assurance/Quality Control (QA/QC) program that will consist of proper laboratory practices (including the required chain-of-custody), an internal quality control program, and external quality control audits by New York State.

Table 2 summarizes the laboratory methods that will be used to analyze field samples as well as the sample container type, preservation, and applicable holding times. An Environmental Laboratory Approval Program (ELAP)-certified laboratory will be used for all chemical analyses in accordance with DER-10 2.1(b) and 2.1(f), i.e., Category B Deliverables and CLP ELAP Certification will be required for confirmatory (post remediation) samples and final delineation samples.

*Table 2*
*Laboratory Analytical Methods for Analysis Groups*

| ANALYSIS GROUP | MATRIX | PARAMETER | EPA METHOD | SAMPLE CONTAINERS | PRESERVATION | HOLDING TIMES |
|---|---|---|---|---|---|---|
| SOIL ANALYSIS PARAMETERS | solid | TCL VOCs | 8260 | 2 oz. clear glass Septum | 4$^{o}$C | 14 days |
| GROUNDWATER ANALYSIS PARAMETERS | liquid/sludge | TCL VOCs | 8260 | (2) 40 ml clear glass vial | HCl, 4$^{o}$C | 14 days |
| SOIL GAS ANALYSIS PARAMETERS | air | VOCs | TO-15 | Summa Canister | -- | 30 days |

Notes: VOCs = volatile organic compounds
HCL = Hydrochloric Acid

## 4.5 Quality Control Sampling

In addition to the laboratory analysis of the investigative and remedial soil, groundwater, and soil gas samples, additional analysis will be included for quality control measures, as required by the Category B sampling techniques. These samples may include equipment rinsate blanks, trip blanks, matrix spike/matrix spike duplicates (MS/MSD) and of duplicate/blind duplicate samples. Equipment blank, MS/MSD and duplicate samples will be analyzed for the same parameter set for which the samples will be analyzed. If the requested parameters include volatile organic compounds (VOCs), a trip blank will be analyzed for volatile organic compounds only. Quality control samples will be collected at a frequency of one sample for every 20 field samples. Quality control sampling in accordance with the disposal facility requirements will be performed when collecting samples for disposal characterization.

## 4.6 Sample Handling

### 4.6.1 Sample Identification

All samples will be consistently identified in all field documentation, chain-of-custody documents and laboratory reports using an alpha-numeric code. Groundwater samples will be identified by the monitoring well number, soil boring samples will be identified by the soil boring number followed by the sample depth interval (in parenthesis), and soil gas samples will be identified by the soil gas number followed by the sample depth interval (in parenthesis). Waste characterization samples collected from 55-gallon drums will be identified by the drum number (e.g., D-1 or D-2) followed by a sample type designation (LQ for liquid and SD for solid).

The field duplicate samples will be labeled with a dummy sample location to ensure that they are submitted as blind samples to the laboratory. The dummy identification will consist of the sample type followed by a letter. For duplicate soil boring samples, the sample depth will be the actual sample depth interval. Trip blanks and field blanks will be identified with "TB" and "FB", respectively.

Table 3 provides examples of the sampling identification scheme.

*Table 3*
*Examples of Sample Names*

| Sample Description | Sample Designation |
|---|---|
| Soil sample collected from 5 to 7 feet at SB-3 | SB-3 (5-7) |
| Groundwater sample collected from deep monitoring well M-5 | M-5d |
| Soil gas sample collected from 5 to 6 feet at SG-2 | SG-2 (5-6) |
| MS/MSD duplicate sample from SB-4 | B-4-MS |
| Duplicate sample from 6 to 8 feet at SB-10 | 10SB (6-8) |

### 4.6.2 Sample Labeling and Shipping

All sample containers will be provided with labels containing the following information:

- Project identification
- Sample identification
- Date and time of collection
- Analysis(es) to be performed
- Sampler's initials

Once the samples are collected and labeled, they will be placed in chilled coolers and stored in a cool area away from direct sunlight to await shipment to the laboratory. Soil and groundwater samples will be shipped to the laboratory once to twice per week. At the start and end of each workday, field personnel will add ice to the coolers as needed.

The samples will be prepared for shipment by placing each sample in a sealable plastic bag, then wrapping each container in bubble wrap to prevent breakage, adding freezer packs and/or fresh ice in sealable plastic bags and the chain-of-custody form. Samples will be shipped overnight (e.g., Federal Express) or transported by a laboratory courier. All coolers shipped to the laboratory will be sealed with mailing tape and a chain-of-custody (COC) seal to ensure that the coolers remain sealed during delivery.

#### 4.6.3 Sample Custody

Field personnel will be responsible for maintaining the sample coolers in a secured location until they are picked up and/or sent to the laboratory. The record of possession of samples from the time they are obtained in the field to the time they are delivered to the laboratory or shipped off-site will be documented on chain-of-custody (COC) forms. The COC forms will contain the following information: project name; names of sampling personnel; sample number; date and time of collection and matrix; and signatures of individuals involved in sample transfer, and the dates and times of transfers. Laboratory personnel will note the condition of the custody seal and sample containers at sample check-in.

### 4.7 Field Instrumentation

Field personnel will be trained in the proper operation of all field instruments at the start of the field program. Instruction manuals for the equipment will be on file at the site for referencing proper operation, maintenance and calibration procedures. The equipment will be calibrated according to manufacturer specifications at the start of each day of fieldwork, if applicable. If an instrument fails calibration, the project manager or QA/QC officer will be contacted immediately to obtain a replacement instrument. A calibration log will be maintained to record the date of each calibration, any failure to calibrate and corrective actions taken. The PID will be calibrated each day using 100 parts per million (ppm) isobutylene standard gas.

## 5.0 DATA REVIEW

The QA/QC officer will conduct a review of all analytical data and prepare a Data Usability Summary Report (DUSR) to assess the quality of the data and determine its usability. To assess the data, the QA/QC officer will:

- Ensure the data package is complete as defined under the requirements for the NYSDEC Analytical Services Protocol (ASP) Category B deliverables and that all data were generated using established and agreed upon protocols.
- Check that all holding times were met.
- Check that all QC data (blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data) fall within the protocol required limits and specifications.
- Compare raw data with results provided in the data summary sheets and quality control verification forms.
- Check that correct data qualifiers were used.

- Evaluate the raw data and confirm the results provided in the data summary sheets and quality control verification forms.

Any Quality Control exceedances will be specified in the DUSR, and the corresponding data package QC summary sheet identifying the exceedances will be attached. The DUSR will identify any data deficiencies, analytical protocol deviations and quality control problems and discuss their effect on the data. Recommendations for resampling and/or reanalysis will be made.

# ATTACHMENT A

## RESUME OF PROJECT QA/QC OFFICER, PROJECT DIRECTOR, AND PROJECT MANAGER

## ANDREW D. RUDKO, PH.D.

### SENIOR VICE PRESIDENT

Andrew D. Rudko, Ph.D., is a senior vice president of AKRF, with more than 25 years of experience in environmental analysis and management, with particular emphasis on hazardous materials, environmental site assessments and audits, and soil and groundwater remediation. Dr. Rudko's current and recent experience includes management of several projects involving Voluntary Cleanup Agreements and Brownfields Cleanup Agreements for assessment and remediation of soil and groundwater contamination problems on major development sites. These include the Queens West Development site, a New York State-sponsored development which extends for three quarters of a mile along the East River waterfront in Queens, New York. The site, which formerly contained an oil refinery, gas plant, paint and varnish factories, and railroad yards, is being redeveloped for residential and commercial uses. Dr. Rudko is also managing the assessment of soil and groundwater on the site of Brooklyn Bridge Park, which is being developed on a stretch of Brooklyn waterfront with a long history or industrial uses.

Dr. Rudko has managed cleanups of many **petroleum and solvent spills.** He is managing ongoing remediation work for chlorinated solvent releases to the groundwater for sites in Harlem, Rego Park, and Springfield Gardens. Some recent spill cleanup sites include a former gasoline station in Downtown Brooklyn, a portion of the Fordham University campus in the Bronx, the Tribeca Hotel site developed by Hartz Mountain Industries in Lower Manhattan, retail sites in Maspeth and Long Island City developed by Forest City Ratner Companies, a site in the Bronx developed by Triangle Equities for the Department of Motor Vehicles, the Rivergate Apartments on East 34th Street in Manhattan, the Tate apartment building on West 23rd Street in Manhattan, and a residential development on Sixth Avenue and 26th Street in Manhattan.

He has been responsible for assessing **impacts on public health** for a number of projects involving the use of hazardous chemicals, biohazards, and radioactive materials. These projects include an engineering and physics research center on the campus of Columbia University, a new laboratory building for biomedical research at Rockefeller University, a new research center for Memorial Sloan Kettering Medical Center and the Audubon Research Park in upper Manhattan.

Dr. Rudko has managed a number of site assessments for New York City Department of Environmental Protection sewer improvement projects. These include the installation of new sewers in the Meadowmere and Warnerville sections of southeastern Queens, the Avenue V Pump Station and associated force mains in Brooklyn, new facilities at the 26th Ward wastewater treatment plant in Brooklyn, and combined sewer outfall abatement projects in Queens and Staten Island.

Dr. Rudko was project director for the site assessment work the firm performed for the New York City School Construction Authority, directing assessments on school sites in the Bronx, Brooklyn, and Queens. Sites included a former gas station, a truck salvage yard, and a former plastics factory. Testing programs were recommended, developed, and implemented for these sites, and remedial actions were recommended where necessary. At the former plastics factory site, the testing program included soil and groundwater sampling, testing of building floors for PCB contamination, and location and removal of old underground gasoline and oil tanks, with screening of surrounding soil for possible petroleum contamination.

### BACKGROUND

**Education**

B.S., Biochemistry, Cornell University, 1965

Ph.D., Biochemistry, Columbia University, 1972

**Years of Experience**

Year started in company: 1985

Year started in industry: 1979

## RELEVANT EXPERIENCE

**26th Ward Water Pollution Control Plant, Brooklyn, NY**

As a subcontractor to Hazen and Sawyer, AKRF has been providing hazardous materials testing and consulting services in connection with the construction of upgraded facilities at the 26th Ward WPCP in Brooklyn. Dr. Rudko has been managing this work, which includes developing testing protocols for proposed construction areas and performing soil and groundwater testing. AKRF has also been reviewing contractor submissions regarding testing and disposal of excavated soil, lead paint and asbestos abatement, and underground storage tank removals.

**South Richmond Drainage Plan, Staten Island, NY**

Dr. Rudko was responsible for hazardous materials studies performed as part of the design and implementation of the South Richmond Drainage Plan. This innovative plan developed by NYCDEP utilizes South Richmond's natural drainage system of streams, ponds, marshes, and wetlands to the greatest extent possible to manage stormwater. AKRF identified areas of proposed construction within drainage basins where there was potential soil or groundwater contamination. Phase I Environmental Site Assessments were prepared for properties NYCDEP was acquiring, and, where necessary, soil and groundwater testing protocols were prepared and implemented.

**Avenue V Pumping Station, Brooklyn, NY**

Dr. Rudko was responsible for hazardous materials studies performed as part of the environmental review for the rehabilitation and upgrade of the Avenue V Pumping Station in Brooklyn, and the construction of two new force mains to convey wastewater to the Owls Head WPCP. After preliminary studies to identify potential sources of contamination along the force main routes, soil and groundwater sampling was performed along both routes.

**Port Richmond Throttling Facility, Staten Island, NY**

AKRF worked with Hazen and Sawyer to provide environmental studies for the proposed throttling facility, which would regulate flows into the Port Richmond WPCP in Staten Island and thus reduce combined sewer overflows. Dr. Rudko managed the soil and groundwater testing program at the site.

**Jamaica Tributaries CSO Facilities Plan, Queens, NY**

Dr. Rudko oversaw hazardous materials studies performed as a subcontractor to Hazen and Sawyer for construction of new facilities as part of the plan to reduce water quality impacts on Jamaica Bay, a designated federal recreation area. Part of this effort involved construction of new sewers and a pumping station to serve Meadowmere and Warnerville, small communities in southeast Queens. AKRF prepared testing protocols and performed soil and groundwater testing at the proposed pumping station site and along the entire route of new sewer construction. AKRF also performed soil testing at the Shellbank Basin site, where new facilities are being constructed to reduce the impact of wastewater discharges.

**Gowanus Canal Clean-Up, Brooklyn, NY**

Dr. Rudko managed the investigation and remedial design of a former manufactured gas plant site on the Gowanus Canal in Brooklyn. The subsurface remains of three large gasholders filled with coal tar-contaminated soil and debris were cleaned up prior to development of the property.

**Queens West Development Project, Long Island City, NY**

For over 20 years, AKRF has played a key role in advancing the Queens West development, which promises to transform an underused industrial waterfront property into one of largest and most vibrant mixed-use communities just across the East River from the United Nations. AKRF has prepared an EIS that examines issues pertaining to air quality, land use and community character, economic impacts, historic and archaeological resources, and infrastructure. As part of the project, AKRF also undertook the largest remediation venture completed to date under the Brownfields Cleanup Program (BCP). Dr. Rudko directed the site assessment work on the project. Former uses on the site include oil refineries, paint manufacturers, and railyards. AKRF developed and implemented extensive soil and groundwater testing programs, and developed remediation plans which have been incorporated into four separate Voluntary Cleanup Agreements.

**Brooklyn Bridge Park, Brooklyn, NY**

Dr. Rudko is responsible for the site assessment work being performed on this waterfront site which is being developed as a park by New York State and New York City. The site, which stretches from Brooklyn Heights under the Brooklyn Bridge to the Manhattan Bridge, has a long history of industrial uses.

**Shea Stadium Redevelopment, Flushing, NY**

Dr. Rudko is directing the site assessment work being performed on the proposed site of a new stadium adjacent to the existing Shea Stadium in Flushing, Queens. The area was formerly used as a landfill for the disposal of ash and other wastes. Dr. Rudko previously directed the soil and groundwater testing on the site of the adjacent National Tennis Center.

**Home Depot, New Rochelle, NY**

Dr. Rudko directed the assessment and remediation work on a 14-acre parcel in New Rochelle, New York that was being developed by Home Depot USA. After extensive review and discussions with the New York State Department of Environmental Conservation (DEC), a remediation agreement was developed and approved that became the model for New York State=s Voluntary Cleanup Program. AKRF supervised the implementation of the remediation measures, which included removal of underground storage tanks and associated contaminated soil, and construction of an impermeable cap with a gas venting system for areas with lead contamination.

**Home Depot, Rego Park, NY**

On another retail site, serious solvent contamination was unexpectedly encountered on a property being developed in Queens, New York. Dr. Rudko managed the design and execution of a testing program, planned a remediation program that would permit development of the site, and assisted in the negotiation of a Voluntary Cleanup Agreement with DEC. Development of the property is now continuing while a groundwater remediation system designed by AKRF's Engineering division is installed as part of the building construction.

**18-30 Whitestone Expressway Clean-Up, College Point, NY**

Dr. Rudko directed a Voluntary Clean-Up involving the delineation and removal of PCB-contaminated soil from a site in College Point. DEC issued a release letter following the successful completion of this project.

**Laundry/Dry Cleaning Plant, New York, NY**

Dr. Rudko has been managing the assessment and cleanup of the only listed hazardous waste site in Manhattan, **a** former laundry/dry cleaning plant on Fifth Avenue in Harlem. Remediation has included the removal of contaminated building materials and operation of an innovative sub-slab vapor extraction system. Installation of this system required the development of special techniques for horizontal drilling under the floor of the building.

**Jamaica Water Company, Queens, NY**

For the New York City Department of Environmental Protection, Dr. Rudko directed fast-track site assessments of 17 properties acquired from the Jamaica Water Company. The assessments, all of which were completed within 2 months, included soil and groundwater testing, asbestos and lead paint surveys, and testing of buildings for mercury contamination.

**Columbia University Properties, New York, NY**

Dr. Rudko has directed site assessments on many properties being acquired by Columbia University. He managed Phase I, Phase II and remediation work on an old garage at a location on Broadway where Columbia developed a new dormitory. He has managed Phase I site assessments on over twenty properties in the area of Manhattanville where the University is developing a new campus.

**Home Depot, Various Locations, NY**

Dr. Rudko has been providing environmental consulting services to Home Depot, Inc. in connection with their development of major retail facilities at locations throughout the New York metropolitan area. Many of these locations are former industrial properties that have required remedial actions prior to redevelopment.

**New York Times, New York, NY**

He directed Phase I and Phase II assessments for the New York Times in preparation for the development of its major new printing facility in New York City. Assessments were prepared for three alternative sites: a former railyard in the Bronx later used as an illegal landfill for demolition debris; a site in Queens comprising six industrial properties, several with multiple tenants; and a large city-owned site in Queens.

## Medical Facilities

**Medical Care Facilities Finance Agency (MCFFA), New York, NY**

Dr. Rudko directed Phase I environmental assessments of several major medical facilities in connection with new financing through bonds issued by MCFFA. Facilities include Presbyterian Hospital, Mt. Sinai Medical Center, St. Lukes/Roosevelt Hospital Center, Brooklyn Hospital, and Syosset Hospital. The firm performed preliminary investigations, including Phase I site assessments, and Phase II assessments if necessary. The firm identified potential environmental liabilities and suggested remediation. For example, for the New York Presbyterian Hospital, AKRF identified several underground tanks remaining on the site, then designed and implemented a remediation plan. For the Syosset Hospital on Long Island, AKRF identified floor drains in basement areas that discharged into old dry wells as a potential environmental liability.

**Audubon Research Park, New York, NY**

Dr. Rudko directed the hazardous materials assessment for the EIS for a 5.5-acre development that includes the Mary Woodard Lasker Biomedical Research Building, which houses the Audubon Business and Technology Center, and the Russ Berrie Medical Science Pavilion. The Berrie Pavilion houses a community health facility, a comprehensive diabetes center, genetics research and a research program in pediatrics. The Irving Center will house research on cancer, genetics, and cell biology. Dr. Rudko led the analysis of medical waste disposal procedures and potential health concerns associated with chemicals used in the proposed research laboratories.

**Memorial Sloan-Kettering Cancer Center (MSKCC), New York, NY**

AKRF prepared a comprehensive EIS for the expansion of MSKCC, a state-of-the-art cancer treatment and research center located on the Upper East Side in Manhattan. Dr. Rudko directed the hazardous materials study, which included analyses of radioactive and toxic materials used in the cancer research and treatment facility

**Mount Sinai School of Medicine, New York, NY**

Dr. Rudko directed a hazardous materials assessment in connection with the EIS for a multi-use building for the Mount Sinai School of Medicine. The site, formerly used for parking, is on the east side of Madison Avenue between 98th and 99th Streets opposite the main portion of the Mount Sinai Medical Center. The 740,000-gross-square-foot structure will contain research labs, clinical labs, psychiatric care beds, administrative offices, an auditorium, a seminar room, a cafeteria, faculty offices, a vivarium, and approximately 300 accessory parking spaces.

**Columbia University Center for Engineering and Physical Science Research, New York, NY**

Dr. Rudko directed the preparation of an EIS for Columbia University's Center for Engineering and Physical Science Research, located on the south side of 120th Street in Manhattan. The project serves as a center for university, government, and industry partnership in high-technology research. The approximately 200,000-square-foot building contains an auditorium, seminar rooms, laboratories, and offices for research activities in four general areas: telecommunications, microelectronics and electronic materials, intelligent systems and robotics, and parallel and distributed computer systems. In addition, a new central boiler facility and power plant for the campus are located in the lower level of the new building.

**The Rockefeller University, New York, NY**

Dr. Rudko led the analysis of hazardous materials for an Environmental Assessment Statement (EAS) and supplemental studies in connection with a new laboratory building. The proposed building would include approximately chemistry and biomedical research laboratories, an auditorium, office and meeting space, underground parking for approximately 180 cars, a glass wash facility, and truck loading and receiving space. Significant issues for environmental review included hazardous materials and air quality, including the potential effects of a spill within a laboratory on pollutant levels at adjacent buildings and receptor locations.

## ROBIN L. HUGHES

### ENVIRONMENTAL SCIENTIST

Mrs. Hughes is an Environmental Consultant with seven years experience in site investigations, remediation, groundwater modeling and litigation support. She has performed Phase I environmental site assessments, transaction screens, Phase II subsurface investigations, and Brownfield remediation oversight for a variety of projects in New York City. General project management experience includes report writing, preparation of proposals, work plan development and implementation, data interpretation, and project coordination with state and local authorities, developers, and contractors. Her project involvement includes many aspects of soil, groundwater and soil vapor investigations and remediation. She has managed field work coordination of soil boring and monitoring well installation, and soil, groundwater and soil vapor sampling. Mrs. Hughes has provided project management support for Brownfield remediation projects and performed construction remediation oversight. She has generated technical specifications for bidding process, including AutoCAD drawings and has provided cost analyses and proposals.

Prior to joining AKRF, Mrs. Hughes most recently worked for a multidisciplinary engineering and environmental firm in New York City as an Environmental Engineer, and prior to that, she provided litigation support including groundwater modeling services for an environmental consulting firm in Princeton, New Jersey.

### BACKGROUND

**Education**

M.S., Applied Environmental Geoscience, Eberhard Karls University – Tuebingen, Germany, 2001

Vordiplom (B.S.-equivalent), Geology, Eberhard Karls University – Tuebingen, Germany, 1998

**Certifications**

Asbestos Inspector (New York State), July 12, 2006

8-Hour HAZWOPER Refresher, August 18, 2006

40-Hour Health & Safety for Hazardous Waste Operations and Emergency Response, July 12, 2004

American Red Cross First Aid, December 16, 2004

**Years of Experience**

Year started in company: 2006

Year started in industry: 2002 (full-time), 1998 (part-time)

### RELEVANT EXPERIENCE

**Phase I ESA, American Wing Courtyard – Metropolitan Museum of Art, Manhattan, NY**

Mrs. Hughes conducted a Phase I Environmental Site Assessment (ESA) for the American Wing Courtyard at the Metropolitan Museum of Art located in the Upper East Side neighborhood of Manhattan. The proposed project entailed excavation below a portion of and adjacent to the existing American Wing Courtyard to capture approximately 10,000 square feet of new space, which would be developed and used for internal Museum needs. The Phase I ESAs included the findings of a site inspection, an evaluation of available historical information, and the interpretation of relevant federal and state environmental databases. Mrs. Hughes also completed hazardous materials assessments by reviewing previous environmental reports to identify potential areas of concern that could pose a hazard to workers and others and/or the environment during or after development of a proposed project.

**Phase I ESAs, Jamaica Transportation Center, Queens, NY**

The Greater Jamaica Development Corporation was proposing a number of transportation improvement projects centered on the Long Island Rail Road Jamaica Station in Downtown Jamaica. Mrs. Huges performed a Phase I ESA of the area of the Atlantic Avenue Extension and Station Plaza located in the Jamaica neighborhood of Queens. The ESA included the findings of a site inspection, an evaluation of available historical information, and the interpretation of relevant federal and state environmental databases.

**Phase I ESA, Charleston Bus Annex, Staten Island, NY**

Mrs. Hughes performed a Phase I ESA for a proposed 3,000-foot long storm sewer route leading from the proposed Charleston Bus Annex to the Arthur Kill in the Charleston neighborhood of Staten Island. The ESA included the findings of a site inspection, an evaluation of available historical information, and the interpretation of relevant federal and state environmental databases.

**Phase I ESA, 637-349 West 125th Street, Manhattan, NY**

As part of the Columbia University project, Mrs. Hughes performed a Phase I ESA for a four-story building occupied by a health care facility. Light industrial and commercial properties including gasoline stations, auto repair shops, garages, and a car wash were present in the surrounding neighborhood. The ESA included the findings of a site inspection, an evaluation of available historical information, and the interpretation of relevant federal and state environmental databases.

**Transaction Screen, 40 Wall Street, Manhattan, NY**

Mrs. Hughes completed a Transaction Screen summarizing the investigation of the 19th, 20th, and 21st floors of the property located at 40 Wall Street in Manhattan. The building is a 70-story high-rise located on the north side of Wall Street. The building was first known as Bank of Manhattan Trust Building and is now also known as the Trump Building. In 1998, the building was designated a historic landmark by the New York Landmarks Preservation Commission. The Transaction Screens included an inspection of the property, a review of historical land use maps, and an evaluation of available regulatory databases, and the completion of a transaction screen questionnaire by the owner/occupants to evaluate the presence of potential environmental hazards, if any, associated with the current uses of the property.

**Transaction Screen, 1700 & 1755 Broadway, Manhattan, NY**

Mrs. Hughes completed a Transaction Screen report summarizing the investigation of the 20th, 28th, 29th, 30th, 36th, 37th, 38th, and 42nd floors of the property located 1700 Broadway and the second floor of the property located at 1755 Broadway in Manhattan, New York. The Transaction Screen included an inspection of the property, a review of historical land use maps, an evaluation of available regulatory databases, and the completion of a transaction screen questionnaire by the owner/occupants to evaluate the presence of potential environmental hazards, if any, associated with the current uses of the property.

**<u>Subsurface Investigations</u>**

**Soil Gas Survey, 37 Bridge Street, Brooklyn, NY**

Mrs. Hughes performed a soil gas survey of a former industrial building proposed to be renovated for residential use. The survey assessed the potential of vapor intrusion through the basement slab and exposure during and after construction.

**Soil Gas Survey, 98-26 Jamaica Avenue, Queens, NY**

Mrs. Hughes performed a soil gas survey of an approximately 65,000 square-foot building operating as a manufacturer of plastic items. The investigation was designed to test for soil vapors beneath the former metal manufacturing portion of the site and former gasoline tanks.

**Underground Storage Tank Removal, 26th Ward Waste Water Treatment Plant, Brooklyn, NY**

Mrs. Hughes conducted underground storage tank removal oversight at the NYCDEP 26th Ward Water Pollution Control Plant.

**Quarterly Monitoring Well Sampling, Home Depot-Rego Park, Queens, NY**

Mrs. Hughes performed quarterly low-flow groundwater sampling.

**Soil and Groundwater Sampling, 1425 Bruckner Avenue, Bronx, NY**

Mrs. Hughes completed geoprobe soil borings and collected soil and groundwater samples.

**Soil and Groundwater Sampling, Hempstead Avenue, Hempstead, NY**

Mrs. Hughes completed geoprobe soil borings and collected soil and groundwater samples.

**Soil Boring and Well Installation, Flushing, Queens, NY**

Mrs. Hughes completed hollow stem auger soil borings and installed monitoring wells.

**Soil Boring and Well Installation, 141st Street and Fifth Avenue, Manhattan, NY**

Mrs. Hughes completed hollow stem auger soil borings and installed monitoring wells.

**Soil Remediation, 40 Marbledale Road, Tuckahoe, NY**

Mrs. Hughes performed soil remediation oversight during construction.

**Landfill Remediation, Lindenwood, Queens, NY**

Mrs. Hughes performed remediation oversight of a landfill.

**Dry Well Remediation, Roosevelt School, Roosevelt, NY**

Mrs. Hughes performed remediation oversight of a dry well during construction.

**Bronx Terminal Market, Bronx, NY**

While at another firm, Mrs. Hughes provided project management support for Brownfield's remediation of a 30-acre commercial redevelopment site in the Bronx. She performed data analysis and generated work plans in compliance with regulatory requirements, performed cost analysis of remediation designs, and generated specifications for bidding process.

**Jacob Javits Convention Center, New York, NY**

While at another firm, Mrs. Hughes managed field work coordination of a Phase II Site Investigation of a 1.75-million square foot commercial expansion development in Manhattan, expanding over seven city blocks. She was responsible for the implementation of the boring, monitoring well and soil gas program, client and contractor interactions, report generation and data analysis.

**New York Jets Stadium, New York, NY**

Prior to joining AKRF, Mrs. Hughes performed subsurface investigations for the Brownfield's remediation of a proposed $1.2 billion development site in Manhattan. She directed field activities including boring and monitoring well installations, soil, groundwater and soil gas sampling, and evaluated sampling data with respect to applicable standards.

**One Hanson Place, Brooklyn, NY**

Prior to joining AKRF, Mrs. Hughes performed a site inspection of the landmark Williamsburg Savings Bank Building located at One Hanson Place in Brooklyn. The building is the tallest in Brooklyn and will be converted into a $165 million luxury condominium development. Mrs. Hughes generated specifications for the bidding process, including detailed AutoCAD drawings and performed cost analysis for the remediation of the mercury-containing spaces.

**Duane Street, New York, NY**

While at another firm, Mrs. Hughes performed a site inspection, generated specifications for the bidding process, including detailed AutoCAD drawings and performed cost analysis for the remediation of mercury-containing spaces in the Tribeca Neighborhood.

**Additional Project Work and Skills**

**Site Investigation and Remediation**

Mrs. Hughes performed soil excavation and UST removal inspection, implemented Community Air Monitoring Programs, monitored pile load tests and implemented horizontal drilling program to investigate an existing retaining wall. She prepared proposals, performed cost analysis, generated Brownfield Cleanup Program applications, work plans and subsurface investigation and closure reports.

**Litigation Support**

Mrs. Hughes provided technical support in one of the nation's largest natural resource damage claims involving ground water contamination and water supply issues in a southwestern valley-fill aquifer system. She was responsible for review of flow and transport models, data analysis, and report generation. Mrs. Hughes assessed ground water models in a CERCLA cost recovery case involving subsurface contamination related to chlorinated solvent release from commercial facility. She participated in toxic tort litigation involving potential residential exposure to chemicals emitted from industrial sites and in insurance cost recovery cases involving cost factor analysis, data and document review.

**Numerical and Analytical Modeling**

Mrs. Hughes created numerical and analytical models for environmental analyses of ground water flow and contaminant transport. She identified source and extent of contamination, possible receptors, estimated plume arrival and cleanup times, and specified location and design of remedial systems. She developed an automatic modeling tool for the efficiency-analysis and optimization of reactive barrier systems for ground water remediation and developed applications using modeling software tools such as Groundwater Vistas, GMS, Visual and Processing MODFLOW.

**Computer and Database Skills**

Mrs. Hughes used Crystal Ball, Microsoft Excel, Access, and Visio to support reporting needs. She developed applications in C and Java and designed 2D and 3D data visualization programs, including AutoCAD, EVS, Surfer, Manifold, Global Mapper and ArcView GIS. Mrs. Hughes designed graphic applications using Dreamweaver, Flash, Adobe Photoshop, Adobe Illustrator, Freehand and Coreldraw.

## MARCUS SIMONS

### SENIOR VICE PRESIDENT

**Short Introduction**

Marcus Simons is a senior vice president of AKRF with more than 18 years of environmental consulting experience. Mr. Simons manages much of the environmental due diligence activity at AKRF (most recently managing environmental due diligence on Tishman/Blackrock's Peter Cooper/Stuyvesant Town acquisition, reportedly the largest real estate transaction in US history), including supervising the preparation of Phase I and Phase II environmental site assessments, as well as more complex multi-site and litigation-related projects. Mr. Simons also manages the preparation of the hazardous materials portions of AKRF's environmental impact studies. His specialty is the assessment and cleanup of contaminated sites, including federal and state superfund sites, brownfield sites, Resource Conservation and Recovery Act (RCRA) and Toxic Substances Control Act (TSCA) sites, and petroleum spill sites. His expertise includes health risk and exposure assessment, development of sampling plans, economic evaluations of remedial alternatives, and regulatory analysis. He also has extensive experience in statistics, selection of sites for controversial facilities, and federal and state wetland regulations and waterfront permitting. In addition to analytical work, Mr. Simons has considerable experience presenting results to regulatory agencies and the general public.

**General Introduction**

Marcus Simons is a senior vice president of AKRF with more than 18 years of experience in environmental consulting. He specializes in the assessment and cleanup of contaminated sites, including federal and state superfund, RCRA, TSCA, brownfield, voluntary cleanup and spill sites. His expertise includes health risk assessment, development of sampling plans, economic evaluations of remedial alternatives, and regulatory analysis. He also has extensive experience in statistics, selection of sites for controversial facilities, and federal and state wetland regulations and waterfront permitting. In addition to analytical work, Mr. Simons has considerable experience in presenting results to regulatory agencies and the general public.

Mr. Simons manages much of the environmental due diligence activity at AKRF (most recently managing environmental due diligence on Tishman/Blackrock's Peter Cooper/Stuyvesant Town acquisition, reportedly the largest real estate transaction in US history), including supervising preparation of numerous Phase I and Phase II Environmental Site Assessments, as well as more complex multi-site and litigation-related projects. Mr. Simons also manages preparation of the contaminated-materials portions of AKRF's Environmental Impact Statements and Environmental Assessments. He also has extensive experience in statistics, selection of sites for controversial facilities, and federal and state wetland regulations and waterfront permitting. In addition to analytical work, Mr. Simons has considerable experience in presenting results to regulatory agencies and the general public.

Mr. Simons has managed some of the most complex cleanup sites in New York State including: the recently completed cleanup of a 12-acre PCB-contaminated former utility property in Flushing, Queens where a 3 million square foot retail/residential building will be constructed; cleanup of the nation's largest former dental factory in Staten Island for reuse as single family housing; the investigation of several former manufactured gas plants; and the investigation and remediation associated with the reconstruction of the West Side Highway and Hudson River Park in Manhattan (from the Battery to 59$^{th}$ Street). These projects involved extensive multi-year negotiations with federal, state and city regulatory agencies. Mr. Simons has experience with federal and state superfund programs, state brownfield and voluntary cleanup programs, spill programs and investigation/cleanup under New York SEQRA/CEQR and NYCDEP E-designation programs.

Mr. Simons also has extensive experience in the evaluation of contaminated materials issues for environmental assessments (EAs) and environmental impact statements (EISs) under NEPA, SEQRA and CEQR, including transportation projects (Second Avenue Subway, MTA/LIRR East Side Access, Cross Harbor Freight Movement

Study, Route 9A Reconstruction), large-scale rezoning projects (Long Island City, Downtown Brooklyn, Jamaica) and public and private redevelopment work (Times Square, School Construction Authority, Queens West)

Before joining AKRF, Mr. Simons worked for Woodward Clyde Consultants (now URS Corporation) in Wayne, New Jersey, where he was responsible for risk assessment, environmental impact analysis, and regulatory analysis for both public and private clients. His responsibilities included projects primarily located in New York and New Jersey. His risk assessment work included a study for the decommissioning and cleanup of a Canadian elemental phosphorus production facility (the first such plant in the world to be systematically decommissioned).

### New Jersey Introduction

Marcus Simons is a senior vice president of AKRF with more than 18 years of experience in environmental analysis and management. Mr. Simons' particular expertise is in human health risk assessment related to hazardous materials at contaminated sites, statistical development of remedial investigation and feasibility study sampling plans, selection of sites for controversial facilities, economic analyses of remedial alternatives, and regulatory analysis.

Mr. Simons' experience includes management of hazardous and radioactive waste management alternatives for a new treatment, storage, and disposal facility at Rutgers University, New Jersey. This project included technical and regulatory analysis, preparation of reports, and presentation of materials to both the university committee and the local community at public meetings. Mr. Simons was also responsible for development of site-specific cleanup levels at several New Jersey former manufactured-gas facilities for PSEG; preparation of post-remediation financial liability estimates for a Potentially Responsible Party-group at a highly contaminated Superfund landfill in New Jersey; and estimation of transportation risks involved in road, rail, and barge shipments of hazardous waste as part of a cost/benefit analysis for a New Jersey public utility deciding where to locate thermal desorption plants for treating hydrocarbon-contaminated soils from multiple former manufactured-gas plant sites.

In addition to analytical work, Mr. Simons has considerable experience in presenting results to a broad range of audiences, including regulatory agencies and the general public. He has prepared and presented testimony to the New Jersey Department of Environmental Protection (NJDEP) concerning proposed New Jersey risk-based cleanup standards on behalf of PSEG.

Before joining AKRF, Mr. Simons was with Woodward Clyde Consultants (now URS Corporation) in Wayne, New Jersey, where he was responsible for risk assessment, environmental impact analysis, and regulatory analysis for both public and private clients. His responsibilities included projects primarily located in New York and New Jersey.

## BACKGROUND

### Education

M.A. and B.A. (Honors), Engineering/Management Science, Cambridge University, England, 1986

M.S., Engineering and Public Policy, Carnegie-Mellon University, 1988

### Years of Experience

Year started in company: 1995

Year started in industry: 1988

## RELEVANT EXPERIENCE

**CE Flushing Site, Flushing, NY**

Mr. Simons directed the remediation of a former industrial site in Flushing, Queens, NY prior to redevelopment of the property as a 3 million square foot retail/residential complex. The property was cleaned up under the NYS Department of Environmental Conservation Brownfield Cleanup Program. The remedial measures included the removal of aboveground and underground storage tanks, excavation and off-site disposal of TSCA, RCRA and non-hazardous wastes, NAPL removal, and removal and investigation of on-site drainage structures.

**Peter Cooper Village/Stuyvesant Town, New York, NY**

Mr. Simons directed the purchaser's environmental due diligence efforts for the bidding and subsequent acquisition of this 80-acre property in Manhattan. Much of the 110-building complex is underlain by former manufactured gas plants and Con Edison entered the site into NYSDEC's Voluntary Cleanup Program. Going forward Mr. Simons will manage oversight of activities that involve disturbance of MGP-contaminated soils, as well as future testing and potentially remediation.

**MTA New York City Transit Manhattan East Side Transit Alternative (MESA)/Second Avenue Subway, New York, NY**

Mr. Simons directed the contaminated material assessment for this multi-billion dollar transit initiative that would provide subway service to Manhattan's East Side. The assessment identified several hundred facilities along the alignment that could have impacted soil and/or groundwater and could require special materials handling and enhanced health and safety procedures. Additional evaluation of these sites is underway.

**Ferry Point Park, Bronx, NY**

Mr. Simons developed the material acceptance criteria (soil standards for capping materials) for the development of Ferry Point Park (including a golf course) in the Bronx. The New York City Department of Environmental Protection DEP and the New York State Departments of Health (DOH) and Environmental Conservation (DEC) agreed for the first time to relax their strict (TAGM 4046) criteria for clean soil, based on statistical analyses of background conditions and risk-based modeling.

**Prince's Point, Staten Island, NY**

Mr. Simons managed the complex cleanup (including the relocation of a contaminated tidal creek) of the nation's largest former dental factory site on Staten Island's waterfront. The site was on the State Superfund list. The future use of the site as single-family residential property entailed extensive negotiations with DEC and DOH.

**Flushing Waterfront Development, Queens, NY**

Mr. Simons managed the investigation and remediation of a 12-acre parcel of former utility property on the Flushing River which is PCB-contaminated from former transformer repair facilities. The site was remediated under the State Brownfield Cleanup Program. Construction is now underway for a large shopping center with residential towers.

**Route 9A Reconstruction, New York, NY**

AKRF directed extensive studies for the reconstruction in Lower Manhattan proposed by the New York State Department of Transportation (NYSDOT) in cooperation with the Federal Highway Administration (FHWA). The project is arguably the most complex environmental analyses performed for a federally funded transportation project in New York City in the last 10 years. The firm was responsible for all environmental tasks as well as the preparation for the Draft, Supplementary, and Final Environmental Impact Statements (EISs) and Section 4(f) Evaluation for this 5-mile $250 million reconstruction of Route 9A as part of the recovery effort following the events of September 11th, 2001. Mr. Simons managed the extensive hazardous materials investigations and prepared the contract specifications for contaminated soil and tank removal, including Health and Safety oversight.

**Hudson River Park, New York, NY**

Mr. Simons is managing hazardous materials issues for the ongoing Hudson River Park construction, located adjacent to the Route 9A roadway. Construction is ongoing and Mr. Simons directs health and safety oversight and remediation during construction.

**Long Island City Rezoning, Queens, NY**

As part of the preparation of an Environmental Impact Statement for NYC Department of City Planning, Mr. Simons managed the hazardous materials assessment of a multi-block industrial area. In addition to conducting the assessment Mr. Simons made recommendation as to the properties where "E-Designations" (city-recorded institutional controls on future development) should be placed.

**Outlet City, Long Island City, Queens, NY**

In Long Island City, Mr. Simons is managing the investigation and remediation of an old factory complex where large volumes of creosote were spilled. The investigations and interim remedial measures (IRMs) are taking place under the state's Voluntary Cleanup Program (VCP).

**MTA/LIRR East Side Access Project, New York, NY**

Mr. Simons managed the hazardous materials investigations for multiple sites in the Bronx, Manhattan, and Queens associated with the Environmental Impact Statement (EIS) for the Long Island Rail Road connection to Grand Central Terminal.

**Pelham Plaza Shopping Center, Pelham Manor, Bronx, NY**

Mr. Simons was responsible for the investigation of a former Con Edison manufactured gas facility on the Hutchinson River on the border between Westchester County and the Bronx. He oversaw the complex investigation of the existing shopping center at the site, and proposed a remediation approach to allow the expansion of the shopping center.

**New York City Department of Transportation, Lead Paint Removal and Disposal on Bridges Project, New York, NY**

Mr. Simons conducted a regulatory analysis of related to the removal of lead paint from nearly 800 bridges. This analysis included an evaluation of the regulatory compliance of various proposed procedures with federal and state hazardous and solid waste management requirements.

**American Felt and Filter Company, New Windsor, NY**

Mr. Simons prepared a Remedial Investigation (including exposure assessment) and Feasibility Study for the country's oldest active felt manufacturing facility, located in Orange County. This solvent-contaminated site is on the State Superfund List.

**Yonkers Waterfront Revitalization Project, Yonkers, NY**

Mr. Simons prepared an exposure assessment for the multi-use Yonkers Waterfront Redevelopment project, which is being funded through the State's Brownfields initiative.