VOLUNTARY REMEDIATION PROGRAM

FINAL COMPLIANCE STATUS REPORT

FORMER IMPERIAL CLEANERS
1233B ALPHARETTA HIGHWAY
ROSWELL, FULTON COUNTY, GEORGIA
HSI SITE NO. 10690

Prepared for Submission to:

Georgia Environmental Protection Division
Hazardous Waste Management Branch
Suite 1066, East Tower
2 Martin Luther King Jr. Drive
Atlanta, Georgia 30334

Prepared by:

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Highway
Atlanta, Georgia 30324
(404) 873-4761

November 12, 2015

Amec Foster Wheeler Project No. 6305-05-0319

November 12, 2015

Mr. Terry Allison
Department of Natural Resources
Environmental Protection Division
Hazardous Sites Response Program
Suite 1462 East Tower
205 Butler Street, S.E.
Atlanta, Georgia 30334

Subject: **Voluntary Remediation Program**
Final Compliance Status Report
Former Imperial Cleaners Site
1233B Alpharetta Highway
Roswell, Fulton County, Georgia
HSI Site No. 10690

Dear Mr. Allison:

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) respectfully submits this Compliance Status Report (CSR) for HSI Site No. 10690 (site) on behalf of the responsible party, PM Ltd.

This Final CSR is submitted under the Voluntary Remediation Program and demonstrates that: (1) Parcel 1 of the site is currently in compliance with Type 1 risk reduction criteria for all constituents in soil and groundwater (2) Parcel 2 of the site is in compliance with Type 5 risk reduction for all constituents in soil and groundwater. On this basis, PM Ltd. requests that the site be delisted from the Hazardous Site Inventory.

Please contact us if further information or clarification is necessary.

Sincerely,
Amec Foster Wheeler Environment & Infrastructure, Inc.

Stephen R. Foley, P.G.
Senior Geologist

Charles T. Ferry, P.E.
Senior Principal Engineer

cc. Ms. Nancy Shannon – PM, Ltd.
Ms. Joan Sasine – Bryan Cave
Ms. Karen Crawford – Nelson Mullins

Amec Foster Wheeler Environment & Infrastructure, Inc.
2677 Buford Highway, Atlanta, Georgia 30324
Tel: (404) 873 4761
Fax: (404) 817 0183
www.amecfw.com

CERTIFICATION STATEMENT

I certify under penalty of law that this report and all attachments were prepared under my direction in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Based on my review of the findings of this report with respect to the Rules for Hazardous Site Response, Rule 391-3-19-.07, I have determined that: (1) Parcel 1 of the site is currently in compliance with Type 1 risk reduction criteria for all constituents in soil and groundwater (2) Parcel 2 of the site is in compliance with Type 5 risk reduction for all constituents in soil and groundwater.

PM, Ltd.

Joan Sasine

By Ms. Joan Sasine
Attorney for PM, Ltd.

11/11/15

Date

GROUNDWATER SCIENTIST STATEMENT

I certify that I am a qualified groundwater scientist who has received a baccalaureate or post-graduate degree in the natural sciences or engineering, and have sufficient training and experience in groundwater hydrology and related fields, as demonstrated by state registration and completion of accredited university courses, that enable me to make sound professional judgments regarding groundwater monitoring and contaminant fate and transport. I further certify that this report was prepared in conjunction with others working under my direction.

Mr. Stephen R. Foley, P.G.
Georgia Registration No. 1057

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1.0 INTRODUCTION

The former Imperial Cleaners was located at 1233B Alpharetta Highway in the northernmost tenant space of the former Kingscreek Shopping Center (Shopping Center) in the city limits of Roswell, Fulton County, Georgia. Refer to Figure 1 in Appendix B

Soil and groundwater impacts were discovered resulting in a Hazardous Site Inventory (HSI) listing in 2001. The HSI listing describes a 9.11-acre site within the Shopping Center that encompasses all of tax parcel 12-1993-0450-063-5. However, the release impacts tax parcels 12-1993-0450-063-5 and 12-1993-0450-062-7 as shown on Figure A-1 in Appendix A (the "subject site" or "site").

1.1 PROPERTY DESCRIPTION

The portion of the Shopping Center that encompassed the former cleaners and was enrolled in the Voluntary Remediation Program (VRP) as a 3.935-acre parcel. A Site and Vicinity Aerial Photograph (Figure 2) shows the Shopping Center property and the VRP Parcel boundary as described in the VRP Application.

The Shopping Center property was acquired from PM, Ltd. in January 2014 by the Fulton County Board of Education (BOE). PM Ltd. is a Georgia Limited Partnership with Wright Management, Inc. as its sole general partner. Partnership shares of PM Ltd. are held in trusts which are managed by SunTrust Bank as Trustee. These trusts were established under the will of William Wright for the benefit of his widow, his two children and their descendants. Title was held this way by PM Ltd. from 1986 until the Shopping Center was acquired by Fulton County in a condemnation action in 2014.

Fulton County BOE has demolished the Shopping Center and redeveloped a 14.359-acre property into the Esther Jackson Elementary School. The BOE subdivided its property to separate the area of soil and groundwater impacts from the school site into a 2.767-acre property ("Parcel 2") which was regraded as an undeveloped vacant lot. Parcel 2 is subsumed within the boundaries of the HSI site and the VRP property as shown on Figure 3. The remaining acreage comprising the listed HSI site is designated Parcel 1 in this Final CSR as shown on Figure 4.

Parcel 2 will be subject to activity and use limitations per an Environment Covenant to be filed by BOE. The covenant will include prohibitions on residential use and groundwater extraction and a

restriction that any structure built on Parcel 2 must be evaluated for vapor intrusion risk and, if warranted, constructed with a vapor mitigation system.

It is documented in this Final CSR that the 2.767-acre property (Parcel 2) encompasses all soil and groundwater impacts. A legal Description and Survey Plat (Figure A-2) for the VRP property, along with the Tax Map showing the various properties in relation to tax parcels 12-1993-0450-063-5 and 12-1993-0450-062-7 (Figure A-1), are provided in Appendix A

1.2 REGULATORY BACKGROUND

On January 5, 2001, the Georgia Environmental Protection Division (EPD) listed the site on the HSI due to the detection of tetrachloroethene (PCE) in soil and vinyl chloride (VC) in groundwater. PCE, cis-1,2-dichloroethene (cis-1,2-DCE) and trans-1,2-dichloroethene (trans-1,2-DCE) were also found in groundwater. From 2001 to 2010, PM, Ltd. submitted several documents to EPD presenting the results of various investigations to characterize the geologic and hydrogeologic conditions and to assess the presence, concentrations, and limits of releases of constituents to site soils, groundwater, surface water and air. These documents include a previous Compliance Status Report (CSR) and a Revised CSR, a Corrective Action Plan (CAP) for Groundwater with subsequent amendments and revisions and periodic groundwater monitoring reports prepared in accordance with the approved CAP.

On October 14, 2010, an application to the Georgia Voluntary Remediation Program (VRP) was submitted by Amec Foster Wheeler (through its predecessor AMEC Environment & Infrastructure, Inc.) on behalf of PM, Ltd. On November 10, 2011, EPD issued a letter accepting the property into the VRP. The approved plan included periodic groundwater monitoring along with computer modeling.

In association with the condemnation by the Fulton County BOE, a Monitoring and Maintenance (M&M) Plan was authorized by EPD in a letter dated February 5, 2014 as a replacement for the VRP semi-annual groundwater reports.

Fulton County BOE proceeded to redevelop Parcel 1 with a school building, surrounding paved parking and landscaped areas. Parcel 2 was graded and partially fenced. See Figure 5 for a recent photograph of Parcel 2.

This Final CSR summarizes assessment activities conducted at the site since it was listed on the HSI and documents compliance with regulatory standards under the VRP appropriate for delisting of the site from the HSI.

1.2.1 Pre-HSI Listing

Imperial Cleaners was a tenant dry cleaning business located in Suite B, at the northern end of the Shopping Center and operated on site between 1991 and 2000. Another dry cleaner at the same location operated on site as early as 1986. In 2000, the dry cleaner operations terminated at the Shopping Center and the dry cleaning machine and related equipment were removed from the building. The dry cleaner was the subject of two environmental assessments conducted by Boykin & Associates (Boykin) in March 1993 and Environmental Corporation of America (ECA) in June and July, 2000. The results of these assessments identified PCE and several of its breakdown products in soil and groundwater on site.

Based on the soil and groundwater testing results, on August 15, 2000, PM Ltd. notified the Georgia Environmental Protection Division (GA-EPD), pursuant to Hazardous Site Response Act (HSRA) requirements, of the presence of a release to soil and groundwater at the Shopping Center property.

1.2.2 Post-HSI Listing

The site was placed on the HSI on January 5, 2001 as a Class II site, designated as HSI Site Number 10690. Following the listing of the site on the HSI, Amec Foster Wheeler (through its predecessors LAW Engineering and Environmental Services, Inc. and MACTEC Engineering & Consulting, Inc.) conducted additional assessments to delineate the soil and groundwater contamination at the site. Groundwater sampling and testing was performed by Amec Foster Wheeler in 2001, 2002, 2005 and 2006.

Amec Foster Wheeler prepared a previous CSR for the subject site which was submitted to the GA-EPD on behalf of PM Ltd. on August 9, 2002. The previous CSR was revised on the basis of EPD comments in August 2005. The soil was certified in compliance with Type 4 risk reduction standards (RRS) in the previous CSR. EPD accepted the Type 4 soil RRS of 1,200 µg/kg in a letter dated June 26, 2009 (See Appendix G).

1.2.3 CAP Implementation

A Corrective Action Plan (CAP) and a Revised CAP were submitted in 2005 and 2006, respectively. A CAP for a program of monitored natural attenuation (MNA) was approved by EPD on January 11, 2007 to include quarterly groundwater monitoring events and semi-annual reports.

The approved CAP required monitoring on a quarterly basis in six wells (MW-2, MW-4, MW-5, MW-7, MW-11 and MW-12) and three surface water sampling locations (SW-1, SW-2 and SW-3) with the results reported to EPD semi-annually for a period of at least two years. The EPD later requested in a letter dated September 9, 2008 that the two deep wells on site (MW-3 and DW-1) also be included in the monitoring program.

On February 20, 2009 EPD issued a letter which requested more extensive soil delineation and assessment of groundwater conditions in the area beneath the building because it was suspected to be a potential source area.

In response to EPD's February 2009 letter, an Amendment to the Corrective Action Plan for Groundwater, dated March 20, 2009, was submitted which proposed additional soil and groundwater testing to be conducted within the former dry cleaner space following the tenant, Tuesday Morning, vacating the building. Deferment of the ninth quarterly monitoring event was also proposed until after the installation of the new wells. EPD approved the amendment in a letter dated June 26, 2009.

In August 2009, Amec Foster Wheeler installed nine soil test borings (SB-20 through SB-28) inside the vacated Tuesday Morning tenant space, three of which were converted to groundwater monitoring wells (MW-13 through MW-15). Soil testing from the borings identified concentrations of PCE which were consistent with previous findings and all results were below the established Type 4 RRS of 1,200 µg/kg. Groundwater testing from the three interior wells identified only very low concentrations of PCE and its breakdown products in one of the three wells. No VOCs were detected in MW-14, located upgradient of MW-7. Only very low VOC concentrations were detected in MW-13, upgradient of MW-2. The groundwater concentrations were significantly below those detected outside the building and were not indicative of an ongoing source of PCE contamination underneath the building. The results of this assessment were included in the Semi-Annual Groundwater Monitoring Report dated October 15, 2009.

Following its review of the report, EPD issued a letter dated February 15, 2010 which requested additional soil sampling and testing in the area outside the building, surrounding MW-7 where the

highest groundwater impacts had been consistently recorded. The purpose of this testing was to attempt to locate the source of the groundwater contamination in this area even though previous testing conducted in this area (1993, 2000 and 2001) had identified only low concentrations of PCE in soil. EPD also requested additional analysis of natural attenuation parameters in groundwater and predictive modeling of the groundwater plume. Soil testing from the borings identified concentrations of PCE which were consistent with previous findings and all below the established Type 4 RRS of 1,200 µg/kg.

1.2.4 VRP Implementation

Eight quarterly monitoring events in 2012 and 2013 were performed under the approved VRP scope which included the following activities:

1. Sampling and testing of shallow monitoring wells MW-2, MW-4R, MW-5, MW-7, MW-11R, MW-12, point of demonstration well MW-16, and deep wells MW-3 and DW-1.
2. Evaluation of natural attenuation parameters for use in groundwater fate and transport modeling.
3. Sampling and testing of surface water samples SW-1, SW-2 and SW-3 and stream flow gauging.
4. Fate and transport model calculations to point of demonstration well MW-16 and to Hog Wallow Creek.

Groundwater monitoring and fate and transport modeling results demonstrated that the migration of the contaminant plume will not occur beyond Hog Wallow Creek and will not result in an exceedance of Georgia in-stream water quality standards in the creek.

1.2.5 M&M Plan Implementation

Under the M&M Plan the following activities were approved:

1. Performance of three groundwater monitoring events in June 2014, December 2014 and June 2015.
2. Testing of five existing monitoring wells for the June 2014 and December 2014 events: DW-1, MW-2, MW-7, MW-4R and MW-11R.
3. Testing of all remaining wells for the June 2015 event: MW-4R, MW-5, and MW-12 (MW-11R was dry and all other wells had been destroyed during site redevelopment).
4. Testing of three surface water samples for the June 2015 event.
5. Preparation of an annual report for the 2014 events.
6. Preparation of a final CSR after the June 2015 event.

The approved M&M Plan has been fully implemented and this document represents the Final CSR for the site.

2.0 PURPOSE

This Final CSR has been prepared on behalf of PM, Ltd. for the former Imperial Cleaners site located in Roswell, Fulton County, Georgia. A Voluntary Investigation and Remediation Plan (VIRP) and VRP Application were submitted for this site on October 14, 2010 and EPD accepted the site into the VRP by letter dated November 10, 2011. Since that time, the VIRP was implemented and the work was summarized in semi-annual progress reports submitted to EPD from May 2012 through August 2013. A revised scope of work was implemented under an approved Monitoring and Maintenance (M&M) Plan and was completed as of the June 2015 sampling event. PM, Ltd. is submitting the required Final CSR documenting compliance with the provisions, purposes, standards, and policies of the VRP and certifying compliance with applicable cleanup standards.

3.0 DESCRIPTION OF THE RELEASE SOURCE

Results of soil and groundwater assessment activities indicate a release of a regulated substance in soil and groundwater, as defined by Rule 391-3-19-.02(2) of HSRA. This section of the Final CSR provides a description of the source of the release, as required by Rule 391-3-19-.06(3)(b)1 of HSRA. Note that much of the assessment work conducted at the site has been presented in a previous CSR dated August 9, 2002, a Revised CSR dated August 31, 2005, VRP Progress Reports submitted between May 2012 and August 2013 and an M&M Plan in June 2014.

3.1 SOURCE OF RELEASE

Information obtained to date and documented in subsequent sections of this report indicate the source of the release at the site is the dry cleaning business formerly located at the northern end of the Shopping Center building (Parcel 2). Between 1991 and 2000, this facility operated as Imperial Cleaners. We understand that another dry cleaner operated at this location as early as 1986; however, details are not available.

3.2 REGULATED SUBSTANCE RELEASED FROM THE SOURCE

The regulated substances identified in soil at the site are tetrachloroethene (CAS No. 127-18-4), trichloroethene (CAS No. 79-01-6), acetone (CAS No. 67-64-1) and toluene (CAS No. 108-88-3).

The regulated substances identified in groundwater at the site are tetrachloroethene (CAS No. 127-18-4), trichloroethene (CAS No. 79-01-6), 1,2-dichloroethene (CAS No. 253-32-3302), vinyl chloride (CAS No. 75-01-4) and toluene (CAS No. 108-88-3).

Chloroform was detected in MW-3 and MW-9, south and southwest of the former dry cleaner during Amec Foster Wheeler's 2001 assessment. The chloroform detected is believed to be related to a leaking water line located behind the Shopping Center building that was in the process of being replaced at the time. As such, chloroform is not a regulated substance associated with the release. No chloroform was detected in any well during subsequent sampling events.

3.3 CHRONOLOGY OF THE RELEASE

Specific information regarding the chronology of the release is not available. Dry cleaners were in operation at the subject site for approximately 15 years, from 1986 to 2000.

3.4 DESCRIPTION OF THE SOURCE

Based on the information obtained during the assessments at the Kingscreek Shopping Center, two potential source areas of soil contamination were identified: one area outside the back door of the facility (most likely related to a condensate discharge line) and another small area within the building in the vicinity of the former dry cleaning machine located in the rear portion of the former Imperial Cleaners tenant space. Other suspected source areas were not identified based on evidence of chemical handling, observed staining or soil testing results.

The source of groundwater contamination is thought to be the area of soil contamination located immediately outside the back door of the former Imperial Cleaners. Soil testing results obtained within the former dry cleaner indicated that PCE concentrations dropped to below laboratory detection levels above the water table in the area of the former dry cleaning machine (where elevated soil concentrations were detected) and significant groundwater impacts were not identified in three wells located within the former dry cleaner space. Significant PCE, TCE and DCE concentrations were detected in groundwater just outside the back door of the facility, adjacent to a condensate discharge line (MW-7 and nearby MW-2). The soil and groundwater sampling results are consistent with a possible discharge of PCE-contaminated water from the rear of the dry cleaner's space.

4.0 SITE SETTING

Understanding the site setting is important in evaluating the fate and transport of contaminants in the subsurface.

4.1 SITE SPECIFIC GEOLOGY

Subsurface conditions were characterized by a total of 16 groundwater monitoring wells, 16 direct-push borings, 12 mechanically augered soil test borings and 13 hand auger borings installed on the site during the course of the various assessments conducted by Boykin, ECA and Amec Foster Wheeler. During the installation of the hand auger and direct-push borings by Amec Foster Wheeler, continuous soil samples were obtained at two or four-foot intervals. During installation of Amec Foster Wheeler's drilled soil borings and monitoring wells, two-feet long soil samples were obtained at five-foot intervals using the standard penetration test and a split spoon sampling device.

The site is located in the Piedmont Geologic Region of the Appalachian Province in an area underlain by late Precambrian to early Paleozoic bedrock of the Powers Ferry Formation which is part of the Sandy Springs Group (McConnell and Abrams, 1984). The Powers Ferry Formation in the area of the site is mapped as consisting of gneiss, mica schist and amphibolite. The residual soils present in this geologic area have been formed by the in-place chemical and physical weathering of the parent rock types. Weathering is facilitated by fractures, joints, and by the presence of less resistant rock types. The typical residual soil profile consists of clayey soils near the ground surface, transitioning to sandy silts and silty sands that generally become harder with depth to the top of parent rock.

The subject site is located within a south-trending stream valley, typical of the surrounding area. This valley is occupied by Hog Wallow Creek which parallels the eastern boundary of the site.

The original topography of the site sloped east toward Hog Wallow Creek. During construction of the Shopping Center, the western portion of the site was cut into the slope and the eastern portion was filled to level the ground surface. The depth to bedrock and the thickness of the overlying material (either fill material, alluvial sediment or residual soil) varies significantly at the site, depending on the depth of fill and the proximity to the valley bottom. Refer to cross-section Figures 6 and 7 and boring logs in Appendix E. Rock is exposed within the creek bed of Hog Wallow Creek and was found at a maximum depth of approximately 37 feet in MW-3.

The soil test borings generally encountered a significant amount of fill soil which consisted of silty fine to medium sand with small rock fragments. Undisturbed virgin soils, including both alluvial sediments and residual soils, were encountered at depths ranging from less than one foot to 24 feet. The presence of fill behind (east of) the Shopping Center building is consistent with filling this area during site development, within the flood plain of Hog Wallow Creek located near the northeastern corner of the Shopping Center. MW-8, installed in the western portion of the Shopping Center, did not encounter fill material as this area of the site had been cut into the original ground slope. Immediately beyond the Shopping Center's rear driveway, the land surface dropped off sharply to Hog Wallow Creek or the creek's flood plain, accounting for a thin layer of alluvium encountered in several borings in the eastern portion of the site.

Partially weathered rock was encountered at depths ranging from 10 to 25 feet below ground surface in the area near the building. The partially weathered rock was generally characterized as silty fine to coarse sand which exhibited standard penetration resistances of greater than 100 blows per foot. Bedrock is distinguished from the overlying partially weathered rock by its greater density, generally resulting in hollow-stem auger refusal. The contact between the bedrock and the overlying partially weathered rock is gradational and was selected as the depth of auger refusal. The rock/partially weathered rock contact, as defined by auger refusal, was encountered in several borings installed by Amec Foster Wheeler at depths ranging up to 37 feet below ground surface. The depth to rock was shallowest along the creek and west of the building where cuts had been made in the original ground slope. Rock was deepest under part of the building and to the east where significant filling had occurred.

The rock/partially weathered rock contact occurred at the highest elevation in the northern portion of the site, near MW-6, and at the lowest elevation in the eastern portion of the site, in the vicinity of Hog Wallow Creek. The rock elevation data indicates a general downward sloping of the rock surface from west to east, toward the creek, paralleling the original topography. Rock outcroppings form the creek bottom along the stretch of creek behind the former dry cleaner space.

Rock core samples obtained from monitoring well MW-3 indicate that the underlying bedrock on site consists predominantly of interlayered muscovite-biotite gneiss and hornblende amphibolite (see Appendix E for well logs). The rock obtained from MW-3 tended to alternate between highly weathered amphibolite and lightly weathered gneiss. The rock core recovered during the initial ten-foot coring run consisted primarily of lightly to highly weathered gray, muscovite-

biotite gneiss which exhibited numerous fractures. However, the first core run exhibited a recovery of only 30%, indicating that much of the material was too highly weathered to remain intact. The pattern of weathering observed in MW-3 was also evident during the drilling of DW-1, MW-6, MW-7, MW-13, MW-14, MW-15 and MW-16 which were extended into rock using an air hammer. Although core samples were not obtained, substantial variations in the hardness of the rock were noted during air hammer advancement. MW-8 was terminated at auger refusal at a depth of 20 feet. Difficult drilling conditions were noted in the lower 10 feet of this boring as partially weathered rock alternated between thin layers of relatively hard material and thicker layers of softer, more highly weathered material.

Significant fracturing was noted in relatively shallow rock in MW-3. These fractures tended to be small in scale and their orientations were widely distributed. The relatively random distribution of fracture orientations indicates that numerous intersections of fracture planes are likely. The presence of a layer of highly weathered rock and large numbers of randomly oriented fractures with numerous intersections indicates that flow through the rock would likely replicate flow through a porous medium. Under such conditions, it is very unlikely that a preferred flow direction would be established as a result of the rock structure. Therefore, groundwater within the fractured rock is expected to flow in a direction similar to the groundwater above the top of rock.

Because original grain boundaries and pore-space relationships within the rocks of the Atlanta area have been altered through metamorphic recrystallization, the primary permeability of the local bedrock is very low. Groundwater flow through the bedrock aquifer occurs primarily through fractures in the bedrock. Groundwater recharge to fractured bedrock occurs primarily through seepage of precipitation through the overlying mantle of residual material. In parts of the site, the groundwater table lies beneath the top of rock, which could potentially alter groundwater flow patterns depending on fracture orientation. However, due to the highly fractured nature of the shallow rock, as observed in MW-3, groundwater flow is expected to follow a path similar to that within the soil overburden.

4.2 SITE SPECIFIC HYDROGEOLOGY

Hog Wallow Creek is a tributary of Big Creek, which is located approximately one mile south of the site. Big Creek enters the Chattahoochee River approximately two miles south of the subject site.

4.2.1 Hydraulic conductivity

As presented in the 2005 Revised CSR, slug tests were performed in three wells on site to evaluate hydraulic conductivity. The three wells were selected on the basis of the type of media in which they were screened. MW-3 was screened in rock, MW-8 was screened in residual soil/partially weathered rock and MW-9 was screened across the boundaries of fill, alluvium and residuum. The slug tests were performed by lowering a solid "slug" into each well and measuring the recovery rate of the water within the well (slug in). After the water level within the well had stabilized, the slug was removed and the recharge rate was measured (slug out). The hydraulic conductivities calculated from the slug test data are summarized in Table 2.

The slug test results indicate hydraulic conductivities at the site of $9x10^{-5}$ cm/sec in the fill/alluvial soil, 2 to $6x10^{-5}$ cm/sec in the residual soil and 20 to $30x10^{-5}$ cm/sec within the upper portion of the bedrock aquifer.

Based on the groundwater elevation data, the horizontal groundwater gradient within the shallow portion of the aquifer on site appears to be relatively consistent at approximately 4.0%. This value was utilized for the purpose of calculating the groundwater flow rate.

The hydraulic conductivity values obtained from the slug tests performed at the site are equivalent to approximately 0.06 to 0.58 ft/day. The deep well, MW-3, exhibited a somewhat higher hydraulic conductivity; however, the difference between this well and MW-8 was relatively minor (less than one order of magnitude). As it appears that the bulk of the groundwater contaminant plume occurs within the zone of fill soil behind the Shopping Center building, the slug-in hydraulic conductivity value measured for MW-9, which was screened primarily in fill and alluvium, was utilized in the calculation of groundwater flow velocity. This hydraulic conductivity (0.27 ft/day) is also between the values exhibited by the strata within the highest (rock) and lowest (residuum) values measured on site.

Effective porosity was assumed to be 15% (Applied Hydrology, C.W. Fetter, 1994). The formula used to calculate the groundwater flow rate is as follows (Applied Hydrology, C.W. Fetter, 1994):

$$\text{Velocity} = \frac{K\,i}{n_e}$$

where: K = hydraulic conductivity (feet per day) = 0.27 ft/day
i = hydraulic gradient (feet per foot) = 0.04 ft/ft
n_e = effective porosity (unitless) = 0.15

Based on the data input, an estimated groundwater velocity of 0.072 feet/day, or approximately 26 feet/year was calculated. We note, however, that PCE does not migrate at the same rate as groundwater and also is diluted as it migrates. This is evidenced by the substantial drop off in contaminant concentrations in wells located in the vicinity of Hog Wallow Creek, located approximately 100 feet from the suspected source area.

4.2.2 Vertical Hydraulic Gradient

The vertical hydraulic gradient at the site was calculated by comparing groundwater elevations within the deep well DW-1 and shallow well MW-7 located adjacent to one another near the building. Comparison of groundwater elevations from these two wells indicates an upward hydraulic gradient of approximately 0.30 ft/ft in June 2014. Such conditions are not unexpected in the vicinity of a surface water body such as Hog Wallow Creek, which is shown by the data to act as a groundwater discharge zone.

A stronger upward hydraulic gradient would be expected in the area closer to the creek as the creek acts as a local groundwater discharge area. The lack of a significant downward vertical hydraulic gradient reduces the chance for dissolved contamination to migrate downward through the water column or beyond the creek alignment. This effect is evidenced by the lack of significant levels of PCE or its breakdown constituents within the deep groundwater of MW-3 or DW-1 and the lack of contamination in MW-12 on the opposite side of the creek from the Shopping Center.

4.2.3 Groundwater flow Direction

The monitoring wells were surveyed to determine their elevations relative to the National Geodetic Vertical Datum (NGVD). During each groundwater monitoring event, the depth to groundwater from the top of each well casing was measured by Amec Foster Wheeler in all monitoring wells on site. The water level data for June 27, 2014, along with well construction data are tabulated in Table 1. The groundwater depths were used to develop the groundwater elevation contours presented on the attached potentiometric surface map (see Figure 7). This sampling event was the last to be conducted prior to the destruction of most of the wells on site during site redevelopment by Fulton County and the pattern is consistent with all other sampling events.

The groundwater elevations and the interpreted flow direction indicate that groundwater flow across the site is generally eastward across the portion of the Shopping Center property where

the dry cleaner was located. Although minor variations in depth to water and groundwater flow direction have been observed over time, groundwater flow has been consistently in an easterly direction toward Hog Wallow Creek. Groundwater in this region typically discharges into creeks or impoundments that lie in topographically low areas and is expected to discharge to Hog Wallow Creek located along the eastern boundary of the site. No other obvious variations in the local geologic conditions were identified which would be expected to cause changes in the groundwater flow direction in the area.

5.0 DELINEATION OF SOIL CONTAMINATION

Some of the data referenced in this Final CSR was obtained in the early stages of the assessment by Boykin during their March, 1993 assessment. Additional samples were collected in June and July, 2000 by ECA. Most of the soil samples referenced in this Final CSR were collected by Amec Foster Wheeler between May 2001 and March 2010. Refer to Figure 8 for boring locations and Table 3 for a summary of laboratory data, along with the following discussion.

5.1 ANALYTICAL PARAMETERS AND RATIONALE FOR SELECTION

The soil samples obtained in the initial stages of the assessment were analyzed for VOCs (SW-846 Test Method 8260B) based upon the presence of a dry cleaning facility located within the Kingscreek Shopping Center.

5.2 SAMPLING AND ANALYSIS PROCEDURES

5.2.1 Sampling Equipment and Collection Techniques

Soil samples from the auger drilled soil borings were collected using a steel split-spoon sampling device and the standard penetration test method. Samples from direct-push borings were collected by driving a steel tube, lined with a polyethylene sleeve, into the soil. The sleeve was then removed and the soil from the appropriate depth interval was collected. Soil samples from hand auger borings were collected using a stainless steel hand auger.

5.2.2 Soil Sample Handling and Preservation Techniques

Limited information is available regarding the sampling techniques employed during the Boykin and ECA assessments conducted in 1993 and 2000. The samples collected by Amec Foster Wheeler were removed from the sampling device and placed in clean sample containers supplied by the laboratory. Clean latex gloves were worn during all sampling activities and the gloves were then discarded. Following sample collection, the samples were maintained on ice in a cooler until they were transferred to the laboratory. Soil samples were collected in accordance with SW-846 Sampling Methods 5030 and 5035.

5.2.3 Equipment Decontamination Procedures

Soil sampling tools and equipment, including drill rigs, augers and split spoons were decontaminated by steam cleaning prior to beginning work on the site. During drilling operations, only clean augers were used in each borehole. Split spoons, Geoprobe sampling

tubes and hand augers were decontaminated prior to the collection of each soil sample using non-phosphate detergent, isopropyl alcohol and deionized water. During direct-push sampling, new polyethylene sleeves were used within the sampling tube for each sample collected. Clean latex gloves were used during the collection of all soil samples. Gloves were changed prior to the collection of each soil sample.

5.2.4 Chain-of-Custody Procedures

All samples collected by Amec Foster Wheeler were logged on a chain-of-custody form that was signed by Amec Foster Wheeler's field representative and the laboratory representative upon release of the samples to the laboratory. Copies of the chains-of-custody for the Boykin and ECA samples were not available.

5.2.5 Laboratory Analytical Procedures

5.2.5.1 Standard Analytical Methods

Following delivery to the laboratory, the soil samples were analyzed for VOCs using SW-846 Test Method 8260B.

5.2.5.2 Quality Assurance/Quality Control Procedures

Quality control samples were prepared and analyzed during the assessment. These included a duplicate soil sample, trip blanks, and a rinse blank. The trip blanks were provided by the laboratory and consisted of 40-ml vials filled with water. Results of the duplicate, rinse blank and trip blank analyses are included in the laboratory reports. Results of Surrogate analyses are also included in the laboratory reports. Backup QA/QC data for these samples are included in Appendix C. No irregularities were identified by the QA/QC sampling program.

5.3 BACKGROUND SOIL CONCENTRATIONS

Because the compounds detected in soil (PCE, TCE, acetone and toluene) are not naturally occurring substances, naturally occurring background conditions on the affected portion of the site were assumed to be below laboratory detection limits.

5.4 SUMMARY OF PERTINENT SOIL DATA

Since 2001, Amec Foster Wheeler has conducted extensive soil sampling and testing, both within and outside of the former dry cleaner space. The regulated substances identified in soil at the site are tetrachloroethene (CAS No. 127-18-4), trichloroethene (CAS No. 79-01-6), acetone (CAS No. 67-64-1) and toluene (CAS No. 108-88-3). As detailed in the Revised CSR,

based on the results of the soil sampling and testing conducted by Amec Foster Wheeler, delineation of the lateral and vertical extent of contamination has been completed. Laboratory results from all soil samples analyzed are summarized on Table 3.

Dry cleaners have reportedly operated on site from approximately 1986 until 2000. The former dry cleaner was the subject of two environmental assessments prior to Amec Foster Wheeler's involvement at the site in 2001. Amec Foster Wheeler conducted a series of investigations in 2001 and 2002, prior to the submission of the original CSR. Additional assessment has been conducted in response to comments received from the EPD. The results of all soil testing activities conducted on site are summarized in Table 3 and on Figure 8.

The first assessment was conducted by Boykin in March 1993 and included the installation of four hand auger borings outside the building (designated B-1 through B-4, see Figure 3 for locations). PCE was detected in each of these soil samples at concentrations ranging from 20 to 260 micrograms per kilogram (µg/kg). The highest concentrations were detected just outside the back door of the dry cleaner in boring B-1. Other VOCs were not detected in soil during this assessment.

In June and July, 2000 Environmental Corporation of America (ECA) performed additional environmental assessment at the site. This assessment was conducted at approximately the time that Imperial Cleaners was vacating the building. ECA installed a total of six soil test borings on the site (designated SB-1 through SB-6, see Figure 3 for locations). Borings SB-1 through SB-3 were drilled soil test borings located outside the building in the rear parking area and driveway of the Shopping Center. Borings SB-1 and SB-2 were intended to be converted to groundwater monitoring wells. However, SB-1 encountered refusal above the water table and was terminated. Boring SB-2, was advanced to below the groundwater table and converted to monitoring well MW-2. A shallow (1-foot deep) soil sample was collected from SB-3. ECA also installed three hand auger borings within the dry cleaner's space (SB-4 through SB-6) to assess shallow soil conditions in the immediate vicinity of the dry cleaning equipment. PCE concentrations were detected in shallow soils within the building, with the highest concentration at 7,700 µg/kg detected in SB-6, located immediately adjacent to the former dry cleaning machine.

The results of the first two sampling events indicated that a notifiable release to soil, as defined under HSRA had occurred at the site. A release to groundwater was also identified as

discussed in Section 6.0. On August 15, 2000, PM Ltd. submitted a release notification package to the Georgia EPD. On January 5, 2001, the site was listed on the Hazardous Site Inventory (HSI Site No. 10690) for releases to both soil and groundwater.

Following the site's listing on the HSI, Amec Foster Wheeler was requested by PM Ltd. to conduct additional assessment at the site prior to the renovation of the then vacant Imperial Cleaners tenant space. This work initially included the installation of five Geoprobe borings within the building to begin the soil contamination delineation process.

In May 2001, five direct-push probe soil borings (GP-1 through GP-5) were installed on the subject site to further assess the extent and concentration of soil contamination. One boring, GP-5, was located by the former dry cleaning machine, adjacent to ECA boring SB-6, which had previously exhibited the highest PCE concentrations. This boring was extended to probe refusal and sampled throughout to allow vertical profiling of the soil contamination in the suspected source area. The remaining borings were spaced just outside of this area.

Three additional soil test borings (MW-3, SB-7 and SB-8) were installed by Amec Foster Wheeler outside the building to further investigate the extent of soil contamination and attempt to identify the source of the groundwater contamination. MW-3 was located in the rear driveway of the Shopping Center, in an area interpreted to be downgradient of the former dry cleaner. This boring was converted to a deep groundwater monitoring well to attempt to provide vertical delineation of the extent of groundwater impact. Boring SB-7 was located just outside the rear door of the former dry cleaner in an area of stained and corroded pavement. This stained area was believed to be related to a condensate discharge line which exited the building at this location. This boring was intended to characterize the vertical distribution of soil contamination in this area and evaluate it as a possible source of groundwater contamination and was extended to auger refusal, which occurred several feet above the water table. Boring SB-8 was located in the grassy area northeast of the parking lot and was intended to provide lateral delineation of soil contamination in this area.

Soil samples were collected at five-foot intervals above the top of rock using a split-spoon sampling device and the standard penetration test method. One sample each from borings MW-3 and SB-8 were selected for laboratory testing. All of the samples collected from SB-7 were tested in order to characterize the vertical distribution of contamination within this boring as this area had been identified as a potential source area. With the exception of the uppermost sample, PCE was

detected throughout the depth of SB-7. VOCs were not detected in SB-8. Very low levels of PCE were detected in MW-3.

In March 2002, Amec Foster Wheeler installed a series of four additional soil test borings (MW-6, MW-8, MW-9 and MW-10) in an attempt to complete the lateral delineation of contamination at the site. These borings were then converted to groundwater monitoring wells. MW-6 was located in the parking area north of the former dry cleaner. MW-8 was located in the main Shopping Center parking lot, west of the former dry cleaner. MW-9 was located in the rear driveway of the Shopping Center and MW-10 was located along Hog Wallow Creek, east of the former dry cleaner, near the bottom of the fill slope.

MW-6, MW-8, and MW-9 were drilled using a truck-mounted drill rig and were extended to a depth approximately five feet below the water table. In the case of MW-6, an air hammer attachment was necessary to extend the boring below the top of rock. MW-8 was terminated at the top of rock. Soil samples were collected at five-foot intervals using a split-spoon sampler and the standard penetration test method. MW-10 was located adjacent to Hog Wallow Creek and was installed using a hand auger. The two-foot sample was collected as the only soil sample above the water table from this boring. The shallowest sample from each of these borings was selected for laboratory testing.

Following the receipt of the soil testing results from MW-6 through MW-10, Amec Foster Wheeler installed two additional hand auger borings to continue the lateral delineation of soil contamination. HA-1 and HA-2 were both installed along Hog Wallow Creek. HA-1 was located in the vicinity of MW-11, while HA-2 was located adjacent to MW-5. VOCs were not detected in either of the samples tested.

At the request of EPD, in July 2005 two additional soil delineation samples were collected along Hog Wallow Creek in the areas downgradient of Borings B-2 and B-4. HA-3 was located downgradient of B-2, while HA-4 was located downgradient of B-4. Chlorinated VOCs were not detected in either of the samples tested. However, acetone and toluene were detected in HA-3, located near the creek, downgradient of boring B-3.

No obvious source of either the acetone or toluene has been identified and neither compound had previously been detected in either soil or groundwater on site. Acetone is commonly detected as a false positive due to laboratory contamination. Laboratory representatives indicated that no evidence of laboratory induced contamination was evident and that the acetone detected

may be an artifact of the sample preservation method as sodium bisulfate has been shown to react with certain soils to produce acetone.

Toluene had not been previously detected in soil on site and does not appear to be related to the dry cleaner release. The extent of the toluene contamination has been delineated to the south, west and north by existing borings. Boring HA-3, in which the toluene was detected, was located near Hog Wallow Creek. The eastward extent of the toluene in soil is limited by the creek, as the creek bottom is the top of rock in this area.

Between January 2006 and August 2009, eight probe borings (SB-10 through SB-17) and nine auger drilled soil test borings (SB-20 through SB-28) were installed inside the building. The purpose of these borings was to further attempt to identify the source of the release or any remaining source materials. The borings were extended to probe or auger refusal. Three of the auger borings were then extended into rock and converted to monitoring wells as discussed in Section 6.3.

PCE was the only chlorinated VOC detected in the 36 soil samples tested during these two phases of the assessment. No other degradation products of PCE were detected in soil. These findings were generally consistent with previous soil testing results obtained from the site. The highest PCE concentrations were detected in the western portion of the former dry cleaner space. None of the soil samples tested exhibited PCE concentrations in excess of the site-specific Type 4 RRS of 1,200 µg/kg approved for the site in associated with the 2005 Revised CSR. Acetone was the only other constituent detected, at concentrations below its approved RRS. As discussed in Section 3.3. Groundwater testing conducted within the building had failed to identify higher groundwater impacts upgradient of MW-2 and MW-7.

At EPD's request, in March 2010, six more soil test borings (SB-29 through SB-34) were installed around MW-7 to again try to search for a specific source for the groundwater impacts identified in MW-7. SB-29 through SB-31 were installed closest to MW-7, while SB-32 through SB-34 were located farther out from MW-7. The plan was to test soil samples from the inner ring of borings and, if warranted by the initial findings, test additional samples from the outer ring of borings. The borings were extended to probe refusal which was encountered just below the water table. The laboratory testing results again identified PCE as the only chlorinated VOC detected in the nine soil samples tested, at concentrations well below the Type 4 RRS. Two

samples also exhibited acetone, at concentrations well below its approved RRS. These findings were generally consistent with previous soil testing results obtained from the site.

The soil testing results obtained from this area were consistent with the findings of the previous soil assessments and did not identify an obvious source of groundwater contamination.

Based on the results of the soil sampling and testing conducted by Amec Foster Wheeler, delineation of the lateral and vertical extent of contamination was completed in 2010.

6.0 HORIZONTAL AND VERTICAL EXTENT OF GROUNDWATER CONTAMINATION

Groundwater assessment activities on site were initiated by ECA in July 2000 with the installation of a groundwater monitoring well (MW-2). A second well (MW-1) was planned at that time, but auger refusal was encountered above the water table and the boring was abandoned. Amec Foster Wheeler continued the assessment in July 2001 with the installation of a deep groundwater monitoring well (MW-3) and two shallow wells (MW-4 and MW-5). Seven additional wells (MW-6 through MW-12) were installed in March, April and June 2002. Another deep well (DW-1) was installed in March 2006 to investigate deep water conditions in the source area. Replacement wells (MW-4R, MW-11R and MW-12R) were installed in 2007. Three wells (MW-13 through MW-15) were installed in August 2009 to investigate groundwater conditions beneath the building. One well (MW-16) was installed in October 2012 as a demonstration well to characterize groundwater conditions between MW-7 and MW-11R for modeling.

The activities conducted by Amec Foster Wheeler addressed the vertical and horizontal extent of groundwater contamination on the site. Since listing on the HSI in 2001, Amec Foster Wheeler has performed the following groundwater monitoring events:

- 5 events as part of site characterization and previous CSR preparation in 2001, 2002 and 2005;
- 13 events as part of CAP implementation between 2007 and 2010;
- 8 events as part of VRP implementation in 2012 and 2013; and
- 3 events as part of the M&M Plan implementation in 2014 and 2015.

The laboratory report for the most recent event in June 2015 is attached in Appendix D. The laboratory reports for all other sampling events were submitted in prior reports.

6.1 ANALYTICAL PARAMETERS SELECTED

Based on the presence of a dry cleaning facility in the area under study, the groundwater samples collected were analyzed for VOCs (SW-846 Method 8260 or 8260B).

6.2 GROUNDWATER MONITORING WELL LOCATIONS, AND INSTALLATION AND CONSTRUCTION METHODS

The locations of the groundwater monitoring wells are shown on Figure 9. See Table 1 for a summary of well construction details and Appendix E for boring logs. Please note that no boring logs were available for boring SB-1 and MW-2 installed by ECA.

6.2.1 Type of Well Casing Material

Monitoring wells MW-2 and MW-4 through MW-16 consist of two-inch diameter, Schedule 40 PVC well casing and screen with threaded joints. The deep Type III wells, MW-3 and DW-1 consist of an inner two-inch diameter PVC casing within an outer six-inch casing which had previously been grouted into place at auger refusal depth. The borings were extended through the outer casing an additional 15 feet prior to installation of the inner casing. Monitoring wells MW-4, MW-5, MW-10, MW-11 and MW-12 originally consisted of one-inch diameter PVC casing installed within hand auger borings located in the vicinity of Hog Wallow Creek. This well installation method was employed because difficult terrain along the creek precluded the use of a drill rig. No PVC cement was utilized during well construction. MW-4, MW-5, MW-11 and MW-12 were later replaced with 2-inch diameter wells installed using a hand auger.

6.2.2 Description of Well Intake Design

6.2.2.1 Screen Slot Size and Length

Each of the wells on site was constructed with 0.01-inch factory slotted PVC well screen. Monitoring wells MW-2, MW-6, MW-7, MW-8, MW-9, MW-13, MW-14, MW-15 and MW-16 utilized a ten-foot screen length which spanned the water table. Monitoring wells DW-1 and MW-3 utilized a five-foot screen length, with the top of the screen installed below the water table. Monitoring wells MW-4, MW-5, MW-10, MW-11 and MW-12 utilized a five-foot screen length which spanned the water table.

6.2.2.2 Filter Pack Materials and Length

Washed 20/30 sieve size quartz sand was used to create the filter pack around the well screen in each of the wells. The sand generally extended to a height of approximately two feet above the top of the screen. In the shallow wells located near Hog Wallow Creek, the shallow depth of water necessitated the use of less sand above the screen.

6.2.2.3 Method of Filter Pack Emplacement

The sand pack in the drilled wells was placed around the screen by pouring the sand through the hollow-stem augers while simultaneously raising the augers to prevent bridging of the sand within the borehole. Sand was placed around the hand augered well screens by pouring the sand around the well screen from the surface. The filter pack was then sealed from above with an approximate two-foot layer of hydrated bentonite clay. Again, the shallow depth to water in the hand augered wells necessitated the use of less bentonite above the sand pack.

6.2.2.4 Surface Seal

The drilled wells were grouted to within approximately six inches of the ground surface and capped with lockable well caps. These wells were then topped with flush mount steel covers (Type II well construction). Well construction for the deep Type III well, MW-3 and DW-1, consisted of a six-inch diameter outer casing which was grouted into place to isolate the upper portion of the aquifer. The casing was then reamed out and the inner well drilled and completed as described above. The hand augered wells were sealed with grout from the top of the bentonite seal to the ground surface.

6.2.2.5 Well Development Methods and Procedures

Following installation, the monitoring wells were developed to remove fine grained formation materials. Development of the well installed by ECA reportedly consisted of removing at least five well volumes of water. Development of the wells installed by Amec Foster Wheeler was conducted by bailing with clean disposable polyethylene bailers and polypropylene rope. During well development, the pH, temperature and conductivity of the water were measured after each volume of water was removed. Development continued until the three parameters stabilized. A minimum of five well volumes of water were removed from each well.

6.3 SAMPLING AND ANALYSIS PROCEDURES

Monitoring well MW-2 was sampled by ECA in July 2000. Monitoring wells MW-3, MW-4 and MW-5 were sampled by Amec Foster Wheeler in July, 2001. Monitoring wells MW-6, MW-7, MW-8, MW-9 and MW-10 were sampled by Amec Foster Wheeler in March, 2002, MW-11 was sampled by Amec Foster Wheeler in April, 2002 and MW-12 was sampled by Amec Foster Wheeler in June 2002. The groundwater samples collected by Amec Foster Wheeler in 2001 and 2002 were submitted to ASI in Norcross, Georgia for chemical analysis.

All of the monitoring wells were resampled by Amec Foster Wheeler in 2005. The groundwater samples collected by Amec Foster Wheeler in 2005 were submitted to Analytical Environmental Services (AES) in Atlanta, Georgia. The samples were analyzed for VOCs using SW-846 Test Method 8260B.

From 2007 to 2010, 13 quarterly groundwater monitoring events were conducted at the site in accordance with the approved CAP. The first seven events included the following six wells: MW-2, MW-4, MW-5, MW-7, MW-11 and MW-12. At EPD's request, the two deep wells were added, beginning with the November 2008 event. Upon the site's acceptance into the VRP, an

additional 8 quarterly monitoring events were conducted in 2012 and 2013 for the eight well network. Upon acceptance of the M&M Plan, three final monitoring events were conducted in 2014 and 2015. The last of these events, conducted in June 2015, included only MW-4R, MW-5 and MW-12 adjacent to the creek as MW-11R was dry and BOE construction activities had destroyed the remaining wells.

6.3.1 Groundwater Elevation

Groundwater levels were measured in each well from the top of the well casing. As discussed in Section 5.3, a level survey was conducted to measure the geodetic elevation of the top of each well casing.

6.3.2 Well Evacuation Procedures

During Amec Foster Wheeler's groundwater monitoring events, the wells were purged until the temperature, pH and conductivity of the groundwater stabilized. A minimum of three well volumes of water were removed during well purging. The field parameters measured during well development and purging were included in the previously submitted Groundwater Monitoring Reports and VRP Progress Reports.

6.3.3 Groundwater Sampling, Handling and Preservation

During Amec Foster Wheeler's 2001 and 2002 assessments, groundwater samples were collected using new, disposable high density polyethylene (HDPE) bailers. All bailers were discarded immediately after use. During the 2005 sampling event, disposable Teflon bailers were used for sample collection. Subsequent sampling events utilized a peristaltic pump and Teflon-lined tubing for sample collection via the "straw method". Clean latex gloves were worn during all development and sampling activities and were changed between each well location.

Samples were collected and poured into clean glass 40 ml vials, supplied by the laboratory. The bottles contained hydrochloric acid as a preservative. Following sample collection, the bottles were stored on ice in a cooler until they were transferred to the laboratory. The samples were maintained under chain-of-custody control from the time they were collected until they were relinquished to the laboratory.

6.3.4 Decontamination Procedures

Decontamination procedures consisted of the use of clean, unused disposable bailers, rope and/or tubing at each sampling location. Latex gloves were also worn and changed between

each sampling location. Bailers were disposed of after each use. No equipment was used to sample more than one well.

6.3.5 Laboratory Analytical Techniques

6.3.5.1 Analytical Procedures

Following delivery to the laboratory, the groundwater samples were analyzed for VOCs. The samples collected by ECA were analyzed using SW-846 Test Method 8260 while those collected by Amec Foster Wheeler were analyzed using SW-846 Test Method 8260B.

6.3.5.2 Quality Control Samples

The groundwater samples were maintained under chain-of-custody control and submitted to ASI for testing. One duplicate groundwater sample was submitted for testing for quality control purposes. Trip blanks prepared by the laboratory were also submitted for testing. According to laboratory representatives, QA/QC was conducted in accordance with the laboratory analysis selected, EPA Test Method 8260B.

6.3.5.3 Chain-of-Custody Procedures

The collected samples were maintained on ice and under chain-of-custody control from the time of collection until they were released to the laboratory. The chain-of-custody records documenting the transfer of the samples to the laboratory are included in the laboratory reports in Appendix C.

6.4 BACKGROUND GROUNDWATER QUALITY

Groundwater monitoring wells MW-6, MW-8, MW-9, MW-10 and MW-12 are located outside the contaminant plume and represent background conditions at the subject site. Because the compounds in question, PCE, TCE, DCE and vinyl chloride are not naturally occurring substances, naturally occurring background conditions at the subject site were assumed to be below laboratory detection limits.

6.5 SUMMARY OF GROUNDWATER TESTING RESULTS

Refer to Figure 9 for the locations of groundwater monitoring wells, along with the following discussion. Also refer to Figures 6 and 7 for cross sections with groundwater testing results.

In July, 2000, ECA performed an Environmental Site Investigation in the surrounding area of the former Imperial Cleaners facility to explore the potential for a release from the dry cleaning facility.

ECA initially installed four soil borings (SB-1 through SB-4) around and within the dry cleaning facility which was just being vacated at that time. One soil boring, SB-2, was extended below the groundwater table and converted to a groundwater monitoring well (MW-2). Boring SB-1 was also intended to be converted to a well (MW-1), but auger refusal was encountered above the water table and the boring was discontinued. ECA collected a groundwater sample from MW-2 and analyzed it for VOCs. The laboratory results identified PCE, TCE, DCE and vinyl chloride in the groundwater sample at concentrations above the laboratory detection limits.

Subsequent monitoring events indicated that MW-2 represented one of the source area wells as indicated by the higher concentrations of PCE and other chlorinated VOCs (CVOCs), breakdown products of PCE. PCE concentrations in MW-2 peaked at 2,700 µg/L in September 2006 and have decreased significantly since that time. Concentrations of the PCE breakdown products TCE, DCE and vinyl chloride have fluctuated over time, but have also decreased significantly since monitoring began. These results indicate that significant natural attenuation is occurring in the area around MW-2.

In August, 2001, Amec Foster Wheeler installed three monitoring wells (MW-3 through MW-5) at the subject site. MW-3 was a deep Type III well located behind and downgradient of the former dry cleaner. This well was intended to evaluate whether deep groundwater within the rock had been impacted by the release from the former dry cleaner. MW-4 and MW-5 were located near Hog Wallow Creek to attempt to define the downgradient extent of the plume. Groundwater samples from each well were collected and analyzed for VOCs. The laboratory results identified PCE and cis-1,2-DCE in the groundwater sample collected from MW-4 at concentrations of 3 and 10 µg/l, respectively. Chloroform was detected in the deep well, MW-3, at a concentration of 10 µg/l. The chloroform was thought to be related to the use of potable water during rock coring, and is not related to the reported release. Neither PCE nor any of its breakdown products were detected in MW-3. VOCs were not detected in MW-5.

Subsequent monitoring of MW-4 (replaced by MW-4R in July 2007) has sporadically identified very low concentrations of CVOCs. Cis-1,2-DCE is the only VOC detected in this well since February 2012. MW-5 has exhibited two detections of cis-1,2-DCE, at concentrations just above the detection limit.

Regular monitoring of MW-3 began in 2008. With the exception of one detection of a low level of PCE in March 2010, VOCs have not been detected in this well. The results obtained from the

deep well, MW-3, indicate that the groundwater contamination does not extend to the deeper portion of the aquifer and that the groundwater contamination has been vertically delineated.

In March, 2002, Amec Foster Wheeler installed five additional monitoring wells (MW-6, MW-7, MW-8, MW-9 and MW-10) on the site to attempt to delineate the lateral extent of groundwater contamination. MW-6 was installed in the parking lot north of the former dry cleaner. MW-7 was located just outside the back door of the former dry cleaner and was intended to investigate groundwater conditions in this potential source area. MW-8 was located in the front parking lot of the Shopping Center, northwest of the former dry cleaner. MW-9 was located in the rear driveway of the Shopping Center, southwest of the former dry cleaner. MW-10 was located along Hog Wallow Creek, near the upstream boundary of the Shopping Center property.

Groundwater samples from these five wells were collected and analyzed for VOCs. Of the five wells installed, only one, MW-7 exhibited VOCs related to the former dry cleaning operations. MW-7 was located just outside the rear door of the former dry cleaners. Chloroform was detected in MW-9, southwest of the former dry cleaners. The chloroform detected is believed to be related to a leaking water line located behind the Shopping Center building. This water line was in the process of being replaced at the time of Amec Foster Wheeler's assessment.

Because no PCE or breakdown products were detected in MW-6, MW-8, MW-9 and MW-10 and these wells were determined to be located outside of the plume, they were not included in future sampling events. MW-7 was regularly sampled during the quarterly monitoring events beginning in 2007. Data from this well also indicated this was a source area well and it exhibited the highest CVOC concentrations on the site. CVOC concentrations were observed to generally rise over time between 2007 and June 2010 when the PCE concentration peaked at 4,800 µg/L. PCE breakdown products were also observed to peak at that time. Since 2010, CVOC concentrations have generally decreased, although with some fluctuations. Although natural attenuation is observed at this location, subsurface conditions are different from those observed at MW-2, resulting in slower breakdown of CVOCs (see Table 5).

In April 2002, Amec Foster Wheeler installed monitoring well MW-11 along the western bank of Hog Wallow Creek. This well was installed in the area interpreted to be directly downgradient of the source of the groundwater contamination, based on the March 2002 groundwater elevation data. Low levels of PCE and its breakdown products were detected in MW-11. MW-11 was replaced with MW-11R in July 2007. The well boring was terminated on rock, just

below the water table. As a result, this well has been dry during several of the quarterly monitoring events. Low concentrations of several CVOCs were identified in MW-11/11R during the first several monitoring events. A notable increase in CVOC concentrations was observed in this well, beginning in 2010, although the concentrations tended to fluctuate significantly from one event to another.

In order to confirm that the creek represented the horizontal delineation of groundwater contamination downgradient of the suspected source area, Amec Foster Wheeler obtained permission from the adjacent property owner, Mr. Maxwell Thomas, to install an additional well on the eastern bank of Hog Wallow Creek in April 2002. Based on the local hydrogeology and Amec Foster Wheeler's experience, Hog Wallow Creek was expected to act as a discharge zone for shallow groundwater in the site vicinity. MW-12 was located in the area downgradient of the former dry cleaner, across the creek to the east of MW-11. VOCs were not detected in MW-12. MW-12 has been included in the quarterly monitoring program from it outset. No CVOCs have been detected in this well, confirming that Hog Wallow Creek acts as a natural drainage boundary.

At the request of EPD, in August 2009, Amec Foster Wheeler installed three additional monitoring wells inside the former dry cleaner tenant space. The purpose of the new wells was to collect groundwater data from within the suspected source area. The locations for monitoring wells MW-13 and MW-14 were selected on the basis of their locations with respect to former operations within the building and because they were located immediately upgradient of the two on-site wells which have exhibited groundwater impacts (MW-2 and MW-7). MW-13 was installed between monitoring well MW-2 and the former location of the dry cleaning machinery. MW-14 was installed inside the former dry cleaner, in an area interpreted to be directly upgradient of monitoring well MW-7. MW-15 was installed as an upgradient well near the northwest corner of the former dry cleaner tenant space.

These three borings were extended 8 to 12 feet into rock from their refusal depths using an air hammer attachment to the drill rig to allow the borings to be extended sufficiently below the water table for well installation.

The groundwater testing results obtained from the newly installed wells inside the building identified only low concentrations of PCE and two of its degradation products (TCE and cis-1,2-DCE) in MW-13 located immediately downgradient of the former dry cleaning machinery.

VOCs were not detected in either MW-14 or MW-15. The VOC concentrations detected in MW-13 were well below those previously encountered in either MW-2 or MW-7, located just outside the building. Based on these findings, these wells were not resampled in subsequent monitoring events.

In October, 2012, again at EPD's request, MW-16 was installed in the area downgradient of MW-7 and upgradient of MW-11R to monitor conditions immediately downgradient of the suspected source area. Results from this well indicated the presence of PCE and its breakdown products at concentrations consistently between those observed in MW-7 and MW-11R. The highest CVOC concentrations were observed during the initial sampling event. Subsequent events showed a general decline in CVOC concentrations over the next seven sampling events. The relative concentrations of PCE and its breakdown products indicate increased natural attenuation in this area compared to the area around MW-7 as would be expected as contaminants migrate.

The final three groundwater monitoring events were conducted on a semi-annual basis under the provisions of the Groundwater Monitoring and Maintenance Plan. The first two of these sampling events included monitoring wells MW-2, MW-4R, MW-7, MW-11R and DW-1. The final sampling event, conducted in June 2015, included MW-5, MW-4R and MW-12 as the only wells on site that had not been destroyed by construction activities.

The results of these monitoring events documented significantly reduced CVOC concentrations in the source area, particularly in MW-2, compared to historic concentrations.

CVOC concentrations in MW-7 were consistently higher than those observed in MW-2, but PCE concentrations remained below historic highs. Although PCE degradation in MW-7 was not as apparent as observed in MW-2, significant increases in TCE and DCE concentrations, particularly in the final sampling event for this well were noted, indicating increased degradation rates.

MW-4R exhibited low concentrations of cis-DCE during these last sampling events. The cis-DCE concentrations were well below the applicable RRS and no other CVOCs were detected in this well.

MW-11R, because of its location and the depth to rock, was dry on several occasions, including the last event, and could not always be sampled. When it was sampled, CVOCs were identified

at relatively low concentrations, with evidence of significant PCE degradation. The CVOC concentrations in MW-11R remained at least two orders of magnitude below the maximum allowable concentrations to maintain compliance with in-stream water quality standards.

The sentinel wells MW-5 and MW-12R were sampled during the final event. CVOCs were not detected in MW-12R, consistent with all previous data. Cis-1,2-DCE was detected in MW-5 just above the reporting limit (but well below its MCL and Type 1 RRS) during the June 2015 sampling event. This compound had been previously detected at a similar concentration in MW-5 during the October 2012 sampling event.

6.6 SUMMARY OF SURFACE WATER TESTING RESULTS

During the July 2001 sampling event, Amec Foster Wheeler collected surface water samples from two locations along Hog Wallow Creek to evaluate potential impact to the surface water from the groundwater plume. SW-1 was collected near the upstream boundary of the site and was intended as a background sample location for comparison purposes. The second surface water sample, SW-2, was collected just downstream of monitoring well MW-4. VOCs were not detected in the surface water samples.

In July 2005 another round of surface water sampling was completed which included a third sample collected from the area between MW-11 and MW-12, directly downgradient of the former dry cleaner. No VOCs were detected in this surface water sampling event.

Between March 2007 and October 2013, surface water samples were collected during each of the groundwater monitoring events and again during the final monitoring event in June 2015. No chlorinated VOCs were detected in the surface water during these monitoring events. Styrene was detected in all three samples, including the upstream sample, during the March 2010 event. However, this compound is not related to any cleaning products and it was apparent from the findings that it was related to an off-site release. It was never detected during subsequent sampling events. VOCs have not been detected in surface water during any of the subsequent sampling events.

7.0 SUMMARY OF REMEDIAL MEASURES COMPLETED TO DATE

7.1 ENHANCED FLUID RECOVERY

As detailed in the September 2007 and March 2008 Semi-Annual Groundwater Monitoring Reports, in accordance with the October 2006 CAP, three Enhanced Fluid Recovery (EFR) events were conducted at the subject site on June 13, 2007, August 7, 2007 and December 17, 2007. Each event consisted of a 24-hour high vacuum extraction event utilizing two extraction points, MW-2 and MW-7. These are the two wells located closest to the area of the release and the two wells on site which have exhibited the highest VOC impacts.

A fourth 24-hour EFR event was conducted at the site in 2010. In addition to extraction from MW-2 and MW-7, this EFR event also included two wells (MW-13 and MW-14) located inside the building. Although only very low concentrations of chlorinated VOCs had previously been detected in groundwater from the wells inside the building, these interior wells were included in the last EFR event to aid in the removal of soil vapors contained within the vadose zone beneath the building. The four EFR events resulted in the cumulative removal of approximately 950 gallons of water and 7.52 pounds of CVOCs.

7.2 FULTON COUNTY SOIL REMOVAL

PM, Ltd. is aware that the Fulton County BOE engaged Contour Engineering to oversee the soil remediation on Parcel 2, including the removal of soil exceeding residential RRS and confirmation sampling. PM, Ltd. has not yet received documentation of this activity from BOE.

8.0 RISK REDUCTION STANDARDS

The subject site is located in Roswell, Georgia in an area which is primarily a mixture of commercial and residential properties. The property immediately east of the former Shopping Center in the area adjacent to the contaminant plume consists of undeveloped property owned by Mr. Maxwell Thomas. Hog Wallow Creek forms the boundary between the Shopping Center property and the Thomas property. Farther to the east is a residential development. The areas north and west of the Shopping Center are commercially developed while the area south and southeast are occupied by the recently developed school property.

Groundwater sampling conducted between 2000 and 2015 detected PCE and its breakdown products in groundwater beneath the site. Chloroform was also detected in groundwater in two wells in 2001 and 2002, although it is not thought to constitute a release nor be related to the release from the former dry cleaner. This compound is commonly detected in potable water as a result of municipal water treatment. In both instances in which chloroform was detected, potable water sources were identified which could have impacted the wells. Chloroform was not detected in any well during subsequent sampling events. Groundwater is not currently utilized on the site.

As described in 391-3-19-.06(4)(a), once the extent of regulated substances in soil and groundwater have been delineated, a comparison against Risk Reduction Standard (RRS) criteria must be made. RRS are based on property use (residential or non-residential) and certain site-specific factors. As defined under HSRA, “a non-residential property means any real property not currently being used for human habitation or other purposes with a similar potential for human exposure, at which activities have been or are being conducted that can be categorized in one of the 1987 Standard Industrial Classification (SIC) major groups 01-97 inclusive (except for the four digit codes 4941, 8051, 8059, 8062-3, 8069, 8211, 8221-2, 8351, 8661, and 9223)”. As such, the site falls within the definition of non-residential property. Therefore, the Former Imperial Cleaners site may certify compliance with residential or non-residential RRS criteria.

8.1 SOIL CRITERIA

Amec Foster Wheeler calculated both residential and non-residential Risk Reduction Standards for constituents detected in soil. Type 1, 2, 3 and 4 RRS were calculated for PCE and TCE using default exposure assumptions (see Appendix G). As summarized on Table 7, Parcel 2

satisfies Type 1-4 RRS criteria calculated for potential exposure to soil for TCE, acetone and toluene.

On Parcel 1 near its boundary with Parcel 2, soil samples from HA-1, MW-8 and MW-9 did not detect VOCs as depicted on Figure 8. As such, Parcel 1 satisfies Type 1 RRS for soil.

In order to evaluate the potential for VOCs to leach from the contaminated soils and impact groundwater, in 2003 two samples were collected from beneath the former dry cleaner where elevated VOC concentrations were detected. LCH-1 was collected from the location of GP-3-4, near the northern wall of the building. LCH-2 was collected from the location of GP-5-16, adjacent to the former dry cleaning equipment. GP-5-16 exhibited a PCE concentration of 1,200 µg/kg, the highest concentration detected during Amec Foster Wheeler's soil testing. The samples were tested for leachability using the Synthetic Precipitation Leaching Procedure (SPLP). The results of the leachability tests, along with the total VOC concentrations measured in these areas are presented in Table 7.

The total VOC analyses indicated PCE was present at these locations at concentrations of 650 and 1,200 µg/kg in GP-4-4 and GP-5-16, respectively. PCE was the only compound detected in these samples in the total VOC analyses. The SPLP test results indicated that VOCs did not leach from the soil above the laboratory detection limits of 0.2 mg/l.

As a result of the leachability testing results, GA-EPD approved a Type 4 RRS for PCE of 1,200 µg/kg for the site. Parcel 2 satisfies Type 4 RRS criterial for PCE in soil.

8.2 GROUNDWATER CRITERIA

Amec Foster Wheeler also calculated RRS for the constituents detected in groundwater on site. Again the Type 1, 2, 3 and 4 RRS criteria were derived using default exposure assumptions. HSRA RRS criteria for groundwater for the site-specific regulated substances are summarized in Table 7 with the highest concentration of each substance. Complete RRS calculations are presented in Appendix G.

Based on the groundwater samples obtained from MW-2 and MW-7, Parcel 2 does not comply with any of the Type 1-4 groundwater RRS for PCE, TCE or vinyl chloride. Parcel 2 will comply with Type 5 RRS upon execution of the Environmental Covenant.

Based on the groundwater samples obtained from MW-8, MW-9 and MW-12R, Parcel 1 complies with Type 1 RRS for groundwater.

Of the 16 wells installed at the site, groundwater quality in only two wells (MW-2 and MW-7) exceeded the non-residential RRS. These wells were within 50 feet of each other and were surrounded by wells which comply with Type 2 and Type 4 RRS. As such, the out-of-compliance portion of the plume is demonstrated to be small and contained on the 2.767-acre Parcel 2 as depicted on Figure 4.

9.0 EXPOSURE PATHWAYS

The risk to human health and the environmental is directly related to the potential for receptors to be exposed to contamination. Exposure pathways are the means by which regulated substances migrate from a source to a point of contact with humans and/or the environment. An examination of the following potential exposure pathways and receptors was conducted for the site.

- Potential exposure to regulated constituents in soil;
- Potential exposure to regulated constituents in groundwater;
- Potential exposure to regulated constituents in surface water;
- Potential exposure to regulated constituents due to vapor intrusion from impacted soil or groundwater.

9.1 SOIL CRITERIA

The potential for direct exposure of commercial workers to impacted soil at the site is incomplete as soil concentrations are below the approved direct exposure risk reduction standards for construction workers and utility workers in the event that ground-disturbing activities are performed in the future.

Both residential and non-residential Risk Reduction Standards (RRS) for constituents detected in soil were calculated. Type 1, 2, 3 and 4 RRS were calculated for PCE, TCE, acetone and toluene using default exposure assumptions. As shown in Appendix G, the site satisfies all RRS criteria calculated for potential exposure to soil for TCE, acetone and toluene. The HSRA Type 1 through Type 4 RRS criteria for soil for the regulated substances are shown in Table 7 along with the highest concentration detected and the corresponding sample location.

The maximum concentration of PCE detected in soil between 2001 and 2006 was 1,200 µg/kg. This concentration is well below the direct contact RRS of 16,000 µg/kg. Only one other sample collected by another consultant during an earlier assessment in 2000 reported a higher concentration of PCE in soil (7,700 µg/kg) which was also below the direct contact RRS. Amec Foster Wheeler resampled soils in that same area on three separate occasions and was not able to replicate the previous elevated finding. Based on the data collected, the area of higher impact has been attenuated such that VOCs are no longer present at such elevated concentrations as those observed in 2000.

In order to evaluate the potential for VOCs to leach from the contaminated soils and impact groundwater, in 2003 two samples were collected from the beneath the former dry cleaner where PCE concentrations were detected up to 1,200 µg/kg (the maximum concentration ever detected by Amec Foster Wheeler). The samples were tested for leachability using the Synthetic Precipitation Leaching Procedure (SPLP, see Table 6). As a result of the leachability testing results, GA-EPD approved a Type 4 RRS for PCE of 1,200 µg/kg for the site.

Based on these results, soil on Parcel 2 was determined to be in compliance with Type 4 RRS prior to its acquisition by Fulton County. EPD accepted the Type 4 RRS in a letter dated June 26, 2009.

As a conservative measure, it has been reported that Fulton County decided to remove impacted soils from the area of the former dry cleaner during its redevelopment of the property. Following demolition of the structures on site and preliminary grading, impacted soils in the area of the former dry cleaner were excavated and disposed of in early 2015, according to Mr. Ken Jacobs, Construction Manager for Hogan Construction. Additional details regarding this removal are not known and PM, Ltd. has not been supplied with the data regarding the soil removal.

On the basis of the site's compliance with Type 4 RRS for soil at a minimum, and in conjunction with the proposed filing of an Environmental Covenant (Appendix H) restricting use of Parcel 2 for non-residential purposes, Parcel 2 will be in compliance with a Type 5 RRS and the soil exposure pathway is no longer complete.

9.2 GROUNDWATER CRITERIA

As detailed in the Revised CSR, a water usage survey was previously conducted for the area surrounding the site to identify active drinking water sources in the site vicinity. The nearest domestic drinking water well was located approximately 0.8 miles from the site. This well location along a tributary of Hog Wallow Creek, upstream of the subject site, will not be impacted by the release. No active domestic drinking water wells are located downgradient within one mile of the site. Another unconfirmed domestic drinking water well in the general vicinity of the site was located approximately 1.5 miles to the southeast across both Hog Wallow Creek and across Big Creek along Grimes Bridge Road. The regional groundwater flow in this area is toward the Chattahoochee River to the south. Therefore, this well is located sidegradient of the regional groundwater flow path and separated from the site by two drainage

divides, Hog Wallow Creek and Big Creek. As stated previously, only the shallow groundwater at the subject site has been affected by the release and there is an upward hydraulic gradient in the area of the release. The Grimes Bridge Road well is set within the bedrock aquifer, at a depth of over 300 feet. In addition, it is located across both Hog Wallow Creek and Big Creek from the site, both of which would serve as barriers to prevent the migration of shallow groundwater from the site to this well. Based on research, no drinking water wells have been identified which could be impacted by the release from the site.

The City of Roswell obtains much of its water from the Fulton County municipal water system, although it also maintains a surface water intake on Big Creek, located just upstream from the confluence with Hog Wallow Creek. Because the City of Roswell intake on Big Creek is located upstream from the Hog Wallow Creek confluence, there is no potential for impact to the surface water intake.

Previous groundwater testing results (Figure 9, Table 4) as well as groundwater fate and transport modeling results (Appendix F) indicate that migration of groundwater will be limited to the area of the site located between the former dry cleaner and Hog Wallow Creek. Lateral migration of impacted groundwater off the former Shopping Center property has not been identified in the past and is not predicted in the future based on site hydrogeology and groundwater modeling results.

RRS were calculated for the constituents detected in groundwater on site. Again the Type 1, 2, 3 and 4 RRS criteria were derived using site default exposure assumptions (Table 7 and Appendix G). Based on the groundwater samples obtained from MW-2 and MW-7, Parcel 2 does not comply with any of the type 1-4 groundwater RRS for PCE, TCE or vinyl chloride. Parcel 2 currently meets Type 4 RRS for cis-1,2-dichloroethene and trans-1,2-dichloroethene. Although groundwater conditions are not currently in compliance with applicable Type 1-4 RRS, there is no use of groundwater for drinking and the risk to human health and the environment posed by the groundwater on site is negligible. Parcel 2 will comply with Type 5 RRS upon execution of the Environmental Covenant using institutional controls. Further, the condition of the groundwater on site is expected to improve over time due to the natural attenuation of regulated constituents as observed in on-site wells in recent sampling events.

Long-term groundwater monitoring and groundwater fate and transport modeling have demonstrated the groundwater conditions will not exceed Georgia in-stream water quality

standards or drinking water standards within 1,000 feet downgradient of the current extent of the plume (Appendix F). As such, the site is in compliance with appropriate groundwater criteria under the VRP.

For these reasons, the groundwater exposure pathway is also incomplete. Also, the proposed filing of an Environmental Covenant (Appendix H) will restrict the use of groundwater on the site.

9.3 SOURCE

Concentrations of dissolved VOCs in groundwater are all well below the aqueous solubilities for the various compounds detected on site. No evidence of highly contaminated soils indicative of a potential free product condition has been identified and, reportedly, impacted soils from the source area have been removed by the BOE. The concentrations of PCE detected in groundwater from MW-7 historically have been slightly in excess of 1% of the aqueous solubility of PCE during some of the monitoring events. However, the PCE concentration detected in the most recent December 2014 event was well below the historic maximum and no direct indications of a dense non-aqueous phase liquid (DNAPL) condition have been observed.

9.4 SURFACE WATER

On-site groundwater discharges into Hog Wallow Creek located along the site's eastern boundary. VOCs have not been detected in surface water samples tested or in groundwater across the creek from the site. Because the creek acts as a groundwater discharge feature for shallow groundwater in the area, VOCs in groundwater are not expected to migrate beyond the creek and impact other properties. Testing of deep groundwater on the site has exhibited no detections of contaminants in the last ten sampling events. Therefore, groundwater impacts are confined to the upper portion of the aquifer. In addition, a vertically upward hydraulic gradient has been measured on site near the source area. This upward gradient will reduce the tendency of dissolved constituents to migrate into the deeper portions of the groundwater.

As detailed in the VRP Application, Amec Foster Wheeler has modeled the fate and transport of VOCs in the groundwater on site and the potential impact of regulated constituents in groundwater on the surface water quality of Hog Wallow Creek (Appendix F). The mixing of impacted groundwater and surface water in Hog Wallow Creek was calculated based on groundwater testing data and measured hydrogeologic conditions on site. Amec Foster Wheeler calculated maximum allowable concentrations of VOCs in MW-11R that would still be

protective of applicable in-stream water quality standards. These calculations were conservatively based on anticipated low flow conditions within Hog Wallow Creek. The modeling results indicated that the CVOC concentrations in MW-11R are at least approximately two orders of magnitude below the predicted maximum allowable concentration. In addition, the maximum allowable VOC concentrations in MW-11R are well below the maximum VOC concentrations historically detected anywhere on site, including the source area. Table F1 illustrates the historic groundwater data from MW-11/11R compared to the maximum allowable concentrations in this well to maintain compliance with in-stream water quality standards.

As detailed in the Semi-Annual VRP Progress Reports, groundwater fate and transport modelling indicates that the anticipated CVOC concentrations discharging to Hog Wallow Creek will remain well below the acceptable concentrations (see Appendix F for the most recent model results).

The field-observed concentrations of COCs dissolved in groundwater at the site, the results of the analytical groundwater fate and transport model for the VOCs in question and the results of the analytical model of mixing between the impacted water and surface water in Hog Wallow Creek show that in-stream water quality standards are not exceeded currently, and are not predicted to be exceeded in the future. Therefore, the surface water exposure pathway is incomplete.

9.5 VAPOR INTRUSION

Recent site development has eliminated the potential for vapor intrusion into buildings as the Shopping Center building has been demolished and there are no structures associated with the school that are located in the vicinity of the groundwater plume on Parcel 2. According to the proposed Environmental Covenant (Appendix H), any new structures on the site must be evaluated for vapor intrusion risk and, if warranted, the risk must be controlled. Therefore, the vapor intrusion exposure pathway is no longer considered complete.

10.0 CONCLUSIONS

Based on the findings of assessment activities and the results of corrective action, the following conclusions are presented:

- The extent of soil impacts has been horizontally and vertically delineated to Type 1 RRS within the boundaries of the 2.767-acre Parcel 2 property.
- The extent of groundwater impacts has been horizontally and vertically delineated to Type 1 RRS within the boundaries of the 2.767-acre Parcel 2 property.
- Soil conditions are certified in compliance with Type 4 RRS on the Parcel 2 property.
- Exposure pathways are currently incomplete for soil, groundwater, surface water and vapors.
- An Environmental Covenant will be implemented upon agreement with EPD so that future site use will maintain incomplete exposure pathways.

The 9.11-acre HSI site (Parcel 1 and Parcel 2) listed in the EPD's HSI site summary will be eligible for delisting because Parcel 1 is in compliance with Type 1 RRS and Parcel 2 will be in compliance with Type 5 RRS upon filing of the Environmental Covenant using institutional controls.

REFERENCES

Cressler, C.W., C.J. Thurmond, and W.G. Hester, 1983, Groundwater in the Greater Atlanta Region, Georgia; Georgia Geologic Survey Information Circular 63

Fetter, C.W., Applied Hydrogeology, third edition, 1994; Macmillan Publishing Company, New York

McConnell, K.I., and C.E. Abrams, 1984, Geology of the Greater Atlanta Region; Georgia Geologic Survey Bulletin 96

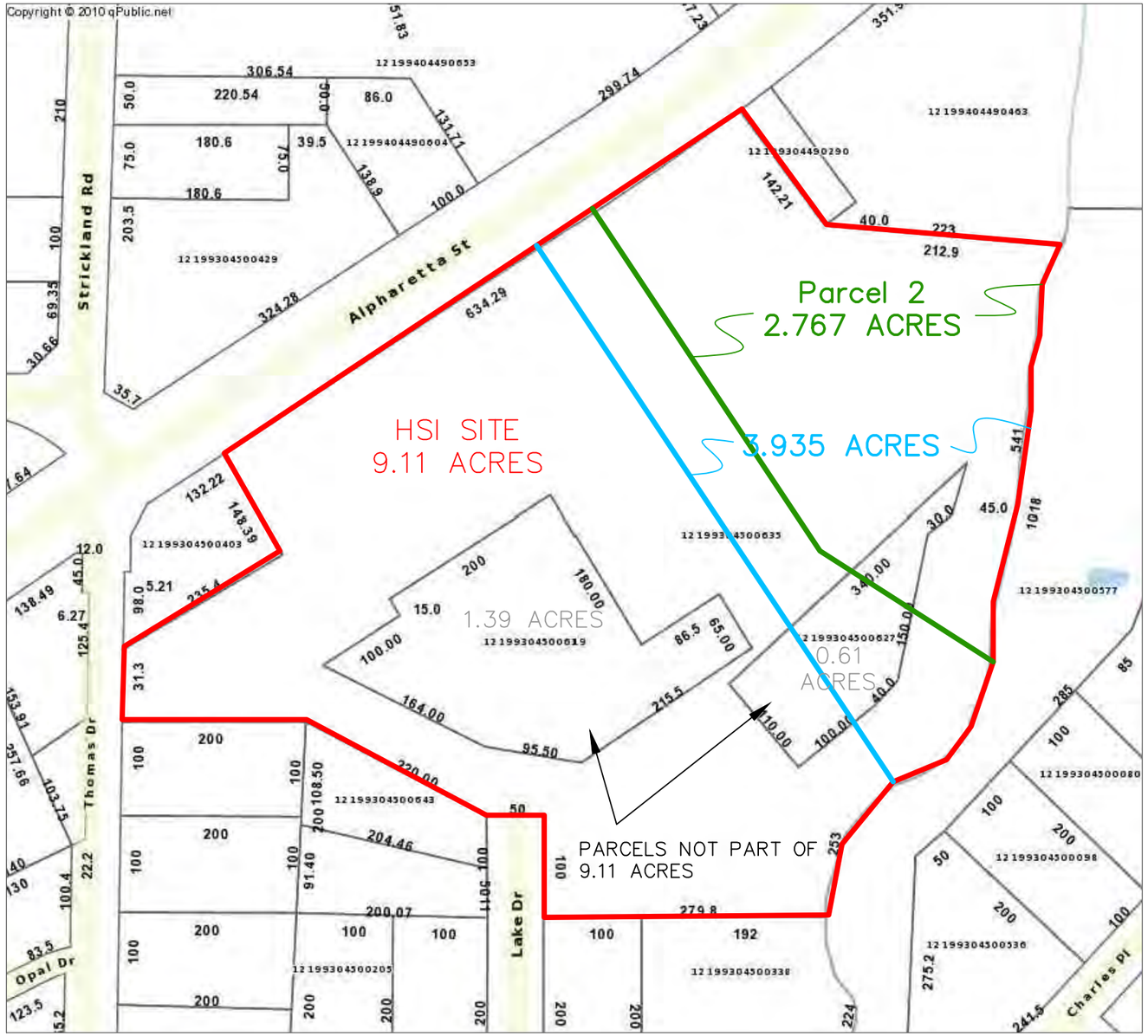
APPENDIX A

TAX PARCELS AND LEGAL DESCRIPTION

LEGAL DESCRIPTION

All that tract or parcel of land lying and being in Land Lots 449 and 450 of the 1st District, 2nd Section City of Roswell, Fulton County, Georgia as shown on a survey prepared for P. M. Properties by Bush-Steed and Boyd, Inc. Land Surveyors, dated 4/20/81, and more particularly described as follows.

Beginning at a point located at the intersection of the easterly right-of-way of Thomas Drive and the southern right-of-way of Alpharetta Street (U.S. Highway No. 19) running along said right of way North 56 degrees 28 minutes East, 571.4 feet, thence North 56 degrees 19 minutes East, 213.4 feet to an iron pin which marks the True Point of Beginning, thence leaving said right of way, running South 39 degrees 52 minutes East, 150.0 feet to an iron pin, thence South 85 degrees 24 minutes East, 223.0 feet to the centerline of Hog Wallow Creek, thence South 8 degrees 48 minutes West, 488.2 feet along the center line of Hog Wallow Creek, thence, thence South 47 degrees 20 minutes West, 60.1 feet along the center line of Hog Wallow Creek, thence leaving said creek centerline, North 39 degrees 45 minutes West, 218.0 feet, thence South 56 degrees 15 minutes West, 12.0 feet, thence North 33 degrees 45 minutes East, 440.0 feet, thence North 56 degrees 28 minutes East, 20.0 feet, thence North 56 degrees 19 minutes, 213.4 feet to the Point of Beginning, said parcel containing 3.935 acres, more or less.



	FORMER IMPERIAL CLEANERS ROSWELL, GEORGIA	amec foster wheeler Environment & Infrastructure, Inc. 2677 BUFORD HWY ATLANTA, GEORGIA 30324 (404) 873-4761	2014 TAX PARCEL MAP JOB NO. 6305-05-0319 FIGURE A.1

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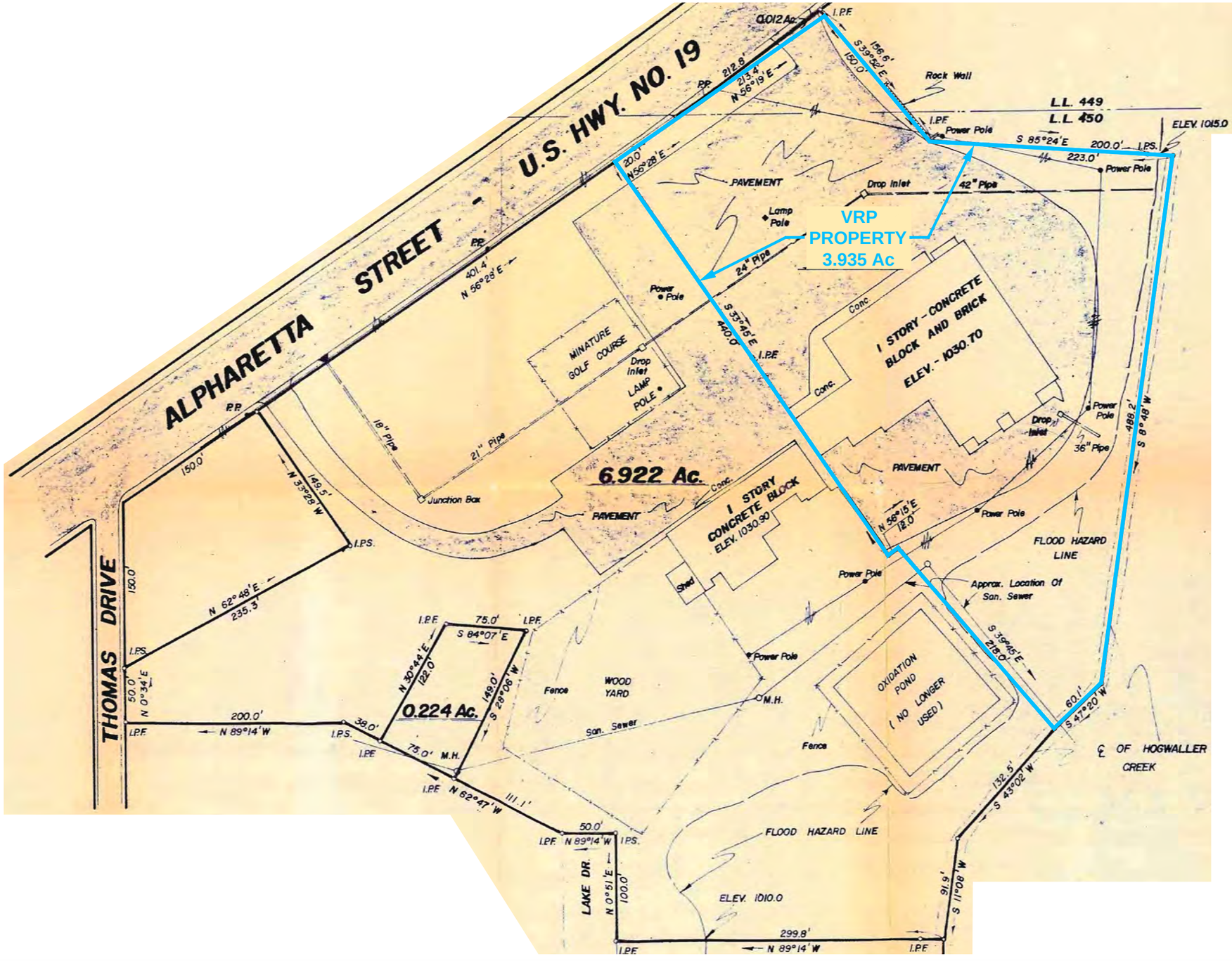

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FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

amec foster wheeler
ENVIRONMENT & INFRASTRUCTURE, INC.
2677 BUFORD HWY
ATLANTA, GEORGIA 30324 (404) 873-4761

VRP PROPERTY BOUNDARY SURVEY

SCALE: AS SHOWN
CONTRACT: 6305-05-0319
FIGURE NO.: A.2
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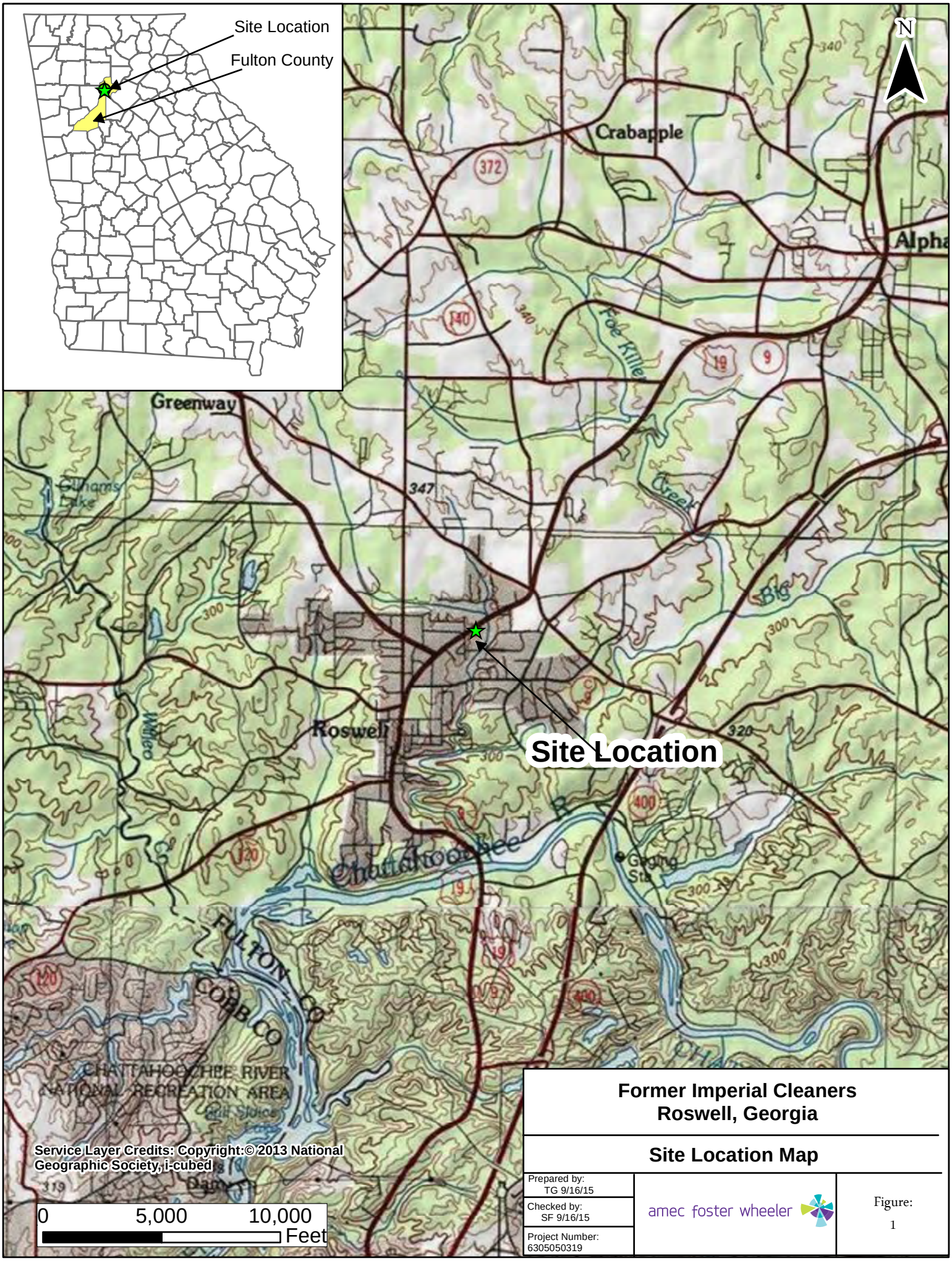
APPENDIX B
FIGURES



Document Path: G:\Former Imperial\mxd\Site location map.mxd

Former Imperial Cleaners
Roswell, Georgia

Site Location Map

Prepared by: TG 9/16/15	amec foster wheeler	Figure: 1
Checked by: SF 9/16/15		
Project Number: 6305050319		

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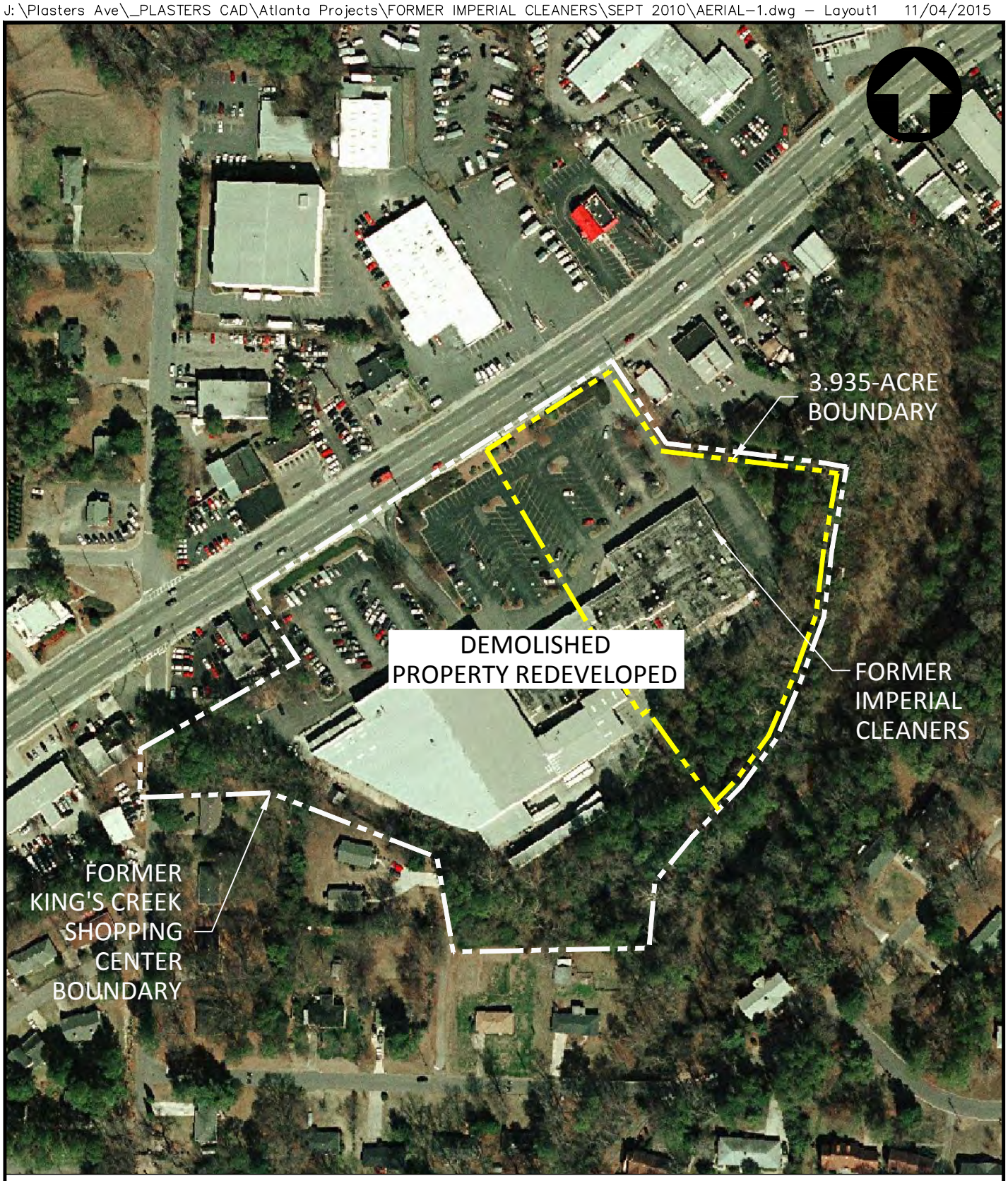

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SOURCE: USGS HIGH RESOLUTION ORTHOIMAGERY FOR THE ATLANTA, GEORGIA, URBAN 2008.

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CLEANERS
ROSWELL, GEORGIA

amec foster wheeler

Amec Foster Wheeler
Environment & Infrastructure, Inc.
2677 BUFORD HWY
ATLANTA, GEORGIA 30324 (404) 873-4761

SITE AND VICINITY
AERIAL PHOTOGRAPH

JOB NO. 6305-05-0319 FIGURE 2

PREPARED BY/DATE

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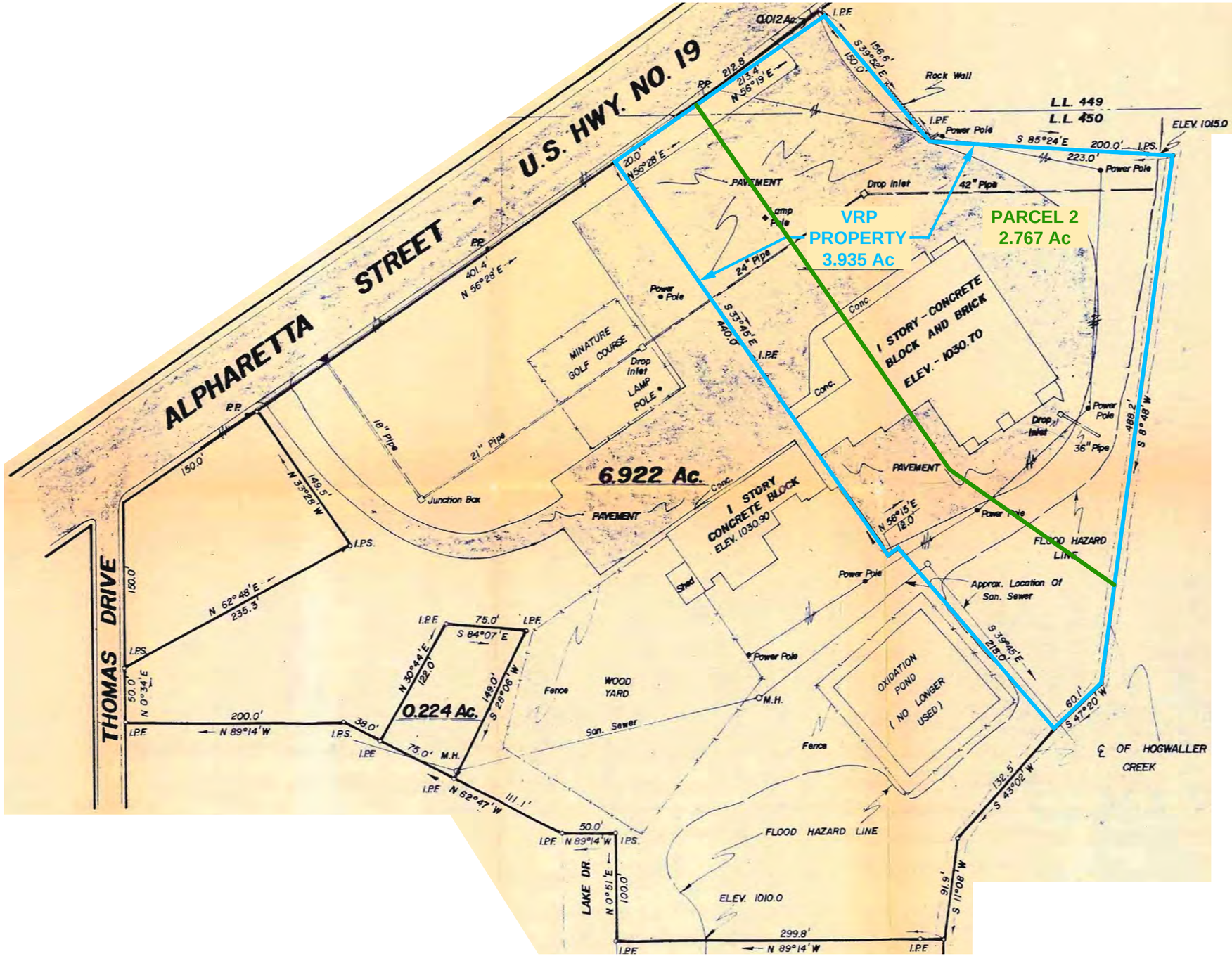

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2677 BUFORD HWY
ATLANTA, GEORGIA 30324 (404) 873-4761

HSI SITE/VRP PROPERTY/PARCEL 2 BOUNDARIES

SCALE AS SHOWN

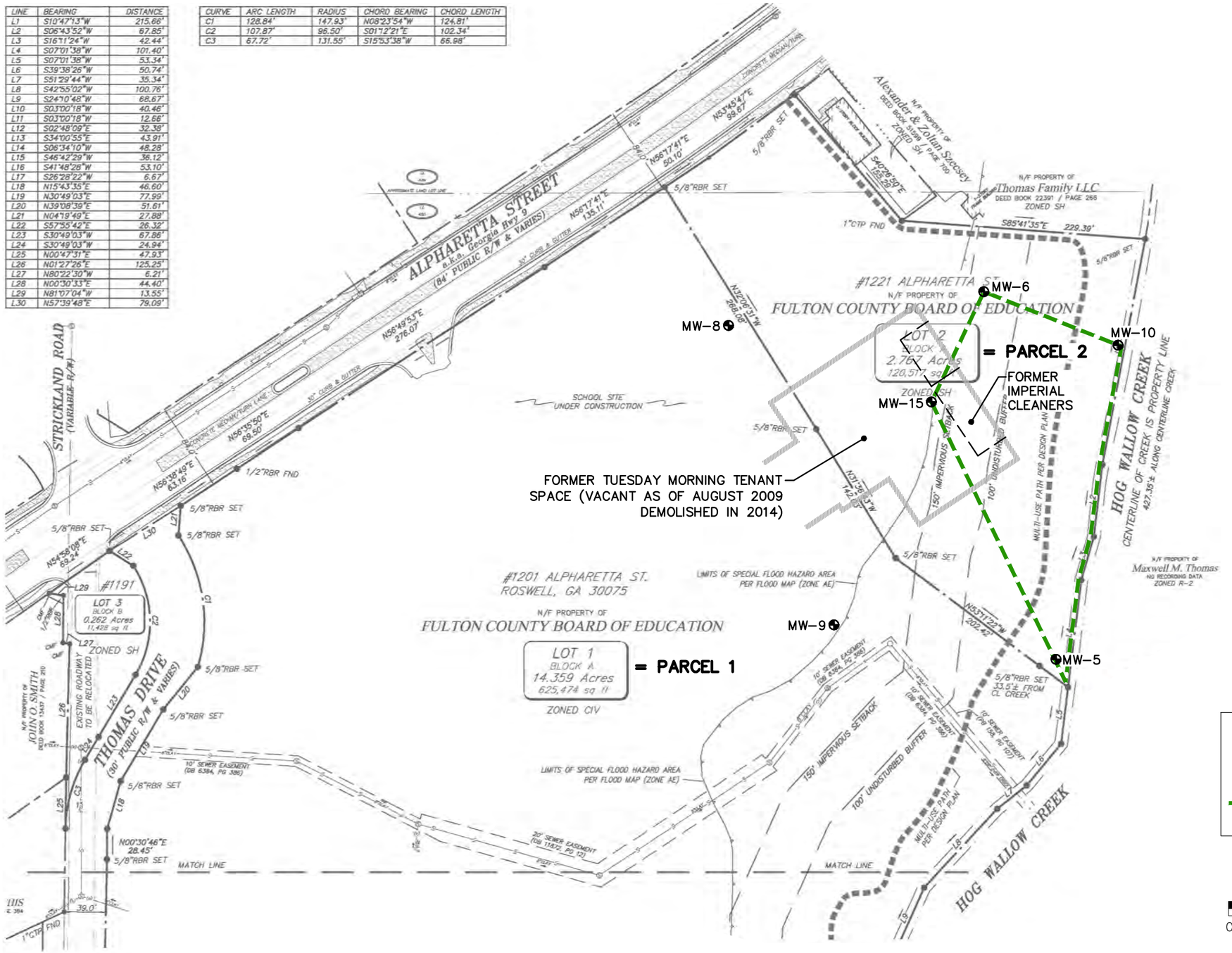
CONTRACT 6305-05-0319

FIGURE NO. 3 | REV | PAGE NO

C:\Users\alex.flont\appdata\local\temp\AcPublish_648\Groundwater Test Results – Oct 2015.dwg – VOC GW 11/04/2015

LINE	BEARING	DISTANCE
L1	S10°47'13"W	215.66'
L2	S06°43'52"W	67.85'
L3	S16°11'24"W	42.44'
L4	S07°01'38"W	101.40'
L5	S07°01'38"W	53.34'
L6	S39°38'26"W	50.74'
L7	S51°29'44"W	35.34'
L8	S42°55'02"W	100.76'
L9	S24°10'48"W	68.67'
L10	S03°00'18"W	40.46'
L11	S03°00'18"W	12.68'
L12	S02°48'09"E	32.38'
L13	S34°00'55"E	43.91'
L14	S06°34'10"W	48.28'
L15	S46°42'29"W	36.12'
L16	S41°48'28"W	53.10'
L17	S26°28'22"W	6.67'
L18	N15°43'35"E	46.60'
L19	N30°49'03"E	77.99'
L20	N39°08'39"E	51.61'
L21	N04°19'49"E	27.88'
L22	S57°55'42"E	26.32'
L23	S30°49'03"W	67.86'
L24	S30°49'03"W	24.94'
L25	N00°47'31"E	47.93'
L26	N01°27'26"E	125.25'
L27	N80°22'30"W	6.21'
L28	N00°30'33"E	44.40'
L29	N81°07'04"W	13.55'
L30	N57°39'48"E	79.09'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	128.84'	147.93'	N08°23'54"W	124.81'
C2	107.87'	96.50'	S01°12'21"E	102.34'
C3	67.72'	131.55'	S15°53'38"W	66.98'



LEGEND:

- GROUNDWATER MONITORING WELL
- GROUNDWATER DELINEATION TO TYPE I RRS

SCALE IN FEET

0 100 200

REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED
DRAWN TG
CHECKED SF
IN CHARGE CTF
DATE 09/15/2015

FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

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PARCEL 1/2 PROPERTY BOUNDARY SURVEY

SCALE AS SHOWN
CONTRACT 6305-05-0319
FIGURE NO. 4 | REV | PAGE NO

NOTE:
LOOKING NORTHWEST TOWARD PACEL 2 FROM DRIVEWAY
OF PARCEL 1 (ESTHER JACKSON ELEMENTARY SCHOOL).
NOTE SLOPE DOWN TO CREEK ON RIGHT SIDE OF PHOTO.
FENCE FORMS BOUNDARY OF 2.767–ACRE PARCEL 2.

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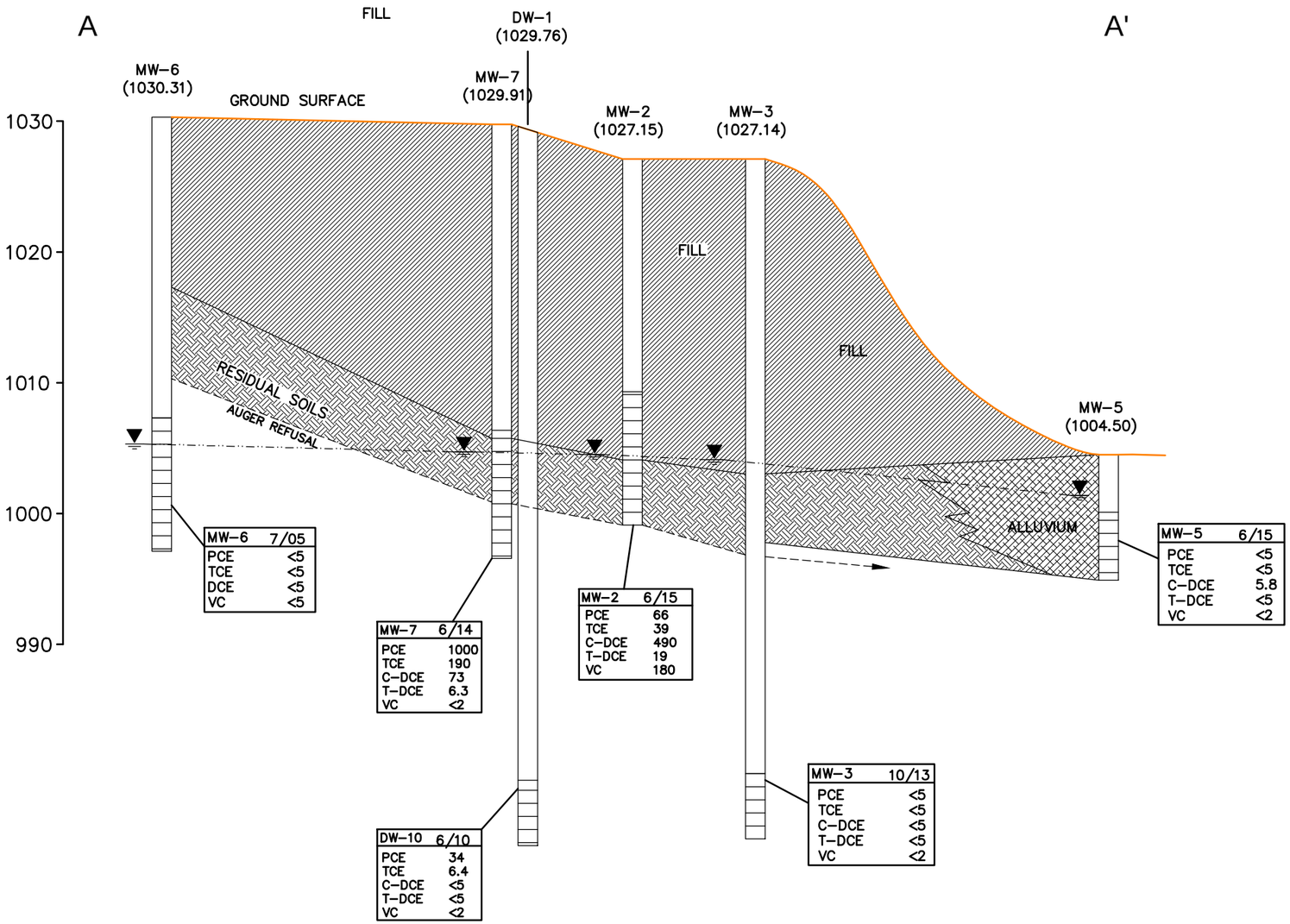
PHOTOGRAPH OF PARCEL 2
TAKEN SEPTEMBER 23, 2015

JOB NO. 6305–05–0319 FIGURE 5

PREPARED BY/DATE
CHECKED BY/DATE



LEGEND:

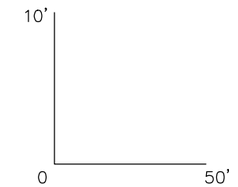
PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
DCE	DICHLOROETHENE
C-DCE	CIS-1,2-DICHLOROETHENE
T-DCE	TRANS-1,2-DICHLOROETHENE
VC	VINYL CHLORIDE

FILL

RESIDUAL SOILS

ALLUVIUM

NOTE: ALL RESULTS PRESENTED IN MICROGRAMS PER LITER (µg/l)



SCALE:
VERTICAL: 1"=10'
HORIZONTAL: 1"=50'

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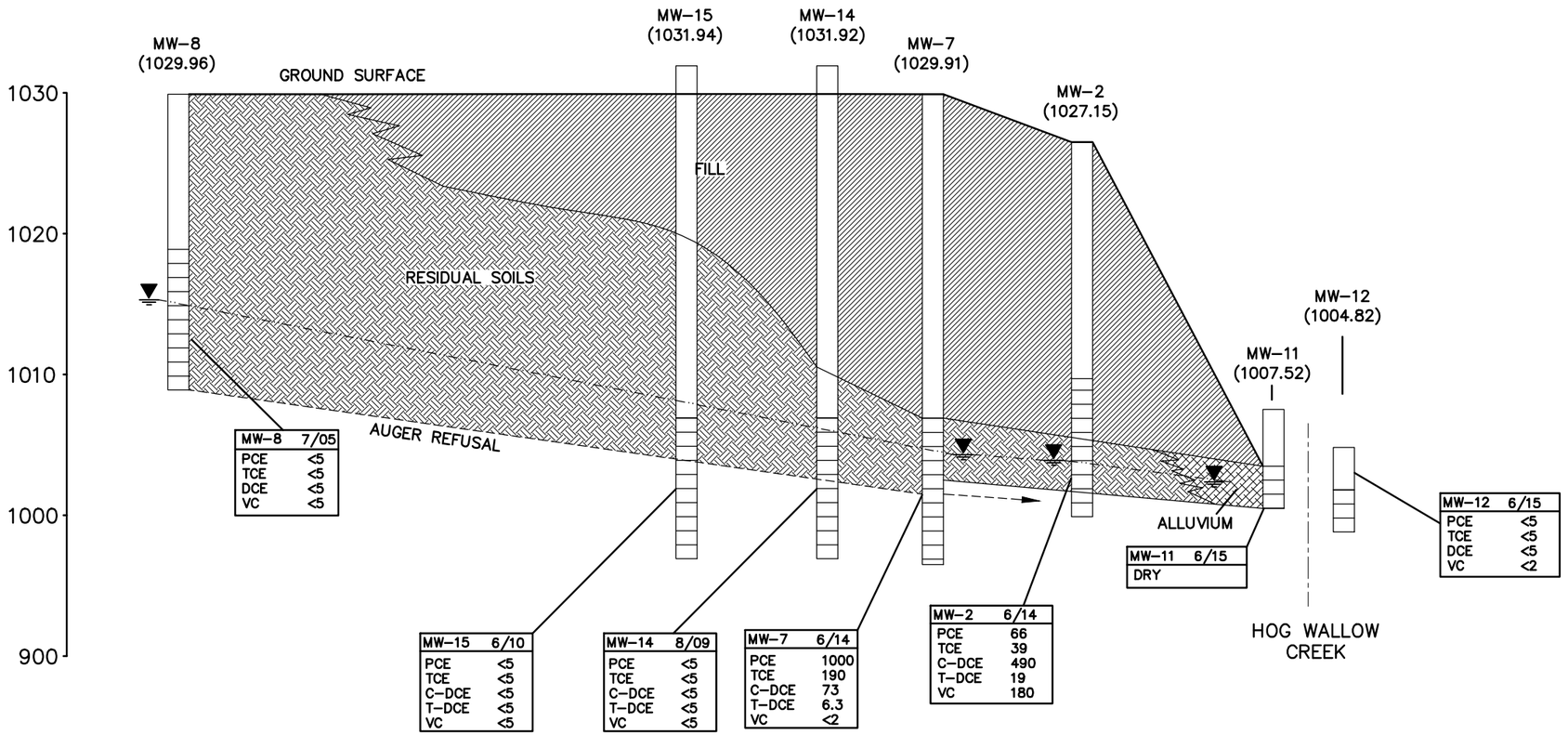
CROSS SECTION A-A'

Job Number	Task	Date	Scale	Drawn By	Approved By	Figure
6305-05-0319	12	SEPT. 2015	AS SHOWN	TG	SRF	6

B

B'



LEGEND:

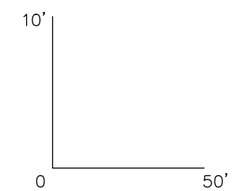
PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
DCE	DICHLOROETHENE
C-DCE	CIS-1,2-DICHLOROETHENE
T-DCE	TRANS-1,2-DICHLOROETHENE
VC	VINYL CHLORIDE

FILL

RESIDUAL SOILS

ALLUVIUM

NOTE: ALL RESULTS PRESENTED IN MICROGRAMS PER LITER (µg/l)



SCALE:
VERTICAL: 1"=10'
HORIZONTAL: 1"=50'

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FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

CROSS SECTION B-B'

Job Number	Task	Date	Scale	Drawn By	Approved By	Figure
6305-05-0319	12	SEPT. 2015	AS SHOWN	TG	SRF	7

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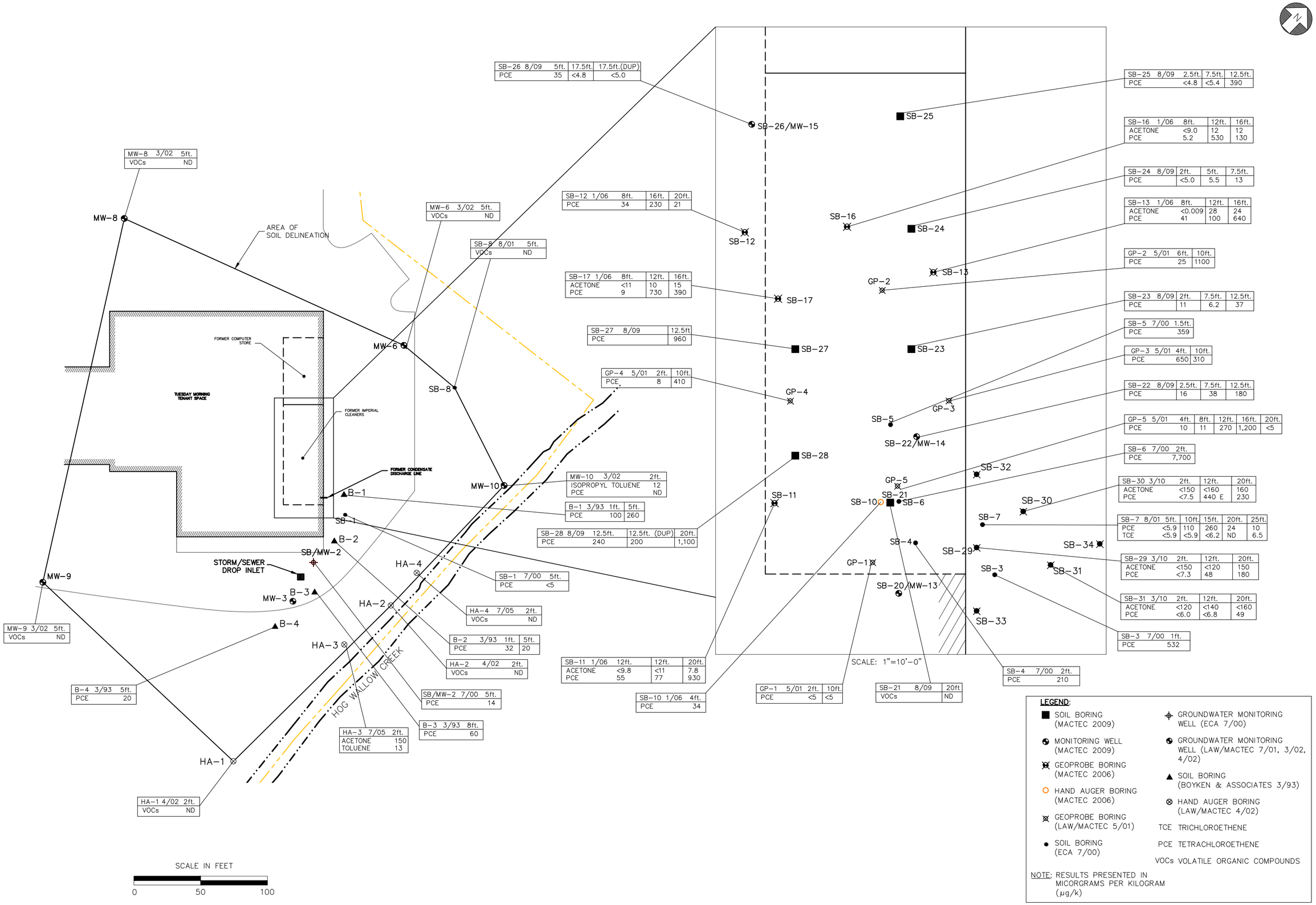

LEGEND:

- SOIL BORING (MACTEC 2009)
- MONITORING WELL (MACTEC 2009)
- GEOPROBE BORING (MACTEC 2006)
- HAND AUGER BORING (MACTEC 2006)
- GEOPROBE BORING (LAW/MACTEC 5/01)
- SOIL BORING (ECA 7/00)
- GROUNDWATER MONITORING WELL (ECA 7/00)
- GROUNDWATER MONITORING WELL (LAW/MACTEC 7/01, 3/02, 4/02)
- SOIL BORING (BOYKEN & ASSOCIATES 3/93)
- HAND AUGER BORING (LAW/MACTEC 4/02)

TCE TRICHLOROETHENE

PCE TETRACHLOROETHENE

VOCs VOLATILE ORGANIC COMPOUNDS

NOTE: RESULTS PRESENTED IN MICORGRAMS PER KILOGRAM (µg/k)

REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED
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CHECKED SRF
IN CHARGE
DATE SEPT. 2015

FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

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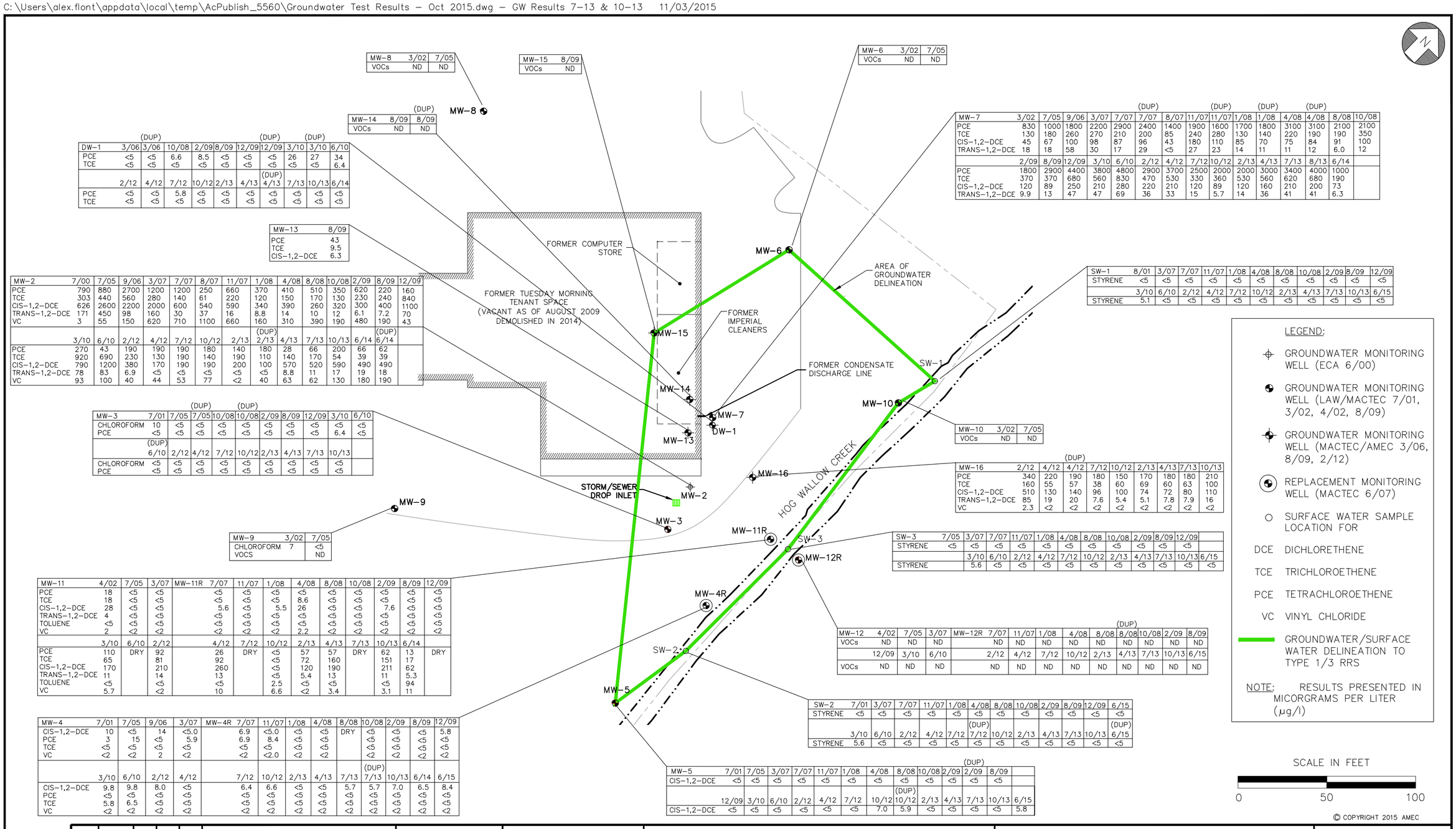
SOIL TESTING RESULTS AND DELINEATION

SCALE: AS SHOWN
CONTRACT: 6305-05-0319
FIGURE NO. 8 | REV | PAGE NO

C:\Users\alex.flont\appdata\local\temp\AcPublish_5560\Groundwater Test Results – Oct 2015.dwg – GW Results 7-13 & 10-13 11/03/2015



MW-8	3/02	7/05
VOCs	ND	ND

MW-15	8/09
VOCs	ND

MW-6	3/02	7/05
VOCs	ND	ND

MW-14	8/09	(DUP) 8/09
VOCs	ND	ND

DW-1	3/06	(DUP) 3/06	10/08	2/09	8/09	12/09	(DUP) 12/09	3/10	(DUP) 3/10	6/10
PCE	<5	<5	6.6	8.5	<5	<5	<5	26	27	34
TCE	<5	<5	<5	<5	<5	<5	<5	<5	<5	6.4

	2/12	4/12	7/12	10/12	2/13	4/13	(DUP) 4/13	7/13	10/13	6/14
PCE	<5	<5	5.8	<5	<5	<5	<5	<5	<5	<5
TCE	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

MW-7	3/02	7/05	9/06	3/07	7/07	(DUP) 7/07	8/07	11/07	(DUP) 11/07	1/08	(DUP) 1/08	4/08	(DUP) 4/08	8/08	10/08
PCE	830	1000	1800	2200	2900	2400	1400	1900	1600	1700	1800	3100	3100	2100	2100
TCE	130	180	260	270	210	200	85	240	280	130	140	220	190	190	350
CIS-1,2-DCE	45	67	100	98	87	96	43	180	110	85	70	75	84	91	100
TRANS-1,2-DCE	18	18	58	30	17	29	<5	27	23	14	11	11	12	6.0	12

	2/09	8/09	12/09	3/10	6/10	2/12	4/12	7/12	10/12	2/13	4/13	7/13	8/13	6/14	
PCE	1800	2900	4400	3800	4800	2900	3700	2500	2000	2000	3000	3400	4000	1000	
TCE	370	370	680	560	830	470	530	330	360	530	560	620	680	190	
CIS-1,2-DCE	120	89	250	210	280	220	210	120	89	120	160	210	200	73	
TRANS-1,2-DCE	9.9	13	47	47	69	36	33	15	5.7	14	36	41	41	6.3	

MW-13	8/09
PCE	43
TCE	9.5
CIS-1,2-DCE	6.3

SW-1	8/01	3/07	7/07	11/07	1/08	4/08	8/08	10/08	2/09	8/09	12/09
STYRENE	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

	3/10	6/10	2/12	4/12	7/12	10/12	2/13	4/13	7/13	6/15
STYRENE	5.1	<5	<5	<5	<5	<5	<5	<5	<5	<5

MW-2	7/00	7/05	9/06	3/07	7/07	8/07	11/07	1/08	(DUP) 2/13	4/08	8/08	10/08	2/09	8/09	(DUP) 6/14	12/09
PCE	790	880	2700	1200	1200	250	660	370	370	410	510	350	620	220	220	160
TCE	303	440	560	280	140	61	220	120	150	150	170	130	230	240	400	840
CIS-1,2-DCE	626	2600	2200	2000	600	540	590	340	390	260	320	300	400	1100		
TRANS-1,2-DCE	171	450	98	160	30	37	16	8.8	14	10	12	6.1	7.2	70		
VC	3	55	150	620	710	1100	660	160	310	390	190	480	190	43		

	3/10	6/10	2/12	4/12	7/12	10/12	2/13	(DUP) 2/13	4/13	7/13	10/13	6/14	(DUP) 6/14
PCE	270	43	190	190	190	180	140	180	28	66	200	66	62
TCE	920	690	230	130	190	140	190	110	140	170	54	39	39
CIS-1,2-DCE	790	1200	380	170	190	190	200	100	570	520	590	490	490
TRANS-1,2-DCE	78	83	6.9	<5	<5	<5	<5	<5	8.8	11	17	19	18
VC	93	100	40	44	53	77	<2	40	63	62	130	180	190

MW-10	3/02	7/05
VOCs	ND	ND

MW-16	2/12	4/12	(DUP) 4/12	7/12	10/12	2/13	4/13	7/13	10/13
PCE	340	220	190	180	150	170	180	180	210
TCE	160	55	57	38	60	69	60	63	100
CIS-1,2-DCE	510	130	140	96	100	74	72	80	110
TRANS-1,2-DCE	85	19	20	7.6	5.4	5.1	7.8	7.9	16
VC	2.3	<2	<2	<2	<2	<2	<2	<2	<2

MW-3	7/01	7/05	7/05 (DUP)	10/08	10/08 (DUP)	2/09	8/09	12/09	3/10	6/10
CHLOROFORM	10	<5	<5	<5	<5	<5	<5	<5	<5	<5
PCE	<5	<5	<5	<5	<5	<5	<5	<5	6.4	<5

	6/10	2/12	4/12	7/12	10/12	2/13	4/13	7/13	10/13	
CHLOROFORM	<5	<5	<5	<5	<5	<5	<5	<5	<5	
PCE	<5	<5	<5	<5	<5	<5	<5	<5	<5	

MW-9	3/02	7/05
CHLOROFORM	7	<5
VOCS		ND

SW-3	7/05	3/07	7/07	11/07	1/08	4/08	8/08	10/08	2/09	8/09	12/09	
STYRENE	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	

	3/10	6/10	2/12	4/12	7/12	10/12	2/13	4/13	7/13	10/13	6/15
STYRENE	5.6	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

MW-12	4/02	7/05	3/07	MW-12R	7/07	11/07	1/08	4/08	(DUP) 8/08	8/08	10/08	2/09	8/09
VOCs	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND

	12/09	3/10	6/10	2/12	4/12	7/12	10/12	2/13	4/13	7/13	10/13	6/15
VOCs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

MW-11	4/02	7/05	3/07	MW-11R	7/07	11/07	1/08	4/08	8/08	10/08	2/09	8/09	12/09
PCE	18	<5	<5		<5	<5	<5	<5	<5	<5	<5	<5	<5
TCE	18	<5	<5		<5	<5	<5	8.6	<5	<5	<5	<5	<5
CIS-1,2-DCE	28	<5	<5		5.6	<5	5.5	26	<5	<5	7.6	<5	<5
TRANS-1,2-DCE	4	<5	<5		<5	<5	<5	<5	<5	<5	<5	<5	<5
TOLUENE	<5	<5	<5		<5	<5	<5	<5	<5	<5	<5	<5	<5
VC	2	<2	<2		<2	<2	<2	2.2	<2	<2	<2	<2	<2

	3/10	6/10	2/12	4/12	7/12	10/12	2/13	4/13	7/13	10/13	6/14	
PCE	110	DRY	92	26	DRY	<5	57	57	DRY	62	13	DRY
TCE	65		81	92		<5	72	160		151	17	
CIS-1,2-DCE	170		210	260		<5	120	190		211	62	
TRANS-1,2-DCE	11		14	13		<5	5.4	13		11	5.3	
TOLUENE	<5		<5	<5		2.5	<5	<5		<5	94	
VC	5.7		<2	10		6.6	<2	3.4		3.1	11	

SW-2	7/01	3/07	7/07	11/07	1/08	4/08	8/08	10/08	2/09	8/09	12/09	6/15
STYRENE	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

	3/10	6/10	2/12	4/12	7/12	(DUP) 7/12	10/12	2/13	4/13	7/13	10/13	(DUP) 6/15
STYRENE	5.6	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

MW-4	7/01	7/05	9/06	3/07	MW-4R	7/07	11/07	1/08	4/08	8/08	10/08	2/09	8/09	12/09
CIS-1,2-DCE	10	<5	14	<5.0		6.9	<5.0	<5	<5	DRY	<5	<5	<5	5.8
PCE	3	15	<5	5.9		6.9	8.4	<5	<5		<5	<5	<5	<5
TCE	<5	<5	<5	<5		<5	<5	<5	<5		<5	<5	<5	<5
VC	<2	<2	2	<2		<2	<2.0	<2	<2		<2	<2	<2	<2

	3/10	6/10	2/12	4/12	7/12	10/12	2/13	4/13	7/13	(DUP) 7/13	10/13	6/14	6/15
CIS-1,2-DCE	9.8	9.8	8.0	<5	6.4	6.6	<5	<5	5.7	5.7	7.0	6.5	8.4
PCE	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
TCE	5.8	6.5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
VC	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2

MW-5	7/01	7/05	3/07	7/07	11/07	1/08	4/08	8/08	(DUP) 10/08	10/08	2/09	(DUP) 2/09	8/09	
CIS-1,2-DCE	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	

	12/09	3/10	6/10	2/12	4/12	7/12	10/12	(DUP) 10/12	2/13	4/13	7/13	10/13	6/15
CIS-1,2-DCE	<5	<5	<5	<5	<5	<5	7.0	5.9	<5	<5	<5	<5	5.8

REV	DATE	BY	SUB	APP	DESCRIPTION

DESIGNED
DRAWN TG
CHECKED SF
IN CHARGE CTF
DATE 09/15/2015

FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

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2677 BUFORD HWY
ATLANTA, GEORGIA 30324 (404) 873-4761

CUMULATIVE GROUNDWATER TESTING RESULTS AND DELINEATION

SCALE AS SHOWN
CONTRACT 6305-05-0319
FIGURE NO. 9
REV
PAGE NO

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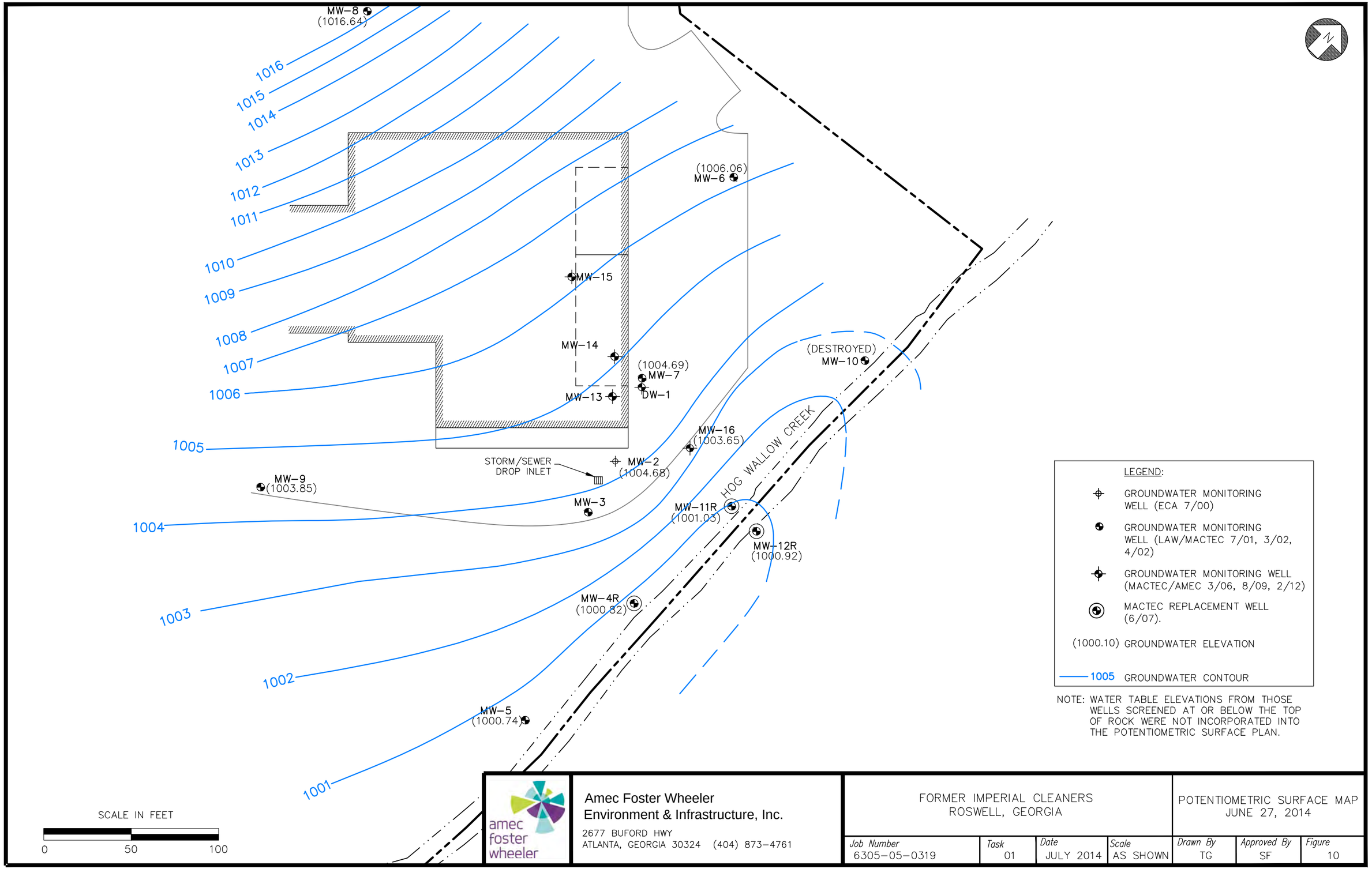

LEGEND:

- GROUNDWATER MONITORING WELL (ECA 7/00)
- GROUNDWATER MONITORING WELL (LAW/MACTEC 7/01, 3/02, 4/02)
- GROUNDWATER MONITORING WELL (MACTEC/AMEC 3/06, 8/09, 2/12)
- MACTEC REPLACEMENT WELL (6/07).
- (1000.10) GROUNDWATER ELEVATION
- 1005 GROUNDWATER CONTOUR

NOTE: WATER TABLE ELEVATIONS FROM THOSE WELLS SCREENED AT OR BELOW THE TOP OF ROCK WERE NOT INCORPORATED INTO THE POTENTIOMETRIC SURFACE PLAN.

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FORMER IMPERIAL CLEANERS
ROSWELL, GEORGIA

POTENTIOMETRIC SURFACE MAP
JUNE 27, 2014

Job Number	Task	Date	Scale	Drawn By	Approved By	Figure
6305-05-0319	01	JULY 2014	AS SHOWN	TG	SF	10

APPENDIX C
TABLES

TABLE 1 – MONITORING WELL DATA, 6/27/14

Well No.	Well Depth, BGS, Ft.	Screened Interval, Ft.	Ground Surface Elevation, Ft.	Top of Casing Elevation, Ft.	Depth to Water, TOC Ft.	Water Table Elevation, Ft.	Material Monitored
MW-2	24	14 - 24	1027.15	1026.80	22.12	1004.68	Soil
MW-3	52	47 - 52	1026.99	1026.83	24.06	1002.77	Bedrock
MW-4R	7.25	5 - 8	1006.87	1009.62	8.80	1000.82	Soil
MW-5	6	4 – 7	1005.06	1007.51	6.73	1000.78	Soil
MW-6	33	23 – 33	1030.35	1030.08	24.02	1006.06	Soil
MW-7	33	23 -33	1029.91	1029.59	24.90	1004.69	Transitional Zone
MW-8	21	11 - 21	1029.96	1029.61	12.97	1016.64	Soil
MW-9	30	20 - 30	1027.69	1027.44	22.87	1004.57	Soil
MW-11R	5.5	3 – 5.5	1005.32	1006.12	5.09	1001.03	Soil
MW-12R	5.5	3 – 5.5	1003.57	1004.82	3.90	1000.92	Soil
MW-16	33	23 – 33	1029.08	1028.69	25.04	1003.65	Transitional Zone
DW-1	55.5	50.5 – 55.5	1029.76	1029.46	24.47	1004.99	Bedrock

BGS - Below Ground Surface
TOC - Top of Casing

TABLE 2 – SUMMARY OF SLUG TEST DATA

Well No.	Hydraulic Conductivity, cm/sec (Slug-In)	Hydraulic Conductivity, cm/sec (Slug-Out)	Strata Measured
MW-3	20.05×10^{-5}	30.08×10^{-5}	Fractured Rock
MW-8	2.140×10^{-5}	6.553×10^{-5}	Residual Soil/Partially Weathered Rock
MW-9	9.396×10^{-5}	9.194×10^{-5}	Fill, Alluvial Soil, Residual Soil

cm/sec – centimeters per second

TABLE 3 - SUMMARY OF SOIL TESTING RESULTS, ug/kg

BOYKIN AND ASSOCIATES, INC. – March 1993

Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
B-1	1	3/93	100	<10	<100	<10
B-1	5	3/93	260	<10	<100	<10
B-2	1	3/93	32	<10	<100	<10
B-2	5	3/93	20	<10	<100	<10
B-3	8	3/93	60	<10	<100	<10
B-4	5	3/93	20	<10	<100	<10

ENVIRONMENTAL CORPORATION OF AMERICA – June-July 2000

Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
SB-1	5	6-7/00	<5	<5	<100	<5
SB-2/MW-2	5	6-7/00	14	<5	<100	<5
SB-3	1	6-7/00	532	<5	<100	<5
SB-4	2	6-7/00	210	<5	<100	<5
SB-5	1.5	6-7/00	359	<5	<100	<5
SB-6	2	6-7/00	7,700	<5	<100	<5

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC. (Amec FW) – May 2001

Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
GP-1-2	2	5/01	<5	<5	NT	NT
GP-1-10	10	5/01	<5	<5	NT	NT
GP-2-6	6	5/01	25	<5	NT	NT
GP-2-10	10	5/01	1,100	<5	NT	NT
GP-3-4	4	5/01	650	<5	NT	NT
GP-3-10	10	5/01	310	<5	NT	NT
GP-4-2	2	5/01	8	<5	NT	NT
GP-4-10	10	5/01	410	<5	NT	NT
GP-5-4	4	5/01	10	<5	NT	NT
GP-5-8	8	5/01	11	<5	NT	NT
GP-5-12	12	5/01	270	<5	NT	NT
GP-5-16	16	5/01	1,200	<5	NT	NT
GP-5-20	20	5/01	<5	<5	NT	NT

µg/kg - micrograms per kilogram (equivalent to parts per billion)

TABLE 3 - SUMMARY OF SOIL TESTING RESULTS, ug/kg (Continued)

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC. (Amec FW) – August 2001

Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
SB-7	5	8/01	<5.9	<5.9	<120	<5.9
SB-7	10	8/01	110	<5.9	<120	<5.9
SB-7	15	8/01	260	<6.3	<130	<6.3
SB-7	20	8/01	84	<6.1	<120	<6.1
SB-7	25	8/01	10	6.5	<120	<5.8
SB-8	5	8/01	<7.1	<7.1	<140	<7.1
MW-3	5	8/01	7.0	<5.7	<110	<5.7

LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC. (Amec FW) – March 2002

Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
MW-6	5	3/02	<6.1	<6.1	<120	<6.1
MW-8	5	3/02	<5.6	<5.6	<110	<5.6
MW-9	5	3/02	<6.1	<6.1	<120	<6.1
MW-10	2	3/02	<6.2	<6.2	<120	<6.2
HA-1	2	4/02	<6.9	<6.9	<140	<6.9
HA-2	2	4/02	<5.9	<5.9	<120	<5.9

MACTEC ENGINEERING AND CONSULTING, INC. (Amec FW) – July 2005

Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
HA-3	2	7/05	<3.6	<3.6	150	13
HA-4	2	7/05	<7.8	<7.8	<160	<7.8
HA-5	1	7/05	8.5	<5.5	<110	<5.5
HA-5 (Dup)	1	7/05	6.9	<5.5	<110	<5.5
HA-5	3	7/05	20	<5.2	<100	<5.2

µg/kg - micrograms per kilogram (equivalent to parts per billion)

TABLE 3 - SUMMARY OF SOIL TESTING RESULTS, ug/kg (Continued)

MACTEC ENGINEERING AND CONSULTING, INC. (Amec FW) – JANUARY 2006						
Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
SB-10	4	1/06	34	<6.3	<130	<6.3
SB-11	12	1/06	55	<5.3	<110	<5.3
SB-11	16	1/06	77	<6.1	<110	<6.1
SB-11	20	1/06	930	7.8	<120	<6.1
SB-12	8	1/06	34	<6.5	<130	<6.5
SB-12	16	1/06	230	<7.2	<140	<7.2
SB-12	20	1/06	21	<6.3	<130	<6.3
SB-13	8	1/06	41	<6.2	<120	<6.2
SB-13	12	1/06	100	<6.6	<130	<6.6
SB-13	16	1/06	640	<5.8	<120	<5.8
SB-16	8	1/06	<6.3	<6.3	<130	<6.3
SB-16	12	1/06	530	<6.0	<120	<6.0
SB-16	16	1/06	130	<6.3	<130	<6.3
SB-17	8	1/06	9	<7.4	<110	<7.4
SB-17	12	1/06	730	<6.5	<130	<6.5
SB-17	16	1/06	390	<7.1	<140	<7.1

µg/kg - micrograms per kilogram (equivalent to parts per billion)

TABLE 3 - SUMMARY OF SOIL TESTING RESULTS, ug/kg (Continued)

MACTEC ENGINEERING AND CONSULTING, INC. (Amec FW) – AUGUST 2009

Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
SB-21-20	20	8/09	<5.0	<7.3	<150	<7.3
SB-22-2.5	2.5	8/09	16	<6.3	<130	<6.3
SB-22-7.5	7.5	8/09	38	<4.9	<98	<4.9
SB-22-12.5	12.5	8/09	180	<5.4	<110	<5.4
SB-23-2	2	8/09	11	<5.8	<120	<5.8
SB-23-7.5	7.5	8/09	6.2	<5.8	<120	<5.8
SB-23-12.5	12.5	8/09	37	<5.3	<110	<5.3
SB-24-2	2	8/09	<5.0	<5.7	<110	<5.7
SB-24-5	5	8/09	5.5	<4.8	<96	<4.8
SB-24-7.5	7.5	8/09	13	<5.9	<120	<5.9
SB-25-2.5	2.5	8/09	<4.8	<4.8	<96	<4.8
SB-25-7.5	7.5	8/09	<5.4	<5.4	<110	<5.4
SB-25-12.5	12.5	8/09	390	<4.9	<98	<4.9
SB-26-5	5	8/09	35	<5.9	<120	<5.9
SB-26-17.5	17.5	8/09	<4.8	<4.8	<96	<4.8
SB-26-17.5 Ft. (Dup)	17.5	8/09	<5.0	<5.0	<100	<5.0
SB-27-12.5	12.5	8/09	960	<4.8	<96	<4.8
SB-28-12.5	12.5	8/09	240	<5.9	<120	<5.9
SB-28-12.5 Ft. (Dup)	12.5	8/09	200	<5.9	<120	<5.9
SB-28-20	20	8/09	1,100	<4.6	<93	<4.6

MACTEC ENGINEERING AND CONSULTING, INC. (Amec FW) – MARCH 2010

Sample No.	Depth, Ft.	Date Collected	PCE	TCE	Acetone	Toluene
SB-29	2	3/10	<7.3	<7.3	<150	<7.3
SB-29	12	3/10	48	<6.2	<120	<6.2
SB-29	20	3/10	180	<7.0	150	<7.0
SB-30	2	3/10	<7.5	<7.5	<150	<7.5
SB-30	12	3/10	440E	<8.1	<160	<8.1
SB-30	20	3/10	230	<7.7	<150	<7.7
SB-31	2	3/10	<6.0	<6.0	<120	<6.0
SB-31	12	3/10	<6.8	<6.8	<140	<6.8
SB-31	20	3/10	49	<7.8	<160	<7.8

µg/kg - micrograms per kilogram (equivalent to parts per billion)

TABLE 4 – SUMMARY OF GROUNDWATER/SURFACE WATER TESTING, µg/l

Well No.	Sampling Date	PCE	TCE	Trans-1,2-DCE	Cis-1,2-DCE	Vinyl Chloride	Chloroform	Styrene
MW-2	7/00	790	303	171	626	3	<2	<2
	7/8/05	880	440	450	2600	55	<5	<5
	9/11/06	2700	560	98	2200	150	<5	<5
	3/21/07	1200	280	160	2000	620	<5	<5
	7/3/07	1200	140	30	600	710	<5	<5
	8/17/07	250	61	37	540	1100	<5	<5
	11/07	660	220	16	590	660	<5	<5
	1/18/08	370	120	8.8	340	160	<5	<5
	4/29/08	410	150	14	390	310	<5	<5
	8/15/08	510	170	10	260	390	<5	<5
	10/28/08	350	130	12	320	190	<5	<5
	2/27/09	620	230	6.1	300	480	<5	<5
	8/19/09	220	240	7.2	400	190	<5	<5
	12/16/09	160	840	70	1100	43	<5	<5
	3/30/10	270	920	78	790	93	<5	<5
	6/30/10	43	690	83	1200	100	<5	<5
	2/9/12	190	230	6.9	380	40	<5	<5
	4/19/12	190	130	<5	170	47	<5	<5
	7/18/12	190	190	<5	190	53	<5	<5
	10/17/12	180	140	<5	190	77	<5	<5
	2/8/13	140	190	<5	200	<2	<5	<5
	2/8/13(dup)	180	110	<5	100	40	<5	<5
	4/18/13	28	140	8.8	570	63	<5	<5
	7/26/13	66	170	11	520	62	<5	<5
	10/16/13	200	54	17	590	130	<5	<5
	6/27/14	66	39	19	490	180	<5	<5
	6/27/14 (dup)	62	39	18	490	190	<5	<5
	12/15/14	43	57	110	440	22	<5	<5
	6/30/15	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed
MW-3	8/15/01	<2	<2	<2	<2	<2	10	<2
	7/13/05	<5	<5	<5	<5	<2	<5	<5
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	10/28/08(dup)	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	3/30/10	6.4	<5	<5	<5	<2	<5	<5
	6/30/10	<5	<5	<5	<5	<2	<5	<5
	6/30/10 (dup)	<5	<5	<5	<5	<2	<5	<5
	2/8/12	<5	<5	<5	<5	<2	<5	<5
	4/19/12	<5	<5	<5	<5	<2	<5	<5
	7/18/12	<5	<5	<5	<5	<2	<5	<5
	10/17/12	<5	<5	<5	<5	<2	<5	<5
	2/7/13	<5	<5	<5	<5	<2	<5	<5
	4/18/13	<5	<5	<5	<5	<2	<5	<5
	7/26/13	<5	<5	<5	<5	<2	<5	<5
	10/15/13	<5	<5	<5	<5	<2	<5	<5
	6/30/15	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed
MW-4	8/15/01	3	<2	<2	10	<2	<2	<2
	7/13/05	15	<5	<5	<5	<2	<5	<5
	9/11/06	<5	<5	<5	14	2	<5	<5
	3/21/07	5.9	<5	<5	<5	<2	<5	<5

TABLE 4 – SUMMARY OF GROUNDWATER/SURFACE WATER TESTING, µg/l

Well No.	Sampling Date	PCE	TCE	Trans-1,2-DCE	Cis-1,2-DCE	Vinyl Chloride	Chloroform	Styrene
MW-4R	7/3/07	6.9	<5	<5	6.9	<2	<5	<5
	11/07	8.4	<5	<5	<5	<2	<5	<5
	1/18/08	<5	<5	<5	<5	<2	<5	<5
	4/29/08	<5	<5	<5	<5	<2	<5	<5
	8/15/08	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	5.8	<5	<5	<5	<2	<5	<5
	3/30/10	<5	<5	<5	9.8	<2	<5	<5
	6/30/10	<5	5.8	<5	9.8	<2	<5	<5
	2/8/12	<5	6.5	<5	<5	<2	<5	<5
	2/8/12	<5	<5	<5	8.0	<2	<5	<5
	4/19/12	<5	<5	<5	<5	<2	<5	<5
	7/18/12	<5	<5	<5	6.4	<2	<5	<5
	10/17/12	<5	<5	<5	6.6	<2	<5	<5
	2/8/13	<5	<5	<5	<5	<2	<5	<5
	4/19/13	<5	<5	<5	<5	<2	<5	<5
	7/25/13	<5	<5	<5	5.7	<2	<5	<5
	7/25/13 (dup)	<5	<5	<5	5.7	<2	<5	<5
	8/15/13	<5	<5	<5	7.0	<2	<5	<5
	6/27/14	<5	<5	<5	6.5	<2	<5	<5
	12/15/14	<5	<5	<5	6.4	<2	<5	<5
	6/30/015	<5	<5	<5	8.4	<2	<5	<5
MW-5	8/15/01	<2	<2	<2	<2	<2	<2	<2
	7/8/05	<5	<5	<5	<5	<2	<5	<5
	3/21/07	<5	<5	<5	<5	<2	<5	<5
	7/3/07	<5	<5	<5	<5	<2	<5	<5
	11/07	<5	<5	<5	<5	<2	<5	<5
	1/18/08	<5	<5	<5	<5	<2	<5	<5
	4/29/08	<5	<5	<5	<5	<2	<5	<5
	8/15/08	<5	<5	<5	<5	<2	<5	<5
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	<5	<2	<5	<5
	2/27/09 (dup)	<5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	3/30/10	<5	<5	<5	<5	<2	<5	<5
	6/30/10	<5	<5	<5	<5	<2	<5	<5
	2/9/12	<5	<5	<5	<5	<2	<5	<5
	4/19/12	<5	<5	<5	<5	<2	<5	<5
	7/18/12	<5	<5	<5	<5	<2	<5	<5
	10/17/12	<5	<5	<5	7.0	<2	<5	<5
	10/17/12 (dup)	<5	<5	<5	5.9(dup)	<2	<5	<5
	2/8/13	<5	<5	<5	<5	<2	<5	<5
	4/19/13	<5	<5	<5	<5	<2	<5	<5
	7/26/13	<5	<5	<5	<5	<2	<5	<5
	10/16/13	<5	<5	<5	<5	<2	<5	<5
	6/30/15	<5	<5	<5	5.8	<2	<5	<5
MW-6	3/14/02	<2	<2	<2	<2	<2	<2	<2
	7/8/05	<5	<5	<5	<5	<5	<5	<5

TABLE 4 – SUMMARY OF GROUNDWATER/SURFACE WATER TESTING, µg/l								
Well No.	Sampling Date	PCE	TCE	Trans-1,2-DCE	Cis-1,2-DCE	Vinyl Chloride	Chloroform	Styrene
MW-7	3/14/02	830	130	18	45	<2	<2	<5
	7/8/05	1000	180	18	67	<2	<5	<5
	9/11/06	1800	260	58	100	<2	<5	<5
	3/21/07	2200	270	30	98	<2	<5	<5
	7/3/07	2900	210	37	87	<2	<5	<5
	7/3/07 (dup)	2400	200	29	96	<2	<5	<5
	8/17/07	1400	85	<5	43	<2	<5	<5
	11/07	1900	240	27	180	<2	<5	<5
	11/07 (dup)	1600	280	23	110	<2	<5	<5
	1/18/08	1700	130	14	85	<2	<5	<5
	1/18/08 (dup)	1800	140	11	70	<2	<5	<5
	4/29/08	3100	220	11	75	<2	<5	<5
	4/29/08 (dup)	3100	190	12	84	<2	<5	<5
	8/15/08	2100	190	6	91	<2	<5	<5
	10/28/08	2100	350	12	100	<2	<5	<5
	2/27/09	1800	370	9.9	120	<2	<5	<5
	8/19/09	2900	370	13	89	<2	<5	<5
	12/16/09	4400	680	47	250	<2	<5	<5
	3/30/10	3800	560	47	210	<2	<5	<5
	6/30/10	4800	830	69	280	<2	<5	<5
	2/9/12	2900	470	36	220	<2	<5	<5
	4/19/12	3700	530	33	210	<2	<5	<5
	7/18/12	2500	330	15	120	<2	<5	<5
	10/17/12	2000	360	5.7	89	<2	<5	<5
	2/7/13	2000	530	14	120	<2	<5	<5
	4/18/13	3000	560	36	160	<2	<5	<5
	7/26/13	3400	620	41	210	<2	<5	<5
	8/16/13	4000	680	41	200	<2	<5	<5
	6/27/14	1000	190	6.3	73	<2	<5	<5
	12/15/14	2500	940	50	410	<2	<5	<5
	12/15/14 (dup)	2900	960	60	410	<2	<5	<5
	6/30/015	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed
MW-8	3/14/02	<2	<2	<2	<2	<2	<2	<2
	7/8/05	<5	<5	<5	<5	<2	<5	<5
MW-9	3/14/02	<2	<2	<2	<2	<2	7	<2
	7/8/05	<5	<5	<5	<5	<2	<5	<5
MW-10	3/14/02	<2	<2	<2	<2	<2	<2	<2
	7/8/05	<5	<5	<5	<5	<5	<5	<5
MW-11	4/4/02	18	18	4	28	2	<2	<2
	7/8/05	<5	<5	<5	<5	<2	<5	<5
	3/21/07	<5	<5	<5	<5	<2	<5	<5

TABLE 4 – SUMMARY OF GROUNDWATER/SURFACE WATER TESTING, µg/l

Well No.	Sampling Date	PCE	TCE	Trans-1,2-DCE	Cis-1,2-DCE	Vinyl Chloride	Chloroform	Styrene
MW-11R			<5					
			<5					
	7/3/07	<5	<5	<5	5.6	<2	<5	<2
	11/07	<5	8.6	<5	<5	<2	<5	<5
	1/18/08	<5	<5	<5	5.5	<2	<5	<5
	4/29/08	<5	<5	<5	26	2.2	<5	<5
	8/15/08	<5	<5	<5	<5	<2	<5	<5
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	7.6	<2	<5	<5
	8/19/09	<5	65	<5	<5	<2	<5	<5
	12/16/09	<5	No	<5	<5	<2	<5	<5
	3/30/10	110	Sample	11	170	5.7	<5	<5
	6/30/10	No Sample	81	No Sample	No Sample	No Sample	No Sample	No Sample
	2/8/12	92	92	14	210	<2	<5	<5
	4/19/12	26	No	13	260	10	<5	<5
	7/18/12	No Sample	Sample	No Sample	No Sample	No Sample	No Sample	No Sample
	10/17/12	<5	<5	<5	<5	6.6	<5	<5
	2/8/13	57	72	5.4	120	<2	<5	<5
	4/19/13	57	160	13	190	3.4	<5	<5
	7/25/13	No Sample	No	No Sample	No Sample	No Sample	No Sample	No Sample
	10/15/13	62	Sample	11	211	3.1	<5	<5
	6/27/14	13	151	5.3	62	11	<5	<5
	12/15/14	72	17	14	150	<2	<5	<5
	6/30/015	No Sample	83	No Sample	No Sample	No Sample	No Sample	No Sample
			No Sample					
MW-12	6/12/02	<2	<2	<2	<2	<2	<2	<2
	7/13/05	<5	<5	<5	<5	<2	<5	<5
	3/21/07	<5	<5	<5	<5	<2	<5	<5
MW-12R	7/3/07	<5	<5	<5	<5	<2	<5	<5
	11/07	<5	<5	<5	<5	<2	<5	<5
	1/18/08	<5	<5	<5	<5	<2	<5	<5
	4/29/08	<5	<5	<5	<5	<2	<5	<5
	8/15/08	<5	<5	<5	<5	<2	<5	<5
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	3/30/10	<5	<5	<5	<5	<2	<5	<5
	6/30/10	<5	<5	<5	<5	<2	<5	<5
	2/8/12	<5	<5	<5	<5	<2	<5	<5
	4/19/12	<5	<5	<5	<5	<2	<5	<5
	7/18/12	<5	<5	<5	<5	<2	<5	<5
	10/17/12	<5	<5	<5	<5	<2	<5	<5
	2/8/13	<5	<5	<5	<5	<2	<5	<5
	4/19/13	<5	<5	<5	<5	<2	<5	<5
	7/26/13	<5	<5	<5	<5	<2	<5	<5
	10/15/13	<5	<5	<5	<5	<2	<5	<5
	6/30/15	<5	<5	<5	<5	<2	<5	<5
DW-1	3/22/06	<5	<5	<5	<5	<2	<5	<5
	10/28/08	6.6	<5	<5	<5	<2	<5	<5
	2/27/09	8.5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09 (dup)	<5	<5	<5	<5	<2	<5	<5
	3/30/10	26	<5	<5	<5	<2	<5	<5
	3/30/10 (dup)	27	<5	<5	<5	<2	<5	<5
	6/30/10	34	6.4	<5	<5	<2	<5	<5
	2/9/12	<5	<5	<5	<5	<2	<5	<5
	4/19/12	<5	<5	<5	<5	<2	<5	<5
	7/18/12	5.8	<5	<5	<5	<2	<5	<5
	10/17/12	<5	<5	<5	<5	<2	<5	<5
	2/7/13	<5	<5	<5	<5	<2	<5	<5
	4/18/13	<5	<5	<5	<5	<2	<5	<5
	4/18/13(dup)	<5	<5	<5	<5	<2	<5	<5
	7/26/13	<5	<5	<5	<5	<2	<5	<5
	10/15/13	<5	<5	<5	<5	<2	<5	<5
	6/27/14	<5	<5	<5	<5	<2	<5	<5
	12/15/14	<5	<5	<5	<5	<2	<5	<5
	6/30/15	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed

TABLE 4 – SUMMARY OF GROUNDWATER/SURFACE WATER TESTING, µg/l								
Well No.	Sampling Date	PCE	TCE	Trans-1,2-DCE	Cis-1,2-DCE	Vinyl Chloride	Chloroform	Styrene
MW-13	8/19/09	43	9.5	<5	6.3	<2	<5	<5
	6/30/15	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed
MW-14	8/19/09	<5	<5	<5	<5	<2	<5	<5
	8/19/09 (dup)	<5	<5	<5	<5	<2	<5	<5
	6/30/15	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed
MW-15	8/19/09	<5	<5	<5	<5	<2	<5	<5
	6/30/15	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed
MW-16	2/13/12	340	160	85	510	2.3	<5	<5
	4/19/12	220	55	19	130	<2	<5	<5
	4/19/12 (dup)	190	57	20	140	<2	<5	<5
	7/18/12	180	38	7.6	96	<2	<5	<5
	10/17/12	150	60	5.4	100	<2	<5	<5
	2/7/13	170	69	5.1	74	<2	<5	<5
	4/18/13	180	60	7.8	72	<2	<5	<5
	7/26/13	180	63	7.9	80	<2	<5	<5
	10/15/13	210	100	16	110	<2	<5	<5
	6/30/15	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed	Destroyed
SW-1	8/15/01	<5	<5	<5	<5	<2	<5	<5
	3/21/07	<5	<5	<5	<5	<2	<5	<5
	7/3/07	<5	<5	<5	<5	<2	<5	<5
	11/07	<5	<5	<5	<5	<2	<5	<5
	1/18/08	<5	<5	<5	<5	<2	<5	<5
	4/29/08	<5	<5	<5	<5	<2	<5	<5
	8/15/08	<5	<5	<5	<5	<2	<5	<5
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	3/30/10	<5	<5	<5	<5	<2	<5	5.1
	6/30/10	<5	<5	<5	<5	<2	<5	<5
	2/8/12	<5	<5	<5	<5	<2	<5	<5
	4/19/12	<5	<5	<5	<5	<2	<5	<5
	7/19/12	<5	<5	<5	<5	<2	<5	<5
	10/17/12	<5	<5	<5	<5	<2	<5	<5
	2/8/13	<5	<5	<5	<5	<2	<5	<5
	4/19/13	<5	<5	<5	<5	<2	<5	<5
	7/26/13	<5	<5	<5	<5	<2	<5	<5
	10/16/13	<5	<5	<5	<5	<2	<5	<5
	6/30/15	<5	<5	<5	<5	<2	<5	<5
SW-2	8/15/01	<5	<5	<5	<5	<2	<5	<5
	3/21/07	<5	<5	<5	<5	<2	<5	<5
	7/3/07	<5	<5	<5	<5	<2	<5	<5
	11/07	<5	<5	<5	<5	<2	<5	<5
	1/18/08	<5	<5	<5	<5	<2	<5	<5
	4/29/08	<5	<5	<5	<5	<2	<5	<5
	8/15/08	<5	<5	<5	<5	<2	<5	<5
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	3/30/10	<5	<5	<5	<5	<2	<5	5.6
	6/30/10	<5	<5	<5	<5	<2	<5	<5
	2/8/12	<5	<5	<5	<5	<2	<5	<5
	4/19/12	<5	<5	<5	<5	<2	<5	<5
	7/19/12	<5	<5	<5	<5	<2	<5	<5
	10/17/12	<5	<5	<5	<5	<2	<5	<5
	2/8/13	<5	<5	<5	<5	<2	<5	<5
	4/19/13	<5	<5	<5	<5	<2	<5	<5
	7/26/13	<5	<5	<5	<5	<2	<5	<5
	10/16/13	<5	<5	<5	<5	<2	<5	<5
	6/30/15	<5	<5	<5	<5	<2	<5	<5

TABLE 4 – SUMMARY OF GROUNDWATER/SURFACE WATER TESTING, µg/l								
Well No.	Sampling Date	PCE	TCE	Trans-1,2-DCE	Cis-1,2-DCE	Vinyl Chloride	Chloroform	Styrene
SW-3	7/8/05	<5	<5	<5	<5	<2	<5	<5
	3/2107	<5	<5	<5	<5	<2	<5	<5
	7/3/07	<5	<5	<5	<5	<2	<5	<5
	11/07	<5	<5	<5	<5	<2	<5	<5
	1/18/08	<5	<5	<5	<5	<2	<5	<5
	4/29/08	<5	<5	<5	<5	<2	<5	<5
	8/15/08	<5	<5	<5	<5	<2	<5	<5
	10/28/08	<5	<5	<5	<5	<2	<5	<5
	2/27/09	<5	<5	<5	<5	<2	<5	<5
	8/19/09	<5	<5	<5	<5	<2	<5	<5
	12/16/09	<5	<5	<5	<5	<2	<5	<5
	3/30/10	<5	<5	<5	<5	<2	<5	5.6
	6/30/10	<5	<5	<5	<5	<2	<5	<5
	2/8/12	<5	<5	<5	<5	<2	<5	<5
	4/19/12	<5	<5	<5	<5	<2	<5	<5
	7/19/12	<5	<5	<5	<5	<2	<5	<5
	10/17/12	<5	<5	<5	<5	<2	<5	<5
	2/8/13	<5	<5	<5	<5	<2	<5	<5
	4/19/13	<5	<5	<5	<5	<2	<5	<5
	7/26/13	<5	<5	<5	<5	<2	<5	<5
	10/16/13	<5	<5	<5	<5	<2	<5	<5
	10/16/13 (dup)	<5	<5	<5	<5	<2	<5	<5
	6/30/15	<5	<5	<5	<5	<2	<5	<5

µg/l - micrograms per liter

TABLE 5 – SUMMARY OF NATURAL ATTENUATION PARAMETERS IN GROUNDWATER

Well No.	Sampling Date	pH	Specific Conductivity mS/cm	Turbidity NTU	Dissolved Oxygen mg/L	Oxidation-Reduction Potential mV
MW-2	3/30/10	5.71	0.287	168	6.00	270
	6/30/10	5.90	0.910	7.8	2.02	-39
	2/9/12	6.00	0.366	9.4	2.33	-42
	4/19/12	6.16	0.339	13.2	0.18	-36
	7/18/12	6.04	0.343	56.8	0.46	-51
	10/17/12	6.25	0.388	256	0.51	-82
	2/8/13	6.01	0.375	38.7	0.11	-77
	4/18/13	5.76	0.315	13.4	0.00	-54
	7/26/13	5.69	0.214	0.0	0.40	-11
	10/16/13	5.60	0.273	4.0	0.56	-19
MW-5	3/30/10	5.68	0.198	11	6.71	157
	6/30/10	5.29	1.32	10.2	1.53	98
	2/9/12	5.51	0.678	8.7	1.1	117
	4/19/12	5.25	0.095	11.2	0.0	132
	7/18/12	5.37	0.122	7.9	0.0	188
	10/17/12	5.24	0.080	8.2	0.0	261
	2/8/13	5.27	0.111	6.7	0.29	193
	4/19/13	4.83	0.149	0.4	0.82	97
	7/26/13	5.38	0.175	0.8	1.35	39
	10/16/13	4.38	0.101	6.9	1.63	124
MW-7	3/30/10	4.81	0.231	2.91	4.64	479
	6/30/10	4.80	0.191	10.4	2.32	331
	2/9/12	4.78	0.178	8.7	1.18	341
	4/19/12	5.18	0.272	8.6	0.0	368
	7/18/12	5.07	0.219	6.9	0.0	307
	10/17/12	5.03	0.144	7.1	0.0	274
	2/8/13	4.96	0.155	7.3	0.0	327
	4/18/13	4.35	0.148	9.4	0.28	409
	7/26/13	4.86	0.237	3.7	1.85	313
	10/16/13	4.50	0.205	7.7	0.55	229

mg/l - milligrams per liter (parts per million)
µg/l - micrograms per liter (parts per billion)
mS/cm - microSiemens per centimeter
mV - millivolts
NTU - Nephelometric Turbidity Units

TABLE 5 – SUMMARY OF NATURAL ATTENUATION PARAMETERS IN GROUNDWATER (Continued)

Well No.	Sampling Date	Alkalinity mg/L	Sulfide mg/L	Ferrous Iron mg/L	Methane µg/l	Ethene µg/l	Ethane µg/l	Chloride mg/l	Nitrate mg/l	Nitrite mg/l	Sulfate mg/l
MW-2	3/30/10	102	<2.0	27.0	1400	11	<9	NT	NT	NT	NT
	6/30/10	103	<2.0	33.4	1100	10	<9	11	<0.25	<0.25	6.8
	2/9/12	141	<2.0	74.8	2300	30	<9	6.4	<0.25	<0.25	3.0
	4/19/12	96.8	<2.0	42.1	2300	36	<9	7.7	<0.25	<0.25	<1.0
	7/18/12	113	<2.0	44.6	3000	42	<9	6.7	<0.25	<0.25	<1.0
	10/18/12	112	<2.0	0.678	140	<7	<9	6.9	<0.25	<0.25	1.4
	2/8/13	179	<2.0	79.9	4700	63	<9	7.4	<0.25	<0.25	<1.0
	4/18/13	132	<2.0	44.6	490	21	<9	9.0	<0.25	<0.25	8.8
	7/26/13	78.0	<2.0	15.8	600	13	<9	9.6	<0.25	<0.25	5.4
	10/16/13	106	<2.0	24.4	1600	28	<9	6.3	<0.25	<0.25	6.3
MW-5	3/30/10	45.5	<2.0	1.40	21	<7	<9	NT	NT	NT	NT
	6/30/10	32.8	<2.0	1.38	44	<7	<9	15	0.71	<0.25	4.8
	2/9/12	21.1	<2.0	0.23	7	<7	<9	31	<0.25	<0.25	9.7
	4/19/12	22.3	<2.0	0.65	130	<7	<9	17	0.78	<0.25	2.5
	7/18/12	21.5	<2.0	0.422	18	<7	<9	13	1.4	<0.50	<2.0
	10/17/12	12.5	<2.0	<0.10	<4	<7	<9	12	2.0	<0.25	1.0
	2/8/13	28.9	<2.0	1.15	65	<7	<9	35	<0.25	<0.25	9.0
	4/9/13	32.8	<2.0	0.808	11	<7	<9	21	<0.25	<0.25	24
	7/26/13	80.8	<2.0	3.20	86	<7	<9	19	<0.25	<0.25	9.4
	10/16/13	25.1	<2.0	0.342	60	<7	<9	12	0.93	<0.25	1.1
MW-7	3/30/10	15.0	<2.0	<0.10	5.0	<7	<9	NT	NT	NT	NT
	6/30/10	15.9	<2.0	<0.10	14	<7	<9	24	4.7	<0.25	15
	2/9/12	10.4	<2.0	<0.10	15	<7	<9	20	5.1	<0.25	11
	4/19/12	<10.0	<2.0	<0.10	<4	<7	<9	20	5.4	<0.25	8.2
	7/18/12	12.7	<2.0	<0.10	<4	<7	<9	17	4.7	<1.2	14
	10/17/12	<10.0	<2.0	<0.10	16	<7	<9	12	2.3	<0.25	19
	2/8/13	17.0	<2.0	<0.10	<4	<7	<9	22	3.6	<0.25	21
	4/18/13	20.0	<2.0	<0.10	<4	<7	<9	22	6.9	<0.25	12
	7/26/13	15.1	<2.0	<0.10	11	<7	<9	25	<0.25	<0.25	16
	10/16/13	19.6	<2.0	<1.0	20	<7	<9	21	7.6	<0.25	13

mg/l - milligrams per liter (parts per million)
µg/l - micrograms per liter (parts per billion)

TABLE 6 – SOIL LEACHABILITY TESTING RESULTS

Constituent	GP-3-4 / LCH-1		GP-5-16 / LCH-2	
	Total VOC Result, µg/kg	SPLP Result, mg/l	Total VOC Result, µg/kg	SPLP Result, mg/l
PCE	650	<0.2	1,200	<0.2
TCE	<5	<0.2	<5	<0.2
Cis-1,2-DCE	<5	<0.2	<5	<0.2
Trans-1,2-DCE	<5	<0.2	<5	<0.2
Vinyl Chloride	<5	<0.2	<5	<0.2

µ/kg - micrograms per kilogram
mg/l - milligrams per liter

TABLE 7 – SUMMARY OF SOIL AND GROUNDWATER RISK REDUCTION STANDARDS

SOIL						
Regulated Substance	Highest Concentration, µg/kg	Location	Type 1 RRS Criteria, µg/kg (Residential Default)	Type 2 RRS Criteria, µg/kg (Residential Calculated)	Type 3 RRS Criteria, µg/kg (Non-Residential Default)	Type 4 RRS Criteria, µg/kg (Non-Residential Calculated)
Tetrachloroethene	1,200*	SB-6	500	170	500	1,200
Trichloroethene	7.8	SB-11	500	36	500	37
Acetone	150	HA-3	400,000	33,000	400,000	190,000
Toluene	13	HA-3	100,000	14,000	100,000	72,000
Cis-1,2-Dichloroethene	<5	NA	7,000	410	7,000	1,200
Trans-1,2-Dichloroethene	<5	NA	10,000	590	10,000	940
Vinyl Chloride	<5	NA	200	14	200	22
GROUNDWATER						
Regulated Substance	Highest Concentration, µg/l 3/30/10	Location	Type 1 RRS Criteria, µg/l (Residential Default)	Type 2 RRS Criteria, µg/l (Residential Calculated)	Type 3 RRS Criteria, µg/l (Non-Residential Default)	Type 4 RRS Criteria, µg/l (Non-Residential Calculated)
Tetrachloroethene	4,800	MW-7	5	19	5	98
Trichloroethene	830	MW-2	5	1	5	5.2
Cis-1,2-Dichloroethene	280	MW-2	70	31	70	200
Trans-1,2-Dichloroethene	83	MW-2	100	32	100	160
Vinyl Chloride	100	MW-2	2	1.1	2	3.3

µg/kg - micrograms per kilogram (equivalent to parts per billion)
µg/L - micrograms per liter (equivalent to parts per billion)
NA - Not applicable as compounds have not been detected on site
* - A higher concentration was detected during an early assessment but could not be duplicated by subsequent intense sampling.
Note - Shaded values indicate compliance with RRS

APPENDIX D
LABORATORY RESULTS

AES

ANALYTICAL ENVIRONMENTAL SERVICES, INC.

July 07, 2015

Steve Foley
AMEC E&I, Inc. - Plasters
2677 Buford Highway NE
Atlanta GA 30324

TEL: (404) 873-4761
FAX: (404) 817-0183

RE: Imperial Cleaners

Dear Steve Foley: Order No: 1506U51

Analytical Environmental Services, Inc. received 8 samples on 6/30/2015 1:56:00 PM for the analyses presented in following report.

No problems were encountered during the analyses. Additionally, all results for the associated Quality Control samples were within EPA and/or AES established limits. Any discrepancies associated with the analyses contained herein will be noted and submitted in the form of a project Case Narrative.
AES' certifications are as follows:
-NELAC/Florida Certification number E87582 for analysis of Environmental Water, soil/hazardous waste, and Drinking Water Microbiology, effective 07/01/15-06/30/16.
-AIHA-LAP, LLC Laboratory ID: 100671 for Industrial Hygiene samples (Organics, Inorganics), Environmental Lead (Paint, Soil, Dust Wipes, Air), and Environmental Microbiology (Fungal) Direct Examination, effective until 09/01/15.

These results relate only to the items tested. This report may only be reproduced in full.

If you have any questions regarding these test results, please feel free to call.

Tara Esbeck

Tara Esbeck
Project Manager

ANALYTICAL ENVIRONMENTAL SERVICES, INC
3080 Presidential Drive, Atlanta GA 30340-3704
TEL.: (770) 457-8177 / TOLL-FREE (800) 972-4889 / FAX: (770) 457-8188

CHAIN OF CUSTODY

Work Order: 1506U51

Date: ______ Page ____ of ____

COMPANY: AMEC
ADDRESS: 2677 BUFORD HWY ATLANTA, GA 30324
PHONE: 404-817-0152
FAX:
SAMPLED BY: STEPHEN R. FOLEY
SIGNATURE: [signature]

ANALYSIS REQUESTED: 8260 TCL VOC

Visit our website **www.aesatlanta.com** to check on the status of your results, place bottle orders, etc.

#	SAMPLE ID	DATE	TIME	Grab	Composite	Matrix (See codes)	8260 TCL VOC (Preservation: H+I)	REMARKS	No # of Containers
1	MW-5	6/30/15	1100	X		GW	X		2
2	MW-4R	↓	1145	↓		GW	↓		2
3	MW-12	↓	1250	↓		GW	↓		2
4	SW-1	↓	1005	↓		SW	↓		2
5	SW-2	↓	1010	↓		SW	↓		2
6	SW-3	↓	1015	↓		SW	↓		2
7	DUP	↓		↓		W	↓		2
8	TRIP BLANK	↓		↓			↓		2
9									
10									
11									
12									
13									
14									

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
1: [signature]	6/30/15 1356	1: [signature]	6/30/15 13:56
2:		2:	
3:		3:	

PROJECT INFORMATION
PROJECT NAME: IMPERIAL CLEANERS
PROJECT #: 6305-05-0319
SITE ADDRESS: ROSWELL, GA
SEND REPORT TO: STEVE FOLEY
INVOICE TO: (IF DIFFERENT FROM ABOVE)
QUOTE #: ______ PO#: C012403270

RECEIPT
Total # of Containers: 16

Turnaround Time Request
- (X) Standard 5 Business Days
- ○ 2 Business Day Rush
- ○ Next Business Day Rush
- ○ Same Day Rush (auth req.)
- ○ Other ______

STATE PROGRAM (if any): ______
E-mail? Y / N; Fax? Y / N
DATA PACKAGE: I II III IV

SPECIAL INSTRUCTIONS/COMMENTS:

SHIPMENT METHOD
OUT / / VIA:
IN / / VIA:
(CLIENT) FedEx UPS MAIL COURIER
GREYHOUND OTHER ______

SAMPLES RECEIVED AFTER 3PM OR ON SATURDAY ARE CONSIDERED RECEIVED THE NEXT BUSINESS DAY. IF TURNAROUND TIME IS NOT INDICATED, AES WILL PROCEED WITH STANDARD TAT OF SAMPLES.
SAMPLES ARE DISPOSED 30 DAYS AFTER REPORT COMPLETION UNLESS OTHER ARRANGEMENTS ARE MADE.

MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) DW = Drinking Water (Blanks) O = Other (specify) WW = Waste Water
PRESERVATIVE CODES: H+I = Hydrochloric acid + ice I = Ice only N = Nitric acid S+I = Sulfuric acid + ice S/M+I = Sodium Bisulfate/Methanol + ice O = Other (specify) NA = None

White Copy - Original; Yellow Copy - Client

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	MW-5
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015 11:00:00 AM
Lab ID:	1506U51-001	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
1,1,2-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
1,1-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
1,1-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
1,2-Dibromoethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
1,2-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
1,2-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
1,2-Dichloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
1,3-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
1,4-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
2-Butanone	BRL	50		ug/L	209810	1	07/07/2015 05:01	MD
2-Hexanone	BRL	10		ug/L	209810	1	07/07/2015 05:01	MD
4-Methyl-2-pentanone	BRL	10		ug/L	209810	1	07/07/2015 05:01	MD
Acetone	BRL	50		ug/L	209810	1	07/07/2015 05:01	MD
Benzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Bromodichloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Bromoform	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Bromomethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Carbon disulfide	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Carbon tetrachloride	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Chlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Chloroethane	BRL	10		ug/L	209810	1	07/07/2015 05:01	MD
Chloroform	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Chloromethane	BRL	10		ug/L	209810	1	07/07/2015 05:01	MD
cis-1,2-Dichloroethene	5.8	5.0		ug/L	209810	1	07/07/2015 05:01	MD
cis-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Cyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Dibromochloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Dichlorodifluoromethane	BRL	10		ug/L	209810	1	07/07/2015 05:01	MD
Ethylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Freon-113	BRL	10		ug/L	209810	1	07/07/2015 05:01	MD
Isopropylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
m,p-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Methyl acetate	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Methyl tert-butyl ether	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Methylcyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Methylene chloride	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
o-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	MW-5
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015 11:00:00 AM
Lab ID:	1506U51-001	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Tetrachloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Toluene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
trans-1,2-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
trans-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Trichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Trichlorofluoromethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:01	MD
Vinyl chloride	BRL	2.0		ug/L	209810	1	07/07/2015 05:01	MD
Surr: 4-Bromofluorobenzene	94	70.6-123		%REC	209810	1	07/07/2015 05:01	MD
Surr: Dibromofluoromethane	102	78.7-124		%REC	209810	1	07/07/2015 05:01	MD
Surr: Toluene-d8	108	81.3-120		%REC	209810	1	07/07/2015 05:01	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	MW-4R
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015 11:45:00 AM
Lab ID:	1506U51-002	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
1,1,2-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
1,1-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
1,1-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
1,2-Dibromoethane	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
1,2-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
1,2-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
1,2-Dichloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
1,3-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
1,4-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
2-Butanone	BRL	50		ug/L	209810	1	07/07/2015 04:37	MD
2-Hexanone	BRL	10		ug/L	209810	1	07/07/2015 04:37	MD
4-Methyl-2-pentanone	BRL	10		ug/L	209810	1	07/07/2015 04:37	MD
Acetone	BRL	50		ug/L	209810	1	07/07/2015 04:37	MD
Benzene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Bromodichloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Bromoform	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Bromomethane	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Carbon disulfide	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Carbon tetrachloride	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Chlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Chloroethane	BRL	10		ug/L	209810	1	07/07/2015 04:37	MD
Chloroform	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Chloromethane	BRL	10		ug/L	209810	1	07/07/2015 04:37	MD
cis-1,2-Dichloroethene	8.4	5.0		ug/L	209810	1	07/07/2015 04:37	MD
cis-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Cyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Dibromochloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Dichlorodifluoromethane	BRL	10		ug/L	209810	1	07/07/2015 04:37	MD
Ethylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Freon-113	BRL	10		ug/L	209810	1	07/07/2015 04:37	MD
Isopropylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
m,p-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Methyl acetate	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Methyl tert-butyl ether	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Methylcyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Methylene chloride	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
o-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	MW-4R
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015 11:45:00 AM
Lab ID:	1506U51-002	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Tetrachloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Toluene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
trans-1,2-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
trans-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Trichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Trichlorofluoromethane	BRL	5.0		ug/L	209810	1	07/07/2015 04:37	MD
Vinyl chloride	BRL	2.0		ug/L	209810	1	07/07/2015 04:37	MD
Surr: 4-Bromofluorobenzene	91.9	70.6-123		%REC	209810	1	07/07/2015 04:37	MD
Surr: Dibromofluoromethane	98.9	78.7-124		%REC	209810	1	07/07/2015 04:37	MD
Surr: Toluene-d8	105	81.3-120		%REC	209810	1	07/07/2015 04:37	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	MW-12
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015 12:50:00 PM
Lab ID:	1506U51-003	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
1,1,2-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
1,1-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
1,1-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
1,2-Dibromoethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
1,2-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
1,2-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
1,2-Dichloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
1,3-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
1,4-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
2-Butanone	BRL	50		ug/L	209810	1	07/07/2015 05:25	MD
2-Hexanone	BRL	10		ug/L	209810	1	07/07/2015 05:25	MD
4-Methyl-2-pentanone	BRL	10		ug/L	209810	1	07/07/2015 05:25	MD
Acetone	BRL	50		ug/L	209810	1	07/07/2015 05:25	MD
Benzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Bromodichloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Bromoform	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Bromomethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Carbon disulfide	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Carbon tetrachloride	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Chlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Chloroethane	BRL	10		ug/L	209810	1	07/07/2015 05:25	MD
Chloroform	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Chloromethane	BRL	10		ug/L	209810	1	07/07/2015 05:25	MD
cis-1,2-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
cis-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Cyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Dibromochloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Dichlorodifluoromethane	BRL	10		ug/L	209810	1	07/07/2015 05:25	MD
Ethylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Freon-113	BRL	10		ug/L	209810	1	07/07/2015 05:25	MD
Isopropylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
m,p-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Methyl acetate	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Methyl tert-butyl ether	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Methylcyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Methylene chloride	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
o-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	MW-12
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015 12:50:00 PM
Lab ID:	1506U51-003	**Matrix:**	Groundwater

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Tetrachloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Toluene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
trans-1,2-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
trans-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Trichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Trichlorofluoromethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:25	MD
Vinyl chloride	BRL	2.0		ug/L	209810	1	07/07/2015 05:25	MD
Surr: 4-Bromofluorobenzene	91.2	70.6-123		%REC	209810	1	07/07/2015 05:25	MD
Surr: Dibromofluoromethane	103	78.7-124		%REC	209810	1	07/07/2015 05:25	MD
Surr: Toluene-d8	107	81.3-120		%REC	209810	1	07/07/2015 05:25	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	SW-1
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015 10:05:00 AM
Lab ID:	1506U51-004	**Matrix:**	Surface Water

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
1,1,2-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
1,1-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
1,1-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
1,2-Dibromoethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
1,2-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
1,2-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
1,2-Dichloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
1,3-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
1,4-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
2-Butanone	BRL	50		ug/L	209810	1	07/07/2015 05:48	MD
2-Hexanone	BRL	10		ug/L	209810	1	07/07/2015 05:48	MD
4-Methyl-2-pentanone	BRL	10		ug/L	209810	1	07/07/2015 05:48	MD
Acetone	BRL	50		ug/L	209810	1	07/07/2015 05:48	MD
Benzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Bromodichloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Bromoform	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Bromomethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Carbon disulfide	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Carbon tetrachloride	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Chlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Chloroethane	BRL	10		ug/L	209810	1	07/07/2015 05:48	MD
Chloroform	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Chloromethane	BRL	10		ug/L	209810	1	07/07/2015 05:48	MD
cis-1,2-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
cis-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Cyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Dibromochloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Dichlorodifluoromethane	BRL	10		ug/L	209810	1	07/07/2015 05:48	MD
Ethylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Freon-113	BRL	10		ug/L	209810	1	07/07/2015 05:48	MD
Isopropylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
m,p-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Methyl acetate	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Methyl tert-butyl ether	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Methylcyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Methylene chloride	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
o-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	SW-1
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015 10:05:00 AM
Lab ID:	1506U51-004	**Matrix:**	Surface Water

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Tetrachloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Toluene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
trans-1,2-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
trans-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Trichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Trichlorofluoromethane	BRL	5.0		ug/L	209810	1	07/07/2015 05:48	MD
Vinyl chloride	BRL	2.0		ug/L	209810	1	07/07/2015 05:48	MD
Surr: 4-Bromofluorobenzene	91.5	70.6-123		%REC	209810	1	07/07/2015 05:48	MD
Surr: Dibromofluoromethane	101	78.7-124		%REC	209810	1	07/07/2015 05:48	MD
Surr: Toluene-d8	105	81.3-120		%REC	209810	1	07/07/2015 05:48	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	SW-2
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015 10:10:00 AM
Lab ID:	1506U51-005	**Matrix:**	Surface Water

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
1,1,2-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
1,1-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
1,1-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
1,2-Dibromoethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
1,2-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
1,2-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
1,2-Dichloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
1,3-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
1,4-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
2-Butanone	BRL	50		ug/L	209810	1	07/07/2015 06:11	MD
2-Hexanone	BRL	10		ug/L	209810	1	07/07/2015 06:11	MD
4-Methyl-2-pentanone	BRL	10		ug/L	209810	1	07/07/2015 06:11	MD
Acetone	BRL	50		ug/L	209810	1	07/07/2015 06:11	MD
Benzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Bromodichloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Bromoform	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Bromomethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Carbon disulfide	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Carbon tetrachloride	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Chlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Chloroethane	BRL	10		ug/L	209810	1	07/07/2015 06:11	MD
Chloroform	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Chloromethane	BRL	10		ug/L	209810	1	07/07/2015 06:11	MD
cis-1,2-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
cis-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Cyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Dibromochloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Dichlorodifluoromethane	BRL	10		ug/L	209810	1	07/07/2015 06:11	MD
Ethylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Freon-113	BRL	10		ug/L	209810	1	07/07/2015 06:11	MD
Isopropylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
m,p-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Methyl acetate	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Methyl tert-butyl ether	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Methylcyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Methylene chloride	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
o-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	SW-2
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015 10:10:00 AM
Lab ID:	1506U51-005	**Matrix:**	Surface Water

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Tetrachloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Toluene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
trans-1,2-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
trans-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Trichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Trichlorofluoromethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:11	MD
Vinyl chloride	BRL	2.0		ug/L	209810	1	07/07/2015 06:11	MD
Surr: 4-Bromofluorobenzene	90.8	70.6-123		%REC	209810	1	07/07/2015 06:11	MD
Surr: Dibromofluoromethane	99.2	78.7-124		%REC	209810	1	07/07/2015 06:11	MD
Surr: Toluene-d8	107	81.3-120		%REC	209810	1	07/07/2015 06:11	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	SW-3
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015 10:15:00 AM
Lab ID:	1506U51-006	**Matrix:**	Surface Water

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
1,1,2-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
1,1-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
1,1-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
1,2-Dibromoethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
1,2-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
1,2-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
1,2-Dichloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
1,3-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
1,4-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
2-Butanone	BRL	50		ug/L	209810	1	07/07/2015 06:35	MD
2-Hexanone	BRL	10		ug/L	209810	1	07/07/2015 06:35	MD
4-Methyl-2-pentanone	BRL	10		ug/L	209810	1	07/07/2015 06:35	MD
Acetone	BRL	50		ug/L	209810	1	07/07/2015 06:35	MD
Benzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Bromodichloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Bromoform	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Bromomethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Carbon disulfide	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Carbon tetrachloride	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Chlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Chloroethane	BRL	10		ug/L	209810	1	07/07/2015 06:35	MD
Chloroform	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Chloromethane	BRL	10		ug/L	209810	1	07/07/2015 06:35	MD
cis-1,2-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
cis-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Cyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Dibromochloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Dichlorodifluoromethane	BRL	10		ug/L	209810	1	07/07/2015 06:35	MD
Ethylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Freon-113	BRL	10		ug/L	209810	1	07/07/2015 06:35	MD
Isopropylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
m,p-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Methyl acetate	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Methyl tert-butyl ether	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Methylcyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Methylene chloride	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
o-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	SW-3
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015 10:15:00 AM
Lab ID:	1506U51-006	**Matrix:**	Surface Water

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Tetrachloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Toluene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
trans-1,2-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
trans-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Trichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Trichlorofluoromethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:35	MD
Vinyl chloride	BRL	2.0		ug/L	209810	1	07/07/2015 06:35	MD
Surr: 4-Bromofluorobenzene	95	70.6-123		%REC	209810	1	07/07/2015 06:35	MD
Surr: Dibromofluoromethane	99.5	78.7-124		%REC	209810	1	07/07/2015 06:35	MD
Surr: Toluene-d8	107	81.3-120		%REC	209810	1	07/07/2015 06:35	MD

Qualifiers:

*	Value exceeds maximum contaminant level	E	Estimated (value above quantitation range)
BRL	Below reporting limit	S	Spike Recovery outside limits due to matrix
H	Holding times for preparation or analysis exceeded	Narr	See case narrative
N	Analyte not NELAC certified	NC	Not confirmed
B	Analyte detected in the associated method blank	<	Less than Result value
>	Greater than Result value	J	Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	DUP
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015
Lab ID:	1506U51-007	**Matrix:**	Aqueous

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
1,1,2-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
1,1-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
1,1-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
1,2-Dibromoethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
1,2-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
1,2-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
1,2-Dichloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
1,3-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
1,4-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
2-Butanone	BRL	50		ug/L	209810	1	07/07/2015 06:58	MD
2-Hexanone	BRL	10		ug/L	209810	1	07/07/2015 06:58	MD
4-Methyl-2-pentanone	BRL	10		ug/L	209810	1	07/07/2015 06:58	MD
Acetone	BRL	50		ug/L	209810	1	07/07/2015 06:58	MD
Benzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Bromodichloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Bromoform	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Bromomethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Carbon disulfide	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Carbon tetrachloride	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Chlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Chloroethane	BRL	10		ug/L	209810	1	07/07/2015 06:58	MD
Chloroform	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Chloromethane	BRL	10		ug/L	209810	1	07/07/2015 06:58	MD
cis-1,2-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
cis-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Cyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Dibromochloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Dichlorodifluoromethane	BRL	10		ug/L	209810	1	07/07/2015 06:58	MD
Ethylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Freon-113	BRL	10		ug/L	209810	1	07/07/2015 06:58	MD
Isopropylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
m,p-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Methyl acetate	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Methyl tert-butyl ether	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Methylcyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Methylene chloride	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
o-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	DUP
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015
Lab ID:	1506U51-007	**Matrix:**	Aqueous

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Tetrachloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Toluene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
trans-1,2-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
trans-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Trichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Trichlorofluoromethane	BRL	5.0		ug/L	209810	1	07/07/2015 06:58	MD
Vinyl chloride	BRL	2.0		ug/L	209810	1	07/07/2015 06:58	MD
Surr: 4-Bromofluorobenzene	91.3	70.6-123		%REC	209810	1	07/07/2015 06:58	MD
Surr: Dibromofluoromethane	105	78.7-124		%REC	209810	1	07/07/2015 06:58	MD
Surr: Toluene-d8	110	81.3-120		%REC	209810	1	07/07/2015 06:58	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	TRIP BLANK
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015
Lab ID:	1506U51-008	**Matrix:**	Aqueous

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
1,1,1-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
1,1,2,2-Tetrachloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
1,1,2-Trichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
1,1-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
1,1-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
1,2,4-Trichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
1,2-Dibromo-3-chloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
1,2-Dibromoethane	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
1,2-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
1,2-Dichloroethane	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
1,2-Dichloropropane	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
1,3-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
1,4-Dichlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
2-Butanone	BRL	50		ug/L	209810	1	07/07/2015 00:41	MD
2-Hexanone	BRL	10		ug/L	209810	1	07/07/2015 00:41	MD
4-Methyl-2-pentanone	BRL	10		ug/L	209810	1	07/07/2015 00:41	MD
Acetone	BRL	50		ug/L	209810	1	07/07/2015 00:41	MD
Benzene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Bromodichloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Bromoform	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Bromomethane	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Carbon disulfide	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Carbon tetrachloride	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Chlorobenzene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Chloroethane	BRL	10		ug/L	209810	1	07/07/2015 00:41	MD
Chloroform	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Chloromethane	BRL	10		ug/L	209810	1	07/07/2015 00:41	MD
cis-1,2-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
cis-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Cyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Dibromochloromethane	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Dichlorodifluoromethane	BRL	10		ug/L	209810	1	07/07/2015 00:41	MD
Ethylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Freon-113	BRL	10		ug/L	209810	1	07/07/2015 00:41	MD
Isopropylbenzene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
m,p-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Methyl acetate	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Methyl tert-butyl ether	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Methylcyclohexane	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Methylene chloride	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
o-Xylene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD

Qualifiers:

- * Value exceeds maximum contaminant level
- BRL Below reporting limit
- H Holding times for preparation or analysis exceeded
- N Analyte not NELAC certified
- B Analyte detected in the associated method blank
- > Greater than Result value
- E Estimated (value above quantitation range)
- S Spike Recovery outside limits due to matrix
- Narr See case narrative
- NC Not confirmed
- < Less than Result value
- J Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc **Date:** 7-Jul-15

Client:	AMEC E&I, Inc. - Plasters	**Client Sample ID:**	TRIP BLANK
Project Name:	Imperial Cleaners	**Collection Date:**	6/30/2015
Lab ID:	1506U51-008	**Matrix:**	Aqueous

Analyses	Result	Reporting Limit	Qual	Units	BatchID	Dilution Factor	Date Analyzed	Analyst
TCL VOLATILE ORGANICS SW8260B				**(SW5030B)**				
Styrene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Tetrachloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Toluene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
trans-1,2-Dichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
trans-1,3-Dichloropropene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Trichloroethene	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Trichlorofluoromethane	BRL	5.0		ug/L	209810	1	07/07/2015 00:41	MD
Vinyl chloride	BRL	2.0		ug/L	209810	1	07/07/2015 00:41	MD
Surr: 4-Bromofluorobenzene	92.1	70.6-123		%REC	209810	1	07/07/2015 00:41	MD
Surr: Dibromofluoromethane	95.3	78.7-124		%REC	209810	1	07/07/2015 00:41	MD
Surr: Toluene-d8	103	81.3-120		%REC	209810	1	07/07/2015 00:41	MD

Qualifiers:

*	Value exceeds maximum contaminant level	E	Estimated (value above quantitation range)
BRL	Below reporting limit	S	Spike Recovery outside limits due to matrix
H	Holding times for preparation or analysis exceeded	Narr	See case narrative
N	Analyte not NELAC certified	NC	Not confirmed
B	Analyte detected in the associated method blank	<	Less than Result value
>	Greater than Result value	J	Estimated value detected below Reporting Limit

Analytical Environmental Services, Inc.

Sample/Cooler Receipt Checklist

Client AMEC Work Order Number 1506U51

Checklist completed by [signature] 6/30/15
Signature Date

Carrier name: FedEx __ UPS __ Courier __ Client ✓ US Mail __ Other _____

Shipping container/cooler in good condition? Yes ✓ No __ Not Present __

Custody seals intact on shipping container/cooler? Yes __ No __ Not Present ✓

Custody seals intact on sample bottles? Yes __ No __ Not Present ✓

Container/Temp Blank temperature in compliance? (0°≤6°C)* Yes ✓ No __

Cooler #1 3.5°C Cooler #2 _____ Cooler #3 _____ Cooler #4 _____ Cooler#5 _____ Cooler #6 _____

Chain of custody present? Yes ✓ No __

Chain of custody signed when relinquished and received? Yes ✓ No __

Chain of custody agrees with sample labels? Yes ✓ No __

Samples in proper container/bottle? Yes ✓ No __

Sample containers intact? Yes ✓ No __

Sufficient sample volume for indicated test? Yes ✓ No __

All samples received within holding time? Yes ✓ No __

Was TAT marked on the COC? Yes ✓ No __

Proceed with Standard TAT as per project history? Yes __ No __ Not Applicable ✓

Water - VOA vials have zero headspace? No VOA vials submitted __ Yes ✓ No __

Water - pH acceptable upon receipt? Yes ✓ No __ Not Applicable __

Adjusted? _____ Checked by _____

Sample Condition: Good ✓ Other(Explain) _____

(For diffusive samples or AIHA lead) Is a known blank included? Yes __ No ✓

See Case Narrative for resolution of the Non-Conformance.

* Samples do not have to comply with the given range for certain parameters.

\\Aes_server\l\Sample Receipt\My Documents\COCs and pH Adjustment Sheet\Sample_Cooler_Recipt_Checklist_Rev1.rtf

Client: AMEC E&I, Inc. - Plasters
Project Name: Imperial Cleaners
Workorder: 1506U51

ANALYTICAL QC SUMMARY REPORT

BatchID: 209810

Sample ID: **MB-209810** Client ID: Units: **ug/L** Prep Date: **07/06/2015** Run No: **295399**
SampleType: **MBLK** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **209810** Analysis Date: **07/06/2015** Seq No: **6298301**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1,1-Trichloroethane	BRL	5.0									
1,1,2,2-Tetrachloroethane	BRL	5.0									
1,1,2-Trichloroethane	BRL	5.0									
1,1-Dichloroethane	BRL	5.0									
1,1-Dichloroethene	BRL	5.0									
1,2,4-Trichlorobenzene	BRL	5.0									
1,2-Dibromo-3-chloropropane	BRL	5.0									
1,2-Dibromoethane	BRL	5.0									
1,2-Dichlorobenzene	BRL	5.0									
1,2-Dichloroethane	BRL	5.0									
1,2-Dichloropropane	BRL	5.0									
1,3-Dichlorobenzene	BRL	5.0									
1,4-Dichlorobenzene	BRL	5.0									
2-Butanone	BRL	50									
2-Hexanone	BRL	10									
4-Methyl-2-pentanone	BRL	10									
Acetone	BRL	50									
Benzene	BRL	5.0									
Bromodichloromethane	BRL	5.0									
Bromoform	BRL	5.0									
Bromomethane	BRL	5.0									
Carbon disulfide	BRL	5.0									
Carbon tetrachloride	BRL	5.0									
Chlorobenzene	BRL	5.0									
Chloroethane	BRL	10									
Chloroform	BRL	5.0									
Chloromethane	BRL	10									

Qualifiers:

>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		

Client: AMEC E&I, Inc. - Plasters
Project Name: Imperial Cleaners
Workorder: 1506U51

ANALYTICAL QC SUMMARY REPORT

BatchID: 209810

Sample ID: **MB-209810** Client ID: Units: **ug/L** Prep Date: **07/06/2015** Run No: **295399**
SampleType: **MBLK** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **209810** Analysis Date: **07/06/2015** Seq No: **6298301**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
cis-1,2-Dichloroethene	BRL	5.0									
cis-1,3-Dichloropropene	BRL	5.0									
Cyclohexane	BRL	5.0									
Dibromochloromethane	BRL	5.0									
Dichlorodifluoromethane	BRL	10									
Ethylbenzene	BRL	5.0									
Freon-113	BRL	10									
Isopropylbenzene	BRL	5.0									
m,p-Xylene	BRL	5.0									
Methyl acetate	BRL	5.0									
Methyl tert-butyl ether	BRL	5.0									
Methylcyclohexane	BRL	5.0									
Methylene chloride	BRL	5.0									
o-Xylene	BRL	5.0									
Styrene	BRL	5.0									
Tetrachloroethene	BRL	5.0									
Toluene	BRL	5.0									
trans-1,2-Dichloroethene	BRL	5.0									
trans-1,3-Dichloropropene	BRL	5.0									
Trichloroethene	BRL	5.0									
Trichlorofluoromethane	BRL	5.0									
Vinyl chloride	BRL	2.0									
Surr: 4-Bromofluorobenzene	46.24	0	50.00		92.5	70.6	123				
Surr: Dibromofluoromethane	46.32	0	50.00		92.6	78.7	124				
Surr: Toluene-d8	50.18	0	50.00		100	81.3	120				

Qualifiers:

>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		

Client: AMEC E&I, Inc. - Plasters
Project Name: Imperial Cleaners
Workorder: 1506U51

ANALYTICAL QC SUMMARY REPORT

BatchID: 209810

Sample ID: **LCS-209810** Client ID: Units: **ug/L** Prep Date: **07/06/2015** Run No: **295399**
SampleType: **LCS** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **209810** Analysis Date: **07/06/2015** Seq No: **6298300**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1-Dichloroethene	62.28	5.0	50.00		125	64.2	137				
Benzene	53.14	5.0	50.00		106	72.8	128				
Chlorobenzene	42.25	5.0	50.00		84.5	72.3	126				
Toluene	54.40	5.0	50.00		109	74.9	127				
Trichloroethene	51.46	5.0	50.00		103	70.5	134				
Surr: 4-Bromofluorobenzene	48.37	0	50.00		96.7	70.6	123				
Surr: Dibromofluoromethane	46.89	0	50.00		93.8	78.7	124				
Surr: Toluene-d8	52.32	0	50.00		105	81.3	120				

Sample ID: **1506U17-001AMS** Client ID: Units: **ug/L** Prep Date: **07/06/2015** Run No: **295399**
SampleType: **MS** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **209810** Analysis Date: **07/07/2015** Seq No: **6298996**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1-Dichloroethene	703.4	50	500.0		141	60.5	156				
Benzene	580.6	50	500.0		116	70	135				
Chlorobenzene	444.6	50	500.0		88.9	70.5	132				
Toluene	594.1	50	500.0		119	70.5	137				
Trichloroethene	1968	50	500.0	1378	118	71.8	139				
Surr: 4-Bromofluorobenzene	444.6	0	500.0		88.9	70.6	123				
Surr: Dibromofluoromethane	477.3	0	500.0		95.5	78.7	124				
Surr: Toluene-d8	524.8	0	500.0		105	81.3	120				

Sample ID: **1506U17-001AMSD** Client ID: Units: **ug/L** Prep Date: **07/06/2015** Run No: **295399**
SampleType: **MSD** TestCode: **TCL VOLATILE ORGANICS SW8260B** BatchID: **209810** Analysis Date: **07/07/2015** Seq No: **6298997**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
1,1-Dichloroethene	615.6	50	500.0		123	60.5	156	703.4	13.3	20	
Benzene	548.5	50	500.0		110	70	135	580.6	5.69	20	

Qualifiers:

>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		

Client: AMEC E&I, Inc. - Plasters
Project Name: Imperial Cleaners
Workorder: 1506U51

ANALYTICAL QC SUMMARY REPORT

BatchID: 209810

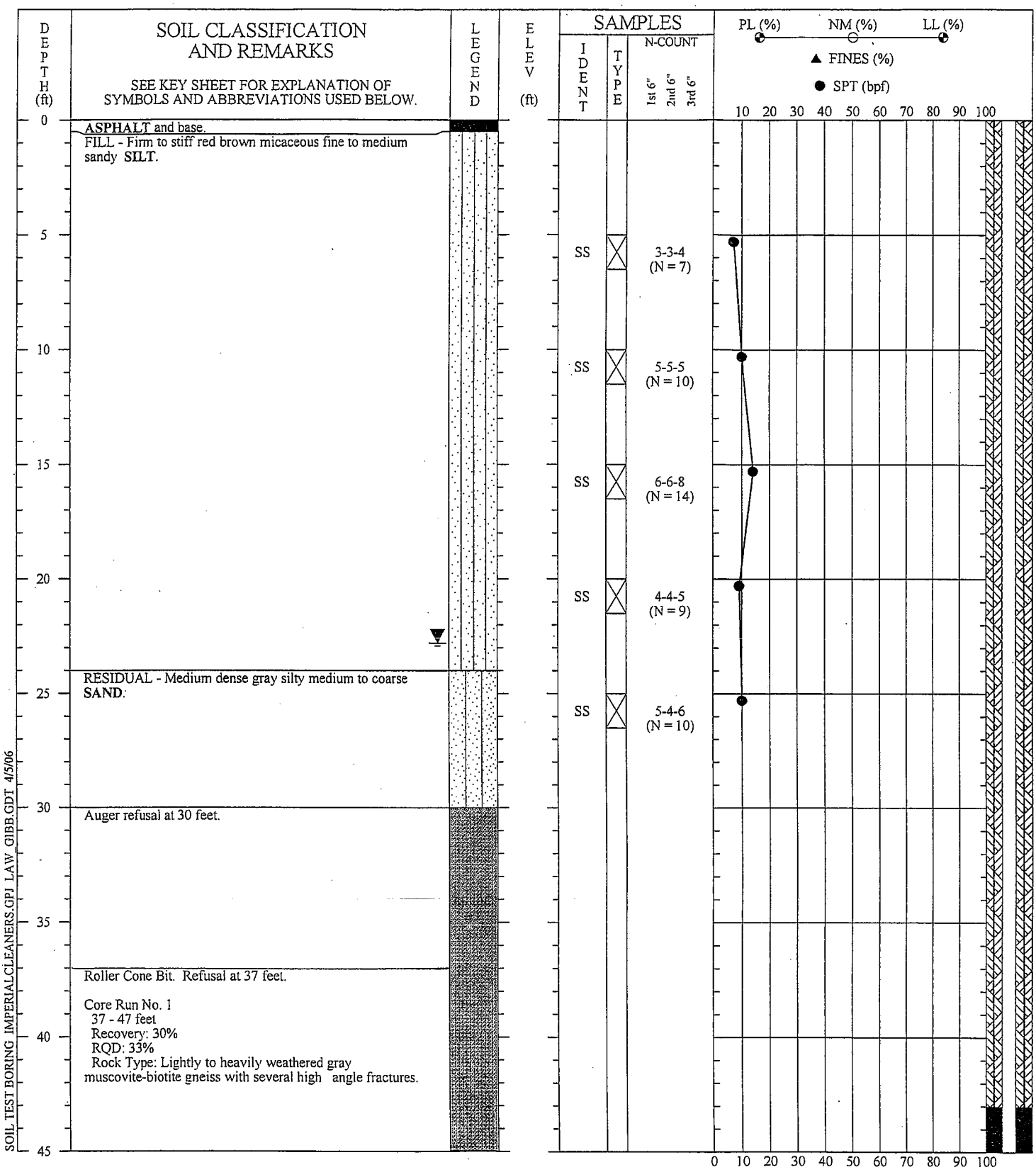
Sample ID: **1506U17-001AMSD** Client ID:
SampleType: **MSD** TestCode: **TCL VOLATILE ORGANICS SW8260B**
Units: **ug/L** Prep Date: **07/06/2015** Run No: **295399**
BatchID: **209810** Analysis Date: **07/07/2015** Seq No: **6298997**

Analyte	Result	RPT Limit	SPK value	SPK Ref Val	%REC	Low Limit	High Limit	RPD Ref Val	%RPD	RPD Limit	Qual
Chlorobenzene	415.1	50	500.0		83.0	70.5	132	444.6	6.86	20	
Toluene	551.0	50	500.0		110	70.5	137	594.1	7.53	20	
Trichloroethene	1834	50	500.0	1378	91.2	71.8	139	1968	7.02	20	
Surr: 4-Bromofluorobenzene	459.0	0	500.0		91.8	70.6	123	444.6	0	0	
Surr: Dibromofluoromethane	490.2	0	500.0		98.0	78.7	124	477.3	0	0	
Surr: Toluene-d8	540.6	0	500.0		108	81.3	120	524.8	0	0	

Qualifiers:

>	Greater than Result value	<	Less than Result value	B	Analyte detected in the associated method blank
BRL	Below reporting limit	E	Estimated (value above quantitation range)	H	Holding times for preparation or analysis exceeded
J	Estimated value detected below Reporting Limit	N	Analyte not NELAC certified	R	RPD outside limits due to matrix
Rpt Lim	Reporting Limit	S	Spike Recovery outside limits due to matrix		

APPENDIX E
BORING LOGS



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

DRILLER:	MACTEC-Jimmy Oglesby
EQUIPMENT:	CME-75
METHOD:	Hollow Stem Auger/Core Drill
HOLE DIA.:	8 inches/4 inches
REMARKS:	Type III well installed. Stabilized groundwater depth 22.80 feet on 8/23/01.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: MW-3
PROJECT: Imperial Cleaners
LOCATION: Atlanta, Georgia
DRILLED: August 7, 2001
PROJECT NO.: 6305-05-0319

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	SAMPLES N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100
45	Core Run No. 2 47-52 feet Recovery: 100% RQD: 21% Rock Type: Lightly weathered grey muscovite-biotite gneiss.						
50	Boring terminated at 52 feet.						
55							
60							
65							
70							
75							
80							
85							
90							0 10 20 30 40 50 60 70 80 90 100

SOIL IMPERIAL.GPJ LAW_GIBB.GDT 9/26/01

DRILLER: Oglesby
EQUIPMENT: CME 75
METHOD: Hollow Stem Auger/Core Drill
HOLE DIA.: 8"/4"
REMARKS: Type III well installed. Stabilized groundwater depth 22.80 feet on 8/23/01.

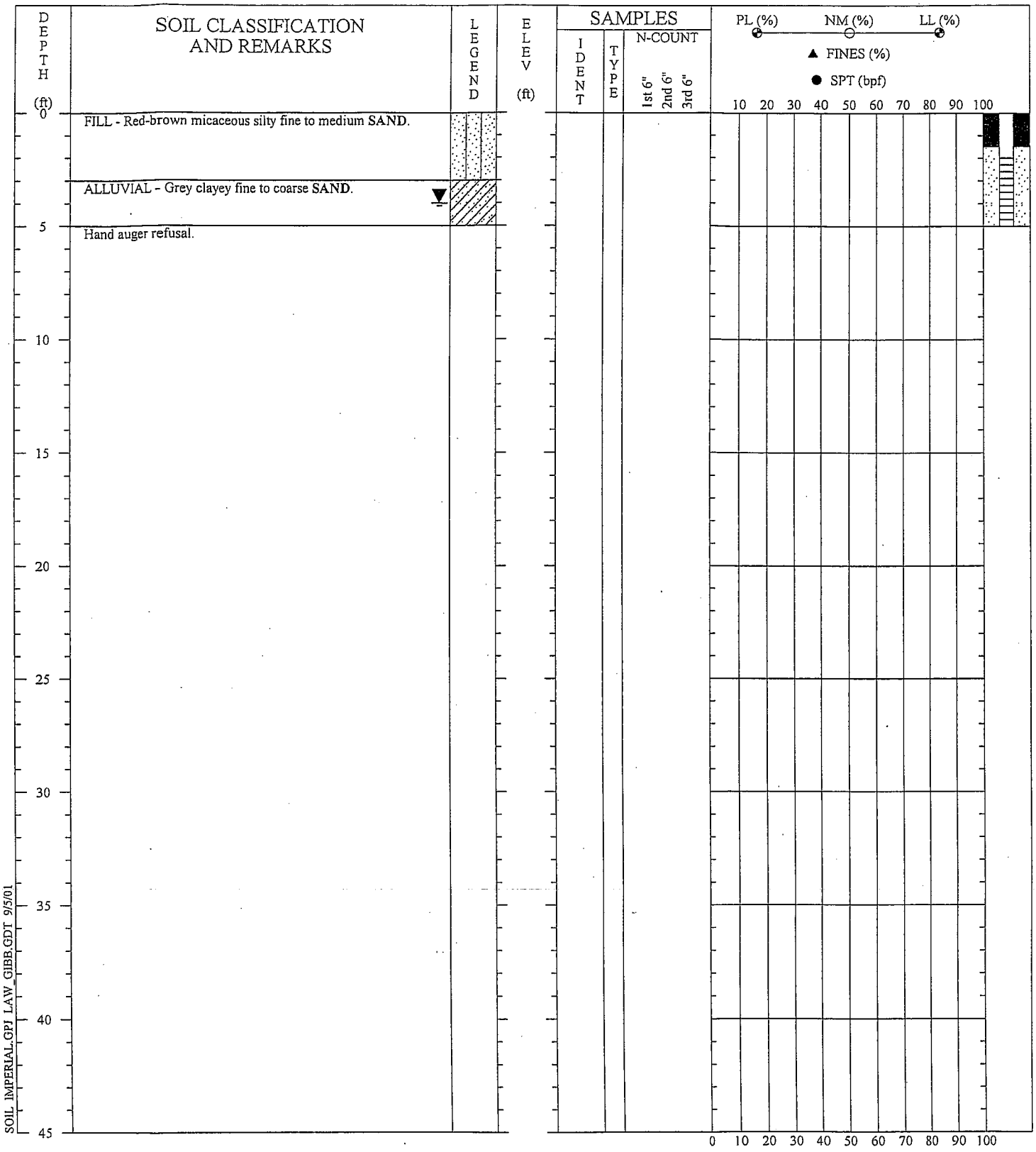
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-3
PROJECT: Imperial Cleaners

DRILLED: August 7, 2001
PROJECT No: 12110-1-0013 **PAGE 2 OF 2**

LAW
LAWGIBB Group Member



SOIL IMPERIAL.GPJ LAW_GIBB.GDT 9/5/01

DRILLER: Foley
EQUIPMENT: Hand Auger
METHOD:
HOLE DIA.: 4"
REMARKS: Type I groundwater monitoring well installed.

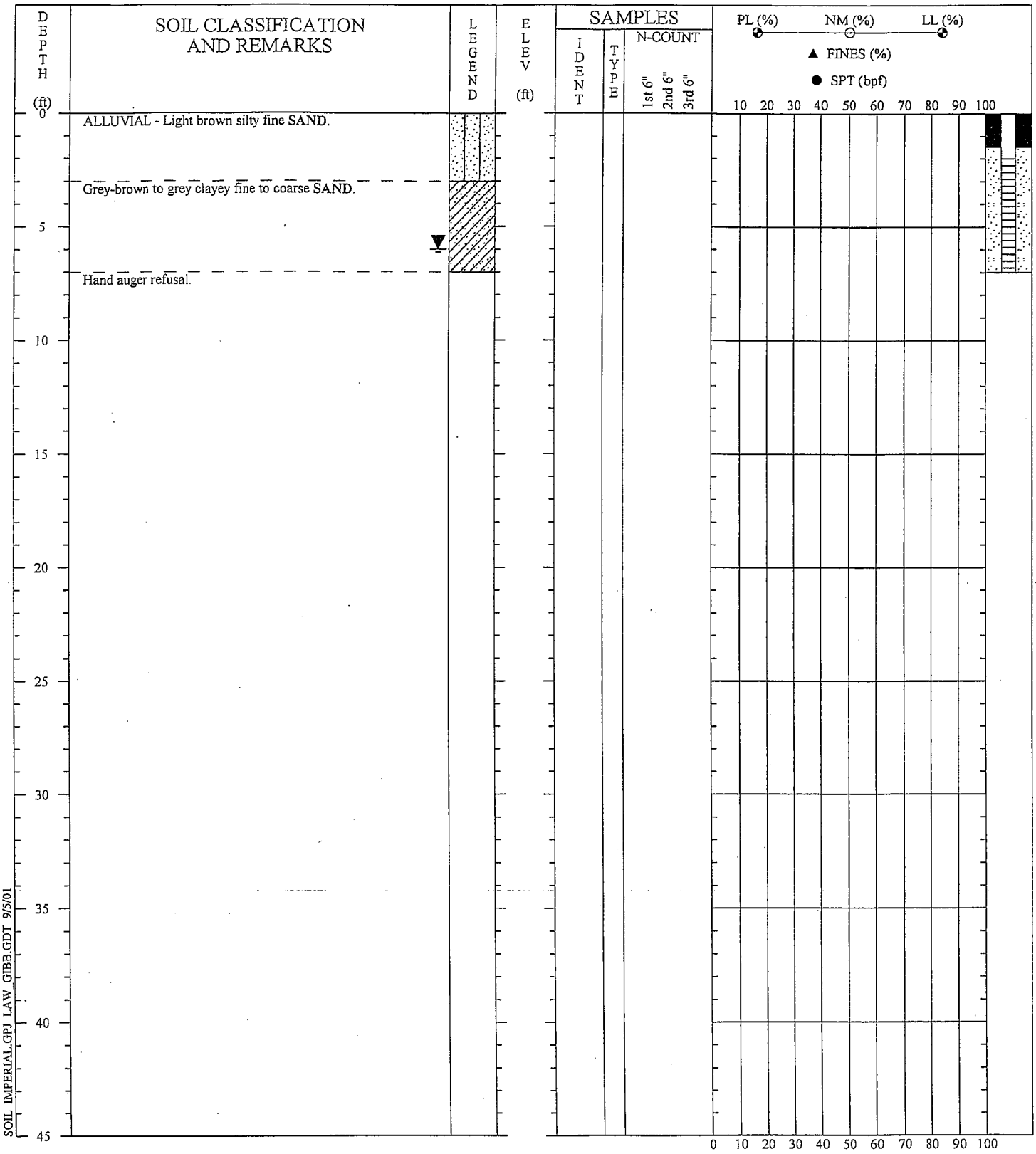
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-4
PROJECT: Imperial Cleaners

DRILLED: August 14, 2001
PROJECT No: 12110-1-0013 PAGE 1 OF 1

LAW
LAWGIBB Group Member



SOIL IMPERIAL.GPJ LAW GIBB.GDT 9/5/01

DRILLER: Foley
EQUIPMENT: Hand Auger
METHOD:
HOLE DIA.: 4"
REMARKS: Type I groundwater monitoring well installed.

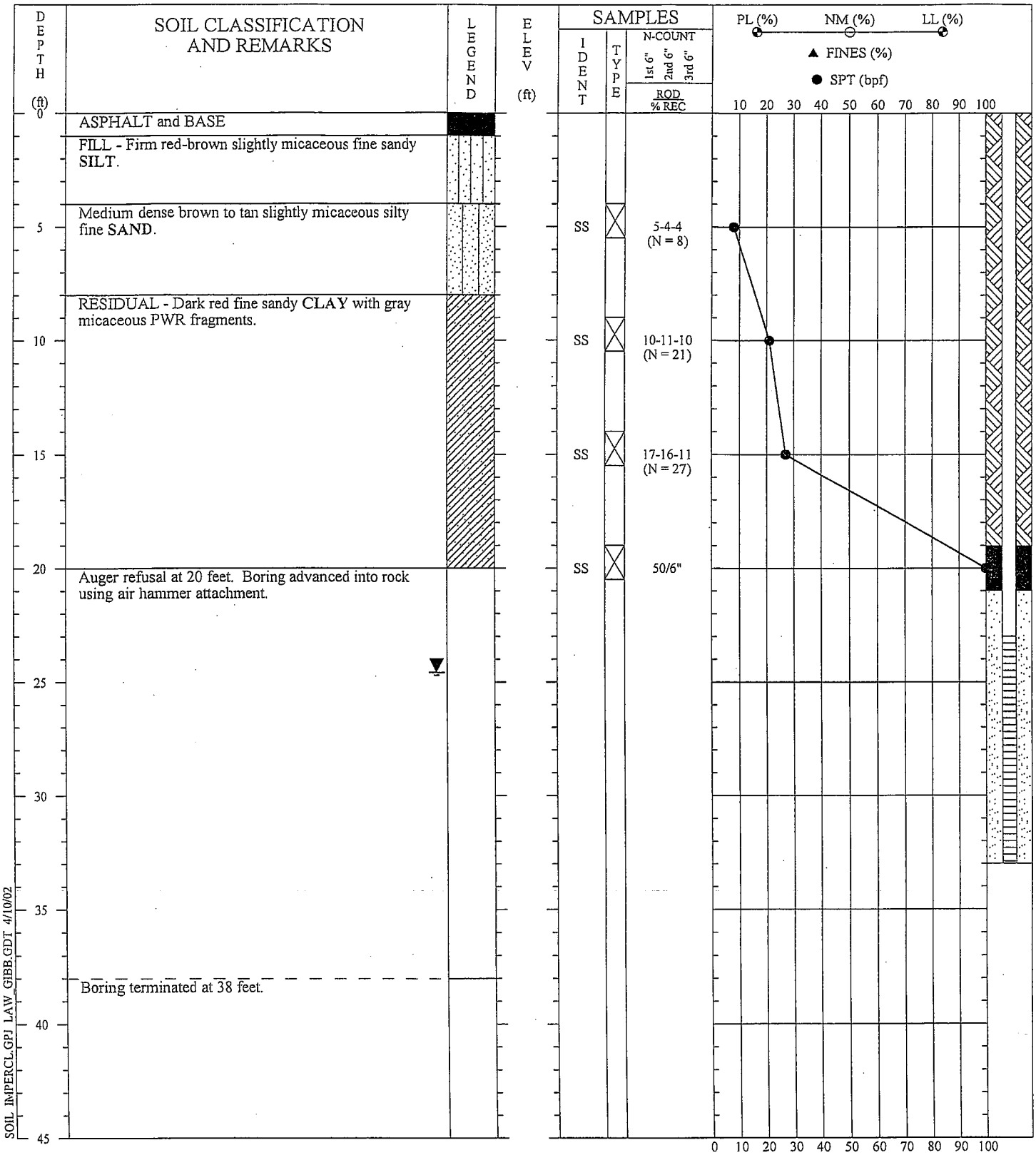
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-5
PROJECT: Imperial Cleaners

DRILLED: August 14, 2001
PROJECT No: 12110-1-0013 PAGE 1 OF 1

LAW
LAWGIBB Group Member



SOIL_IMPERCL.GPJ LAW_GIBB.GDT 4/10/02

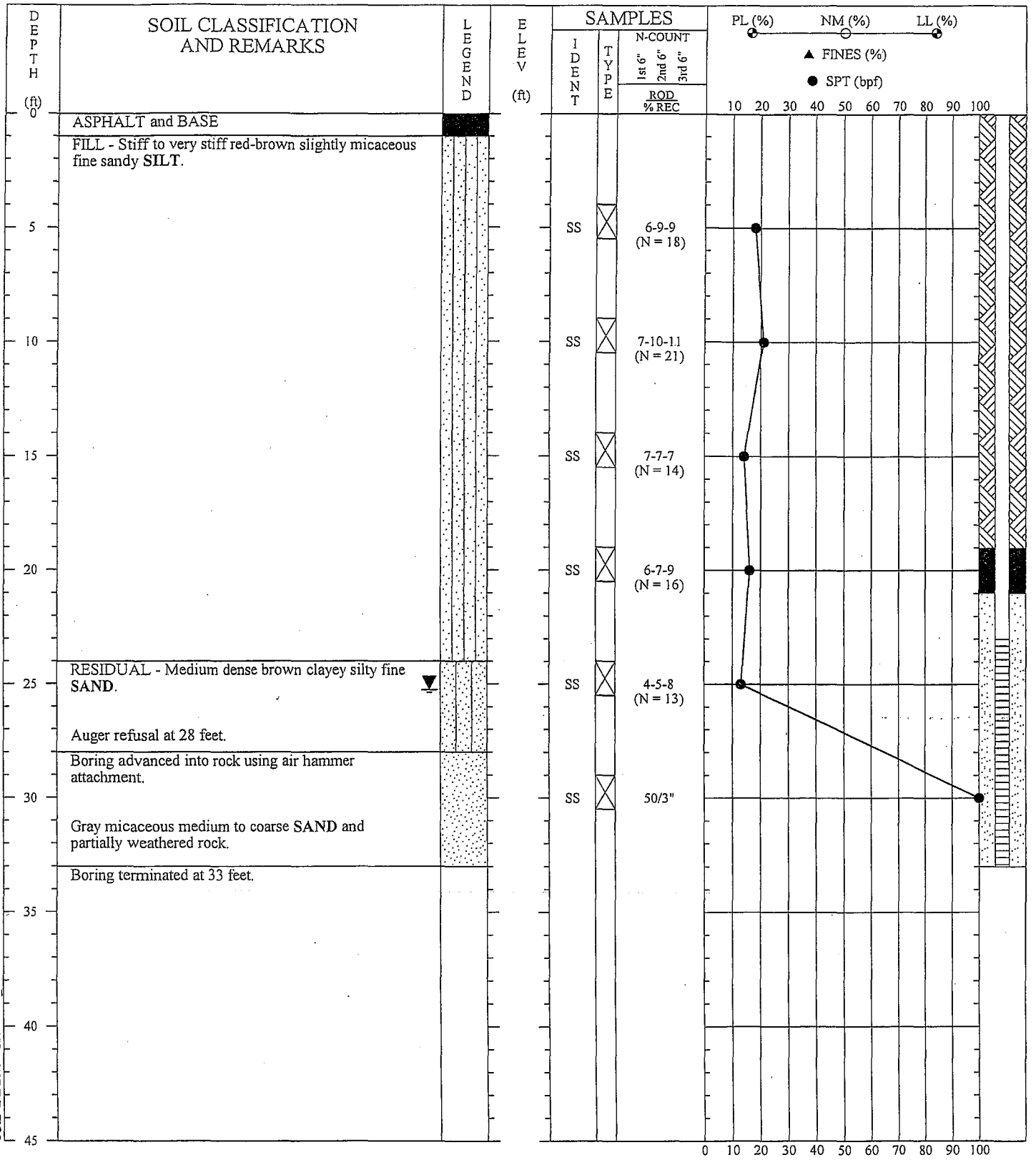
DRILLER:	Piedmont
EQUIPMENT:	CME 75
METHOD:	Hollow Stem Auger/Air Hammer
HOLE DIA.:	8"/4"
REMARKS:	Type II monitoring well installed. Stabilized groundwater depth 24.58 feet.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-6
PROJECT: Imperial Cleaners
LOCATION:
DRILLED: March 4, 2002
PROJECT NO: 12110-1-0013 PAGE 1 OF 1

LAW
LAWGIBB Group Member



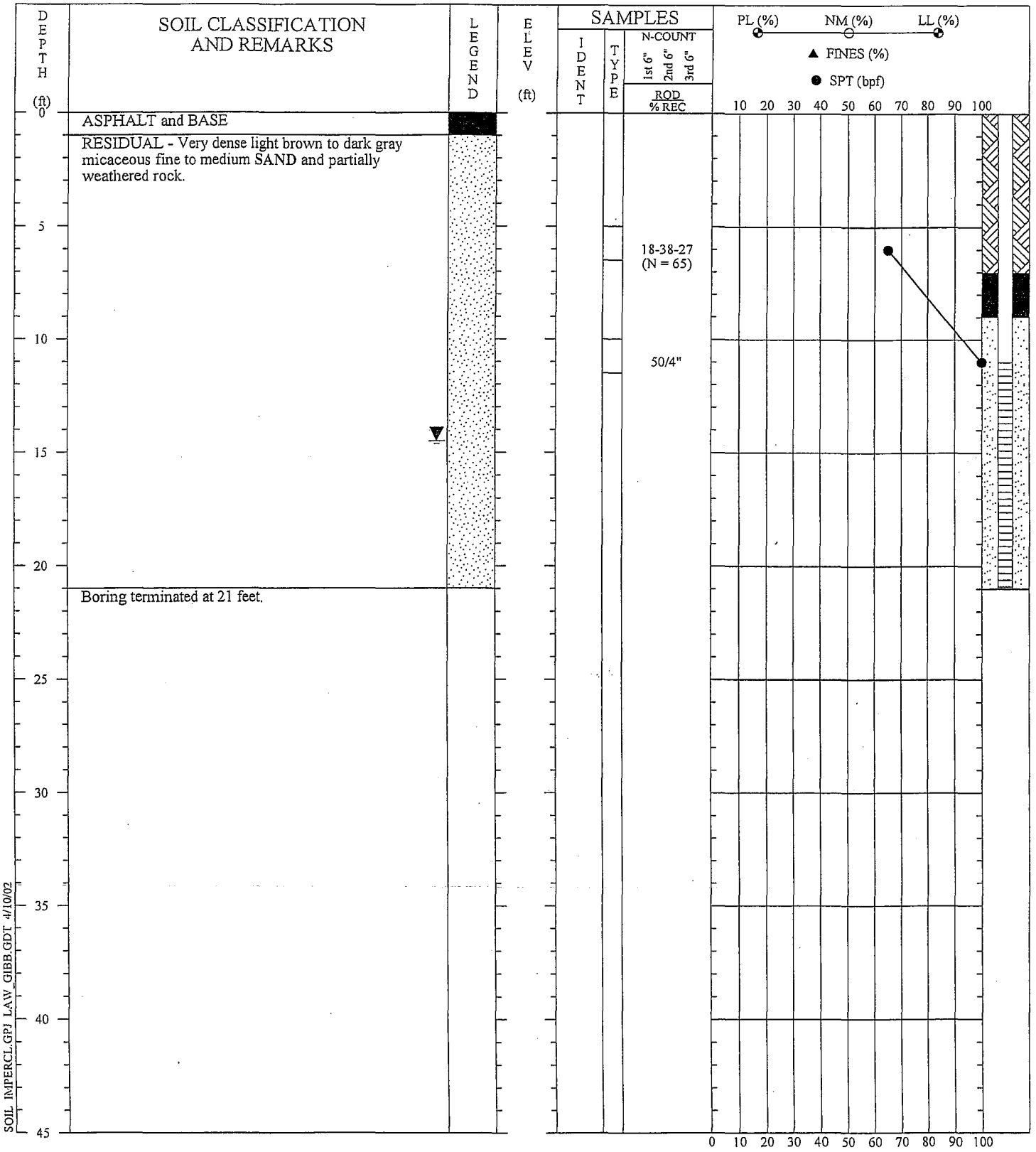
DRILLER:	Piedmont
EQUIPMENT:	CME 75
METHOD:	Hollow Stem Auger/Air Hammer
HOLE DIA.:	8"/4"
REMARKS:	Type II monitoring well installed. Stabilized groundwater depth 25.26 feet.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-7
PROJECT: Imperial Cleaners
LOCATION:
DRILLED: March 4, 2002
PROJECT NO: 12110-1-0013

LAW
LAWGIBB Group Member



SOIL IMPERCL.GPJ LAW_GIBB.GDT 4/10/02

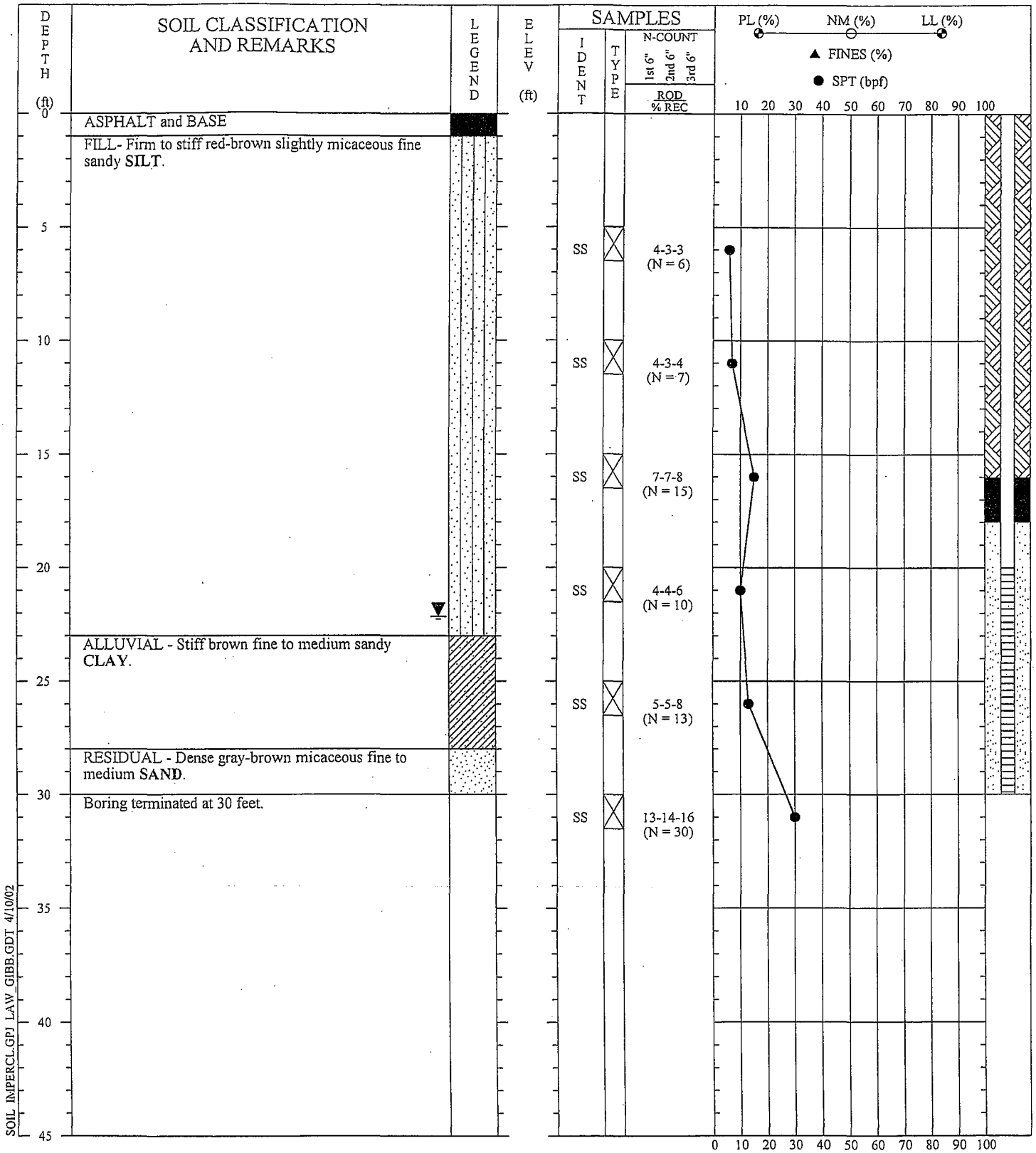
DRILLER:	Piedmont
EQUIPMENT:	CME 75
METHOD:	Hollow Stem Auger
HOLE DIA.:	8"
REMARKS:	Type II monitoring well installed. Stabilized groundwater depth 14.52 feet.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO:	MW-8
PROJECT:	Imperial Cleaners
LOCATION:	
DRILLED:	March 5, 2002
PROJECT NO:	12110-1-0013

LAW
LAWGIBB Group Member



DRILLER:	Piedmont
EQUIPMENT:	CME 75
METHOD:	Hollow Stem Auger
HOLE DIA.:	8"
REMARKS:	Type II monitoring well installed. Stabilized groundwater depth 22.15 feet.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-9
PROJECT: Imperial Cleaners
LOCATION:
DRILLED: March 5, 2002
PROJECT NO: 12110-1-0013

LAW
LAWGIBB Group Member

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)
0	FILL - Red-brown micaceous silty fine to medium SAND.		
	ALLUVIAL - Gray-brown clayey fine to coarse SAND.		
	Hand auger refusal at 3.5 feet.		

SAMPLES: IDENT | TYPE | N-COUNT (1st 6" / 2nd 6" / 3rd 6") | ROD % REC

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

10 20 30 40 50 60 70 80 90 100

0 10 20 30 40 50 60 70 80 90 100

SOIL IMPERCL.GPJ LAW_GIBB.GDT 4/10/02

DRILLER:	Steve Foley
EQUIPMENT:	Hand Auger
METHOD:	
HOLE DIA.:	4"
REMARKS:	Type I monitoring well installed. Stabilized groundwater depth 5.15 feet below TOC.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO:	MW-10
PROJECT:	Imperial Cleaners
LOCATION:	
DRILLED:	March 14, 2002
PROJECT NO:	12110-1-0013

LAW
LAWGIBB Group Member

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)	SAMPLES: IDENT	SAMPLES: TYPE	SAMPLES: N-COUNT (1st 6" / 2nd 6" / 3rd 6") / ROD % REC
0	ALLUVIAL - Brown clayey medium to coarse SAND.					
	Hand auger refusal at 3 feet.					

PL (%) NM (%) LL (%)
▲ FINES (%)
● SPT (bpf)

10 20 30 40 50 60 70 80 90 100

5 10 15 20 25 30 35 40 45

0 10 20 30 40 50 60 70 80 90 100

SOIL IMPERCL.GPJ LAW_GIBB.GDT 4/10/02

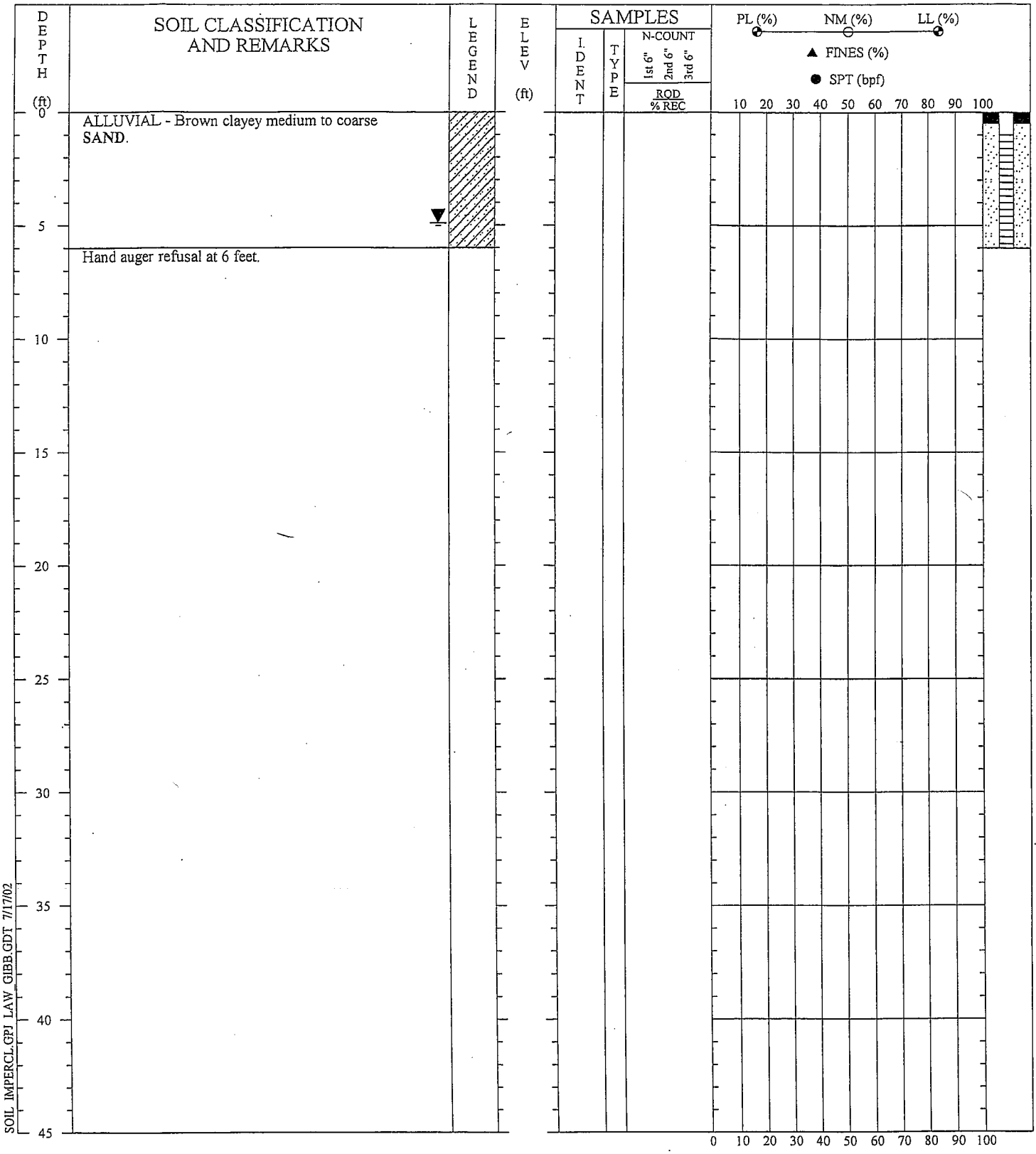
DRILLER: Steve Foley
EQUIPMENT: Hand Auger
METHOD:
HOLE DIA.: 4"
REMARKS: Type I monitoring well installed. Stabilized groundwater depth 5.80 feet below TOC.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: MW-11
PROJECT: Imperial Cleaners
LOCATION:
DRILLED: April 4, 2002
PROJECT NO: 12110-1-0013 **PAGE 1 OF 1**

LAW
LAWGIBB Group Member



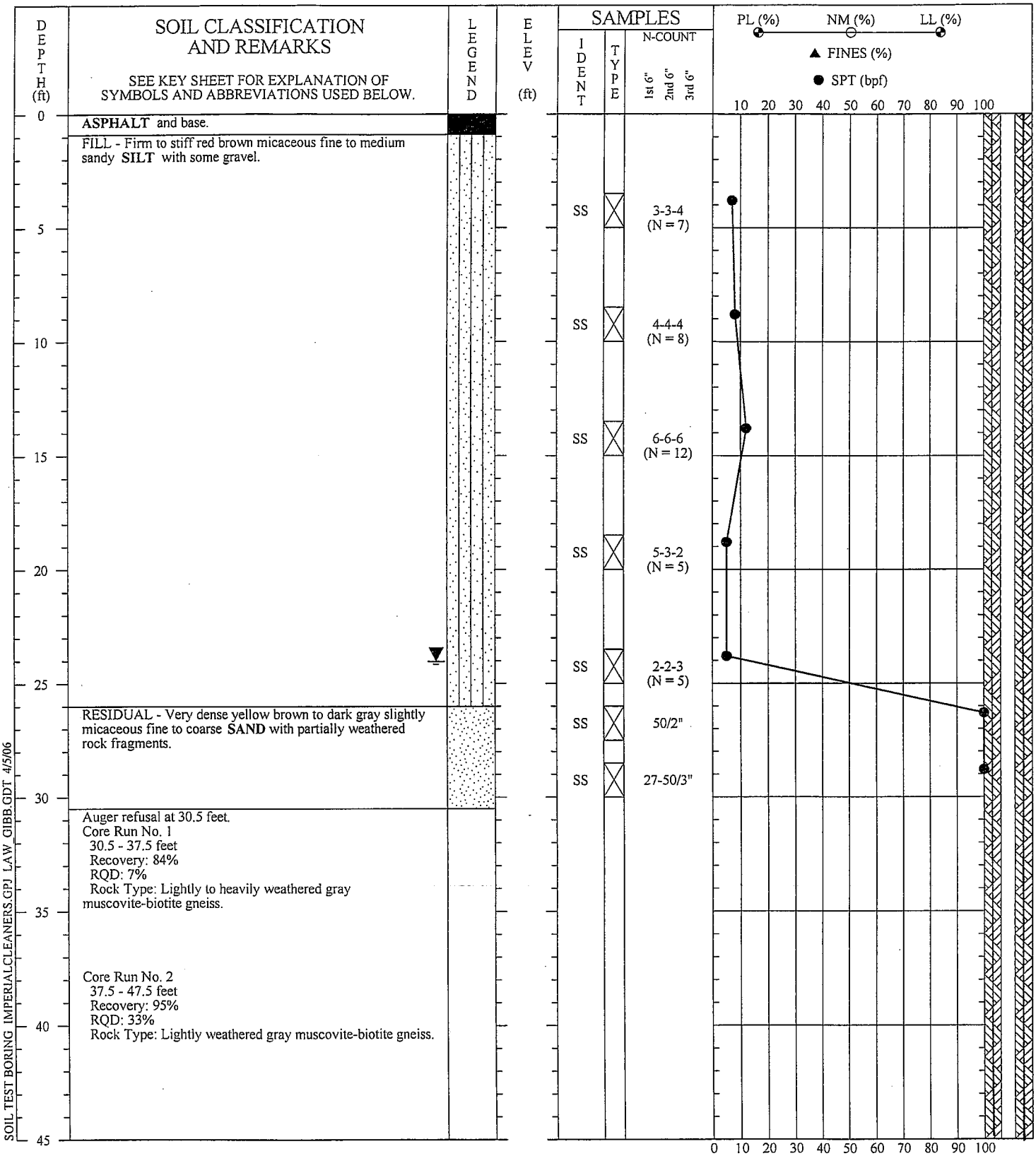
DRILLER:	Steve Foley
EQUIPMENT:	Hand Auger
METHOD:	
HOLE DIA.:	4"
REMARKS:	Type I monitoring well installed. Stabilized groundwater depth 4.91 feet below TOC.

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO:	MW-12
PROJECT:	Imperial Cleaners
LOCATION:	
DRILLED:	June 12, 2002
PROJECT NO:	12110-1-0013

LAW
LAWGIBB Group Member



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

DRILLER:	MACTEC
EQUIPMENT:	CME-54
METHOD:	Hollow Stem Auger/Core Drill
HOLE DIA.:	8 inches/4 inches
REMARKS:	Type III well installed. Outer casing grouted at 30.5 feet. Stabilized groundwater depth 24.03 on 3/31/06.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

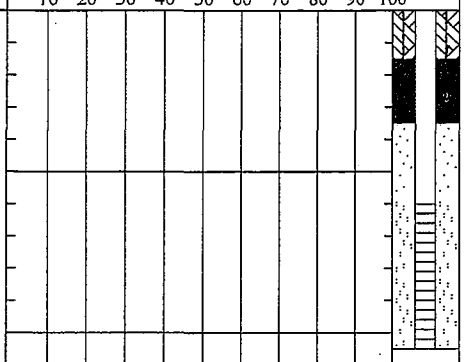
SOIL TEST BORING RECORD

BORING NO.: DW-1
PROJECT: Imperial Cleaners
LOCATION: Atlanta, Georgia
DRILLED: March 15, 2006
PROJECT NO.: 6305-05-0319

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES: IDENT	SAMPLES: TYPE	SAMPLES: N-COUNT (1st 6" / 2nd 6" / 3rd 6")
45						
	Core Run No. 3 47.5 - 55.5 feet Recovery: 100% RQD: 63% Rock type: Lightly weathered to fresh gray muscovite-biotite gneiss					
50						
55	Boring terminated at 55.5 feet.					
60						
65						
70						
75						
80						
85						
90						

PL (%) NM (%) LL (%)
▲ FINES (%)
● SPT (bpf)
10 20 30 40 50 60 70 80 90 100



0 10 20 30 40 50 60 70 80 90 100

SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

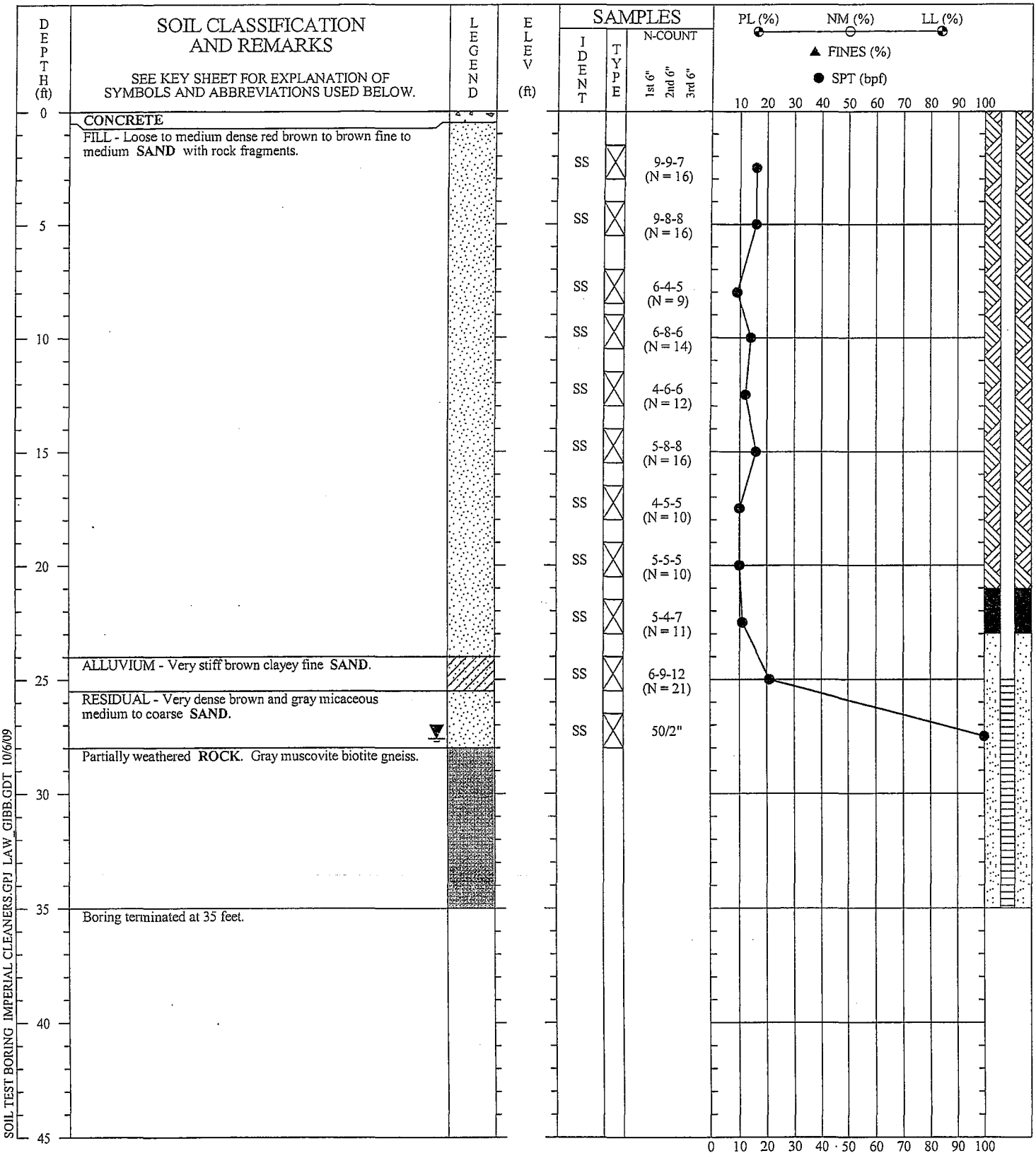
DRILLER:	MACTEC
EQUIPMENT:	CME-54
METHOD:	Hollow Stem Auger/Core Drill
HOLE DIA.:	8 inches/4 inches
REMARKS:	Type III well installed. Outer casing grouted at 30.5 feet. Stabilized groundwater depth 24.03 on 3/31/06.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: DW-1
PROJECT: Imperial Cleaners
LOCATION: Atlanta, Georgia
DRILLED: March 15, 2006
PROJECT NO.: 6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 10/6/09

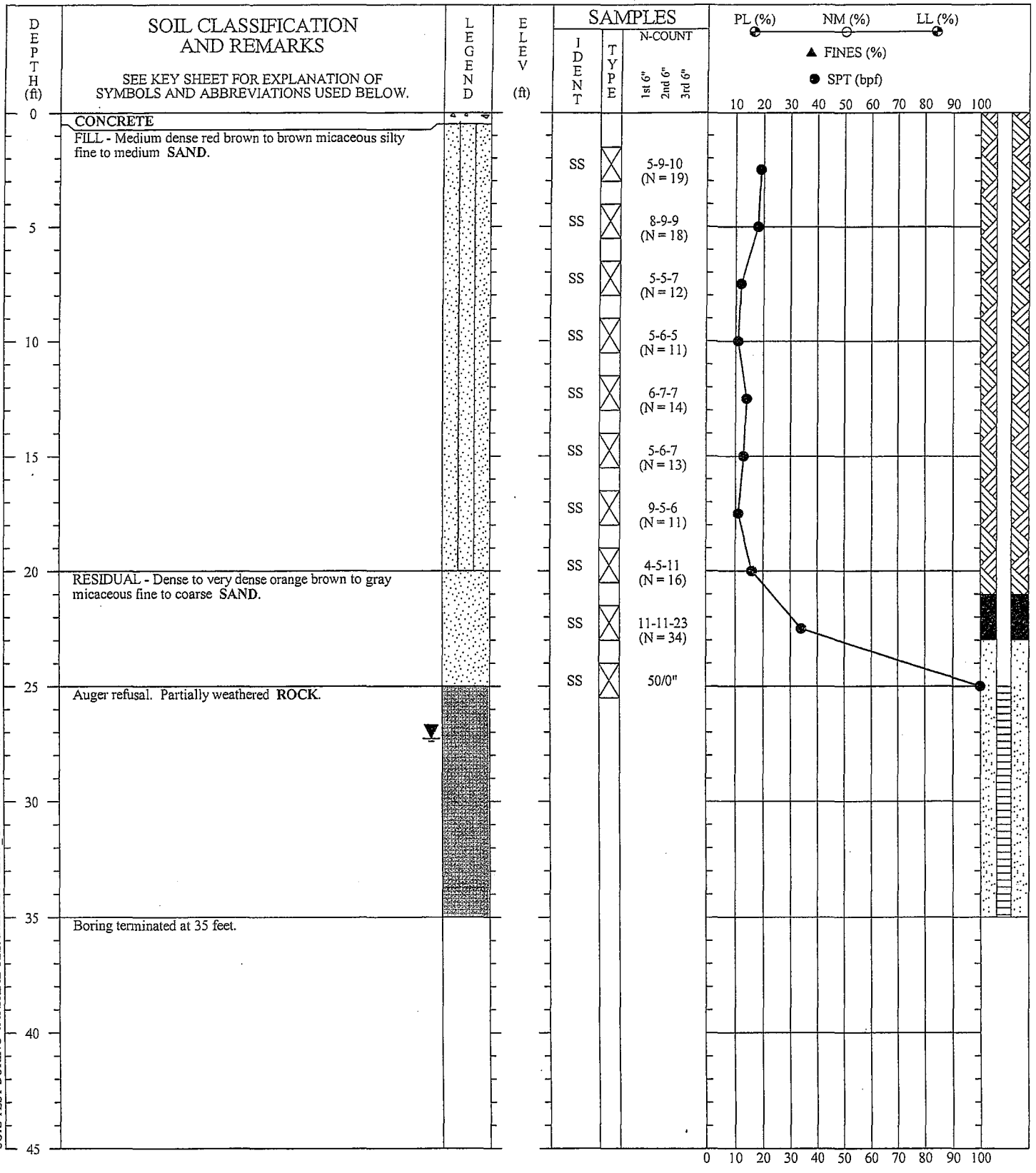
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger/Air Hammer
HOLE DIA.:	8 inches
REMARKS:	Type II monitoring well installed. Stabilized grounwater depth 27.60 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-20/MW-13
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	August 12, 2009
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 10/6/09

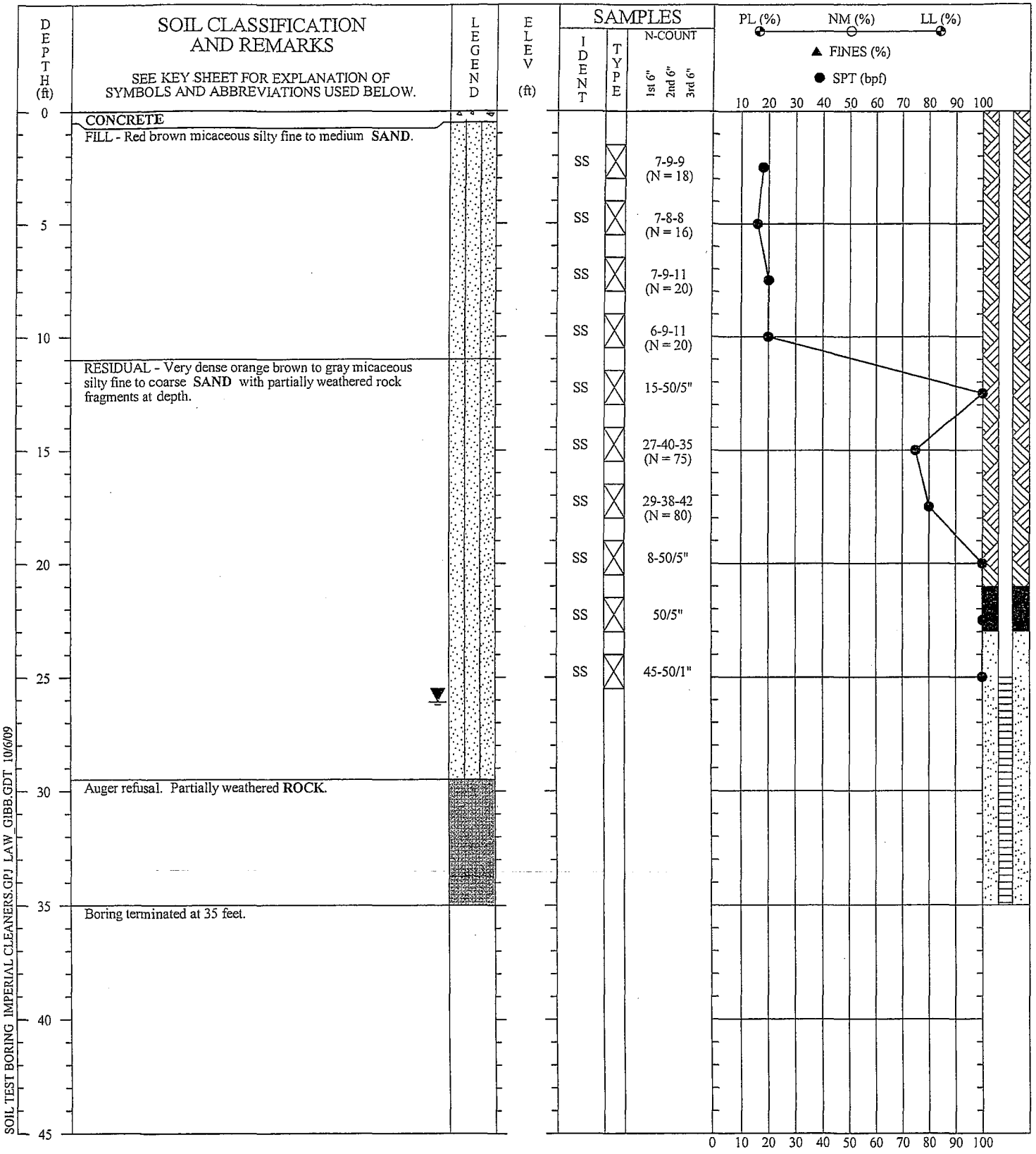
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger/Air Hammer
HOLE DIA.:	8 inches
REMARKS:	Type II monitoring well installed. Stabilized grounwater depth 27.28 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-22/MW-14
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	August 13, 2009
PROJECT NO.:	6305-05-0319

MACTEC



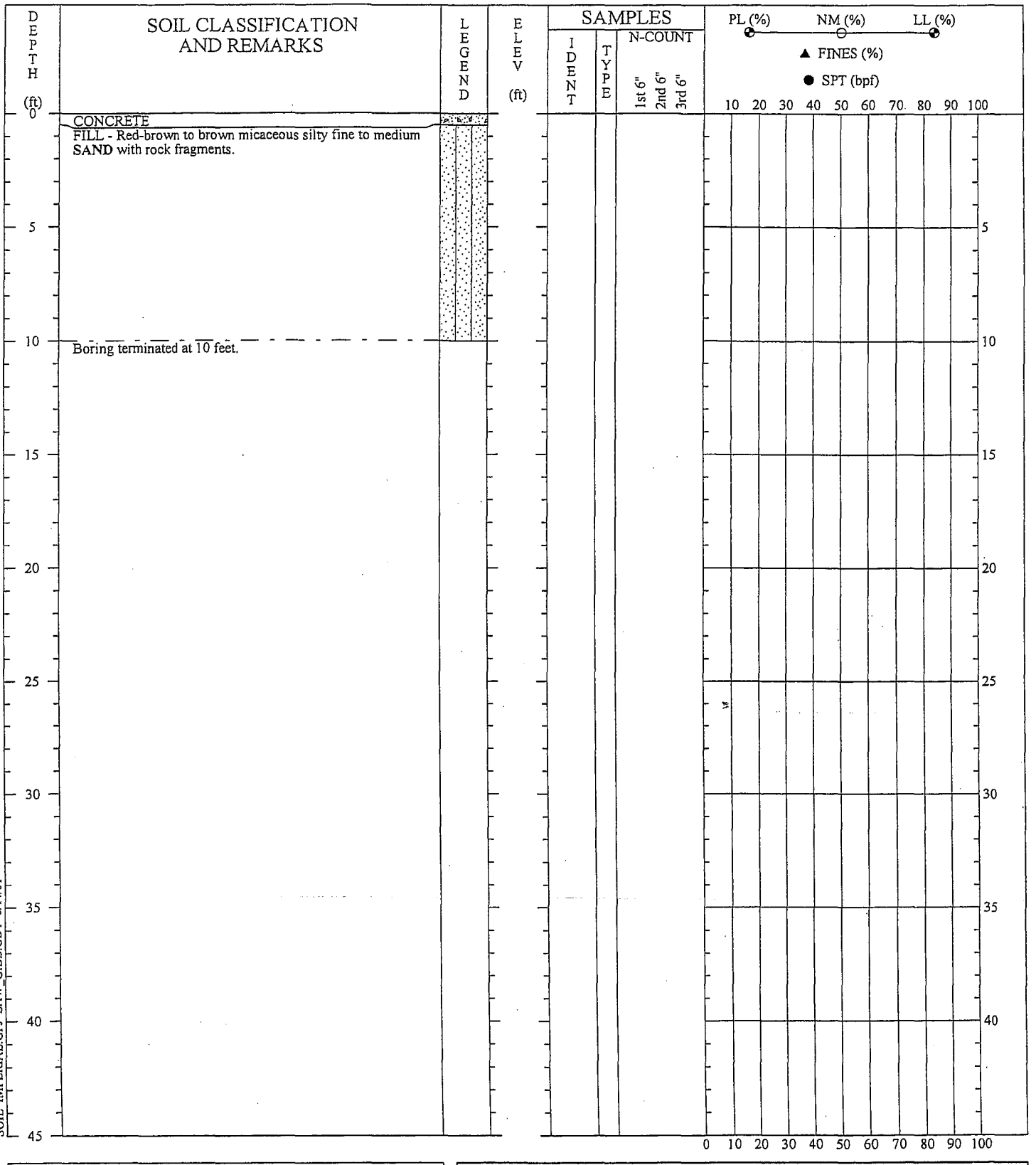
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger/Air Hammer
HOLE DIA.:	8 inches
REMARKS:	Type II monitoring well installed. Stabilized grounwater depth 26.10 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-26/MW-15
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	August 14, 2009
PROJECT NO.:	6305-05-0319

MACTEC



SOIL IMPERIAL.GPJ LAW_GIBB.GDT 6/14/01

DRILLER: ESN Southeast
EQUIPMENT: Geoprobe
METHOD: Direct Push
HOLE DIA.: 1.5"
REMARKS: No groundwater encountered.

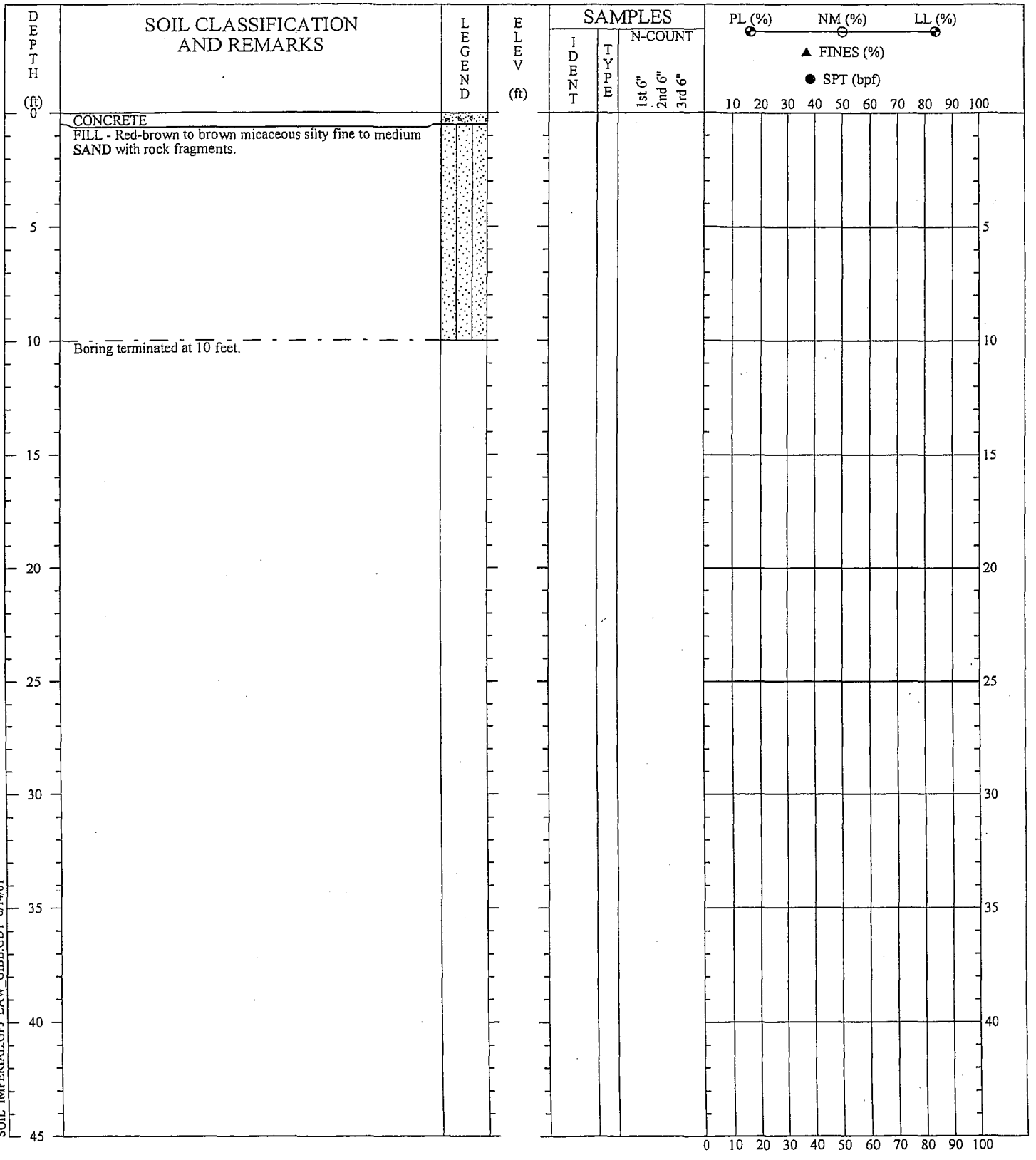
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: GP-1
PROJECT: Imperial Cleaners

DRILLED: May 21, 2001
PROJECT No: 12110-1-0013

LAW
LAWGIBB Group Member



DRILLER: ESN Southeast
EQUIPMENT: Geoprobe
METHOD: Direct Push
HOLE DIA.: 1.5"
REMARKS: No groundwater encountered.

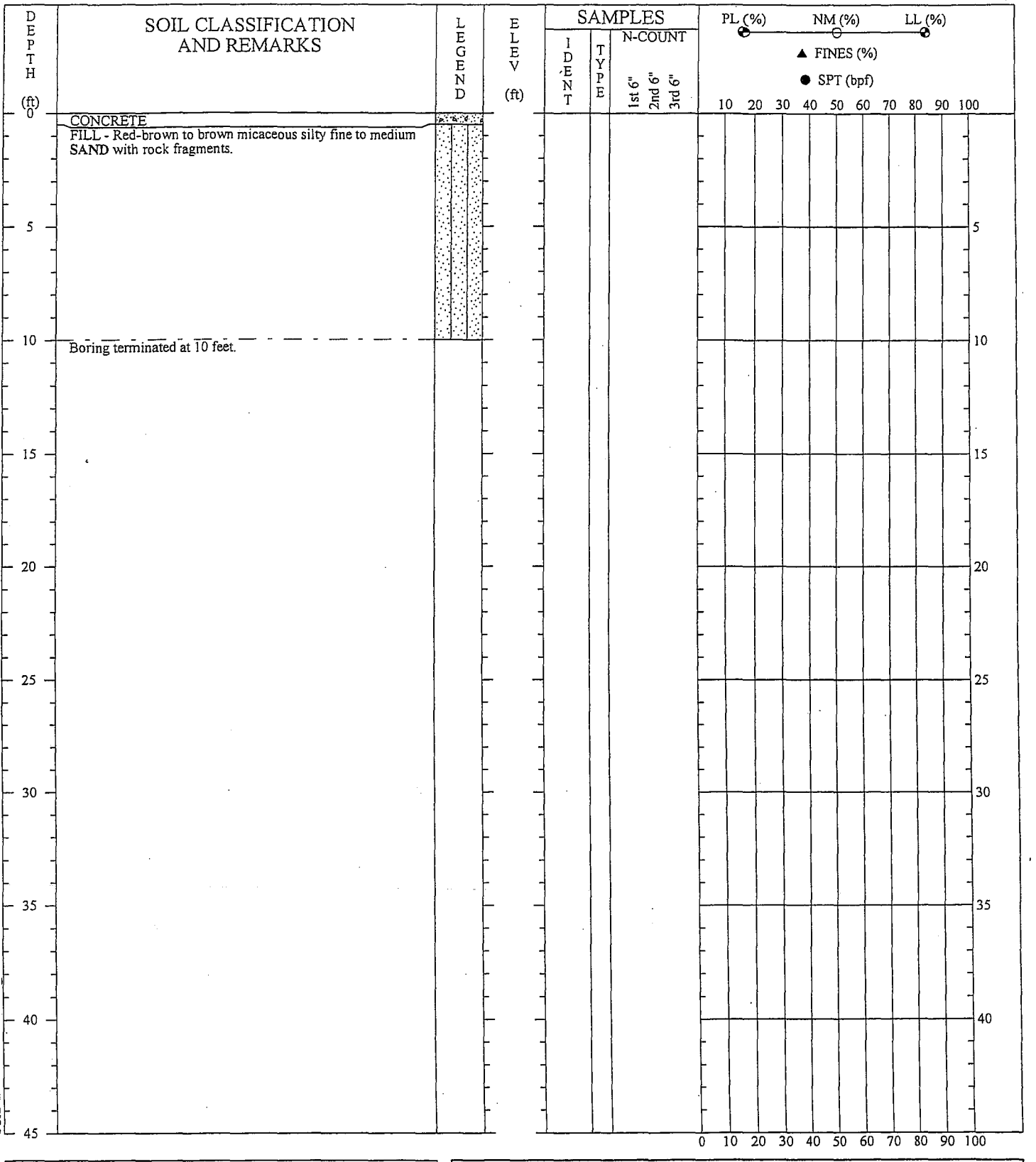
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: GP-2
PROJECT: Imperial Cleaners

DRILLED: May 21, 2001
PROJECT No: 12110-1-0013

LAW
LAWGIBB Group Member



SOIL IMPERIAL.GPJ LAW_GIBB.GDT 6/14/01

DRILLER:	ESN Southeast
EQUIPMENT:	Geoprobe
METHOD:	Direct Push
HOLE DIA.:	1.5"
REMARKS:	No groundwater encountered.

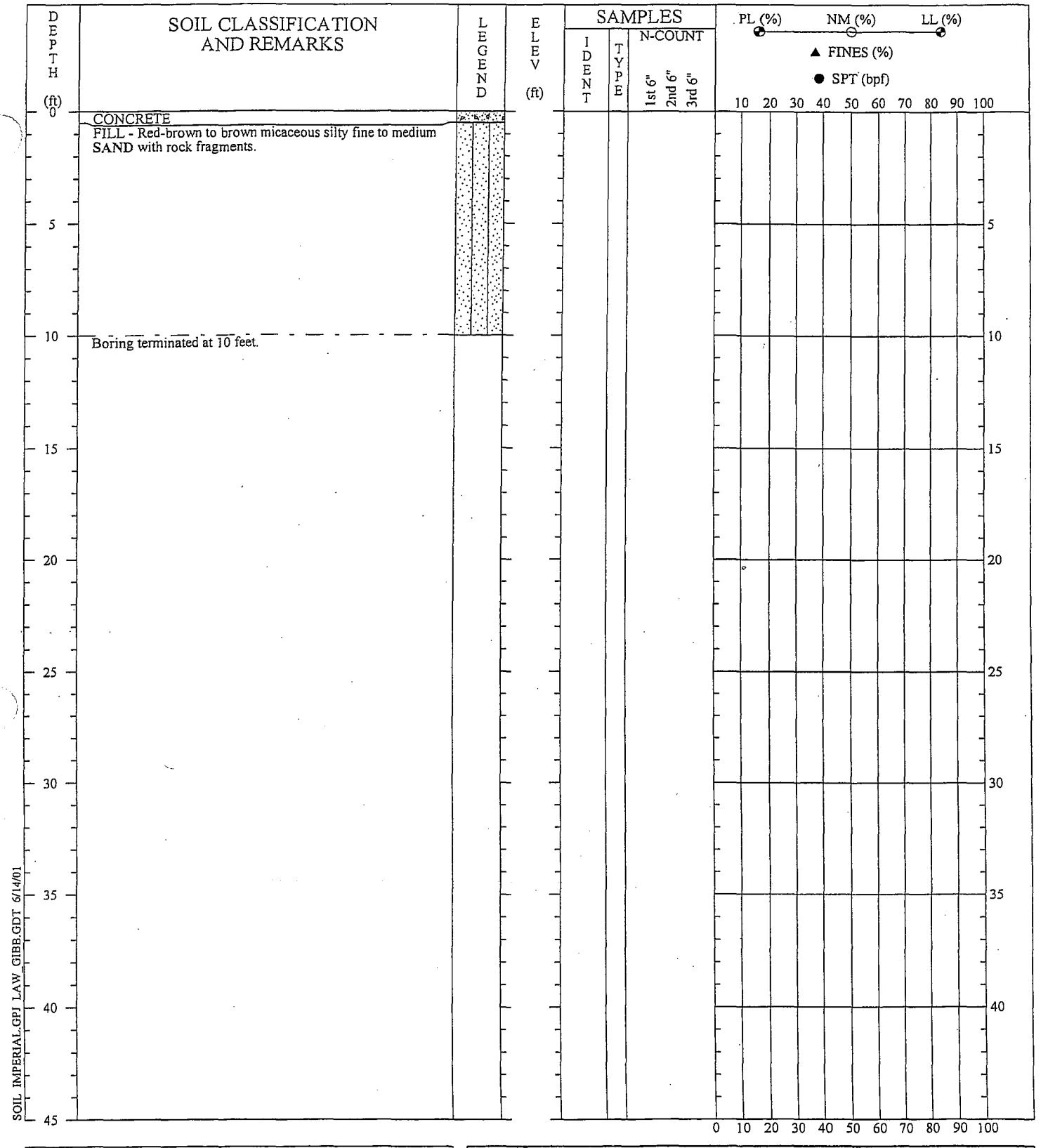
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: GP-3
PROJECT: Imperial Cleaners

DRILLED: May 21, 2001
PROJECT No: 12110-1-0013

LAW
LAWGIBB Group Member



SOIL IMPERIAL.GPJ LAW_GIBB.GDT 6/14/01

DRILLER:	ESN Southeast
EQUIPMENT:	Geoprobe
METHOD:	Direct Push
HOLE DIA.:	1.5"
REMARKS:	No groundwater encountered.

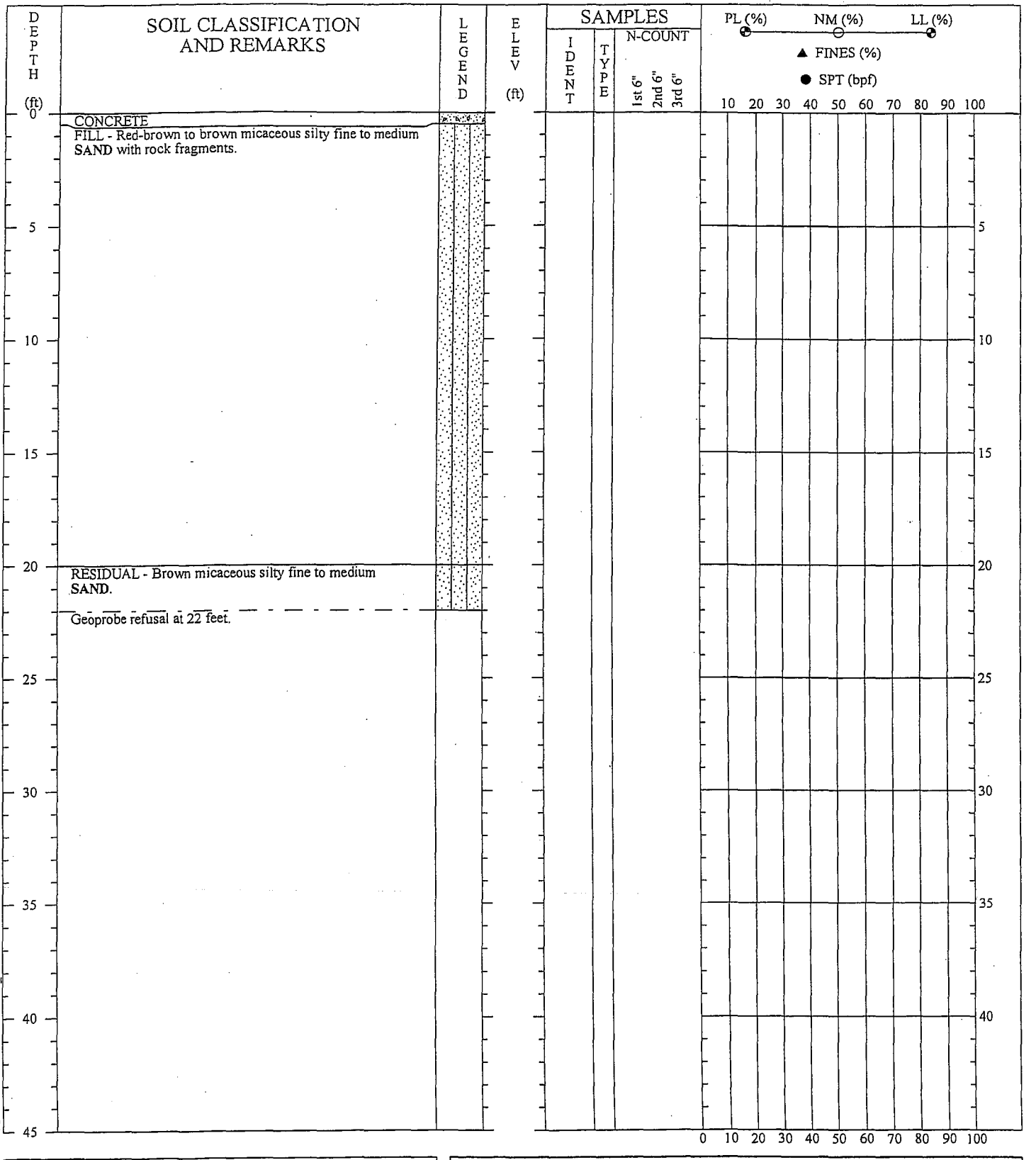
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: GP-4
PROJECT: Imperial Cleaners

DRILLED: May 21, 2001
PROJECT No: 12110-1-0013

LAW
LAWGIBB Group Member



SOIL_IMPERIAL.GPJ LAW_GIBB.GDT 6/15/01

DRILLER: ESN Southeast
EQUIPMENT: Geoprobe
METHOD: Direct Push
HOLE DIA.: 1.5"
REMARKS: Geoprobe refusal at 22 feet. No groundwater encountered.

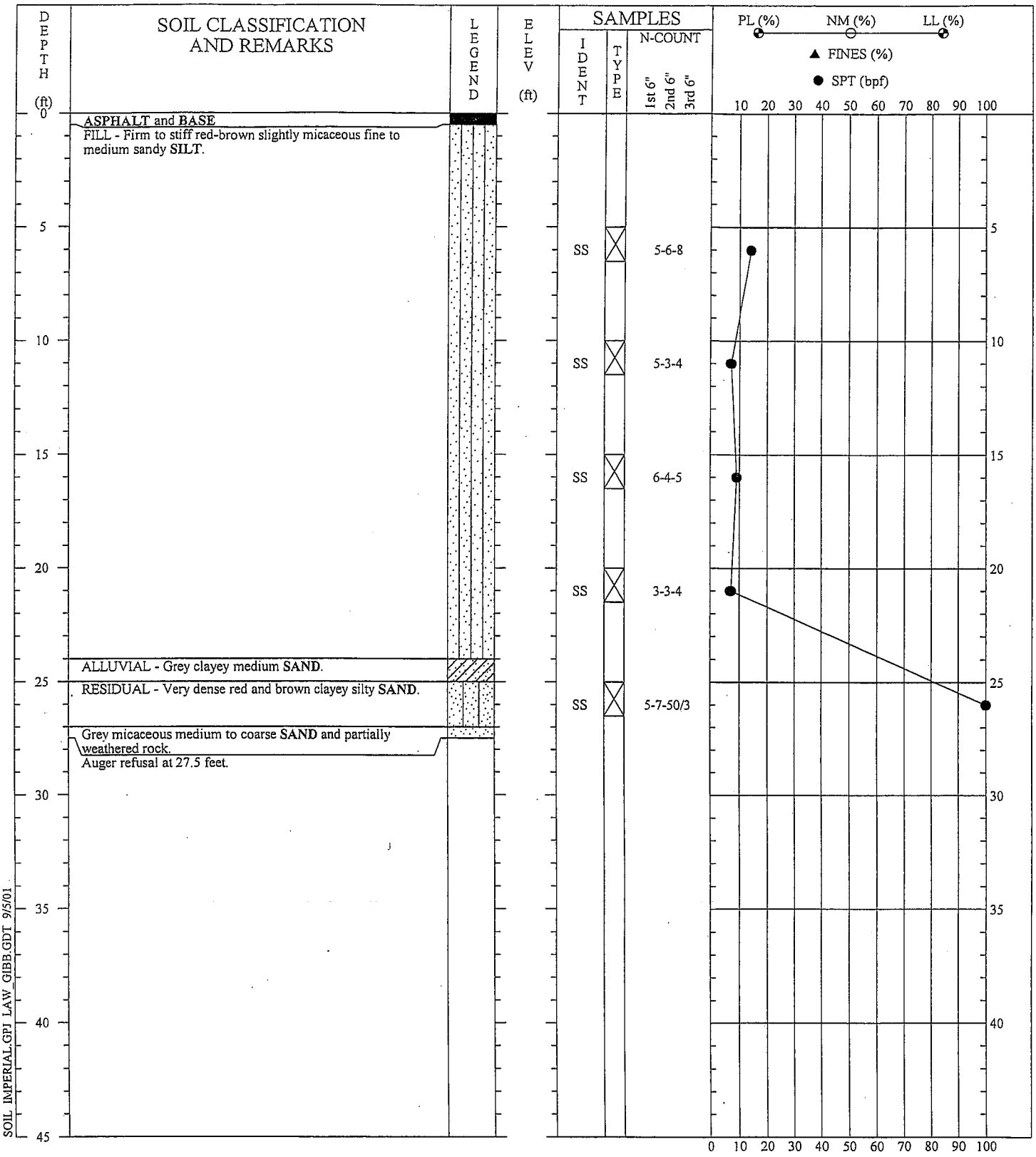
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: GP-5
PROJECT: Imperial Cleaners

DRILLED: May 21, 2001
PROJECT No: 12110-1-0013

LAW
LAWGIBB Group Member



SOIL IMPERIAL.GPJ LAW_GIBB.GDT 9/5/01

DRILLER: Oglesby
EQUIPMENT: CME 75
METHOD: Hollow Stem Auger
HOLE DIA.: 8"
REMARKS: Auger refusal at 27.5 feet. No groundwater encountered.

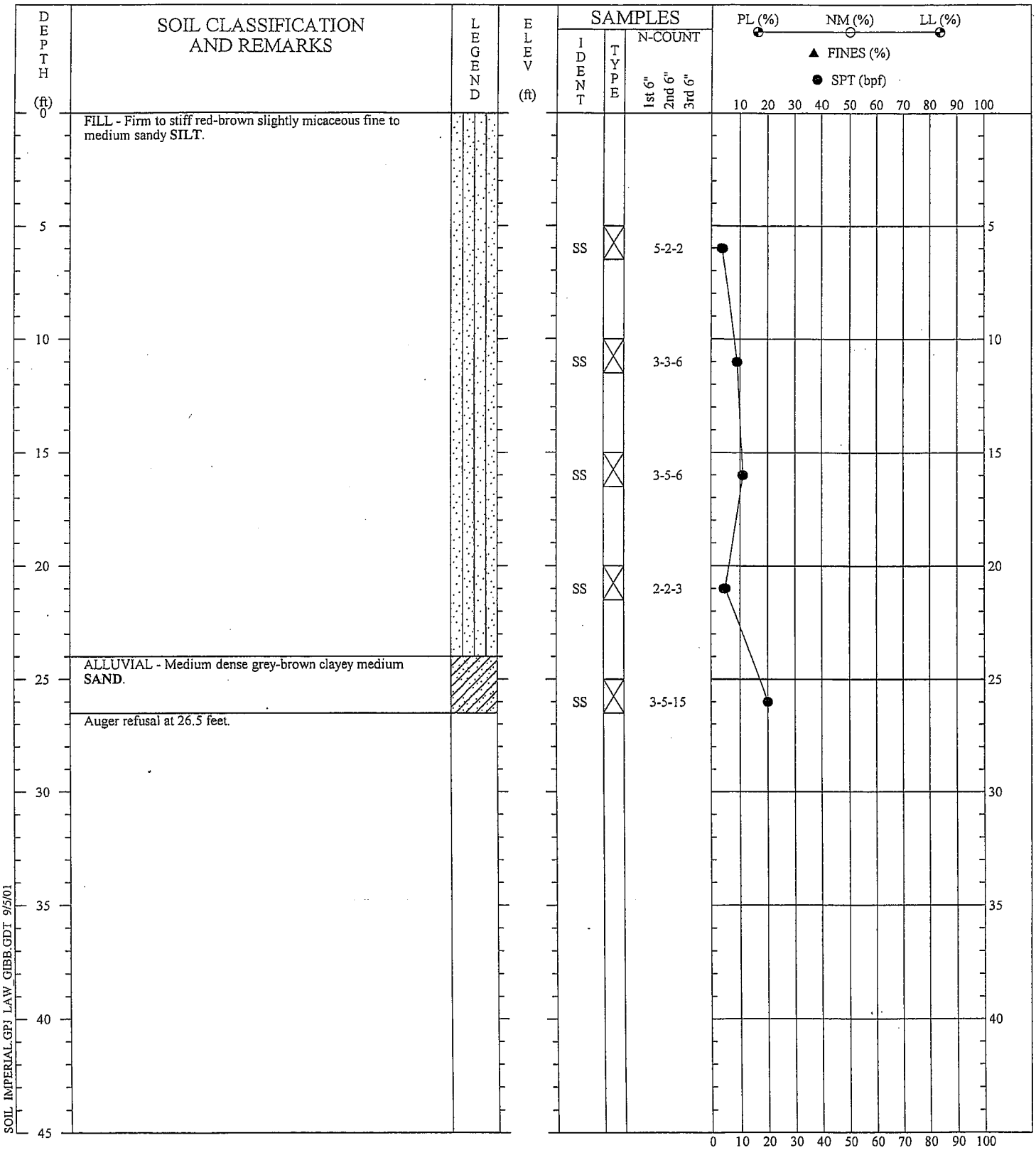
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: SB-7
PROJECT: Imperial Cleaners

DRILLED: August 7, 2001
PROJECT No: 12110-1-0013 PAGE 1 OF 1

LAW
LAWGIBB Group Member



SOIL IMPERIAL.GPJ LAW GIBB.GDT 9/5/01

DRILLER:	Oglesby
EQUIPMENT:	CME 75
METHOD:	Hollow Stem Auger
HOLE DIA.:	8"
REMARKS:	Auger refusal at 26.5 feet. No groundwater encounter.

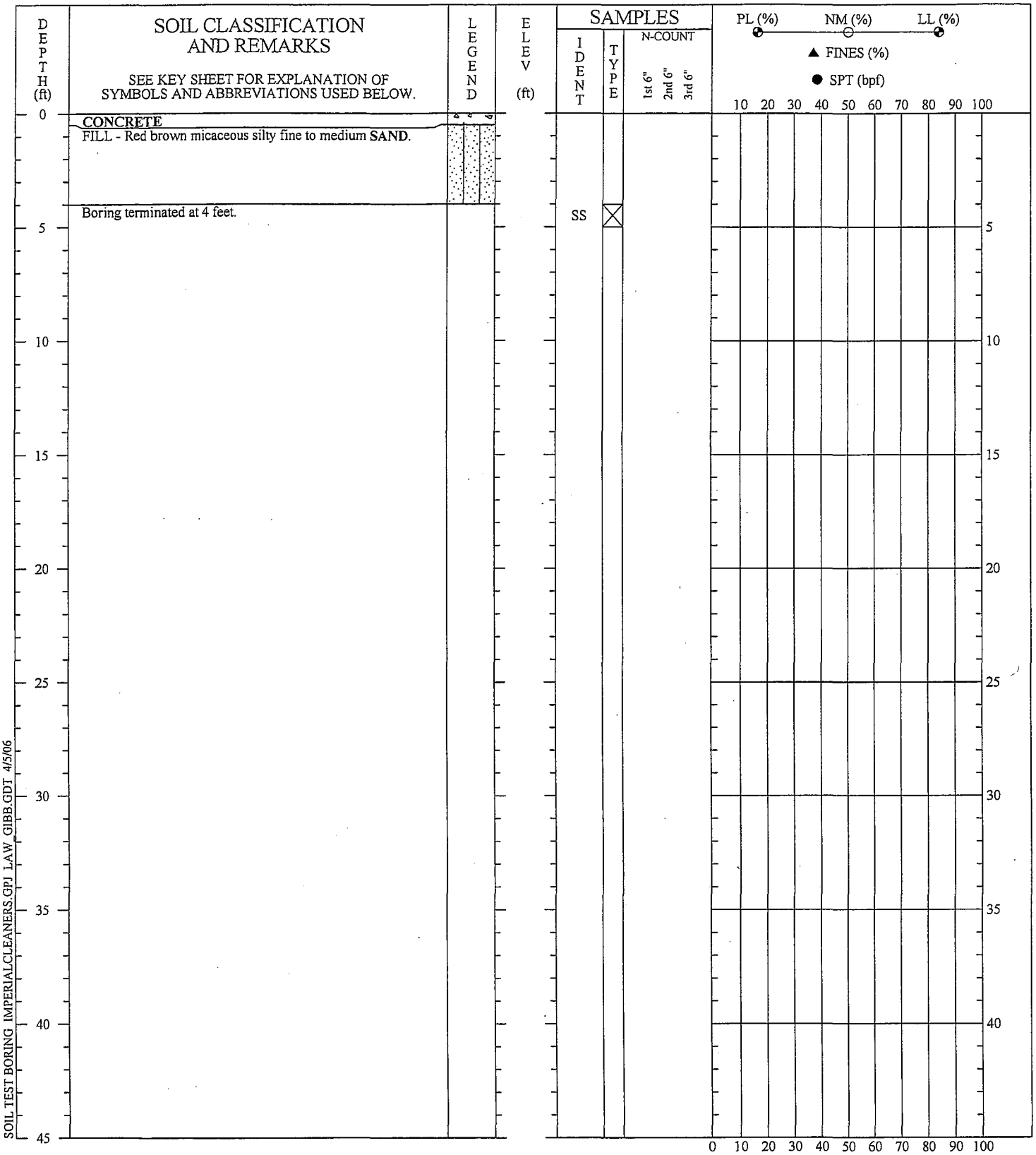
SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED ABOVE.

SOIL TEST BORING RECORD

BORING NO: SB-8
PROJECT: Imperial Cleaners

DRILLED: August 8, 2001
PROJECT No: 12110-1-0013

LAW
LAWGIBB Group Member



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

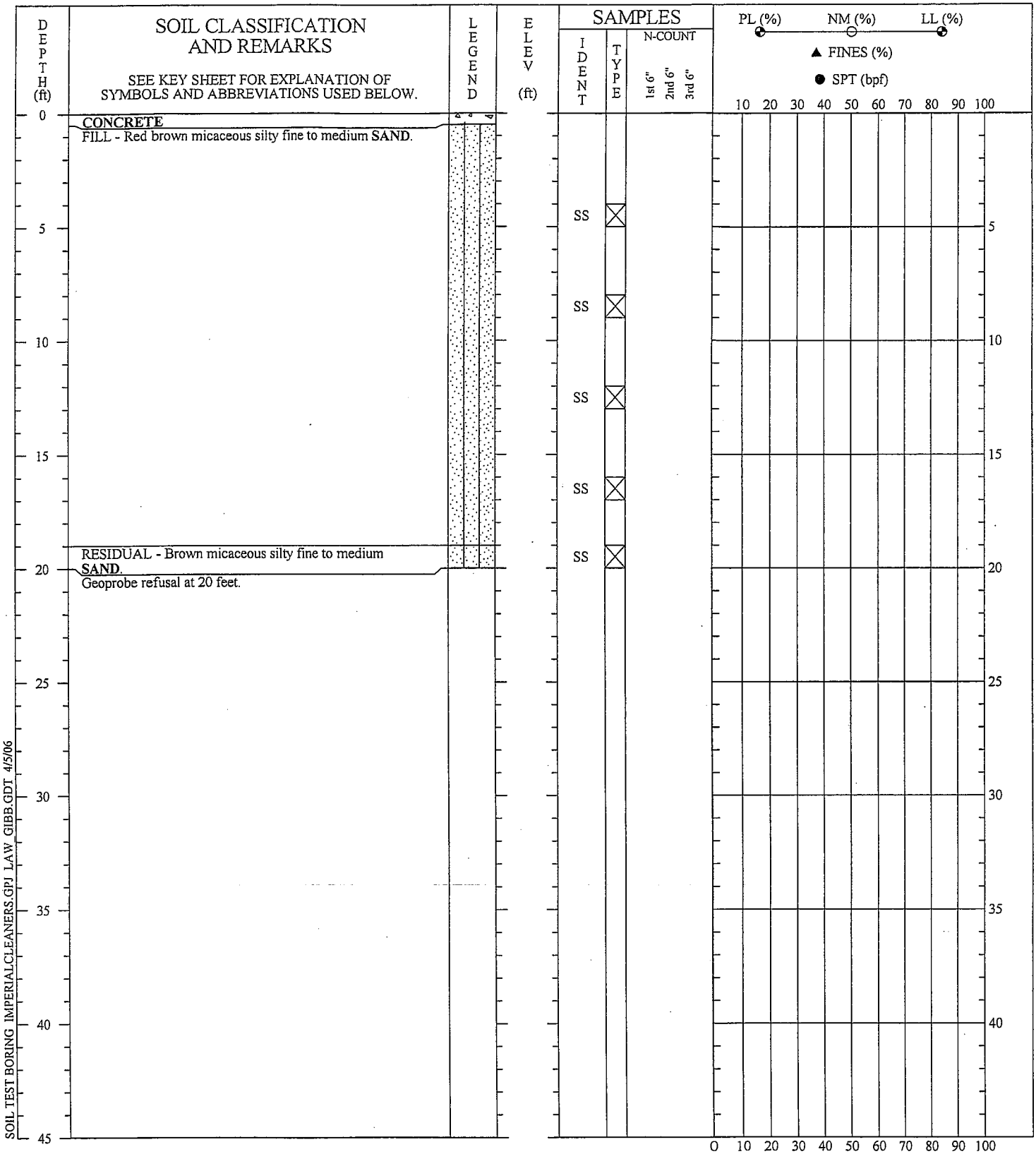
DRILLER:	MACTEC-Paul Gazzo
EQUIPMENT:	Hand Auger
METHOD:	Hand Auger
HOLE DIA.:	3 inches
REMARKS:	

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-10
PROJECT:	Imperial Cleaners
LOCATION:	Atlanta, Georgia
DRILLED:	January 27, 2006
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

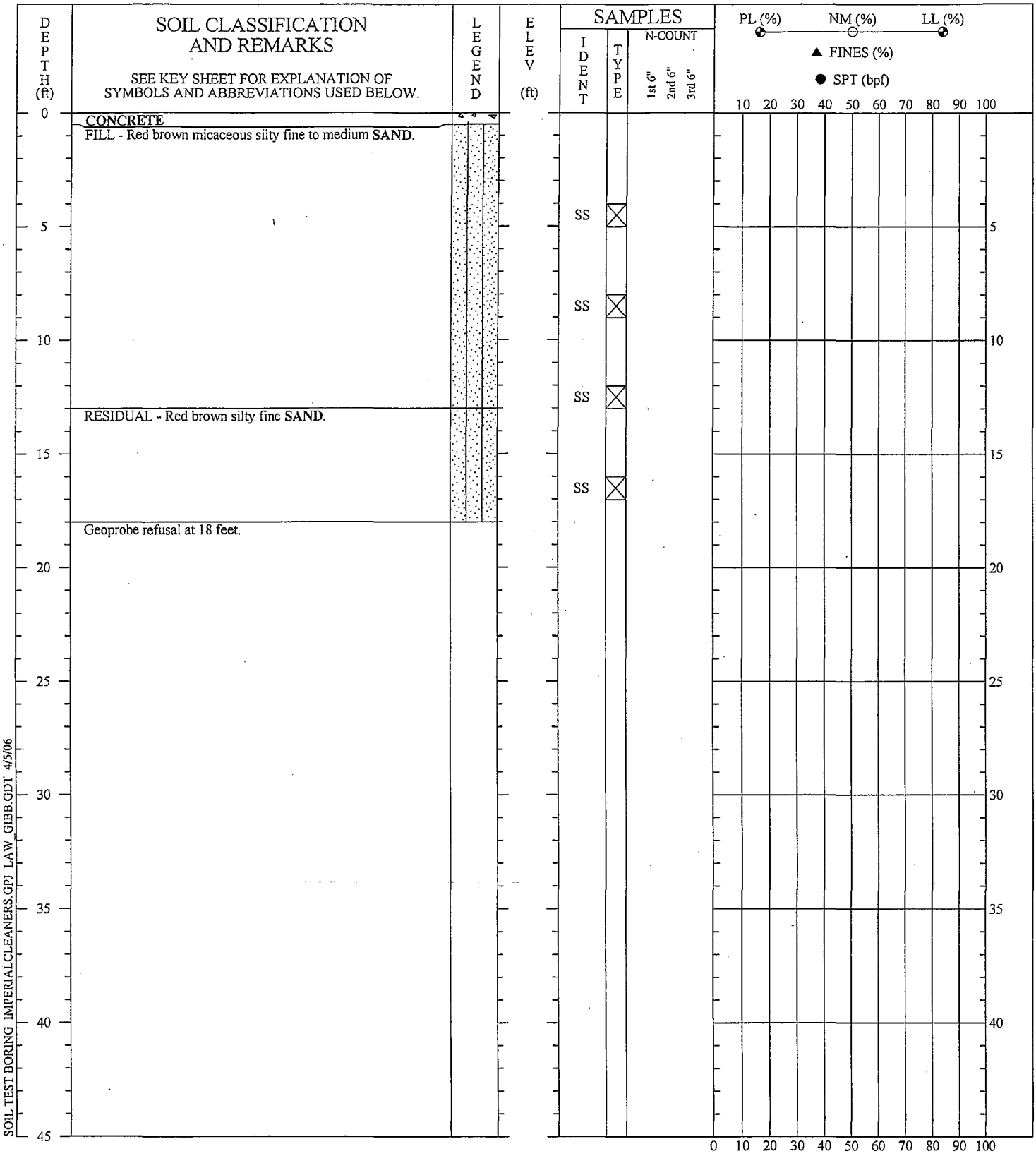
DRILLER:	ATLAS GeoSampling
EQUIPMENT:	GeoProbe
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Geoprobe refusal at 20 feet. No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: SB-11
PROJECT: Imperial Cleaners
LOCATION: Atlanta, Georgia
DRILLED: January 27, 2006
PROJECT NO.: 6305-05-0319 **PAGE 1 OF 1**

MACTEC



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

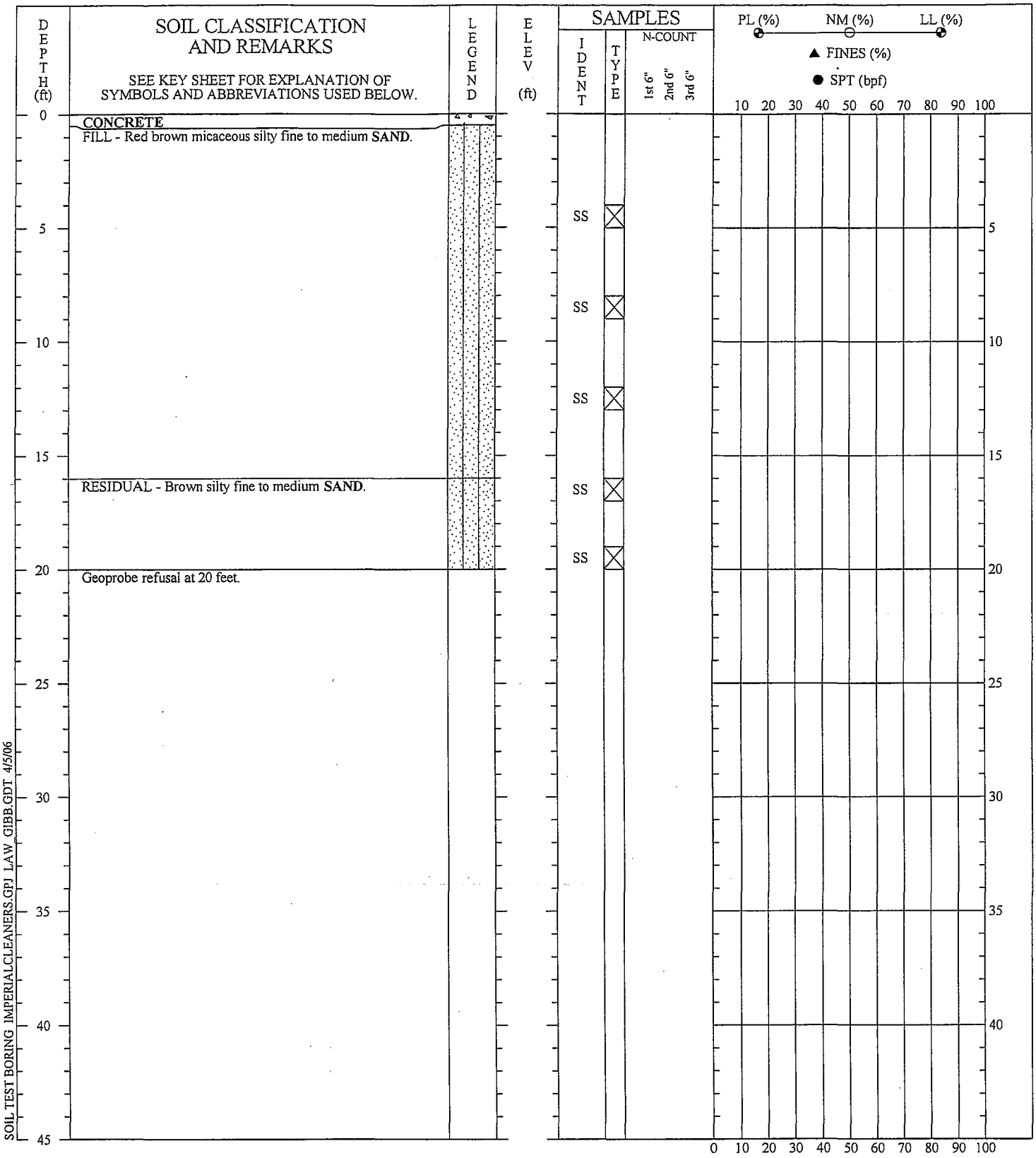
DRILLER:	ATLAS GeoSampling
EQUIPMENT:	GeoProbe
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Geoprobe refusal at 18 feet. No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-12
PROJECT:	Imperial Cleaners
LOCATION:	Atlanta, Georgia
DRILLED:	January 27, 2006
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

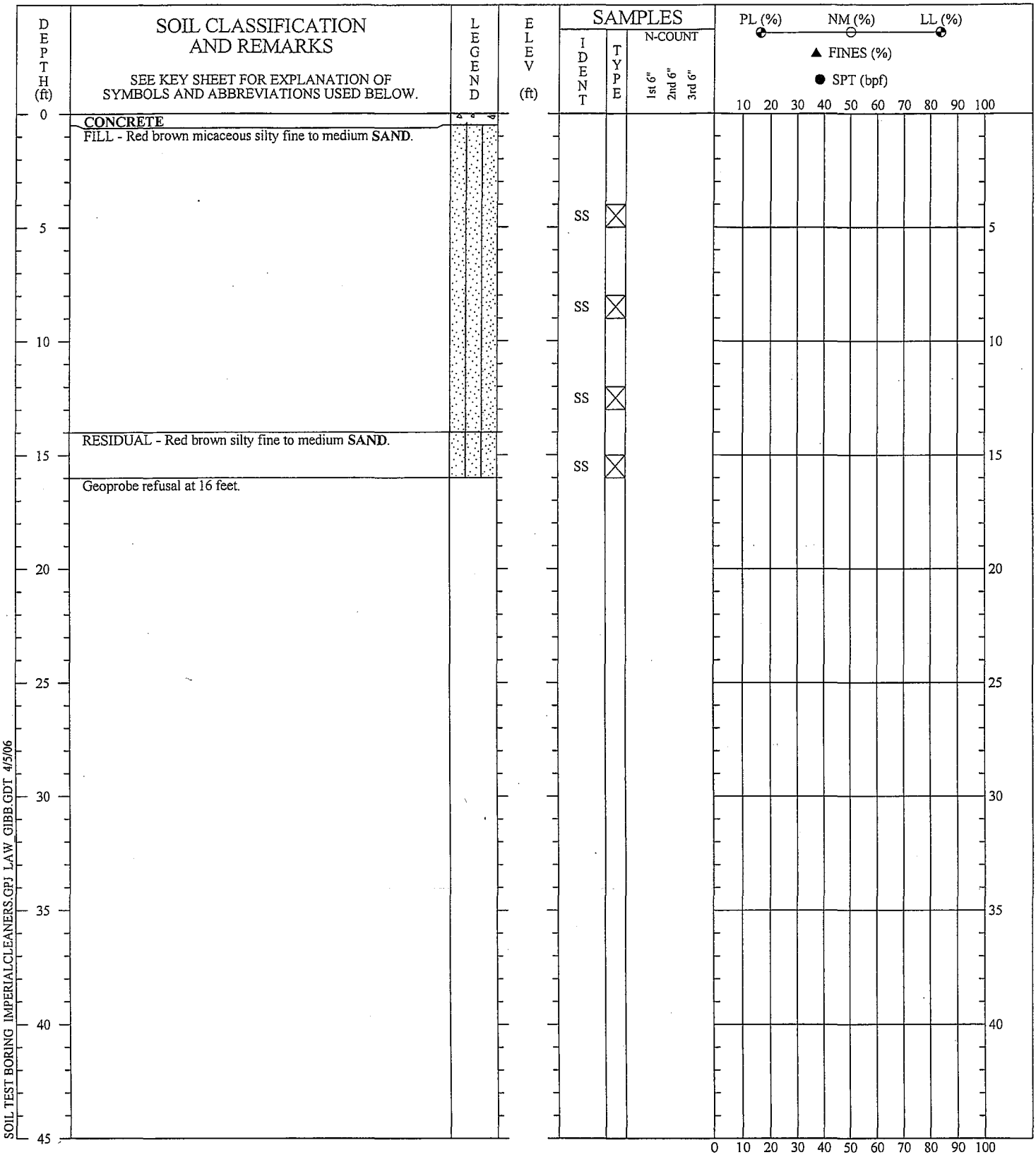
DRILLER:	ATLAS GeoSampling
EQUIPMENT:	GeoProbe
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Geoprobe refusal at 20 feet. No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: SB-13
PROJECT: Imperial Cleaners
LOCATION: Atlanta, Georgia
DRILLED: January 28, 2006
PROJECT NO.: 6305-05-0319

MACTEC



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

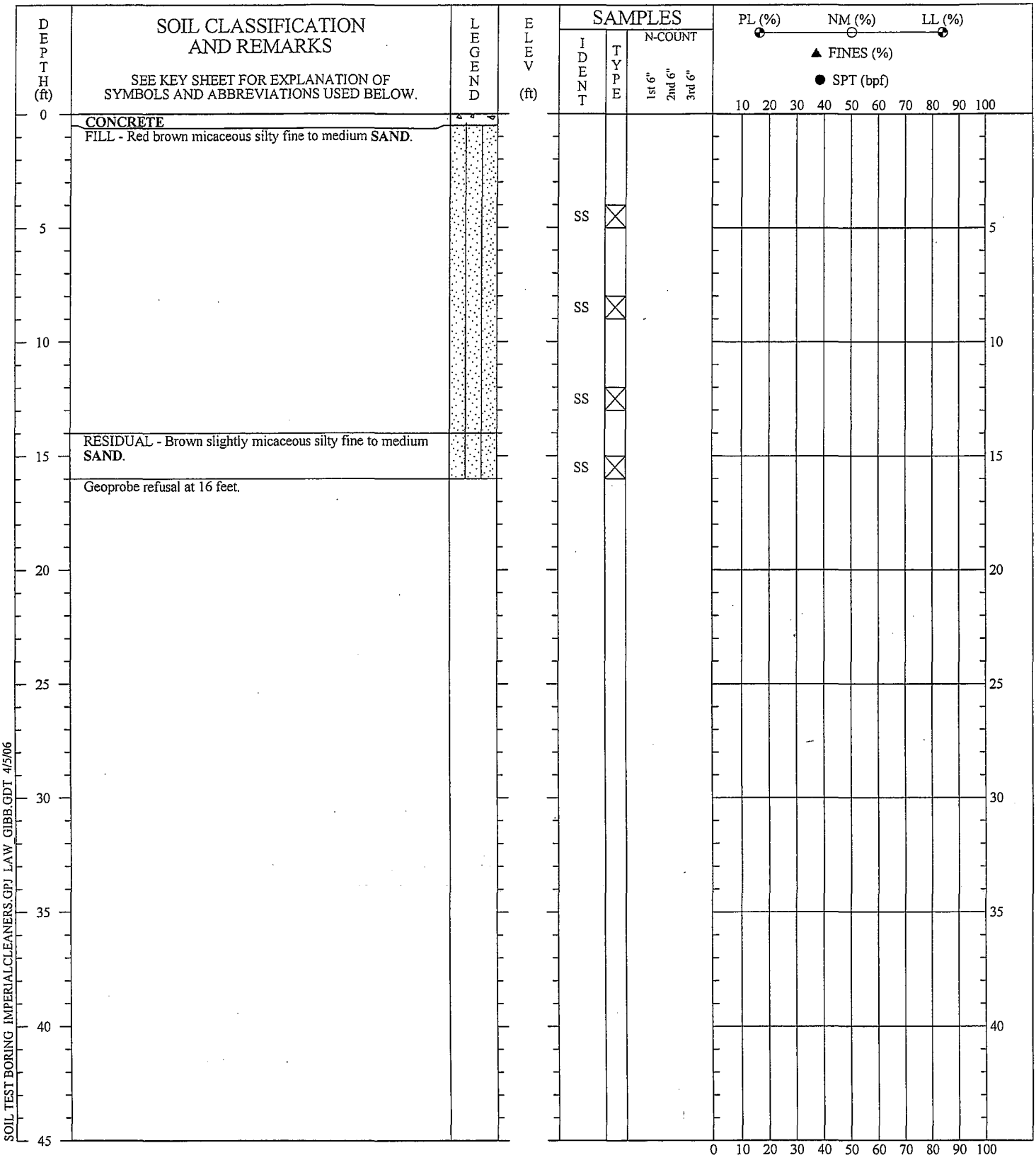
DRILLER:	ATLAS GeoSampling
EQUIPMENT:	GeoProbe
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Geoprobe refusal at 16 feet. No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-16
PROJECT:	Imperial Cleaners
LOCATION:	Atlanta, Georgia
DRILLED:	January 28, 2006
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIALCLEANERS.GPJ LAW_GIBB.GDT 4/5/06

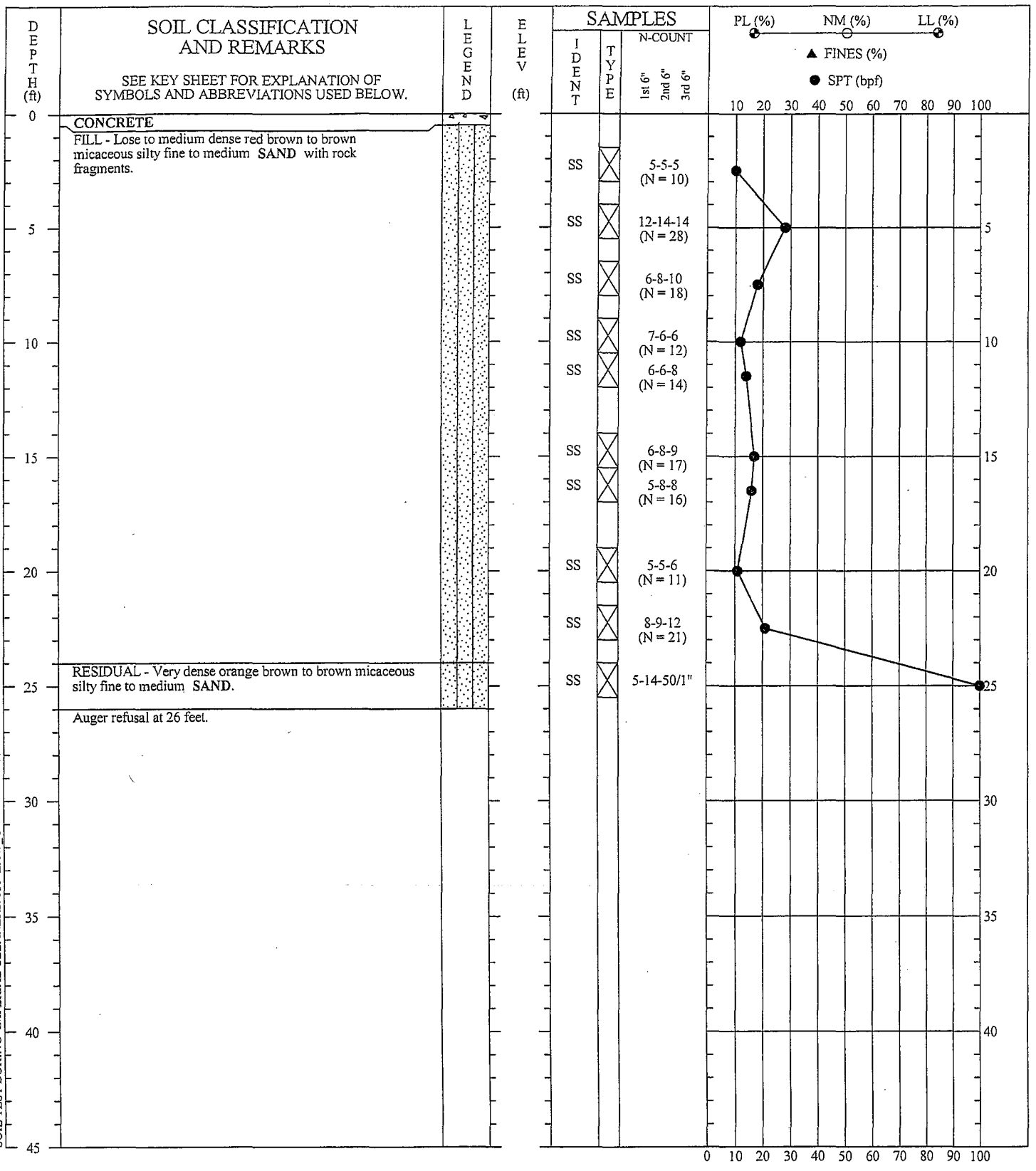
DRILLER:	ATLAS GeoSampling
EQUIPMENT:	GeoProbe
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Geoprobe refusal at 16 feet. No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-17
PROJECT:	Imperial Cleaners
LOCATION:	Atlanta, Georgia
DRILLED:	January 28, 2006
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 10/6/09

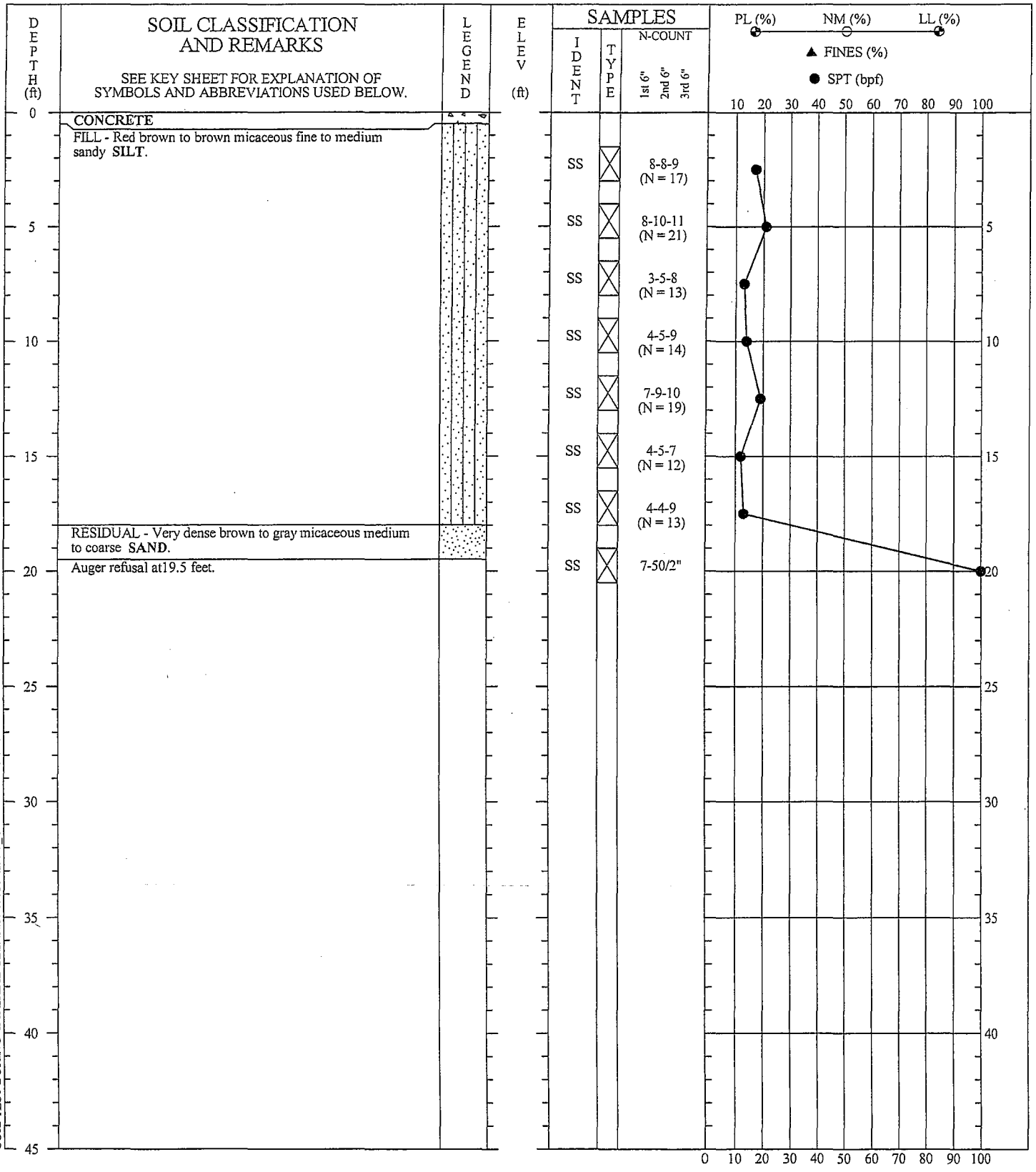
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger
HOLE DIA.:	8 inches
REMARKS:	No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-21
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	August 13, 2009
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 10/6/09

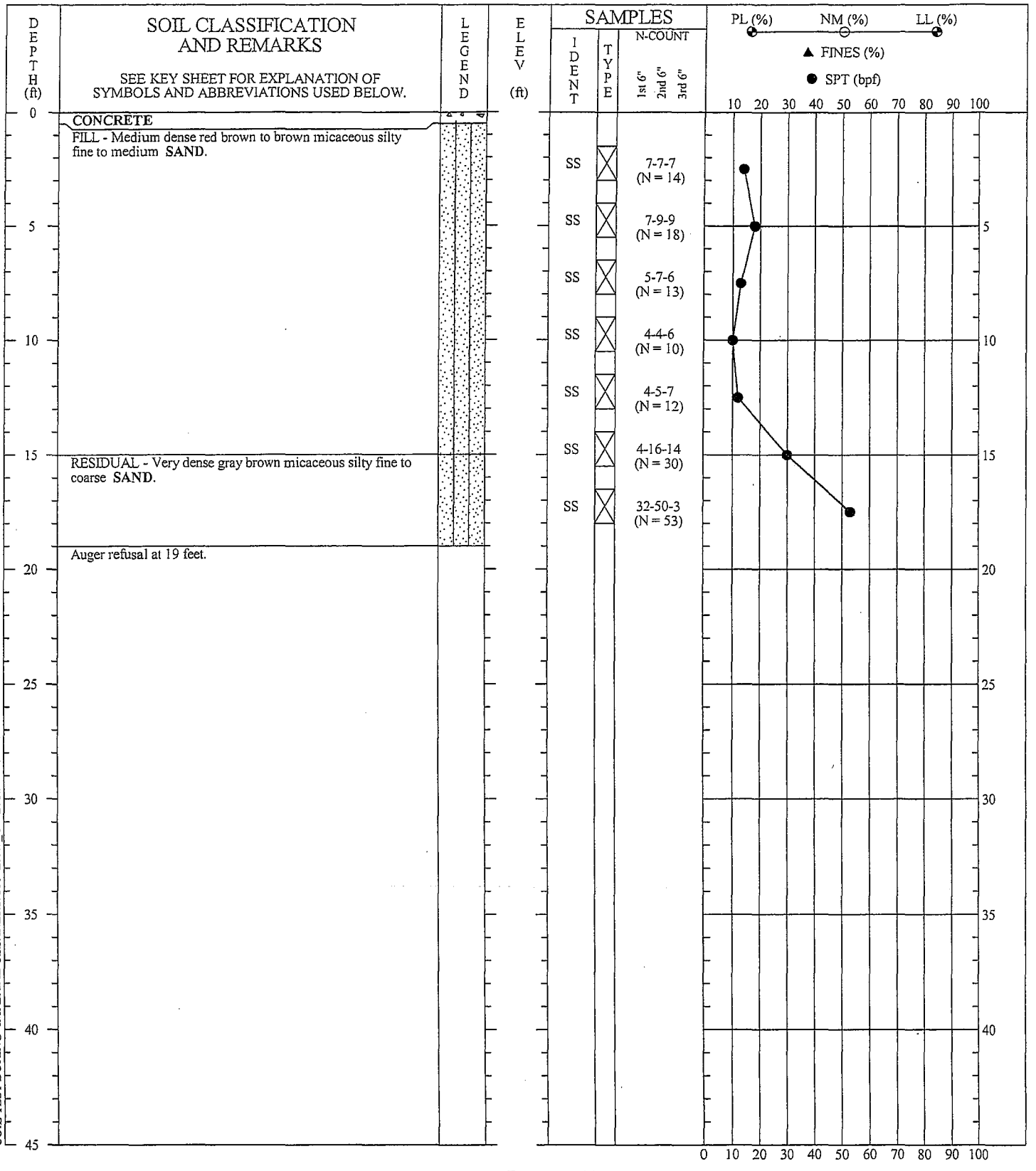
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger
HOLE DIA.:	8 inches
REMARKS:	No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-23
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	August 13, 2009
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 10/6/09

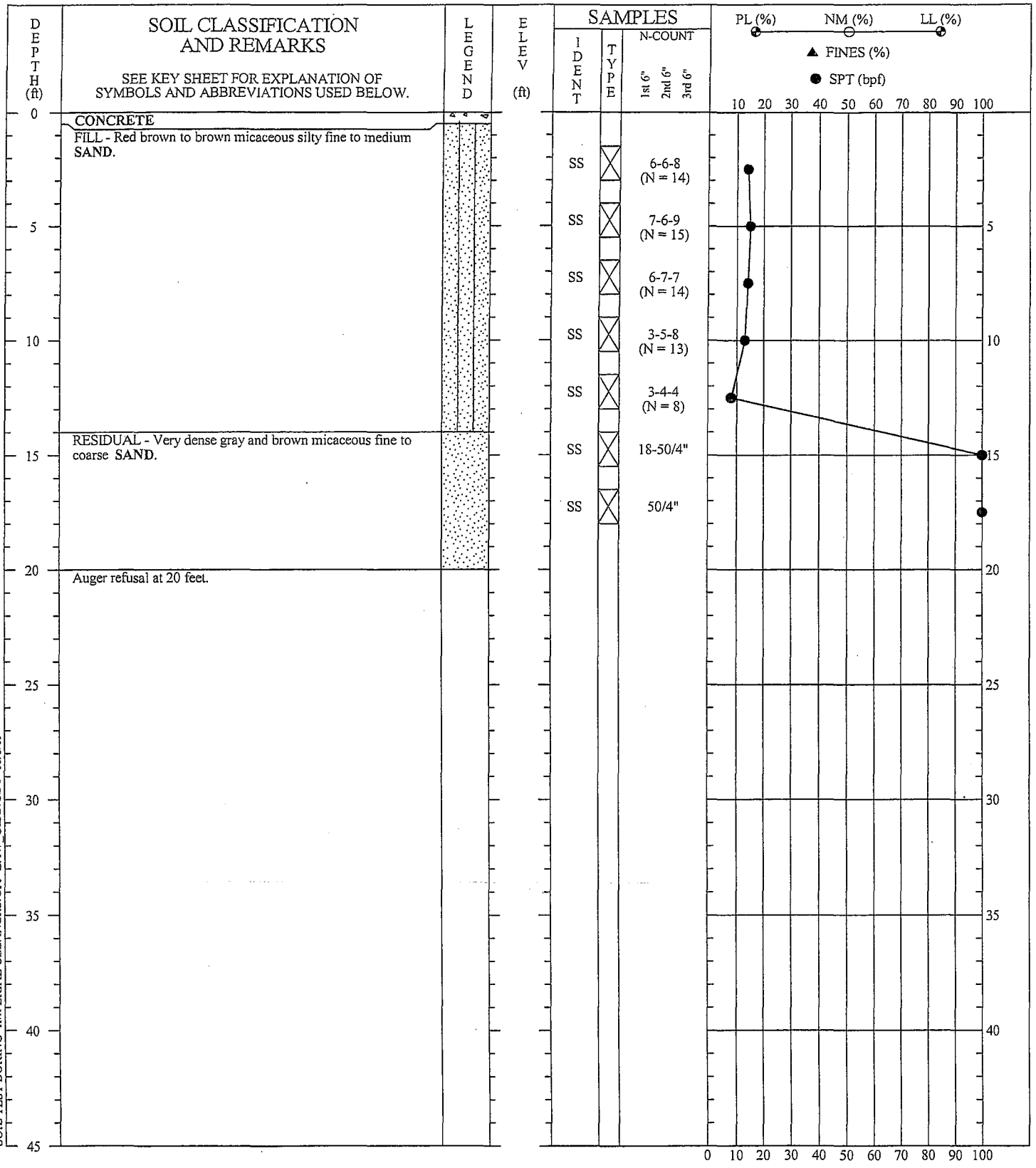
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger
HOLE DIA.:	8 inches
REMARKS:	No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: SB-24
PROJECT: Imperial Cleaners
LOCATION: Roswell, GA
DRILLED: August 13, 2009
PROJECT NO.: 6305-05-0319

MACTEC



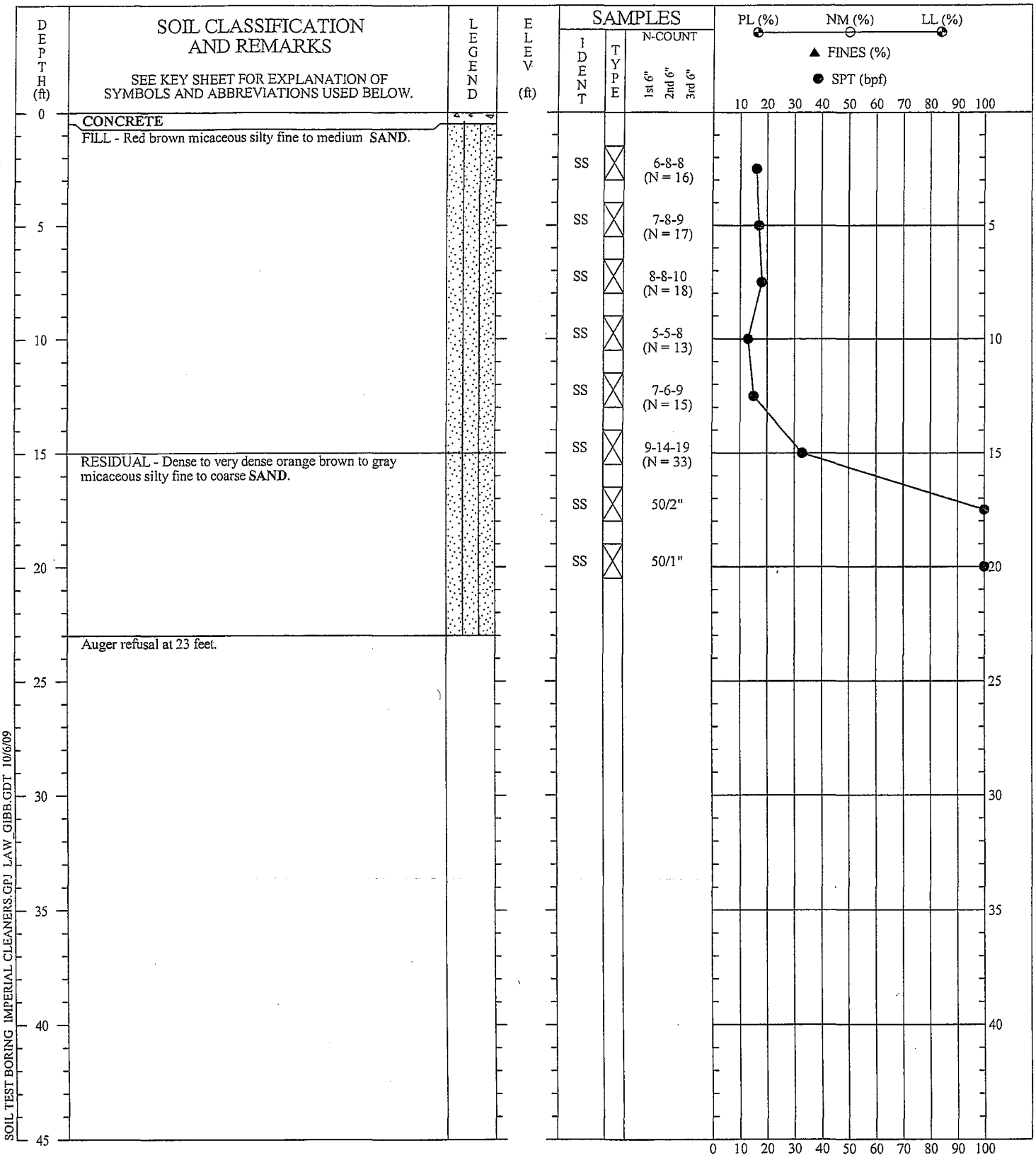
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger
HOLE DIA.:	8 inches
REMARKS:	No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: SB-25
PROJECT: Imperial Cleaners
LOCATION: Roswell, GA
DRILLED: August 14, 2009
PROJECT NO.: 6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 10/6/09

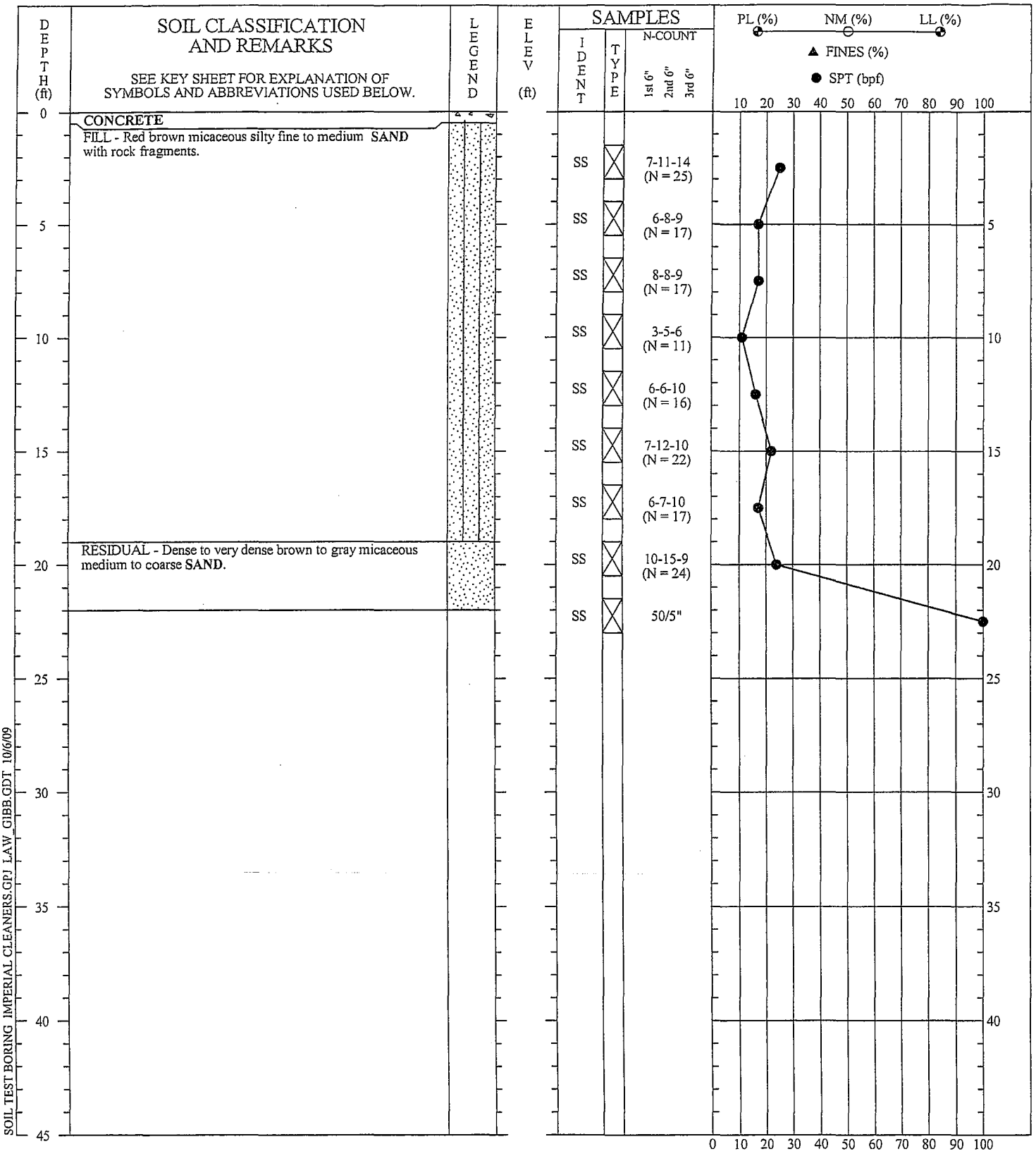
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger
HOLE DIA.:	8 inches
REMARKS:	No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-27
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	August 14, 2009
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 10/6/09

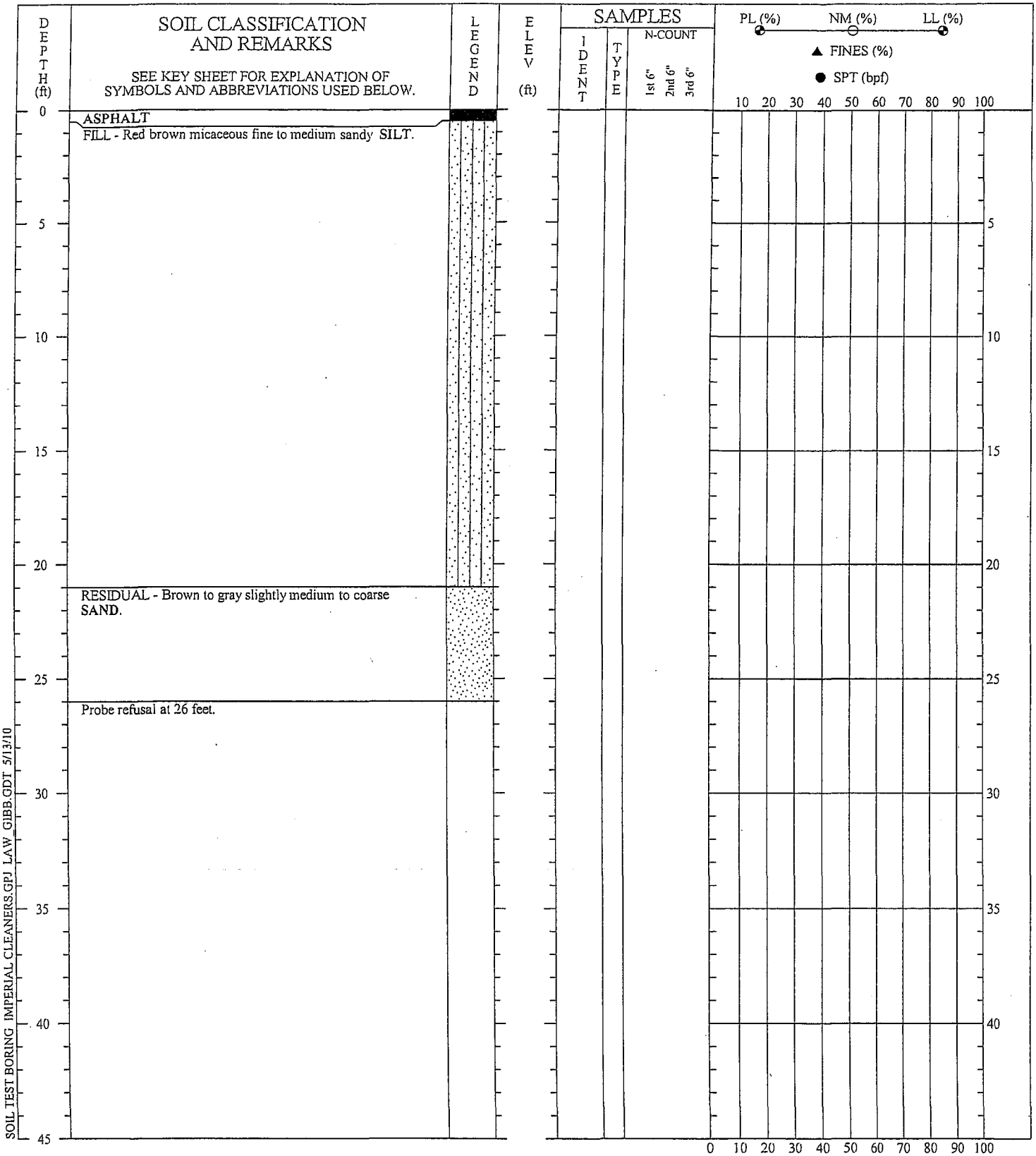
DRILLER:	Piedmont Environmental Drilling
EQUIPMENT:	Deitrich
METHOD:	Hollow Stem Auger
HOLE DIA.:	8 inches
REMARKS:	No groundwater encountered.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-28
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	August 14, 2009
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 5/13/10

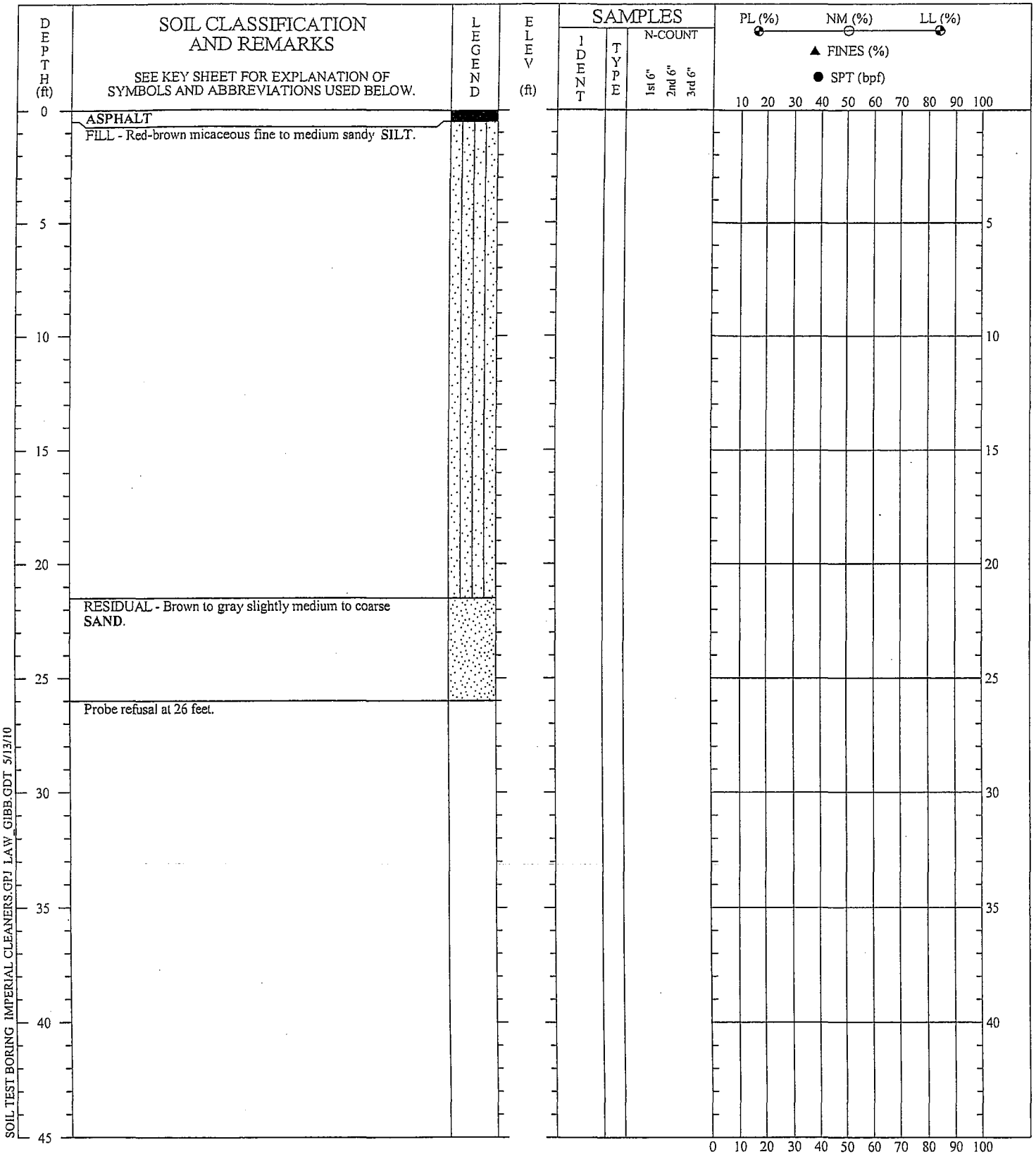
DRILLER:	Atlas GeoSampling
EQUIPMENT:	Power Probe 9100 VTR
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Groundwater encountered at approximately 24 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-29
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	March 29, 2010
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 5/13/10

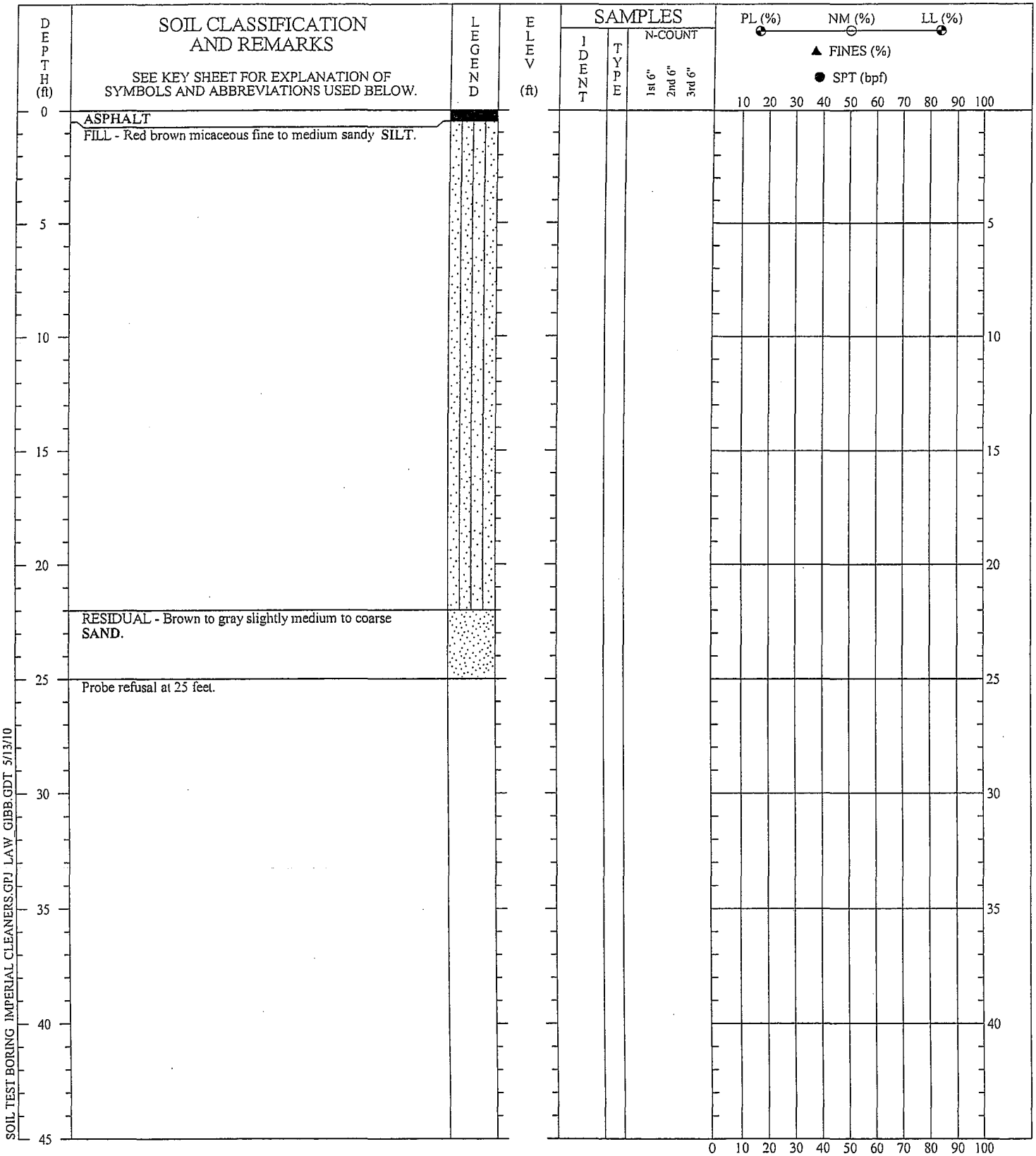
DRILLER:	Atlas GeoSampling
EQUIPMENT:	Power Probe 9100 VTR
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Groundwater encountered at approximately 24 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-30
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	March 29, 2010
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 5/13/10

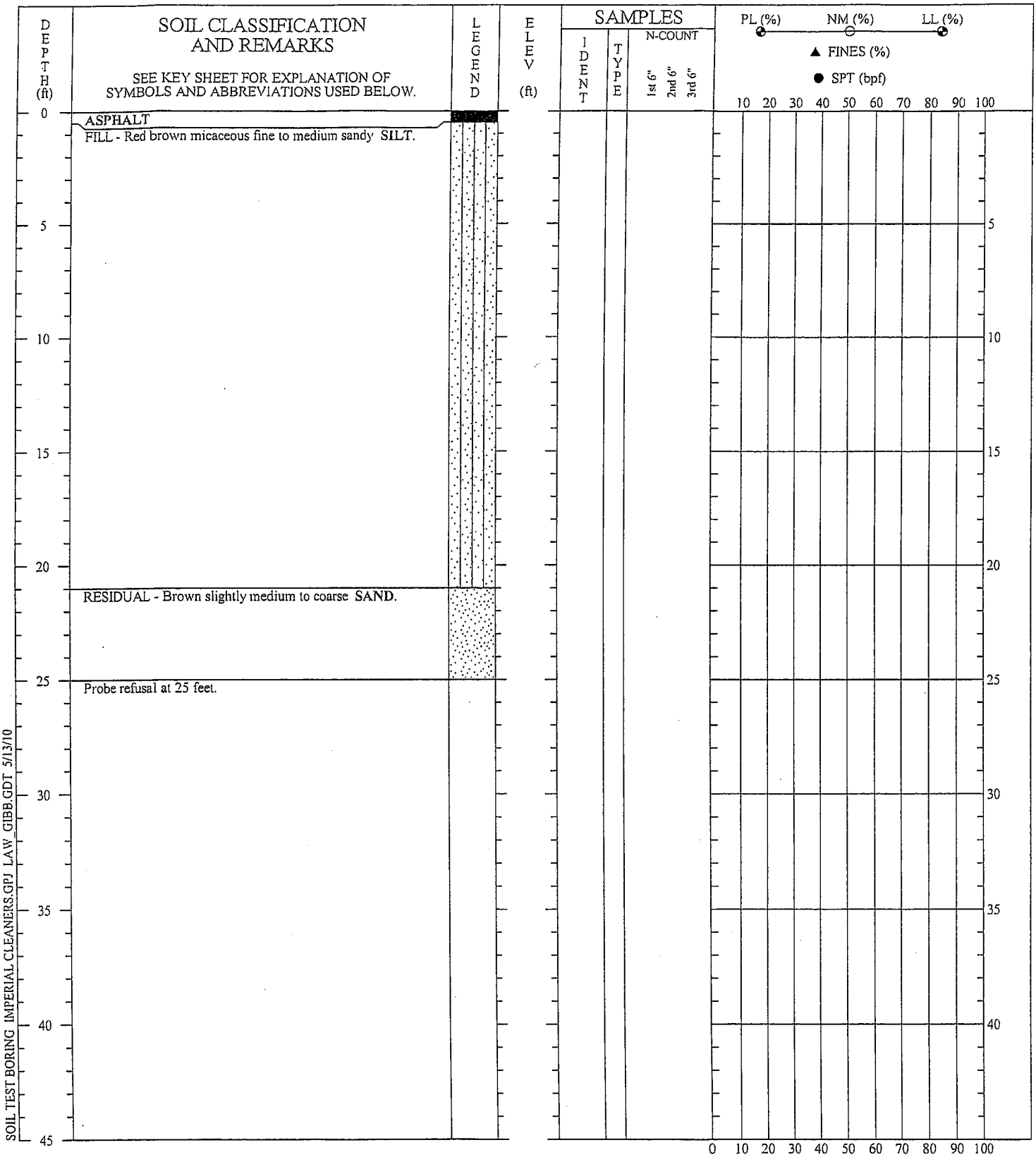
DRILLER:	Atlas GeoSampling
EQUIPMENT:	Power Probe 9100 VTR
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Groundwater encountered at approximately 24 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL

SOIL TEST BORING RECORD

BORING NO.:	SB-31
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	March 29, 2010
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 5/13/10

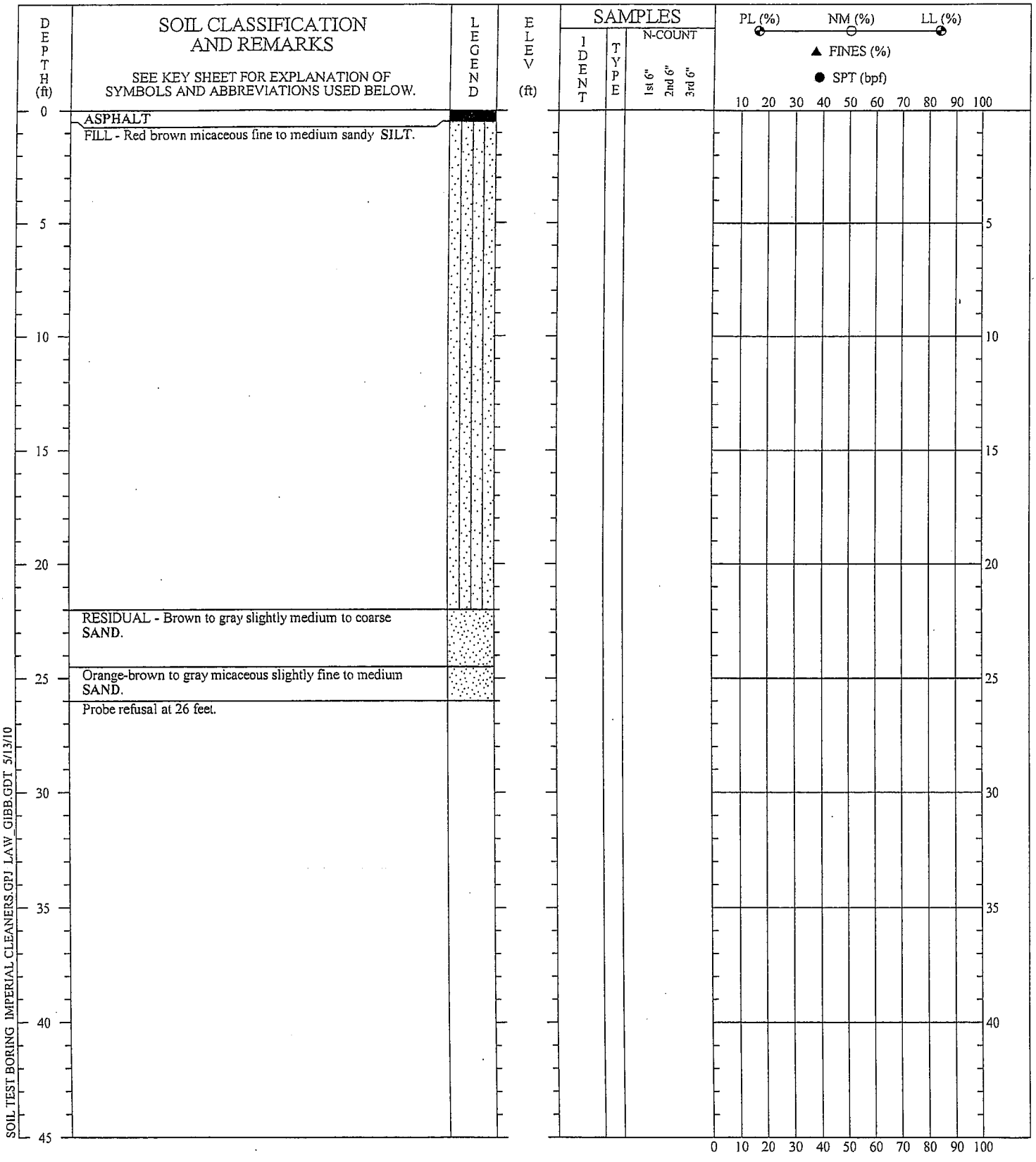
DRILLER:	Atlas GeoSampling
EQUIPMENT:	Power Probe 9100 VTR
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Groundwater encountered at approximately 24 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-32
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	March 29, 2010
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 5/13/10

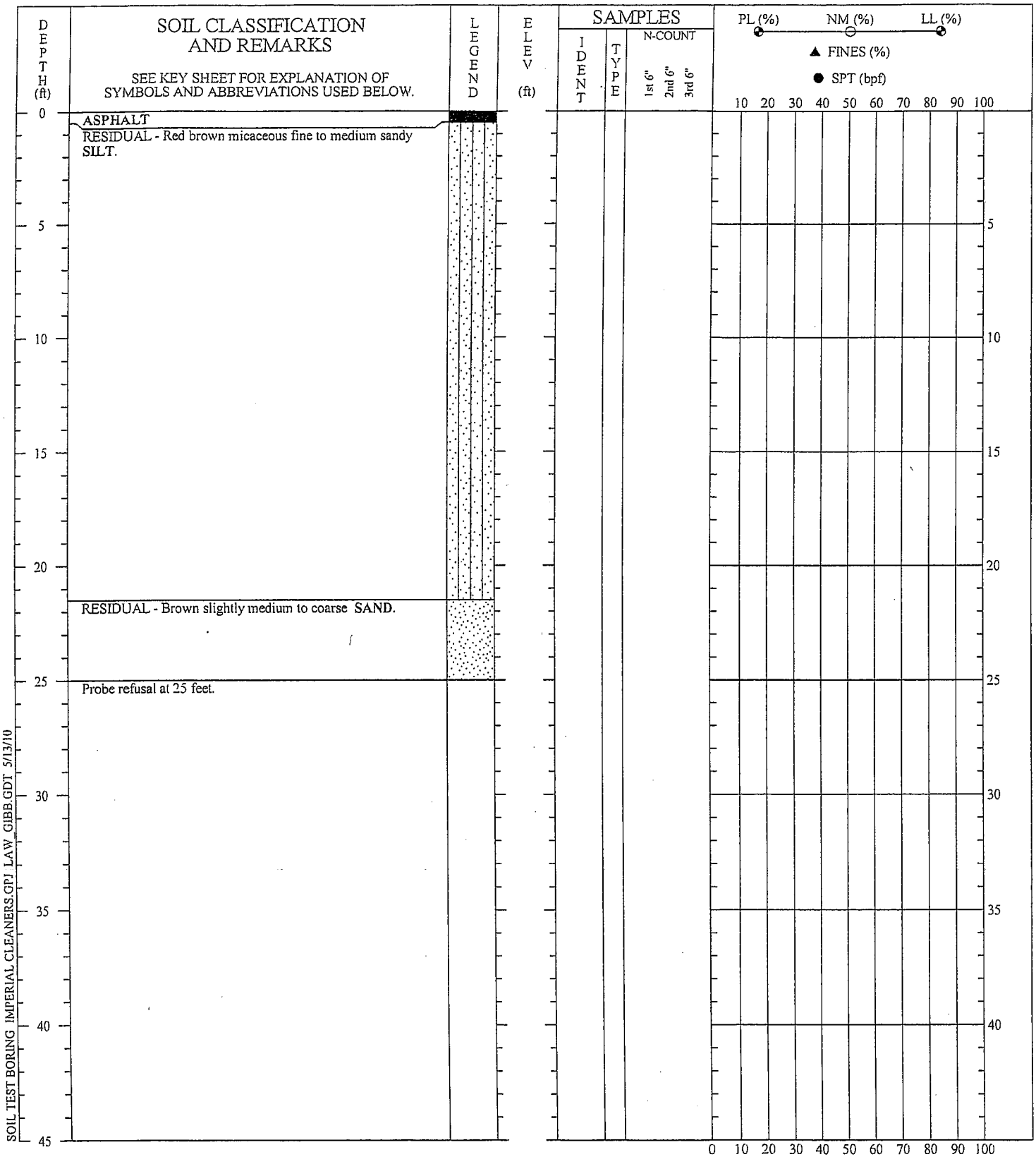
DRILLER:	Atlas GeoSampling
EQUIPMENT:	Power Probe 9100 VTR
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Groundwater encountered at approximately 24 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-33
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	March 29, 2010
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING IMPERIAL CLEANERS.GPJ LAW_GIBB.GDT 5/13/10

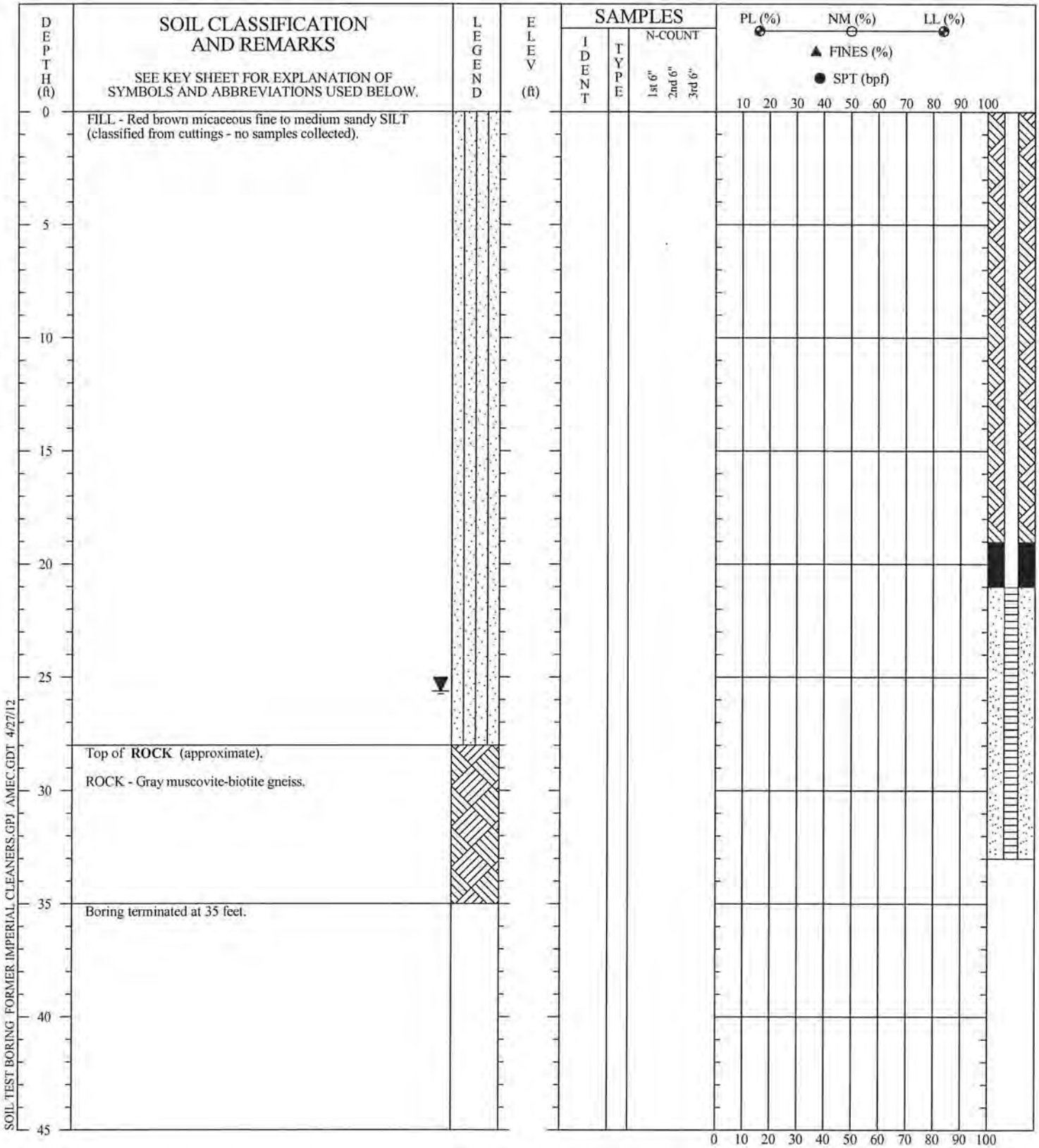
DRILLER:	Atlas GeoSampling
EQUIPMENT:	Power Probe 9100 VTR
METHOD:	Direct Push
HOLE DIA.:	2 inches
REMARKS:	Groundwater encountered at approximately 24 feet.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	SB-34
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	March 29, 2010
PROJECT NO.:	6305-05-0319

MACTEC



SOIL TEST BORING FORMER IMPERIAL CLEANERS.GPJ AMEC.GDT 4/27/12

DRILLER:	AMEC
EQUIPMENT:	CME 550
METHOD:	Air Hammer
HOLE DIA.:	6 inches
REMARKS:	Type II well installed. Stabilized groundwater depth 25.63 feet.

PREPARED BY: S. Davenport CHECKED BY: C. Ferry

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.:	MW-16
PROJECT:	Imperial Cleaners
LOCATION:	Roswell, GA
DRILLED:	February 10, 2012
PROJECT NO.:	6305-05-0319

amec

APPENDIX F
COMPUTER MODELING

CONTAMINANT FATE AND TRANSPORT MODELING

An analysis of groundwater fate and transport was presented in the 4th Semi-Annual Groundwater Monitoring Report, dated May 14, 2010 to estimate the time required to achieve compliance with applicable RRS and in the VRP Application to model the potential for regulated constituents in groundwater to impact Hog Wallow Creek located downgradient of the former dry cleaner. AMEC utilized the BIOCHLOR software to model the fate and transport of impacted groundwater on site. BIOCHLOR utilizes a combination of site specific data and literature values to determine the various physical properties of the plume and the migration potential of chlorinated VOC constituents. The purpose of the modeling is to predict the migration pattern of a chlorinated solvent plume where no engineering controls or source area reduction measures have been implemented and monitored natural attenuation (MNA) is the groundwater remedial option. The VRP application also included calculations of surface water flow for Hog Wallow Creek to determine the input of regulated constituents from the on-site plume necessary to result in exceedance of applicable Georgia In-Stream Water Quality standards for the constituents of concern (COCs).

In its November 10, 2011 Comment Letter regarding the VRP Application, EPD issued several comments which requested alterations to the input parameters such as VOC source area concentrations, model run duration and plume dispersivity values.

The model was updated utilizing the requested input parameters, including the June 2010 monitoring data, which contained the highest PCE concentration in MW-7 measured to date as the source concentration. The simulation time was also begun on that date and the modeling period extended for a duration of 25 years. By the end of the 25-year period, steady state conditions had been achieved in MW-11R. In addition, a Y-dispersivity coefficient near zero was selected to provide a uniform concentration across the plume front and allow a more conservative estimate of VOC input to the creek to be made. Changing these input factors resulted in a more conservative estimate for VOC migration into the creek. The resulting VOC concentrations could then be compared to the maximum allowable COC concentrations that ensure compliance with the In-stream Water Quality Standards.

In addition, a “point of demonstration” well (MW-16) was installed between MW-7 and MW-11R in February 2012 and included in subsequent groundwater monitoring events. These data were incorporated into the model as well to help refine the model inputs.

The model was re-run utilizing the revised input VOC concentrations and start date and the results of the updated analysis were presented in the May and November 2012 VRP Progress Reports. In addition, the retardation factor calculated for PCE was utilized for other constituents as it provided a better fit with the observed monitoring data. The results of the updated model runs, with the EPD requested changes to the input parameters, indicated that COC concentrations in MW-11R were predicted to remain well below the maximum allowable concentrations as summarized in Table 1. The model was run again with updated field observation values for MW-7, MW-16 and MW-11R. As a conservative measure, the source area concentration from June 2010 was retained, although the concentration in MW-7 has decreased since that time.

EPD required that the stream flow be gauged on a monthly basis over a period of at least six months during the expected dry part of the year to determine a reasonable low-flow value for Hog Wallow Creek. The results of the stream flow gauging indicated the flow varied from a high of approximately 1.9 cubic feet per second (cfs) in May 2012 to a low of approximately 0.37 cfs in October 2012. The lowest of these values, 0.37 cfs, was measured following an extended dry spell and likely represents a low-level flow condition for Hog Wallow Creek. This value also closely corresponds to the previously assumed value of 0.38 cfs estimated for the site using 7Q10 minimum flow data for area streams.

The maximum allowable concentrations of COCs at MW-11R protective of in-stream water quality standards have been updated to reflect the measured low flow conditions for the creek. As shown on Table F1, the COC concentrations detected to date in MW-11R have remained well below the maximum allowable concentrations.

Table F1 - Maximum allowable concentrations of COCs at MW-11R protective of in-stream water quality standards, parameter C_1

COC	Q_1 (cfs)	$Q_2 = Q_3 =$ 7Q10 (cfs)	C_2 (µg/L)	Maximum Allowable Concentration at MW-11R C_1 (µg/L)	Maximum Predicted Concentration at MW-11R (µg/L)	June 2014 Measured Concentration at MW-11R (µg/L)	In-stream Criteria (µg/L)
PCE	0.000131915	0.37	3.297875	9,250	1,395	72	3.3
TCE	0.000131915	0.37	30.0280197	84,220	686	83	30
DCE	0.000131915	0.37	10001.2399	28,805,000	299	164	10,000
VC	0.000131915	0.37	2.39529868	6,710	23	<2	2.4

Q_1 - Flow rate of impacted groundwater entering the stream segment (ft^3/sec)
Q_2 - Measured low flow in the stream immediately upgradient of the Site (ft^3/sec)
Q_3 - Measured low flow in the stream immediately downgradient of the Site; $Q_3 = Q_2$ since $Q_2 >> Q_1$
C_1 - Dissolved concentration of COC in groundwater (in µg/L) represented by MW-11R.
C_2 - Resulting concentration of COC in the stream after mixing (in µg/L)

The modeling results are consistent with the groundwater monitoring data obtained at the site. To date, no chlorinated VOC impacts to surface water have been detected on site since monitoring began, as predicted by the model. The highest VOC concentrations measured in MW-11R remain several orders of magnitude below the maximum allowable concentrations that would be protective of the surface water. As indicated in Table F1, after extending the model run to the point at which steady state conditions are achieved in MW-11R (approximately 25 years), the predicted VOC concentrations in MW-11R all remain well below the maximum allowable concentrations that would be protective of the surface water.

BIOCHLOR OUTPUT SHEETS

BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

Imperial Cleaners
VRP
Run Name

Data Input Instructions:
115 → 1. Enter value directly....or
↑ or → 2. Calculate by filling in gray
0.02 cells. Press Enter, then
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT: Ethenes ● Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	26.2	(ft/yr)
or			
Hydraulic Conductivity	K	9.5E-05	(cm/sec)
Hydraulic Gradient	i	0.04	(ft/ft)
Effective Porosity	n	0.15	(-)

2. DISPERSION

Alpha x*	10	(ft)
(Alpha y) / (Alpha x)*	1E-10	(-)
(Alpha z) / (Alpha x)*	1.E-99	(-)

Calc. Alpha x

3. ADSORPTION

Retardation Factor* → R

or

Soil Bulk Density, rho		1.6	(kg/L)	
FractionOrganicCarbon, foc		1.6E-3	(-)	
Partition Coefficient	Koc			
PCE	426	(L/kg)	8.27	(-)
TCE	130	(L/kg)	3.22	(-)
DCE	125	(L/kg)	3.13	(-)
VC	30	(L/kg)	1.51	(-)
ETH	302	(L/kg)	6.15	(-)
Common R (used in model)* =			**8.27**	

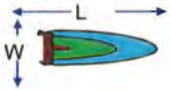
4. BIOTRANSFORMATION -1st Order Decay Coefficient*

	λ (1/yr)	half-life (yrs)	Yield
Zone 1			
PCE → TCE	0.231	3.00	0.79
TCE → DCE	0.330	2.10	0.74
DCE → VC	0.365	1.90	0.64
VC → ETH	2.772	0.25	0.45
Zone 2	λ (1/yr)	half-life (yrs)	
PCE → TCE	0.000		
TCE → DCE	0.000		
DCE → VC	0.000		
VC → ETH	0.000		

λ HELP

5. GENERAL

Simulation Time*	25	(yr)
Modeled Area Width*	300	(ft)
Modeled Area Length*	100	(ft)
Zone 1 Length*	100	(ft)
Zone 2 Length*	0	(ft)



Zone 2= L - Zone 1

6. SOURCE DATA TYPE: Continuous / Single Planar

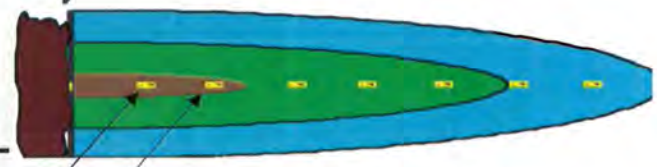
Source Options

Source Thickness in Sat. Zone* 10 (ft)

Width* (ft) Y1: 75

Conc. (mg/L)*	C1	k_s* (1/yr)
PCE	4.8	0
TCE	.83	0
DCE	.349	0
VC	.001	0
ETH		0

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations



View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)	4.0	.21	.062								
TCE Conc. (mg/L)	.68	.1	.151								
DCE Conc. (mg/L)	.241	.126	.222								
VC Conc. (mg/L)	0.0	.001	.003								
ETH Conc. (mg/L)											
Distance from Source (ft)	0	40	95								
Date Data Collected	2013										

8. CHOOSE TYPE OF OUTPUT TO SEE:

RUN CENTERLINE | RUN ARRAY | Help | Restore Formulas | RESET | SEE OUTPUT | Paste Example

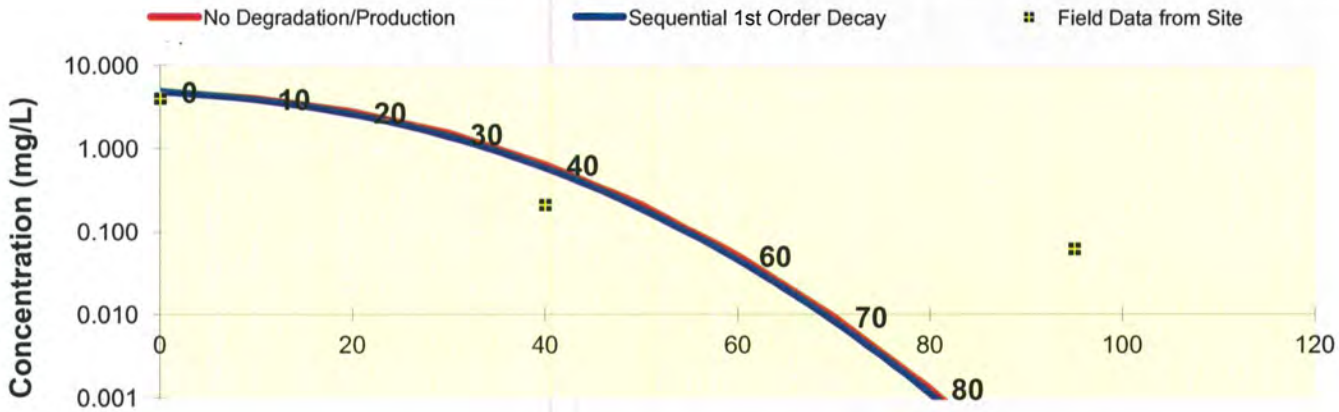
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

PCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	4.800	3.974	2.739	1.507	0.643	0.209	0.051	0.009	0.001	0.000	0.000
Biotransformation	4.8000	3.798	2.540	1.371	0.578	0.187	0.045	0.008	0.001	0.000	0.000

Monitoring Well Locations (ft)

	0	40	95								
Field Data from Site	4.000	0.210	0.062								



Distance From Source (ft.)

See PCE

See TCE

See DCE

See VC

See ETH

Replay

Time:

5.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

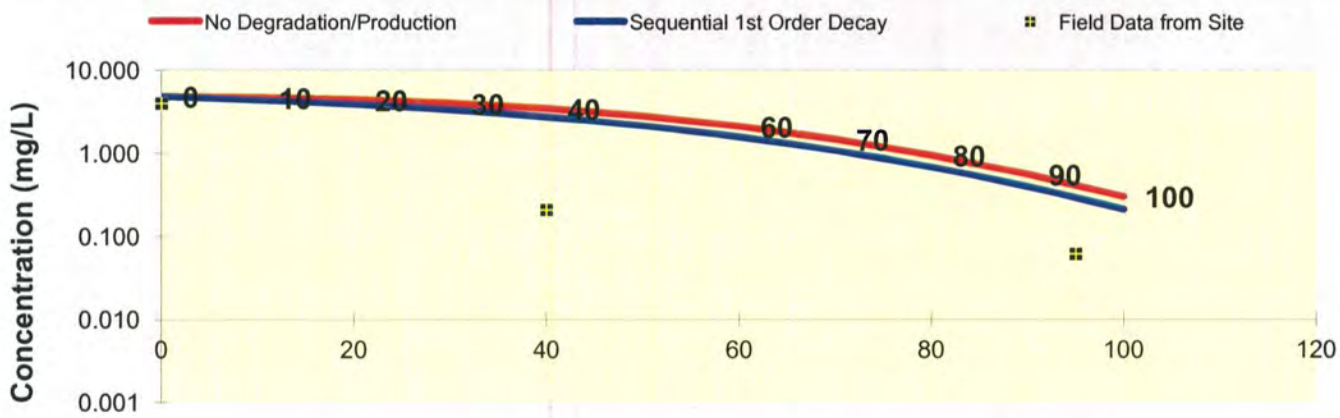
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

PCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	4.800	4.668	4.413	4.008	3.457	2.803	2.119	1.482	0.955	0.563	0.304
Biotransformation	4.8000	4.353	3.869	3.334	2.754	2.156	1.585	1.085	0.686	0.399	0.213

Monitoring Well Locations (ft)

	0	40	95								
Field Data from Site	4.000	0.210	0.062								



See PCE

See TCE

See DCE

See VC

See ETH

Distance From Source (ft.)

Replay

Time:

15.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

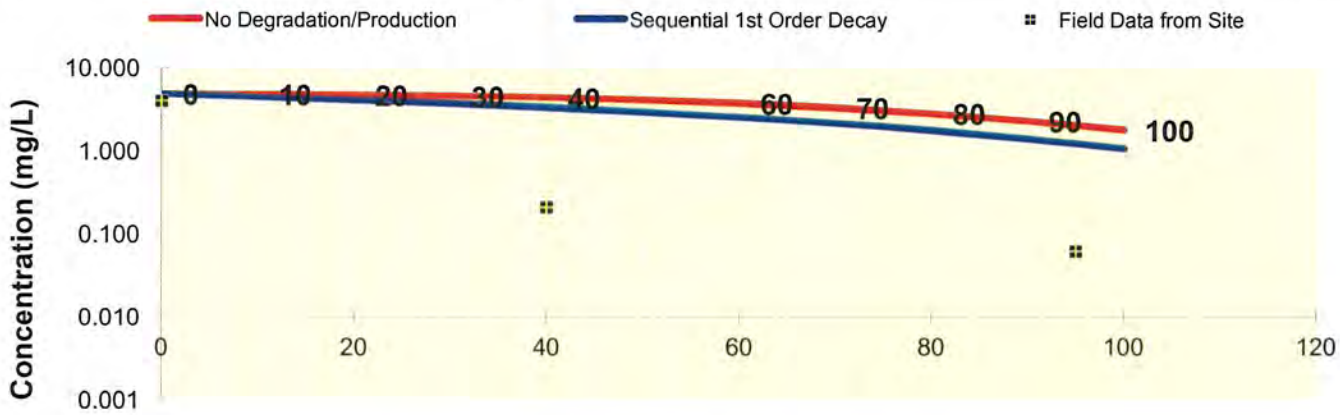
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

PCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	4.800	4.766	4.697	4.574	4.381	4.106	3.745	3.308	2.816	2.302	1.800
Biotransformation	4.8000	4.411	4.037	3.669	3.299	2.922	2.535	2.145	1.760	1.395	1.062

Monitoring Well Locations (ft)

	0	40	95								
Field Data from Site	4.000	0.210	0.062								



See PCE

See TCE

See DCE

See VC

See ETH

Distance From Source (ft.)

Prepare Animation

Time:

25.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

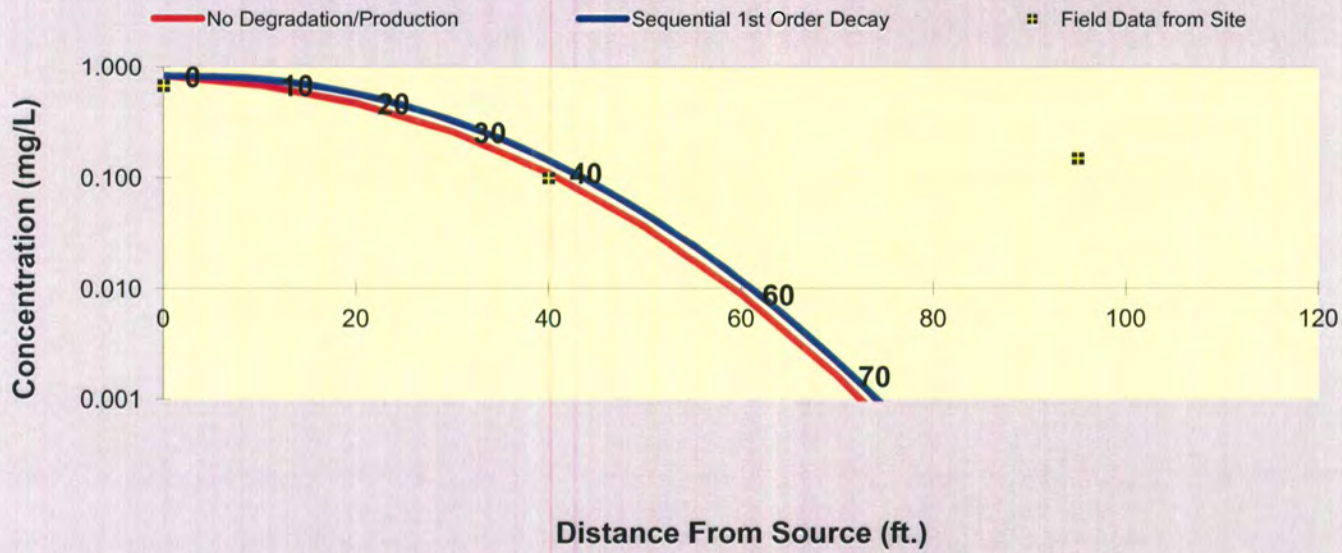
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	0.830	0.687	0.474	0.261	0.111	0.036	0.009	0.002	0.000	0.000	0.000
Biotransformation	0.8300	0.777	0.573	0.328	0.143	0.047	0.012	0.002	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	40	95								
Field Data from Site	0.680	0.100	0.151								



See PCE

See TCE

See DCE

See VC

See ETH

Replay

Time:

5.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

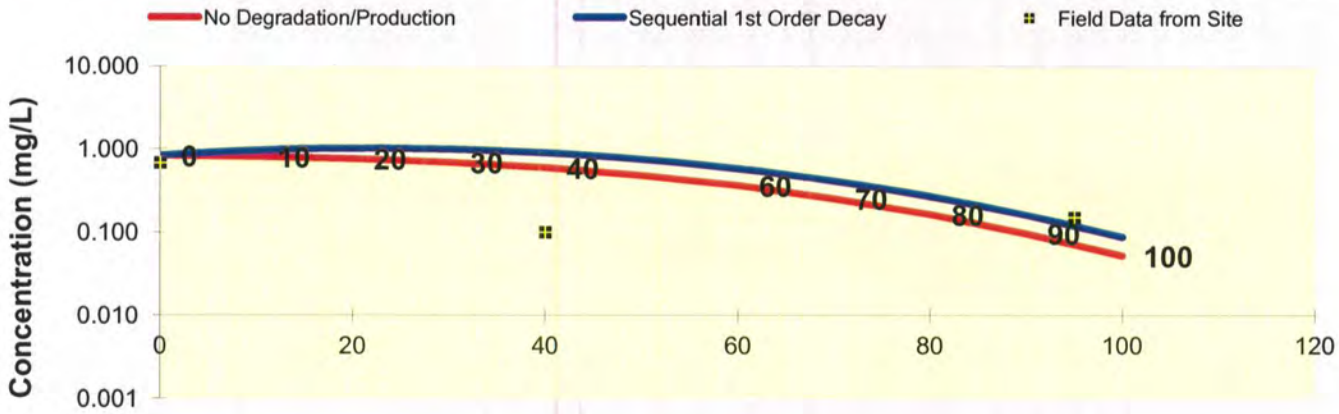
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	0.830	0.807	0.763	0.693	0.598	0.485	0.366	0.256	0.165	0.097	0.053
Biotransformation	0.8300	0.958	1.011	0.988	0.895	0.751	0.582	0.414	0.270	0.161	0.087

Monitoring Well Locations (ft)

	0	40	95								
Field Data from Site	0.680	0.100	0.151								



Distance From Source (ft.)

See PCE

See TCE

See DCE

See VC

See ETH

Replay

Time:

15.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

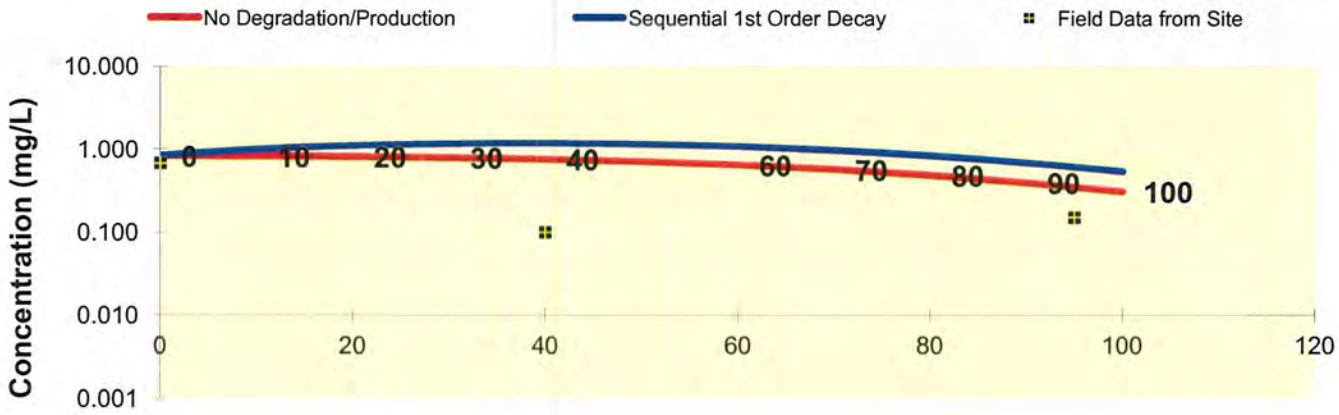
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	0.830	0.824	0.812	0.791	0.758	0.710	0.648	0.572	0.487	0.398	0.311
Biotransformation	0.8300	0.987	1.096	1.159	1.174	1.144	1.072	0.965	0.832	0.686	0.540

Monitoring Well Locations (ft)

	0	40	95								
Field Data from Site	0.680	0.100	0.151								



Distance From Source (ft.)

See PCE

See TCE

See DCE

See VC

See ETH

Replay

Time:

25.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

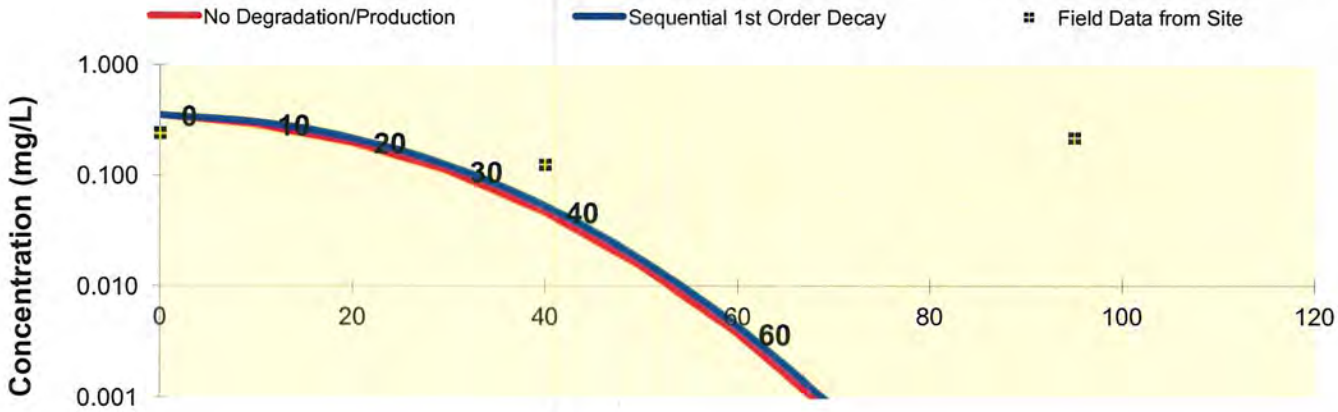
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

DCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	0.349	0.289	0.199	0.110	0.047	0.015	0.004	0.001	0.000	0.000	0.000
Biotransformation	0.3490	0.304	0.217	0.122	0.053	0.017	0.004	0.001	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	40	95								
Field Data from Site	0.241	0.126	0.222								



Distance From Source (ft.)

See PCE | See TCE | See DCE | See VC | See ETH

Replay

Time: 5.0 Years

Log ⟺ Linear

Return to Input | To All | To Array

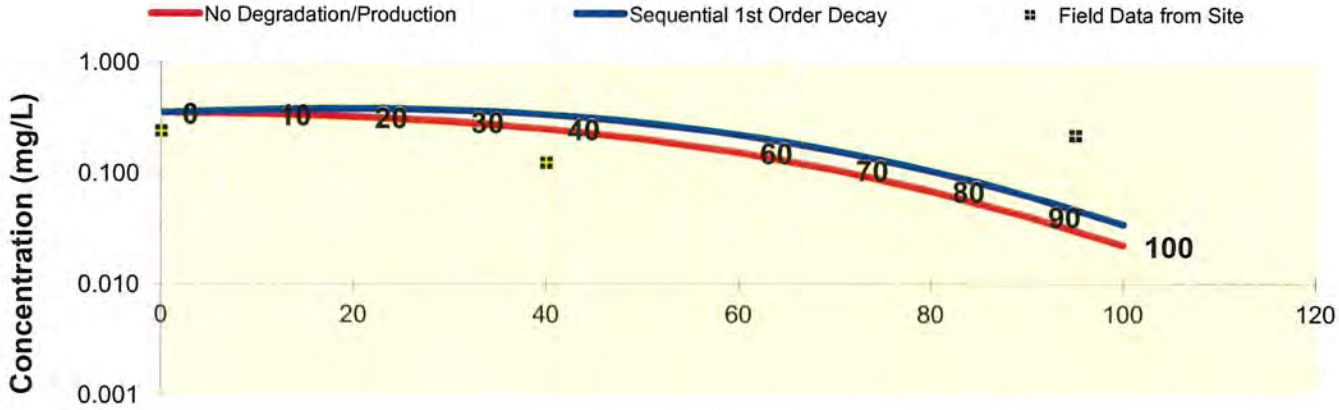
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

DCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	0.349	0.339	0.321	0.291	0.251	0.204	0.154	0.108	0.069	0.041	0.022
Biotransformation	0.3490	0.371	0.380	0.368	0.335	0.284	0.221	0.159	0.104	0.063	0.034

Monitoring Well Locations (ft)

	0	40	95								
Field Data from Site	0.241	0.126	0.222								



See PCE

See TCE

See DCE

See VC

See ETH

Distance From Source (ft.)

Replay

Time:

15.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

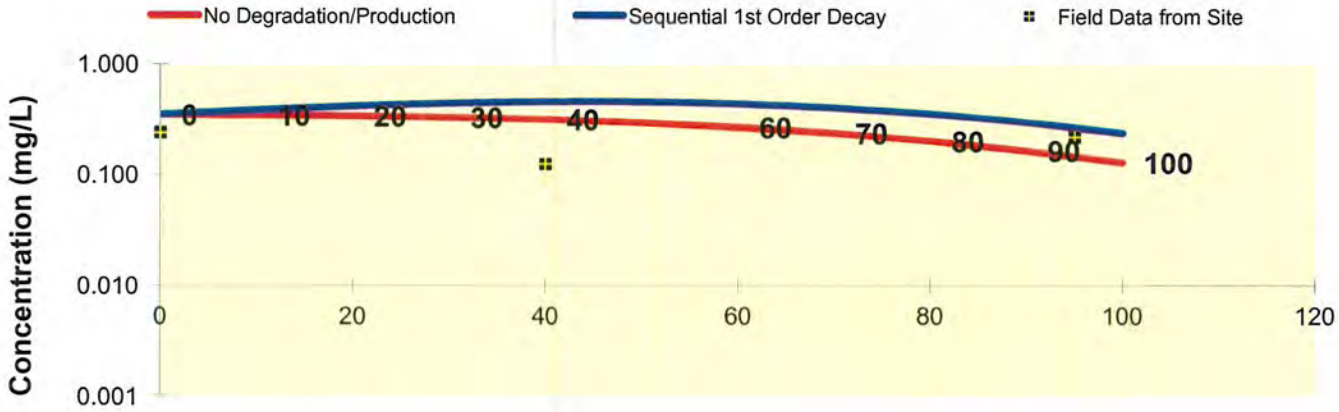
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

DCE	0	10	20	30	40	50	60	70	80	90	100
No Degradation	0.349	0.347	0.341	0.333	0.319	0.299	0.272	0.241	0.205	0.167	0.131
Biotransformation	0.3490	0.384	0.417	0.443	0.458	0.457	0.439	0.404	0.356	0.299	0.239

Monitoring Well Locations (ft)

	0	40	95								
Field Data from Site	0.241	0.126	0.222								



See PCE

See TCE

See DCE

See VC

See ETH

Distance From Source (ft.)

Replay

Time:

25.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

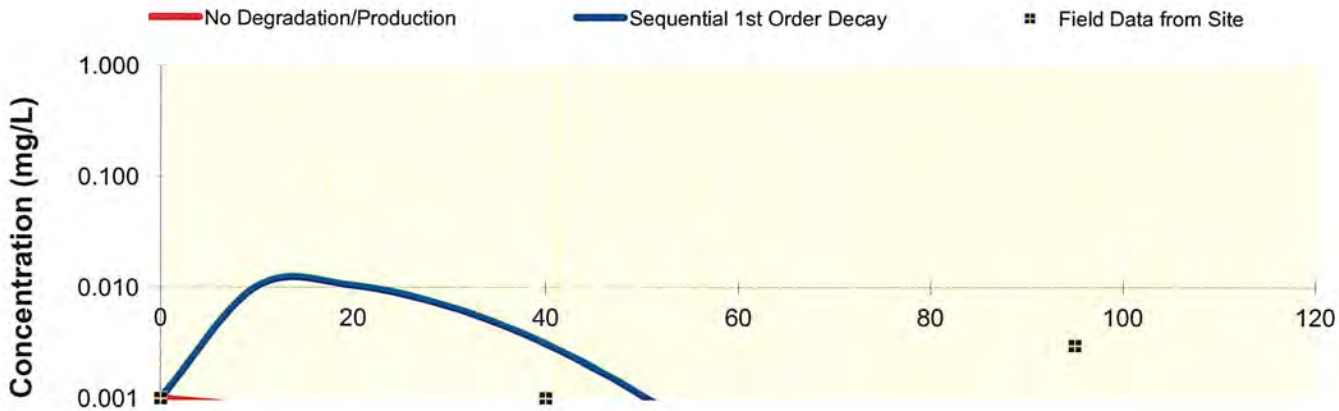
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

VC	0	10	20	30	40	50	60	70	80	90	100
No Degradation	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0010	0.010	0.010	0.007	0.003	0.001	0.000	0.000	0.000	0.000	0.000

Monitoring Well Locations (ft)

	0	40	95								
Field Data from Site	0.001	0.001	0.003								



See PCE

See TCE

See DCE

See VC

See ETH

Replay

Time:

5.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

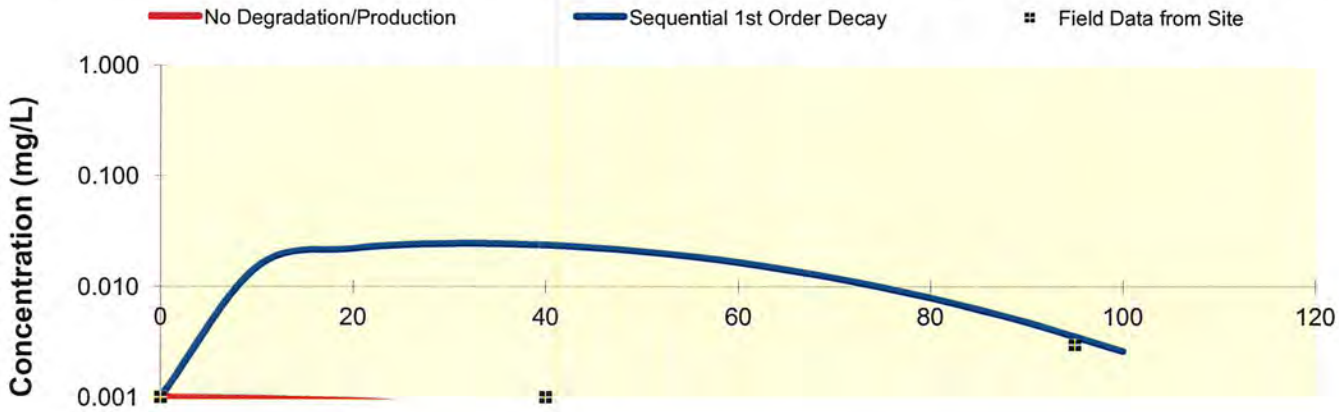
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

VC	0	10	20	30	40	50	60	70	80	90	100
No Degradation	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0010	0.015	0.022	0.025	0.024	0.021	0.017	0.012	0.008	0.005	0.003

Monitoring Well Locations (ft)

	0	40	95								
Field Data from Site	0.001	0.001	0.003								



See PCE

See TCE

See DCE

See VC

See ETH

Replay

Time:

15.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

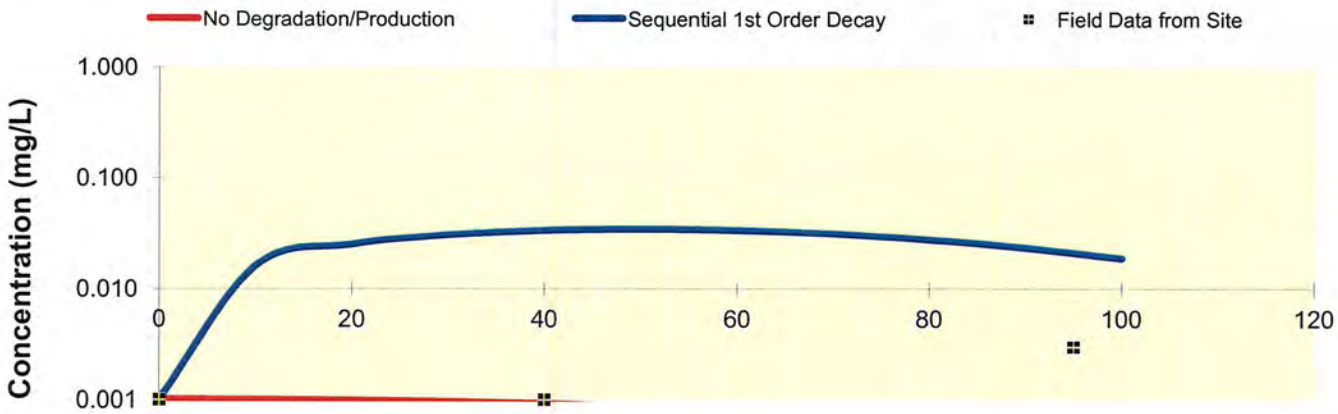
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

VC	0	10	20	30	40	50	60	70	80	90	100
No Degradation	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000
Biotransformation	0.0010	0.016	0.025	0.031	0.033	0.034	0.034	0.031	0.028	0.023	0.019

Monitoring Well Locations (ft)

	0	40	95								
Field Data from Site	0.001	0.001	0.003								



See PCE

See TCE

See DCE

See VC

See ETH

Time:

25.0 Years

Log ⟺ Linear

Replay

Return to Input

To All

To Array

APPENDIX G
RISK REDUCTION STANDARDS

Table B-3
Type 1 and Type 3 Soil RRS, mg/kg

PARAMETER	Volatilization Factor (m^3/kg)	HSRA Type I Soil Criteria (mg/kg) (a)	HSRA Appendix I Value (mg/kg) (b)	Type I Groundwater RRS (mg/L) (c)	Type 1 GW RRS x 100 (mg/kg)	Number 1 (mg/kg) (d)	Risk-Based Residential Type 1 Noncarcinogenic (mg/kg) (e)	Risk-Based Residential Type 1 Carcinogenic (mg/kg) (f)	Risk-Based Soil Type 1 RRS (mg/kg) (g)	Overall Type 1 RRS (mg/kg) (h)	Risk-Based Nonresidential Type 3 Noncarcinogenic (mg/kg) (e)	Risk-Based Nonresidential Type 3 Carcinogenic (mg/kg) (f)	Risk-Based Soil Type 3 RRS (mg/kg) (g)	Subsurface Soil Type 3 RRS (mg/kg) (i)	Surface Soil Type 3 RRS (mg/kg) (j)
Volatile Organic Compounds (VOCs)															
Acetone	6.7E+03	ND	2.7E+00	4.0E+00	4.0E+02	4.0E+02	1.9E+05	ND	1.9E+05	4.0E+02	2.6E+05	ND	2.6E+05	4.0E+02	4.0E+02
cis-1,2-Dichloroethene	2.7E+03	ND	5.3E-01	7.0E-02	7.0E+00	7.0E+00	1.3E+03	ND	1.3E+03	7.0E+00	4.1E+03	ND	4.1E+03	7.0E+00	7.0E+00
Tetrachloroethene	2.7E+03	ND	1.8E-01	5.0E-03	5.0E-01	5.0E-01	1.4E+02	3.2E+02	1.4E+02	5.0E-01	1.5E+02	4.1E+02	1.5E+02	5.0E-01	5.0E-01
Toluene	5.6E+03	ND	1.4E+01	1.0E+00	1.0E+02	1.0E+02	2.2E+04	ND	2.2E+04	1.0E+02	3.2E+04	ND	3.2E+04	1.0E+02	1.0E+02
trans-1,2-Dichloroethene	2.8E+03	ND	5.3E-01	1.0E-01	1.0E+01	1.0E+01	2.2E+02	ND	2.2E+02	1.0E+01	2.4E+02	ND	2.4E+02	1.0E+01	1.0E+01
Trichloroethene	2.5E+03	ND	1.3E-01	5.0E-03	5.0E-01	5.0E-01	6.7E+00	1.9E+01	6.7E+00	5.0E-01	7.1E+00	2.5E+01	7.1E+00	5.0E-01	5.0E-01
Vinyl chloride	5.8E+02	ND	4.0E-02	2.0E-03	2.0E-01	2.0E-01	7.9E+01	3.6E+00	3.6E+00	2.0E-01	8.5E+01	5.1E+00	5.1E+00	2.0E-01	2.0E-01

Notes:
(a) Table 2, Appendix III of HSRA regulations
(b) Appendix I of HSRA regulations. Value is the soil concentration that triggers notification requirements.
(c) Table 1, Appendix III of HSRA regulations. For those substances not listed, reporting limit used as the Type I groundwater RRS.
(d) Value is the highest of the Appendix I value and the groundwater RRS x 100.

(e) $$\frac{THI \times BW \times ATn \times 365 days/year}{EF \times ED \times [(1/RfDi \times (1/VF + 1/PEF) \times InhR) + (1/RfDo \times Irs \times CF)]}$$

(f) $$\frac{TR \times BW \times ATc \times 365 days/year}{EF \times ED \times [(SFi \times (1/VF + 1/PEF) \times InhR) + (SFo \times Irs \times CF)]}$$

(g) Minimum of noncarcinogenic and carcinogenic concentrations.
(h) Minimum concentration of Number 1 and Type 1 RRS.
(i) Maximum concentration of Number 1 and HSRA Type 1 Soil Criteria.
(j) Minimum concentration of the risk-based soil Type 3 RRS and the subsurface soil Type 3 RRS.
RL Reporting Limit
RRS Risk Reduction Standard
GW Groundwater
ND Not Determined - Can not be calculated

Exposure Parameters	Residential Type 1	Nonresidential Type 3	Unit
Total Hazard Index (THI)	1	1	unitless
Target Risk (TR)	1.E-05	1.E-05	unitless
Target Risk (TR) WOE - C	1.E-04	1.E-04	
Body Weight (BW)	70	70	kg
Averaging Time, Carcinogen (ATc)	70	70	yrs
Averaging Time, Noncarcinogen (ATn)	30	25	yrs
Exposure Duration (ED)	30	25	yrs
Exposure Frequency (EF)	350	250	days/yr
Soil Ingestion Rate (IRs)	114	50	mg/day
Air Inhalation Rate (InhR)	15	20	m^3/day
Particulate Emission Factor (PEF)	4.63E+09	4.63E+09	m^3/kg
Conversion Factor (CF)	1.E-06	1.E-06	kg/mg
Volatilization Factor (VF)	Chemical-specific	Chemical-specific	m^3/kg

UPDATED/DATE: LWC 5/1/2012
CHECKED/DATE: LMS 5/3/2012

Table B-2
Toxicity Values

PARAMETER	Chronic Reference Dose: Oral (RfDo) (mg/kg/day)	Chronic Reference Dose: Inhalation (RfDi) (mg/kg/day)	Cancer Slope Factor: Oral (SFo) (mg/kg/day)-1	Cancer Slope Factor: Inhalation (SFi) (mg/kg/day)-1	Weight of Evidence	Source for Chronic RfDs and SFs
Volatile Organic Compounds (VOCs)						
Acetone	9.0E-01	8.9E+00	ND	ND	NA	IRIS, ATSDR
cis-1,2-Dichloroethene	2.0E-03	ND	ND	ND	NA	IRIS
Tetrachloroethene	6.0E-03	1.1E-02	2.1E-03	9.1E-04	B	IRIS
Toluene	8.0E-02	1.4E+00	ND	ND	D	IRIS
trans-1,2-Dichloroethene	2.0E-02	1.7E-02	ND	ND	NA	IRIS,PPRTV
Trichloroethene	5.0E-04	5.7E-04	5.0E-02	1.4E-02	A	IRIS
Vinyl chloride	3.0E-03	2.9E-02	7.2E-01	1.5E-02	A	IRIS

SOURCES: EPA Regional Screening Level Table, November 2011.
IRIS Integrated Risk Information System
PPRTV Provisional Peer Reviewed Toxicity Values
ATSDR Agency for Toxic Substances and Disease Registry
ND No Data
NA Not Available

UPDATED/DATE: LWC 5/1/2012
CHECKED/DATE: LMS 5/3/2012

Table B-1
Type 1 through Type 4 Ground Water RRS, mg/L

Parameter	Chronic Reference Dose Oral (mg/kg/day)	Chronic Reference Dose Inhalation (mg/kg/day)	Cancer Slope Factor Oral (mg/kg/day)-1	Cancer Slope Factor Inhalation (mg/kg/day)-1	Source for Chronic Rfds and CSFs	Type 1/ Type 3 (mg/L)	Type 2 Standard (mg/L) Adult Noncarcinogenic	Type 2 Standard (mg/L) Adult Carcinogenic	Type 2 Standard (mg/L) Child Noncarcinogenic	Type 2 Standard (mg/L) Child Carcinogenic	Type 2 Overall	Overall Residential	Type 4 (mg/L) Industrial Worker Noncarcinogenic	Type 4 (mg/L) Industrial Worker Carcinogenic	Type 4 Overall IW	Overall Nonresidential IW
Volatile Organic Compounds (VOCs)																
Acetone	9.0E-01	8.9E+00	ND	ND	IRIS, ATSDR	4.0E+00	2.2E+01	ND	8.0E+00	ND	8.0E+00	8.0E+00	4.6E+01	ND	4.6E+01	4.6E+01
cis-1,2-Dichloroethene	2.0E-03	ND	ND	ND	IRIS	7.0E-02	7.3E-02	ND	3.1E-02	ND	3.1E-02	7.0E-02	2.0E-01	ND	2.0E-01	2.0E-01
Tetrachloroethene	6.0E-03	1.1E-02	2.1E-03	9.1E-04	IRIS	5.0E-03	6.0E-02	1.3E-01	1.9E-02	2.0E-01	1.9E-02	1.9E-02	9.8E-02	2.6E-01	9.8E-02	9.8E-02
Toluene	8.0E-02	1.4E+00	ND	ND	IRIS	1.0E+00	2.3E+00	ND	8.8E-01	ND	8.8E-01	1.0E+00	5.2E+00	ND	5.2E+00	5.2E+00
trans-1,2-Dichloroethene	2.0E-02	1.7E-02	ND	ND	IRIS,PPRTV	1.0E-01	1.1E-01	ND	3.2E-02	ND	3.2E-02	1.0E-01	1.6E-01	ND	1.6E-01	1.6E-01
Trichloroethene	5.0E-04	5.7E-04	4.6E-02	1.4E-02	IRIS	5.0E-03	3.4E-03	7.3E-03	1.0E-03	1.2E-02	1.0E-03	5.0E-03	5.2E-03	1.5E-02	5.2E-03	5.2E-03
Vinyl chloride	3.0E-03	2.9E-02	7.2E-01	1.5E-02	IRIS	2.0E-03	7.2E-02	1.1E-03	2.6E-02	2.2E-03	1.1E-03	2.0E-03	1.5E-01	3.3E-03	3.3E-03	3.3E-03

IRIS Integrated Risk Information System
ATSDR - Agency for Toxic Substances and Disease Registry, 2011.
IRIS - Integrated Risk Information System, USEPA.
PPRTV - Provisional Peer Reviewed Toxicity Values, USEPA.

ND Toxicity values not available
DL Detection limit
(a) Compound is not volatile in water.

Equation 2 (Noncarcinogens):

$$C = \frac{THI \times BW \times AT \times 365 days/year}{EF \times ED \times [(1/RfDi \times K \times IRa) + (1/RfDo \times IRw)]}$$

Equation 1 (Carcinogens):

$$C = \frac{TR \times BW \times AT \times 365 days/year}{EF \times ED \times [(SFi \times K \times IRa) + (SFo \times IRw)]}$$

Where:	Type 2 Adult	Type 2 Parameters Child	Type 4 Industrial Worker Parameters
THI = Target Hazard Index =	1	1	1
BW = Body Weight =	70 kg	15 kg	70 kg
AT = Averaging Time =	30 years (noncarc.); 70 (carc	6 years (noncarc.); 70 (carcinogens)	25 years for noncarcinogens; 70 years for carc.
EF = Exposure Frequency =	350 days/year	350 days/year	250 day/year
ED = Exposure Duration =	30 years	6 years	25 year
RfDi = Inhalation Reference Dose =	Chemical Specific	Chemical Specific	Chemical Specific
K = Volatilization Factor = 0.0005 x 1000 L/m3 =	0.5 L/m3	0.5 L/m3	0.5 L/m3
IRa = Inhalation Rate for Air =	20 m3/day	15 m3/day	20 m3/day
RfDo = Oral Reference Dose =	Chemical Specific	Chemical Specific	Chemical Specific
IRw = Ingestion Rate for Water =	2 L/day	1 L/day	1 L/day
TR = Target Risk =	0.00001	0.00001	0.00001
SFo = Oral Cancer Slope Factor =	Chemical Specific	Chemical Specific	Chemical Specific
SFi = Inhalation Cancer Slope Factor =	Chemical Specific	Chemical Specific	Chemical Specific

UPDATED/DATE: LWC 5/1/2012
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Table B-4
Soil to Ground water Leachability

	K_d (L/kg) (1)	K_{oc} (L/kg) (2)	Source	$Ø_w$	Øa	H' (unitless)	Øw+Øa*H'/$Þ_b$	Groundwater Type 1/3 RRS (C_w, mg/L)	C_w*20	Pathway Type 1/3 C_s (mg/kg)	Groundwater Type 2 RRS (C_w, mg/L)	C_w*20	Pathway Type 2 C_s (mg/kg)	Residential Soil Leaching Criteria (3)	Industrial Worker Groundwater Type 4 RRS (C_w, mg/L)	C_w*20	Pathway Type 4 C_s (mg/kg)	Industrial Worker Soil Leaching Criteria (4)
Volatile Organic Compounds (VOCs)																		
Acetone	4.7E-03	2.4E+00	RSL	3.0E-01	1.3E-01	1.4E-03	2.0E-01	4.0E+00	8.0E+01	1.6E+01	8.0E+00	1.6E+02	3.3E+01	3.3E+01	4.6E+01	9.1E+02	1.9E+02	1.9E+02
cis-1,2-Dichloroethene	7.9E-02	4.0E+01	RSL	3.0E-01	1.3E-01	1.7E-01	2.1E-01	7.0E-02	1.4E+00	4.1E-01	3.1E-02	6.3E-01	1.8E-01	4.1E-01	2.0E-01	4.1E+00	1.2E+00	1.2E+00
Tetrachloroethene	1.9E-01	9.5E+01	RSL	3.0E-01	1.3E-01	7.2E-01	2.6E-01	5.0E-03	1.0E-01	4.5E-02	1.9E-02	3.8E-01	1.7E-01	1.7E-01	9.8E-02	2.0E+00	8.9E-01	8.9E-01
Toluene	4.7E-01	2.3E+02	RSL	3.0E-01	1.3E-01	2.7E-01	2.2E-01	1.0E+00	2.0E+01	1.4E+01	8.8E-01	1.8E+01	1.2E+01	1.4E+01	5.2E+00	1.0E+02	7.2E+01	7.2E+01
trans-1,2-Dichloroethene	7.9E-02	4.0E+01	RSL	3.0E-01	1.3E-01	1.7E-01	2.1E-01	1.0E-01	2.0E+00	5.9E-01	3.2E-02	6.4E-01	1.9E-01	5.9E-01	1.6E-01	3.2E+00	9.4E-01	9.4E-01
Trichloroethene	1.2E-01	6.1E+01	RSL	3.0E-01	1.3E-01	4.0E-01	2.3E-01	5.0E-03	1.0E-01	3.6E-02	1.0E-03	2.1E-02	7.3E-03	3.6E-02	5.2E-03	1.0E-01	3.7E-02	3.7E-02
Vinyl chloride	4.3E-02	2.2E+01	RSL	3.0E-01	1.3E-01	1.1E+00	3.0E-01	2.0E-03	4.0E-02	1.4E-02	1.1E-03	2.1E-02	7.2E-03	1.4E-02	3.3E-03	6.5E-02	2.2E-02	2.2E-02

NA Not Available
ND No Data Available
RSL EPA Regional Screening Level
HSDB Toxnet Hazardous Substances Data Base
1. Kd values taken from USEPA Regional Screening Table User's Guide.
2. Koc values taken from the EPA RSL Chemical-specific Parameters Supporting Table November 2011 unless otherwise noted. $K_d = K_{oc} * f_{oc}$ where f_{oc} equals 0.002.
3. Residential leaching value is the higher of the values based on the Type 1 and Type 2 groundwater RRS.
4. Non-residential leaching value is the higher of the values based on Type 3 and Type 4 groundwater RRS.

$Ø_w$ Water-filled soil porosity = 0.3 (L/L)
$Ø_a$ Air-filled soil porosity = 0.13 (L/L)
H' Dimensionless Henry Law Constant (HLC x 41) (unitless)
Þb Dry soil bulk density = 1.5 kg/L
RRS Risk Reduction Standard
C_w Target Leachate Concentration (mg/L)
C_s Screening Level in soil (mg/kg)

Table B-5
Type 2 Soil RRS, mg/kg

PARAMETER	Volatilization Factor (m^3/kg)	Residential Leaching DAF=20 (mg/kg)	Risk-Based Residential Child Noncarcinogenic (mg/kg) (a)	Risk-Based Residential Child Carcinogenic (mg/kg) (b)	Risk-Based Residential Adult Noncarcinogenic (mg/kg) (a)	Risk-Based Residential Adult Carcinogenic (mg/kg) (b)	Risk-Based Soil Type 2 RRS (mg/kg) (c)	Overall Type 2 RRS DAF=20 (mg/kg) (d)
Volatile Organic Compounds (VOCs)								
Acetone	6.7E+03	3.3E-01	3.3E+04	ND	1.6E+05	ND	3.3E+04	3.3E-01
cis-1,2-Dichloroethene	2.7E+03	4.1E-01	1.6E+02	ND	1.5E+03	ND	1.6E+02	4.1E-01
Tetrachloroethene	2.7E+03	1.7E-01	3.0E+01	3.3E+02	1.1E+02	2.4E+02	3.0E+01	1.7E-01
Toluene	5.6E+03	1.4E+01	3.6E+03	ND	1.9E+04	ND	3.6E+03	1.4E+01
trans-1,2-Dichloroethene	2.8E+03	5.9E-01	4.7E+01	ND	1.7E+02	ND	4.7E+01	5.9E-01
Trichloroethene	2.5E+03	3.6E-02	1.4E+00	1.9E+01	5.0E+00	1.4E+01	1.4E+00	3.6E-02
Vinyl chloride	5.8E+02	1.4E-02	1.6E+01	3.4E+00	6.0E+01	2.8E+00	2.8E+00	1.4E-02

Notes:
RRS Risk Reduction Standard
ND Not Determined - Can not be calculated

(a) $$\frac{THI \times BW \times ATn \times 365days/year}{EF \times ED \times [(1/RfDi \times (1/VF + 1/PEF) \times InhR) + (1/RfDo \times Irs \times CF)]}$$

(b) $$\frac{TR \times BW \times ATc \times 365days/year}{EF \times ED \times [(SFi \times (1/VF + 1/PEF) \times InhR) + (SFo \times Irs \times CF)]}$$

(c) Minimum of noncarcinogenic and carcinogenic concentrations.
(d) Minimum concentration of Leaching Value and Risk-based Value.

Exposure Parameters	Residential Child Type 2	Residential Adult Type 2
Total Hazard Index (THI)	1	1
Target Risk (TR)	1.E-05	1.E-05
Body Weight (BW)	15	70
Averaging Time, Carcinogen (ATc)	70	70
Averaging Time, Noncarcinogen (ATn)	6	30
Exposure Duration (ED)	6	30
Exposure Frequency (EF)	350	350
Soil Ingestion Rate (IRs)	200	100
Air Inhalation Rate (InhR)	15	20
Particulate Emission Factor (PEF)	4.63E+09	4.63E+09
Conversion Factor (CF)	1.E-06	1.E-06
Volatilization Factor (VF)	Chemical-specific	Chemical-specific

UPDATED/DATE: LWC 5/1/2012
CHECKED/DATE: LMS 5/3/2012

Table B-6
Type 4 Soil RRS, mg/kg
Default Industrial Worker

PARAMETER	Volatilization Factor (m^3/kg)	Nonresidential Leaching DAF=20 (mg/kg)	Risk-Based Industrial Worker Noncarcinogenic (mg/kg) (a)	Risk-Based Industrial Worker Carcinogenic (mg/kg) (b)	Risk-Based Soil IW Type 4 RRS (mg/kg) (c)	Overall IW Type 4 RRS DAF=20 (mg/kg) (d)
Volatile Organic Compounds (VOCs)						
Acetone	6.7E+03	1.9E+02	2.6E+05	ND	2.6E+05	1.9E+02
cis-1,2-Dichloroethene	2.7E+03	1.2E+00	4.1E+03	ND	4.1E+03	1.2E+00
Tetrachloroethene	2.7E+03	8.9E-01	1.5E+02	4.1E+02	1.5E+02	8.9E-01
Toluene	5.6E+03	7.2E+01	3.2E+04	ND	3.2E+04	7.2E+01
trans-1,2-Dichloroethene	2.8E+03	9.4E-01	2.4E+02	ND	2.4E+02	9.4E-01
Trichloroethene	2.5E+03	3.7E-02	7.1E+00	2.5E+01	7.1E+00	3.7E-02
Vinyl chloride	5.8E+02	2.2E-02	8.5E+01	5.1E+00	5.1E+00	2.2E-02

Notes:
RRS Risk Reduction Standard
ND Not Determined - Can not be calculated

(a) $$\frac{THI \times BW \times ATn \times 365days/year}{EF \times ED \times [(1/RfDi \times (1/VF + 1/PEF) \times InhR) + (1/RfDo \times Irs \times CF)]}$$

(b) $$\frac{TR \times BW \times ATc \times 365days/year}{EF \times ED \times [(SFi \times (1/VF + 1/PEF) \times InhR) + (SFo \times Irs \times CF)]}$$

(c) Minimum of noncarcinogenic and carcinogenic concentrations.
(d) Minimum concentration of Leaching Value and Risk-based Value.

Exposure Parameters	Industrial Worker Type 4	Unit
Total Hazard Index (THI)	1	unitless
Target Risk (TR)	1.E-05	unitless
Body Weight (BW)	70	kg
Averaging Time, Carcinogen (ATc)	70	yrs
Averaging Time, Noncarcinogen (ATn)	25	yrs
Exposure Duration (ED)	25	yrs
Exposure Frequency (EF)	250	days/yr
Soil Ingestion Rate (IRs)	50	mg/day
Air Inhalation Rate (InhR)	20	m3/day
Particulate Emission Factor (PEF)	4.63E+09	m3/kg
Conversion Factor (CF)	1.E-06	kg/mg
Volatilization Factor (VF)	Chemical-specific	m3/kg

UPDATED/DATE: LWC 5/1/2012
CHECKED/DATE: LMS 5/3/2012

Table B-7
Type 4 Soil RRS, mg/kg
Construction Worker

PARAMETER	Volatilization Factor (m^3/kg)	Nonresidential Leaching DAF=20 (mg/kg)	Risk-Based Construction Worker Noncarcinogenic (mg/kg) (a)	Risk-Based Construction Worker Carcinogenic (mg/kg) (b)	Risk-Based Soil CW Type 4 RRS (mg/kg) (c)	Overall CW Type 4 RRS DAF=20 (mg/kg) (d)
Volatile Organic Compounds (VOCs)						
Acetone	6.7E+03	1.9E+02	2.9E+05	ND	2.9E+05	1.9E+02
cis-1,2-Dichloroethene	2.7E+03	1.2E+00	1.2E+03	ND	1.2E+03	1.2E+00
Tetrachloroethene	2.7E+03	8.9E-01	2.9E+02	1.9E+04	2.9E+02	8.9E-01
Toluene	5.6E+03	7.2E+01	3.1E+04	ND	3.1E+04	7.2E+01
trans-1,2-Dichloroethene	2.8E+03	9.4E-01	4.6E+02	ND	4.6E+02	9.4E-01
Trichloroethene	2.5E+03	3.7E-02	1.4E+01	1.1E+03	1.4E+01	3.7E-02
Vinyl chloride	5.8E+02	2.2E-02	1.6E+02	1.9E+02	1.6E+02	2.2E-02

Notes:
RRS Risk Reduction Standard
ND Not Determined - Can not be calculated

(a) $$\frac{THI \times BW \times ATn \times 365days/year}{EF \times ED \times [(1/RfDi \times (1/VF + 1/PEF) \times InhR) + (1/RfDo \times Irs \times CF)]}$$

(b) $$\frac{TR \times BW \times ATc \times 365days/year}{EF \times ED \times [(SFi \times (1/VF + 1/PEF) \times InhR) + (SFo \times Irs \times CF)]}$$

(c) Minimum of noncarcinogenic and carcinogenic concentrations.
(d) Minimum concentration of Leaching Value and Risk-based Value.

Exposure Parameters	Construction Worker Type 4	Unit
Total Hazard Index (THI)	1	unitless
Target Risk (TR)	1.E-05	unitless
Body Weight (BW)	70	kg
Averaging Time, Carcinogen (ATc)	70	yrs
Averaging Time, Noncarcinogen (ATn)	1	yrs
Exposure Duration (ED)	1	yrs
Exposure Frequency (EF)	125	days/yr
Soil Ingestion Rate (IRs)	330	mg/day
Air Inhalation Rate (InhR)	20	m3/day
Particulate Emission Factor (PEF)	4.63E+09	m3/kg
Conversion Factor (CF)	1.E-06	kg/mg
Volatilization Factor (VF)	Chemical-specific	m3/kg

UPDATED/DATE: LWC 5/2/2012
CHECKED/DATE: LMS 5/3/2012

Table B-8
Type 4 Soil RRS, mg/kg
Utility Worker

PARAMETER	Volatilization Factor (m^3/kg)	Nonresidential Leaching DAF=20 (mg/kg)	Risk-Based Utility Worker Noncarcinogenic (mg/kg) (a)	Risk-Based Utility Worker Carcinogenic (mg/kg) (b)	Risk-Based Soil UW Type 4 RRS (mg/kg) (c)	Overall UW Type 4 RRS DAF=20 (mg/kg) (d)
Volatile Organic Compounds (VOCs)						
Acetone	6.7E+03	1.9E+02	1.5E+06	ND	1.5E+06	1.9E+02
cis-1,2-Dichloroethene	2.7E+03	1.2E+00	6.2E+03	ND	6.2E+03	1.2E+00
Tetrachloroethene	2.7E+03	8.9E-01	1.4E+03	3.8E+03	1.4E+03	8.9E-01
Toluene	5.6E+03	7.2E+01	1.5E+05	ND	1.5E+05	7.2E+01
trans-1,2-Dichloroethene	2.8E+03	9.4E-01	2.3E+03	ND	2.3E+03	9.4E-01
Trichloroethene	2.5E+03	3.7E-02	6.8E+01	2.2E+02	6.8E+01	3.7E-02
Vinyl chloride	5.8E+02	2.2E-02	7.9E+02	3.7E+01	3.7E+01	2.2E-02

Notes:
RRS Risk Reduction Standard
ND Not Determined - Can not be calculated

(a) $$\frac{THI \times BW \times ATn \times 365days/year}{EF \times ED \times [(1/RfDi \times (1/VF + 1/PEF) \times InhR) + (1/RfDo \times Irs \times CF)]}$$

(b) $$\frac{TR \times BW \times ATc \times 365days/year}{EF \times ED \times [(SFi \times (1/VF + 1/PEF) \times InhR) + (SFo \times Irs \times CF)]}$$

(c) Minimum of noncarcinogenic and carcinogenic concentrations.
(d) Minimum concentration of Leaching Value and Risk-based Value.

Exposure Parameters	Utility Worker Type 4	Unit
Total Hazard Index (THI)	1	unitless
Target Risk (TR)	1.E-05	unitless
Body Weight (BW)	70	kg
Averaging Time, Carcinogen (ATc)	70	yrs
Averaging Time, Noncarcinogen (ATn)	25	yrs
Exposure Duration (ED)	25	yrs
Exposure Frequency (EF)	25	days/yr
Soil Ingestion Rate (IRs)	330	mg/day
Air Inhalation Rate (InhR)	20	m3/day
Particulate Emission Factor (PEF)	4.63E+09	m3/kg
Conversion Factor (CF)	1.E-06	kg/mg
Volatilization Factor (VF)	Chemical-specific	m3/kg

UPDATED/DATE: LWC 5/2/2012
CHECKED/DATE: LMS 5/3/2012

Summary of Soil RRS

PARAMETER	Type 1 RRS mg/kg	Type 2 RRS DAF of 20 mg/kg	Type 3 RRS Surface mg/kg	Type 3 RRS Subsurface mg/kg	Type 4 RRS IW DAF of 20 mg/kg	Type 4 RRS CW DAF of 20 mg/kg	Type 4 RRS UW DAF of 20 mg/kg	Selected Residential	Source	DAF of 1 Lowest of Type 3	Lowest of Type 4	Selected Nonresidential	Source	Selected Residential	Source	DAF of 20 Lowest of Type 3	west of Typ	Selected Nonresidential	Source	Non-Residential Surface	Subsurface
Volatile Organic Compounds (VOCs)																					
Acetone	4.0E+02	3.3E+01	4.0E+02	4.0E+02	1.9E+02	1.9E+02	1.9E+02	4.0E+02	Type 1	4.0E+02	1.1E+01	4.0E+02	Type 3	4.0E+02	Type 1	4.0E+02	#REF!	#REF!	#REF!	4.0E+02	4.0E+02
cis-1,2-Dichloroethene	7.0E+00	4.1E-01	7.0E+00	7.0E+00	1.2E+00	1.2E+00	1.2E+00	7.0E+00	Type 1	7.0E+00	2.1E-01	7.0E+00	Type 3	7.0E+00	Type 1	7.0E+00	#REF!	#REF!	#REF!	7.0E+00	7.0E+00
Tetrachloroethene	5.0E-01	1.7E-01	5.0E-01	5.0E-01	8.9E-01	8.9E-01	8.9E-01	5.0E-01	Type 1	5.0E-01	2.1E-01	5.0E-01	Type 3	5.0E-01	Type 1	5.0E-01	#REF!	#REF!	#REF!	5.0E-01	5.0E-01
Toluene	1.0E+02	1.4E+01	1.0E+02	1.0E+02	7.2E+01	7.2E+01	7.2E+01	1.0E+02	Type 1	1.0E+02	2.6E+01	1.0E+02	Type 3	1.0E+02	Type 1	1.0E+02	#REF!	#REF!	#REF!	1.0E+02	1.0E+02
trans-1,2-Dichloroethene	1.0E+01	5.9E-01	1.0E+01	1.0E+01	9.4E-01	9.4E-01	9.4E-01	1.0E+01	Type 1	1.0E+01	1.6E-01	1.0E+01	Type 3	1.0E+01	Type 1	1.0E+01	#REF!	#REF!	#REF!	1.0E+01	1.0E+01
Trichloroethene	5.0E-01	3.6E-02	5.0E-01	5.0E-01	3.7E-02	3.7E-02	3.7E-02	5.0E-01	Type 1	5.0E-01	7.6E-03	5.0E-01	Type 3	5.0E-01	Type 1	5.0E-01	#REF!	#REF!	#REF!	5.0E-01	5.0E-01
Vinyl chloride	2.0E-01	1.4E-02	2.0E-01	2.0E-01	2.2E-02	2.2E-02	2.2E-02	2.0E-01	Type 1	2.0E-01	2.4E-03	2.0E-01	Type 3	2.0E-01	Type 1	2.0E-01	#REF!	#REF!	#REF!	2.0E-01	2.0E-01

UPDATED/DATE: LWC 5/2/2012
CHECKED/DATE: LMS 5/3/2012

Georgia Department of Natural Resources
2 Martin Luther King Jr. Drive, SE, Suite 1462 East. Atlanta, Georgia 30334
Chris Clark, Commissioner
Environmental Protection Division
Carol A. Couch, Ph.D., Director
Hazardous Waste Management Branch
404-657-8600

June 26, 2009

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

PM Ltd
c/o Ms. Nancy Shannon
Suntrust Bank
25 Park Place, 2nd floor
Atlanta, Georgia 30003

Subject: CAP and Vapor Intrusion Mitigation Plan Amendment Approval
Former Imperial Cleaners Site
Roswell, Fulton County, Georgia
HSI Number: 10690

Dear Ms. Shannon:

The Georgia Environmental Protection Division (EPD) has reviewed the Noevmer 26, 2008 Vapor Mitigation Plan and Corrective Action Plan (CAP) and Vapor Intrusion Mitigation Plan Amendment, dated March 20, 2009 for the above referenced site. The amendment is hereby approved subject to the following conditions:

1. The amendment proposes to sample new monitoring wells immediatealy after well development. The U.S. EPA Field Branches Quality Sytems Technical Procedure for Design and Installation of Monitoring Wells (SESD-GUID-101-R0) recommends waiting 24 hrs after development to purge and sample monitoring wells.
2. In a March 2, 2009 meeting with EPD, Chuck Ferry with Mactec stated that the approved Type 4 soil risk reduction standard (RRS) for PCE is 4.12 mg/kg at the subject site. As stated in the Response to Comments and Revised CAP dated October 4, 2006, site specific data (total and SPLP data) indicate that 1.2 mg/kg of PCE in soil is protective of groundwater. Therefore, 1.2 mg/kg is the approved Type 4 soil RRS. This approved Type 4 soil RRS should be used to evaluate the results from pending soil sampling.
3. Within thirty (30) days of receipt of this CAP Amendment approval, a cost estimate and a statement of financial assurance for the cost of the corrective action must be submitted to the EPD. Examples of acceptable forms for demonstrating financial assurance are available on-line at www.gaepd.org.
4. EPD approves PM Ltd. to defer vapor intrusion migitgation until a new tenant occupies the property. However, prior to a new tenant occupying the space, PM Ltd must implement the Vapor Intrusion Mitigation Plan dated November 26, 2008. Furthermore, if during post-mitigation air sampling concentrations of PCE and TCE continue to exceed target indoor air concentrations, EPD may require an alternative mitigation measure, such as sub-slab depressurization (SSD) system to remove soil vapors from beneath the slab and venting them to the atmosphere above the outdoor breathing zone.

EPD's approval of this document extends only to those technical aspects of the document that expressly require EPD approval under applicable rules and statutes. This approval is not an endorsement by EPD that it accepts as conclusive any representations made in the document. Nor does EPD guarantee or warrant that the document is free of errors or omissions. EPD may later withdraw approval of this document, in whole or in part, if EPD determines that withdrawal is necessary to ensure compliance with the applicable rules and statutes. EPD hereby approves the CAP subject to the conditions enumerated above.

Please submit a cost estimate and financial assurance instrument along with acknowledgement of the above conditions by July 31, 2009. If you have any questions regarding this matter, please contact David Reuland at 404-657-8600.

Sincerely,

David Reuland
Unit Coordinator
Superfund Management Unit

c: Charles Ferry, Mactec

File: HSI # 10690
S:\RDRIVE\KRoss\HSI Sites\Former Imperial Cleaners\CAP\CAP amendment and VI response.doc

APPENDIX H
DRAFT ENVIRONMENTAL COVENANT

After Recording Return to:
Georgia Environmental Protection Division
2 Martin Luther King Jr. Drive, SW
Suite 1054
Atlanta, Georgia 30334

Environmental Covenant

This instrument is an Environmental Covenant executed pursuant to the Georgia Uniform Environmental Covenants Act, OCGA § 44-16-1, *et seq.* This Environmental Covenant subjects the Property identified below to the activity and/or use limitations specified in this document. The effective date of this Environmental Covenant shall be the date upon which the fully executed Environmental Covenant has been recorded in accordance with OCGA § 44-16-8(a).

Fee Owner of Property/Grantor:
Fulton County Board of Education
786 Cleveland Avenue, SW
Atlanta, Georgia 30315

Grantee/Holder:
PM, Ltd.
Wright Management, Inc.
c/o SunTrust Bank, Agent
Privately Held Investments
303 Peachtree Street, Suite 2600
Atlanta, Georgia 30303
Attn: Nancy Shannon

Grantee/Entity with express power to enforce:
State of Georgia
Department of Natural Resources
Environmental Protection Division
2 Martin Luther King Jr. Drive, SE
Suite 1054 East Tower
Atlanta, Georgia 30334

Other Parties with interest in the Property: _____

Property:

The property subject to this Environmental Covenant is more particularly described below and consists of land formerly occupied by Imperial Cleaners and located at 1233B Alpharetta Highway in Roswell, Fulton County, Georgia. The tract of land containing this property was conveyed on December 26, 1985, from Trust Company Bank as Successor Trustee for the Marital Trust and for the Residual Trust, both created under the Last Will and Testament of William R. Wright, and from William R. Wright, Jr., to PM, Ltd., recorded in Deed Book 9889, Pages 448-53, Fulton County Records. The Fulton County Board of Education obtained title to the Property in a condemnation action on _____. The property is located in Land Lots 449 and 450 of the 1st District, 2nd Section, Fulton County, Georgia and consists of the northern portion of the former Kingscreek Shopping Center. A complete legal description of the property (the "Property") is more particularly described on attached as Exhibit A, and a map of the Property is attached as Exhibit B.

Tax Parcel Number(s):

The Property consists of Tax Parcel ID Number _____.

Name and Location of Administrative Records:

The corrective action at the Property that is the subject of this Environmental Covenant is described in the following document[s]:

- Compliance Status Report (CSR) (Aug. 2002)
- Revised CSR (Aug. 2005)
- Corrective Action Plan (CAP) (2005)
- Revised CAP (2006)
- Monitored Natural Attenuation (MNA) approved by EPD (Jan. 2007)
- Voluntary Remediation Plan (VRP) (Oct. 2010)
- VRP approved by EPD (Nov. 2011)
- Compliance Status Report (October 2015)

These documents are available at the following locations:

Georgia Environmental Protection Division
Response and Remediation Program
2 MLK Jr. Drive, SE, Suite 1054 East Tower
Atlanta, Georgia 30334
M-F 8:00 AM to 4:30 PM excluding state holidays

Description of Contamination and Corrective Action:

This Property has been listed on the state's hazardous site inventory and has been designated as needing corrective action due to the presence of hazardous wastes, hazardous constituents, or hazardous substances regulated under state law. Contact the property owner or the Georgia Environmental Protection Division for further information concerning this Property. This notice is provided in compliance with the Georgia Hazardous Site Response Act.

This Environmental Covenant is made pursuant to the Georgia Uniform Environmental Covenants Act, O.C.G.A. § 44-16-1 *et seq*. by The Fulton County Board of Education, its successors

and assigns, PM**,** and the State of Georgia, Department of Natural Resources, Environmental Protection Division (hereinafter "EPD"), its successors and assigns. This Environmental Covenant is required because of a past release of Tetrachloroethene, Trichloroethene, Cis-1,2-Dichloroethene, Trans-1,2-Dichloroethene, Vinyl Chloride, Chloroform, Acetone and Toulene ("constituents") occurred on the Property. Each of the constituents is a "regulated substance" as defined under the Georgia Hazardous Site Response Act, O.C.G.A. § 12-8-90 *et seq.*, and the rules promulgated thereunder (hereinafter "HSRA" and "Rules", respectively). The Corrective Action consists of institutional controls limiting the type of use of the Property; mitigation of risk, if any, from indoor air vapor intrusion; and the prohibition on the use or extraction of groundwater beneath the Property for drinking water or for any other non-remedial purposes to protect human health and the environment.

Grantor, Fulton County Board of Education (hereinafter "Board"), hereby binds Grantor, its successors and assigns to the activity and use restriction(s) for the Property identified herein and grants such other rights under this Environmental Covenant in favor of PM, and EPD until such time as, pursuant to Section 11, this Environmental Covenant is terminated or to the extent modified thereunder.. EPD shall have full right of enforcement of the rights conveyed under this Environmental Covenant pursuant to HSRA, O.C.G.A. § 12-8-90 *et seq*., and the rules promulgated thereunder. Failure to timely enforce compliance with this Environmental Covenant or the use or activity limitations contained herein by any person shall not bar subsequent enforcement by such person and shall not be deemed a waiver of the person's right to take action to enforce any non-compliance. Nothing in this Environmental Covenant shall restrict EPD from excising any authority under applicable law.

The Board makes the following declaration as to limitations, restrictions, and uses to which the Property may be put and specifies that such declarations shall constitute covenants to run with the land, pursuant to O.C.G.A. § 44-16-5(a); is perpetual, unless modified or terminated pursuant to the terms of this Covenant pursuant to O.C.G.A. § 44-16-9; and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in the Property (hereinafter "Owner"). Should a transfer or sale of the Property occur before such time as this Environmental Covenant has been amended or revoked then said Environmental Covenant shall be binding on the transferee(s) or purchaser(s).

The Environmental Covenant shall inure to the benefit of PM, EPD, the Board, and their respective successors and assigns, and shall be enforceable by the Director, or his agents or assigns, PM, or its successors and assigns, and other party(ies), as provided for in O.C.G.A. § 44-16-11, in a court of competent jurisdiction.

Activity and/or Use Limitation(s)

1. Registry. Pursuant to O.C.G.A. § 44-16-12, this Environmental Covenant and any amendment or termination thereof, may be contained in EPD's registry for environmental covenants.

2. Notice. The Owner of the Property must give thirty (30) days advance written notice to EPD of the Owner's intent to convey any interest in the Property. No conveyance of title, easement, lease, or other interest in the Property shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the Corrective Action. The Owner of the Property must also give thirty (30) days advance written notice to EPD of the Owner's intent to change the use of the Property, apply for building permit(s), or propose any site work inconsistent with the activity and use limitations set forth herein.

3. Notice of Limitation in Future Conveyances. Each instrument hereafter conveying an interest in the Property subject to this Environmental Covenant shall contain a notice of the activity and use limitations set forth in this Environmental Covenant and shall provide the recorded location of the Environmental Covenant.

4. Periodic Reporting. Annually, by no later than July 31st following the effective date of this Environmental Covenant, the Owner shall submit to EPD an Annual Report certifying nonresidential use of the Property and also documenting that the Property is in compliance with the activity and use limitations in this Environmental Covenant.

5. Activity and Use Limitation. The Property shall be used only for non-residential uses, as defined in Section 391-3-19-.02 of the Rules and defined in and allowed under Fulton County's zoning regulations as of the date of this Environmental Covenant. Any residential use on the Property shall be prohibited. Any activity on the Property that may result in the release or exposure to the regulated substances that were contained as part of the Corrective Action, or create a new exposure pathway, is prohibited. In addition, prior to building any structure on the Property, a qualified professional shall evaluate the potential risk and/or hazard for the intrusion of vapors and, if warranted, an engineered vapor intrusion ("VI") mitigation system shall be designed and installed. No soil exceeding the Type 1 risk reduction standard removed from the Property may be used as fill material at another site.

6. Groundwater Limitation. The use or extraction of groundwater beneath the Property for drinking water or for any other non-remedial use shall be prohibited.

7. Right of Access. In addition to any rights already possessed by EPD and the access being provided PM under an express easement, the Owner shall allow authorized representatives of EPD the right to enter the Property and inspect records at reasonable times to evaluate and determine compliance with the Corrective Action; take samples; and to determine compliance with this Environmental Covenant.

8. Recording of Environmental Covenant and Proof of Notification. Within thirty (30) days after the date of the Director's signature, the Owner shall file this Environmental Covenant with the Recorders of Deeds for each County in which the Property is located, and send a file stamped copy of this Environmental Covenant to EPD within thirty (30) days of recording. Within that time period, the Owner shall also send a file-stamped copy to each of the following: (1) PM, (2) each person holding a recorded interest in the Property subject to the covenant, (3) each person in possession of the real property subject to the covenant, (4) each municipality, county, consolidated government; or other unit of local government in which real property subject to the covenant is located, and (5) each owner in fee simple whose property abuts the property subject to the Environmental Covenant.

9. Termination or Modification. The Environmental Covenant shall remain in full force and effect in accordance with O.C.G.A. § 44-5-60, unless and until the Director determines that the Property is in compliance with the applicable Risk Reduction Standards, as defined in Georgia Rules of Hazardous Site Response (Rules) Section 391-3-19-.07 whereupon the Environmental Covenant may be amended or revoked in accordance with Section 391-3-19-08(7) of the Rules and O.C.G.A. § 44-16-1 *et seq*.

10. Severability. If any provision of this Environmental Covenant is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired.

11. No Property Interest Created in EPD. This Environmental Covenant does not in any way create any interest by EPD in the Property that is subject to the Environmental Covenant. Furthermore, the act

of approving this Environmental Covenant does not in any way create any interest by EPD in the Property in accordance with O.C.G.A. § 44-16-3(b).

Representations and Warranties.

Grantor hereby represents and warrants to the other signatories hereto:

a) That the Grantor has the power and authority to enter into this Environmental Covenant, to grant the rights and interests herein provided and to carry out all obligations hereunder;
b) That the Grantor is the sole owner of the Property and holds fee simple title which is free, clear and unencumbered;
c) That the Grantor has identified all other parties that hold any interest (e.g., encumbrance) in the Property and notified such parties of the Grantor's intention to enter into this Environmental Covenant;
d) That this Environmental Covenant will not materially violate, contravene, or constitute a material default under any other agreement, document or instrument to which Grantor is a party, by which Grantor may be bound or affected;
e) That the Grantor has served each of the people or entities referenced in Activity 8 above with an identical copy of this Environmental Covenant in accordance with O.C.G.A. § 44-16-4(d).
f) That this Environmental Covenant will not materially violate or contravene any zoning law or other law regulating use of the Property; and
g) That this Environmental Covenant does not authorize a use of the Property that is otherwise prohibited by a recorded instrument that has priority over the Environmental Covenant.

Notices.

Any document or communication required to be sent pursuant to the terms of this Environmental Covenant shall be sent to the following persons:

Georgia Environmental Protection Division
Branch Chief
Land Protection Branch
2 Martin Luther King Jr. Drive SE
Suite 1054 East Tower
Atlanta, Georgia 30334

PM Ltd.
Wright Management, Inc.
c/o SunTrust Bank, Agent
Privately Held Investments
303 Peachtree Street, Suite 2600
Atlanta, Georgia 30308

Grantor has caused this Environmental Covenant to be executed pursuant to The Georgia Uniform Environmental Covenants Act, on the _____ day of _____, 2015.

GRANTOR:

Signed, sealed and delivered in the presence of:

The Fulton County Board of Education

By: _____
Name: _____
Title: _____

_____
Unofficial Witness

_____
Notary Public

My Commission Expires:

_____
Notary Seal

WITNESS:

By: _____
Name: _____

Dated: _____

GRANTEE/HOLDER:

Signed, sealed and delivered in the presence of:

PM LTD.

By: _____
Name: _____
Title: _____

_____
Unofficial Witness

_____
Notary Public

My Commission Expires:

_____
Notary Seal

WITNESS:

By: _____
Name: _____

Dated: _____

GRANTEE/ENTITY WITH EXPRESS POWER TO ENFORCE:

Signed, sealed and delivered in the presence of:

STATE OF GEORGIA, DEPARTMENT OF RESOURCES, ENVIRONMENTAL PROTECTION DIVISION

By: _____

Name: _____

Title: _____

_____

Unofficial Witness

WITNESS:

_____

Notary Public

By: _____

My Commission Expires: Name: _____

_____

Notary Seal

Dated: _____

EXHIBIT A

LEGAL DESCRIPTION

[TO BE ADDED ONCE SEPARATE PARCEL IS ESTABLISHED.]

EXHIBIT B
Area Map

LEGEND

STANDARD ABBREVIATIONS

AC	AIR CONDITIONER
BH	BORE HOLE
CI	CURB INLET
CMP	CORRUGATED METAL PIPE
CMF	CONCRETE MONUMENT FND
CO	SANITARY CLEANOUT
CPED	COMMUNICATION PEDESTAL
CTP	CRIMPED TOP PIPE
DI	DROP INLET
DIP	DUCTILE IRON PIPE
DWCB	DOUBLE WING CATCH BASIN
FNC	FENCE
FND	FOUND
GM	GAS METER
INV	INVERT
JB	JUNCTION BOX
MH	MANHOLE
OHP	OVERHEAD POWER
OTP	OPEN TOP PIPE
PM	POWER METER
POB	POINT OF BEGINNING
POC	POINT OF COMMENCING
RCP	REINFORCED CONCRETE PIPE
RBR	IRON REINFORCING BAR
RBS	5/8"RBR SET
SS	SANITARY SEWER
SWCB	SINGLE WING CATCH BASIN
TRANS	ELECTRIC TRANSFORMER

STANDARD SYMBOLS

X 000.00	SPOT ELEVATION
	POWER POLE
	GUY WIRE
	POWER LINE
LP	LIGHT POLE
	ELECTRIC TRANSFORMER
	WATER VAULT
GV	GAS VALVE
GM	GAS METER
WV	WATER VALVE
WM	WATER METER
	FIRE HYDRANT
E	UNDERGROUND ELECTRIC LINE
G	UNDERGROUND GAS LINE
CM	UNDERGROUND COMMUNICATION LINE
W	UNDERGROUND WATER LINE

GRID NORTH — GA. WEST ZONE

FULTON COUNTY HEALTH DEPARTMENT

This subdivision, as shown, is approved upon the condition that sewage disposal and water supply facilities are in compliance with Articles C and D, Sewage Disposal and Drinking Water Supply of the Fulton County Health Department regulations and in accordance with the requirements below:

WATER SUPPLY	SEWAGE DISPOSAL
( ) Public Water Supply	( ) Public Sanitary
( ) Individual Water Supplies	( ) Individual Onsite Sewage

Service Requirements - S/D Type

( ) Type "A"
( ) Type "B"

Service Requirements -S/D Type

( ) Type "A" ( ) Type "C"
( ) Type "B" ( ) Type "D"

_____ Date — Fulton County Health Department

_____ Revision Date — Fulton County Health Department

OWNER'S STATEMENT

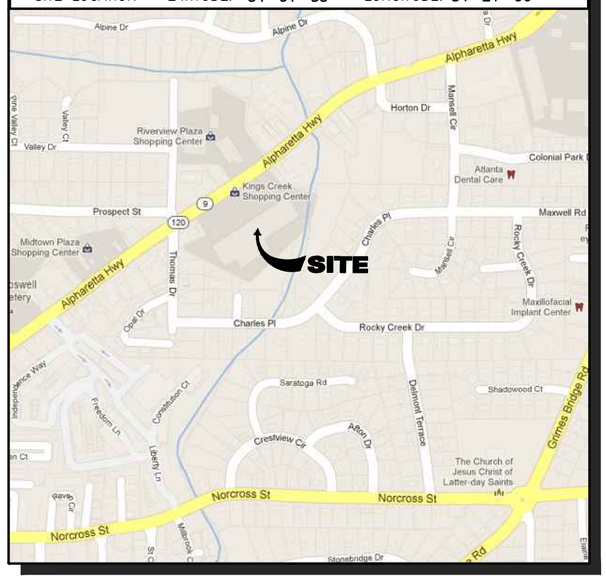
OWNER/SUBDIVIDER
FULTON COUNTY SCHOOL SYSTEM
5270 NORTHFIELD BOULEVARD
COLLEGE PARK, GA 30349
CONTACT: MR. DAVID KNOTTS

CERTIFICATE OF OWNER: The owner of the land shown on this plat and whose name is subscribed thereto, and in person or through a duly authorized agent, acknowledges that this plat was made from an actual survey and dedicates to the use of the public forever, all streets, parks, drains, easements and public grounds thereon shown, which comprise a total of acres, for the purposes therein expressed. The entire ownership of the subdivider's property is included within this plat.

_____
OWNER/SUBDIVIDER *DATE*
FOR FULTON COUNTY BOARD OF EDUCATION

VICINITY MAP

SITE LOCATION – LATITUDE: *34° 01' 53"* LONGITUDE: *84° 21' 06"*



PLAT NOTES

NAME OF SUBDIVISION: "WEST ROSWELL ELEMENTARY SCHOOL SITE"
TOTAL ACREAGE OF FOUR PROPOSED LOTS: 19.922 ACRES
(Area does not include Thomas Drive or Charles Place.)

LOT 1 IS ZONED "CIV" (CIVIC).
THE MINIMUM YARD SETBACKS FOR CIVIC ARE:
FRONT – 10 FEET; SIDE – 10 FEET INTERIOR, 10 FEET SIDE STREET; AND REAR – 10 FEET; REAR ADJACENT TO ALLEY – 5 FEET. A 40 FOOT BUFFER SHALL BE MAINTAINED ADJACENT TO RESIDENTIAL PROPERTY.
MINIMUM LOT AREA 10,000 SF; MINIMUM LOT WIDTH 75 FEET

LOT 2 AND 3 ARE ZONED SH.
THE MINIMUM YARD SETBACKS FOR SH ARE:
FRONT – 0 FEET; SIDE – 3 FEET INTERIOR, 0 FEET SIDE STREET; AND REAR – 3 FEET; REAR ADJACENT TO ALLEY – 5 FEET
MINIMUM LOT AREA 5,000 SF; MINIMUM LOT WIDTH 50 FEET

LOT 4 IS ZONED RS–12.
THE MINIMUM YARD SETBACKS FOR RS–12 ARE:
FRONT – 35 FEET; SIDE STREET – 20 FEET;
SIDE INTERIOR – 10 FEET; AND REAR – 30 FEET.
MINIMUM LOT AREA 12,000 SF; MINIMUM LOT WIDTH 85 FEET

PLEASE NOTE: ZONING AND SETBACKS SHOULD BE CONFIRMED AND VERIFIED BY PLANNING AND ZONING PRIOR TO DESIGN OR CONSTRUCTION ACTIVITIES.

BEARINGS ARE REFERENCED TO GRID NORTH, AND ARE CALCULATED FROM ANGLES TURNED.

THE NATURAL DRAINS, BRANCHES, CULVERTS AND DRAINAGE STRUCTURES SHOW ON THIS PLAT ARE NECESSARY FOR DRAINAGE OF THE SUBDIVISION, AND THE CITY OF ROSWELL WILL NOT BE HELD RESPONSIBLE FOR OVERFLOW OR EROSION CAUSED BY THEM, OR FOR EXTENSION OF CULVERTS SHOWN. PURSUANT TO THE 'UNIFIED DEVELOPMENT CODE OF THE CITY OF ROSWELL', THIS PLAT WAS GIVEN FINAL APPROVAL BY THE CITY OF ROSWELL.

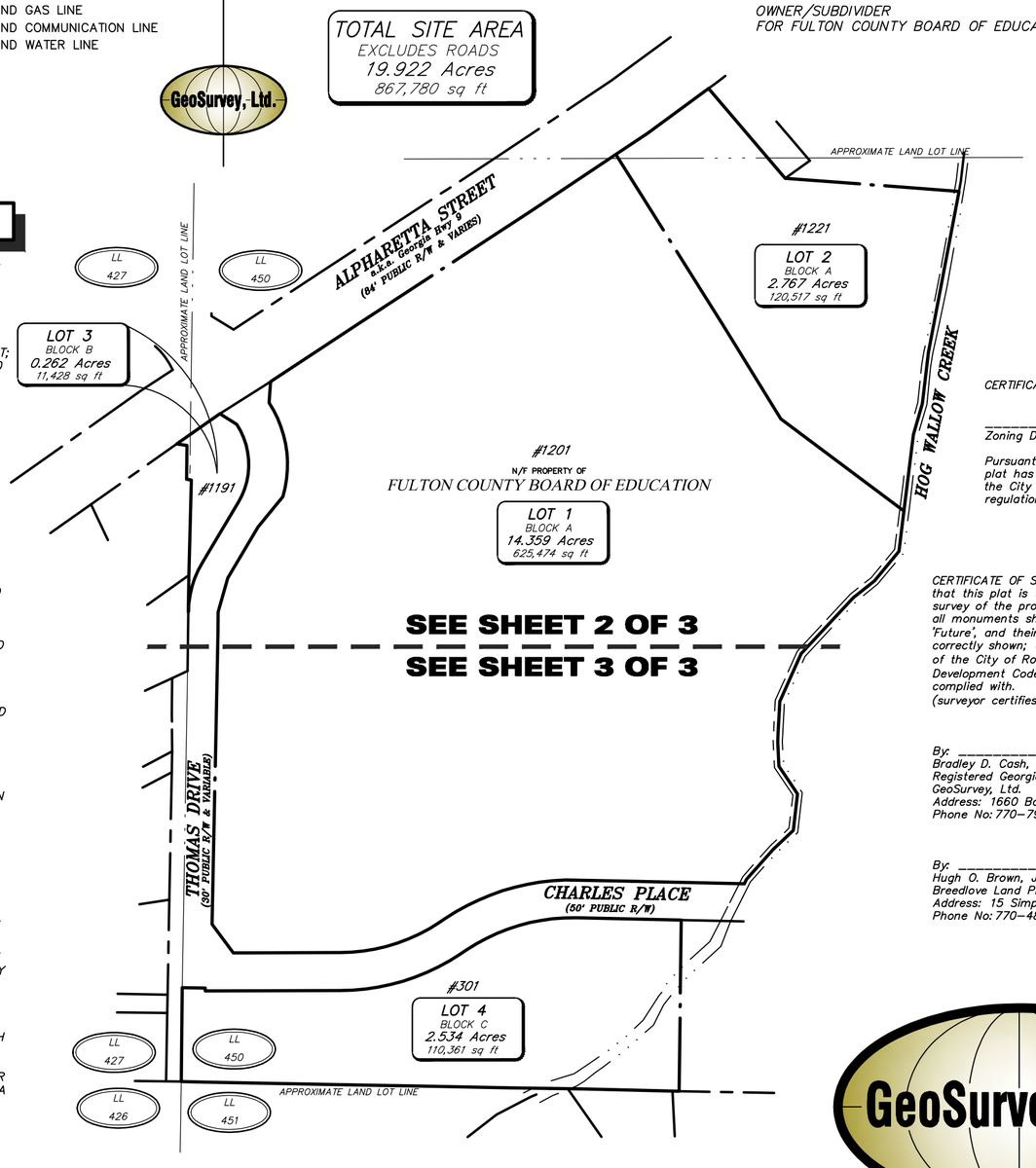
NO STRUCTURE SHALL BE LOCATED WITHIN FORTY (40) FEET OF AN OPEN DRAIN.

DISTURBANCE OF THE 100 YEAR FLOOD PLAIN IS PROHIBITED.

DRAINAGE: THE OWNER OF RECORD, ON BEHALF OF HIMSELF/HERSELF/ITSELF AND ALL SUCCESSORS IN INTEREST, SPECIFICALLY RELEASE THE CITY OF ROSWELL FROM ANY AND ALL LIABILITY AND RESPONSIBILITY FOR FLOODING OR EROSION FROM STORM DRAINS OR FROM FLOODING FROM HIGH WATER OF NATURAL CREEKS, RIVERS OR DRAINAGE FEATURES. DRAINAGE EASEMENTS ARE HEREBY ESTABLISHED FOR THE SOLE PURPOSE OF PROVIDING FOR THE EMERGENCY PROTECTION OF THE FREE FLOW OF SURFACE OR STORM WATERS ALONG ALL WATERCOURSES AS ESTABLISHED BY A FINAL PLAT. THE CITY OF ROSWELL MAY CONDUCT EMERGENCY MAINTENANCE OPERATIONS WITHIN THIS EASEMENT, WHERE EMERGENCY CONDITIONS EXIST. EMERGENCY MAINTENANCE SHALL INCLUDE THE REMOVAL OF TREES AND OTHER DEBRIS, EXCAVATION, FILLING AND THE LIKE, NECESSARY TO REMEDY A CONDITION, WHICH IN THE JUDGMENT OF THE CITY OF ROSWELL IS POTENTIALLY INJURIOUS TO HEALTH, LIFE, PUBLIC PROPERTY, PUBLIC ROADS OR UTILITY SYSTEMS. SUCH EMERGENCY MAINTENANCE, CONDUCTED FOR THE COMMON GOOD, SHALL NOT BE CONSTRUED AS CONSTITUTING A CONTINUING MAINTENANCE OBLIGATION ON THE PART OF THE CITY OF ROSWELL. THE CITY RESERVES THE RIGHT TO SEEK REIMBURSEMENT FOR EXPENSES FROM THE OWNER(S) OF THE PROPERTY(IES) OF THE LAND THAT GENERATED THE CONDITIONS REQUIRING THE EMERGENCY SERVICE.

WATER AND SEWER LINES WILL BE DEDICATED TO APPROPRIATE AGENCY AS REQUIRED.

TOTAL SITE AREA
EXCLUDES ROADS
19.922 Acres
867,780 sq ft



APPROXIMATE SCALE 1"=150'

CERTIFICATE OF ZONING DIRECTOR:

_____ _____
Zoning Director *Date*

Pursuant to section 11.2 of the Unified Development Code, this plat has been approved for recording by the Zoning Director of the City of Roswell in accordance with the existing rules and regulations

CERTIFICATE OF SURVEYOR/ENGINEER: It is hereby certified that this plat is true and correct and was prepared from an actual survey of the property made by me or under my supervision; that all monuments show hereon actually exist or are marked as 'Future', and their locations, size, type and material are correctly shown; and that all engineering requirements of the of the City of Roswell' and the requirements of the 'Unified Development Code of the City of Roswell, Georgia' have been fully complied with.
(surveyor certifies only to survey matters above)

By: _____
Bradley D. Cash, LS
Registered Georgia Land Surveyor No. 2840
GeoSurvey, Ltd.
Address: 1660 Barnes Mill Road, Marietta, GA 30062
Phone No: 770–795–9900

By: _____
Hugh O. Brown, Jr., RLA
Breedlove Land Planning, Inc.
Address: 15 Simpson Street NW, Atlanta, GA 30308
Phone No: 770–483–1173

GENERAL NOTES

THIS SURVEY HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF THE PERSON OR ENTITIES NAMED HEREON. NO EXPRESS OR IMPLIED WARRANTIES WITH RESPECT TO THE INFORMATION SHOWN HEREON IS TO BE EXTENDED TO ANY PERSONS OR ENTITIES OTHER THAN THOSE SHOWN HEREON.

THIS SURVEY HAS BEEN PREPARED WITHOUT THE BENEFIT OF A CURRENT TITLE INSPECTION REPORT. EASEMENTS OR OTHER ENCUMBRANCES MAY EXIST ON PUBLIC RECORD BUT NOT BE SHOWN HEREON.

THIS PROPERTY IS LOCATED IN A 100 YEAR SPECIAL FLOOD HAZARD AREA BASED ON THE FLOOD INSURANCE RATE MAP FOR THIS AREA. THE MAP NUMBER FOR THIS AREA IS 13121C0061E (6–22–1998) AND 13121C0063F (6–18–2010). THIS DETERMINATION WAS MADE BY GRAPHICALLY DETERMINING THE POSITION OF THIS SITE ON SAID FIRM MAPS UNLESS OTHERWISE NOTED.

THE HORIZONTAL DATUM FOR THIS SURVEY IS BASED ON THE NORTH AMERICAN DATUM OF 1983 (NAD'83) FROM GPS OBSERVATIONS PERFORMED BY GEOSURVEY, LTD. BEARINGS ARE REFERENCED TO GRID NORTH.

THE VERTICAL DATUM FOR THIS SURVEY IS BASED ON THE NORTH AMERICAN DATUM OF 1988 (NAVD'88) FROM GPS OBSERVATIONS PERFORMED BY GEOSURVEY, LTD.

DATE OF FIELD SURVEY: JULY 13, 2013. EXISTING IMPROVEMENTS ARE NOT SHOWN.

THE FIELD CLOSURE UPON WHICH THIS PLAT IS BASED HAS A CLOSURE PRECISION OF ONE FOOT IN 23,078, AND WAS ADJUSTED USING THE LEAST SQUARES METHOD. A TRIMBLE S–6 TOTAL STATION AND TRIMBLE DATA COLLECTOR WERE USED TO COLLECT THIS FIELD DATA.

THIS PLAT HAS BEEN CALCULATED FOR CLOSURE AND WAS FOUND TO BE ACCURATE WITHIN ONE FOOT IN 565,322 FEET. BDC INIT.

SURVEY REFERENCES

1> ALTA/ACSM LAND TITLE SURVEY FOR WEST ROSWELL ELEMENTARY SCHOOL SITE, PREPARED BY GEOSURVEY, LTD., DATED 07–17–2013 AND LAST REVISED 09–19–2014. PROJECT NUMBER 20134503–05.

2> SITE PLAN FOR NEW WEST ROSWELL ELEMENTARY SCHOOL SITE, PREPARED BY CONTOUR ENGINEERING, LLC, DATED 06–20–2014 AND LAST REVISED 10–24–2014.

3> RIGHT–OF–WAY AND ABANDONMENT PLATS FOR FULTON COUNTY SCHOOLS, PREPARED BY GEOSURVEY, LTD., DATED 05–15–2014.

4> SITE PLAN "EXHIBIT C" HOG WALLER CREEK MULTI–USE PATH/NATURE TRAIL, PREPARED BY COLLINS, COOPER, CARUSI ARCHITECTS FOR FULTON COUNTY SCHOOLS.

I HEREBY CERTIFY this survey has been prepared in conformity with The Technical Standards for Property Surveys in Georgia as set forth in Chapter 180–7 of the Rules of the Georgia Board of Registration for Professional Engineers and Land Surveyors and as set forth in the Georgia Plat Act O.C.G.A. 15–6–67.

Sheet 1 of 3

GeoSurvey, Ltd.
Land Surveying & Mapping
1660 Barnes Mill Road
Marietta, Georgia 30062
Phone: (770) 795–9900
Fax: (770) 795–8880
www.geosurvey.com
info@geosurvey.com
Certificate of Authorization #LS000621

SUBDIVISION PLAT FOR

West Roswell Elementary School Site

FULTON COUNTY BOARD OF EDUCATION

GS JOB NO: 20134503	DRAWING SCALE: NA	SURVEY DATE: 01–06–2015	
FIELD WORK: TB	CITY: ROSWELL	REVISIONS	
PROJ MGR: BDC	COUNTY: FULTON STATE: GA	No.	Date / Description
REVIEWED: JRC	LAND LOT: 449 & 450		
DWG FILE: 20134503–08	DISTRICT: 1ST SECTION: 2ND		

LINE	BEARING	DISTANCE
L1	S10°47'13"W	215.66'
L2	S06°43'52"W	67.85'
L3	S16°11'24"W	42.44'
L4	S07°01'38"W	101.40'
L5	S07°01'38"W	53.34'
L6	S39°38'26"W	50.74'
L7	S51°29'44"W	35.34'
L8	S42°55'02"W	100.76'
L9	S24°10'48"W	68.67'
L10	S03°00'18"W	40.46'
L11	S03°00'18"W	12.66'
L12	S02°48'09"E	32.38'
L13	S34°00'55"E	43.91'
L14	S06°34'10"W	48.28'
L15	S46°42'29"W	36.12'
L16	S41°48'28"W	53.10'
L17	S26°28'22"W	6.67'
L18	N15°43'35"E	46.60'
L19	N30°49'03"E	77.99'
L20	N39°08'39"E	51.61'
L21	N04°19'49"E	27.88'
L22	S57°55'42"E	26.32'
L23	S30°49'03"W	67.86'
L24	S30°49'03"W	24.94'
L25	N00°47'31"E	47.93'
L26	N01°27'26"E	125.25'
L27	N80°22'30"W	6.21'
L28	N00°30'33"E	44.40'
L29	N81°07'04"W	13.55'
L30	N57°39'48"E	79.09'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	128.84'	147.93'	N08°23'54"W	124.81'
C2	107.87'	96.50'	S01°12'21"E	102.34'
C3	67.72'	131.55'	S15°53'38"W	66.98'

GRID NORTH – GA. WEST ZONE

GeoSurvey, Ltd.

ALPHARETTA STREET
a.k.a. Georgia Hwy 9
(84' PUBLIC R/W & VARIES)

STRICKLAND ROAD
(VARIABLE R/W)

THOMAS DRIVE
(30' PUBLIC R/W & VARIES)

EXISTING ROADWAY TO BE RELOCATED

APPROXIMATE LAND LOT LINE

LL 449

LL 450

CONCRETE MEDIAN/TURN LANE

30" CURB & GUTTER

8"CLAY

N56°49'53"E 276.07'

N56°35'50"E 69.50'

N56°38'49"E 63.16'

N54°58'08"E 69.24'

N56°17'41"E 135.11'

N56°17'41"E 50.10'

N53°45'47"E 99.67'

S40°26'50"E 155.29'

S85°41'35"E 229.39'

N32°06'31"W 268.08'

N31°36'43"W 142.03'

N53°11'22"W 202.42'

N00°30'46"E 28.45'

39.0'

5/8"RBR SET

1/2"RBR FND

1"CTP FND

CMF 1/2"RBR

CMF

N/F PROPERTY OF
Alexander & Zoltan Szecsey
DEED BOOK 51598 / PAGE 700
ZONED SH

1-STORY BLOCK BUILDING

N/F PROPERTY OF
Thomas Family LLC
DEED BOOK 22391 / PAGE 266
ZONED SH

1-STORY FRAME BUILDING

#1221 ALPHARETTA ST.
N/F PROPERTY OF
FULTON COUNTY BOARD OF EDUCATION

LOT 2
BLOCK A
2.767 Acres
120,517 sq ft
ZONED SH

SCHOOL SITE
UNDER CONSTRUCTION

#1201 ALPHARETTA ST.
ROSWELL, GA 30075
N/F PROPERTY OF
FULTON COUNTY BOARD OF EDUCATION

LOT 1
BLOCK A
14.359 Acres
625,474 sq ft
ZONED CIV

#1191

LOT 3
BLOCK B
0.262 Acres
11,428 sq ft
ZONED SH

N/F PROPERTY OF
JOHN O. SMITH
DEED BOOK 13437 / PAGE 210

THIS
E 394

10' SEWER EASEMENT (DB 6384, PG 386)

20' SEWER EASEMENT (DB 11872, PG 12)

10' SEWER EASEMENT (PB 158, PG 107)

LIMITS OF SPECIAL FLOOD HAZARD AREA PER FLOOD MAP (ZONE AE)

150' IMPERVIOUS SETBACK

100' UNDISTURBED BUFFER

MULTI-USE PATH PER DESIGN PLAN

HOG WALLOW CREEK

HOG WALLOW CREEK IS PROPERTY LINE
CENTERLINE OF CREEK
427.35'± ALONG CENTERLINE CREEK

5/8"RBR SET
33.5'± FROM CL CREEK

N/F PROPERTY OF
Maxwell M. Thomas
NO RECORDING DATA
ZONED R-2

MATCH LINE

SEE SHEET 3 OF 3

GRAPHIC SCALE

0 30 60 150 300

1"= 60'

GeoSurvey, Ltd.
Land Surveying & Mapping
1660 Barnes Mill Road
Marietta, Georgia 30062
Phone: (770) 795-9900
Fax: (770) 795-8880
www.geosurvey.com
info@geosurvey.com
Certificate of Authorization #LS000621

MATCH LINE **SEE SHEET 2 OF 3** MATCH LINE

N00°30'46"E
28.45'
5/8"RBR SET

N/F PROPERTY OF
JAMES P. MATHIS
DEED BOOK 49955 / PAGE 394

39.0'

1"CTP FND

N/F PROPERTY OF
ROBERT L. JOHNSON
DEED BOOK 13438 / PAGE 253

58.46'

OPAL DRIVE
PRIVATE ROAD

THOMAS DRIVE
(30' PUBLIC R/W & VARIABLE)

N01°09'21"E 382.47'

N/F PROPERTY OF
JEFFERY W. FRAZIER
DEED BOOK 9849 / PAGE 223

20' SEWER EASEMENT
(DB 11872, PG 12)

ZONED CIV

SCHOOL SITE
UNDER CONSTRUCTION

LIMITS OF SPECIAL FLOOD HAZARD AREA
PER FLOOD MAP (ZONE AE)

150' IMPERVIOUS SETBACK

100' UNDISTURBED BUFFER

HOG WALLOW CREEK
CENTERLINE OF CREEK IS PROPERTY LINE
582.42'± ALONG CENTERLINE CREEK

L8 L9 L10 L11 L12 L13 L14 L15 L16 L17

N/F PROPERTY OF
Maxwell M. Thomas
NO RECORDING DATA
ZONED RS-12

GRID NORTH – GA. WEST ZONE

GeoSurvey, Ltd.

EXISTING ROADWAY TO BE RELOCATED

S72°14'14"W
165.90'
R=301.50'
L=168.07'

N88°45'16"W
78.30'

N88°45'16"W
156.84'

5/8"RBR SET

CHARLES PLACE
(50' PUBLIC R/W)

N60°04'42"E
95.67'
BRIDGE

S88°45'16"E
125.00'

5/8"RBR SET

5/8"RBR SET

N36°31'38"W
47.04'

5/8"RBR SET

S89°51'59"W
140.22'

S73°04'01"W
137.00'
R=237.00'
L=138.98'

S56°16'03"W
9.39'

N56°16'03"E
9.39'

N73°37'03"E
150.00'
R=251.50'
L=152.31'

#301 CHARLES PLACE

N/F PROPERTY OF
FULTON COUNTY BOARD OF EDUCATION

N/F PROPERTY OF
PUREZA GIRALDO
DEED BOOK 20498 / PAGE 289

S00°39'17"W
3.81'

S88°57'57"E
30.42'

N89°51'59"E
177.33'

1/2"RBR FND

5/8"RBR SET

OPAL DRIVE
PRIVATE ROAD

N73°04'01"E
165.90'
R=287.00'
L=168.30'

LOT 4
BLOCK C
2.534 Acres
110,361 sq ft

ZONED RS-12

MULTI-USE PATH
PER DESIGN PLAN

SEWER EASEMENT
(DB 4712, PG 100)

HOG WALLOW CREEK

N/F PROPERTY OF
TALMADGE B. HAWKINS
DEED BOOK 47190 / PAGE 524
ZONED RS-12

S00°42'22"W
225.20'

N00°34'51"E
123.64'

N/F PROPERTY OF
WILLIAM J. MARROW
DEED BOOK 30241 / PAGE 296

LL 450
LL 427
LL 426
LL 451

N88°54'29"W
30.26'

5/8"RBR SET

APPROXIMATE LAND LOT LINE

LAND LOT CORNER
1" AXLE FOUND

N88°54'29"W
200.01'

N88°54'29"W
99.94'

N88°54'29"W
100.00'

5/8"RBR SET

N89°07'21"W
100.02'

1"CTP FND

N88°41'04"W
125.00'

5/8"RBR SET

1/2"RBR FND

1"OTP FND

N/F PROPERTY OF
LIBERTY LOFTS & TOWNHOMES ASSOCIATION INC
NO RECORD DEED FOUND

N/F PROPERTY OF
PEGGY ELIZABETH LYON
DEED BOOK 50087 / PAGE 582
ZONED RS-12

N/F PROPERTY OF
MALIK HERRON
DEED BOOK 37359 / PAGE 172
ZONED RS-12

N/F PROPERTY OF
GENE L. HAMILTON
DEED BOOK 6469 / PAGE 240
ZONED RS-12

IF YOU DIG

811

Know what's **below.**
Call **before you dig.**
Dial 811
Or Call 800-282-7411

GRAPHIC SCALE

0 30 60 150 300
1"= 60'

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