



PHASE II ENVIRONMENTAL SITE ASSESSMENT

4301 W. Chicago Avenue

Chicago, Illinois

Property Index Number: 16-10-200-061-0000

Prepared for:

City of Chicago Department of Fleet and Facility Management

30 North LaSalle, Suite 300

Chicago, Illinois 60602-2575

Prepared by:

Amec Foster Wheeler Environment & Infrastructure, Inc.

8745 West Higgins Road, Suite 300

Chicago, Illinois 60631

January 12, 2018

Project No. 3205171606



amec
foster
wheeler

January 12, 2018

Ms. Abby Mazza, P.E.
City of Chicago Department of Fleet and Facility Management
30 North LaSalle Street, Suite 300
Chicago, Illinois 60602-2575

Subject: Phase II Environmental Site Assessment
4301 West Chicago Avenue
Chicago, Illinois
Project No. 3205171606

Dear Ms. Mazza:

Amec Foster Wheeler Environment & Infrastructure, Inc., is pleased to present this Phase II Environmental Site Assessment report for the above-referenced site in Chicago, Illinois. We appreciate the opportunity to serve you on this project. If you have any questions or desire further information, please feel free to contact us at 773-693-6030.

Sincerely,

Amec Foster Wheeler Environment & Infrastructure, Inc.

Mary E. Jank, PG
Sr. Associate

Eric J. Walkowiak, PE
Senior Engineer

Attachments



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EXECUTIVE SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), was retained by the City of Chicago Department of Fleet and Facility Management (2FM) to complete a Phase II Environmental Site Assessment (ESA) for the site located at 4301 West Chicago Avenue in Chicago, Cook County, Illinois (the site). The site is a 30.4-acre parcel that is currently vacant. Development of the site as a Joint Public Safety Training Academy (JPSTA) is planned. The JPSTA campus will provide the Chicago Police Department (CPD) and the Chicago Fire Department (CFD) with a central location, replacing training facilities located throughout the City.

Site History

The site was developed as a rail yard by 1900 according to historic topographic maps. Previous environmental reports for the site indicate that the rail yard was constructed in 1896 by the Chicago and Northwestern Transportation Company on previously undeveloped land. By 1978-1980, most of the rail yard tracks were gone, and by at most 2002, the parcel was totally vacant.

Property Description

The site consists of 30.4 acres located on the southeast corner of the intersection of Kilbourn and West Chicago Avenue. The Parcel ID (Tax ID) number for the site is 16-10-200-061-0000. The site is located in a mixed land use area. At the time of the site reconnaissance, the site was vacant. The site is partially fenced and no buildings or other improvements are present on the site.

The site is situated at an elevation of approximately 610 feet above mean sea level (msl). Based on our review of the local topography, it appears that groundwater would generally flow toward the east to Lake Michigan.

Adjacent to the east is N. Kostner Avenue, beyond which is Falcon Transportation to the north and Chicago Transit Authority (CTA) to the south, to the north is W Chicago Avenue with commercial buildings lining the street and residences behind them, to the west is N. Kilbourn Avenue, beyond which is a City of Chicago Transfer Station, and to the south is a remaining railroad spur and some industrial and warehouse properties.

Recognized Environmental Conditions

Amec Foster Wheeler performed a Phase I ESA as outlined in ASTM E 1527-13 in June 2017. Amec Foster Wheeler issued the Draft Phase I ESA on June 26, 2017. Acquisition of the property is expected to occur in January 2018. Components of the Phase I ESA which are required to be completed within 180 days of the expected date of purchase were updated in November 2017 and a final Phase I report was issued on December 11, 2017. The following recognized environmental conditions (REC) were determined to be associated with the property:

- On the property, a potential underground storage tank (UST) installed in 1959 with no record of it having been removed, its use as a former rail yard and the fill materials present on the site, various debris piles and rail ties present on the site and contaminants identified during previous investigations at the property.

- CTA at 4401 West Chicago Avenue, due to USTs installed in 1992, and because it is a former rail yard and may have fill similar to the site.
- Rail IT Property, 733 North Kilbourn Avenue, due to an UST that was not closed. It is unclear if this is the site or adjacent, as Rail IT at one time owned the site and the street number identified in the EDR report could potentially put it near the southeast corner of Chicago and Kilbourn Avenues, which would be the site.
- Department of Streets and Sanitation, 750 North Kilbourn Avenue, adjacent across North Kilbourn Avenue, due to USTs removed but not closed and since it is a transfer station and incinerator which may have resulted in airborne particulates reaching the site.
- City of Chicago, 715 North Kilbourn Avenue, due to an UST that was not closed. The initial incident report for #940242 lists 715 N. Kilbourn Avenue and then subsequent documentation on the Illinois EPA website for this incident changed to 750 N. Kilbourn Avenue. Amec Foster Wheeler believes the address was mis-identified in the original report and subsequently corrected. Although an incident was reported, a subsequent Illinois EPA letter indicates the site is a non-LUST site, which could indicate there was no confirmed release, or that the incident was from a non-regulated tank.

Investigation and Results

A previous investigation by Warzyn in 1991 consisted of the installation of ten (10) soil borings and three (3) temporary wells in three (3) of the borings. Twenty (20) soil samples were collected and analyzed for volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PNAs), Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver) and total cyanides. Comparison of Warzyn results to Tiered Approach to Corrective Action Objectives (TACO, 35 IAC 742) Tier 1 current objectives showed that only one sample, SB10-4, taken at 8.5 to 10.5 feet below ground surface, had a concentration which exceeded the soil remediation objectives (SROs) to which it was compared. Arsenic was detected at 13.8 mg/kg, and its soil ingestion objective (which is the same as its background concentration) is 13 mg/kg.

A 2007 Phase II by Carlson included nineteen (19) soil borings. Twenty-four soil samples were analyzed. Analyses included VOCs, semivolatile organic compounds (SVOCs), priority pollutant metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc), pH, pesticides, polychlorinated biphenyls (PBCs) and chlorinated herbicides. Comparison of Carlson results to TACO Tier 1 current objectives showed that eight (8) samples, taken at seven (7) locations had concentrations which exceeded the SROs to which the samples were compared. Five (5) samples had PNA concentrations above their objectives, and three samples had inorganic concentrations (arsenic, antimony and chromium) above SROs.

This Phase II ESA consisted of the installation of twenty-four (24) soil borings, collection of twenty-six (26) soil samples for analytical testing, the installation and sampling of two (2) temporary monitoring wells, sampling of two (2) existing monitoring wells, level survey of some existing and the newly installed wells, and a limited ground penetrating radar survey. Soil samples were generally analyzed for PNAs and Priority Pollutant metals, with select samples analyzed for the Target Compound List (TCL) from the Site Remediation Program (35 IAC 740 Appendix A) and herbicides.

Groundwater samples were analyzed variously for the TCL, PNAs, metals and VOCs. three soil samples had concentrations of PNAs which exceeded objectives and four soil samples had arsenic concentrations above its soil ingestion objective.

Remediation Objectives

Based on comparison of the results of all of these investigations to TACO Tier 1 objectives for industrial/commercial sites with Class II groundwater, soils at the site have been identified as impacted by benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic at concentrations above their soil ingestion objectives. Three chemicals at three locations exceeded their soil component of groundwater ingestion objectives: benzo(a)anthracene, antimony and chromium.

TACO allows for the averaging of results with the approval of the planned or completed sampling by Illinois EPA. Based on the Illinois EPA's approach to other sites in the Site Remediation Program (SRP), concentrations of PNAs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene) and arsenic in shallow (above 3 feet in depth) soil were averaged to represent current exposure which would be only to shallow soils. All concentrations of the listed PNAs and arsenic in soils were averaged to represent future exposures, which could be to any of the soils at the site from any depth or location. PNA and arsenic concentration were averaged in accordance with Section 742.225 of TACO to demonstrate that they would be in compliance with objectives.

Results were averaged using ProUCL Version 5.1.02. Within the PNAs' current (shallow soils) data set, one sample (GP3A at 0 to 2 feet) had elevated concentrations of PNAs and will need to be remediated or have an engineered barrier, consistent with Illinois EPA SRP requirements, to prevent access. With this concentration removed, the averages for current users for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic are below their objectives.

Within the PNAs' future (all soils) data set, two samples (GP3A at 0 to 2 feet and GP-7D at 6 to 8 feet) had elevated concentrations of PNAs and will need to be remediated or have an engineered barrier, consistent with Illinois EPA SRP requirements, to prevent access. With these concentrations removed, the averages for future site use for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic are below their objectives.

The soil component of groundwater ingestion pathway can be addressed by exclusion of the groundwater pathway in accordance with 35 IAC 742.320. The City of Chicago has an ordinance which prohibits the installation of or use of potable water wells. The TACO calculations indicate that at the concentrations detected, groundwater at 10 to 1000 feet beyond any of the concentrations exceeding TACO Tier 1 Class II groundwater ingestion objectives would have no concentrations exceeding the applicable TACO Tier 1 objectives for sites with Class II groundwater. Site conditions and concentrations of chemicals of concern which exceeded the soil component of groundwater ingestion pathway were determined to be appropriate for pathway exclusion. The evaluation showed that the pathway could be excluded.

No chemicals were of concern (above objectives) for the construction worker ingestion and inhalation routes, except possibly mercury. The site was a rail yard previously, and elemental mercury is not known to be associated with rail yards. However, given the widespread detection of mercury and

the significant concentration of mercury in one 2007 Carlson investigation sample (GP-17A, 0 to 2 feet below ground surface) of 7.5 mg/kg, Amec Foster Wheeler recommends a construction worker warning for mercury be placed on the site.

Construction Considerations

During design and construction of the JPTSA, it is recommended that the following be taken into consideration:

- Future site buildings should be constructed with a full concrete slab-on-grade foundation or with a full concrete basement floor and walls. Future site buildings should not be constructed with earthen crawl spaces, earthen floors, stone foundations, partial concrete floors, or sumps.
- Unless additional testing is performed to determine compliance with Illinois EPA's Clean Construction and Demolition Debris (CCDD) regulations, all soil being removed from the site must be disposed of in accordance with applicable regulations to a Subtitle D landfill.
- Areas depicted on Figure 9 must be covered with an Illinois EPA TACO-compliant engineered barrier such as asphalt, concrete, 3 ft of clean fill, or other Illinois EPA-approved barrier.
- Imported fill material must be certified virgin stone or other soil or earthen material, which has been tested for Target Compound List parameters (35 IAC 740 Appendix A) and found to meet the most stringent objectives for residential land use included in Appendix B of TACO.
- Construction workers who will encounter site soils should be informed of the mercury detections at the site so that they may take appropriate precautions as determined by their evaluation of the data.
- Although a GPR survey for underground tanks, utilities and foundations was performed in a limited area of the site, this does not guarantee that such underground tanks, utilities and foundations are not present in these areas, or other areas where such survey was not completed.
- A Soil Management Plan should be prepared and implemented during construction to document, at a minimum: the site specific soil excavation, disposal, storage and reuse procedures, imported material testing requirements, and environmental oversight requirements.

Conclusions

A Phase II Environmental Site Assessment has been completed for the property at 4301 W Chicago Avenue in Chicago, Illinois. This investigation and previous sampling indicated that soils at the site have been impacted by benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic at concentrations above their soil ingestion objectives. Three chemicals at three locations exceeded their soil component of groundwater ingestion objectives: benzo(a)anthracene, antimony and chromium. Mercury was detected above construction worker inhalation objectives at the site. The construction worker inhalation objective is only valid if elemental mercury is a contaminant of concern. A high (7.5 mg/kg) concentration of mercury in one sample (GP-17A, 0 to 2 feet) and widespread detections of mercury above the construction worker objective, combined with limited site history has resulted in the determination that a construction worker caution should be required for the site.

Averaging of soils above soil ingestion objectives, as allowed in TACO, has resulted in a determination that two locations should be remediated or barriered to prevent exposure. The use of the City of Chicago groundwater ordinance has allowed for exclusion of the groundwater pathway. A construction worker caution for exposure to mercury by the inhalation pathway is recommended for the site.



PHASE II ENVIRONMENTAL SITE ASSESSMENT

4301 West Chicago Avenue
Chicago, Illinois

1.0 INTRODUCTION

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), was retained by the City of Chicago Department of Fleet and Facility Management (2FM) to conduct a Phase II Environmental Site Assessment (ESA) for the site located at 4301 West Chicago Avenue in Chicago, Cook County, Illinois (the site). Development of the site as a Joint Public Safety Training Academy (JPSTA) is planned. The JPSTA campus will provide the Chicago Police Department (CPD) and the Chicago Fire Department (CFD) with a central location, replacing training facilities located throughout the City.

Although the site has not been enrolled in the Illinois EPA's Site Remediation Program, this Phase II ESA was conducted in accordance with all applicable subsections of Illinois Environmental Protection Agency, Title 35: Environmental Protection, Subtitle G: Waste Disposal, Chapter I: Pollution Control Board, Parts 740 (Site Remediation Program) and 742 (Tiered Approach to Corrective Action Objectives). This Phase II also identifies remedial actions that would be necessary to obtain an industrial/commercial comprehensive No Further Remediation Letter for the site.

1.1 PROPERTY LOCATION

The current site address is 4301 West Chicago Avenue, Chicago, Illinois. The site is located in Chicago, Cook County, Illinois. The site location is shown on Figure 1. The site is located in Township 39N, Range 13E, Section 10 at latitude 41° 53' 38" North and longitude -87° 44' 10" West. The property is currently vacant and is located in a mixed-use area.

1.2 PROPERTY DESCRIPTION

The site consists of 30.4 acres located on the southeast corner of the intersection of Kilbourn and West Chicago Avenue. The Property Index Number (PIN) for the site is 16-10-200-061-0000. The site is located in a mixed land use area. At the time of the site reconnaissance, the site was vacant. The site is partially fenced and no buildings or other improvements are present on the site.

The site is situated at an elevation of approximately 610 feet above mean sea level (msl). Based on our review of the local topography, it appears that groundwater would generally flow toward the east to Lake Michigan.

Adjacent to the east is N. Kostner Avenue, beyond which is Falcon Transportation to the north and Chicago Transit Authority (CTA) to the south, to the north is W Chicago Avenue with commercial buildings lining the street and residences behind them, to the west is N. Kilbourn Avenue, beyond which is a City of Chicago Transfer Station, and to the south is a remaining railroad spur and some industrial and warehouse properties.

1.3 RECOGNIZED ENVIRONMENTAL CONDITIONS

Amec Foster Wheeler performed a Phase I ESA as outlined in ASTM E 1527-13 in June 2017. Amec Foster Wheeler issued the Draft Phase I ESA on June 26, 2017. Acquisition of the property is expected to occur in January 2018. Components of the Phase I ESA which are required to be completed within 180 days of the expected date of purchase were updated in November 2017 and a final Phase I report was issued on December 11, 2017. The following recognized environmental conditions (REC) (see Figure 2 for locations) were determined to be associated with the property:

- On the property, a potential underground storage tank (UST) installed in 1959 with no record of it having been removed, its use as a former rail yard and the fill materials present on the site, various debris piles and rail ties present on the site and contaminants identified during previous investigations at the property.
- CTA at 4401 West Chicago Avenue, due to USTs installed in 1992, and because it is a former rail yard and may have fill similar to the site.
- Rail IT Property, 733 North Kilbourn Avenue, due to an UST that was not closed. It is unclear if this is the site or adjacent, as Rail IT at one time owned the site and the street number identified in the EDR report could potentially put it near the southeast corner of Chicago and Kilbourn Avenues, which would be the site.
- Department of Streets and Sanitation, 750 North Kilbourn Avenue, adjacent across North Kilbourn Avenue, due to USTs removed but not closed and since it is a transfer station and incinerator which may have resulted in airborne particulates reaching the site.
- City of Chicago, 715 North Kilbourn Avenue, due to an UST that was not closed. The initial incident report for #940242 lists 715 N. Kilbourn Avenue and then subsequent documentation on the Illinois EPA website for this incident changed to 750 N. Kilbourn Avenue. Amec Foster Wheeler believes the address was mis-identified in the original report and subsequently corrected. Although an incident was reported, a subsequent Illinois EPA letter indicates the

site is a non-LUST site, which could indicate there was no confirmed release, or that the incident was from a non-regulated tank.

1.4 DOCUMENTS REVIEWED

The following reports were provided for Amec Foster Wheeler review:

- Phase II ESA, prepared by Warzyn Inc., dated August 1991 – this was a separate report, but was also in Appendix A of the Carlson Phase I ESA
- Preliminary Report of Soils Exploration, prepared by Testing Service Corporation, April 29, 1998 - this was in Appendix A to the Carlson Phase I
- Phase I ESA, prepared by Carlson Environmental, dated May 11, 1998
- Limited Phase II, prepared by Carlson Environmental, dated October 17, 2007
- Property Screen Summary Report, prepared by 2FM, dated April 10, 2017

1.5 WORK COMPLETED

This Phase II ESA consisted of the installation of twenty-four (24) soil borings, collection of twenty - six (26) soil samples for analytical testing, the installation and sampling of two (2) temporary monitoring wells, sampling of two (2) existing monitoring wells, level survey of some existing and the newly installed wells, and a limited ground penetrating radar survey. See Figure 3 for boring and well locations.

1.6 LIMITATIONS AND EXCEPTIONS

This report was prepared by Amec Foster Wheeler exclusively for the City of Chicago Department of Fleet and Facility Management. The quality of information, conclusions, and opinions contained herein is consistent with the level of effort involved in Amec Foster Wheeler services and based on: (1) information available at the time of preparation, (2) data supplied by outside sources, and (3) the assumptions, conditions, and qualifications set forth in this report.

This Phase II Environmental Site Assessment is intended to be used by the City of Chicago Department of Fleet and Facility Management for the 4301 West Chicago Avenue, Chicago, Illinois site only, subject to the terms and conditions of its contract with Amec Foster Wheeler. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

Environmental impairment of a property may result from many activities, such as illegal or unreported dumping, or the spilling of hazardous wastes or materials. The presence of contaminants at a

particular property may not always be apparent, and the completion of a Phase II ESA cannot provide a guarantee that hazardous wastes or materials not discovered during this investigation do not exist. The scope of services executed for this project does not include an audit for regulatory compliance, ecological resources, endangered species, cultural and historic resources, indoor air quality, industrial hygiene, health and safety, or high-voltage power lines. It also does not include a detailed condition survey for asbestos, lead, radon, lead in drinking water, or other potential hazards or for wetlands, naturally occurring materials, or other items not outlined in Amec Foster Wheeler's scope of services.

The findings contained herein are relevant to the dates of Amec Foster Wheeler's investigation and should not be relied upon to represent conditions at later dates. If additional information becomes available, it should be provided to Amec Foster Wheeler so the original conclusions and recommendations can be modified as necessary.

1.7 REPORT ORGANIZATION

This document is the Phase II Environmental Site Assessment for 4301 West Chicago Avenue, Chicago, Illinois. A description of the contents of the document is presented below:

- Section 1.0, Introduction: provides background information regarding the purpose of this report; identifies the objectives of the investigation and the technical approach used to meet the objectives; and outlines the contents of this report.
- Section 2.0, Site Characterization: provides relevant background information regarding the site such as the site history, and the geology and physiographic setting of the site.
- Section 3.0, Site Investigation: details site-specific sampling strategies; procedures; chain-of-custody procedures and other information which assured that accurate information was gathered regarding chemical contamination at the site.
- Section 4.0, Analytical Results: presents and discusses the results obtained from the investigation.
- Section 5.0, Endangerment Assessment: details the nature and extent of contamination; presents details on potential contaminant migration pathways and contaminant fate and transport mechanisms; and evaluates exposure routes for completeness.
- Section 6.0, Remediation Objectives: compares the contaminant concentrations with Tier 1 residential criteria, construction worker objectives and soil component of groundwater

ingestion pathway objectives presented in the Tiered Approach to Corrective Action Objectives (TACO) and provides the proposed remediation objectives for the site.

- Section 7.0, Summary and Conclusions: summarizes the information presented in this document and presents conclusions.

2.0 SITE CHARACTERIZATION

The following is a description of the general setting, and previous usage of the site. Information on previous site assessment and investigation is included in this section.

2.1 PHYSICAL SETTING

2.1.1 Site Topography

The 7.5-minute Chicago Loop, Illinois, United States Geological Survey (USGS) quadrangle, published in 2012, was examined. Review of the topographic map indicates that the site is located between 600 and 610 feet above mean sea level (msl). The topography of the area is generally flat with a slight slope to the east. Based on our review of the local topography, it appears that groundwater would generally flow toward the east to Lake Michigan.

The site itself is generally bermed on the north and the southeast and southwest and fairly flat and lower in the central portion.

2.1.2 Geology/Hydrogeology

Site soils consist primarily of the Urbanland soil type, and are comprised of fine sand, sandy loam or clay loam.

The region is located in the central portion of the Central Lowlands Physiographic Province, a broad, relatively low area that roughly outlines the glaciated area and extends from the Appalachian Plateaus on the east to the Great Plains on the west, and from the Superior Upland on the north to the Interior Low Plateaus and the Ozark Plateaus on the south. The local relief in the Central Lowlands seldom exceeds a few hundred feet. The Central Lowland Province is divided into two sections, the Till Plains Section and the Great Lakes Section. The Great Lakes Section, which includes the site, contains surficial features of the youngest part of the Wisconsin Stage glacial drift, and is characterized by its many lakes, and rough surfaced moraines.

Near surface geology in the southeastern Chicago area consists primarily of glacially derived fluvial, lacustrine, and ice-contact sediments. The property is underlain by these glacial deposits which overlie Silurian Dolomite bedrock. The underlying glacial deposits in the area are predominantly the Pleistocene-aged Wadsworth Till Member of the Wedron Formation. Overlying the till in parts of the area is the Carmi Member of the Equality Formation, which is composed primarily of quiet-water, well-bedded silts. In northeastern Illinois, the Wadsworth Till ranges from clay to clayey silt to sandy, clayey silt. All tills of the Wadsworth are characterized by their high clay content and abundance of

black shale fragments. The high clay content produces medium to high plasticity and low hydraulic conductivity in the till unit.

The geologic rock stratigraphic unit underlying the site is a Paleozoic Middle Silurian (Niagoaran) dolomite.

Four regional aquifers are present within the Chicago area. The first two are shallow aquifer systems that provide groundwater for domestic and municipal use. The first of these is the sand and gravel located within glacial deposits. These deposits of sand and gravel may occur as shallow, unconfined surficial aquifers or as confined aquifers buried beneath clay till. Groundwater flow within the clay till is expected to be downward toward underlying aquifers.

The upper 50 feet of bedrock forms the second shallow aquifer system in northeastern Illinois. Prior to glaciation, the bedrock was at or near the ground surface and was subject to chemical and physical weathering processes. As a result, the shallow weathered bedrock is generally more permeable and water-bearing than deeper sections of bedrock. The Silurian Dolomite, which is the upper bedrock in much of northeastern Illinois, has historically been used as a water source for municipalities. However, most municipalities in northeastern Illinois, including Chicago, now obtain water from Lake Michigan.

The Silurian Dolomite is underlain by the Maquoketa Shale which is approximately 170 feet thick and is a regional aquitard. An aquitard may be defined as any saturated geologic formation not capable of yielding useable quantities of groundwater to a well. Sandstone and dolomite formations beneath the Maquoketa Shale form two deep regional aquifer systems capable of yielding large groundwater supplies.

In general, soils throughout the site encountered during this investigation consisted of fill material to varying depths, from 5.5 feet to as deep as 17.5 feet below ground surface (bgs), under which was a stiff gray to brown clay. With greater depth, the clay and silty clay becomes very stiff and then overlies hard, and in some cases very hard grey silty clay to clayey silt.

Groundwater was encountered at 5 feet to 30 feet bgs and the occurrence of groundwater coincided with more permeable sand or gravel in the fill materials or the zone just above the stiff, native glacial clay.

Groundwater levels in newly installed wells and previously installed wells that had been found by Amec Foster Wheeler were measured in August 2017. A level survey, with a benchmark of 100 feet for the previous well identified by Amec Foster Wheeler as Well E, was performed to aid in the

determination of the groundwater flow direction. See Table 1 for depth to groundwater and water level elevations. Two groundwater contour maps were developed: Figure 4 is a map of the shallow groundwater elevations (wells set at about 15 to 20 feet in depth) and Figure 5 is a map of deeper groundwater elevations (wells set at about 38 to 51 feet below surface). Note that Well E was excluded from the deep map as its water level was anomalous; it was about 11 feet higher than the next closest deep well. The shallow groundwater contours indicate groundwater flow is to the southeast toward the CTA facility. The deeper groundwater contours indicate that the site is a groundwater high with offsite flow in all directions from the site.

2.1.3 Groundwater Classification

Results of soil borings at the site were evaluated to determine the proper classification of the shallow groundwater at the site. Per 35 IAC Section 620.201, all groundwaters of the State are designated as either:

Class I:	Potable Resource Groundwater;
Class II:	General Resource Groundwater;
Class III:	Special Resource Groundwater; or
Class IV:	Other Groundwater.

As defined in 35 IAC Section 620.230, Class III Special Resource Groundwater is groundwater that is demonstrably unique or vital for a particularly sensitive ecological system. Since the shallow groundwater at the site is not unique or vital to a sensitive ecological system, this classification is not appropriate for the site.

According to 35 IAC Section 620.240, Class IV Other Groundwater refers to groundwater that is within the zone of attenuation of non-hazardous waste landfills, within the point of compliance of a RCRA permitted unit, groundwater designated as exempt pursuant to the UIC regulations (35 IAC 704), groundwater that naturally contains total dissolved solid concentrations in excess of 10,000 mg/L, groundwater with contaminants present no farther than 25 feet from a non-regulated source, and groundwater within a previously mined area or which underlies a coal mine refuse disposal area. Since the groundwater at the site does not satisfy any of these requirements, this groundwater classification is also not appropriate.

Therefore, the groundwater at the site would be classified as either Class I Potable Resource or Class II General Resource Groundwater. Among other requirements, 35 IAC Section 620.210 specifies that Class I groundwater is:

- a) Groundwater located 10 feet or more below the land surface and within:

- 1) The minimum setback zone of a well which serves as a potable water supply and to the bottom of such well.
- 2) Unconsolidated sand, gravel or sand and gravel which is five feet or more in thickness and that contains 12% or less of fines.
- 3) Sandstone which is 10 feet or more in thickness, or fractured carbonate which is 15 feet or more in thickness.
- 4) Any geologic material which is capable of a:
 - A) Sustained groundwater yield, from up to a 12-inch diameter borehole, of 150 gallons per day or more from a thickness of 15 feet or less; or
 - B) Hydraulic conductivity of 1×10^{-4} cm/sec or greater using one of the following test methods or its equivalent:
 - i) Permeameter;
 - ii) Slug test; or
 - iii) Pump test.

Groundwater at the site was encountered at eight (8) feet and deeper below surface, based on Amec Foster Wheeler measurements (see Table 1) and a geotechnical report prepared by Midland Standard Engineering and Testing, Inc. (MSET) (see Appendix G). Near surface soil at the site consists of sandy fill to up to about 17.5 feet below the ground surface. Grain size analysis of this fill material performed by MSET indicates that, below 6 feet in depth (B-7, 6-8 feet) the sand contains 13% fines (exceeding 12% or less). The sample (B-11) at 4 to 6 feet had only 8% fines, but the remaining clay samples (B-9, 21-22.5 feet, 61% fines; and B-15, 14 to 15.5 feet, 89% fines) had greater concentrations of fines. Below the fill is glacial till consisting of silty clay to clayey silt, which becomes stiff and hard with depth.

Soil permeability testing was conducted by MSET on the existing sandy fill and underlying silty clay. The fill was tested for hydraulic conductivity in place at boring location ESB-4. At ESB-4, a falling head permeability test was conducted to determine the soil permeability. At this location, 15.5 feet of well pipe was installed to a depth of 13 feet below the ground surface with 2.5 feet of stick up. The screened interval was at roughly a depth of 2.75 feet to 12.75 feet. Clay at this location started at a depth of 9 feet. The permeability test consisted of filling the well pipe and timing the drop of the water level for several time intervals (falling head test). A total of 4 trials were conducted.

The permeability of the silty clay at boring B-10 from a depth of 11 to 13 feet was determined by performing a laboratory hydraulic conductivity test. A Shelby tube sample was collected and

laboratory permeability testing was conducted per ASTM 5084-90. Geotechnical hydraulic conductivity testing at the site found that the sandy granular fill had a hydraulic conductivity of 8.8×10^{-4} cm/sec (just above the 1×10^{-4} cm/sec required for the Class II groundwater designation by hydraulic conductivity) and the underlying clay till had a hydraulic conductivity of 4.2×10^{-7} cm/sec. Based on the concentration of fines in the fill materials below 6 feet and the hydraulic conductivity of the underlying clay till, the groundwater classification at the site is Class II groundwater.

2.1.4 Surface Water Bodies

Surface water at the site discharges into storm sewers, and thence into the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) combined sewer system, by overland flow to other properties, or through infiltration, into the site soils. The closest apparent surface water bodies are small ponds in Garfield Park about 1 mile southeast of the site. Lake Michigan is about 6 miles to the east and the DesPlaines River is about 5 miles west of the site.

2.1.5 Wetlands

A detailed wetland evaluation is beyond the scope of this investigation. Areas that may be wetlands or nearby surface water bodies were not observed on the site. The closest wetlands appear to be small areas near the ponds in Garfield Park, about 1 mile southeast of the site.

2.1.6 Flood Maps

The property and surrounding properties are not within 100-year and 500-year flood zones as defined by the Federal Emergency Management Agency (FEMA). The information includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.

2.2 SITE HISTORY

Before its first development in about 1896, the property was vacant and undeveloped. The site was first developed as a rail yard by 1900 according to historic topographic maps. Previous environmental reports for the site indicate that the rail yard was constructed in 1896 by the Chicago and Northwestern Transportation Company on previously undeveloped land. By 1978-1980, most of the rail yard tracks were gone, and by at most 2002, the parcel was totally vacant.

2.2.1 Previous Assessments and Investigations

A previous investigation by Warzyn in 1991 consisted of the installation of ten (10) soil borings and three (3) temporary wells in three (3) of the borings. Twenty (20) soil samples were collected and analyzed for volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PNAs),

Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver) and total cyanides. Total xylene was detected in two (2) samples from one (1) boring and trichlorofluoromethane was detected in samples from two (2) other borings. PNAs were widespread, but generally below 1 mg/kg concentration, although some locations were higher. Metals were detected but at concentrations considered to be background or naturally occurring. Cyanides were not detected. Groundwater flow in the shallow soils was thought to be to the north, but could not be determined based on the temporary wells. No VOCs were detected and low concentrations of PNAs, metals and cyanide (one sample) were detected in the water samples. See Table 2 for a summary of the Warzyn investigation soil sample results and comparison of these results to the Tiered Approach to Corrective Action Objectives (TACO, 35 IAC 742) Tier 1 objectives for industrial/commercial sites with Class II groundwater.

A 2007 Phase II by Carlson included nineteen (19) soil borings. Twenty-four soil samples were analyzed. Analyses included VOCs, semivolatile organic compounds (SVOCs), priority pollutant metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc), pH, pesticides, polychlorinated biphenyls (PBCs) and chlorinated herbicides. No VOCs were detected at concentrations exceeding the TACO objectives; although VOCs were detected at some locations. PNAs and carbazole were detected at concentrations that exceeded the TACO Tier 1 screening objectives. Antimony, arsenic, chromium, lead and mercury were detected at concentrations above their TACO Tier 1 objectives. PCBs, pesticides and herbicides were not detected in the two (2) samples analyzed for these parameters. The report concluded that concentrations of five (5) PNAs, one (1) SVOC and five (5) metals were present at concentrations exceeding the most stringent TACO Tier 1 residential screening levels. See Table 3 for a summary of the Carlson investigation soil sample results and comparison of these results to the TACO Tier 1 objectives for industrial/commercial sites with Class II groundwater.

3.0 SITE INVESTIGATION

3.1 SITE-SPECIFIC SAMPLING PLAN

Prior to completing this Phase II ESA, Amec Foster Wheeler prepared a site-specific sampling plan consisting of a figure showing planned sampling locations (Figures 2 through 8) and a table (Table 4) showing planned samples and analytical testing to be performed. After revisions and discussion with the 2FM representative, the plan was implemented substantially per the revised planning documents.

3.1.1 Soil Borings

Twenty-four (24) soil borings were installed at the property. Six (6) borings (ESB-1 to ESB-6) were environmental borings drilled to about 16 feet bgs. Eighteen (18) borings (B-1 to B-18) were geotechnical borings which were drilled to depths of 16 feet to 40 feet bgs. Soil samples for environmental testing were obtained from fifteen (15) of the geotechnical borings. No environmental samples were taken from borings B-5, B-8 and B-13.

Drilling was performed by Groff Testing Corporation using a CME 75 ATV to drive 2.25 inch or 4.25-inch hollow stem augers. Soil sampling conducted through the hollow stem augers involved the use of a 1-3/8 inch, 24-inch long split-barrel sampler. The split-barrel sampler was advanced in substantial accordance with American Society for Testing Materials ("ASTM") methods, which involves driving the sampler into the soil with a 140-pound hammer, falling 30-inches. The number of blows required to drive the sampler each 6-inch interval was recorded and used as a qualitative measure of soil density. An Amec Foster Wheeler field person logged soil in general accordance with the Unified Soil Classification System. The boring logs are included in Appendix A.

After the split-barrel sampler was driven 24-inches, the sampler was extracted from the borehole, opened and screened for volatile organic vapors using a photoionization detector (PID). Headspace analysis was conducted on soil samples from each boring. Headspace analysis was completed by first placing a small portion of soil into a zip lock bag which was then sealed. The bagged samples were left undisturbed for a period of not less than ten minutes to allow any organic compounds to come to equilibrium within the bag. The tip of a Minibreak 3000 PID was then inserted into the bag. The PID utilizes a lamp with an ionization potential of 10.6 electron volts. The maximum PID response for each sample in parts per million (ppm) was recorded on the field boring logs in Appendix A.

The split-barrel sampler was decontaminated between each sample using an Alconox wash and clean water rinse. Decontamination water was discharged to the land surface away from boring and well locations. Boreholes were subsequently filled with soil cuttings and/or bentonite chips to complete boring backfilling.

3.1.2 Temporary Monitoring Wells

Two temporary wells were installed at the site in borings ESB-5 and ESB-6. The temporary wells were installed through the 4.25-inch hollow stem augers. Each well was constructed of a 2-inch ID 10-foot long PVC well screen with 0.010-inch continuous slots at an approximate depth of 6 to 16 ft. bgs. A 2-inch inner diameter (I.D.) PVC well casing was used to bring the well to land surface. The annular space surrounding the well screen was backfilled with #5 filter sand to a level approximately 2.0 foot above the well screen. The remaining annular space was backfilled with bentonite chips. Wells were level surveyed with regard to a site-specific datum. Wells were removed immediately after sampling and their boreholes backfilled with soil cuttings or bentonite chips. Temporary well installation diagrams are presented in Appendix B.

3.1.3 Soil Samples

Soil samples for all testing except volatile organic analysis were collected in laboratory-supplied, USEPA-approved eight-ounce glass sample jars. For boring locations requiring volatile organic analysis, samples were collected in laboratory-supplied USEPA-approved 40 milliliter vials with sample collection procedures conforming to SW-846 Method 5035. Prior to each sampling interval and between each boring location, the sampling equipment, were decontaminated by using an Alconox wash followed by a tap water rinse. To reduce the possibility of cross contamination between samples, a new pair of disposable latex gloves was donned by the sampler for each sample collected. Upon collection, the sample jars were labeled with the site name, sample number, date, time, and sampler initials, and were placed in a cooler containing ice. Samples were submitted to STAT Analysis Corporation of Chicago, Illinois, an Illinois EPA-accredited testing laboratory (accreditation number 100445), using proper chain of custody procedures.

3.1.4 Groundwater Samples

The wells were sampled utilizing a peristaltic pump with dedicated tubing. The well was purged prior to sampling using low flow sampling techniques until the water became visually clearer and pH, temperature and specific conductivity had stabilized. Groundwater samples were collected in laboratory-supplied, USEPA-approved, sample containers with the sampler donning a new pair of disposable nitrile gloves. Upon collection, the sample jars were labeled with the site name, sample number, date, time, and sampler initials, and were placed in a cooler containing ice. The samples

were submitted to STAT Analysis Corporation of Chicago, Illinois, an Illinois EPA-accredited testing laboratory (accreditation number 100445), using proper chain of custody procedures.

3.1.5 Ground Penetrating Radar Survey

The objective of the Ground Penetrating Radar Survey was to detect and identify potential buried metallic objects that may represent USTs, piping, buried drums or other similar objects that could be characterized as an REC and adversely affect redevelopment. Specifically, the survey was performed around an area with debris in the northwest of the site that appeared for have formerly been a structure based on the assumption that any previous tanks would have been associated with a structure. On August 7, 2017, Mr. Michael McGarry of Worksmart, Inc. (Worksmart), subcontracted by Amec Foster Wheeler, performed a GPR Survey of approximately 10,000 square feet around the structure debris pile. The area was delineated using a one meter interval grid pattern. This grid pattern should allow for objects consistent with an underground storage tank to be scanned. Multiple scans in a North – South and East – West direction were performed using a trolley-mounted USRADAR SPR unit with a 500 MHz antenna, and a 500 MHz GPR system mounted on an all-terrain rover, providing imaging to an anticipated depth of 8.5 feet.

4.0 ANALYTICAL RESULTS

This Phase II ESA consisted of the installation of twenty-four (24) soil borings, collection of twenty - six (26) soil samples for analytical testing, the installation and sampling of two (2) temporary monitoring wells, sampling of two (2) existing monitoring wells, level survey of some existing and the newly installed wells, and a limited ground penetrating radar survey. Soil samples were generally analyzed for PNAs and Priority Pollutant metals, with select samples analyzed for the Target Compound List (TCL) from the Site Remediation Program (35 IAC 740 Appendix A) and herbicides. Groundwater samples were analyzed variously for the TCL, PNAs, metals and VOCs.

Analytical testing was performed by STAT Analysis Corporation of Chicago, Illinois, an accredited Illinois EPA Environmental Laboratory Program (ELAP) laboratory (IEPA ELAP 100445). All analyses were performed in accordance with the requirements of 35 Illinois Administrative Code (IAC) Part 186 National Environmental Laboratory Accreditation Conference (NELAC) standards.

All analytical results were compared to the current Illinois EPA Tier 1 Tiered Approach to Corrective Action Objectives (TACO) Tier 1 Soil Remediation Objectives (SROs) for Industrial/Commercial sites with Class II groundwater. Soil results were compared to the Illinois TACO Soil Remediation Objectives for Industrial/Commercial land use (35 IAC 742 Appendix B Table A); for Construction Workers (35 IAC 742 Appendix B Table B); and to pH-specific objectives for sites with Class II groundwater (35 IAC 742 Appendix B Tables C and D). Background values as provided in TACO (35 IAC 742, Appendix A Tables G and H) were also used for comparison. If concentrations did not exceed background values, they were not compared to SROs. In some cases, results could not be compared to objectives (metals) but were above background, or were above pH-specific objectives. In these cases, Toxicity Characteristic Leaching Procedure (TCLP) or Synthetic Precipitation Leaching Procedure (SPLP) testing was requested from the laboratory.

Groundwater results were compared to Groundwater Remediation objectives for sites with Class II groundwater (35 IAC 742 Appendix B Table E) and to Groundwater Remediation objectives for the Indoor Inhalation Exposure Route – Diffusion and Advection (35 IAC Appendix B, Table H). Use of the objectives in 35 IAC 742 Appendix B Table H is only allowed if institutional controls are in place which ensure that any existing or potential building has a full concrete slab-on-grade or a full concrete basement floor and walls.

The current analytical results and previous results are summarized and compared to the SROs and GROs in Tables 2, 3, 5 and 6. Those results that exceed the applicable SROs and GROs are discussed in the following sections. The laboratory analytical reports are provided in Appendix C.

4.1 SOIL RESULTS

Warzyn Investigation

Comparison of Warzyn results to TACO Tier 1 current objectives showed that three samples had concentrations which exceeded the SROs to which they were compared. SB10-4, taken at 8.5 to 10.5 feet bgs, had arsenic and mercury above objectives. Arsenic was detected at 13.8 mg/kg, and its soil ingestion objective (which is the same as its background concentration) is 13 mg/kg. In addition, the same sample had mercury at a concentration above its construction worker inhalation objective. The sample concentration was 0.14 mg/kg and the construction worker inhalation objective is 0.1 mg/kg. Mercury was detected above its construction worker inhalation objective in two other samples: SB2-1 at 1 to 3 feet bgs, concentration 0.31 mg/kg (qualified by the laboratory as estimated due to a matrix issue) and SB2-1 at 1 to 3 feet bgs, concentration 0.17 mg/kg. Note that this mercury objective is only valid where elemental mercury is a contaminant of concern.

Carlson Investigation

Comparison of Carlson results to TACO Tier 1 current objectives showed that ten (10) samples, taken at nine (9) locations had concentrations which exceeded the SROs to which the samples were compared. Five (5) samples had PNA concentrations above their objectives, as summarized below.

Sample Number and Depth	Chemical	Concentration mg/kg	Soil Ingestion Objective mg/kg	Soil Component of Class II Groundwater Ingestion Objective mg/kg
GP-3A (0-2.0 ft)	Benzo(a)pyrene Benzo(b)fluoranthene Dibenzo(a,h)anthracene	6.3 E 8.7E 1.7	1.3 (ingestion) 8 (ingestion) 0.8 (ingestion)	
GP-6C (4-6 ft)	Benzo(a)pyrene Dibenzo(a,h)anthracene	3.8 0.82	1.3 (ingestion) 0.8 (ingestion)	
GP-7D (6-8 ft)	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Dibenzo(a,h)anthracene	12 13 12 1.0	8 (ingestion) 1.3 (ingestion) 8 (ingestion) 0.8 (ingestion)	8
GP-7F	Benzo(a)pyrene	2.3 E	1.3 (ingestion)	

Sample Number and Depth	Chemical	Concentration mg/kg	Soil Ingestion Objective mg/kg	Soil Component of Class II Groundwater Ingestion Objective mg/kg
(10-12 ft)				
GP-11D (1.0-3.0 ft)	Benzo(a)pyrene	3.1	1.3 (ingestion)	

mg/kg: milligrams per kilogram ft – feet below ground surface

E – laboratory qualifier – value above quantitation range

Eight (8) samples had inorganic concentrations above SROs. Arsenic and mercury in sample GP-17A at 0 to 2 feet bgs were detected at concentrations above their objectives. Arsenic was detected at a concentration of 18 mg/kg, above its soil ingestion objective of 13 mg/kg. Mercury was detected at a concentration of 7.5 mg/kg, above its construction worker inhalation objective of 0.1 mg/kg. Note that this mercury objective is only valid where elemental mercury is a contaminant of concern.

Antimony in sample GP-4E at 8 to 10 feet bgs was detected at a concentration of 23 mg/kg, which is above its pH-specific soil component of groundwater ingestion objective for Class II groundwater of 20 mg/kg. Mercury in this same sample was detected at a concentration of 0.16 mg/kg, above its construction worker inhalation objective of 0.1 mg/kg. Leaching procedure testing by the Toxicity Characteristic Leaching Procedure (TCLP) or Synthetic Precipitation Leaching Procedure (SPLP), another method accepted by the Illinois EPA to determine compliance with the soil component of groundwater ingestion objective for Class II groundwater, could not be performed as the sample was taken in 2007 and was no longer within holding times or available for testing.

For five (5) samples, mercury was the only inorganic detected above an objective. Mercury was detected above its construction worker inhalation objective (0.1 mg/kg) in the following samples: GP-6C 4 to 6 feet bgs at a concentration of 0.16 mg/kg, GP-7D 6 to 8 feet bgs at a concentration of 0.76 mg/kg, GP-7F 10 to 12 feet bgs at a concentration of 0.16 mg/kg, GP-13A 0 to 2 feet bgs at a concentration of 0.12 mg/kg and GP-15A 0 to 2 feet bgs at a concentration of 0.28 mg/kg. Note that this mercury objective is only valid where elemental mercury is a contaminant of concern.

Chromium in sample GP-19A, at 0 to 2 feet bgs, was detected at a concentration of 35 mg/kg, which is above its pH-specific soil component of groundwater ingestion objective of 28 mg/kg. The chromium pH-specific objective is for Class I groundwater as there is no chromium pH-specific objective for Class II groundwater and it is an objective for hexavalent chromium, which is not as

abundant naturally in soils as trivalent chromium. Hexavalent chromium is more toxic than trivalent chromium so it would have a lower objective. Leaching procedure testing by TCLP or SPLP could not be performed as the sample was taken in 2007 and was no longer within holding times or available for testing.

Note that had samples still been available from the Carlson sampling, it may have been possible to eliminate both chromium and antimony as chemicals of concern for the soil component of groundwater ingestion pathway by performing leaching procedure, TCLP or SPLP testing, and comparison to the appropriate objectives.

Amec Foster Wheeler Investigation

For this Phase II investigation, three (3) soil samples had concentrations of PNAs which exceeded objectives, as shown below.

Sample Number and Depth	Chemical	Concentration mg/kg	Soil Ingestion Objective mg/kg
ESB-3B (5.5-6.5 ft)	Benzo(a)pyrene Dibenzo(a,h)anthracene	3.0 0.87	1.3 (ingestion) 0.8 (ingestion)
ESB-4A (0.5-1.5 ft)	Benzo(a)pyrene Dibenzo(a,h)anthracene	3.2 0.81	1.3 (ingestion) 0.8 (ingestion)
B-6A (1-3 ft)	Benzo(a)pyrene Dibenzo(a,h)anthracene	3.9 1.1	1.3 (ingestion) 0.8 (ingestion)

mg/kg: milligrams per kilogram ft – feet below ground surface

Four (4) samples had arsenic concentrations above its soil ingestion objective of 13 mg/kg: ESB-6A (2-4 ft bgs) at 18 mg/kg, B-9A (1-3 ft bgs) at 14 mg/kg, B-17A (0-2 ft bgs) at 34 mg/kg and B-18A (0-2 ft bgs) at 20 mg/kg.

Two (2) soil samples had concentrations of chromium which exceeded the pH-specific soil component of groundwater ingestion objective for chromium. At sample location B-6B, 8 to 10 feet bgs, chromium was detected at 29 mg/kg and the pH-specific is 28 mg/kg. At sample location-18A, 0 to 2 feet bgs, the detected concentration was 61 mg/kg and the pH-specific chromium objective for this location is 32 mg/kg. The chromium pH-specific objective is for Class I groundwater as there is no chromium pH-specific objective for Class II groundwater and it is an objective for hexavalent

chromium, which is not as abundant naturally in soils as trivalent chromium. Hexavalent chromium is more toxic than trivalent chromium so it would have a lower objective.

Mercury was detected at nine (9) locations at concentrations which exceeded its construction worker inhalation objective. The following locations had detected concentrations of mercury that exceeded the construction worker inhalation objective (0.1 mg/kg): ESB-4A, 0.5 to 1.5 feet bgs, 0.14 mg/kg; ESB-5A, 0 to 1 feet bgs, 0.15 mg/kg; ESB-6A, 2 to 4 feet bgs, 0.15 mg/kg; B-6B, 8 to 10 feet bgs, 0.24 mg/kg; B-7A, 0 to 2 feet bgs, 0.23 mg/kg; B-9A, 1 to 3 feet bgs, 0.22 mg/kg; B-10A, 0 to 1 feet bgs, 0.20 mg/kg; B-12A, 0 to 2 feet bgs, 0.32 mg/kg and B-18A, 0 to 2 feet bgs, 0.25 mg/kg. This objective is only valid if elemental mercury is a chemical of concern for the site. The site was a former railyard and elemental mercury is not known to have been used at the site.

Some concentrations of chromium, manganese, iron and cobalt were above background, or for two (2) samples for chromium (see above), above the pH-specific objective for the soil component of groundwater ingestion pathway. Leaching procedure testing (TCLP or SPLP) was performed on these samples and the results were below the soil component of ingestion pathway objectives for Class II groundwater. The detected chromium concentration for B-6B, 8 to 10 feet bgs, was <0.0040 mg/L (non-detect) and for B-18A, 0 to 2 feet bgs, the detected chromium concentration was 0.008 mg/L. The chromium objective for the soil component of groundwater ingestion for Class II groundwater is 1.0 mg/L.

See Figure 6 for soil ingestion pathway exceedances, Figure 7 for soil component of groundwater ingestion pathway exceedances and Figure 8 for construction worker inhalation pathway exceedances. See Table 7 for a summary of all results above objectives.

4.2 GROUNDWATER RESULTS

Two temporary wells were installed and sampled. The sample from ESB-5 was analyzed for the entire Target Compound List from the Site Remediation Program (35 IAC 740 Appendix A). The sample from ESB-6 was analyzed for PNAs and metals, as they were the chemicals of concern for previous soil sampling at the site. The sample from ESB-6 was also later sampled for VOCs, using the unpreserved sample from the amber jar used for PNAs and metals. Since the sample was unpreserved, it was also past the sample's holding time.

Due to concerns about volatile compounds at the site, two of the previously installed wells at the site were sampled for volatile organic compounds (VOCs). Well I with a measured depth of 47 feet and Well C with a measured depth of 15 feet were sampled and the samples were analyzed only for VOCs. No VOCs were detected in any of the groundwater samples (1 temporary well, ESB-5 and

two previous wells, Well I and Well C). For ESB-6, methylene chloride was detected at a low level in the well; but the laboratory indicated that this detection was most probably a laboratory artifact due to the sample having been obtained from a jar that had already been opened at least twice in the laboratory.

4.3 GPR SURVEY RESULTS

During the GPR Survey, no anomalies consistent with buried debris, tanks or other metal objects were identified. There are limitations to this survey. It covered only a small area of the site, near what appeared to be a demolished building. Also, GPR, which sends an electromagnetic pulse into the subsurface, and then measures the return signal, is affected by many factors: moisture, the soil type, nearby metallic objects or electrical sources (such as power lines). Therefore, although Amec Foster Wheeler and its subcontractor, Worksmart, Inc. have performed this survey with care and as skilled professionals, no survey can completely evaluate for the presence of USTs or other underground obstructions, or eliminate the risk of encountering them during construction.

5.0 ENDANGERMENT ASSESSMENT

5.1 NATURE AND EXTENT OF CONTAMINATION

The site was vacant prior to its first developed usage. The site was developed as a rail yard by 1900 according to historic topographic maps. Previous environmental reports for the site indicate that the rail yard was constructed in 1896 by the Chicago and Northwestern Transportation Company on previously undeveloped land. By 1978-1980, most of the rail yard tracks were gone, and by at most 2002, the parcel was totally vacant.

A previous investigation by Warzyn in 1991 consisted of the installation of ten (10) soil borings and three (3) temporary wells in three (3) of the borings. Twenty (20) soil samples were collected and analyzed for volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PNAs), Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver) and total cyanides. Total xylene was detected in two (2) samples from one (1) boring and trichlorofluoromethane was detected in samples from two (2) other borings. PNAs were widespread, but generally below 1 mg/kg concentration, although some locations were higher. Metals were detected but at concentrations considered to be background or naturally occurring. Cyanides were not detected. Groundwater flow in the shallow soils was thought to be to the north, but could not be determined based on the temporary wells. No VOCs were detected and low concentrations of PNAs, metals and cyanide (one sample) were detected in the water samples.

A 2007 Phase II by Carlson included nineteen (19) soil borings. Twenty-four soil samples were analyzed. Analyses included VOCs, semivolatile organic compounds (SVOCs), priority pollutant metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc), pH, pesticides, polychlorinated biphenyls (PBCs) and chlorinated herbicides. No VOCs were detected at concentrations exceeding the TACO objectives; although VOCs were detected at some locations. PNAs and carbazole were detected at concentrations that exceeded the TACO Tier 1 screening objectives. Antimony, arsenic, chromium, lead and mercury were detected at concentrations above their TACO Tier 1 objectives. PCBs, pesticides and herbicides were not detected in the two (2) samples analyzed for these parameters. The report concluded that concentrations of five (5) PNAs, one (1) SVOC and five (5) metals were present at concentrations exceeding the most stringent TACO Tier 1 residential screening levels.

The current investigation included the installation of twenty-four (24) soil borings and two (2) temporary wells. Twenty-six (26) soil samples were obtained and four (4) groundwater samples (2 groundwater samples were from wells already present on the site). Samples were compared to current TACO Tier 1 objectives for industrial/commercial sites with Class II groundwater.

Concentrations of PNAs, arsenic, antimony and chromium were detected in soils at concentrations above those objectives. No detected concentrations in groundwater exceeded the objectives.

Based on comparison of the results of all of these investigations to TACO Tier 1 objectives for industrial/commercial sites with Class II groundwater, soils at the site have been identified as impacted by benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic at concentrations above their soil ingestion objectives.

Groundwater at the site was tested and only low levels of inorganic and organic chemicals were detected. Soils at the site were tested and compared to soil component of groundwater ingestion objectives (soil migration to groundwater). One organic contaminant, benzo(a)anthracene, was detected at one location at a concentration which exceeded its soil component of groundwater ingestion pathway objective for sites with Class II groundwater. One contaminant, antimony, was detected at one location at a concentration above its TACO Tier 1 pH-specific soil component of groundwater ingestion objective for sites with Class II groundwater. For another contaminant, chromium, there is no pH-specific objective for sites with Class II groundwater. There are pH-specific objectives for Class I groundwater and site chromium concentrations were compared to these objectives and were below the objectives, or were analyzed again by a leaching procedure and were below the objective. However, at one location, the chromium concentration was above the Class I objective to which it was compared and the sample was from the Carlson investigation so re-analysis by a leaching procedure was not possible. Three chemicals at three locations therefore exceeded their soil component of groundwater ingestion objectives: benzo(a)anthracene, antimony and chromium.

No contaminant concentrations exceeded construction worker objectives. The mercury inhalation construction worker objective was exceeded at many locations; but, this objective is only valid if elemental mercury is a contaminant of concern at the site. No previous site use would have resulted in the use of elemental mercury at the site.

Arsenic and PNA detections above objectives were scattered throughout the site, with localized hot spots at various locations indicative of concentrations in non-native fill materials.

Investigations to-date have identified, characterized and quantified the extent of impacted soils at the site sufficiently to determine appropriate remediation objectives for soil pathways, to allow determination of the need for remediation, and to evaluate remedial options.

5.2 CONTAMINANT FATE AND TRANSPORT

The term “Fate and Transport” refers to the process that a contaminant encounters in the environment as a result of its potential to be transported, transformed (physically, chemically, or biologically), or accumulated in soil, groundwater or surface water. The following sections briefly summarize the fate and transport properties of the constituents detected above TACO Tier 1 industrial/commercial objectives for sites with Class II groundwater.

5.2.1 Inorganic Compounds (Arsenic, Antimony and Chromium)

Generally, metals (arsenic, antimony and chromium) tend to be immobile in soils, and the extent of transport and migration is dependent on environmental conditions at the site. While the pure metallic forms of these compounds are insoluble in water, many of their salts are soluble in varying degrees. The primary fate process for all of the metals in relation to groundwater and surface water transport is adsorption. These constituents may be released into solution depending on pH, the particular chemical state present, and the presence of aerobic or anaerobic conditions at the site.

Arsenic, because of its complex chemistry, exists in the environment in many different inorganic and organic forms, which have different toxicological and physicochemical properties. Inorganic arsenic exists as either the trivalent (3+) form or the pentavalent (5+) form. The inorganic trivalent arsenic forms are more toxic than the pentavalent forms. Elemental arsenic (the metalloid -0+) is essentially nontoxic even at high intakes. The dominant form of arsenic in soil and its transport are largely dependent on the physical characteristics of the soil matrix. Insoluble arsenic compounds, such as arsenic trioxide, bind tightly to organic matter in soil or sediment in surface water, soluble inorganic arsenate (As5+) predominates under normal conditions and is more stable than arsenite (EPA 1980a). Movement and partitioning of arsenic in water depends on the chemical form of arsenic and on interactions with other materials present (Callahan et al. 1979). Soluble forms of arsenic remain dissolved in the water column or adsorb onto sediments or soils, especially those containing clays, iron oxides, aluminum hydroxides, manganese compounds, and organic matter (Callahan et al. 1979; Welch et al. 1988). Sediment bound arsenic is released back into the water by chemical or biological interconversions. This interconversion is influenced by the Eh (the oxidation-reduction potential), pH, temperature, other metals, salinity, and biota (Callahan et al. 1979) (U.S. EPA Office of Solid Waste, U.S. EPA Region 6 Multimedia Planning and Permitting Division Center for Combustion Science and Engineering, Protocol for Screening Level Ecological Risk Assessment, Appendix H, August 1999).

Antimony is found naturally in the environment and the general population is exposed to low levels of it every day, primarily in food, drinking water, and air. It may be found in air near industries that process or release it, such as smelters, coal-fired plants, and refuse incinerators. In polluted areas

containing high levels of antimony, it may be found in the air, water, and soil. In the air, antimony is attached to very small particles that may stay in the air for many days. Oxidation states, speciation and redox transformation generally determine the geochemical characteristics of antimony. Oxidative dissolution of sulfide minerals and aqueous dissolution are the most prevalent geochemical mechanisms for the release of antimony to the environment. Transformation of mobile forms of antimony is predominantly controlled by naturally occurring precipitation and adsorption processes. Most antimony ends up in soil, where it attaches strongly to particles that contain iron, manganese, or aluminum. Antimony is also immobilized in the natural environment via precipitation with alkali and heavy metals resulting in extremely stable mineral phases.

Human exposure to chromium occurs from both natural and anthropogenic sources. Chromium is present naturally in soil. The mobility of chromium in soil is dependent upon the speciation of chromium, which is a function of redox potential and the pH of the soil. In most soils, chromium will be present predominantly in the chromium(III) oxidation state. This form has very low solubility and low reactivity, resulting in low mobility in the environment (Barnhart 1997; Jardine et al. 1999; Robson 2003). Under oxidizing conditions, chromium(VI) may be present in soil as CrO_4^{2-} and HCrO_4^- (James et al. 1997). In this form, chromium is relatively soluble and mobile. A leachability study comparing the mobility of several metals, including chromium, in soil demonstrated that chromium had the least mobility of all of the metals studied (Sahuquillo et al. 2003). These results support previous data finding that chromium is not very mobile in soil, especially in the trivalent oxidation state (Balasoju et al. 2001; Jardine et al. 1999; Lin et al. 1996; Robson 2003). These results are further supported by a leachability investigation in which chromium mobility was studied for a period of 4 years in a sandy loam (Sheppard and Thibault 1991). The vertical migration pattern of chromium in this soil indicated that after an initial period of mobility, chromium forms insoluble complexes and little leaching is observed. Chromium present as insoluble oxide, $\text{Cr}_2\text{O}_3 \cdot n\text{H}_2\text{O}$, exhibited limited mobility in soil (Rifkin et al. 2004). Organic matter in soil is expected to convert soluble chromate, chromium(VI), to insoluble chromium(III) oxide, Cr_2O_3 (Calder 1988). Surface runoff from soil can transport both soluble and bulk precipitate of chromium to surface water. Soluble and unadsorbed chromium(VI) and chromium(III) complexes in soil may leach into groundwater. The leachability of chromium(VI) in the soil increases as the pH of the soil increases. On the other hand, lower pH present in acid rain may facilitate leaching of acid-soluble chromium(III) complexes and chromium(VI) compounds in soil (from ATSDR, Toxicological Profile, Chromium).

5.2.2 Polynuclear Aromatic Hydrocarbons

Most PNAs such as those found at the site (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and dibenzo(a,h)anthracene), because of their low volatility, are classified as semivolatile organic compounds. In general, PNAs do not easily dissolve in water and are more likely to partition into sediments and soils rather than into groundwater because of their low solubilities and

high soil organic carbon-water partitioning coefficients (Koc's). As a result, transport of PNAs tends to be associated primarily with erosion of contaminated soils and sediments. PNAs sorbed to sediments may potentially affect aquatic communities downstream of contaminated sites (Irwin and others, 1998). The potential for colloid-facilitated transport of PNAs in groundwater also has been documented. PNAs possess a wide range of physicochemical properties, but generally PNAs have low vapor pressures and water solubilities, and high Koc. PNAs if released to soil will be expected to adsorb very strongly and will not be expected to leach to the groundwater. Adsorption onto suspended solids and particulate matter and complexation with natural organic substances are probably the most important environmental transport processes for these compounds. They also migrate to ground or surface waters by leaching from soil, but this is generally a slow process. Volatilization of these compounds from the aqueous phase is generally not expected to be a major fate process. PNAs may be bioaccumulated; however, some are also quickly metabolized and eliminated by most organisms. Biodegradation and biotransformation are probably an important fate process for this group of constituents, although because of their high molecular weights, degradation of these compounds is expected to be slow.

5.3 EXPOSURE ROUTE EVALUATION

5.3.1 Receptors

There are no current potential receptors. Future receptors will be personnel accessing the training facility (trainees, instructors and visitors). The City of Chicago has a groundwater ordinance which prohibits use of groundwater as a potable water source so no groundwater receptors should be present.

5.3.2 Exposure Pathways

In accordance with TACO guidance, four exposure pathways (i.e., soil ingestion, outdoor soil inhalation, protection from groundwater/surface water ingestion, and indoor inhalation) must be addressed during site closure.

5.3.2.1 Soil Ingestion Pathway

For the current and future personnel at the site, compounds above the industrial/commercial soil ingestion objectives could be accessed and ingested at concentrations above objectives at any Site areas where impacted soils are present in a contiguous area and where no natural and man-made barriers (i.e. clean soil at shallower depths, buildings, concrete pavement) are present or will be in-place in the future to prevent such ingestion.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic are present at the site at concentrations which exceed the TACO Tier 1 industrial/commercial soil

ingestion objective. Eight (8) of the samples had measured concentrations of PNAs which exceed the soil ingestion objective. Five (5) of the samples had measured concentrations of arsenic which exceed the soil ingestion objective

5.3.2.2 Outdoor Inhalation Exposure Pathway

Constituents bound to soils may be transported as suspended particulates (dust) or may be volatilized. Transport on dust poses less risk for the compounds detected than does soil ingestion or inhalation of volatiles.

No site soil samples had concentrations which exceeded outdoor inhalation pathway objectives, except mercury which may exceed construction worker inhalation pathway objectives if elemental mercury is a contaminant of concern for the site (see discussion in Section 6.0).

5.3.2.3 Soil and Groundwater Components of the Groundwater Ingestion Pathway

Constituents present in soil may leach to groundwater. There are no known current receptors. The City of Chicago has a groundwater ordinance which prohibits use of groundwater as a potable water source so no groundwater receptors should be present. Groundwater discharging to surface water could result in other receptors, but the concentrations, and distance to surface water should result in no effect on surface water.

No contaminants are present at the site at concentrations which exceed their TACO Tier 1 Class II groundwater ingestion objectives.

One (1) organic contaminant, benzo(a)anthracene, was detected at one location at a concentration which exceeded its soil component of groundwater ingestion pathway objective for sites with Class II groundwater. Antimony, an inorganic contaminant, was detected at one (1) location at a concentration above its TACO Tier 1 pH-specific soil component of groundwater ingestion objective for sites with Class II groundwater. The sample was from the Carlson investigation so re-analysis by a leaching procedure was not possible. For another inorganic contaminant, chromium, there is no pH-specific objective for sites with Class II groundwater. There are pH-specific objectives for Class I groundwater and site chromium concentrations from the recent investigation were compared to these objectives and were below the objectives, or were analyzed again by a leaching procedure and were below the objective. However, at one (1) location, the chromium concentration was above the Class I objective to which it was compared and the sample was from the Carlson investigation so re-analysis by a leaching procedure was not possible. Three (3) chemicals at three (3) locations therefore exceeded their soil component of groundwater ingestion objectives: benzo(a)anthracene, antimony and chromium.

5.3.2.4 Indoor Inhalation Exposure Pathway

The indoor inhalation exposure pathway refers to the migration of volatile chemicals from subsurface contaminated soils and groundwater into the indoor air spaces of overlying buildings through openings in the building foundation (for example, cracks and utility openings). Any volatile chemical may migrate in this manner. The Illinois EPA in the TACO guidance (35 IAC 742 Appendix A, Table J) provides a list of TACO volatile chemicals for the indoor inhalation route.

Acetone, benzene, carbon disulfide, carbon tetrachloride, chloroform, tetrachloroethene, toluene, trichlorofluoromethane, xylenes, 2-methyl naphthalene and naphthalene were detected at the site and are listed as volatile chemicals on 35 IAC 742 Table J in TACO. Other detected chemicals and metals are not volatile, except mercury, which was also detected and is considered a volatile chemical. Generally, these compounds and metal are present at low levels at scattered locations. Since the compounds and metal are not present in groundwater, which was sampled at three locations for VOCs and two locations for mercury, they are not a concern for the indoor inhalation pathway.

6.0 REMEDIATION OBJECTIVES

A comparison of the results with Tier 1 industrial/commercial objectives (for ingestion, for indoor and outdoor inhalation and for the soil component of groundwater ingestion for Class II groundwater) was conducted to determine the chemicals of concern for the site. Soils with PNAs, and arsenic results above the soil ingestion pathway objectives were considered for averaging (95% Upper Confidence Limit) and two (2) locations will need to be remediated or have an engineered barrier to prevent access.

Benzo(a)anthracene is present at one (1) location at a concentration which exceeds its TACO Tier 1 Class II groundwater ingestion objective. Antimony was detected at one (1) location at a concentration above its TACO Tier 1 pH-specific objective for sites with Class II groundwater and chromium, detected above its pH-specific Class I objective at one (1) location, has no pH-specific objective for sites with Class II groundwater. Groundwater pathway exclusion was evaluated for these sample results.

6.1 TIER 1 INDUSTRIAL/COMMERCIAL COMPARISON

Site investigation soil sample results have been compared to TACO Tier 1 industrial/commercial objectives for sites with Class II groundwater (35 IAC 742 Appendix B, Table B, and Table D). Soil Remediation Objectives (SROs) were determined from TACO Tier 1 industrial/commercial soil remediation objectives in 35 IAC 742 Appendix B Table B and Appendix B Table D; and background concentrations found in 35 IAC 742 Appendix A, Table H. Groundwater sample analytical results were compared to the Illinois EPA TACO Tier 1 groundwater remediation objectives (GROs) for Class II groundwater (35 IAC 742 Appendix B Table E) and to the Tier 1 Groundwater Remediation objectives (GROs) for the Indoor Inhalation Route – Diffusion and Advection (35 IAC 742, Appendix B, Table H). This comparison has resulted in the identification of samples with concentrations which exceed the Tier 1 objectives or background concentrations. Results which exceed these objectives are summarized in Table 7.

The chemicals of concern for the soil ingestion pathway are: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic. There are no chemicals of concern for the outdoor or indoor soil inhalation pathways.

Benzo(a)anthracene is present at one (1) location at a concentration which exceeds its TACO Tier 1 Class II soil component of groundwater ingestion objective. Antimony was detected at one (1) location at a concentration above its TACO Tier 1 pH-specific soil component of groundwater objective for sites with Class II groundwater. Chromium has no pH-specific soil component of

groundwater objective for sites with Class II groundwater. At one (1) location, the chromium concentration was above the Class I objectives to which it was compared.

The pathways of concern for industrial/commercial use of the site are therefore the soil ingestion pathway and the soil component of groundwater ingestion pathway.

6.2 CONSTRUCTION WORKER COMPARISON

Soil chemical concentrations were compared to the construction worker objectives provided in TACO (35 IAC 742 Appendix B, Table B). No chemicals were of concern (above objectives) for the construction worker ingestion and inhalation routes, except possibly mercury. The site was a rail yard previously, and elemental mercury is not known to be associated with rail yards. However, given the widespread detection of mercury (see Figure 8) and the significant concentration of mercury in one 2007 Carlson investigation sample (GP-17A, 0 to 2 feet bgs) of 7.5 mg/kg, Amec Foster Wheeler recommends a construction worker warning for mercury be placed on the site.

6.3 AVERAGING OF SHALLOW PNA AND ARSENIC IMPACTED SOIL CONCENTRATIONS

TACO allows for the averaging of results with the approval of the planned or completed sampling by Illinois EPA. Based on the Illinois EPA's approach to other sites in the SRP, concentrations of PNAs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene) and arsenic in shallow (above 3 feet in depth) soil were averaged to represent current exposure which would be only to shallow soils. All concentrations of the listed PNAs and arsenic in soils were averaged to represent future exposures, which could be to any of the soils at the site from any depth or location.. PNA and arsenic concentration were averaged in accordance with Section 742.225 of TACO to demonstrate that they would be in compliance with objectives.

Results were averaged using ProUCL Version 5.1.02 Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations (ProUCL software was developed by Lockheed Martin under a contract with the EPA and is made available through the EPA Technical Support Center in Atlanta, Georgia, EPA/600/R-07/041 October 2015). The software is used to calculate a 95% upper confidence limit (UCL95) of the arithmetic mean of the concentrations of compounds detected at a site. Concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic, at above 3 feet in depth, were included in the current soil calculations. Concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic at all depths were included in the future site use calculations. Input data and calculation results are provided in Appendix E.

Within the PNAs current (shallow soils) data set, one sample (GP3A at 0 to 2 feet bgs) had elevated concentrations of PNAs and will need to be remediated or have an engineered barrier to prevent access. With this concentration removed, the average for current users for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic is below their objectives.

Within the PNAs future (all soils) data set, two samples (GP3A at 0 to 2 feet bgs and GP-7D at 6 to 8 feet bgs) had elevated concentrations of PNAs and will need to be remediated or have an engineered barrier to prevent exposure to the soils. With these concentrations removed, the average for future site use for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic is below their objectives.

Areas around GP3A at 0 to 2 feet bgs and GP-7D at 6 to 8 feet bgs which would require soil removal or engineered barriers based on the above averaging are shown on Figure 9. The extent of these areas was based on detected concentrations and depths of PNAs in the borings around GP3A at 0 to 2 feet bgs and GP-7D at 6 to 8 feet bgs.

Engineered barriers should be consistent with the Illinois EPA's TACO requirements (35 IAC 742). Barriers cited in TACO and approved by the Illinois EPA include concrete, asphalt, or three feet of clean soil or fill. The Illinois EPA also approves alternative barriers of less than three feet of clean fill, such as 18" of clean fill with geotextile fabric. Clean fill can be certified virgin stone or or other soil or earthen material, which has been tested for Target Compound List parameters (35 IAC 740 Appendix A) and found to meet the most stringent objectives for residential land use included in Appendix B of TACO.

6.4 EXCLUSION OF THE GROUNDWATER INGESTION PATHWAY

The chemicals of concern for the soil component of groundwater ingestion pathway at the site are benzo(a)anthracene, antimony and chromium. None of these chemicals were detected in the groundwater in two samples tested for metals and PNAs. The TACO regulations under 35 IAC 742.320 allow for the exclusion of the groundwater ingestion pathway from consideration if certain conditions are met. The site is evaluated for compliance with these conditions in the following paragraphs.

- A.) Requirements under Sections 742.300 and 742.305 of the regulation must be met.
35 IAC 742.300 addresses the following procedures for exclusion of an exposure route, requires that the site be fully characterized, and refers to the requirements for Tier 3 evaluation as an alternative for pathway exclusion.

35 IAC 742.305 requires that:

- (1) The sum of the concentrations of all of the organic contaminants of concern cannot exceed the attenuation capacity of the soil as determined under Section 742.215. Section 742.215 states that at each discrete sampling point, the sum of all of the organic compounds detected cannot exceed the natural organic carbon fraction of the soil. A default value of 6000 mg/kg can be used for soils within one meter of the surface and 2000 mg/kg can be used for soils below one meter.

$$\sum_{i=1}^n C_i \leq \frac{OC}{f_{OC}}$$
 where:
 C_i = concentration of organic contaminant i in mg/kg
 OC = natural organic carbon fraction of the soil in mg/kg
 f_{OC} = fraction of organic carbon in the soil that is available for sorption

- (2) The concentrations of any organic contaminant remaining in the soil shall not exceed the soil saturation limit as determined under Section 742.220. Section 742.220 states that the soil saturation limit shall be: the default value listed in Appendix A, Table A of TACO, a value derived from Equation S29 in Appendix C, Table A, or a value derived from another method approved by the Agency.

$$C_i \leq \frac{K_{oc} \cdot C_{org}}{1 + K_{oc}}$$
 where:
 C_i = concentration of organic contaminant i in mg/kg
 K_{oc} = organic carbon partition coefficient in L/kg
 C_{org} = concentration of organic carbon in the soil in mg/kg

- (3) Soils which contain contaminants of concern shall not exhibit the characteristics of reactivity for hazardous waste as determined under 35 IAC 721.123.

$$C_i \leq \frac{K_{oc} \cdot C_{org}}{1 + K_{oc}}$$
 where:
 C_i = concentration of organic contaminant i in mg/kg
 K_{oc} = organic carbon partition coefficient in L/kg
 C_{org} = concentration of organic carbon in the soil in mg/kg

- (4) Soils which contain contaminants of concern shall not exhibit a pH of less than or equal to 2 or greater than or equal to 12.5.

$$pH \geq 2 \text{ and } pH \leq 12.5$$

- (5) Soil which contains the following inorganic contaminants of concern shall not exhibit characteristics of toxicity as determined by 35 IAC 721.124: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.

$$C_i \leq \frac{K_{oc} \cdot C_{org}}{1 + K_{oc}}$$
 where:
 C_i = concentration of inorganic contaminant i in mg/kg
 K_{oc} = organic carbon partition coefficient in L/kg
 C_{org} = concentration of organic carbon in the soil in mg/kg

- (6) If contaminants of concern include polychlorinated biphenyls (PCBs), the concentration of any PCBs in the soil shall not exceed 50 parts per million.

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- (7) The concentration of any contaminant of concern in soil gas shall not exceed 10% of its Lower Explosive Limit (LEL) as measured by a hand held combustible gas indicator that has been calibrated to manufacturer specifications

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- B.) Corrective action measures must be completed to remove any free product to the maximum extent practicable.

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- C.) The source of the release may not be located within the minimum or designated maximum setback zone or within the regulated recharge area of a potable water supply well.

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- D.) An ordinance adopted by a unit of local government must be in place which prohibits the installation and use of potable water supply wells for an area within 2500 feet from the source of the release. This ordinance must be approved in accordance with Section 742.1015.

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- E.) The concentration of any contaminant of concern in groundwater within the minimum or designated setback zone of an existing potable water supply well will meet the applicable Tier 1 groundwater remediation objective, as demonstrated using Equation R-26 in Appendix C, Table C.

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- F.) The concentration of any contaminant of concern in groundwater discharging into surface water will meet the applicable surface water quality standard under 35 IAC 302, as demonstrated using Equation R-26 in Appendix C, Table C.

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7.0 SUMMARY AND CONCLUSIONS

Amec Foster Wheeler was retained by the City of Chicago Department of Fleet and Facility Management to complete a Phase II Environmental Site Assessment for the site located at 4301 West Chicago Avenue in Chicago, Cook County, Illinois (the site). The site is a 30.4-acre parcel that is currently vacant. Development of the site as a Joint Public Safety Training Academy is planned. The JPSTA campus will provide the Chicago Police Department (CPD) and the Chicago Fire Department (CFD) with a central location, replacing training facilities located throughout the City.

7.1 SITE HISTORY

The site was developed as a rail yard by 1900 according to historic topographic maps. Previous environmental reports for the site indicate that the rail yard was constructed in 1896 by the Chicago and Northwestern Transportation Company on previously undeveloped land. By 1978-1980, most of the rail yard tracks were gone, and by at most 2002, the parcel was totally vacant.

7.2 PROPERTY DESCRIPTION

The site consists of 30.4 acres located on the southeast corner of the intersection of Kilbourn and West Chicago Avenue. The Parcel ID (Tax ID) number for the site is 16-10-200-061-0000. The site is located in a mixed land use area. At the time of the site reconnaissance, the site was vacant. The site is partially fenced and no buildings or other improvements are present on the site.

The site is situated at an elevation of approximately 610 feet above mean sea level (msl). Based on our review of the local topography, it appears that groundwater would generally flow toward the east to Lake Michigan.

Adjacent to the east is N. Kostner Avenue, beyond which is Falcon Transportation to the north and Chicago Transit Authority (CTA) to the south, to the north is W Chicago Avenue with commercial buildings lining the street and residences behind them, to the west is N. Kilbourn Avenue, beyond which is a City of Chicago Transfer Station, and to the south is a remaining railroad spur and some industrial and warehouse properties.

7.3 RECOGNIZED ENVIRONMENTAL CONDITIONS

Amec Foster Wheeler performed a Phase I ESA as outlined in ASTM E 1527-13 in June 2017. Amec Foster Wheeler issued the Draft Phase I ESA on June 26, 2017. Acquisition of the property is

expected to occur in January 2018. Components of the Phase I ESA which are required to be completed within 180 days of the expected date of purchase were updated in November 2017 and a final Phase I report was issued on December 11, 2017. The following recognized environmental conditions (REC) were determined to be associated with the property:

- On the property, a potential underground storage tank (UST) installed in 1959 with no record of it having been removed, its use as a former rail yard and the fill materials present on the site, various debris piles and rail ties present on the site and contaminants identified during previous investigations at the property.
- CTA at 4401 West Chicago Avenue, due to USTs installed in 1992, and because it is a former rail yard and may have fill similar to the site.
- Rail IT Property, 733 North Kilbourn Avenue, due to an UST that was not closed. It is unclear if this is the site or adjacent, as Rail IT at one time owned the site and the street number identified in the EDR report could potentially put it near the southeast corner of Chicago and Kilbourn Avenues, which would be the site.
- Department of Streets and Sanitation, 750 North Kilbourn Avenue, adjacent across North Kilbourn Avenue, due to USTs removed but not closed and since it is a transfer station and incinerator which may have resulted in airborne particulates reaching the site.
- City of Chicago, 715 North Kilbourn Avenue, due to an UST that was not closed. The initial incident report for #940242 lists 715 N. Kilbourn Avenue and then subsequent documentation on the Illinois EPA website for this incident changed to 750 N. Kilbourn Avenue. Amec Foster Wheeler believes the address was mis-identified in the original report and subsequently corrected. Although an incident was reported, a subsequent Illinois EPA letter indicates the site is a non-LUST site, which could indicate there was no confirmed release, or that the incident was from a non-regulated tank.

7.4 INVESTIGATION AND RESULTS

A previous investigation by Warzyn in 1991 consisted of the installation of ten (10) soil borings and three (3) temporary wells in three (3) of the borings. Twenty (20) soil samples were collected and analyzed for volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PNAs), Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver) and total cyanides. Comparison of Warzyn results to TACO Tier 1 current objectives showed that only one sample, SB10-4, taken at 8.5 to 10.5 feet below ground

surface, had a concentration which exceeded the soil remediation objectives (SROs) to which it was compared. Arsenic was detected at 13.8 mg/kg, and its soil ingestion objective (which is the same as its background concentration) is 13 mg/kg.

A 2007 Phase II by Carlson included nineteen (19) soil borings. Twenty-four (24) soil samples were analyzed. Analyses included VOCs, semivolatile organic compounds (SVOCs), priority pollutant metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc), pH, pesticides, polychlorinated biphenyls (PBCs) and chlorinated herbicides. Comparison of Carlson results to TACO Tier 1 current objectives showed that eight (8) samples, taken at seven (7) locations had concentrations which exceeded the SROs to which the samples were compared. Five (5) samples had PNA concentrations above their objectives, and three samples had inorganic concentrations (arsenic, antimony and chromium) above SROs.

This Phase II ESA consisted of the installation of twenty-four (24) soil borings, collection of twenty-six (26) soil samples for analytical testing, the installation and sampling of two (2) temporary monitoring wells, sampling of two (2) existing monitoring wells, level survey of some existing and the newly installed wells, and a limited ground penetrating radar survey. Soil samples were generally analyzed for PNAs and Priority Pollutant metals, with select samples analyzed for the Target Compound List (TCL) from the Site Remediation Program (35 IAC 740 Appendix A) and herbicides. Groundwater samples were analyzed variously for the TCL, PNAs, metals and VOCs. Three (3) soil samples had concentrations of PNAs which exceeded objectives and four (4) soil samples had arsenic concentrations above its soil ingestion objective.

7.5 REMEDIATION OBJECTIVES

Based on comparison of the results of all of these investigations to TACO Tier 1 objectives for industrial/commercial sites with Class II groundwater, soils at the site have been identified as impacted by benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic at concentrations above their soil ingestion objectives. Three (3) chemicals at three (3) locations exceeded their soil component of groundwater ingestion objectives: benzo(a)anthracene, antimony and chromium.

Concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic in shallow (above 3 feet in depth) soil, to represent current exposure, and all of the listed PNAs and arsenic in soils to represent future exposures, which exceeded soil ingestion pathway objectives were averaged in accordance with Section 742.225 of TACO to demonstrate that they would be in compliance with objectives if the use of averaging and the already completed sampling was approved by the Illinois EPA.

Results were averaged using ProUCL Version 5.1.02. Within the PNAs current (shallow soils) data set, one sample (GP3A at 0 to 2 feet bgs) had elevated concentrations of PNAs and will need to be remediated or have an engineered barrier to prevent access. With this concentration removed, the average for current users for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic is below their objectives.

Within the PNAs future (all soils) data set, two samples (GP3A at 0 to 2 feet bgs and GP-7D at 6 to 8 feet bgs) had elevated concentrations of PNAs and will need to be remediated or have an engineered barrier to prevent access. With these concentrations removed, the averages for future site use for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic are below their objectives.

The soil component of groundwater ingestion pathway was addressed by exclusion of the groundwater pathway in accordance with 35 IAC 742.320. Site conditions and concentrations of chemicals of concern which exceeded the soil component of groundwater ingestion pathway were determined to be appropriate for pathway exclusion. The evaluation showed that the pathway could be excluded.

No chemicals were of concern (above objectives) for the construction worker ingestion and inhalation routes, except possibly mercury. The site was a rail yard previously, and elemental mercury is not known to be associated with rail yards. However, given the widespread detection of mercury and the significant concentration of mercury in one 2007 Carlson investigation sample (GP-17A, 0 to 2 feet bgs) of 7.5 mg/kg, Amec Foster Wheeler recommends a construction worker warning for mercury be placed on the site.

7.6 CONSTRUCTION CONSIDERATIONS

During design and construction of the JPTSA, it is recommended that the following be taken into consideration:

- Future site buildings should be constructed with a full concrete slab-on-grade foundation or with a full concrete basement floor and walls. Future site buildings should not be constructed with earthen crawl spaces, earthen floors, stone foundations, partial concrete floors, or sumps.
- Unless additional testing is performed to determine compliance with Illinois EPA's Clean Construction and Demolition Debris (CCDD) regulations, all soil being removed from the site must be disposed of in accordance with applicable regulations to a Subtitle D landfill.
- Areas depicted on Figure 9 must be covered with an Illinois EPA TACO-compliant engineered barrier such as asphalt, concrete, 3 ft of clean fill, or other Illinois EPA-approved barrier.

- Imported fill material must be certified virgin stone or or other soil or earthen material, which has been tested for Target Compound List parameters (35 IAC 740 Appendix A) and found to meet the most stringent objectives for residential land use included in Appendix B of TACO.
- Construction workers who will encounter site soils should be informed of the mercury detections at the site so that they may take appropriate precautions as determined by their evaluation of the data.
- Although a GPR survey for underground tanks, utilities and foundations was performed in a limited area of the site, this does not guarantee that such underground tanks, utilities and foundations are not present in these areas, or other areas where such survey was not completed.
- A Soil Management Plan should be prepared and implemented during construction to document, at a minimum: the site specific soil excavation, disposal, storage and reuse procedures, imported material testing requirements, and environmental oversight requirements.

7.7 CONCLUSIONS

A Phase II Environmental Site Assessment has been completed for the property at 4301 W Chicago Avenue in Chicago, Illinois. This investigation and previous sampling indicated that soils at the site have been impacted by benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and arsenic at concentrations above their soil ingestion objectives. Three (3) chemicals at three locations exceeded their soil component of groundwater ingestion objectives: benzo(a)anthracene, antimony and chromium.

Averaging of soils above soil ingestion objectives, as allowed in TACO, has resulted in a determination that two (2) locations should be remediated or barriered to prevent exposure. The use of the City of Chicago groundwater ordinance has allowed for exclusion of the groundwater pathway.

A construction worker caution for exposure to mercury by the inhalation pathway is recommended for the site.



TABLES

Table 1. Groundwater Level Data Summary
(August 2017)
4301 West Chicago Avenue
Chicago, Illinois

Well ID	Date	Depth to Bottom	Top of Well Casing Elevation ¹ (feet)	Water Depth Below TOC ¹ (feet)	Ground Water Elevation (feet)
MW A	8/11/2017	44.04	92.54	26.26	66.28
MW B	8/11/2017	51.28	95.73	29.15	66.58
MW C	8/11/2017	15.09	94.91	10.03	84.88
	8/28/2017		94.91	10.00	84.91
MW D	8/11/2017	44.27	92.89	25.96	66.93
MW E	8/11/2017	42.70	100.00	21.90	78.10
MW F (MW-25)	8/11/2017	14.90	99.29	dry	--
MW G	8/11/2017	49.32	99.13	32.23	66.90
MW-H	8/11/2017	37.87	100.67	30.42	70.25
MW I (MW-4)	8/11/2017	47.80	97.26	30.85	66.41
	8/29/2017		97.26	30.46	66.80
MW J	8/11/2017	45.30	94.07	27.60	66.47
MW K	8/11/2017	47.24	92.89	25.99	66.90
ESB-5 (temporary well)	8/9/2017 am	20.16	95.77	9.59	86.18
ESB-5 (temporary well)	8/9/2017 sampling		95.77	9.65	86.12
ESB-6 (temporary well)	8/9/2017 am	16.78	95.50	10.63	84.87
ESB-6 (temporary well)	8/9/2017 sampling		95.50	10.67	84.83

Notes:

1. TOC = Top of Casing - top of casing elevations were surveyed against an assumed elevation of 100 feet at top of casing for existing well E

Shallow Wells

Prepared by: MEJ 11/14/17
Checked by: EJW 12/20/2017

TABLE 2
SUMMARY OF WARZYN SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
Chicago, Illinois

Sample ID Sample Depth (feet)		SB1-1 1-3	SB1-4 8.5-10.5	SB2-1 1-3	SB2-3 6-8	SB3-1 1-3	SB3-3 6-8	SB4-1 1-3	SB4-4 8.5-10.5	SB5-1 1-3	SB5-4 8.5-10.5	TACO Tier 1 Industrial- Commercial SROs (1)	TACO Tier 1 Construction Worker SROs (2)	TACO Tier 1 SRO Class II Groundwater (3)	TACO Tier 1 Background Concentrations (4)
Sample Date		6/19/91	6/19/91	6/19/91	6/19/91	6/19/91	6/19/91	6/19/91	6/19/91	6/19/91	6/19/91				
Parameter	Units											Ingestion	Inhalation	Ingestion	Inhalation
VOLATILE ORGANIC COMPOUNDS															
Trichlorofluoromethane	mg/kg	<0.005	<0.005	0.00775	<0.005	0.0089	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
Xylenes, m & p	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	410,000	420	41,000	5.9
Xylenes, o	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	410,000	410	41,000	6.5
POLYNUCLEAR AROMATIC HYDROCARBONS															
Anthracene	mg/kg	<0.038	0.0019	<0.037	<0.00074	<0.075	0.0094	<0.00075	<0.00074	<0.037	<0.00074	610,000	NE	610,000	NE
Acenaphthylene	mg/kg	<0.007	<0.0014	<0.007	<0.0014	<0.140	<0.007	<0.0014	<0.0014	<0.0069	<0.0014	NE	NE	NE	NE
Acenaphthene	mg/kg	<0.0063	0.0033	<0.0062	<0.0012	<0.120	<0.0063	<0.0012	<0.0012	<0.0062	<0.0012	120,000	NE	120,000	NE
Benzo(a)anthracene	mg/kg	0.140	0.002	0.093	0.002	0.470	0.026	0.004	0.00056	0.140	0.0056	8	NE	170	NE
Benzo(a)pyrene	mg/kg	0.250	0.0025	0.094	0.0019	0.480	0.029	0.0051	0.00071	0.140	0.0052	0.8	NE	17	NE
Benzo(b)fluoranthene	mg/kg	0.260	0.0049	0.130	0.0035	0.130	0.08	0.0077	0.0011	0.220	0.014	8	NE	170	NE
Benzo(g,h,i)perylene	mg/kg	0.260	<0.00040	0.094	<0.00039	0.330	0.032	0.0054	<0.00039	0.23	<0.00039	NE	NE	NE	NE
Benzo(k)fluoranthene	mg/kg	0.140	0.0018	0.053	0.0012	0.250	0.017	0.0035	0.00045	0.100	0.01	78	NE	1,700	NE
Chrysene	mg/kg	0.140	<0.00045	0.120	0.0019	0.120	<0.0023	0.0068	0.00078	0.180	<0.00044	780	NE	17,000	NE
Dibenzo(a,h)anthracene	mg/kg	0.044	<0.00035	0.017	<0.00034	0.071	<0.0018	0.00092	<0.00035	0.023	<0.00034	0.8	NE	17	NE
Fluoranthene	mg/kg	0.210	0.006	<0.017	0.0046	0.730	0.089	0.0081	0.0015	0.310	0.013	82,000	NE	82,000	NE
Fluorene	mg/kg	<0.012	<0.0023	<0.012	<0.0023	<0.230	<0.012	<0.0023	<0.0023	<0.012	<0.0023	82,000	NE	82,000	NE
Indeno(1,2,3-cd)pyrene	mg/kg	<0.020	<0.00040	<0.020	<0.00039	0.270	<0.002	<0.00040	<0.00039	<0.020	<0.00039	8	NE	170	NE
Naphthalene	mg/kg	0.096	0.0024	0.070	0.0053	0.250	0.025	<0.0014	0.0014	0.130	0.028	41,000	270	4,100	1.8
Phenanthrene	mg/kg	0.23	0.0052	0.240	0.006	0.240	0.15	0.0085	0.0019	0.410	0.032	NE	NE	NE	NE
Pyrene	mg/kg	0.200	0.0049	0.160	0.0042	0.160	0.073	0.0072	0.0012	0.260	0.011	61,000	NE	61,000	NE
METALS, TOTAL															
Arsenic	mg/kg	8.84	3.44	13.0	3.36	12.2	2.77	3.38	3.47	4.51	5.42	13	1,200	61	25,000
Barium	mg/kg	21.8	53.0	47.2	25.3	52.2	12.7	10.8	55.4	10.8	42.6	140,000	910,000	14,000	870,000
Cadmium	mg/kg	<1.00	<1.00	1.6	<1.00	2.79	<1.00	<1.00	<1.00	<1.00	<1.00	2,000	2,800	200	59,000
Chromium	mg/kg	10.0	22.10	13.2	4.39	9.98	6.76	4.00	19.4	3.79	19.2	6,100	420	4,100	690
Lead	mg/kg	91.9	25.9	166	<20.0	261	<20.0	<20.0	<20.0	32.5	22.3	800	NE	700	NE
Mercury	mg/kg	0.10	<0.04	0.31 (5)	<0.04	0.17	<0.04	<0.04	<0.04	<0.04	<0.04	610	16 (6)	61	0.1 (6)
Selenium	mg/kg	0.45	<0.40	0.90	<0.40	0.85	<0.40	<0.40	<0.40	<0.40	0.65	10,000	NE	1,000	NE
Silver	mg/kg	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	2.00	<2.00	10,000	NE	1,000	NE
CYANIDE															
Cyanide	mg/kg	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	41,000	NE	4,100	NE

TABLE 2
SUMMARY OF WARZYN SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
Chicago, Illinois

Sample ID Sample Depth (feet)		SB6-1 1-3	SB6-4 8.5-10.5	SB7-4 8.5-10.5	SB7-5 11-13	SB8-1 1-3	SB8-3 8.5-10.5	SB9-2 3.5-5.5	SB9-3 6-8	SB10-1 1-3	SB10-4 8.5-10.5	TACO Tier 1 Industrial- Commercial SROs (1)	TACO Tier 1 Construction Worker SROs (2)	TACO Tier 1 SRO Class II Groundwater (3)	TACO Tier 1 Background Concentrations (4)
Sample Date		6/19/91	6/19/91	6/19/91	6/19/91	6/19/91	6/19/91	6/19/91	6/19/91	6/19/91	6/19/91				
Parameter	Units											Ingestion	Inhalation	Ingestion	Inhalation
VOLATILE ORGANIC COMPOUNDS															
Trichlorofluoromethane	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NE	NE	NE	NE
Xylenes, m & p	mg/kg	<0.010	<0.010	<0.010	<0.010	0.023	0.015	<0.010	<0.010	<0.010	<0.010	410,000	420	41,000	5.9
Xylenes, o	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	410,000	410	41,000	6.5
POLYNUCLEAR AROMATIC HYDROCARBONS															
Anthracene	mg/kg	<0.0037	<0.00075	<0.0015	<0.0015	<0.0015	0.032	<0.0015	<0.0015	<0.0015	0.091	610,000	NE	610,000	NE
Acenaphthylene	mg/kg	<0.0069	<0.0014	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.0028	<0.055	NE	NE	NE	NE
Acenaphthene	mg/kg	<0.0062	<0.0013	<0.0025	<0.0025	0.0026	<0.0025	<0.0025	<0.0025	<0.0025	<0.049	120,000	NE	120,000	NE
Benzo(a)anthracene	mg/kg	0.014	0.0025	<0.00060	<0.00060	0.027	0.030	0.0042	<0.00060	0.025	0.190	8	NE	170	NE
Benzo(a)pyrene	mg/kg	0.016	0.0018	<0.00070	<0.00070	0.033	0.031	0.0042	<0.00070	0.026	<0.014	0.8	NE	17	NE
Benzo(b)fluoranthene	mg/kg	0.034	0.0036	<0.00070	0.001	0.051	0.072	0.0089	0.00095	0.064	0.021	8	NE	170	NE
Benzo(g,h,i)perylene	mg/kg	0.017	<0.00040	<0.00080	<0.00080	0.04	0.041	0.0062	0.00083	0.041	0.310	NE	NE	NE	NE
Benzo(k)fluoranthene	mg/kg	0.0093	0.0014	<0.00070	<0.00070	0.018	0.021	0.0028	<0.00070	0.016	<0.014	78	NE	1,700	NE
Chrysene	mg/kg	<0.0022	<0.00045	<0.00090	<0.00090	<0.00090	0.067	<0.00090	<0.00090	<0.00090	<0.018	780	NE	17,000	NE
Dibenzo(a,h)anthracene	mg/kg	<0.0017	<0.00035	<0.00070	<0.00070	0.0054	0.0074	<0.00070	<0.00070	<0.00070	<0.014	0.8	NE	17	NE
Fluoranthene	mg/kg	0.037	0.0069	0.00089	0.0012	0.055	0.050	0.0084	0.0011	0.057	0.59	82,000	NE	82,000	NE
Fluorene	mg/kg	<0.012	<0.0024	<0.0047	<0.0047	<0.0047	0.018	<0.0047	<0.0047	<0.0047	0.350	82,000	NE	82,000	NE
Indeno(1,2,3-cd)pyrene	mg/kg	<0.002	<0.00040	<0.00080	<0.00080	<0.00080	0.016	<0.00080	<0.00080	<0.00080	<0.016	8	NE	170	NE
Naphthalene	mg/kg	0.012	0.0042	<0.0029	<0.0029	0.022	0.0078	0.0063	<0.0029	0.018	0.110	41,000	270	4,100	1.8
Phenanthrene	mg/kg	0.070	0.018	0.0021	0.0021	0.080	0.049	0.015	0.0021	0.110	0.620	NE	NE	NE	NE
Pyrene	mg/kg	0.036	0.0047	0.001	0.00081	0.059	0.055	0.0082	<0.00080	0.058	0.650	61,000	NE	61,000	NE
METALS , TOTAL															
Arsenic	mg/kg	3.53	2.38	2.65	2.72	2.09	3.15	3.26	2.94	5.45	13.8	13	1,200	61	25,000
Barium	mg/kg	9.95	6.71	6.57	8.81	5.81	39.0	26.1	19.2	13.9	38.5	140,000	910,000	14,000	870,000
Cadmium	mg/kg	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	2,000	2,800	200	59,000
Chromium	mg/kg	5.81	3.20	2.38	4.96	2.17	2.37	7.22	3.95	3.98	8.03	6,100	420	4,100	690
Lead	mg/kg	22.9	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0	346	800	NE	700	NE
Mercury	mg/kg	0.06	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	<0.04	0.14	610	16 (6)	61	0.1 (6)
Selenium	mg/kg	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.66	10,000	NE	1,000	NE
Silver	mg/kg	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	10,000	NE	1,000	NE
CYANIDE															
Cyanide	mg/kg	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	<1.25	41,000	NE	4,100	NE

TABLE 2
SUMMARY OF WARZYN SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
Chicago, Illinois

Notes:

- (1): Soil remediation objective (SRO) for the soil ingestion or inhalation routes for industrial-commercial exposure (35 IAC 742 Appendix B, Table B).
- (2): Soil remediation objective (SRO) for the soil ingestion or inhalation routes for construction worker exposure (35 IAC 742 Appendix B, Table B).
- (3): The soil remediation objective (SRO) for the soil component of the groundwater ingestion route for Class II groundwater 35 IAC 742 Appendix B, Table B. For metals and cyanide, objectives are based on leached concentrations or pH-specific objectives may be used
- (4): Concentrations of Inorganic Chemicals in Background Soils within Counties Inside Metropolitan Statistical Areas (35 IAC 742 Appendix A, Table G).
Concentrations of Polynuclear Aromatic Hydrocarbon Chemicals in Background Soils within the City of Chicago (35 IAC 742 Appendix A, Table H).
- (5): Results should be considered estimated due to non-homogenous sample matrix
- (6): Soil remediation objective for inhalation route only applies at sites where elemental mercury (CAS#7439-97-6) is a contaminant of concern (35 IAC 742 Appendix B, Tables A and B).

mg/kg	Milligram per kilogram
NE	Not established by the Illinois Environmental Protection Agency
NA	Not analyzed
BOLD	Laboratory Analytical Detection
BOLD + HIGHLIGHT	Laboratory Analytical Detection that exceeds TACO Tier 1 Industrial-Commercial Objective for sites with Class I Groundwater

Created By: MEJ 7/17/2017
Reviewed By: EJW 12/20/17

TABLE 3
SUMMARY OF CARLSON SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
Chicago, Illinois

Sample ID Sample Depth (feet)	Units	GP-1A	GP-2B	GP-3A	GP-4B	GP-4E	GP-5A	GP-6A	GP-6C	GP-7D	GP-7F	TACO Tier 1 Industrial- Commercial SROs (1)		TACO Tier 1 Construction Worker SROs (2)		TACO Tier 1 SRO Class II Groundwater (3)	TACO Tier 1 Background Concentrations (4)
		0-2	2-4	0-2	2-4	8-10	0-2	0-2	4-6	6-8	10-12	Ingestion	Inhalation	Ingestion	Inhalation		
Sample Date		9/5/07	9/5/07	9/5/07	9/5/07	9/5/07	9/5/07	9/5/07	9/5/07	9/5/07	9/5/07						
Parameter																	
VOLATILE ORGANIC COMPOUNDS																	
Acetone	mg/kg	<0.40	<0.053	0.17	0.071	0.067	0.14	0.055	0.074	0.075	<0.26	NE	100,000	NE	100,000	25	NE
Benzene	mg/kg	<0.0080	<0.0053	<0.0071	0.0064	<0.0050	<0.0076	<0.0052	<0.0050	<0.0066	<0.0051	100	1.6	2,300	2.2	0.17	NE
Carbon Disulfide	mg/kg	<0.021	<0.011	<0.014	<0.012	<0.010	0.016	0.023	<0.010	<0.013	<0.013	200,000	720	20,000	9	160	NE
Tetrachloroethene	mg/kg	<0.0080	<0.0053	<0.0071	<0.0061	0.0051	<0.0076	<0.0052	<0.0050	<0.0066	<0.0051	110	20	2,400	28	0.3	NE
Toluene	mg/kg	<0.016	0.0084	<0.0071	0.0072	0.0075	0.017	0.0075	0.0094	0.0080	<0.010	410,000	650	410,000	42	29	NE
Xylenes, m & p	mg/kg	<0.0080	<0.0053	<0.0071	<0.0061	<0.0050	0.010	<0.0052	<0.0050	<0.0066	<0.0051	410,000	420	41,000	5.9	200	NE
POLYNUCLEAR AROMATIC HYDROCARBONS																	
Anthracene	mg/kg	0.11	0.15	2.5 E	0.25	<0.055	<0.057	<0.056	3.2	5.7	0.76	610,000	NE	610,000	NE	59,000	0.25
Acenaphthylene	mg/kg	0.089	<0.055	<0.056	<0.056	<0.055	<0.057	<0.056	<0.055	0.068	<0.061	NE	NE	NE	NE	NE	0.03
Acenaphthene	mg/kg	<0.055	<0.055	0.66	0.060	<0.055	<0.057	<0.056	1.2	1.6	0.26	120,000	NE	120,000	NE	2,900	0.09
Benzo(a)anthracene	mg/kg	0.78	0.59	7.0 E	1.2	0.20	0.092	0.099	6.1	12	3.1 E	8	NE	170	NE	8	1.1
Benzo(a)pyrene	mg/kg	0.90	0.55	6.3 E	1.1	0.16	0.072	0.086	3.8	13	2.3 E	0.8	NE	17	NE	82	1.3
Benzo(b)fluoranthene	mg/kg	1.9 E	1.0	8.7 E	1.5	0.28	0.16	0.18	6.4	12	4.8 E	8	NE	170	NE	25	1.5
Benzo(g,h,i)perylene	mg/kg	1.1	0.46	3.5 E	0.50	0.16	0.12	0.10	1.5	2.3	1.0	NE	NE	NE	NE	NE	0.68
Benzo(k)fluoranthene	mg/kg	0.47	0.26	3.0 E	0.34	0.10	<0.057	<0.056	2.2	4.6	1.6	78	NE	1,700	NE	250	0.99
Chrysene	mg/kg	0.51	0.47	4.1 E	0.86	0.16	0.063	0.077	2.8	5.6	1.9	780	NE	17,000	NE	800	1.2
Dibenzo(a,h)anthracene	mg/kg	0.31	0.13	1.7	0.18	<0.055	<0.057	<0.056	0.82	1.0	0.46	0.8	NE	17	NE	7.6	0.2
Fluoranthene	mg/kg	1.1	0.99	8.9 E	1.9 E	0.33	0.085	0.11	8.6	14	6.7 E	82,000	NE	82,000	NE	21,000	2.7
Fluorene	mg/kg	<0.055	<0.055	1.0	0.070	<0.055	<0.057	<0.056	1.8	4.4	0.25	82,000	NE	82,000	NE	2,800	0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.88	0.37	3.1 E	0.44	0.11	0.076	0.074	1.6	3.4	1.2	8	NE	170	NE	60	0.86
Naphthalene	mg/kg	0.087	<0.055	0.17	0.057	<0.055	ND	<0.056	1.4	1.2	0.081	41,000	270	4,100	1.8	18	0.04
Phenanthrene	mg/kg	0.6	0.68	8.2 E	1.1	0.35	0.11	<0.056	9.6	16	5.2 E	NE	NE	NE	NE	NE	1.3
Pyrene	mg/kg	0.92	0.75	9.2 E	2.6 E	0.49	0.12	0.11	8.4	15	6.5 E	61,000	NE	61,000	NE	21000	1.9

*Notes on final page

TABLE 3
SUMMARY OF CARLSON SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
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Sample ID Sample Depth (feet) Sample Date		GP-1A 0-2 9/5/07	GP-2B 2-4 9/5/07	GP-3A 0-2 9/5/07	GP-4B 2-4 9/5/07	GP-4E 8-10 9/5/07	GP-5A 0-2 9/5/07	GP-6A 0-2 9/5/07	GP-6C 4-6 9/5/07	GP-7D 6-8 9/5/07	GP-7F 10-12 9/5/07	TACO Tier 1 Industrial- Commercial SROs (1)		TACO Tier 1 Construction Worker SROs (2)		TACO Tier 1 SRO Class II Groundwater (3)	TACO Tier 1 Background Concentrations (4)
Parameter	Units											Ingestion	Inhalation	Ingestion	Inhalation		
SEMIVOLATILE ORGANIC COMPOUNDS																	
Carbazole	mg/kg	<0.36	<0.37	0.58	<0.37	<0.36	<0.37	<0.37	1.5	1.9	0.57	290	NE	6,200	NE	2.8	NE
Dibenzofuran	mg/kg	<0.36	<0.37	0.68	<0.37	<0.36	<0.37	<0.37	1.5	2.8	<0.40	NE	NE	NE	NE	NE	NE
2-Methylnaphthalene	mg/kg	<0.36	<0.37	<0.37	<0.37	<0.36	<0.37	<0.37	0.66	0.74	<0.40	NE	NE	NE	NE	NE	NE
METALS, TOTAL																	
Antimony	mg/kg	4.6	4.6	1.2	1.5	23	5.4	<1.1	3.6	2.6	3.0	820	NE	82	NE	20	4.0
Arsenic	mg/kg	7.9	8.5	4.0	5.2	6.2	6.8	7.7	5.2	11	7.6	13	1,200	61	25,000	120-130	13
Beryllium	mg/kg	0.29	0.57	0.46	0.33	0.38	0.50	0.47	0.40	0.72	0.42	4,100	2,100	410	44,000	130,000-NE	0.59
Cadmium	mg/kg	0.80	1.80	0.89	0.75	1.3	0.89	0.63	0.84	3.4	1.8	2,000	2,800	200	59,000	590-NE	0.6
Chromium	mg/kg	20	19	13	15	23	11	15	13	21	23	6,100	420	4,100	690	NE (32-28)	16.2
Copper	mg/kg	45	51	24	36	150	61	26	41	62	67	82,000	NE	8,200	NE	330,000-NE	19.6
Lead	mg/kg	130	160	88	72	310	130	21	110	270	130	800	NE	700	NE	1,420	36.0
Mercury	mg/kg	0.087	0.081	ND	0.044	0.16	0.087	<0.045	0.16	0.76	0.16	610	16 (5)	61	0.1 (5)	32-NE	0.06
Nickel	mg/kg	15.0	16.0	14.0	13.0	14	15	26	21	21	20	41,000	21,000	4,100	440,000	14,000-NE	18
Selenium	mg/kg	0.66	1.60	0.63	0.48	0.69	0.89	0.46	0.46	0.87	0.67	10,000	NE	1,000	NE	3.3-1.8	0.48
Silver	mg/kg	<0.49	<0.53	<0.53	<0.56	<0.51	<0.55	<0.55	<0.52	<0.55	<0.57	10,000	NE	1,000	NE	39-NE	0.55
Thallium	mg/kg	<0.25	0.51	0.27	<0.28	<0.26	0.41	0.55	<0.26	0.3	<0.28	160	NE	160	NE	3.4-4.4	0.32
Zinc	mg/kg	110	260	130	90	180	120	50	140	330	250	610,000	NE	61,000	NE	16,000-NE	95
pH																	
pH	Standard	8.1	7.9	7.8	8.1	7.4	7.3	7.4	7.9	7.7	7.6	USEPA Criteria for determination of hazardous waste: not less than 2 or greater than 12.5					

*Notes on final page

TABLE 3
SUMMARY OF CARLSON SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
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Sample ID Sample Depth (feet)	Units	GP-8A	GP-9B	GP-10B	GP-11B	GP-11D	GP-13A	GP-13D	GP-14B	GP-15A	GP-16B	TACO Tier 1 Industrial- Commercial SROs (1)		TACO Tier 1 Construction Worker SROs (2)		TACO Tier 1 SRO Class II Groundwater (3)	TACO Tier 1 Background Concentrations (4)
		0-2	2-4	2-4	2-4	6-8	0-2	6-8	2-4	0-2	2-4	Ingestion	Inhalation	Ingestion	Inhalation		
Sample Date		9/5/07	9/5/07	9/5/07	9/5/07	9/5/07	9/5/07	9/5/07	9/5/07	9/5/07	9/5/07						
Parameter																	
VOLATILE ORGANIC COMPOUNDS																	
Acetone	mg/kg	NA	NA	NA	<0.22	<0.23	<0.36	<0.21	NA	NA	<0.24	NE	100,000	NE	100,000	25	NE
Benzene	mg/kg	NA	NA	NA	<0.0044	<0.0049	<0.0073	<0.0042	NA	NA	<0.0048	100	1.6	2,300	2.2	0.17	NE
Carbon Disulfide	mg/kg	NA	NA	NA	<0.012	<0.012	<0.019	<0.011	NA	NA	<0.012	200,000	720	20,000	9	160	NE
Tetrachloroethene	mg/kg	NA	NA	NA	<0.0044	<0.0049	<0.0073	<0.0042	NA	NA	<0.0048	110	20	2,400	28	0.3	NE
Toluene	mg/kg	NA	NA	NA	<0.0089	<0.0092	<0.015	<0.0085	NA	NA	<0.0096	410,000	650	410,000	42	29	NE
Xylenes, m & p	mg/kg	NA	NA	NA	<0.0044	<0.0049	<0.0073	<0.0042	NA	NA	<0.0048	410,000	420	41,000	5.9	200	NE
POLYNUCLEAR AROMATIC HYDROCARBONS																	
Anthracene	mg/kg	NA	NA	NA	<0.056	0.72	0.070	<0.050	NA	NA	<0.052	610,000	NE	610,000	NE	59,000	0.25
Acenaphthylene	mg/kg	NA	NA	NA	<0.056	<0.11	<0.050	<0.050	NA	NA	<0.052	NE	NE	NE	NE	NE	0.03
Acenaphthene	mg/kg	NA	NA	NA	<0.056	0.18	<0.050	<0.050	NA	NA	<0.052	120,000	NE	120,000	NE	2,900	0.09
Benzo(a)anthracene	mg/kg	NA	NA	NA	0.067	2.0	0.20	<0.050	NA	NA	<0.052	8	NE	170	NE	8	1.1
Benzo(a)pyrene	mg/kg	NA	NA	NA	<0.056	3.1	0.16	<0.050	NA	NA	<0.052	0.8	NE	17	NE	82	1.3
Benzo(b)fluoranthene	mg/kg	NA	NA	NA	0.070	2.1	0.29	<0.050	NA	NA	<0.052	8	NE	170	NE	25	1.5
Benzo(g,h,i)perylene	mg/kg	NA	NA	NA	<0.056	0.52	0.17	<0.050	NA	NA	<0.052	NE	NE	NE	NE	NE	0.68
Benzo(k)fluoranthene	mg/kg	NA	NA	NA	<0.056	0.67	0.10	<0.050	NA	NA	<0.052	78	NE	1,700	NE	250	0.99
Chrysene	mg/kg	NA	NA	NA	<0.056	1.5	0.19	<0.050	NA	NA	<0.052	780	NE	17,000	NE	800	1.2
Dibenzo(a,h)anthracene	mg/kg	NA	NA	NA	<0.056	0.19	0.075	<0.050	NA	NA	<0.052	0.8	NE	17	NE	7.6	0.2
Fluoranthene	mg/kg	NA	NA	NA	0.11	3.4	0.21	<0.050	NA	NA	<0.052	82,000	NE	82,000	NE	21,000	2.7
Fluorene	mg/kg	NA	NA	NA	<0.056	0.17	<0.050	<0.050	NA	NA	<0.052	82,000	NE	82,000	NE	2,800	0.1
Indeno(1,2,3-cd)pyrene	mg/kg	NA	NA	NA	<0.056	0.85	0.12	<0.050	NA	NA	<0.052	8	NE	170	NE	60	0.86
Naphthalene	mg/kg	NA	NA	NA	<0.056	<0.11	0.060	<0.050	NA	NA	<0.052	41,000	270	4,100	1.8	18	0.04
Phenanthrene	mg/kg	NA	NA	NA	0.070	3.2	0.33	<0.050	NA	NA	<0.052	NE	NE	NE	NE	NE	1.3
Pyrene	mg/kg	NA	NA	NA	0.12	5.1 E	0.31	<0.050	NA	NA	<0.052	61,000	NE	61,000	NE	21000	1.9

*Notes on final page

TABLE 3
SUMMARY OF CARLSON SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
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Sample ID Sample Depth (feet) Sample Date		GP-8A 0-2 9/5/07	GP-9B 2-4 9/5/07	GP-10B 2-4 9/5/07	GP-11B 2-4 9/5/07	GP-11D 6-8 9/5/07	GP-13A 0-2 9/5/07	GP-13D 6-8 9/5/07	GP-14B 2-4 9/5/07	GP-15A 0-2 9/5/07	GP-16B 2-4 9/5/07	TACO Tier 1 Industrial- Commercial SROs (1)	TACO Tier 1 Construction Worker SROs (2)	TACO Tier 1 SRO Class II Groundwater (3)	TACO Tier 1 Background Concentrations (4)										
Parameter	Units											Ingestion	Inhalation	Ingestion	Inhalation										
SEMIVOLATILE ORGANIC COMPOUNDS																									
Carbazole	mg/kg	NA	NA	NA	<0.37	<0.72	<0.33	<0.33	NA	NA	<0.34	290	NE	6,200	NE	2.8	NE								
Dibenzofuran	mg/kg	NA	NA	NA	<0.37	<0.72	<0.33	<0.33	NA	NA	<0.34	NE	NE	NE	NE	NE	NE								
2-Methylnaphthalene	mg/kg	NA	NA	NA	<0.37	<0.72	<0.33	<0.33	NA	NA	<0.34	NE	NE	NE	NE	NE	NE								
METALS, TOTAL																									
Antimony	mg/kg	2.5	7.3	<0.97	<1.1	<0.98	5.6	<0.97	<1.0	7.6	<1.0	820	NE	82	NE	20	4.0								
Arsenic	mg/kg	5.8	5.5	3.4	9.2	4.6	8.1	2.5	3.9	12	2.6	13	1,200	61	25,000	120-130	13								
Beryllium	mg/kg	0.34	0.48	0.19	0.75	0.56	0.58	0.08	0.12	0.87	0.090	4,100	2,100	410	44,000	130,000-NE	0.59								
Cadmium	mg/kg	4.50	0.74	0.23	0.55	0.49	1.5	0.13	0.22	3.2	0.16	2,000	2,800	200	59,000	590-NE	0.6								
Chromium	mg/kg	10	5.8	6.1	20	15	12	3.5	5.0	20	3.1	6,100	420	4,100	690	NE (32-28)	16.2								
Copper	mg/kg	41	31	14	22	19	48	6.6	10	78	6.3	82,000	NE	8,200	NE	330,000-NE	19.6								
Lead	mg/kg	83	140	11	15	22	170	4.4	34	320	3.6	800	NE	700	NE	1,420	36.0								
Mercury	mg/kg	0.10	<0.041	<0.044	<0.041	0.045	0.12	<0.040	<0.043	0.28	<0.040	610	16 (5)	61	0.1 (5)	32-NE	0.06								
Nickel	mg/kg	12	8.8	6.8	30	22	14	5.4	6.8	22	4.6	41,000	21,000	4,100	440,000	14,000-NE	18								
Selenium	mg/kg	0.56	0.67	0.28	0.57	0.45	1.1	<0.24	<0.26	1.1	<0.26	10,000	NE	1,000	NE	3.3-1.8	0.48								
Silver	mg/kg	<0.50	<0.53	<0.49	<0.55	<0.49	<0.50	<0.49	<0.51	<0.51	<0.51	10,000	NE	1,000	NE	39-NE	0.55								
Thallium	mg/kg	<0.25	0.32	<0.24	0.29	0.29	0.42	<0.24	<0.26	0.35	<0.26	160	NE	160	NE	3.4-4.4	0.32								
Zinc	mg/kg	190	66	37	40	45	250	20	26	340	18	610,000	NE	61,000	NE	16,000-NE	95								
pH																									
pH												Standard	8.2	8.1	8.1	8.3	8.0	7.8	8.4	8.3	7.8	8.7	USEPA Criteria for determination of hazardous waste: not less than 2 or greater than 12.5		

*Notes on final page

TABLE 3
SUMMARY OF CARLSON SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
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Sample ID Sample Depth (feet) Sample Date Parameter	Units	GP-16E	GP-17A	GP-18B	GP-19A							TACO Tier 1 Industrial- Commercial SROs (1)		TACO Tier 1 Construction Worker SROs (2)		TACO Tier 1 SRO Class II Groundwater (3)	TACO Tier 1 Background Concentrations (4)
		8-10	0-2	2-4	0-2												
		9/5/07	9/5/07	9/5/07	9/5/07							Ingestion	Inhalation	Ingestion	Inhalation		
VOLATILE ORGANIC COMPOUNDS																	
Acetone	mg/kg	<0.24	NA	NA	NA							NE	100,000	NE	100,000	25	NE
Benzene	mg/kg	<0.0049	NA	NA	NA							100	1.6	2,300	2.2	0.17	NE
Carbon Disulfide	mg/kg	<0.013	NA	NA	NA							200,000	720	20,000	9	160	NE
Tetrachloroethene	mg/kg	<0.0049	NA	NA	NA							110	20	2,400	28	0.3	NE
Toluene	mg/kg	<0.0098	NA	NA	NA							410,000	650	410,000	42	29	NE
Xylenes, m & p	mg/kg	<0.0049	NA	NA	NA							410,000	420	41,000	5.9	200	NE
POLYNUCLEAR AROMATIC HYDROCARBONS																	
Anthracene	mg/kg	<0.054	NA	NA	NA							610,000	NE	610,000	NE	59,000	0.25
Acenaphthylene	mg/kg	<0.054	NA	NA	NA							NE	NE	NE	NE	NE	0.03
Acenaphthene	mg/kg	<0.054	NA	NA	NA							120,000	NE	120,000	NE	2,900	0.09
Benzo(a)anthracene	mg/kg	<0.054	NA	NA	NA							8	NE	170	NE	8	1.1
Benzo(a)pyrene	mg/kg	<0.054	NA	NA	NA							0.8	NE	17	NE	82	1.3
Benzo(b)fluoranthene	mg/kg	<0.054	NA	NA	NA							8	NE	170	NE	25	1.5
Benzo(g,h,i)perylene	mg/kg	<0.054	NA	NA	NA							NE	NE	NE	NE	NE	0.68
Benzo(k)fluoranthene	mg/kg	<0.054	NA	NA	NA							78	NE	1,700	NE	250	0.99
Chrysene	mg/kg	<0.054	NA	NA	NA							780	NE	17,000	NE	800	1.2
Dibenzo(a,h)anthracene	mg/kg	<0.054	NA	NA	NA							0.8	NE	17	NE	7.6	0.2
Fluoranthene	mg/kg	<0.054	NA	NA	NA							82,000	NE	82,000	NE	21,000	2.7
Fluorene	mg/kg	<0.054	NA	NA	NA							82,000	NE	82,000	NE	2,800	0.1
Indeno(1,2,3-cd)pyrene	mg/kg	<0.054	NA	NA	NA							8	NE	170	NE	60	0.86
Naphthalene	mg/kg	<0.054	NA	NA	NA							41,000	270	4,100	1.8	18	0.04
Phenanthrene	mg/kg	<0.054	NA	NA	NA							NE	NE	NE	NE	NE	1.3
Pyrene	mg/kg	<0.054	NA	NA	NA							61,000	NE	61,000	NE	21000	1.9

*Notes on final page

TABLE 3
SUMMARY OF CARLSON SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
Chicago, Illinois

Sample ID Sample Depth (feet)		GP-16E 8-10	GP-17A 0-2	GP-18B 2-4	GP-19A 0-2							TACO Tier 1 Industrial- Commercial SROs (1)		TACO Tier 1 Construction Worker SROs (2)		TACO Tier 1 SRO Class II Groundwater (3)	TACO Tier 1 Background Concentrations (4)
Sample Date		9/5/07	9/5/07	9/5/07	9/5/07							Ingestion	Inhalation	Ingestion	Inhalation		
Parameter	Units																
SEMIVOLATILE ORGANIC COMPOUNDS																	
Carbazole	mg/kg	<0.35	NA	NA	NA							290	NE	6,200	NE	2.8	NE
Dibenzofuran	mg/kg	<0.35	NA	NA	NA							NE	NE	NE	NE	NE	NE
2-Methylnaphthalene	mg/kg	<0.35	NA	NA	NA							NE	NE	NE	NE	NE	NE
METALS, TOTAL																	
Antimony	mg/kg	<0.98	3.6	<1.0	1.9							820	NE	82	NE	20	4.0
Arsenic	mg/kg	3.1	18	2.4	5.4							13	1,200	61	25,000	120-130	13
Beryllium	mg/kg	0.14	0.68	0.10	0.33							4,100	2,100	410	44,000	130,000-NE	0.59
Cadmium	mg/kg	0.19	2.3	0.12	1.5							2,000	2,800	200	59,000	590-NE	0.6
Chromium	mg/kg	6.8	15	3.6	35							6,100	420	4,100	690	NE (32-28) ⁽⁶⁾	16.2
Copper	mg/kg	11	130	5.7	41							82,000	NE	8,200	NE	330,000-NE	19.6
Lead	mg/kg	7.5	230	2.8	96							800	NE	700	NE	1,420	36.0
Mercury	mg/kg	<0.038	7.5	<0.042	0.066							610	16 (5)	61	0.1 (5)	32-NE	0.06
Nickel	mg/kg	7.1	23	4.5	20							41,000	21,000	4,100	440,000	14,000-NE	18
Selenium	mg/kg	0.41	0.74	<0.26	0.61							10,000	NE	1,000	NE	3.3-1.8	0.48
Silver	mg/kg	<0.49	<0.53	<0.51	<0.53							10,000	NE	1,000	NE	39-NE	0.55
Thallium	mg/kg	<0.24	0.31	<0.26	<0.26							160	NE	160	NE	3.4-4.4	0.32
Zinc	mg/kg	23	390	16	450							610,000	NE	61,000	NE	16,000-NE	95
pH																	
pH	Standard	8.2	8.2	8.6	8.2							USEPA Criteria for determination of hazardous waste: not less than 2 or greater than 12.5					

*Notes on final page

TABLE 3
SUMMARY OF CARLSON SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
Chicago, Illinois

Notes:

- (1): Soil remediation objective (SRO) for the soil ingestion or inhalation routes for industrial-commercial exposure (35 IAC 742 Appendix B, Table B).
- (2): Soil remediation objective (SRO) for the soil ingestion or inhalation routes for construction worker exposure (35 IAC 742 Appendix B, Table B).
- (3): The soil remediation objective (SRO) for the soil component of the groundwater ingestion route for Class II groundwater 35 IAC 742 Appendix B, Table B. For metals and cyanide, objectives are based on leached concentrations or pH-specific objectives may be used
Objectives are provide for pH range of 7.25 to 8.74
- (4): Concentrations of Inorganic Chemicals in Background Soils within Counties Inside Metropolitan Statistical Areas (35 IAC 742 Appendix A, Table G).
Concentrations of Polynuclear Aromatic Hydrocarbon Chemicals in Background Soils within the City of Chicago (35 IAC 742 Appendix A, Table H).
- (5): Soil remediation objective for inhalation route only applies at sites where elemental mercury (CAS#7439-97-6) is a contaminant of concern (35 IAC 742 Appendix B, Tables A and B).
- (6): There are no Class II objectives for chromium, Class I objectives are provided, Class I objectives are for hexavalent chromium which is more toxic than trivalent chromium which is naturally more prevalent

mg/kg	Milligram per kilogram
NE	Not established by the Illinois Environmental Protection Agency
NA	Not analyzed
ND	Not detected
E	Laboratory qualifier - value above quantitation range
BOLD	Laboratory Analytical Detection
BOLD + HIGHLIGHT	Laboratory Analytical Detection that exceeds TACO Tier 1 Industrial-Commercial Objective for sites with Class I Groundwater

Created By: MEJ 7/17/2017
Reviewed By: EJW 12/20/17

TABLE 4
PLANNED SOIL BORINGS AND SAMPLING

4301 W Chicago Ave
Chicago, Illinois

Boring Number	Depth	Sample Number	Sample Depth	Analytical Testing	Notes
PROPOSED GEOTECHNICAL/ENVIRONMENTAL BORINGS					
B-1	40.0	B-1A	0.0 - 3.0	PNAs, PP Metals, pH	Near Former Structures, Near GP-3 with elevated PNAs at 0'-2'.
		B-1B	TBD	TBD	HOLD for Vertical Delineation
B-2	30.0	B-2A	0.0 - 3.0	PNAs, PP Metals, pH	Near Former Structures and Building Demo Pile.
		B-2B	TBD	TBD	HOLD for Vertical Delineation
B-3	40.0	B-3A	0.0 - 3.0	PNAs, PP Metals, pH	Near GP-7 with elevated PNAs at 6'-12'.
		B-3B	6.0' - 12.0'	Target Compound List	Near GP-7 with elevated PNAs at 6'-12'.
		B-3C	TBD	TBD	HOLD for Vertical Delineation
B-4	30.0	B-4A	0.0 - 3.0	PNAs, PP Metals, pH	Near Former Structures and Building Demo Pile, Near GP-3 with elevated PNAs at 0'-2'.
		B-4B	TBD	TBD	HOLD for Vertical Delineation
B-5	30.0	No samples			
B-6	30.0	B-6A	0.0 - 3.0	PNAs, PP Metals, pH	Near Former Structures and Building Demo Pile, Near GP-11 with elevated PNA at 6'-8' and GP-7 with elevated PNAs at 6'-12".
		B-6B	6.0' - 12.0'	PNAs, PP Metals, pH	Near Former Structures and Building Demo Pile, Near GP-11 with elevated PNA at 6'-8' and GP-7 with elevated PNAs at 6'-12".
		B-6C	TBD	TBD	HOLD for Vertical Delineation
B-7	40.0	B-7A	0.0 - 3.0	PNAs, PP Metals, pH	Near Former Structures and Building Demo Pile, Near GP-3 with elevated PNAs at 0'-2'.
		B-7B	TBD	TBD	HOLD for Vertical Delineation
B-8	30.0	No samples			
B-9	40.0	B-9A	0.0 - 3.0	PNAs, PP Metals, pH	Near GP-11 with elevated PNA at 6'-8'
		B-9B	TBD	TBD	HOLD for Vertical Delineation
B-10	25.0	B-10A	0.0 - 3.0	PNAs, PP Metals, pH	Additional Shallow Sample.
		B-10B	TBD	TBD	HOLD for Vertical Delineation
B-11	25.0	B-11A	0.0 - 3.0	PNAs, PP Metals, pH, added VOCs	Additional Shallow Sample, soil mound
		B-11B	TBD	TBD	HOLD for Vertical Delineation
B-12	25.0	B-12A	0.0 - 3.0	PNAs, PP Metals, pH	Additional Shallow Sample.
		B-12B	TBD	TBD	HOLD for Vertical Delineation
B-13	30.0	No samples			
B-14	30.0	B-14A	0.0 - 3.0	PNAs, PP Metals, pH	Additional Shallow Sample.
		B-14B	TBD	TBD	HOLD for Vertical Delineation
B-15	25.0	B-15A	0.0 - 3.0	PNAs, PP Metals, pH	Additional Shallow Sample.
		B-15B	TBD	TBD	HOLD for Vertical Delineation
B-16	25.0	B-16A	0.0 - 3.0	PNAs, PP Metals, pH	Additional Shallow Sample.
		B-16B	TBD	TBD	HOLD for Vertical Delineation
B-17	25.0	B-17A	0.0 - 3.0	PNAs, PP Metals, pH	Additional Shallow Sample.
		B-17B	TBD	TBD	HOLD for Vertical Delineation
B-18	16.0	B-18A	0.0 - 3.0	Target Compound List	Additional Shallow Sample, Near GP-3 with elevated PNAs at 0'-2'.
		B-18B	3.0' - 6.0'	PNAs	Vertical Delineation for GP-3 with elevated PNAs at 0'-2'.
		B-18C	TBD	TBD	HOLD for Vertical Delineation
PROPOSED ENVIRONMENTAL BORINGS					
ESB-1	16.0	ESB-1A	0.0 - 3.0	PNAs, PP Metals, pH	Additional Shallow Sample near soil mound
		ESB-1B	12.0' - 16.0'	PNAs	Vertical Delineation for GP-7 with elevated PNAs at 6'-12'.
ESB-2	16.0	ESB-2A	0.0 - 3.0	Target Compound List, herbicides	Additional Shallow Sample, offsite west
		ESB-2B	TBD	PNAs, PP Metals, pH	Near GP-6 with elevated PNAs at 4'-6'.
ESB-3	16.0	ESB-3A	0.0 - 3.0	Target Compound List	Additional Shallow Sample, offsite west
		ESB-3B	TBD	PNAs	Vertical Delineation for GP-6 with elevated PNAs at 4'-6'.
ESB-4	16.0	ESB-4A	0.0 - 3.0	Target Compound List	Additional Shallow Sample, former rail spur
		ESB-4B	TBD	TBD	HOLD for Vertical Delineation
ESB-5	16.0	ESB-5A	0.0 - 3.0	Target Compound List	Additional Shallow Sample, rail spur, south offsite
		ESB-5B	TBD	TBD	Additional Deep Sample.
ESB-6	16.0	ESB-6A	0.0 - 3.0	Target Compound List, herbicides	Additional Shallow Sample. Near Concrete Pile
		ESB-6B	TBD	TBD	HOLD for Vertical Delineation

TABLE 5
SUMMARY OF SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
Chicago, Illinois

Sample ID Sample Depth (feet) Sample Date Parameter	Units	ESB-1A	ESB-1C	ESB-2A	ESB-3A	ESB-3B	ESB-4A	ESB-5A	ESB-6A	B-1A	B-2A	TACO Tier 1 Industrial- Commercial SROs (1)		TACO Tier 1 Construction Worker SROs (2)		TACO Tier 1 SRO Class II Groundwater (3)	TACO Tier 1 Background Concentrations (4)
		0-2	13-14	1.5-2.5	1-4	5.5-6.5	0.5-1.5	0-1	2-4	2-4	0-2	Ingestion	Inhalation	Ingestion	Inhalation		
VOLATILE ORGANIC COMPOUNDS																	
Acetone	mg/kg	NA	NA	< 0.10	< 0.096	NA	0.15	< 0.12	< 0.13	NA	NA	NE	100,000	NE	100,000	25	NE
Benzene	mg/kg	NA	NA	< 0.0067	< 0.0064	NA	< 0.0075	< 0.0083	< 0.0084	NA	NA	100	1.6	2,300	2.2	0.17	NE
Carbon Disulfide	mg/kg	NA	NA	< 0.067	< 0.064	NA	< 0.075	< 0.083	< 0.084	NA	NA	200,000	720	20,000	9	160	NE
Carbon Tetrachloride	mg/kg	NA	NA	< 0.0067	< 0.0064	NA	< 0.0075	< 0.0083	0.15	NA	NA	44	0.64	410	0.9	0.33	NE
Chloroform	mg/kg	NA	NA	< 0.0067	< 0.0064	NA	< 0.0075	< 0.0083	0.034	NA	NA	940	0.54	2,000	0.76	2.9	NE
Tetrachloroethene	mg/kg	NA	NA	< 0.0067	< 0.0064	NA	< 0.0075	0.027	< 0.0084	NA	NA	110	20	2,400	28	0.3	NE
Toluene	mg/kg	NA	NA	< 0.0067	< 0.0064	NA	< 0.0075	< 0.0083	< 0.0084	NA	NA	410,000	650	410,000	42	29	NE
Total Xylenes	mg/kg	NA	NA	< 0.020	< 0.019	NA	< 0.022	< 0.025	< 0.025	NA	NA	410,000	320	41,000	5.6	150	NE
POLYNUCLEAR AROMATIC HYDROCARBONS																	
Acenaphthylene	mg/kg	< 0.034	< 0.034	< 0.038	< 0.35	0.16	0.11	0.05	0.12	< 0.034	< 0.035	NE	NE	NE	NE	NE	0.03
Acenaphthene	mg/kg	< 0.034	< 0.034	< 0.038	0.41	0.19	0.41	< 0.034	< 0.036	< 0.034	< 0.035	120,000	NE	120,000	NE	2,900	0.09
Anthracene	mg/kg	< 0.034	< 0.034	< 0.038	0.82	0.82	1.3	0.092	0.089	0.085	0.045	610,000	NE	610,000	NE	59,000	0.25
Benzo(a)anthracene	mg/kg	0.084	< 0.034	0.045	2.4	2.6	3.1	0.16	0.25	0.21	0.16	8	NE	170	NE	8	1.1
Benzo(a)pyrene	mg/kg	0.074	< 0.034	< 0.038	0.84	3.0	3.2	0.13	0.26	0.2	0.16	0.8	NE	17	NE	82	1.3
Benzo(b)fluoranthene	mg/kg	0.070	< 0.034	< 0.038	< 0.35	2.9	3.3	0.18	0.35	0.18	0.15	8	NE	170	NE	25	1.5
Benzo(g,h,i)perylene	mg/kg	0.071	< 0.034	< 0.038	1.6	1.9	1.9	0.22	0.22	0.19	0.13	NE	NE	NE	NE	NE	0.68
Benzo(k)fluoranthene	mg/kg	0.066	< 0.034	< 0.038	< 0.35	2.2	2.5	0.13	0.25	0.16	0.14	78	NE	1,700	NE	250	0.99
Chrysene	mg/kg	0.11	< 0.034	0.052	4.1	2.8	3.5	0.25	0.34	0.27	0.19	780	NE	17,000	NE	800	1.2
Dibenzo(a,h)anthracene	mg/kg	0.035	< 0.034	< 0.038	< 0.35	0.87	0.81	0.062	0.094	0.076	0.064	0.8	NE	17	NE	7.6	0.2
Fluoranthene	mg/kg	0.13	< 0.034	0.071	3.1	4.3	7.7	0.31	0.52	0.34	0.26	82,000	NE	82,000	NE	21,000	2.7
Fluorene	mg/kg	< 0.034	< 0.034	< 0.038	< 0.35	0.25	0.46	< 0.034	< 0.036	< 0.034	< 0.035	82,000	NE	82,000	NE	2,800	0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.057	< 0.034	< 0.038	0.94	1.7	1.7	0.12	0.17	0.14	0.11	8	NE	170	NE	60	0.86
Naphthalene	mg/kg	< 0.034	< 0.034	< 0.038	< 0.35	0.12	0.088	0.059	0.07	0.051	< 0.035	41,000	270	4,100	1.8	18	0.04
Phenanthrene	mg/kg	0.13	< 0.034	< 0.038	2.6	2.3	5.7	0.29	0.45	0.37	0.16	NE	NE	NE	NE	NE	1.3
Pyrene	mg/kg	0.13	< 0.034	0.065	6.4	3.9	6.3	0.29	0.52	0.34	0.22	61,000	NE	61,000	NE	21000	1.9
SEMIVOLATILE ORGANIC COMPOUNDS																	
Carbazole	mg/kg	NA	NA	< 0.20	< 1.8	NA	0.75	< 0.18	< 0.18	NA	NA	290	NE	6,200	NE	2.8	NE
Dibenzofuran	mg/kg	NA	NA	< 0.20	< 1.8	NA	0.26	< 0.18	< 0.18	NA	NA	NE	NE	NE	NE	NE	NE
2-Methylnaphthalene	mg/kg	NA	NA	< 0.20	< 1.8	NA	< 0.18	< 0.18	< 0.18	NA	NA	NE	NE	NE	NE	NE	NE
PESTICIDES																	
4,4'-DDD	mg/kg	NA	NA	< 0.0018	< 0.0017	NA	< 0.0017	< 0.0016	0.042	NA	NA	24	NE	520	NE	80	NE
4,4'-DDE	mg/kg	NA	NA	< 0.0018	< 0.0017	NA	< 0.0017	< 0.0016	0.069	NA	NA	17	NE	370	NE	270	NE
4,4'-DDT	mg/kg	NA	NA	< 0.0018	< 0.0017	NA	< 0.0017	< 0.0016	0.042	NA	NA	17	1,500	100	2,100	160	NE

*Notes on final page

TABLE 5
SUMMARY OF SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
Chicago, Illinois

Sample ID Sample Depth (feet)	Units	ESB-1A	ESB-1C	ESB-2A	ESB-3A	ESB-3B	ESB-4A	ESB-5A	ESB-6A	B-1A	B-2A	TACO Tier 1 Industrial- Commercial SROs (1)		TACO Tier 1 Construction Worker SROs (2)		TACO Tier 1 SRO Class II Groundwater (3)	TACO Tier 1 Background Concentrations (4)
		0-2	13-14	1.5-2.5	1-4	5.5-6.5	0.5-1.5	0-1	2-4	2-4	0-2	Ingestion	Inhalation	Ingestion	Inhalation		
Sample Date		8/9/17	8/9/17	8/2/17	8/2/17	8/2/17	8/7/17	8/3/17	8/4/17	8/9/17	8/9/17						
Parameter																	
POLYCHLORINATED BIPHENYLS																	
Polychlorinated Biphenyls (PCB's)	mg/kg	NA	NA	< 0.092	< 0.085	NA	< 0.084	< 0.082	< 0.085	NA	NA	1	NE	1	NE	NE	NE
METALS, TOTAL																	
Aluminum	mg/kg	NA	NA	6600	4400	NA	3900	3600	4500	NA	NA	NE	NE	NE	NE	NE	9500
Antimony	mg/kg	< 1.8	NA	< 2.1	< 1.9	NA	2	2.2	3.1	< 1.8	< 1.9	820	NE	82	NE	20	4.0
Arsenic	mg/kg	8.6	NA	8.6	6.4	NA	13	12	18	6.2	12	13	1,200	61	25,000	120-130	13
Barium	mg/kg	NA	NA	42	45	NA	79	40	57	NA	NA	140,000	910,000	14,000	870,000	1,700-NE	110
Beryllium	mg/kg	0.53	NA	0.54	< 0.48	NA	0.69	0.62	0.74	< 0.45	0.60	4,100	2,100	410	44,000	17,000-NE	0.59
Cadmium	mg/kg	0.48	NA	0.59	0.56	NA	2.1	2.1	1.7	0.47	0.76	2,000	2,800	200	59,000	110-NE	0.6
Calcium	mg/kg	NA	NA	40000	80000	NA	42000	68000	49000	NA	NA	NE	NE	NE	NE	NE	NE
Chromium	mg/kg	16	NA	17	13	NA	18	21	24	16	18	6,100	420	4,100	690	NE (36-21) ⁽⁶⁾	16.2
SPLP Chromium	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE	1.0	NE
Cobalt	mg/kg	NA	NA	9.3	4.7	NA	6.3	5.8	7.1	NA	NA	120,000	NE	12,000	NE	NE	8.9
SPLP Cobalt	mg/L	NA	NA	< 0.0040	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE	1.0	NE
Copper	mg/kg	39	NA	47	77	NA	78	93	700	27	58	82,000	NE	8,200	NE	200,000-NE	19.6
Iron	mg/kg	NA	NA	24000	19000	NA	28000	35000	39000	NA	NA	NE	NE	NE	NE	NE	15,900
TCLP Iron	mg/L	NA	NA	NA	<0.25	NA	3.1	2.4	NA	NA	NA	NE	NE	NE	NE	5	NE
SPLP Iron	mg/L	NA	NA	0.65	NA	NA	NA	NA	0.86	NA	NA	NE	NE	NE	NE	5	NE
Lead	mg/kg	51	NA	94	160	NA	180	210	420	75	85	800	NE	700	NE	1,420-3,760	36
Magnesium	mg/kg	NA	NA	23000	43000	NA	23000	31000	26000	NA	NA	NE	NE	730,000	NE	NE	4820
Manganese	mg/kg	NA	NA	410	340	NA	360	470	1400	NA	NA	41,000	91,000	4,100	8,700	NE	636
SPLP Manganese	mg/L	NA	NA	NA	NA	NA	NA	NA	0.012	NA	NA	NE	NE	NE	NE	10	NE
Mercury	mg/kg	0.043	NA	0.038	0.065	NA	0.14	0.15	0.15	0.073	0.061	610	16 (5)	61	0.1 (5)	16-NE	0.06
Nickel	mg/kg	24	NA	27	15	NA	19	21	20	10	29	41,000	21,000	4,100	440,000	3,500-NE	18
Potassium	mg/kg	NA	NA	1400	800	NA	630	440	730	NA	NA	NE	NE	NE	NE	NE	1268
Selenium	mg/kg	< 0.92	NA	< 1.0	< 0.95	NA	< 0.97	1.1	1.1	< 0.91	< 0.96	10,000	NE	1,000	NE	4.5-1.3	0.48
Silver	mg/kg	< 0.92	NA	< 1.0	< 0.95	NA	< 0.97	< 0.92	< 0.98	< 0.91	< 0.96	10,000	NE	1,000	NE	NE (13-NE) ⁽⁷⁾	0.55
Sodium	mg/kg	NA	NA	100	180	NA	150	180	250	NA	NA	NE	NE	NE	NE	NE	130
Thallium	mg/kg	< 0.92	NA	< 1.0	< 0.95	NA	< 0.97	< 0.92	< 0.98	< 0.91	< 0.96	160	NE	160	NE	30-49	0.32
Vanadium	mg/kg	NA	NA	17	18	NA	18	17	20	NA	NA	14,000	NE	1,400	NE	NE (980) ⁽⁷⁾	25.2
Zinc	mg/kg	110	NA	130	180	NA	690	750	580	93	180	610,000	NE	61,000	NE	15,000-NE	95
CYANIDE																	
Cyanide	mg/kg	NA	NA	< 0.29	< 0.27	NA	< 0.27	<0.26	<0.27	NA	NA	41,000	NE	4,100	NE	NE	0.51
pH																	
pH	Standard	8.05	NA	8.21	8.15	NA	7.86	7.89	7.56	8.07	7.92	USEPA Criteria for determination of hazardous waste: not less than 2 or greater than 12.5					

*Notes on final page

TABLE 5
SUMMARY OF SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
Chicago, Illinois

Sample ID Sample Depth (feet) Sample Date Parameter	Units	B-3A	B-3B	B-4A	B-6A	B-6B	B-7A	B-9A	B-10A	B-11A	B-12A	TACO Tier 1 Industrial- Commercial SROs (1)		TACO Tier 1 Construction Worker SROs (2)		TACO Tier 1 SRO Class II Groundwater (3)	TACO Tier 1 Background Concentrations (4)
		0-2	6-8	0-2	1-3	8-10	0-2	1-3	0-1	1-2	0-2	Ingestion	Inhalation	Ingestion	Inhalation		
VOLATILE ORGANIC COMPOUNDS																	
Acetone	mg/kg	NA	< 0.081	NA	NA	NA	NA	NA	NA	< 0.074	NA	NE	100,000	NE	100,000	25	NE
Benzene	mg/kg	NA	< 0.0054	NA	NA	NA	NA	NA	NA	< 0.0050	NA	100	1.6	2,300	2.2	0.17	NE
Carbon Disulfide	mg/kg	NA	< 0.054	NA	NA	NA	NA	NA	NA	< 0.050	NA	200,000	720	20,000	9	160	NE
Carbon Tetrachloride	mg/kg	NA	< 0.0054	NA	NA	NA	NA	NA	NA	< 0.0050	NA	44	0.64	410	0.9	0.33	NE
Chloroform	mg/kg	NA	< 0.0054	NA	NA	NA	NA	NA	NA	< 0.0050	NA	940	0.54	2,000	0.76	2.9	NE
Tetrachloroethene	mg/kg	NA	< 0.0054	NA	NA	NA	NA	NA	NA	< 0.0050	NA	110	20	2,400	28	0.3	NE
Toluene	mg/kg	NA	< 0.0054	NA	NA	NA	NA	NA	NA	< 0.0050	NA	410,000	650	410,000	42	29	NE
Total Xylenes	mg/kg	NA	<0.016	NA	NA	NA	NA	NA	NA	<0.015	NA	410,000	320	41,000	5.6	150	NE
POLYNUCLEAR AROMATIC HYDROCARBONS																	
Acenaphthylene	mg/kg	< 0.035	< 0.036	0.05	0.085	0.10	< 0.039	< 0.37	0.12	< 0.039	0.11	610,000	NE	610,000	NE	NE	0.25
Acenaphthene	mg/kg	< 0.035	< 0.036	< 0.035	0.32	< 0.040	< 0.039	< 0.37	< 0.035	< 0.039	< 0.034	NE	NE	NE	NE	2,900	0.03
Anthracene	mg/kg	< 0.035	< 0.036	0.17	2.0	0.25	0.04	0.57	0.28	0.066	0.16	120,000	NE	120,000	NE	59,000	0.09
Benzo(a)anthracene	mg/kg	0.11	< 0.036	0.75	4.9	0.64	0.17	1.3	0.25	0.19	0.73	8	NE	170	NE	8	1.1
Benzo(a)pyrene	mg/kg	0.13	< 0.036	0.71	3.9	0.68	< 0.039	1.2	0.31	0.18	0.91	0.8	NE	17	NE	82	1.3
Benzo(b)fluoranthene	mg/kg	0.11	< 0.036	0.56	3.5	0.53	0.042	1.0	0.41	0.18	0.63	8	NE	170	NE	25	1.5
Benzo(g,h,i)perylene	mg/kg	0.097	< 0.036	0.61	3.3	0.65	0.13	2.0	0.51	0.12	0.66	NE	NE	NE	NE	NE	0.68
Benzo(k)fluoranthene	mg/kg	0.096	< 0.036	0.64	3.2	0.67	< 0.039	0.38	0.29	0.16	0.65	78	NE	1,700	NE	250	0.99
Chrysene	mg/kg	0.13	< 0.036	1.1	5.1	0.89	0.21	2.8	0.41	0.21	0.79	780	NE	17,000	NE	800	1.2
Dibenzo(a,h)anthracene	mg/kg	< 0.035	< 0.036	0.27	1.1	0.25	0.14	0.52	0.11	0.066	0.25	0.8	NE	17	NE	7.6	0.2
Fluoranthene	mg/kg	0.16	0.040	0.95	9.8	0.97	0.32	1.2	0.39	0.34	1.1	82,000	NE	82,000	NE	21,000	2.7
Fluorene	mg/kg	< 0.035	< 0.036	0.049	0.46	0.067	< 0.039	< 0.37	< 0.035	< 0.039	< 0.034	82,000	NE	82,000	NE	2,800	0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.075	< 0.036	0.44	2.5	0.51	0.11	0.73	0.30	0.098	0.49	8	NE	170	NE	60	0.86
Naphthalene	mg/kg	< 0.035	< 0.036	0.06	0.061	0.20	< 0.039	1.2	0.064	0.046	< 0.034	41,000	270	4,100	1.8	18	0.04
Phenanthrene	mg/kg	0.088	< 0.036	0.92	6.5	0.91	0.17	5.7	0.34	0.19	0.48	NE	NE	NE	NE	NE	1.3
Pyrene	mg/kg	0.18	0.043	1.1	13	1.2	0.29	2.8	0.40	0.29	1.5	61,000	NE	61,000	NE	21000	1.9
SEMIVOLATILE ORGANIC COMPOUNDS																	
Carbazole	mg/kg	NA	< 0.18	NA	NA	NA	NA	NA	NA	NA	NA	290	NE	6,200	NE	2.8	NE
Dibenzofuran	mg/kg	NA	< 0.18	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE	NE	NE
2-Methylnaphthalene	mg/kg	NA	< 0.18	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE	NE	NE
PESTICIDES																	
4,4'-DDD	mg/kg	NA	< 0.0017	NA	NA	NA	NA	NA	NA	NA	NA	24	NE	520	NE	80	NE
4,4'-DDE	mg/kg	NA	< 0.0017	NA	NA	NA	NA	NA	NA	NA	NA	17	NE	370	NE	270	NE
4,4'-DDT	mg/kg	NA	< 0.0017	NA	NA	NA	NA	NA	NA	NA	NA	17	1,500	100	2,100	160	NE

*Notes on final page

TABLE 5
SUMMARY OF SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
Chicago, Illinois

Sample ID Sample Depth (feet) Sample Date Parameter		B-3A	B-3B	B-4A	B-6A	B-6B	B-7A	B-9A	B-10A	B-11A	B-12A	TACO Tier 1 Industrial- Commercial SROs (1)		TACO Tier 1 Construction Worker SROs (2)		TACO Tier 1 SRO Class II Groundwater (3)	TACO Tier 1 Background Concentrations (4)
		0-2	6-8	0-2	1-3	8-10	0-2	1-3	0-1	1-2	0-2	Ingestion	Inhalation	Ingestion	Inhalation		
POLYCHLORINATED BIPHENYLS																	
Polychlorinated Biphenyls (PCB's)	mg/kg	NA	< 0.087	NA	NA	NA	NA	NA	NA	NA	NA	1	NE	1	NE	NE	NE
METALS, TOTAL																	
Aluminum	mg/kg	NA	2600	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE	NE	9500
Antimony	mg/kg	< 1.9	< 2.0	2.5	< 2.0	3.4	4.6	8	4.1	< 2.0	< 1.8	820	NE	82	NE	20	4.0
Arsenic	mg/kg	4.2	2.7	12	6.8	13	12	14	7.5	8.6	7.2	13	1,200	61	25,000	120-130	13
Barium	mg/kg	NA	13	NA	NA	NA	NA	NA	NA	NA	NA	140,000	910,000	14,000	870,000	1,700-NE	110
Beryllium	mg/kg	< 0.48	< 0.49	1.1	0.56	0.57	1.6	0.56	< 0.46	0.78	0.50	4,100	2,100	410	44,000	17,000-NE	0.59
Cadmium	mg/kg	< 0.48	< 0.49	1.5	< 0.49	2.7	1.4	1.3	0.96	< 0.50	0.60	2,000	2,800	200	59,000	110-NE	0.6
Calcium	mg/kg	NA	50000	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE	NE	NE
Chromium	mg/kg	9.5	6.7	16	20	29	13	17	12	20	12	6,100	420	4,100	690	NE (36-21) ⁽⁶⁾	16.2
SPLP Chromium	mg/L	NA	NA	NA	NA	<0.0040	NA	NA	NA	NA	NA	NE	NE	NE	NE	1.0	NE
Cobalt	mg/kg	NA	3.1	NA	NA	NA	NA	NA	NA	NA	NA	120,000	NE	12,000	NE	NE	8.9
SPLP Cobalt	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE	1.0	NE
Copper	mg/kg	18	7.7	83	41	170	79	90	67	35	46	82,000	NE	8,200	NE	200,000-NE	19.6
Iron	mg/kg	NA	7600	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE	NE	15,900
TCLP Iron	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE	5	NE
SPLP Iron	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE	5	NE
Lead	mg/kg	29	6.4	190	66	240	160	320	130	38	86	800	NE	700	NE	1,420-3,760	36
Magnesium	mg/kg	NA	26000	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	730,000	NE	NE	4820
Manganese	mg/kg	NA	200	NA	NA	NA	NA	NA	NA	NA	NA	41,000	91,000	4,100	8,700	NE	636
SPLP Manganese	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE	10	NE
Mercury	mg/kg	0.075	0.047	0.086	0.077	0.24	0.23	0.22	0.20	0.033	0.32	610	16 (5)	61	0.1 (5)	16-NE	0.06
Nickel	mg/kg	12	7.4	17	29	31	18	19	16	31	15	41,000	21,000	4,100	440,000	3,500-NE	18
Potassium	mg/kg	NA	440	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE	NE	1268
Selenium	mg/kg	< 0.96	< 0.98	1.6	< 0.98	1.2	2	1.2	< 0.93	< 0.99	< 0.90	10,000	NE	1,000	NE	4.5-1.3	0.48
Silver	mg/kg	< 0.96	< 0.98	< 0.95	< 0.98	< 1.1	< 1.0	< 0.97	< 0.93	< 0.99	< 0.90	10,000	NE	1,000	NE	NE (13-NE) ⁽⁷⁾	0.55
Sodium	mg/kg	NA	95	NA	NA	NA	NA	NA	NA	NA	NA	NE	NE	NE	NE	NE	130
Thallium	mg/kg	< 0.96	< 0.98	< 0.95	< 0.98	< 1.1	< 1.0	< 0.97	< 0.93	< 0.99	< 0.90	160	NE	160	NE	30-49	0.32
Vanadium	mg/kg	NA	12	NA	NA	NA	NA	NA	NA	NA	NA	14,000	NE	1,400	NE	NE (980) ⁽⁷⁾	25.2
Zinc	mg/kg	59	25	280	100	650	180	370	200	67	160	610,000	NE	61,000	NE	15,000-NE	95
CYANIDE																	
Cyanide	mg/kg	NA	<0.27	NA	NA	NA	NA	NA	NA	NA	NA	41,000	NE	4,100	NE	120	0.51
pH																	
pH	Standard	7.77	8.04	7.61	9.92	8.22	7.42	7.74	7.82	7.97	7.81	USEPA Criteria for determination of hazardous waste: not less than 2 or greater than 12.5					

*Notes on final page

TABLE 5
SUMMARY OF SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
Chicago, Illinois

Sample ID Sample Depth (feet) Sample Date Parameter	Units	B-14A 1-2 8/4/17	B-15A 1.5-3 8/8/17	B-16A 1-2 8/7/17	B-17A 0-2 8/4/17	B-18A 0-2 8/9/17	B-18B 4.5-5.5 8/9/17					TACO Tier 1 Industrial- Commercial SROs (1)		TACO Tier 1 Construction Worker SROs (2)		TACO Tier 1 SRO Class I Groundwater (3)	TACO Tier 1 Background Concentrations (4)
		Ingestion	Inhalation	Ingestion	Inhalation												
VOLATILE ORGANIC COMPOUNDS																	
Acetone	mg/kg	NA	NA	NA	NA	< 0.11	NA					NE	100,000	NE	100,000	25	NE
Benzene	mg/kg	NA	NA	NA	NA	< 0.0071	NA					100	1.6	2,300	2.2	0.17	NE
Carbon Disulfide	mg/kg	NA	NA	NA	NA	< 0.071	NA					200,000	720	20,000	9	160	NE
Carbon Tetrachloride	mg/kg	NA	NA	NA	NA	< 0.0071	NA					44	0.64	410	0.9	0.33	NE
Chloroform	mg/kg	NA	NA	NA	NA	< 0.0071	NA					940	0.54	2,000	0.76	2.9	NE
Tetrachloroethene	mg/kg	NA	NA	NA	NA	< 0.0071	NA					110	20	2,400	28	0.3	NE
Toluene	mg/kg	NA	NA	NA	NA	< 0.0071	NA					410,000	650	410,000	42	29	NE
Total Xylenes	mg/kg	NA	NA	NA	NA	0.021	NA					410,000	320	41,000	5.6	150	NE
POLYNUCLEAR AROMATIC HYDROCARBONS																	
Acenaphthylene	mg/kg	< 0.035	< 0.035	< 0.034	0.18	< 0.035	< 0.034					NE	NE	NE	NE	NE	0.03
Acenaphthene	mg/kg	< 0.035	0.11	< 0.034	< 0.034	< 0.035	< 0.034					120,000	NE	120,000	NE	2,900	0.09
Anthracene	mg/kg	0.037	< 0.035	< 0.034	0.089	0.061	< 0.034					610,000	NE	610,000	NE	59,000	0.25
Benzo(a)anthracene	mg/kg	0.15	0.24	0.058	0.18	0.16	< 0.034					8	NE	170	NE	8	1.1
Benzo(a)pyrene	mg/kg	0.17	0.22	0.089	0.17	0.11	< 0.034					0.8	NE	17	NE	82	1.3
Benzo(b)fluoranthene	mg/kg	0.18	0.23	0.11	0.23	0.14	< 0.034					8	NE	170	NE	25	1.5
Benzo(g,h,i)perylene	mg/kg	0.14	0.20	0.071	0.15	0.13	< 0.034					NE	NE	NE	NE	NE	0.68
Benzo(k)fluoranthene	mg/kg	0.12	0.16	0.081	0.15	0.095	< 0.034					78	NE	1,700	NE	250	0.99
Chrysene	mg/kg	0.25	0.30	0.086	0.31	0.25	< 0.034					780	NE	17,000	NE	800	1.2
Dibenzo(a,h)anthracene	mg/kg	0.063	0.050	< 0.034	0.066	0.064	< 0.034					0.8	NE	17	NE	7.6	0.2
Fluoranthene	mg/kg	0.22	0.33	0.055	0.34	0.26	< 0.034					82,000	NE	82,000	NE	21,000	2.7
Fluorene	mg/kg	< 0.035	< 0.035	< 0.034	< 0.034	< 0.035	< 0.034					82,000	NE	82,000	NE	2,800	0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.10	0.13	0.054	0.11	0.092	< 0.034					8	NE	170	NE	60	0.86
Naphthalene	mg/kg	0.082	0.079	< 0.034	< 0.034	0.10	< 0.034					41,000	270	4,100	1.8	18	0.04
Phenanthrene	mg/kg	0.38	0.90	0.063	0.34	0.48	< 0.034					NE	NE	NE	NE	NE	1.3
Pyrene	mg/kg	0.29	0.35	0.096	0.45	0.25	< 0.034					61,000	NE	61,000	NE	21000	1.9
SEMIVOLATILE ORGANIC COMPOUNDS																	
Carbazole	mg/kg	NA	NA	NA	NA	<0.18	NA					290	NE	6,200	NE	2.8	NE
Dibenzofuran	mg/kg	NA	NA	NA	NA	<0.18	NA					NE	NE	NE	NE	NE	NE
2-Methylnaphthalene	mg/kg	NA	NA	NA	NA	0.18	NA					NE	NE	NE	NE	NE	NE
PESTICIDES																	
4,4´-DDD	mg/kg	NA	NA	NA	NA	< 0.0017	NA					24	NE	520	NE	80	NE
4,4´-DDE	mg/kg	NA	NA	NA	NA	< 0.0017	NA					17	NE	370	NE	270	NE
4,4´-DDT	mg/kg	NA	NA	NA	NA	< 0.0017	NA					17	1,500	100	2,100	160	NE

*Notes on final page

TABLE 5
SUMMARY OF SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
Chicago, Illinois

Sample ID Sample Depth (feet) Sample Date	Units	B-14A	B-15A	B-16A	B-17A	B-18A	B-18B						TACO Tier 1 Industrial- Commercial SROs (1)		TACO Tier 1 Construction Worker SROs (2)		TACO Tier 1 SRO Class II Groundwater (3)	TACO Tier 1 Background Concentrations (4)
		1-2	1.5-3	1-2	0-2	0-2	4.5-5.5						Ingestion	Inhalation	Ingestion	Inhalation		
POLYCHLORINATED BIPHENYLS																		
Polychlorinated Biphenyls (PCB's)	mg/kg	NA	NA	NA	NA	< 0.084	NA					1	NE	1	NE	NE	NE	
METALS, TOTAL																		
Aluminum	mg/kg	NA	NA	NA	NA	3500	NA					NE	NE	NE	NE	NE	9500	
Antimony	mg/kg	< 1.9	3.3	< 1.9	4.3	3.0	NA					820	NE	82	NE	20	4.0	
Arsenic	mg/kg	11	11	8.8	34	20	NA					13	1,200	61	25,000	120-130	13	
Barium	mg/kg	NA	NA	NA	NA	99	NA					140,000	910,000	14,000	870,000	1,700-NE	110	
Beryllium	mg/kg	< 0.48	0.77	< 0.47	0.89	0.70	NA					4,100	2,100	410	44,000	17,000-NE	0.59	
Cadmium	mg/kg	< 0.48	0.8	0.96	1.9	3.1	NA					2,000	2,800	200	59,000	110-NE	0.6	
Calcium	mg/kg	NA	NA	NA	NA	19000	NA					NE	NE	NE	NE	NE	NE	
Chromium	mg/kg	7.2	11	13	18	61	NA					6,100	420	4,100	690	NE (36-21) ⁽⁶⁾	16.2	
SPLP Chromium	mg/L	NA	NA	NA	NA	0.006	NA					NE	NE	NE	NE	1.0	NE	
Cobalt	mg/kg	NA	NA	NA	NA	7.7	NA					120,000	NE	12,000	NE	NE	8.9	
SPLP Cobalt	mg/L	NA	NA	NA	NA	NA	NA					NE	NE	NE	NE	1.0	NE	
Copper	mg/kg	24	66	46	120	210	NA					82,000	NE	8,200	NE	200,000-NE	19.6	
Iron	mg/kg	NA	NA	NA	NA	64000	NA					NE	NE	NE	NE	NE	15,900	
TCLP Iron	mg/L	NA	NA	NA	NA	2.8	NA					NE	NE	NE	NE	5	NE	
SPLP Iron	mg/L	NA	NA	NA	NA	NA	NA					NE	NE	NE	NE	5	NE	
Lead	mg/kg	53	170	110	300	280	NA					800	NE	700	NE	1,420-3,760	36	
Magnesium	mg/kg	NA	NA	NA	NA	9000	NA					NE	NE	730,000	NE	NE	4820	
Manganese	mg/kg	NA	NA	NA	NA	750	NA					41,000	91,000	4,100	8,700	NE	636	
SPLP Manganese	mg/L	NA	NA	NA	NA	0.038	NA					NE	NE	NE	NE	10	NE	
Mercury	mg/kg	0.091	0.090	0.075	0.097	0.25	NA					610	16 (5)	61	0.1 (5)	16-NE	0.06	
Nickel	mg/kg	11	15	13	24	41	NA					41,000	21,000	4,100	440,000	3,500-NE	18	
Potassium	mg/kg	NA	NA	NA	NA	360	NA					NE	NE	NE	NE	NE	1268	
Selenium	mg/kg	< 0.96	1.3	< 0.94	2.0	0.97	NA					10,000	NE	1,000	NE	4.5-1.3	0.48	
Silver	mg/kg	< 0.96	< 0.96	< 0.94	< 0.95	< 0.94	NA					10,000	NE	1,000	NE	NE (13-NE) ⁽⁷⁾	0.55	
Sodium	mg/kg	NA	NA	NA	NA	180	NA					NE	NE	NE	NE	NE	130	
Thallium	mg/kg	< 0.96	< 0.96	< 0.94	< 0.95	< 0.94	NA					160	NE	160	NE	30-49	0.32	
Vanadium	mg/kg	NA	NA	NA	NA	19	NA					14,000	NE	1,400	NE	NE (980) ⁽⁷⁾	25.2	
Zinc	mg/kg	80	210	260	910	500	NA					610,000	NE	61,000	NE	15,000-NE	95	
CYANIDE																		
Cyanide	mg/kg	NA	NA	NA	NA	0.27	NA					41,000	NE	4,100	NE	120	0.51	
pH																		
pH	Standard	7.21	7.49	8.36	7.95	7.65	NA					USEPA Criteria for determination of hazardous waste: not less than 2 or greater than 12						

*Notes on final page

TABLE 5
SUMMARY OF SOIL ANALYTICAL RESULTS

4301 W Chicago Ave
Chicago, Illinois

- Notes:
- (1): Soil remediation objective (SRO) for the soil ingestion or inhalation routes for industrial-commercial exposure (35 IAC 742 Appendix B, Table B).
 - (2): Soil remediation objective (SRO) for the soil ingestion or inhalation routes for construction worker exposure (35 IAC 742 Appendix B, Table B).
 - (3): The soil remediation objective (SRO) for the soil component of the groundwater ingestion route for Class II groundwater 35 IAC 742 Appendix B, Table B. For metals and cyanide, objectives are based on leached concentrations or pH-specific objectives may be used. Objectives are provided for pH range of 6.9 to 9.0 (highest pH for which pH-specific objectives are provided)
 - (4): Concentrations of Inorganic Chemicals in Background Soils within Counties Inside Metropolitan Statistical Areas (35 IAC 742 Appendix A, Table G).
Concentrations of Polynuclear Aromatic Hydrocarbon Chemicals in Background Soils within the City of Chicago (35 IAC 742 Appendix A, Table H).
 - (5): Soil remediation objective for inhalation route only applies at sites where elemental mercury (CAS#7439-97-6) is a contaminant of concern (35 IAC 742 Appendix B, Tables A and B)
 - (6): There are no Class II objectives for chromium, Class I objectives are provided, Class I objectives are for hexavalent chromium which is more toxic than trivalent chromium which is naturally more prevalent
 - (7): There are no Class II objectives for silver or vanadium, Class I objectives are provided

mg/kg	Milligram per kilogram
NE	Not established by the Illinois Environmental Protection Agency
NA	Not analyzed
ND	Not detected
TCLP	Toxicity Characteristic Leaching Procedure
SPLP	Synthetic Precipitation Leaching Procedure
BOLD	Laboratory Analytical Detection
BOLD + HIGHLIGHT	Laboratory Analytical Detection that exceeds TACO Tier 1 Industrial-Commercial Objective for sites with Class II Groundwater

Created By: MEJ 11/27/17
Reviewed By: EJW 12/7/17

TABLE 6
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

4301 W Chicago Ave
Chicago, Illinois

Sample ID		ESB-5	ESB-6	Well I	Well C	TACO Tier 1 Remediation Objective Class II Groundwater (1)	TACO Indoor Inhalation Route - Tier 1 Groundwater Remediation Objectives Industrial/Commercial Diffusion and Advection (2)
Sample Date	Units	8/9/17	8/9/17	8/29/17	8/29/17		
Parameter	Units						
VOLATILE ORGANIC COMPOUNDS							
Acetone	mg/L	< 0.020	< 0.020 H	< 0.020	< 0.020	6.3	1,000,000
Benzene	mg/L	< 0.005	< 0.0050 H	< 0.0050	< 0.0050	0.025	0.41
Carbon Disulfide	mg/L	< 0.010	< 0.010 H	< 0.010	< 0.010	3.5	210
Carbon Tetrachloride	mg/L	< 0.0050	< 0.0050 H	< 0.0050	< 0.0050	0.025	0.076
Chloroform	mg/L	< 0.0050	< 0.0050 H	< 0.0050	< 0.0050	0.001	0.15
Methylene Chloride	mg/L	< 0.0050	0.13 H (3)	< 0.0050	< 0.0050	0.05	8.2
Tetrachloroethene	mg/L	< 0.0050	< 0.0050 H	< 0.0050	< 0.0050	0.025	0.34
Toluene	mg/L	< 0.0050	< 0.0050 H	< 0.0050	< 0.0050	2.5	530
Total Xylenes	mg/L	< 0.015	< 0.015 H	< 0.015	< 0.015	10	93
POLYNUCLEAR AROMATIC COMPOUNDS (PNAs)							
Acenaphthene	mg/L	< 0.0010	< 0.0010	NA	NA	2.1	NE
Acenaphthylene	mg/L	< 0.0010	< 0.0010	NA	NA	NE	NE
Anthracene	mg/L	< 0.0010	< 0.0010	NA	NA	10.5	NE
Benzo(a)anthracene	mg/L	< 0.00010	< 0.00010	NA	NA	0.00065	NE
Benzo(a)pyrene	mg/L	< 0.00010	< 0.00010	NA	NA	0.002	NE
Benzo(b)fluoranthene	mg/L	< 0.00010	< 0.00010	NA	NA	0.0009	NE
Benzo(g,h,i)perylene	mg/L	< 0.0010	< 0.0010	NA	NA	NE	NE
Benzo(k)fluoranthene	mg/L	< 0.00010	< 0.00010	NA	NA	0.00085	NE
Chrysene	mg/L	< 0.00010	< 0.00010	NA	NA	0.0075	NE
Dibenzo(a,h)anthracene	mg/L	< 0.00010	< 0.00010	NA	NA	0.0015	NE
Fluoranthene	mg/L	< 0.0010	< 0.0010	NA	NA	1.4	NE
Fluorene	mg/L	< 0.0010	< 0.0010	NA	NA	1.4	NE
Indeno(1,2,3-cd)pyrene	mg/L	< 0.00010	< 0.00010	NA	NA	0.00215	NE
Naphthalene	mg/L	< 0.0010	< 0.0010	NA	NA	0.22	NE
Phenanthrene	mg/L	< 0.0010	< 0.0010	NA	NA	NE	NE
Pyrene	mg/L	< 0.0010	< 0.0010	NA	NA	1.05	NE
METALS, TOTAL							
Aluminum	mg/L	< 0.040	NA	NA	NA	NE	NE
Antimony	mg/L	< 0.0060	< 0.0060	NA	NA	0.024	NE
Arsenic	mg/L	0.0074	< 0.0040	NA	NA	0.2	NE
Barium	mg/L	0.079	NA	NA	NA	2.0	NE
Beryllium	mg/L	< 0.0020	< 0.0020	NA	NA	0.5	NE
Cadmium	mg/L	< 0.0020	< 0.0020	NA	NA	0.05	NE
Calcium	mg/L	84	NA	NA	NA	NE	NE
Chromium	mg/L	< 0.0040	< 0.0040	NA	NA	1.0	NE
Cobalt	mg/L	< 0.0040	NA	NA	NA	1.0	NE
Copper	mg/L	< 0.010	< 0.010	NA	NA	0.65	NE
Iron	mg/L	1.4	NA	NA	NA	5.0	NE
Lead	mg/L	< 0.0020	< 0.0020	NA	NA	0.1	NE
Magnesium	mg/L	28	NA	NA	NA	NE	NE
Manganese	mg/L	0.43	NA	NA	NA	10.0	NE
Mercury	mg/L	< 0.00020	< 0.00020	NA	NA	0.01	0.060
Nickel	mg/L	< 0.0040	< 0.0040	NA	NA	2.0	NE
Potassium	mg/L	3.6	NA	NA	NA	NE	NE
Selenium	mg/L	< 0.0040	< 0.0040	NA	NA	0.05	NE
Silver	mg/L	< 0.0040	< 0.0040	NA	NA	NE (0.05)	NE
Sodium	mg/L	9.6	NA	NA	NA	NE	NE
Thallium	mg/L	< 0.0020	< 0.0020	NA	NA	0.02	NE
Vanadium	mg/L	< 0.0040	NA	NA	NA	0.1	NE
Zinc	mg/L	0.04	0.037	NA	NA	10	NE
CYANIDE							
Cyanide	mg/L	0.0055	NA	NA	NA	0.6	NE
pH							
pH	Standard	7.3	NA	NA	NA	USEPA Criteria for determination of hazardous waste: not less than 2 or greater than 12.5	

Notes:

Sample ESB-5 was analyzed for the entire Target Compound List from 35 IAC 740 Appendix A, including Semivolatile Organic Compounds (SVOCs), Pesticides and PCBs. No SVOCs (other than PNAs), pesticides or PCBs were detected.

- (1): The groundwater remediation objective (GRO) for the groundwater ingestion route for Class II groundwater 35 IAC 742 Appendix B, Table E.
- (2): The groundwater remediation objective for the indoor inhalation route (diffusion and advection) for industrial/commercial sites from 35 IAC 742 Appendix B, Table H.
- (3): The laboratory has indicated that the methylene chloride detected is a laboratory artifact, the result of analyzing the sample from an unpreserved amber jar from which previous aliquots for other analyses had been taken

mg/L Milligrams per liter

NE Not established by the Illinois Environmental Protection Agency

NA Not analyzed

H Sample was analyzed from unpreserved sample, past holding time for an unpreserved sample

BOLD Detected concentration

BOLD + HIGHLIGHT Concentration above objectives

Created By:
Reviewed By:

MEJ 11/27/17
EJW 12/20/17

Table 7
Summary of Concentrations Exceeding Objectives
4301 West Chicago Avenue
Chicago, Illinois 60624
Page 1 of 3

Sample Identification	Parameter	Concentration (mg/kg) or (mg/L)	Industrial/ Commercial Ingestion or Inhalation Objectives ⁽¹⁾ (mg/kg)	Class II Groundwater Objectives ⁽²⁾ (mg/kg)
SOIL				
SB2-1 (1.0-3.0 ft)	Mercury	0.31*	0.1 (CW Inhalation)⁽³⁾	
SB3-1 (1.0-3.0 ft)	Mercury	0.17	0.1 (CW Inhalation)⁽³⁾	
SB10-4 (8.5-10.5 ft)	Arsenic Mercury	13.8 0.14	13 (ingestion) 0.1 (CW Inhalation)⁽³⁾	
GP-3A (0-2.0 ft)	Benzo(a)pyrene Benzo(b)fluoranthene Dibenzo(a,h)anthracene	6.3 E 8.7 E 1.7	1.3 (ingestion) 8 (ingestion) 0.8 (ingestion)	
GP-4E (8-10 ft)	Antimony Mercury	23 0.16	0.1 (CW Inhalation)⁽³⁾	20
GP-6C (4.0-6.0 ft)	Benzo(a)pyrene Dibenzo(a,h)anthracene Mercury	3.8 0.82 0.16	1.3 (ingestion) 0.8 (ingestion) 0.1 (CW Inhalation)⁽³⁾	
GP-7D (6.0-8.0 ft)	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Dibenzo(a,h)anthracene Mercury	12 13 12 1.0 0.76	8 (ingestion) 1.3 (ingestion) 8 (ingestion) 0.8 (ingestion) 0.1 (CW Inhalation)⁽³⁾	8
GP-7F (10-12 ft)	Benzo(a)pyrene Mercury	2.3 E 0.16	1.3 (ingestion) 0.1 (CW Inhalation)⁽³⁾	
GP-11D (1.0-3.0 ft)	Benzo(a)pyrene	3.1	1.3 (ingestion)	
GP-13A (0-2.0 ft)	Mercury	0.12	0.1 (CW Inhalation)⁽³⁾	

Table 7
Summary of Concentrations Exceeding Objectives
4301 West Chicago Avenue
Chicago, Illinois 60624
Page 2 of 3

Sample Identification	Parameter	Concentration (mg/kg) or (mg/L)	Industrial/ Commercial Ingestion or Inhalation Objectives ⁽¹⁾ (mg/kg)	Class II Groundwater Objectives ⁽²⁾ (mg/kg)
GP-15A (0-2.0 ft)	Mercury	0.28	0.1 (CW Inhalation)⁽³⁾	
GP-17A (0-2 ft)	Arsenic Mercury	18 7.5	13 (ingestion) 0.1 (CW Inhalation)⁽³⁾	
GP-19A (0-2 ft)	Chromium	35		28
ESB-3B (5.5-6.5 ft)	Benzo(a)pyrene Dibenzo(a,h)anthracene	3.0 0.87	1.3 (ingestion) 0.8 (ingestion)	
ESB-4A (0.5-1.5 ft)	Benzo(a)pyrene Dibenzo(a,h)anthracene Mercury	3.2 0.81 0.14	1.3 (ingestion) 0.8 (ingestion) 0.1 (CW Inhalation)⁽³⁾	
ESB-5A (0-1.0 ft)	Mercury	0.15	0.1 (CW Inhalation)⁽³⁾	
ESB-6A (2-4 ft)	Arsenic Mercury	18 0.15	13 (ingestion) 0.1 (CW Inhalation)⁽³⁾	
B-6A (1-3 ft)	Benzo(a)pyrene Dibenzo(a,h)anthracene	3.9 1.1	1.3 (ingestion) 0.8 (ingestion)	
B-6B (8.0-10.0 ft)	Mercury	0.24	0.1 (CW Inhalation)⁽³⁾	
B-7A (0-2.0 ft)	Mercury	0.23	0.1 (CW Inhalation)⁽³⁾	
B-9A (1-3 ft)	Arsenic Mercury	14 0.22	13 (ingestion) 0.1 (CW Inhalation)⁽³⁾	
B-10A	Mercury	0.20	0.1 (CW	

Table 7
Summary of Concentrations Exceeding Objectives
4301 West Chicago Avenue
Chicago, Illinois 60624
Page 3 of 3

Sample Identification	Parameter	Concentration (mg/kg) or (mg/L)	Industrial/ Commercial Ingestion or Inhalation Objectives ⁽¹⁾ (mg/kg)	Class II Groundwater Objectives ⁽²⁾ (mg/kg)
(0-1.0 ft)			Inhalation ⁽³⁾	
B-12A (0-2.0 ft)	Mercury	0.32	0.1 (CW Inhalation) ⁽³⁾	
B-17A (0-2 ft)	Arsenic	34	13 (ingestion)	
B-18A (0-2 ft)	Arsenic Mercury	20 0.25	13 (ingestion) 0.1 (CW Inhalation) ⁽³⁾	

- (1) Illinois EPA TACO objectives for Industrial/Commercial sites (35 IAC 742 Appendix B, Table B) most restrictive of inhalation or ingestion pathway objectives, or background concentrations, includes construction worker ingestion or inhalation concentrations
- (2) Illinois EPA TACO objectives (soil) for Sites with Class II Groundwater (35 IAC 742 Appendix B, Table B)
- (3) Soil remediation objective for inhalation route only applies at sites where elemental mercury (CAS#7439-97-6) is a contaminant of concern (35 IAC 742 Appendix B, Tables A and B).

E = Laboratory qualifier – value above quantitation limit

* Laboratory qualified as estimated due to non-homogenous sample matrix

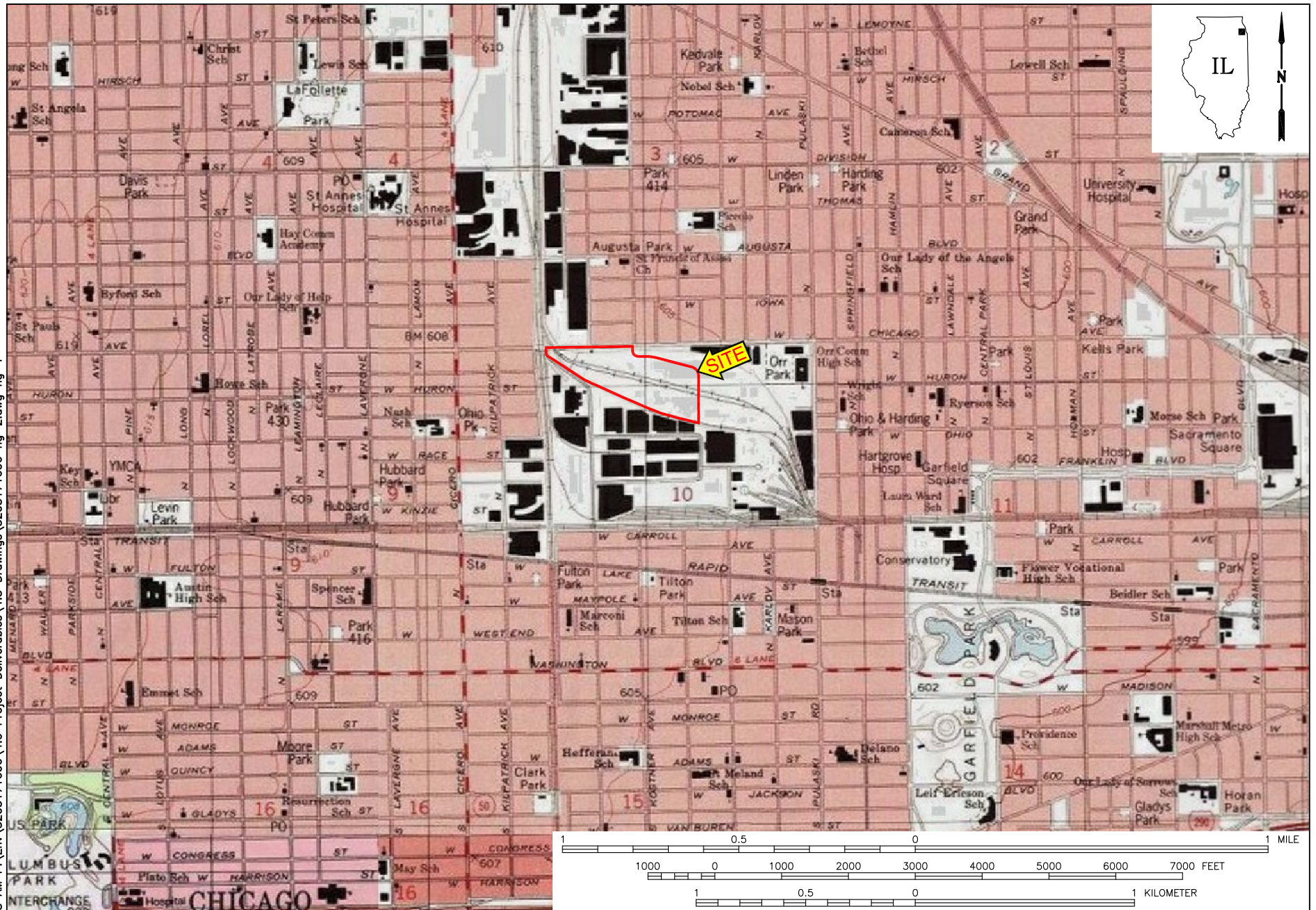
CW = Construction Worker

mg/kg = milligrams per kilogram

mg/L = milligrams per liter



FIGURES



LEGEND:

— = APPROXIMATE SITE BOUNDARY



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Property Location Map
Vacant Parcel
Chicago Avenue & Kilbourn Avenue
Chicago, IL

DRAWN
GAP

PROJECT NUMBER
3205171606

APPROVED

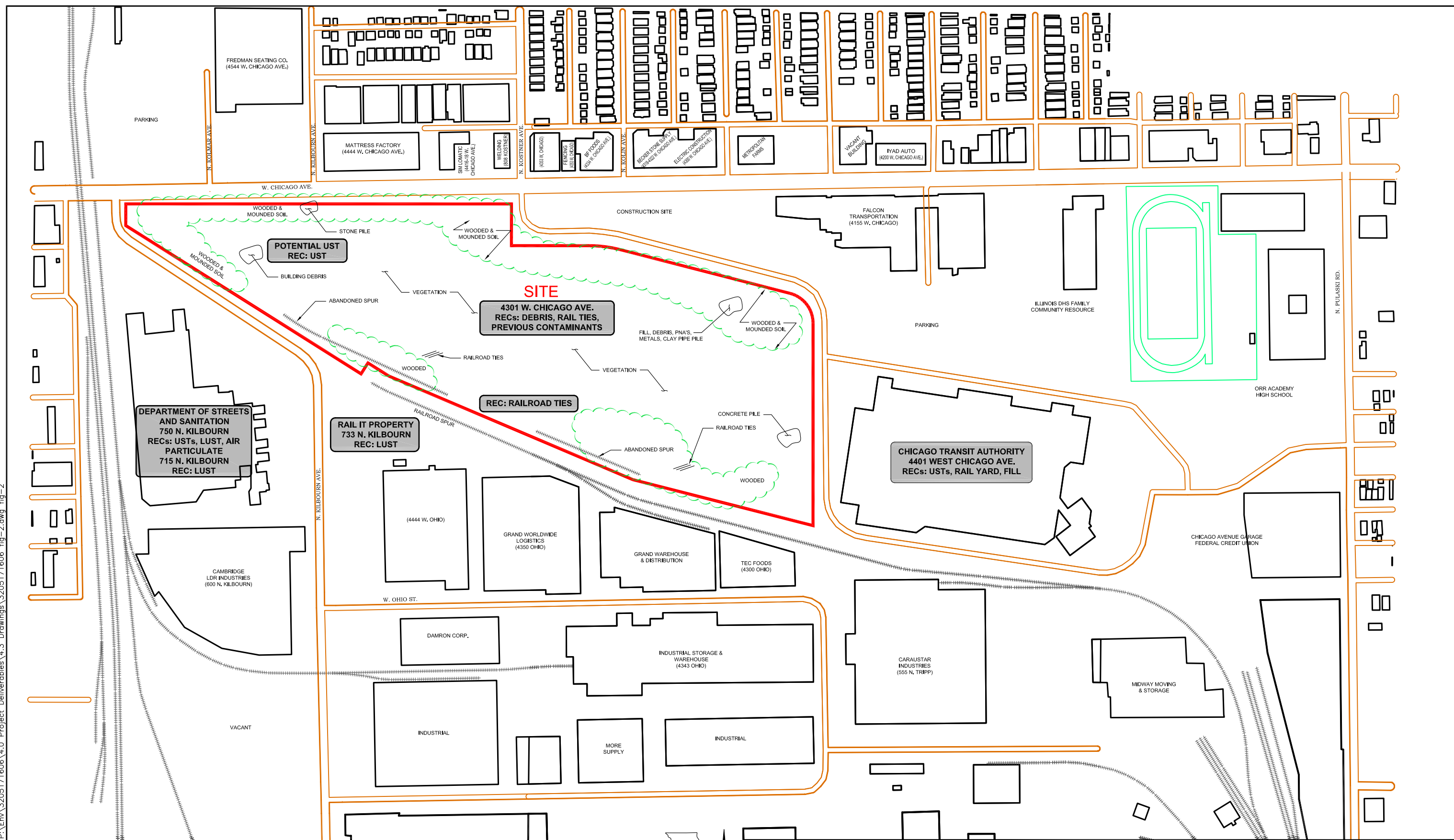
DATE
6/19/17

REVISED DATE

REV. #

FIGURE
1

1/8/2018 12:00 PM P:\Env\3205171606\4.0 Project Deliverables\4.3 Drawings\3205171606 fig-2.dwg fig-2



LEGEND:
= APPROXIMATE SITE BOUNDARY

0 0 0
SCALE: NOT TO SCALE



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Environment & Infrastructure, Inc.

Map Showing RECs
Vacant Parcel
Chicago Avenue & Kilbourne Avenue
Chicago, IL

DRAWN GAP	PROJECT NUMBER 3205171606	APPROVED	DATE 6/19/17	REVISED DATE	REV. No.
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FIGURE
2

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LEGEND:

- APPROXIMATE SITE BOUNDARY
- SB (green circle) APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (WARZYN 1991)
- GP (pink diamond) APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (CARLSON 2007)
- GP (pink diamond) GEOTECHNICAL / ENVIRONMENTAL SOIL BORING LOCATION (2017)
- ESB (red square) ENVIRONMENTAL SOIL BORING LOCATION (2017)
- MW (black circle) MONITORING WELL, UNKNOWN DATE, UNKNOWN INSTALLER

0 150
SCALE: 1" = 150'



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Environment & Infrastructure, Inc.

Map Showing Planned Land Development & Boring Locations
Vacant Parcel
4303 W. Chicago Avenue
Chicago, IL

DRAWN
GAP

PROJECT NUMBER
3205171606

APPROVED
DATE
11/9/17

REVISED DATE
REV. No.

FIGURE
3

1/8/2018 12:05 PM P:\Env\3205171606\4.0 Project Deliverables\4.3 Drawings\3205171606 SB-GW Data.dwg fig-4

- LEGEND:
- APPROXIMATE SITE BOUNDARY
 - APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (WARZYN 1991)
 - APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (CARLSON 2007)
 - GEOTECHNICAL / ENVIRONMENTAL SOIL BORING LOCATION (2017)
 - ENVIRONMENTAL SOIL BORING LOCATION (2017)
 - MONITORING WELL, UNKNOWN DATE, UNKNOWN INSTALLER
 - - - GROUNDWATER CONTOUR
 - (84.87) GROUNDWATER ELEVATION (AUGUST 2017)

0 100 200
SCALE: 1" = 200'



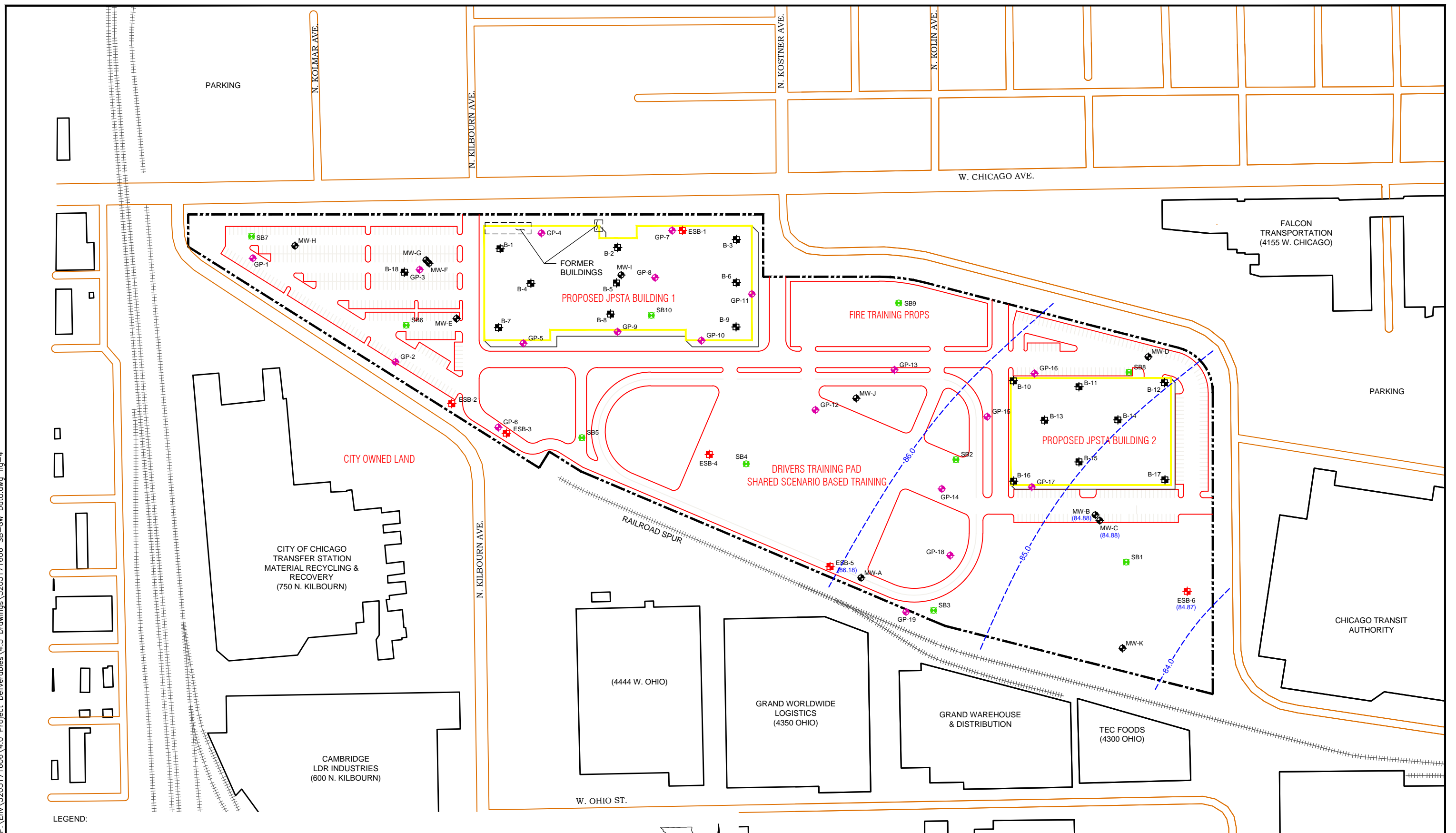
Amec Foster Wheeler
Environment & Infrastructure, Inc.

Shallow Groundwater Contour
Vacant Parcel
4303 W. Chicago Avenue
Chicago, IL

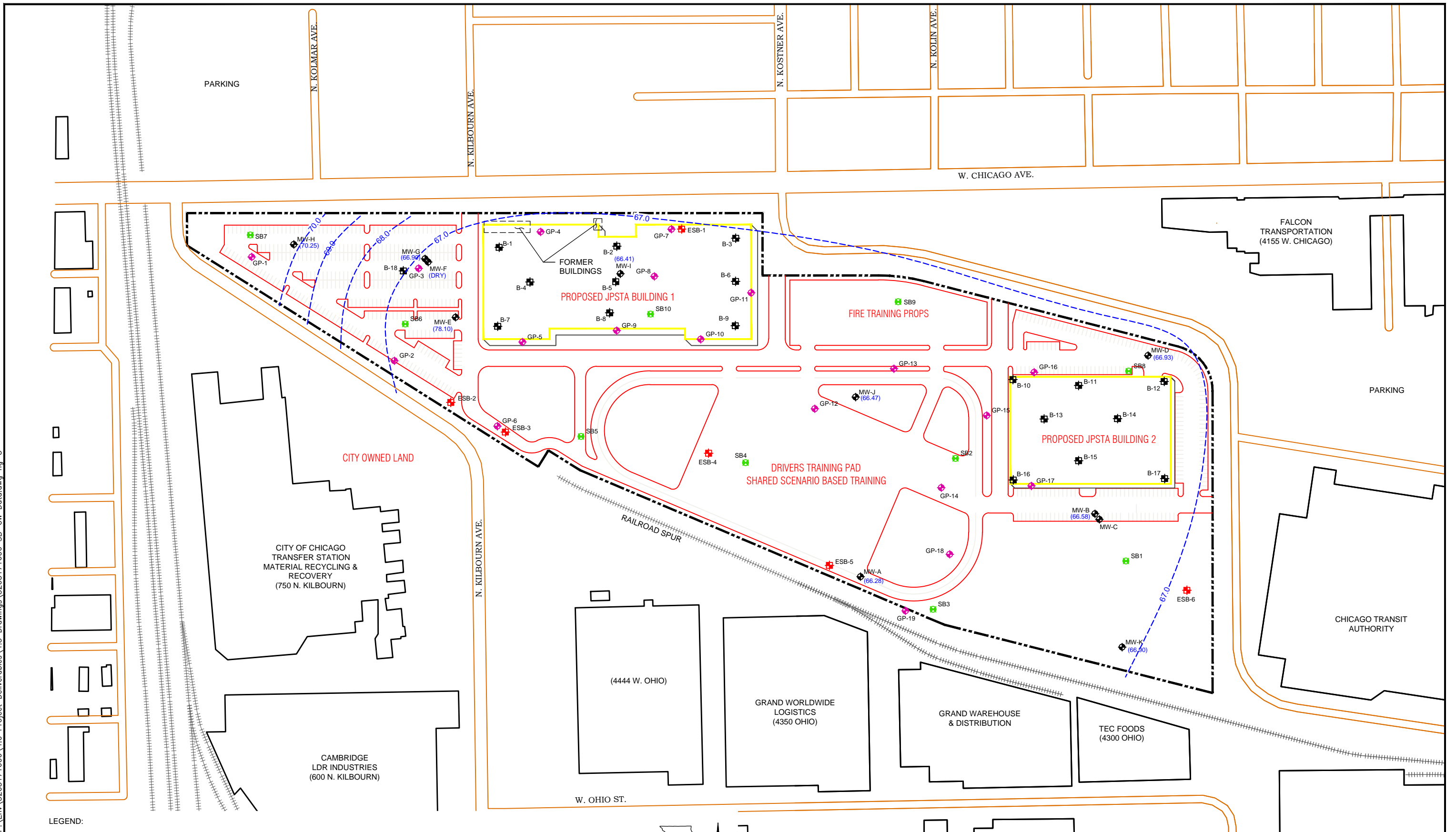
DRAWN PROJECT NUMBER
GAP 3205171606

APPROVED DATE REVISED DATE REV. No.
11/9/17

FIGURE
4



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LEGEND:

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (WARZYN 1991)
- APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (CARLSON 2007)
- GEOTECHNICAL / ENVIRONMENTAL SOIL BORING LOCATION (2017)
- ENVIRONMENTAL SOIL BORING LOCATION (2017)
- MONITORING WELL, UNKNOWN DATE, UNKNOWN INSTALLER
- GROUNDWATER CONTOUR
- (84.87) GROUNDWATER ELEVATION (AUGUST 2017)

0 100 200
SCALE: 1" = 200'



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Environment & Infrastructure, Inc.

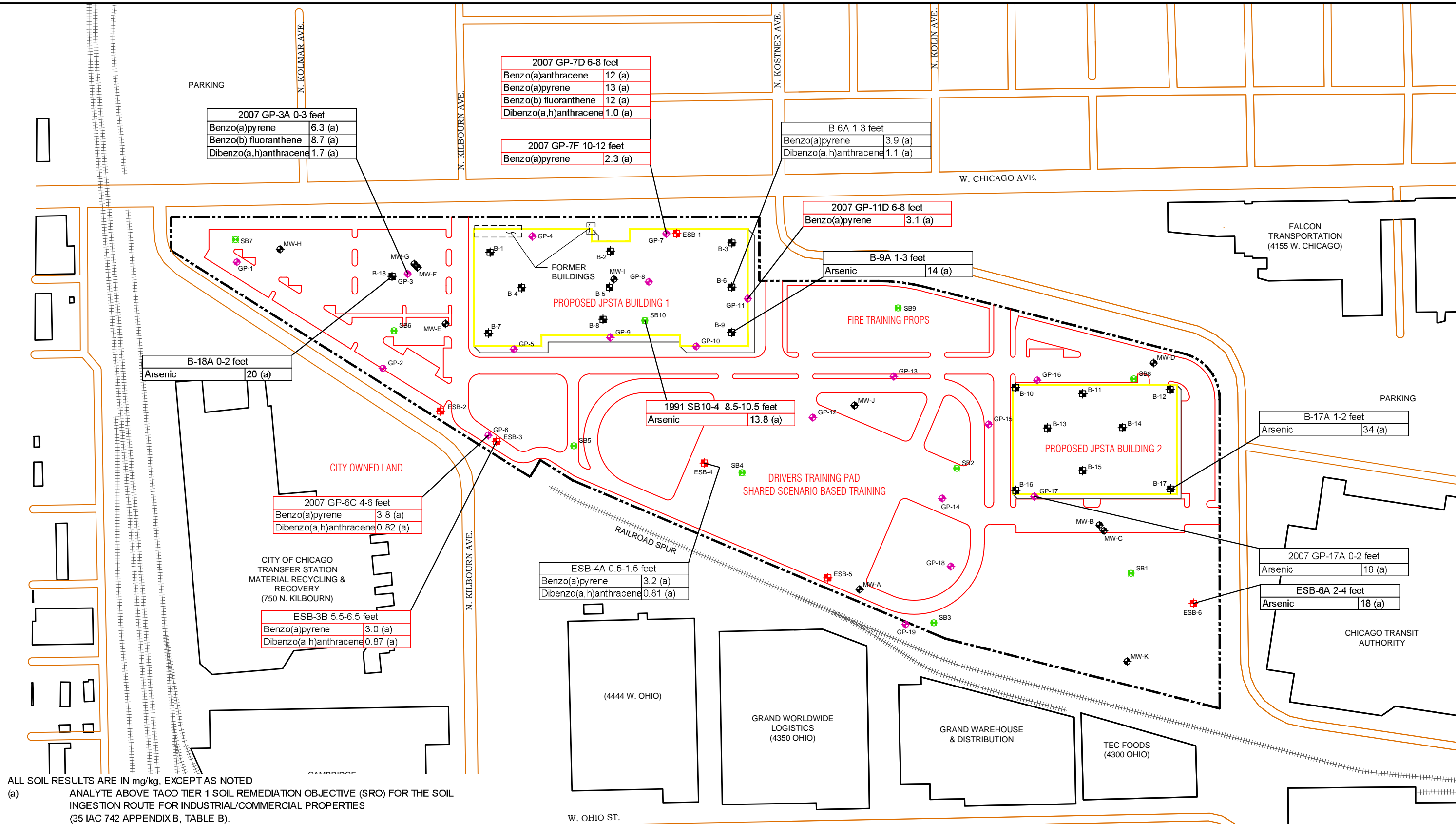
Deep Groundwater Contour
Vacant Parcel
4303 W. Chicago Avenue
Chicago, IL

DRAWN PROJECT NUMBER
GAP 3205171606

APPROVED	DATE	REVISED DATE	REV. No.
	11/9/17		

FIGURE
5

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ALL SOIL RESULTS ARE IN mg/kg, EXCEPT AS NOTED
(a) ANALYTE ABOVE TACO TIER 1 SOIL REMEDIATION OBJECTIVE (SRO) FOR THE SOIL INGESTION ROUTE FOR INDUSTRIAL/COMMERCIAL PROPERTIES (35 IAC 742 APPENDIX B, TABLE B).

LEGEND:

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (WARZYN 1991)
- APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (CARLSON 2007)
- GEOTECHNICAL / ENVIRONMENTAL SOIL BORING LOCATION (2017)
- ENVIRONMENTAL SOIL BORING LOCATION (2017)
- MONITORING WELL, UNKNOWN DATE, UNKNOWN INSTALLER
- SHALLOW SAMPLE
- DEEP SAMPLE

0 100 200
SCALE: 1" = 200'



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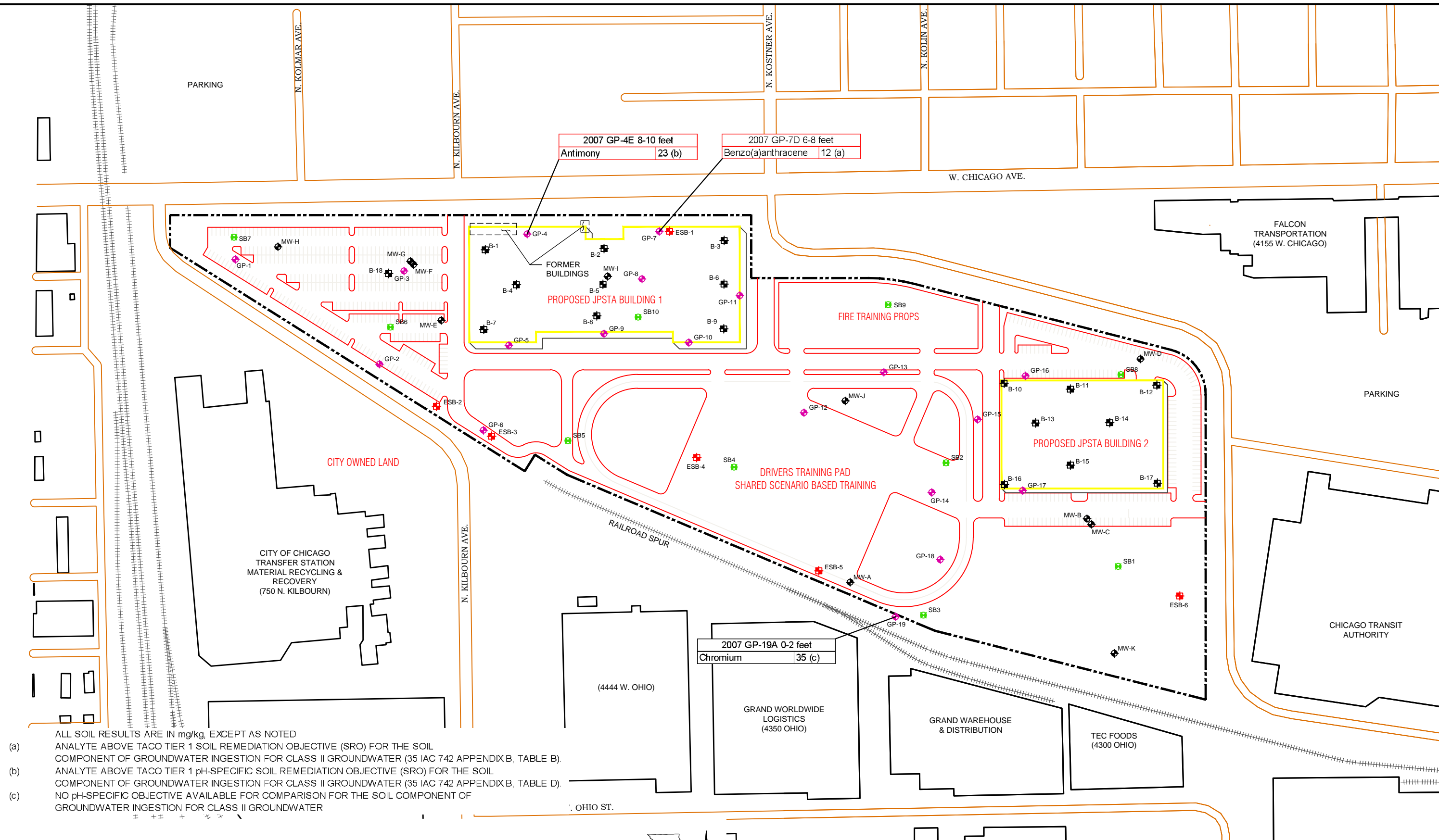
Soil Ingestion Pathway Exceedences
Vacant Parcel
4303 W. Chicago Avenue
Chicago, IL

DRAWN PROJECT NUMBER
GAP 3205171606

APPROVED DATE REVISED DATE REV. No.
11/9/17

FIGURE
6

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- ALL SOIL RESULTS ARE IN mg/kg, EXCEPT AS NOTED
- (a) ANALYTE ABOVE TACO TIER 1 SOIL REMEDIATION OBJECTIVE (SRO) FOR THE SOIL COMPONENT OF GROUNDWATER INGESTION FOR CLASS II GROUNDWATER (35 IAC 742 APPENDIX B, TABLE B).
- (b) ANALYTE ABOVE TACO TIER 1 pH-SPECIFIC SOIL REMEDIATION OBJECTIVE (SRO) FOR THE SOIL COMPONENT OF GROUNDWATER INGESTION FOR CLASS II GROUNDWATER (35 IAC 742 APPENDIX B, TABLE D).
- (c) NO pH-SPECIFIC OBJECTIVE AVAILABLE FOR COMPARISON FOR THE SOIL COMPONENT OF GROUNDWATER INGESTION FOR CLASS II GROUNDWATER

LEGEND:

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (WARZYN 1991)
- APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (CARLSON 2007)
- GEOTECHNICAL / ENVIRONMENTAL SOIL BORING LOCATION (2017)
- ENVIRONMENTAL SOIL BORING LOCATION (2017)
- MONITORING WELL, UNKNOWN DATE, UNKNOWN INSTALLER

0 100 200
SCALE: 1" = 200'



Amec Foster Wheeler
Environment & Infrastructure, Inc.

Soil Component of Groundwater Ingestion Pathway Exceedances
Vacant Parcel
4303 W. Chicago Avenue
Chicago, IL

DRAWN PROJECT NUMBER
GAP 3205171606

APPROVED DATE REVISED DATE REV. No.
11/9/17

FIGURE
7

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ALL SOIL RESULTS ARE IN mg/kg, EXCEPT AS NOTED
(a) ANALYTE ABOVE TACO TIER 1 SRO FOR THE SOIL INHALATION ROUTE FOR CONSTRUCTION WORKER EXPOSURE (35 IAC 742 APPENDIX B, TABLE B).
ELEMENTAL MERCURY IS NOT KNOWN TO BE A CONTAMINANT OF CONCERN AT THE SITE
THIS SOIL REMEDIATION OBJECTIVE ONLY APPLIES AT SITES WHERE ELEMENTAL MERCURY IS A CONTAMINANT OF CONCERN

LEGEND:

- = APPROXIMATE SITE BOUNDARY
- = APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (WARZYN 1991)
- = APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (CARLSON 2007)
- = GEOTECHNICAL / ENVIRONMENTAL SOIL BORING LOCATION (2017)
- = ENVIRONMENTAL SOIL BORING LOCATION (2017)
- = MONITORING WELL, UNKNOWN DATE, UNKNOWN INSTALLER

0 100 200
SCALE: 1" = 200'



Amec Foster Wheeler
Environment & Infrastructure, Inc.

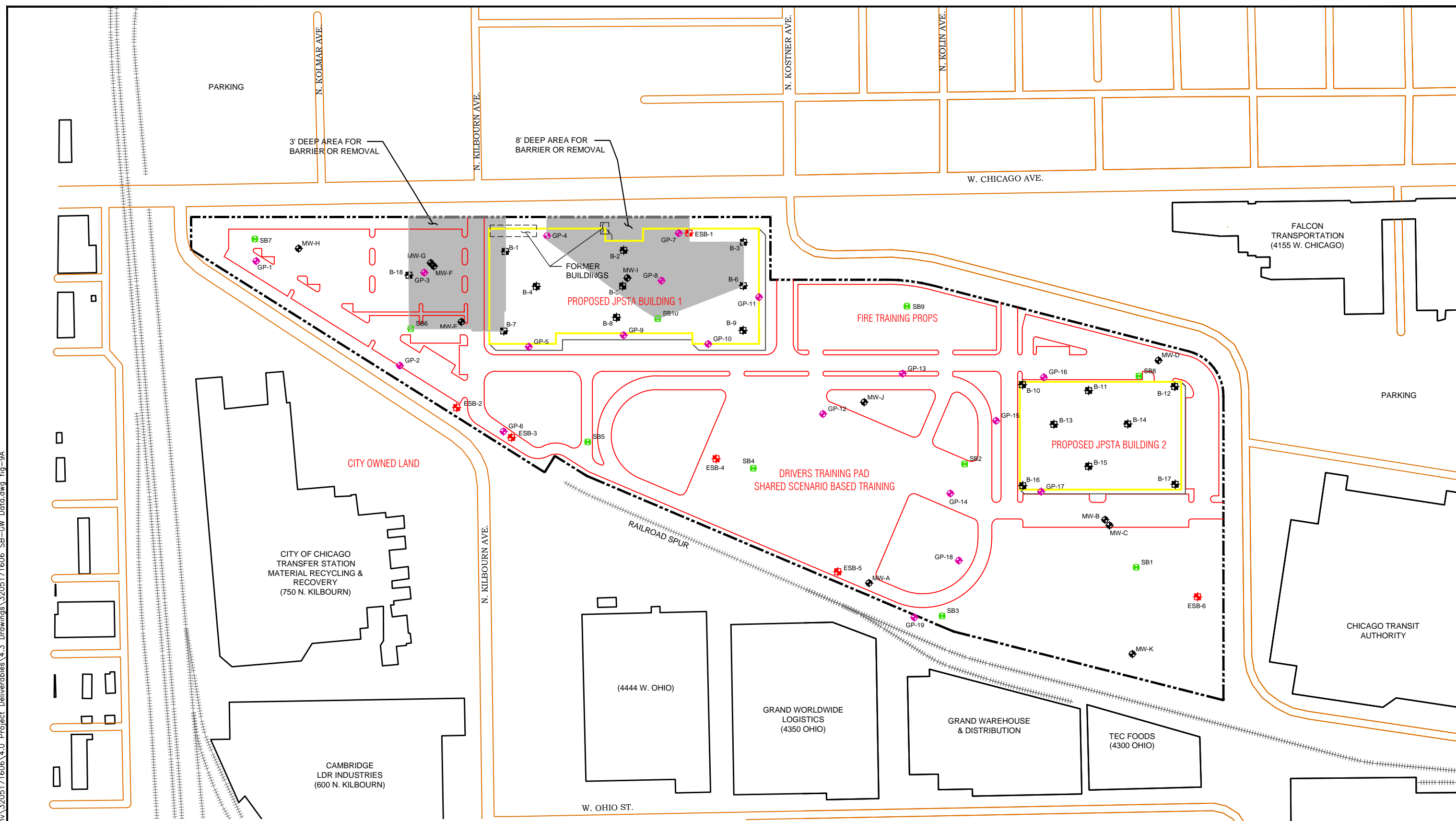
Construction Worker Inhalation Exceedances
Vacant Parcel
4303 W. Chicago Avenue
Chicago, IL

DRAWN PROJECT NUMBER
GAP 3205171606






APPROVED DATE REVISED DATE REV. No.
11/9/17

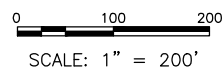
FIGURE

8



LEGEND:

- = APPROXIMATE SITE BOUNDARY
 = APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (WARZYN 1991)
 = APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (CARLSON 2007)
 = GEOTECHNICAL / ENVIRONMENTAL SOIL BORING LOCATION (2017)
 = ENVIRONMENTAL SOIL BORING LOCATION (2017)
 = MONITORING WELL, UNKNOWN DATE, UNKNOWN INSTALLER



**Amec Foster Wheeler
Environment & Infrastructure, Inc.**

Areas for Barrier or Removal
Vacant Parcel
4303 W. Chicago Avenue
Chicago, IL

DRAWN	PROJECT NUMBER
GAP	3205171606


APPROVED	DATE	REVISED DATE	REV. No.
	11/9/17		


FIGURE 9





APPENDIX A


Boring Logs

<div> amec foster wheeler 8745 West Higgins Road Suite 300 Chicago, IL 60631</div>					TEST BORING RECORD		Page 1	of 1
					CLIENT: City of Chicago 2FM		SITE: JPSTA	
					BORING NO: ESB-1		4301 West Chicago Avenue	
					DATE: 8/9/2017		Chicago, Illinois	
					LOGGED BY: Andrew E. Hastings		DRILLED BY: Groff Testing Corporation	
					DRILLING METHOD: CME 75 ATV Hollow stem auger		SAMPLING METHOD: Split spoon	
BORING LOCATION: Northeast of B-2, on berm and in tree line					HOLE DIA.: 5 5/8 inches			
AMEC PROJECT NUMBER: 3205171606					TOTAL DEPTH: 18 feet			
DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS		
0	ESB-1A				0-2' FILL: brown clayey silt with little sand and gravel, rootlets, dry	A soil sample was collected at 0-2' feet bgs to be analyzed for PNAs, PP metals and pH		
1		50%	0.0	dry				
2					2' - 3' FILL: Concrete fragments			
3		50%	0.0	dry				
4					3'-6' FILL: dark brown to black clayey silt, with little gravel, dry			
5		30%	0.0	dry				
6					6'-11' FILL: dark brown to black clayey silt, with little slag or asphalt grindings, little gravel, dry			
7		50%	0.1	dry				
8					increased clay with depth, becoming slightly moist			
9		50%	0.0	slightly moist	chunks of metal noted			
10					wood pieces noted			
11		50%	0.0	dry				
12	ESB-1B				11'-11.5' FILL: reddish brown brick fragments, dry	A soil sample was collected at 10'-12' feet bgs and held for potential later analysis		
13					11.5'-12.5' FILL: dark brown to black clayey silt with some pieces of gravel, dry			
14					12.5'-13.5' FILL: Brown sand with little gravel, dry	A soil sample was collected at 13'-14' feet bgs to be analyzed for PNAs,		
15					13.5'-15' FILL: dark brown silty clay with slag and gravel, dry to moist			
16	ESB-1C				15'-17' FILL: brown sand with little gravel, slightly moist			
17		75%	0.0	dry to moist	becomes very moist to wet with increased gravel			
18					17'-18' dark brown silty clay with trace sand and gravel, moist			
19								
20								
21								
22								
23								
24								
25								

<div> 8745 West Higgins Road Suite 300 Chicago, IL 60631</div>					TEST BORING RECORD		Page 1 of 1	
					CLIENT: City of Chicago 2FM		SITE: JPSTA	
					BORING NO: ESB-2		4301 West Chicago Avenue	
					DATE: 8/2/2017		Chicago, Illinois	
					LOGGED BY: Andrew E. Hastings		DRILLED BY: Groff Testing Corporation	
DRILLING METHOD: CME 75 ATV Hollow stem auger					SAMPLING METHOD: Split spoon			
BORING LOCATION: Southwest central area near trees					HOLE DIA.: 5 5/8 inches			
AMEC PROJECT NUMBER: 3205171606					TOTAL DEPTH: 16 feet			
DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS		
0	ESB-2A	80%	0.0	dry	About 3 inches roots and organics	A soil sample was collected at 1.5'-2.5' feet bgs to be analyzed for SRP Target Compound List parameters and herbicides		
1					0.25'-1.25' FILL: brown silty clay with trace gravel, dry			
2					1.25'-2.5' FILL: black silt with rootlets and large white gravel			
3					2.5'-11.5' FILL: brown sand, medium, little to trace grey gravel, dry			
4	ESB-2B	50%	0.0	dry	4'-6' No recovery	A soil sample was collected at 6'-8' feet bgs and held for potential later analysis		
5					0%			
6					6'-8' Little recovery continue gravelly brown sand, dry			
7					25%		0.0	dry
8	ESB-2C	35%	0.0	dry	sand, dry	A soil sample was collected at 11.5'-12' feet bgs and held for potential later analysis		
9								
10								
11					50%		0.0	moist
12	ESB-2C	60%	0.0	slightly moist	11.5-13 FILL:dark brown clay silt with sand and a little gravel, and cinders or slag, moist			
13					13-15' dark gray to graybrown silty clay, slightly moist, firm			
14								
15					75%		0.0	moist
16					Boring terminated at 16' below ground surface (bgs)			
17								
18								
19								
20								
21								
22								
23								
24								
25								

<div> 8745 West Higgins Road Suite 300 Chicago, IL 60631</div>					TEST BORING RECORD				Page 1 of 1			
					CLIENT:		City of Chicago 2FM		SITE:		JPSTA	
					BORING NO:		ESB-3				4301 West Chicago Avenue	
					DATE:		8/2/2017				Chicago, Illinois	
					LOGGED BY:		Andrew E. Hastings		DRILLED BY:		Groff Testing Corporation	
					DRILLING METHOD:		CME 75 ATV Hollow stem auger		SAMPLING METHOD:		Split spoon	
BORING LOCATION:					Southwest central near south edge, up on berm				HOLE DIA.: 5 5/8 inches			
AMEC PROJECT NUMBER:					3205171606				TOTAL DEPTH: 16 feet			
DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY				REMARKS			
0					1-2 inches grass and roots							
1	ESB-3A	50%	0.0	dry	2" to 5' FILL: Black to very dark brown to grey silt (asphalt grindings with soil), little gravel, dry				A soil sample was collected at 1'-4' feet bgs to be analyzed for SRP Target Compound List parameters			
2												
3		50%	0.0	dry								
4												
5	ESB-3B	75%	0.0	dry	rootlets at 5.5' to 6'				A soil sample was collected at 5.5'-6.5' feet bgs to be analyzed for PNAs			
6					5' to 8' FILL: Brown to dark brown sand with silt, clay and gravel, some small slag, dry							
7		10%	0.0	dry								
8												
9	ESB-3C	70%	0.0	dry	8' to 13' FILL: Brown to orangish brown medium sand with little gravel, dry				A soil sample was collected at 14.5'-15.5' feet bgs and held for potential later analysis			
10					trace gravel, still dry							
11		60%	0.0	dry								
12												
13			0.0	moist	13.5' to 14.5' FILL: Brown silty sand, trace gravel, moist							
14	ESB-3C		0.0	very moist	14.5' to 15.5' FILL: Sand, ground slag with gravel, very moist							
15					15.5' to 16' Dark brown silty clay, firm, trace gravel							
16					Boring terminated at 16' below ground surface (bgs)							
17												
18												
19												
20												
21												
22												
23												
24												
25												

 8745 West Higgins Road Suite 300 Chicago, IL 60631					TEST BORING RECORD		Page 1 of 1			
					CLIENT:	City of Chicago 2FM	SITE:	JPSTA		
					BORING NO:	ESB-4	4301 West Chicago Avenue			
					DATE:	8/7/2017	Chicago, Illinois			
					LOGGED BY:	Craig T. Cabrera	DRILLED BY:	Groff Testing Corporation		
DRILLING METHOD:					CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon			
BORING LOCATION:					Center south, near south boundary		HOLE DIA.:	7 5/8 inches		
AMEC PROJECT NUMBER:					3205171606		TOTAL DEPTH:	16 feet		
DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS				
0	ESB-4A	10%	2.3	moist	0' to 2' Black organic soil with trace gravel, moist	A soil sample was collected at 0-3' feet bgs to be analyzed for SRP Target Compound List parameters A soil sample was collected at 3'-4' feet bgs and held for potential later analysis				
1					2' to 9' FILL: Tan medium sand, silty, trace gravel, moist					
2	ESB-4B	50%	0.0	moist						
3										
4										
5		50%	0.0	moist	Groundwater encountered					
6							50%	0.0	moist	wet
7										
8										
9					Black slag at 8 feet					
10										
11										
12										
13										
14										
15										
16					Boring terminated at 16' below ground surface (bgs)					
17										
18										
19										
20										
21										
22										
23										
24										
25										

<div> 8745 West Higgins Road Suite 300 Chicago, IL 60631</div>					TEST BORING RECORD		Page 1 of 1	
					CLIENT: City of Chicago 2FM		SITE: JPSTA	
					BORING NO: ESB-5		4301 West Chicago Avenue	
					DATE: 8/3/2017		Chicago, Illinois	
					LOGGED BY: Andrew E. Hastings		DRILLED BY: Groff Testing Corporation	
					DRILLING METHOD: CME 75 ATV Hollow stem auger		SAMPLING METHOD: Split spoon	
BORING LOCATION: South edge; near rail spur line					HOLE DIA.: 7 5/8 inches			
AMEC PROJECT NUMBER: 3205171606					TOTAL DEPTH: 16 feet			
DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS		
0	ESB-5A	50%	0.0	dry	0 to 1' FILL: Black to dark brown sandy silt with little gravel, dry	A soil sample was collected at 0-1' feet bgs to be analyzed for SRP Target Compound List parameters		
1					1' to 6' FILL: Brown medium sand with little gravel, dry			
2		50%	0.0	dry		A soil sample was collected at 4'-5' feet bgs and held for potential later analysis		
3								
4	ESB-2B	50%	0.0	dry		A soil sample was collected at 6'-7' feet bgs and held for potential later analysis		
5								
6	ESB-2C	50%	0.0	wet to very moist	6' to 7' FILL: Brown to dark brown gravelly sand, wet to very moist	A soil sample was collected at 6'-7' feet bgs and held for potential later analysis		
7					7' to 10' Gray to dark gray silty clay, moist, firm to stiff, trace sand and gravel			
8		60%	0.0	moist				
9								
10		60%	0.0	slightly moist	10' to 14' Brown to gray silty clay with trace to little sand and gravel, slightly moist, stiff			
11								
12			0.0	slightly moist				
13								
14		90%	0.0	slightly moist	14' to 16' Grayish brown silty clay, hard, trace gravel, slightly moist			
15								
16					Boring terminated at 16' below ground surface (bgs)			
17								
18								
19								
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21								
22								
23								
24								
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TEST BORING RECORD

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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	ESB-6		4301 West Chicago Avenue
DATE:	8/4/2017		Chicago, Illinois
LOGGED BY:	Craig T. Cabrera	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: Southeast corner; near property boundary on east side

HOLE DIA.: 7 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 16 feet

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0					0 to 2' FILL: Black silty soil with gravel and stone, dry	
1						
2	ESB-4A	10%	0.0	dry		A soil sample was collected at 2'-4' feet bgs to be analyzed for SRP Target Compound List parameters A soil sample was collected at 5'-6' feet bgs and held for potential later analysis
3		50%	0.0	moist	4' to 8' FILL: tan silty sand, medium, moist	
4	ESB-4B					
5		50%	0.0	wet	wet	
6						
7						
8		50%	0.0	wet	8 to 10' FILL: tan sand with pebbles, wet	
9						
10		50%	0.0	moist	10' to 14' gray to green silty clay, moist, pliable	
11						
12		75%	0.0			
13		100%	0.0			
14					14 to 16' Gray to brown silty clay with shale fragments	
15		75%	0.0	moist		
16					Boring terminated at 16' below ground surface (bgs)	
17						
18						
19						
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22						
23						
24						
25						



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TEST BORING RECORD

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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-1		4301 West Chicago Avenue
DATE:	8/9/2017		Chicago, Illinois
LOGGED BY:	Andrew E. Hastings	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION:	northwest corner of planned location of building 1	HOLE DIA.:	5 5/8 inches
AMEC PROJECT NUMBER:	3205171606	TOTAL DEPTH:	40'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0					0 to 1' FILL: sandy and clayey concrete	
1		25%	0.0	dry	1' to 12' FILL: Grayish brown gravelly silt with little clay and silt, concrete debris, dry	
2						
3	B-1A	50%	0.0	dry		A soil sample was collected at 2'-4' feet bgs to be analyzed for PNAs, PP metals and pH
4						
5		50%	0.0	dry	less concrete debris, but still slag and some gravel	
6						
7		50%	0.0	dry	concrete again	
8					some blackish to dark brown sandy silt with gravel/debris (concrete and brick), dry	
9	B-1B	75%	0.0	dry		A soil sample was collected at 9'-10' feet bgs and held for potential later analysis
10					increased silt and clay, still some gravel and brick fragments, dry	
11		75%	0.0	moist		
12					12' to 15' FILL: grayish brown silty clay with little gravel and brick fragments, moist, soft	
13		75%	0.0	moist		
14	B-1C	75%	0.0			A soil sample was collected at 14'-15' feet bgs and held for potential later analysis
15					15' to 17' Dark brown and black silty clay (topsoil), moist	
16						
17					17' to 21' Brown to orangish brown silty clay with trace sand and gravel, slightly moist, stiff	
18						
19						
20						
21		100%	0.0	slightly moist to moist	21' to 28' Brown and gray silty clay, trace gravel, slightly moist to moist, hard to stiff	
22						
23						
24		75%	0.0	moist		
25						



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TEST BORING RECORD

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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-1		4301 West Chicago Avenue
DATE:	8/9/2017		Chicago, Illinois
LOGGED BY:	Andrew E. Hastings	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION:	northwest corner of planned location of building 1	HOLE DIA.:	5 5/8 inches
AMEC PROJECT NUMBER:	3205171606	TOTAL DEPTH:	40'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
26						
27						
28					28' to 32' gray silty sand with trace gravel, dry	
29		100%	0.0	dry		
30						
31						
32					32' to 40' Gray silty clay with little gravel, hard, dry	
33						
34		100%	0.0	dry		
35						
36						
37						
38						
39		100%	0.0	dry		
40					Boring terminated at 40' below ground surface (bgs)	
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51						

 8745 West Higgins Road Suite 300 Chicago, IL 60631					TEST BORING RECORD		Page 1 of 2	
					CLIENT:	City of Chicago 2FM	SITE:	JPSTA
					BORING NO:	B-2	4301 West Chicago Avenue	
					DATE:	8/9/2017	Chicago, Illinois	
					LOGGED BY:	Andrew E. Hastings	DRILLED BY:	Groff Testing Corporation
					DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon
BORING LOCATION:					north edge of site on berm, south side		HOLE DIA.:	5 5/8 inches
AMEC PROJECT NUMBER:					3205171606		TOTAL DEPTH:	30'
DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY		REMARKS	
0	B-2A	25%	0.0	dry	0 to 4.5' FILL: Brown to dark brown clayey silt, little gravel, dry		A soil sample was collected at 0-2' feet bgs to be analyzed for PNAs, PP metals and pH	
1					concrete fragments at 2' (spoon refusal)			
2		0%	0.0				A soil sample was collected at 4'-6' feet bgs and held for potential later analysis	
3					4.5' to 7' FILL: Dark brown to black clayey silt, little sand and gravel, dry			
4	B-2B		0.0	dry				
5					7' to 8' FILL: Brown sand with gravel, dry to slightly moist			
6		70%	0.0	dry to slightly moist			No data from 8' to 10' Shelby tube collected for geotechnical testing	
7					10' to 14' FILL: Brown to dark brown medium sand with little to trace gravel, slightly moist			
8		50%	0.0	slightly moist	within the sand, two less than 0.5 inch seams of grayish brown silty clay with sand			
9					14' to 15.5': Tan to brown sand with trace to little gravel, wet			
10		50%	0.0	slightly moist wet				
11					15.5' to 18.5' Dark brown to grayish brown silty clay with trace to little gravel, moist to very moist			
12		50%	0.0	moist to very moist				
13					18.5' to 20' Dark brown silty clay with trace gravel, very moist, soft, plastic			
14		0.0		very moist				
15					20' to 23' Grayish brown silty clay with trace gravel, moist, firm			
16		75%	0.0	slightly moist				
17					23' to 30' Gray silty clay with trace to little gravel, hard, slightly moist			
18		75%	0.0	slightly moist				
19								
20								
21								
22								
23								
24								
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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-2		4301 West Chicago Avenue
DATE:	8/9/2017		Chicago, Illinois
LOGGED BY:	Andrew E. Hastings	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: north edge of site on berm, south side

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 30'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
26						
27						
28						
29		75%	0.0			
30					Boring terminated at 30' below ground surface (bgs)	
31						
32						
33						
34						
35						
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51						



DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0	B-3A	75%	1.1		0 to 1.5' FILL: Brown to black silty sand, gravel, concrete debris, slightly moist	A soil sample was collected at 0-2' feet bgs to be analyzed for PNAs, PP metals and pH
1			0.0	slightly moist	1.5 to 2.5 FILL: Brown to black silty sandy clay, slightly moist	
2						
3		75%	0.0	slightly moist	2.5 to 9.5 FILL: Brown to black silty sand with trace gravel, slightly moist	
4						
5		25%	0.0	slightly moist		
6	B-3B	100%		moist	wet at 7.5 feet	A soil sample was collected at 6'-8' feet bgs to be analyzed for SRP Target Compound List parameters
7			0.0	wet		
8						
9		25%	0.0	wet	9.5' to 39.5': Gray silty clay with trace sand, orange mottling, wet	
10				slightly moist		
11		50%	0.0	moist		
12	B-3C	75%		slightly moist	no mottling	A soil sample was collected at 12'-13' feet bgs to be held for potential later analysis
13			0.0			
14						
15		100%	0.0	slightly moist		
16						
17		50%	0.0	slightly moist		
18		75%	0.0	dry	stiffer, dryer	
19						
20						
21		100%	0.0	slightly	more plastic	
22						
23						
24						
25						



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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-3		4301 West Chicago Avenue
DATE:	8/8/2017		Chicago, Illinois
LOGGED BY:	Eric Walkowiak	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: north of berm

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 39.5'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
26						
27						
28						
29		100%	0.0	dry	stiffer	
30						
31						
32						
33						
34		100%	0.0	dry		
35						
36						
37						
38						
39					stiffer, refusal at 39.5'	
40					Boring terminated at 39.5' below ground surface (bgs)	
41						
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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-4		4301 West Chicago Avenue
DATE:	8/2/2017		Chicago, Illinois
LOGGED BY:	Andrew E. Hastings	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: interior boring, west side of building 1

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 30'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0	B-4A	20%	0.0	dry	0 to 2.5' FILL: Dark brown silt with sand and trace gravel, dry	A soil sample was collected at 0-2' feet bgs to be analyzed for PNAs, PP metals and pH
1						
2	B-4B	50%	0.0	dry	2.5' to 10' FILL: Brown to dark brown medium sand, dry	A soil sample was collected at 4.5'-5.5' feet bgs and held for potential later analysis
3						
4	B-4B	50%	0.0	dry	trace to little gravel	
5						
6	B-4B	50%	0.0	dry		
7						
8	B-4B	50%	0.0	dry		
9						
10	B-4B	10%	0.0	dry wet	10' to 10.5': Black sand, wet to very moist	
11					10.5' to 13': Gray to dark gray clay, slightly moist to moist, stiff	
12	B-4B	75%	0.0	slightly moist to moist		
13					13' to 18': Brown to gray to orangish brown silty clay, trace gravel	
14	B-4B	75%	0.0	slightly moist	stiff, slightly moist	
15						
16	B-4B					
17						
18	B-4B			slightly moist	18' to 21': Gray to grayish brown silty clay, very stiff, slightly moist	
19						
20	B-4B					
21					21' to 30': Grayish brown silty clay with little gravel, very hard, slightly moist	
22	B-4B			slightly moist		
23						
24	B-4B					
25						



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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-4		4301 West Chicago Avenue
DATE:	8/2/2017		Chicago, Illinois
LOGGED BY:	Andrew E. Hastings	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: interior boring, west side of building 1

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 30'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
26						
27						
28						
29						
30					Boring terminated at 30' below ground surface (bgs)	
31						
32						
33						
34						
35						
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TEST BORING RECORD

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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-5		4301 West Chicago Avenue
DATE:	8/4/2017		Chicago, Illinois
LOGGED BY:	Craig Cabrera	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: interior boring, center of building 1

HOLE DIA.: 7 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 40'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0					1 inch black topsoil	
1		50%	0.0	dry	1" to 6' FILL: Brown silty sand with gravel, dry	No environmental samples from this boring
2						
3		50%	0.0	dry		
4						
5		50%	0.0	dry		
6					6 to 7.5' FILL: Black silty sand with pebbles, moist to wet	
7		50%	0.0	moist to wet		
8					7.5' to 8.5' FILL: Black silty clay, moist	
9		100%		moist	8.5' to 16': Gray silty clay, plastic, moist	Shelby tube collected for geotechnical testing at 8.5' to 11'
10						
11						
12						
13		100%	0.0	moist		
14					stiffer	
15		75%	0.0	moist		
16					16' to 21': Gray silty clay with some gravel, stiff, moist	
17		90%	0.0	moist		
18						
19		100%	0.0	moist		
20						
21					21' to 23.5': Gray silty clay, stiff, dry	
22		100%	0.0	dry		
23						
24		50%	0.0	wet	23.5' to 35': Gray silty clay, wet	
25						



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TEST BORING RECORD

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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-5		4301 West Chicago Avenue
DATE:	8/4/2017		Chicago, Illinois
LOGGED BY:	Craig Cabrera	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: interior boring, center of building 1

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 40'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
26						
27						
28						
29						
30						
31		0%				No Recovery
32						
33						
34						
35					35' to 40': Gray silty clay, stiff, moist	
36		50%	0.0	moist		
37						
38						
39						
40					Boring terminated at 40' below ground surface (bgs)	
41						
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50						
51						



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TEST BORING RECORD

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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-6		4301 West Chicago Avenue
DATE:	8/8/2017		Chicago, Illinois
LOGGED BY:	Eric Walkowiak	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: top of berm

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 30'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0	B-6A	25%	0.0	dry	0 to 1' FILL: Gray to black silty sandy clay with gravel dry obstruction at 1 foot bgs	A soil sample was collected at 0-2' feet bgs to be analyzed for PNAs, PP metals and pH
1					1' to 4' FILL: Gray to black fine silty sand with gravel, debris	
2		25%	0.0	dry		
3	B-6B					A soil sample was collected at 8'-10' feet bgs to be analyzed for PNAs, PP metals and pH
4		0%			4' to 6' concrete chunk, no recovery	
5						
6	B-6C	30%	0.0	slightly moist	6' to 6.5' FILL: Black silty sand with clay, slag-crystalline	A soil sample was collected at 12'-14' feet bgs to be held for potential later analysis
7					6.5' to 8.5' FILL: Black to gray silty clay with sand and gravel	
8						
9	B-6B	50%	0.0	slightly moist	8.5' to 9.5' FILL: Black to brown silty sand with trace gravel	A soil sample was collected at 8'-10' feet bgs to be analyzed for PNAs, PP metals and pH
10					9.5' to 16' FILL: Tan silty sand with trace gravel	
11		75%	0.0	slightly moist		
12	B-6C					A soil sample was collected at 12'-14' feet bgs to be held for potential later analysis
13		75%	0.0	slightly moist		
14						
15	B-6C	75%	0.0	moist		A soil sample was collected at 12'-14' feet bgs to be held for potential later analysis
16						
17		50%	0.0	slightly moist	16' to 30' Gray silty clay with trace sand, tan mottling, stiff	
18	B-6C					A soil sample was collected at 12'-14' feet bgs to be held for potential later analysis
19		75%	0.0	slightly moist		
20						
21	B-6C					A soil sample was collected at 12'-14' feet bgs to be held for potential later analysis
22		100%	0.0	dry		
23						
24	B-6C				stiffer	A soil sample was collected at 12'-14' feet bgs to be held for potential later analysis
25						
26						



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TEST BORING RECORD

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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-6		4301 West Chicago Avenue
DATE:	8/8/2017		Chicago, Illinois
LOGGED BY:	Eric Walkowiak	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon


BORING LOCATION: top of berm

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 30'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
26						
27						
28		25%	0.0	wet	28.5' to 30' Gray sand and gravel	
29						
30					Boring terminated at 30' below ground surface (bgs)	
31						
32						
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34						
35						
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					CLIENT: City of Chicago 2FM			SITE: JPSTA		
					BORING NO: B-7			4301 West Chicago Avenue		
					DATE: 8/2/2017			Chicago, Illinois		
					LOGGED BY: Andrew E. Hastings			DRILLED BY: Groff Testing Corporation		
					DRILLING METHOD: CME 75 ATV Hollow stem auger			SAMPLING METHOD: Split spoon		
BORING LOCATION:					southwest corner of proposed Building 1			HOLE DIA.: 5 5/8 inches		
AMEC PROJECT NUMBER:					3205171606			TOTAL DEPTH: 40'		
DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY			REMARKS		
0	B-7A	50%	0.0	dry	0 to 3" grass and topsoil			A soil sample was collected at 0-2' feet bgs to be analyzed for PNAs, PP metals and pH		
3" to 3' FILL: Black to dark brown sand with little gravel and silt, dry										
1										
2										
3	B-7B	60%	0.0	dry	3' to 11,25' FILL: Brown to tan medium sand, little gravel to trace gravel, dry			A soil sample was collected at 3'-4' feet bgs and held for potential later analysis		
4										
5		60%	0.0	dry	less gravel with depth					
6										
7										
8		60%	0.0	moist	finer sand, moist					
9										
10		60%	0.0	very moist	coarser sand, very moist					
11	B-7C	60%	0.0	very moist to wet	11.25' to 13': Sand to gravel, very moist to wet			A soil sample was collected at 11'-11.75' feet bgs and held for potential later analysis		
12										
13		60%	0.0	moist	13' to 15' Dark brown to dark gray silty clay, firm, moist					
14										
15		60%	0.0	moist	15' to 18' Light gray silty clay, moist					
16										
17										
18		60%	0.0	moist	18' to 23,5' Brown and gray silty clay, firm to stiff					
19										
20			0.0	slightly moist						
21				very moist						
22			0.0	to wet	same clay, very moist to wet					
23										
24			0.0	slightly moist	23.5' to 28.5' Brown to gray silty clay, hard, slightly moist					
25										



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TEST BORING RECORD

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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-7		4301 West Chicago Avenue
DATE:	8/2/2017		Chicago, Illinois
LOGGED BY:	Andrew E. Hastings	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: southwest corner of proposed Building 1

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 40

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
26						
27						
28						
29				wet	28.5' to 29.5' Gray sandy, silty seam, wet	
30				moist	29.5' to 40' Gray silty clay, hard, moist	
31						
32						
33						
34				slightly moist to dry	trace gravel, slightly moist to dry	
35						
36						
37						
38						
39					very hard	
40					Boring terminated at 40' below ground surface (bgs)	
41						
42						
43						
44						
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48						
49						
50						
51						



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TEST BORING RECORD

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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-8		4301 West Chicago Avenue
DATE:	8/3/2017		Chicago, Illinois
LOGGED BY:	Andrew E. Hastings	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: south edge of Building 1

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 30'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0					0-1' FILL: Dark brown topsoil/silt	No environmental samples from this boring
1		30%	0.0	dry	1' to 7' FILL: Brown sand, medium, little gravel, dry	
2						
3						
4		50%	0.0	slightly moist		
5						
6		50%	0.0	moist		
7					7' to 9' FILL: Black to dark brown gravelly sad with ground slag, moist	
8						
9		60%	0.0	very moist	9' to 11' FILL: Orangish brown to brown, gravelly sand, very moist	
10						
11						Shelby tube collected for geotechnical testing at 11' to 13'
12						
13					11' to 19' Brown to gray to orangish brown silty clay, trace gravel slightly most	
14		70%	0.0	slightly moist		
15						
16						
17						
18						
19			0.0	wet	19' to 20' Dark gray sandy gravel, wet	
20					20' to 22.5' Dark gray gravelly sand, wet	
21						
22				wet	22.5' to 23' Dark gray clay with silt, wet	
23				slightly moist	23' to 30' Dark gray to gray silty clay with trace to little gravel hard	
24						
25						



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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-8		4301 West Chicago Avenue
DATE:	8/3/2017		Chicago, Illinois
LOGGED BY:	Andrew E. Hastings	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: south edge of Building 1

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 30'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
26						
27						
28						
29						
30					Boring terminated at 30' below ground surface (bgs)	
31						
32						
33						
34						
35						
36						
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50						
51						



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TEST BORING RECORD

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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-9		4301 West Chicago Avenue
DATE:	8/8/2017		Chicago, Illinois
LOGGED BY:	Eric Walkowiak	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: southeast corner of building 1

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 35'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0	B-9A	75%	0.0	dry	0 to 1' FILL: Black to gray silty sandy clay, dry	A soil sample was collected at 1-3' feet bgs to be analyzed for PNAs, PP metals and pH
1					1' to 3' FILL: Black silty sand with trace gravel, debris (concrete, brick), dry to slightly moist	
2		75%	0.0	slightly moist	3' to 7.5' FILL: tan to brown silty sand with trace gravel	
3	B-9B					A soil sample was collected at 6'-8' feet bgs to be held for potential later analysis
4		50%	0.0	slightly moist		
5						
6	B-9C	50%	0.0	moist	wet at 7.5'	A soil sample was collected at 11.5'-12.5' feet bgs to be held for potential later analysis
7				wet	7.5' to 11.5' FILL: Black to dark gray sandy gravel with silty clay, wet	
8		25%	0.0	wet	at 8', about 3" of black sandy slag and concrete	
9	B-9C					
10		75%	0.0	slightly moist		
11					11.5' to 35' Gray silty clay with trace sand, stiff, with some tan mottling	
12	B-9C	100%	0.0	slightly moist		
13						
14		100%	0.0	slightly moist		
15	B-9C					
16		50%	0.0	slightly moist	higher plasticity	
17						
18	B-9C					
19		75%	0.0	moist	stiff, no mottling	
20						
21	B-9C	50%		dry	stiffer	
22						
23						
24	B-9C					
25		75%		dry		



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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-9		4301 West Chicago Avenue
DATE:	8/8/2017		Chicago, Illinois
LOGGED BY:	Eric Walkowiak	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: southeast corner of building 1

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 35'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
26						
27						
28						
29		75%	0.0	dry		
30						
31						
32						
33						
34		50%	0.0	dry	Refusal at 35'	
35					Boring terminated at 35' below ground surface (bgs)	
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
51						



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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-10		4301 West Chicago Avenue
DATE:	8/7/2017		Chicago, Illinois
LOGGED BY:	Craig Cabrera	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: northwest corner of Building 2

HOLE DIA.: 7 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 25'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0	B-10A	100%	0.0	moist	Black silty organic soil	A soil sample was collected at 0-1' feet bgs to be analyzed for PNAs, PP metals and pH
1					3' to 4' FILL: Tan silty sand with gravel, moist	
2	B-10B	50%	0.0	moist		A soil sample was collected at 2'-4' feet bgs to be held for potential later analysis
3					4' to 6' FILL: Tan silty sand with pebbles, wet	
4		50%	0.0	wet		Shelby tube collected for geotechnical testing at 11' to 13'
5					6' to 6.5' FILL: Black silty sand with pebbles, wet	
6		10%	0.0	wet	6.5' to 7.5' FILL: Black silty sand with slag chips, wet	
7					7.5' to 25': Green-gray silty clay, moist	
8		50%	0.0	moist	stiff	
9						
10						
11						
12				moist	stiff	
13						
14						
15		100%	0.0	moist	gray silty clay, moist, stiff	
16						
17		50%	0.0	moist		
18					large stone at 18'	
19		25%	0.0	moist		
20					large stone at 21'	
21						
22		50%	0.0	moist	gray silty clay, moist, stiff	
23						
24						
25					Boring terminated at 25' below ground surface (bgs)	



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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-11		4301 West Chicago Avenue
DATE:	8/8/2017		Chicago, Illinois
LOGGED BY:	Eric Walkowiak	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: north central building 2

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 25'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0		75%		dry	0 to 0.5' topsoil	
1	B-11A		6.2		0.5' to 1.5' FILL: Gray silty clay with some concrete, petroleum odor	A soil sample was collected at 1-2' feet bgs to be analyzed for VOCs PNAs, PP metals and pH
2		75%	3.7	slightly moist	1.5' to 2' FILL: Black silty sand with concrete	
3					2 to 7.5' FILL: Tan silty sand with trace gravel	
4	B-11B	75%	0.0	slightly moist		
5					cement debris at 5.5'	
6		50%	0.0	wet		A soil sample was collected at 5'-6' feet bgs to be held for potential later analysis
7	B-11C				wet at 7.5'	
8		0%	0.0		7.5' to 10' Black silty clay, organic debris (soil?) No recovery 8' to 10'	
9						
10		100%	0.0	slightly moist	10' to 25': Gray silty clay with trace sand, some tan mottling	
11	B-11C	75%	0.0			A soil sample was collected at 11'-12' feet bgs to be held for potential later analysis
12						
13		100%	0.0	slightly moist		
14						
15		100%	0.0	slightly moist		
16					higher plasticity at 15' to 16'	
17		100%	0.0	moist		
18						
19		75%	0.0	dry	stiff	
20						
21						
22		75%	0.0	slightly moist		
23						
24						
25					Boring terminated at 25' below ground surface (bgs)	



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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-12		4301 West Chicago Avenue
DATE:	8/7/2017		Chicago, Illinois
LOGGED BY:	Andrew E. Hastings	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: northeast corner building 2

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 24'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0	B-12A	50%	0.0	moist	0 to 1.5' FILL: Black silty sand and organic soil with pebbles	A soil sample was collected at 0-2' feet bgs to be analyzed for PNAs, PP metals and pH
1					1.5' to 4' FILL: Tan silty sand	
2	B-12B	75%	0.0	wet	4 to 5.5' FILL: Tan silty sand with pebbles, wet	A soil sample was collected at 3'-4' feet bgs and held for potential later analysis
3					5.5' to 8' Black silty clay, wet to moist	
4	B-12C	75%	0.0	wet to moist	8' to 12' Gray silty clay, stiff, moist	A soil sample was collected at 7'-8' feet bgs and held for potential later analysis
5					12' to 16' Gray to brown silty clay, stiff, moist	
6	B-12D	75%	0.0	moist	16' to 21' Gray silty clay, stiff, moist	
7					21' to 24' Gray silty clay with trace pebbles, stiff, moist	
8	B-12E	50%	0.0	moist		
9						
10	B-12F	50%	0.0	moist		
11						
12	B-12G	75%	0.0	moist		
13						
14	B-12H	100%	0.0	moist		
15						
16	B-12I	100%	0.0	moist		
17						
18	B-12J	75%	0.0	moist		
19						
20	B-12K	75%	0.0	moist		
21						
22	B-12L	50%	0.0	moist		
23						
24					Boring terminated at 24' below ground surface (bgs)	
25						



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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-13		4301 West Chicago Avenue
DATE:	8/7/2017		Chicago, Illinois
LOGGED BY:	Andrew E. Hastings	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: center west building 2

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 26'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0					0 to 1' FILL: Black organic soil with tan sand, moist	No environmental samples from this boring
1		5%	0.0	moist	1' to 4' FILL: Tan silty sand with gravel, moist	
2						
3		50%	0.0	moist		
4					4' to 5' FILL: Tan silty sand and pebbles, wet	
5		50%	0.0	wet	5' to 6' Black silty clay, wet	
6					6' to 8.5' Gray silty clay, firm, moist	
7						
8		50%	0.0	moist		
9					8.5' to 13.5' Gray to brown silty clay, firm, moist	
10		75%	0.0	moist		
11						
12						
13		100%	0.0	moist		
14					13.5' to 16' Gray silty clay, firm, moist	
15		50%	0.0	moist	pebbles at 15'	
16					16' to 26' Gray silty clay, firm, moist	
17						
18		75%	0.0	moist		
19						
20		75%	0.0	moist		
21						
22						
23		50%	0.0	moist		
24						
25		75%	0.0	moist		
Boring terminated at 26' below ground surface (bgs)						



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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-14		4301 West Chicago Avenue
DATE:	8/4/2017		Chicago, Illinois
LOGGED BY:	Andrew E. Hastings	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: center east building 2

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 26'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0					0 to 1' FILL: Black organic soil	
1	B-14A	50%	0.0	moist	1' to 2' FILL: Tan silty sand, moist	A soil sample was collected at 1-2' feet bgs to be analyzed for PNAs, PP metals and pH
2					2' to 4' FILL: Brown to black silty sand	
3		50%	0.0			
4					4' to 6' FILL: Tan silty clay with trace gravel	
5		50%	0.0			
6	B-14B				6' to 12' Gray silty clay, pliable, moist	A soil sample was collected at 6'-7' feet bgs and held for potential later analysis
7		50%	0.0	moist		
8					decayed wood	
9		50%	0.0	moist		
10						
11		75%	0.0	moist		
12					12' to 14' Gray silty clay, soft, pliable, moist	
13		100%	0.0	moist		
14					14' to 21' Gray silty clay, firm, moist	
15		100%	0.0	moist		
16						
17		50%	0.0	moist		
18						
19		75%	0.0	moist		
20						
21					21' to 26' Gray silty clay, stiff, moist	
22		50%	0.0	moist		
23						
24		75%	0.0	moist		
25					Boring terminated at 26' below ground surface (bgs)	



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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-15		4301 West Chicago Avenue
DATE:	8/8/2017		Chicago, Illinois
LOGGED BY:	Eric Walkowiak	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: central south building 2

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 25'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0	B-15A	75%	0.0	dry	0 to 0.5' Topsoil organic	A soil sample was collected at 1.5'-3' feet bgs to be analyzed for PNAs, PP metals and pH
1					0.5' to 1.5' FILL: Black silty sand with gravel	
2					1.5' to 3' FILL: Black slag material with silty sand	
3	B-15B	50%	0.0	slightly moist	3' to 7' FILL: Tan to brown silty sand with trace gravel	A soil sample was collected at 5'-6' feet bgs to be held for potential later analysis
4						
5		75%	0.0	moist	at 5', 2" concrete debris	
6	B-15C			wet		
7		25%	0.0	wet	wet at 7'	
8					7' to 9' Brown to black silty sandy clay, wet	
9	B-15C	50%	0.0	wet		
10					9' to 11' Sand with gravel, silt and clay	
11		50%	0.0	slightly moist	11' to 25' Black to gray silty clay with trace sand, stiff, moist to dry	
12	B-15C					A soil sample was collected at 14'-15' feet bgs to be held for potential later analysis
13		25%	0.0	moist		
14		75%	0.0	slightly moist	at 15' Gray silty clay with tan mottling, some debris	
15	B-15C					
16		75%	0.0	dry	no mottling	
17					stiff to 25'	
18	B-15C					
19		100%	0.0	dry		
20						
21	B-15C					
22		75%	0.0	slightly moist		
23						
24	B-15C					
25					Boring terminated at 25' below ground surface (bgs)	



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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-16		4301 West Chicago Avenue
DATE:	8/7/2017		Chicago, Illinois
LOGGED BY:	Craig Cabrera	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: southwest corner Building 2

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 25'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0					0 to 1' FILL: Black silty organic soil with trace wood and pebbles	
1	B-16A	50%	0.0	moist	1' to 4' FILL: Tan silty sand with gravel, moist	A soil sample was collected at 1-2' feet bgs to be analyzed for PNAs, PP metals and pH A soil sample was collected at 2'-4' feet bgs and held for potential later analysis
2						
3	B-16B	50%	0.0	moist	4' to 7' FILL: Tan silty sand, moist	
4						
5		50%	0.0	moist		
6						
7					7' to 8' FILL: Black gravel and decayed wood, wet	
8					8' to 10' Black silty clay, soft, moist	
9		2%	0.0	moist		
10					10' to 11' Green silty clay, soft, moist	
11					11' to 25' Tan to brown silty clay, stiff, moist	
12		100%	0.0	moist		
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25					Boring terminated at 25' below ground surface (bgs)	



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CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-17		4301 West Chicago Avenue
DATE:	8/4/2017		Chicago, Illinois
LOGGED BY:	Craig Cabrera	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION:	southeast corner Building 2	HOLE DIA.:	7 5/8 inches
AMEC PROJECT NUMBER:	3205171606	TOTAL DEPTH:	23.5'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0					0 to 1' FILL: Black silty organic soil with pebbles, dry	
1	B-17A	50%	1.0	dry	1' to 5' FILL: Tan silty sand with gravel, dry	A soil sample was collected at 1-2' feet bgs to be analyzed for PNAs, PP metals and pH
2						
3						
4	B-17B	10%	0.2	dry		A soil sample was collected at 7'-8' feet bgs to be held for potential later analysis
5					5' to 7' FILL: Tan silty sand, moist	
6						
7	B-17B	50%	0.0	moist	7' to 7.5' FILL: Black silty sand and gravel, moist	A soil sample was collected at 7'-8' feet bgs to be held for potential later analysis
8					7.5' to 8' FILL: Black silty clay, moist	
9					8' to 12' Tan to green silty clay, moist	
10	B-17B	50%	0.0	moist		
11						
12					12' to 14' Shelby tube	
13	B-17B	100%	0.0	moist		
14					14' to 16' Brown to Gray silty clay, moist	
15						
16	B-17B	100%	0.0	moist	16' to 21' Grey silty clay, moist	
17						
18						
19	B-17B	100%	0.0	moist		
20						
21						
22	B-17B	75%	0.0	moist	21' to 23.5' Gray to brown silty sand, moist	
23						
24					Boring terminated at 23.5' below ground surface (bgs)	
25						



8745 West Higgins Road
Suite 300
Chicago, IL 60631

TEST BORING RECORD

Page 1 of 1

CLIENT:	City of Chicago 2FM	SITE:	JPSTA
BORING NO:	B-18		4301 West Chicago Avenue
DATE:	8/9/2017		Chicago, Illinois
LOGGED BY:	Andrew E. Hastings	DRILLED BY:	Groff Testing Corporation
DRILLING METHOD:	CME 75 ATV Hollow stem auger	SAMPLING METHOD:	Split spoon

BORING LOCATION: westmost, parking area boring, west of Building 1

HOLE DIA.: 5 5/8 inches

AMEC PROJECT NUMBER: 3205171606

TOTAL DEPTH: 16'

DEPTH	SAMPLE NUMBER	SAMPLE RECOVERY	PID READING (PPM)	MOISTURE CONTENT	LITHOLOGY	REMARKS
0	B-18A				0 to 4.5' FILL: Brown to darker brown silty clay with sand and gravel dry	A soil sample was collected at 0-2' feet bgs to be analyzed for SRP Target Compound List parameters
1		10%	0.0	dry		
2	B-18B					A soil sample was collected at 4.5'-5.5' feet bgs to be analyzed for PNAs, PP metals and pH
3		40%	0.0	dry		
4	B-18B				4.5' to 12.5' FILL: Tan to brown sand, medium, with trace to little gravel, dry	A soil sample was collected at 4.5'-5.5' feet bgs to be analyzed for PNAs, PP metals and pH
5		60%	0.0	dry		
6	B-18B				more brown	A soil sample was collected at 4.5'-5.5' feet bgs to be analyzed for PNAs, PP metals and pH
7		60%	0.0	dry		
8	B-18B					A soil sample was collected at 4.5'-5.5' feet bgs to be analyzed for PNAs, PP metals and pH
9		50%	0.0	moist		
10	B-18B				trace gravel	A soil sample was collected at 4.5'-5.5' feet bgs to be analyzed for PNAs, PP metals and pH
11		50%	0.0	slightly moist		
12	B-18B				wet	A soil sample was collected at 4.5'-5.5' feet bgs to be analyzed for PNAs, PP metals and pH
13		50%	0.0	very moist	12.5' to 13.5' FILL: Dark brown to black gravelly sand, slag, wet	
14	B-18B				13.5' to 14.5' Dark brown to black silty clay with organic material (topsoil?), trace sand and gravel, very moist	A soil sample was collected at 4.5'-5.5' feet bgs to be analyzed for PNAs, PP metals and pH
15		50%	0.0	moist	14.5' to 16' Brown and gray silty clay with trace gravel, stiff moist	
16					Boring terminated at 16' below ground surface (bgs)	
17						
18						
19						
20						
21						
22						
23						
24						
25						



APPENDIX B

Monitoring Well Construction Diagrams

Amec Foster Wheeler Environment & Infrastructure, Inc.			STICK-UP OVERBURDEN WELL/PIEZOMETER	
Project: Phase II ESA 4301 W Chicago Avenue		Number: ESB-5		
Client: City of Chicago 2FM		Date: 8/3/2017		Subcontractor: Groff
Drilling Method: 4 1/4" Hollow Stem Auger		Measuring Point		
Development Method: Peristaltic Pump/Dedicated Tubing		Type: Top of Casing		
		Elevation (ft): 95.77		
Item	Depth, below surface grade (ft)	Elevation (ft)	Description	
Riser Pipe				
Top of Inner Casing	-4.38	95.77		
Grade	0.00	91.39		
Top of Backfill/Grout	0.00	91.39		
			Protective Casing Length:	None
			Material:	NA
			Surface Seal Type:	Medium Bentonite Chips, Hydrated
			Backfill/Grout Type:	Medium Bentonite Chips, Hydrated
			Riser Pipe Type:	PVC
			Riser Pipe ID:	2"
			Borehole Diameter:	8 1/2"
Top of Seal	0.00	91.39		
Top of Filter Pack	4.25	87.14	Type of Seal:	Medium Bentonite Chips, Hydrated
Top of Screen	5.53	85.86		
			Screen Type:	PVC
			Screen ID:	2"
			Screen Slot Size:	0.010"
			Screen Length:	10'
			Filter/Sand Pack Type:	#5 Filter Sand
Base of Screen	15.53	75.86		
End Cap	15.78	75.61	Sump:	PVC
Drilled Depth	16.00	75.39	Fallback/Backfill:	Natural Formation
Total Depth	16.00	75.39		
<div>Notes: Elevations referenced to 100.00 feet designated for MW E</div> <div>Prepared By: MEJ 12/17/2018</div> <div>Reviewed By: EJW 12/21/2017</div>				

Amec Foster Wheeler Environment & Infrastructure, Inc.			STICK-UP OVERBURDEN WELL/PIEZOMETER	
Project: Phase II ESA 4301 W Chicago Avenue		Number: ESB-6		
Client: City of Chicago 2FM		Date: 8/4/2017		Subcontractor: Groff
Drilling Method: 4 1/4" Hollow Stem Auger		Measuring Point		
Development Method: Peristaltic Pump/Dedicated Tubing		Type: Top of Casing		
		Elevation (ft): 95.50		
Item	Depth, below surface grade (ft)	Elevation (ft)	Description	
Riser Pipe				
Top of Inner Casing	-3.00	95.50		
Grade	0.00	92.50		
Top of Backfill/Grout	0.00	92.50		
			Protective Casing Length:	None
			Material:	NA
			Surface Seal Type:	Medium Bentonite Chips, Hydrated
			Backfill/Grout Type:	Medium Bentonite Chips, Hydrated
			Riser Pipe Type:	PVC
			Riser Pipe ID:	2"
			Borehole Diameter:	8 1/2"
Top of Seal	0.00	92.50		
Top of Filter Pack	2.00	90.50	Type of Seal:	Medium Bentonite Chips, Hydrated
Top of Screen	3.63	88.87		
			Screen Type:	PVC
			Screen ID:	2"
			Screen Slot Size:	0.010"
			Screen Length:	10'
			Filter/Sand Pack Type:	#5 Filter Sand
Base of Screen	13.63	78.87		
End Cap	13.88	78.62	Sump:	PVC
Drilled Depth	16.00	76.50	Fallback/Backfill:	Natural Formation
Total Depth	16.00	76.50		
<div>Notes: Elevations referenced to 100.00 feet designated for MW E</div> <div>Prepared By: MEJ 12/17/2018</div> <div>Reviewed By: EJW 12/21/2017</div>				



APPENDIX C

Analytical Data



Analysis Corporation

2242 West Harrison St., Suite 200, Chicago, IL 60612-3766

Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com

Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

December 14, 2017

AMEC Foster Wheeler Environment & Infrastructure
550 Warrenville Road
Lisle, IL 60532

Telephone: (630) 724-8517

Fax: (630) 724-8518

Analytical Report for STAT Work Order: 17080088 Revision 3

RE: City of Chicago JPSTA, Chicago, IL

Dear Mary Jank:

STAT Analysis received 10 samples for the referenced project on 8/2/2017 6:00:00 PM. The analytical results are presented in the following report.

This report is revised to reflect additional analysis requested after the last report revision.

All analyses were performed in accordance with the requirements of 35 IAC Part 186 / NELAP standards. Analyses were performed in accordance with methods as referenced on the analytical report. Those analytical results expressed on a dry weight basis are also noted on the analytical report.

All analyses were performed within established holding time criteria, and all Quality Control criteria met EPA or laboratory specifications except when noted in the Case Narrative or Analytical Report. If required, an estimate of uncertainty for the analyses can be provided. A listing of accredited methods/parameters can also be provided.

Thank you for the opportunity to serve you and I look forward to working with you in the future. If you have any questions regarding the enclosed materials, please contact me at (312) 733-0551.

Sincerely,

Martin Kucan

Project Manager

The information contained in this report and any attachments is confidential information intended only for the use of the individual or entities named above. The results of this report relate only to the samples tested. If you have received this report in error, please notify us immediately by phone. This report shall not be reproduced, except in its entirety, unless written approval has been obtained from the laboratory. This analytical report shall become property of the Customer upon payment in full. Otherwise, STAT will be under no obligation to support, defend or discuss the analytical report.

Client: AMEC Foster Wheeler Environment & Infrastructure
Project: City of Chicago JPSTA, Chicago, IL
Work Order: 17080088 Revision 3

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Tag Number	Collection Date	Date Received
17080088-001A	ESB-2A		8/2/2017 10:45:00 AM	8/2/2017
17080088-001B	ESB-2A		8/2/2017 10:45:00 AM	8/2/2017
17080088-002A	ESB-2B		8/2/2017 10:55:00 AM	8/2/2017
17080088-003A	ESB-2C		8/2/2017 11:10:00 AM	8/2/2017
17080088-004A	ESB-3A		8/2/2017 12:05:00 PM	8/2/2017
17080088-004B	ESB-3A		8/2/2017 12:05:00 PM	8/2/2017
17080088-005A	ESB-3B		8/2/2017 12:20:00 PM	8/2/2017
17080088-006A	B-7A		8/2/2017 1:25:00 PM	8/2/2017
17080088-007A	B-7B		8/2/2017 1:30:00 PM	8/2/2017
17080088-008A	B-7C		8/2/2017 1:50:00 PM	8/2/2017
17080088-009A	B-4A		8/2/2017 3:35:00 PM	8/2/2017
17080088-010A	B-4B		8/2/2017 3:45:00 PM	8/2/2017

STAT Analysis Corporation

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: December 14, 2017

ANALYTICAL RESULTS

Date Printed: December 14, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-2A

Work Order: 17080088 Revision 3

Collection Date: 8/2/2017 10:45:00 AM

Project: City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080088-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS						
	SW5035/8260B			Prep Date: 8/3/2017		Analyst: RRS
Acetone	ND	0.10		mg/Kg-dry	1	8/8/2017
Benzene	ND	0.0067		mg/Kg-dry	1	8/8/2017
Bromodichloromethane	ND	0.0067		mg/Kg-dry	1	8/8/2017
Bromoform	ND	0.0067		mg/Kg-dry	1	8/8/2017
Bromomethane	ND	0.013		mg/Kg-dry	1	8/8/2017
2-Butanone	ND	0.10		mg/Kg-dry	1	8/8/2017
Carbon disulfide	ND	0.067		mg/Kg-dry	1	8/8/2017
Carbon tetrachloride	ND	0.0067		mg/Kg-dry	1	8/8/2017
Chlorobenzene	ND	0.0067		mg/Kg-dry	1	8/8/2017
Chloroethane	ND	0.013		mg/Kg-dry	1	8/8/2017
Chloroform	ND	0.0067		mg/Kg-dry	1	8/8/2017
Chloromethane	ND	0.013		mg/Kg-dry	1	8/8/2017
Dibromochloromethane	ND	0.0067		mg/Kg-dry	1	8/8/2017
1,1-Dichloroethane	ND	0.0067		mg/Kg-dry	1	8/8/2017
1,2-Dichloroethane	ND	0.0067		mg/Kg-dry	1	8/8/2017
1,1-Dichloroethene	ND	0.0067		mg/Kg-dry	1	8/8/2017
cis-1,2-Dichloroethene	ND	0.0067		mg/Kg-dry	1	8/8/2017
trans-1,2-Dichloroethene	ND	0.0067		mg/Kg-dry	1	8/8/2017
1,2-Dichloropropane	ND	0.0067		mg/Kg-dry	1	8/8/2017
cis-1,3-Dichloropropene	ND	0.0027		mg/Kg-dry	1	8/8/2017
trans-1,3-Dichloropropene	ND	0.0027		mg/Kg-dry	1	8/8/2017
Ethylbenzene	ND	0.0067		mg/Kg-dry	1	8/8/2017
2-Hexanone	ND	0.027		mg/Kg-dry	1	8/8/2017
4-Methyl-2-pentanone	ND	0.027		mg/Kg-dry	1	8/8/2017
Methylene chloride	ND	0.013		mg/Kg-dry	1	8/8/2017
Methyl tert-butyl ether	ND	0.0067		mg/Kg-dry	1	8/8/2017
Styrene	ND	0.0067		mg/Kg-dry	1	8/8/2017
1,1,2,2-Tetrachloroethane	ND	0.0067		mg/Kg-dry	1	8/8/2017
Tetrachloroethene	ND	0.0067		mg/Kg-dry	1	8/8/2017
Toluene	ND	0.0067		mg/Kg-dry	1	8/8/2017
1,1,1-Trichloroethane	ND	0.0067		mg/Kg-dry	1	8/8/2017
1,1,2-Trichloroethane	ND	0.0067		mg/Kg-dry	1	8/8/2017
Trichloroethene	ND	0.0067		mg/Kg-dry	1	8/8/2017
Vinyl chloride	ND	0.0067		mg/Kg-dry	1	8/8/2017
Xylenes, Total	ND	0.020		mg/Kg-dry	1	8/8/2017
Volatile Organic Compounds by GC/MS						
	SW5035/8260B			Prep Date: 8/3/2017		Analyst: RRS
Trichlorofluoromethane	ND	0.0067		mg/Kg-dry	1	8/8/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

STAT Analysis Corporation

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: December 14, 2017

ANALYTICAL RESULTS

Date Printed: December 14, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-2A

Work Order: 17080088 Revision 3

Collection Date: 8/2/2017 10:45:00 AM

Project: City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080088-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
		SW8270C (SW3550B)			Prep Date: 8/4/2017	Analyst: DM
Acenaphthene	ND	0.038		mg/Kg-dry	1	8/8/2017
Acenaphthylene	ND	0.038		mg/Kg-dry	1	8/8/2017
Aniline	ND	0.38		mg/Kg-dry	1	8/8/2017
Anthracene	ND	0.038		mg/Kg-dry	1	8/8/2017
Benz(a)anthracene	0.045	0.038		mg/Kg-dry	1	8/8/2017
Benzidine	ND	0.38		mg/Kg-dry	1	8/8/2017
Benzo(a)pyrene	ND	0.038		mg/Kg-dry	1	8/8/2017
Benzo(b)fluoranthene	ND	0.038		mg/Kg-dry	1	8/8/2017
Benzo(g,h,i)perylene	ND	0.038		mg/Kg-dry	1	8/8/2017
Benzo(k)fluoranthene	ND	0.038		mg/Kg-dry	1	8/8/2017
Benzoic acid	ND	0.95		mg/Kg-dry	1	8/8/2017
Benzyl alcohol	ND	0.20		mg/Kg-dry	1	8/8/2017
Bis(2-chloroethoxy)methane	ND	0.20		mg/Kg-dry	1	8/8/2017
Bis(2-chloroethyl)ether	ND	0.20		mg/Kg-dry	1	8/8/2017
Bis(2-ethylhexyl)phthalate	ND	0.95		mg/Kg-dry	1	8/8/2017
4-Bromophenyl phenyl ether	ND	0.20		mg/Kg-dry	1	8/8/2017
Butyl benzyl phthalate	ND	0.20		mg/Kg-dry	1	8/8/2017
Carbazole	ND	0.20		mg/Kg-dry	1	8/8/2017
4-Chloroaniline	ND	0.20		mg/Kg-dry	1	8/8/2017
4-Chloro-3-methylphenol	ND	0.38		mg/Kg-dry	1	8/8/2017
2-Chloronaphthalene	ND	0.20		mg/Kg-dry	1	8/8/2017
2-Chlorophenol	ND	0.20		mg/Kg-dry	1	8/8/2017
4-Chlorophenyl phenyl ether	ND	0.20		mg/Kg-dry	1	8/8/2017
Chrysene	0.052	0.038		mg/Kg-dry	1	8/8/2017
Dibenz(a,h)anthracene	ND	0.038		mg/Kg-dry	1	8/8/2017
Dibenzofuran	ND	0.20		mg/Kg-dry	1	8/8/2017
1,2-Dichlorobenzene	ND	0.20		mg/Kg-dry	1	8/8/2017
1,3-Dichlorobenzene	ND	0.20		mg/Kg-dry	1	8/8/2017
1,4-Dichlorobenzene	ND	0.20		mg/Kg-dry	1	8/8/2017
3,3'-Dichlorobenzidine	ND	0.20		mg/Kg-dry	1	8/8/2017
2,4-Dichlorophenol	ND	0.20		mg/Kg-dry	1	8/8/2017
Diethyl phthalate	ND	0.20		mg/Kg-dry	1	8/8/2017
2,4-Dimethylphenol	ND	0.20		mg/Kg-dry	1	8/8/2017
Dimethyl phthalate	ND	0.20		mg/Kg-dry	1	8/8/2017
4,6-Dinitro-2-methylphenol	ND	0.38		mg/Kg-dry	1	8/8/2017
2,4-Dinitrophenol	ND	0.95		mg/Kg-dry	1	8/8/2017
2,4-Dinitrotoluene	ND	0.038		mg/Kg-dry	1	8/8/2017
2,6-Dinitrotoluene	ND	0.038		mg/Kg-dry	1	8/8/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

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Date Reported: December 14, 2017

ANALYTICAL RESULTS

Date Printed: December 14, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-2A

Work Order: 17080088 Revision 3

Collection Date: 8/2/2017 10:45:00 AM

Project: City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080088-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3550B)		Prep Date: 8/4/2017		Analyst: DM	
Di-n-butyl phthalate	ND	0.20		mg/Kg-dry	1	8/8/2017
Di-n-octyl phthalate	ND	0.20		mg/Kg-dry	1	8/8/2017
Fluoranthene	0.071	0.038		mg/Kg-dry	1	8/8/2017
Fluorene	ND	0.038		mg/Kg-dry	1	8/8/2017
Hexachlorobenzene	ND	0.20		mg/Kg-dry	1	8/8/2017
Hexachlorobutadiene	ND	0.20		mg/Kg-dry	1	8/8/2017
Hexachlorocyclopentadiene	ND	0.20		mg/Kg-dry	1	8/8/2017
Hexachloroethane	ND	0.20		mg/Kg-dry	1	8/8/2017
Indeno(1,2,3-cd)pyrene	ND	0.038		mg/Kg-dry	1	8/8/2017
Isophorone	ND	0.20		mg/Kg-dry	1	8/8/2017
2-Methylnaphthalene	ND	0.20		mg/Kg-dry	1	8/8/2017
2-Methylphenol	ND	0.20		mg/Kg-dry	1	8/8/2017
4-Methylphenol	ND	0.20		mg/Kg-dry	1	8/8/2017
Naphthalene	ND	0.038		mg/Kg-dry	1	8/8/2017
2-Nitroaniline	ND	0.20		mg/Kg-dry	1	8/8/2017
3-Nitroaniline	ND	0.20		mg/Kg-dry	1	8/8/2017
4-Nitroaniline	ND	0.20		mg/Kg-dry	1	8/8/2017
2-Nitrophenol	ND	0.20		mg/Kg-dry	1	8/8/2017
4-Nitrophenol	ND	0.38		mg/Kg-dry	1	8/8/2017
Nitrobenzene	ND	0.038		mg/Kg-dry	1	8/8/2017
N-Nitrosodi-n-propylamine	ND	0.038		mg/Kg-dry	1	8/8/2017
N-Nitrosodimethylamine	ND	0.20		mg/Kg-dry	1	8/8/2017
N-Nitrosodiphenylamine	ND	0.038		mg/Kg-dry	1	8/8/2017
2, 2'-oxybis(1-Chloropropane)	ND	0.20		mg/Kg-dry	1	8/8/2017
Pentachlorophenol	ND	0.038		mg/Kg-dry	1	8/8/2017
Phenanthrene	ND	0.038		mg/Kg-dry	1	8/8/2017
Phenol	ND	0.20		mg/Kg-dry	1	8/8/2017
Pyrene	0.065	0.038		mg/Kg-dry	1	8/8/2017
Pyridine	ND	0.77		mg/Kg-dry	1	8/8/2017
1,2,4-Trichlorobenzene	ND	0.20		mg/Kg-dry	1	8/8/2017
2,4,5-Trichlorophenol	ND	0.20		mg/Kg-dry	1	8/8/2017
2,4,6-Trichlorophenol	ND	0.20		mg/Kg-dry	1	8/8/2017
PCBs						
	SW8082 (SW3550B)		Prep Date: 8/5/2017		Analyst: GVC	
Aroclor 1016	ND	0.092		mg/Kg-dry	1	8/7/2017
Aroclor 1221	ND	0.092		mg/Kg-dry	1	8/7/2017
Aroclor 1232	ND	0.092		mg/Kg-dry	1	8/7/2017
Aroclor 1242	ND	0.092		mg/Kg-dry	1	8/7/2017
Aroclor 1248	ND	0.092		mg/Kg-dry	1	8/7/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

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Date Reported: December 14, 2017

ANALYTICAL RESULTS

Date Printed: December 14, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-2A

Work Order: 17080088 Revision 3

Collection Date: 8/2/2017 10:45:00 AM

Project: City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080088-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs	SW8082 (SW3550B)				Prep Date: 8/5/2017	Analyst: GVC
Aroclor 1254	ND	0.092		mg/Kg-dry	1	8/7/2017
Aroclor 1260	ND	0.092		mg/Kg-dry	1	8/7/2017
Pesticides	SW8081 (SW3550B)				Prep Date: 8/5/2017	Analyst: GVC
4,4'-DDD	ND	0.0018		mg/Kg-dry	1	8/7/2017
4,4'-DDE	ND	0.0018		mg/Kg-dry	1	8/7/2017
4,4'-DDT	ND	0.0018		mg/Kg-dry	1	8/7/2017
Aldrin	ND	0.0018		mg/Kg-dry	1	8/7/2017
alpha-BHC	ND	0.0018		mg/Kg-dry	1	8/7/2017
alpha-Chlordane	ND	0.0018		mg/Kg-dry	1	8/7/2017
beta-BHC	ND	0.0018		mg/Kg-dry	1	8/7/2017
Chlordane	ND	0.018		mg/Kg-dry	1	8/7/2017
delta-BHC	ND	0.0018		mg/Kg-dry	1	8/7/2017
Dieldrin	ND	0.0018		mg/Kg-dry	1	8/7/2017
Endosulfan I	ND	0.0018		mg/Kg-dry	1	8/7/2017
Endosulfan II	ND	0.0018		mg/Kg-dry	1	8/7/2017
Endosulfan sulfate	ND	0.0018		mg/Kg-dry	1	8/7/2017
Endrin	ND	0.0018		mg/Kg-dry	1	8/7/2017
Endrin aldehyde	ND	0.0018		mg/Kg-dry	1	8/7/2017
Endrin ketone	ND	0.0018		mg/Kg-dry	1	8/7/2017
gamma-BHC	ND	0.0018		mg/Kg-dry	1	8/7/2017
gamma-Chlordane	ND	0.0018		mg/Kg-dry	1	8/7/2017
Heptachlor	ND	0.0018		mg/Kg-dry	1	8/7/2017
Heptachlor epoxide	ND	0.0018		mg/Kg-dry	1	8/7/2017
Methoxychlor	ND	0.0018		mg/Kg-dry	1	8/7/2017
Toxaphene	ND	0.038		mg/Kg-dry	1	8/7/2017
Herbicides in Soil	SW8321A (SW3550B)				Prep Date: 8/3/2017	Analyst: MEP
2,4,5-TP (Silvex)	ND	0.0038		mg/Kg-dry	1	8/3/2017
2,4-D	ND	0.0038		mg/Kg-dry	1	8/3/2017
Dalapon	ND	0.038		mg/Kg-dry	1	8/3/2017
Dinoseb	ND	0.0077		mg/Kg-dry	1	8/3/2017
Pentachlorophenol	ND	0.012	*	mg/Kg-dry	1	8/3/2017
Picloram	ND	0.0077	*	mg/Kg-dry	1	8/3/2017
Metals by ICP/MS	SW6020 (SW3050B)				Prep Date: 8/8/2017	Analyst: JG
Aluminum	6600	21		mg/Kg-dry	10	8/9/2017
Antimony	ND	2.1		mg/Kg-dry	10	8/9/2017
Arsenic	8.6	1.0		mg/Kg-dry	10	8/9/2017
Barium	42	1.0		mg/Kg-dry	10	8/9/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

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HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

STAT Analysis Corporation

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: December 14, 2017

ANALYTICAL RESULTS

Date Printed: December 14, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-2A

Work Order: 17080088 Revision 3

Collection Date: 8/2/2017 10:45:00 AM

Project: City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080088-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)		Prep Date: 8/8/2017		Analyst: JG	
Beryllium	0.54	0.52		mg/Kg-dry	10	8/9/2017
Cadmium	0.59	0.52		mg/Kg-dry	10	8/9/2017
Calcium	40000	62		mg/Kg-dry	10	8/9/2017
Chromium	17	1.0		mg/Kg-dry	10	8/9/2017
Cobalt	9.3	1.0		mg/Kg-dry	10	8/9/2017
Copper	47	2.6		mg/Kg-dry	10	8/9/2017
Iron	24000	31		mg/Kg-dry	10	8/9/2017
Lead	94	0.52		mg/Kg-dry	10	8/9/2017
Magnesium	23000	31		mg/Kg-dry	10	8/9/2017
Manganese	410	1.0		mg/Kg-dry	10	8/9/2017
Nickel	27	1.0		mg/Kg-dry	10	8/9/2017
Potassium	1400	31		mg/Kg-dry	10	8/9/2017
Selenium	ND	1.0		mg/Kg-dry	10	8/9/2017
Silver	ND	1.0		mg/Kg-dry	10	8/9/2017
Sodium	100	62		mg/Kg-dry	10	8/9/2017
Thallium	ND	1.0		mg/Kg-dry	10	8/9/2017
Vanadium	17	1.0		mg/Kg-dry	10	8/9/2017
Zinc	130	5.2		mg/Kg-dry	10	8/9/2017
SPLP Metals by ICP/MS	SW1312/6020A (SW3005A)		Prep Date: 11/24/2017		Analyst: JG	
Cobalt	ND	0.0040		mg/L	2	11/24/2017
Iron	0.65	0.10		mg/L	2	11/24/2017
Mercury	SW7471A		Prep Date: 8/3/2017		Analyst: LB	
Mercury	0.038	0.021		mg/Kg-dry	1	8/4/2017
Cyanide, Total	SW9012A		Prep Date: 8/4/2017		Analyst: MD	
Cyanide	ND	0.29		mg/Kg-dry	1	8/5/2017
pH (25 °C)	SW9045C		Prep Date: 8/3/2017		Analyst: RW	
pH	8.21			pH Units	1	8/3/2017
Percent Moisture	D2974		Prep Date: 8/3/2017		Analyst: KKA	
Percent Moisture	13.2	0.2	*	wt%	1	8/4/2017

Qualifiers:

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S - Spike Recovery outside accepted recovery limits

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Date Reported: December 14, 2017

Date Printed: December 14, 2017

ANALYTICAL RESULTS

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-3A

Work Order: 17080088 Revision 3

Collection Date: 8/2/2017 12:05:00 PM

Project: City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080088-004

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS						
	SW5035/8260B			Prep Date: 8/3/2017		Analyst: RRS
Acetone	ND	0.096		mg/Kg-dry	1	8/8/2017
Benzene	ND	0.0064		mg/Kg-dry	1	8/8/2017
Bromodichloromethane	ND	0.0064		mg/Kg-dry	1	8/8/2017
Bromoform	ND	0.0064		mg/Kg-dry	1	8/8/2017
Bromomethane	ND	0.013		mg/Kg-dry	1	8/8/2017
2-Butanone	ND	0.096		mg/Kg-dry	1	8/8/2017
Carbon disulfide	ND	0.064		mg/Kg-dry	1	8/8/2017
Carbon tetrachloride	ND	0.0064		mg/Kg-dry	1	8/8/2017
Chlorobenzene	ND	0.0064		mg/Kg-dry	1	8/8/2017
Chloroethane	ND	0.013		mg/Kg-dry	1	8/8/2017
Chloroform	ND	0.0064		mg/Kg-dry	1	8/8/2017
Chloromethane	ND	0.013		mg/Kg-dry	1	8/8/2017
Dibromochloromethane	ND	0.0064		mg/Kg-dry	1	8/8/2017
1,1-Dichloroethane	ND	0.0064		mg/Kg-dry	1	8/8/2017
1,2-Dichloroethane	ND	0.0064		mg/Kg-dry	1	8/8/2017
1,1-Dichloroethene	ND	0.0064		mg/Kg-dry	1	8/8/2017
cis-1,2-Dichloroethene	ND	0.0064		mg/Kg-dry	1	8/8/2017
trans-1,2-Dichloroethene	ND	0.0064		mg/Kg-dry	1	8/8/2017
1,2-Dichloropropane	ND	0.0064		mg/Kg-dry	1	8/8/2017
cis-1,3-Dichloropropene	ND	0.0026		mg/Kg-dry	1	8/8/2017
trans-1,3-Dichloropropene	ND	0.0026		mg/Kg-dry	1	8/8/2017
Ethylbenzene	ND	0.0064		mg/Kg-dry	1	8/8/2017
2-Hexanone	ND	0.026		mg/Kg-dry	1	8/8/2017
4-Methyl-2-pentanone	ND	0.026		mg/Kg-dry	1	8/8/2017
Methylene chloride	ND	0.013		mg/Kg-dry	1	8/8/2017
Methyl tert-butyl ether	ND	0.0064		mg/Kg-dry	1	8/8/2017
Styrene	ND	0.0064		mg/Kg-dry	1	8/8/2017
1,1,2,2-Tetrachloroethane	ND	0.0064		mg/Kg-dry	1	8/8/2017
Tetrachloroethene	ND	0.0064		mg/Kg-dry	1	8/8/2017
Toluene	ND	0.0064		mg/Kg-dry	1	8/8/2017
1,1,1-Trichloroethane	ND	0.0064		mg/Kg-dry	1	8/8/2017
1,1,2-Trichloroethane	ND	0.0064		mg/Kg-dry	1	8/8/2017
Trichloroethene	ND	0.0064		mg/Kg-dry	1	8/8/2017
Vinyl chloride	ND	0.0064		mg/Kg-dry	1	8/8/2017
Xylenes, Total	ND	0.019		mg/Kg-dry	1	8/8/2017
Volatile Organic Compounds by GC/MS						
	SW5035/8260B			Prep Date: 8/3/2017		Analyst: RRS
Trichlorofluoromethane	ND	0.0064		mg/Kg-dry	1	8/8/2017

Qualifiers:

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Date Reported: December 14, 2017

ANALYTICAL RESULTS

Date Printed: December 14, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-3A

Work Order: 17080088 Revision 3

Collection Date: 8/2/2017 12:05:00 PM

Project: City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080088-004

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS		SW8270C (SW3550B)		Prep Date: 8/4/2017		Analyst: DM
Acenaphthene	0.41	0.35		mg/Kg-dry	1	8/8/2017
Acenaphthylene	ND	0.35		mg/Kg-dry	1	8/8/2017
Aniline	ND	3.6		mg/Kg-dry	1	8/8/2017
Anthracene	0.82	0.35		mg/Kg-dry	1	8/8/2017
Benz(a)anthracene	2.4	0.35		mg/Kg-dry	1	8/8/2017
Benzydine	ND	3.5		mg/Kg-dry	1	8/8/2017
Benzo(a)pyrene	0.84	0.35		mg/Kg-dry	1	8/8/2017
Benzo(b)fluoranthene	ND	0.35		mg/Kg-dry	1	8/8/2017
Benzo(g,h,i)perylene	1.6	0.35		mg/Kg-dry	1	8/8/2017
Benzo(k)fluoranthene	ND	0.35		mg/Kg-dry	1	8/8/2017
Benzoic acid	ND	8.8		mg/Kg-dry	1	8/8/2017
Benzyl alcohol	ND	1.8		mg/Kg-dry	1	8/8/2017
Bis(2-chloroethoxy)methane	ND	1.8		mg/Kg-dry	1	8/8/2017
Bis(2-chloroethyl)ether	ND	1.8		mg/Kg-dry	1	8/8/2017
Bis(2-ethylhexyl)phthalate	ND	8.8		mg/Kg-dry	1	8/8/2017
4-Bromophenyl phenyl ether	ND	1.8		mg/Kg-dry	1	8/8/2017
Butyl benzyl phthalate	ND	1.8		mg/Kg-dry	1	8/8/2017
Carbazole	ND	1.8		mg/Kg-dry	1	8/8/2017
4-Chloroaniline	ND	1.8		mg/Kg-dry	1	8/8/2017
4-Chloro-3-methylphenol	ND	3.5		mg/Kg-dry	1	8/8/2017
2-Chloronaphthalene	ND	1.8		mg/Kg-dry	1	8/8/2017
2-Chlorophenol	ND	1.8		mg/Kg-dry	1	8/8/2017
4-Chlorophenyl phenyl ether	ND	1.8		mg/Kg-dry	1	8/8/2017
Chrysene	4.1	0.35		mg/Kg-dry	1	8/8/2017
Dibenz(a,h)anthracene	ND	0.35		mg/Kg-dry	1	8/8/2017
Dibenzofuran	ND	1.8		mg/Kg-dry	1	8/8/2017
1,2-Dichlorobenzene	ND	1.8		mg/Kg-dry	1	8/8/2017
1,3-Dichlorobenzene	ND	1.8		mg/Kg-dry	1	8/8/2017
1,4-Dichlorobenzene	ND	1.8		mg/Kg-dry	1	8/8/2017
3,3'-Dichlorobenzidine	ND	1.8		mg/Kg-dry	1	8/8/2017
2,4-Dichlorophenol	ND	1.8		mg/Kg-dry	1	8/8/2017
Diethyl phthalate	ND	1.8		mg/Kg-dry	1	8/8/2017
2,4-Dimethylphenol	ND	1.8		mg/Kg-dry	1	8/8/2017
Dimethyl phthalate	ND	1.8		mg/Kg-dry	1	8/8/2017
4,6-Dinitro-2-methylphenol	ND	3.5		mg/Kg-dry	1	8/8/2017
2,4-Dinitrophenol	ND	8.8		mg/Kg-dry	1	8/8/2017
2,4-Dinitrotoluene	ND	0.35		mg/Kg-dry	1	8/8/2017
2,6-Dinitrotoluene	ND	0.35		mg/Kg-dry	1	8/8/2017

Qualifiers:

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Date Reported: December 14, 2017

ANALYTICAL RESULTS

Date Printed: December 14, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-3A

Work Order: 17080088 Revision 3

Collection Date: 8/2/2017 12:05:00 PM

Project: City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080088-004

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3550B)		Prep Date: 8/4/2017		Analyst: DM	
Di-n-butyl phthalate	ND	1.8		mg/Kg-dry	1	8/8/2017
Di-n-octyl phthalate	ND	1.8		mg/Kg-dry	1	8/8/2017
Fluoranthene	3.1	0.35		mg/Kg-dry	1	8/8/2017
Fluorene	ND	0.35		mg/Kg-dry	1	8/8/2017
Hexachlorobenzene	ND	1.8		mg/Kg-dry	1	8/8/2017
Hexachlorobutadiene	ND	1.8		mg/Kg-dry	1	8/8/2017
Hexachlorocyclopentadiene	ND	1.8		mg/Kg-dry	1	8/8/2017
Hexachloroethane	ND	1.8		mg/Kg-dry	1	8/8/2017
Indeno(1,2,3-cd)pyrene	0.94	0.35		mg/Kg-dry	1	8/8/2017
Isophorone	ND	1.8		mg/Kg-dry	1	8/8/2017
2-Methylnaphthalene	ND	1.8		mg/Kg-dry	1	8/8/2017
2-Methylphenol	ND	1.8		mg/Kg-dry	1	8/8/2017
4-Methylphenol	ND	1.8		mg/Kg-dry	1	8/8/2017
Naphthalene	ND	0.35		mg/Kg-dry	1	8/8/2017
2-Nitroaniline	ND	1.8		mg/Kg-dry	1	8/8/2017
3-Nitroaniline	ND	1.8		mg/Kg-dry	1	8/8/2017
4-Nitroaniline	ND	1.8		mg/Kg-dry	1	8/8/2017
2-Nitrophenol	ND	1.8		mg/Kg-dry	1	8/8/2017
4-Nitrophenol	ND	3.5		mg/Kg-dry	1	8/8/2017
Nitrobenzene	ND	0.35		mg/Kg-dry	1	8/8/2017
N-Nitrosodi-n-propylamine	ND	0.35		mg/Kg-dry	1	8/8/2017
N-Nitrosodimethylamine	ND	1.8		mg/Kg-dry	1	8/8/2017
N-Nitrosodiphenylamine	ND	0.35		mg/Kg-dry	1	8/8/2017
2, 2'-oxybis(1-Chloropropane)	ND	1.8		mg/Kg-dry	1	8/8/2017
Pentachlorophenol	ND	0.35		mg/Kg-dry	1	8/8/2017
Phenanthrene	2.6	0.35		mg/Kg-dry	1	8/8/2017
Phenol	ND	1.8		mg/Kg-dry	1	8/8/2017
Pyrene	6.4	0.35		mg/Kg-dry	1	8/8/2017
Pyridine	ND	7.1		mg/Kg-dry	1	8/8/2017
1,2,4-Trichlorobenzene	ND	1.8		mg/Kg-dry	1	8/8/2017
2,4,5-Trichlorophenol	ND	1.8		mg/Kg-dry	1	8/8/2017
2,4,6-Trichlorophenol	ND	1.8		mg/Kg-dry	1	8/8/2017
PCBs						
	SW8082 (SW3550B)		Prep Date: 8/5/2017		Analyst: GVC	
Aroclor 1016	ND	0.085		mg/Kg-dry	1	8/7/2017
Aroclor 1221	ND	0.085		mg/Kg-dry	1	8/7/2017
Aroclor 1232	ND	0.085		mg/Kg-dry	1	8/7/2017
Aroclor 1242	ND	0.085		mg/Kg-dry	1	8/7/2017
Aroclor 1248	ND	0.085		mg/Kg-dry	1	8/7/2017

Qualifiers:

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Date Reported: December 14, 2017

ANALYTICAL RESULTS

Date Printed: December 14, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-3A

Work Order: 17080088 Revision 3

Collection Date: 8/2/2017 12:05:00 PM

Project: City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080088-004

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs						
	SW8082 (SW3550B)				Prep Date: 8/5/2017	Analyst: GVC
Aroclor 1254	ND	0.085		mg/Kg-dry	1	8/7/2017
Aroclor 1260	ND	0.085		mg/Kg-dry	1	8/7/2017
Pesticides						
	SW8081 (SW3550B)				Prep Date: 8/5/2017	Analyst: GVC
4,4'-DDD	ND	0.0017		mg/Kg-dry	1	8/7/2017
4,4'-DDE	ND	0.0017		mg/Kg-dry	1	8/7/2017
4,4'-DDT	ND	0.0017		mg/Kg-dry	1	8/7/2017
Aldrin	ND	0.0017		mg/Kg-dry	1	8/7/2017
alpha-BHC	ND	0.0017		mg/Kg-dry	1	8/7/2017
alpha-Chlordane	ND	0.0017		mg/Kg-dry	1	8/7/2017
beta-BHC	ND	0.0017		mg/Kg-dry	1	8/7/2017
Chlordane	ND	0.017		mg/Kg-dry	1	8/7/2017
delta-BHC	ND	0.0017		mg/Kg-dry	1	8/7/2017
Dieldrin	ND	0.0017		mg/Kg-dry	1	8/7/2017
Endosulfan I	ND	0.0017		mg/Kg-dry	1	8/7/2017
Endosulfan II	ND	0.0017		mg/Kg-dry	1	8/7/2017
Endosulfan sulfate	ND	0.0017		mg/Kg-dry	1	8/7/2017
Endrin	ND	0.0017		mg/Kg-dry	1	8/7/2017
Endrin aldehyde	ND	0.0017		mg/Kg-dry	1	8/7/2017
Endrin ketone	ND	0.0017		mg/Kg-dry	1	8/7/2017
gamma-BHC	ND	0.0017		mg/Kg-dry	1	8/7/2017
gamma-Chlordane	ND	0.0017		mg/Kg-dry	1	8/7/2017
Heptachlor	ND	0.0017		mg/Kg-dry	1	8/7/2017
Heptachlor epoxide	ND	0.0017		mg/Kg-dry	1	8/7/2017
Methoxychlor	ND	0.0017		mg/Kg-dry	1	8/7/2017
Toxaphene	ND	0.035		mg/Kg-dry	1	8/7/2017
Metals by ICP/MS						
	SW6020 (SW3050B)				Prep Date: 8/8/2017	Analyst: JG
Aluminum	4400	19		mg/Kg-dry	10	8/9/2017
Antimony	ND	1.9		mg/Kg-dry	10	8/9/2017
Arsenic	6.4	0.95		mg/Kg-dry	10	8/9/2017
Barium	45	0.95		mg/Kg-dry	10	8/9/2017
Beryllium	ND	0.48		mg/Kg-dry	10	8/9/2017
Cadmium	0.56	0.48		mg/Kg-dry	10	8/9/2017
Calcium	80000	57		mg/Kg-dry	10	8/9/2017
Chromium	13	0.95		mg/Kg-dry	10	8/9/2017
Cobalt	4.7	0.95		mg/Kg-dry	10	8/9/2017
Copper	77	2.4		mg/Kg-dry	10	8/9/2017
Iron	19000	29		mg/Kg-dry	10	8/9/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

STAT Analysis Corporation

2242 West Harrison St., Suite 200, Chicago, IL 60612-3766

Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com

Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: December 14, 2017

ANALYTICAL RESULTS

Date Printed: December 14, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-3A

Work Order: 17080088 Revision 3

Collection Date: 8/2/2017 12:05:00 PM

Project: City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080088-004

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)				Prep Date: 8/8/2017	Analyst: JG
Lead	160	0.48		mg/Kg-dry	10	8/9/2017
Magnesium	43000	29		mg/Kg-dry	10	8/9/2017
Manganese	340	0.95		mg/Kg-dry	10	8/9/2017
Nickel	15	0.95		mg/Kg-dry	10	8/9/2017
Potassium	800	29		mg/Kg-dry	10	8/9/2017
Selenium	ND	0.95		mg/Kg-dry	10	8/9/2017
Silver	ND	0.95		mg/Kg-dry	10	8/9/2017
Sodium	180	57		mg/Kg-dry	10	8/9/2017
Thallium	ND	0.95		mg/Kg-dry	10	8/9/2017
Vanadium	18	0.95		mg/Kg-dry	10	8/9/2017
Zinc	180	4.8		mg/Kg-dry	10	8/9/2017
TCLP Metals by ICP/MS	SW1311/6020 (SW3005A)				Prep Date: 12/12/2017	Analyst: JG
Iron	ND	0.25		mg/L	5	12/13/2017
Mercury	SW7471A				Prep Date: 8/3/2017	Analyst: LB
Mercury	0.065	0.019		mg/Kg-dry	1	8/4/2017
Cyanide, Total	SW9012A				Prep Date: 8/4/2017	Analyst: MD
Cyanide	ND	0.27		mg/Kg-dry	1	8/5/2017
pH (25 °C)	SW9045C				Prep Date: 8/3/2017	Analyst: RW
pH	8.15			pH Units	1	8/3/2017
Percent Moisture	D2974				Prep Date: 8/3/2017	Analyst: KKA
Percent Moisture	6.7	0.2	*	wt%	1	8/4/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: December 14, 2017

Date Printed: December 14, 2017

ANALYTICAL RESULTS

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-3B

Work Order: 17080088 Revision 3

Collection Date: 8/2/2017 12:20:00 PM

Project: City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080088-005

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS SW8270C (SW3550B)						
					Prep Date: 8/4/2017	Analyst: DM
Acenaphthene	0.16	0.034		mg/Kg-dry	1	8/8/2017
Acenaphthylene	0.19	0.034		mg/Kg-dry	1	8/8/2017
Anthracene	0.82	0.034		mg/Kg-dry	1	8/8/2017
Benz(a)anthracene	2.6	0.034		mg/Kg-dry	1	8/8/2017
Benzo(a)pyrene	3.0	0.034		mg/Kg-dry	1	8/8/2017
Benzo(b)fluoranthene	2.9	0.034		mg/Kg-dry	1	8/8/2017
Benzo(g,h,i)perylene	1.9	0.034		mg/Kg-dry	1	8/8/2017
Benzo(k)fluoranthene	2.2	0.034		mg/Kg-dry	1	8/8/2017
Chrysene	2.8	0.034		mg/Kg-dry	1	8/8/2017
Dibenz(a,h)anthracene	0.87	0.034		mg/Kg-dry	1	8/8/2017
Fluoranthene	4.3	0.17		mg/Kg-dry	5	8/9/2017
Fluorene	0.25	0.034		mg/Kg-dry	1	8/8/2017
Indeno(1,2,3-cd)pyrene	1.7	0.034		mg/Kg-dry	1	8/8/2017
Naphthalene	0.12	0.034		mg/Kg-dry	1	8/8/2017
Phenanthrene	2.3	0.034		mg/Kg-dry	1	8/8/2017
Pyrene	3.9	0.034		mg/Kg-dry	1	8/8/2017
Percent Moisture D2974						
					Prep Date: 8/3/2017	Analyst: KKA
Percent Moisture	5.6	0.2	*	wt%	1	8/4/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: December 14, 2017

ANALYTICAL RESULTS

Date Printed: December 14, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-7A

Work Order: 17080088 Revision 3

Collection Date: 8/2/2017 1:25:00 PM

Project: City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080088-006

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
	SW8270C (SW3550B)				Prep Date: 8/4/2017	Analyst: DM
Acenaphthene	ND	0.039		mg/Kg-dry	1	8/9/2017
Acenaphthylene	ND	0.039		mg/Kg-dry	1	8/9/2017
Anthracene	0.040	0.039		mg/Kg-dry	1	8/9/2017
Benz(a)anthracene	0.17	0.039		mg/Kg-dry	1	8/9/2017
Benzo(a)pyrene	ND	0.039		mg/Kg-dry	1	8/9/2017
Benzo(b)fluoranthene	0.042	0.039		mg/Kg-dry	1	8/9/2017
Benzo(g,h,i)perylene	0.13	0.039		mg/Kg-dry	1	8/9/2017
Benzo(k)fluoranthene	ND	0.039		mg/Kg-dry	1	8/9/2017
Chrysene	0.21	0.039		mg/Kg-dry	1	8/9/2017
Dibenz(a,h)anthracene	0.14	0.039		mg/Kg-dry	1	8/9/2017
Fluoranthene	0.32	0.039		mg/Kg-dry	1	8/9/2017
Fluorene	ND	0.039		mg/Kg-dry	1	8/9/2017
Indeno(1,2,3-cd)pyrene	0.11	0.039		mg/Kg-dry	1	8/9/2017
Naphthalene	ND	0.039		mg/Kg-dry	1	8/9/2017
Phenanthrene	0.17	0.039		mg/Kg-dry	1	8/9/2017
Pyrene	0.29	0.039		mg/Kg-dry	1	8/9/2017
Metals by ICP/MS						
	SW6020 (SW3050B)				Prep Date: 8/8/2017	Analyst: JG
Antimony	4.6	2.0		mg/Kg-dry	10	8/9/2017
Arsenic	12	1.0		mg/Kg-dry	10	8/9/2017
Beryllium	1.6	0.50		mg/Kg-dry	10	8/10/2017
Cadmium	1.4	0.50		mg/Kg-dry	10	8/9/2017
Chromium	13	1.0		mg/Kg-dry	10	8/9/2017
Copper	79	2.5		mg/Kg-dry	10	8/9/2017
Lead	160	0.50		mg/Kg-dry	10	8/9/2017
Nickel	18	1.0		mg/Kg-dry	10	8/9/2017
Selenium	2.0	1.0		mg/Kg-dry	10	8/9/2017
Silver	ND	1.0		mg/Kg-dry	10	8/9/2017
Thallium	ND	1.0		mg/Kg-dry	10	8/9/2017
Zinc	180	5.0		mg/Kg-dry	10	8/9/2017
Mercury						
	SW7471A				Prep Date: 8/3/2017	Analyst: LB
Mercury	0.23	0.020		mg/Kg-dry	1	8/4/2017
pH (25 °C)						
	SW9045C				Prep Date: 8/3/2017	Analyst: RW
pH	7.42			pH Units	1	8/3/2017
Percent Moisture						
	D2974				Prep Date: 8/3/2017	Analyst: KKA
Percent Moisture	15.4	0.2	*	wt%	1	8/4/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: December 14, 2017

ANALYTICAL RESULTS

Date Printed: December 14, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-4A

Work Order: 17080088 Revision 3

Collection Date: 8/2/2017 3:35:00 PM

Project: City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080088-009

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS SW8270C (SW3550B) Prep Date: 8/4/2017 Analyst: DM						
Acenaphthene	ND	0.035		mg/Kg-dry	1	8/9/2017
Acenaphthylene	0.050	0.035		mg/Kg-dry	1	8/9/2017
Anthracene	0.17	0.035		mg/Kg-dry	1	8/9/2017
Benz(a)anthracene	0.75	0.035		mg/Kg-dry	1	8/9/2017
Benzo(a)pyrene	0.71	0.035		mg/Kg-dry	1	8/9/2017
Benzo(b)fluoranthene	0.56	0.035		mg/Kg-dry	1	8/9/2017
Benzo(g,h,i)perylene	0.61	0.035		mg/Kg-dry	1	8/9/2017
Benzo(k)fluoranthene	0.64	0.035		mg/Kg-dry	1	8/9/2017
Chrysene	1.1	0.035		mg/Kg-dry	1	8/9/2017
Dibenz(a,h)anthracene	0.27	0.035		mg/Kg-dry	1	8/9/2017
Fluoranthene	0.95	0.035		mg/Kg-dry	1	8/9/2017
Fluorene	0.049	0.035		mg/Kg-dry	1	8/9/2017
Indeno(1,2,3-cd)pyrene	0.44	0.035		mg/Kg-dry	1	8/9/2017
Naphthalene	0.060	0.035		mg/Kg-dry	1	8/9/2017
Phenanthrene	0.92	0.035		mg/Kg-dry	1	8/9/2017
Pyrene	1.1	0.035		mg/Kg-dry	1	8/9/2017
Metals by ICP/MS SW6020 (SW3050B) Prep Date: 8/8/2017 Analyst: JG						
Antimony	2.5	1.9		mg/Kg-dry	10	8/9/2017
Arsenic	12	0.95		mg/Kg-dry	10	8/9/2017
Beryllium	1.1	0.47		mg/Kg-dry	10	8/10/2017
Cadmium	1.5	0.47		mg/Kg-dry	10	8/9/2017
Chromium	16	0.95		mg/Kg-dry	10	8/9/2017
Copper	83	2.4		mg/Kg-dry	10	8/9/2017
Lead	190	0.47		mg/Kg-dry	10	8/9/2017
Nickel	17	0.95		mg/Kg-dry	10	8/9/2017
Selenium	1.6	0.95		mg/Kg-dry	10	8/9/2017
Silver	ND	0.95		mg/Kg-dry	10	8/9/2017
Thallium	ND	0.95		mg/Kg-dry	10	8/9/2017
Zinc	280	4.7		mg/Kg-dry	10	8/9/2017
Mercury SW7471A Prep Date: 8/3/2017 Analyst: LB						
Mercury	0.086	0.019		mg/Kg-dry	1	8/4/2017
pH (25 °C) SW9045C Prep Date: 8/3/2017 Analyst: RW						
pH	7.61			pH Units	1	8/3/2017
Percent Moisture D2974 Prep Date: 8/3/2017 Analyst: KKA						
Percent Moisture	6.9	0.2	*	wt%	1	8/4/2017

Qualifiers:

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J - Analyte detected below quantitation limits

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HT - Sample received past holding time

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RL - Reporting / Quantitation Limit for the analysis

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R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

CHAIN OF CUSTODY RECORD

[illegible]

Sample Receipt Checklist

Client Name **AMEC**

Date and Time Received: **8/2/2017 6:00:00 PM**

Work Order Number **17080088**

Received by: **JNW**

Checklist completed by: _____

Signature

Date

Reviewed by: **MK**

Initials

Date

Matrix:

Carrier name Client Delivered

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 ☒

Chain of custody present?

Yes ☒

No ☐

Chain of custody signed when relinquished and received?

Yes ☒

No ☐

Chain of custody agrees with sample labels/containers?

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 ☐

Container or Temp Blank temperature in compliance?

Yes ☒

No ☐

Temperature **4.6 °C**

Water - VOA vials have zero headspace?

No VOA vials submitted ☐

Yes ☐

No ☐

Water - Samples pH checked?

Yes ☐

No ☐

Checked by: _____

Water - Samples properly preserved?

Yes ☐

No ☐

pH Adjusted? _____

Any No response must be detailed in the comments section below.

Comments:

Report trichlorofluoromethane per Mary Jank verbal 8/22/17.

Client / Person
contacted: _____

Date contacted: _____

Contacted by: _____

Response: _____

Craig Chawla

From: Jank, Mary E [mary.jank@woodplc.com]
Sent: Monday, November 20, 2017 3:47 PM
To: Craig Chawla; Frank Capoccia
Subject: Additional Testing -

Please perform additional leaching procedure testing (TCLP or SPLP) for the following metals on the identified samples:

B-18A – chromium and manganese your sample # 17080321-011

B-6B – chromium your sample #17080265-014

ESB-2A – cobalt, iron – your sample #17080088-001

ESB-4A – iron your sample #17080223-001

ESB-5A – iron your sample #17080126-001

ESB-6A – iron, manganese your sample #17080177-001

Mary E. Jank
Senior Associate
Amec Foster Wheeler Environment & Infrastructure, Inc.
8745 W. Higgins Road, Suite 300
Chicago, IL

D 773-693-6030, ext. 8742
M 312-617-8342
mary.jank@amecfw.com
amecfw.com

Craig Chawla

From: Jank, Mary E [mary.jank@woodplc.com]
Sent: Thursday, December 07, 2017 6:48 PM
To: Craig Chawla; Frank Capoccia
Subject: More TCLP/SPLP for JPSTA

Please run TCLP/SPLP for the following samples for the listed metals:

B-18A – Iron your sample #17080321-011 – chromium and manganese were already done
ESB-3A – Iron - your sample #17080088-004

Thank you

Mary E. Jank
Senior Associate
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November 27, 2017

AMEC Foster Wheeler Environment & Infrastructure
550 Warrenville Road
Lisle, IL 60532

Telephone: (630) 724-8517

Fax: (630) 724-8518

Analytical Report for STAT Work Order: 17080126 Revision 2

RE: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Dear Mary Jank:

STAT Analysis received 3 samples for the referenced project on 8/3/2017 4:05:00 PM. The analytical results are presented in the following report.

This report is revised to reflect additional analysis requested after the last report revision.

All analyses were performed in accordance with the requirements of 35 IAC Part 186 / NELAP standards. Analyses were performed in accordance with methods as referenced on the analytical report. Those analytical results expressed on a dry weight basis are also noted on the analytical report.

All analyses were performed within established holding time criteria, and all Quality Control criteria met EPA or laboratory specifications except when noted in the Case Narrative or Analytical Report. If required, an estimate of uncertainty for the analyses can be provided. A listing of accredited methods/parameters can also be provided.

Thank you for the opportunity to serve you and I look forward to working with you in the future. If you have any questions regarding the enclosed materials, please contact me at (312) 733-0551.

Sincerely,

Martin Kucan

Project Manager

The information contained in this report and any attachments is confidential information intended only for the use of the individual or entities named above. The results of this report relate only to the samples tested. If you have received this report in error, please notify us immediately by phone. This report shall not be reproduced, except in its entirety, unless written approval has been obtained from the laboratory. This analytical report shall become property of the Customer upon payment in full. Otherwise, STAT will be under no obligation to support, defend or discuss the analytical report.

Client: AMEC Foster Wheeler Environment & Infrastructure
Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL
Work Order: 17080126 Revision 2

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Tag Number	Collection Date	Date Received
17080126-001A	ESB-5A		8/3/2017 10:55:00 AM	8/3/2017
17080126-001B	ESB-5A		8/3/2017 10:55:00 AM	8/3/2017
17080126-002A	ESB-5B		8/3/2017 11:05:00 AM	8/3/2017
17080126-002B	ESB-5B		8/3/2017 11:05:00 AM	8/3/2017
17080126-003A	ESB-5C		8/3/2017 11:15:00 AM	8/3/2017

STAT Analysis Corporation

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-5A

Work Order: 17080126 Revision 2

Collection Date: 8/3/2017 10:55:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080126-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS						
	SW5035/8260B			Prep Date: 8/3/2017		Analyst: PS
Acetone	ND	0.12		mg/Kg-dry	1	8/9/2017
Benzene	ND	0.0083		mg/Kg-dry	1	8/9/2017
Bromodichloromethane	ND	0.0083		mg/Kg-dry	1	8/9/2017
Bromoform	ND	0.0083		mg/Kg-dry	1	8/9/2017
Bromomethane	ND	0.017		mg/Kg-dry	1	8/9/2017
2-Butanone	ND	0.12		mg/Kg-dry	1	8/9/2017
Carbon disulfide	ND	0.083		mg/Kg-dry	1	8/9/2017
Carbon tetrachloride	ND	0.0083		mg/Kg-dry	1	8/9/2017
Chlorobenzene	ND	0.0083		mg/Kg-dry	1	8/9/2017
Chloroethane	ND	0.017		mg/Kg-dry	1	8/9/2017
Chloroform	ND	0.0083		mg/Kg-dry	1	8/9/2017
Chloromethane	ND	0.017		mg/Kg-dry	1	8/9/2017
Dibromochloromethane	ND	0.0083		mg/Kg-dry	1	8/9/2017
1,1-Dichloroethane	ND	0.0083		mg/Kg-dry	1	8/9/2017
1,2-Dichloroethane	ND	0.0083		mg/Kg-dry	1	8/9/2017
1,1-Dichloroethene	ND	0.0083		mg/Kg-dry	1	8/9/2017
cis-1,2-Dichloroethene	ND	0.0083		mg/Kg-dry	1	8/9/2017
trans-1,2-Dichloroethene	ND	0.0083		mg/Kg-dry	1	8/9/2017
1,2-Dichloropropane	ND	0.0083		mg/Kg-dry	1	8/9/2017
cis-1,3-Dichloropropene	ND	0.0033		mg/Kg-dry	1	8/9/2017
trans-1,3-Dichloropropene	ND	0.0033		mg/Kg-dry	1	8/9/2017
Ethylbenzene	ND	0.0083		mg/Kg-dry	1	8/9/2017
2-Hexanone	ND	0.033		mg/Kg-dry	1	8/9/2017
4-Methyl-2-pentanone	ND	0.033		mg/Kg-dry	1	8/9/2017
Methylene chloride	ND	0.017		mg/Kg-dry	1	8/9/2017
Methyl tert-butyl ether	ND	0.0083		mg/Kg-dry	1	8/9/2017
Styrene	ND	0.0083		mg/Kg-dry	1	8/9/2017
1,1,2,2-Tetrachloroethane	ND	0.0083		mg/Kg-dry	1	8/9/2017
Tetrachloroethene	0.027	0.0083		mg/Kg-dry	1	8/9/2017
Toluene	ND	0.0083		mg/Kg-dry	1	8/9/2017
1,1,1-Trichloroethane	ND	0.0083		mg/Kg-dry	1	8/9/2017
1,1,2-Trichloroethane	ND	0.0083		mg/Kg-dry	1	8/9/2017
Trichloroethene	ND	0.0083		mg/Kg-dry	1	8/9/2017
Vinyl chloride	ND	0.0083		mg/Kg-dry	1	8/9/2017
Xylenes, Total	ND	0.025		mg/Kg-dry	1	8/9/2017
Volatile Organic Compounds by GC/MS						
	SW5035/8260B			Prep Date: 8/3/2017		Analyst: PS
Trichlorofluoromethane	ND	0.0083		mg/Kg-dry	1	8/9/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

STAT Analysis Corporation

2242 West Harrison St., Suite 200, Chicago, IL 60612-3766

Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com

Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-5A

Work Order: 17080126 Revision 2

Collection Date: 8/3/2017 10:55:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080126-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3550B)		Prep Date: 8/5/2017		Analyst: DM	
Acenaphthene	ND	0.034		mg/Kg-dry	1	8/10/2017
Acenaphthylene	0.050	0.034		mg/Kg-dry	1	8/10/2017
Aniline	ND	0.35		mg/Kg-dry	1	8/10/2017
Anthracene	0.092	0.034		mg/Kg-dry	1	8/10/2017
Benz(a)anthracene	0.16	0.034		mg/Kg-dry	1	8/10/2017
Benzidine	ND	0.34		mg/Kg-dry	1	8/10/2017
Benzo(a)pyrene	0.13	0.034		mg/Kg-dry	1	8/10/2017
Benzo(b)fluoranthene	0.18	0.034		mg/Kg-dry	1	8/10/2017
Benzo(g,h,i)perylene	0.22	0.034		mg/Kg-dry	1	8/10/2017
Benzo(k)fluoranthene	0.13	0.034		mg/Kg-dry	1	8/10/2017
Benzoic acid	ND	0.87		mg/Kg-dry	1	8/10/2017
Benzyl alcohol	ND	0.18		mg/Kg-dry	1	8/10/2017
Bis(2-chloroethoxy)methane	ND	0.18		mg/Kg-dry	1	8/10/2017
Bis(2-chloroethyl)ether	ND	0.18		mg/Kg-dry	1	8/10/2017
Bis(2-ethylhexyl)phthalate	ND	0.87		mg/Kg-dry	1	8/10/2017
4-Bromophenyl phenyl ether	ND	0.18		mg/Kg-dry	1	8/10/2017
Butyl benzyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
Carbazole	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Chloroaniline	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Chloro-3-methylphenol	ND	0.34		mg/Kg-dry	1	8/10/2017
2-Chloronaphthalene	ND	0.18		mg/Kg-dry	1	8/10/2017
2-Chlorophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Chlorophenyl phenyl ether	ND	0.18		mg/Kg-dry	1	8/10/2017
Chrysene	0.25	0.034		mg/Kg-dry	1	8/10/2017
Dibenz(a,h)anthracene	0.062	0.034		mg/Kg-dry	1	8/10/2017
Dibenzofuran	ND	0.18		mg/Kg-dry	1	8/10/2017
1,2-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
1,3-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
1,4-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
3,3'-Dichlorobenzidine	ND	0.18		mg/Kg-dry	1	8/10/2017
2,4-Dichlorophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
Diethyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
2,4-Dimethylphenol	ND	0.18		mg/Kg-dry	1	8/10/2017
Dimethyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
4,6-Dinitro-2-methylphenol	ND	0.34		mg/Kg-dry	1	8/10/2017
2,4-Dinitrophenol	ND	0.87		mg/Kg-dry	1	8/10/2017
2,4-Dinitrotoluene	ND	0.034		mg/Kg-dry	1	8/10/2017
2,6-Dinitrotoluene	ND	0.034		mg/Kg-dry	1	8/10/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-5A

Work Order: 17080126 Revision 2

Collection Date: 8/3/2017 10:55:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080126-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3550B)		Prep Date: 8/5/2017		Analyst: DM	
Di-n-butyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
Di-n-octyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
Fluoranthene	0.31	0.034		mg/Kg-dry	1	8/10/2017
Fluorene	ND	0.034		mg/Kg-dry	1	8/10/2017
Hexachlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
Hexachlorobutadiene	ND	0.18		mg/Kg-dry	1	8/10/2017
Hexachlorocyclopentadiene	ND	0.18		mg/Kg-dry	1	8/10/2017
Hexachloroethane	ND	0.18		mg/Kg-dry	1	8/10/2017
Indeno(1,2,3-cd)pyrene	0.12	0.034		mg/Kg-dry	1	8/10/2017
Isophorone	ND	0.18		mg/Kg-dry	1	8/10/2017
2-Methylnaphthalene	ND	0.18		mg/Kg-dry	1	8/10/2017
2-Methylphenol	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Methylphenol	ND	0.18		mg/Kg-dry	1	8/10/2017
Naphthalene	0.059	0.034		mg/Kg-dry	1	8/10/2017
2-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/10/2017
3-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/10/2017
2-Nitrophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Nitrophenol	ND	0.34		mg/Kg-dry	1	8/10/2017
Nitrobenzene	ND	0.034		mg/Kg-dry	1	8/10/2017
N-Nitrosodi-n-propylamine	ND	0.034		mg/Kg-dry	1	8/10/2017
N-Nitrosodimethylamine	ND	0.18		mg/Kg-dry	1	8/10/2017
N-Nitrosodiphenylamine	ND	0.034		mg/Kg-dry	1	8/10/2017
2, 2'-oxybis(1-Chloropropane)	ND	0.18		mg/Kg-dry	1	8/10/2017
Pentachlorophenol	ND	0.034		mg/Kg-dry	1	8/10/2017
Phenanthrene	0.29	0.034		mg/Kg-dry	1	8/10/2017
Phenol	ND	0.18		mg/Kg-dry	1	8/10/2017
Pyrene	0.29	0.034		mg/Kg-dry	1	8/10/2017
Pyridine	ND	0.70		mg/Kg-dry	1	8/10/2017
1,2,4-Trichlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
2,4,5-Trichlorophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
2,4,6-Trichlorophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
PCBs						
	SW8082 (SW3550B)		Prep Date: 8/5/2017		Analyst: GVC	
Aroclor 1016	ND	0.082		mg/Kg-dry	1	8/8/2017
Aroclor 1221	ND	0.082		mg/Kg-dry	1	8/8/2017
Aroclor 1232	ND	0.082		mg/Kg-dry	1	8/8/2017
Aroclor 1242	ND	0.082		mg/Kg-dry	1	8/8/2017
Aroclor 1248	ND	0.082		mg/Kg-dry	1	8/8/2017

Qualifiers:

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E - Value above quantitation range

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-5A

Work Order: 17080126 Revision 2

Collection Date: 8/3/2017 10:55:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080126-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs						
	SW8082 (SW3550B)				Prep Date: 8/5/2017	Analyst: GVC
Aroclor 1254	ND	0.082		mg/Kg-dry	1	8/8/2017
Aroclor 1260	ND	0.082		mg/Kg-dry	1	8/8/2017
Pesticides						
	SW8081 (SW3550B)				Prep Date: 8/5/2017	Analyst: GVC
4,4'-DDD	ND	0.0016		mg/Kg-dry	1	8/8/2017
4,4'-DDE	ND	0.0016		mg/Kg-dry	1	8/8/2017
4,4'-DDT	ND	0.0016		mg/Kg-dry	1	8/8/2017
Aldrin	ND	0.0016		mg/Kg-dry	1	8/8/2017
alpha-BHC	ND	0.0016		mg/Kg-dry	1	8/8/2017
alpha-Chlordane	ND	0.0016		mg/Kg-dry	1	8/8/2017
beta-BHC	ND	0.0016		mg/Kg-dry	1	8/8/2017
Chlordane	ND	0.016		mg/Kg-dry	1	8/8/2017
delta-BHC	ND	0.0016		mg/Kg-dry	1	8/8/2017
Dieldrin	ND	0.0016		mg/Kg-dry	1	8/8/2017
Endosulfan I	ND	0.0016		mg/Kg-dry	1	8/8/2017
Endosulfan II	ND	0.0016		mg/Kg-dry	1	8/8/2017
Endosulfan sulfate	ND	0.0016		mg/Kg-dry	1	8/8/2017
Endrin	ND	0.0016		mg/Kg-dry	1	8/8/2017
Endrin aldehyde	ND	0.0016		mg/Kg-dry	1	8/8/2017
Endrin ketone	ND	0.0016		mg/Kg-dry	1	8/8/2017
gamma-BHC	ND	0.0016		mg/Kg-dry	1	8/8/2017
gamma-Chlordane	ND	0.0016		mg/Kg-dry	1	8/8/2017
Heptachlor	ND	0.0016		mg/Kg-dry	1	8/8/2017
Heptachlor epoxide	ND	0.0016		mg/Kg-dry	1	8/8/2017
Methoxychlor	ND	0.0016		mg/Kg-dry	1	8/8/2017
Toxaphene	ND	0.034		mg/Kg-dry	1	8/8/2017
Metals by ICP/MS						
	SW6020 (SW3050B)				Prep Date: 8/4/2017	Analyst: JG
Aluminum	3600	18		mg/Kg-dry	10	8/4/2017
Antimony	2.2	1.8		mg/Kg-dry	10	8/7/2017
Arsenic	12	0.92		mg/Kg-dry	10	8/4/2017
Barium	40	0.92		mg/Kg-dry	10	8/7/2017
Beryllium	0.62	0.46		mg/Kg-dry	10	8/4/2017
Cadmium	2.1	0.46		mg/Kg-dry	10	8/4/2017
Calcium	68000	55		mg/Kg-dry	10	8/4/2017
Chromium	21	0.92		mg/Kg-dry	10	8/4/2017
Cobalt	5.8	0.92		mg/Kg-dry	10	8/4/2017
Copper	93	2.3		mg/Kg-dry	10	8/4/2017
Iron	35000	28		mg/Kg-dry	10	8/4/2017

Qualifiers:

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-5A

Work Order: 17080126 Revision 2

Collection Date: 8/3/2017 10:55:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080126-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)				Prep Date: 8/4/2017	Analyst: JG
Lead	210	0.46		mg/Kg-dry	10	8/4/2017
Magnesium	31000	28		mg/Kg-dry	10	8/4/2017
Manganese	470	0.92		mg/Kg-dry	10	8/4/2017
Nickel	21	0.92		mg/Kg-dry	10	8/4/2017
Potassium	440	28		mg/Kg-dry	10	8/4/2017
Selenium	1.1	0.92		mg/Kg-dry	10	8/4/2017
Silver	ND	0.92		mg/Kg-dry	10	8/4/2017
Sodium	180	55		mg/Kg-dry	10	8/4/2017
Thallium	ND	0.92		mg/Kg-dry	10	8/4/2017
Vanadium	17	0.92		mg/Kg-dry	10	8/4/2017
Zinc	750	4.6		mg/Kg-dry	10	8/4/2017
TCLP Metals by ICP/MS	SW1311/6020A (SW3005A)				Prep Date: 11/21/2017	Analyst: JG
Iron	2.4	0.25		mg/L	5	11/22/2017
Mercury	SW7471A				Prep Date: 8/4/2017	Analyst: LB
Mercury	0.15	0.017		mg/Kg-dry	1	8/7/2017
Cyanide, Total	SW9012A				Prep Date: 8/8/2017	Analyst: MD
Cyanide	ND	0.26		mg/Kg-dry	1	8/8/2017
pH (25 °C)	SW9045C				Prep Date: 8/4/2017	Analyst: VA
pH	7.89			pH Units	1	8/4/2017
Percent Moisture	D2974				Prep Date: 8/4/2017	Analyst: KKA
Percent Moisture	5.2	0.2	*	wt%	1	8/5/2017

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[illegible]

Sample Receipt Checklist

Client Name AMEC
Work Order Number 17080126

Date and Time Received: 8/3/2017 4:05:00 PM

Received by: JNW

Checklist completed by:

Signature

Date

Reviewed by:

Initials

Date

Matrix:

Carrier name Client Delivered

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels/containers?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container or Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Temperature 4.6 °C
Water - VOA vials have zero headspace?	No VOA vials submitted <input checked="" type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Water - Samples pH checked?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Checked by: _____
Water - Samples properly preserved?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	pH Adjusted? _____

Any No response must be detailed in the comments section below.

Comments: Report trichlorofluoromethane per Mary Zank verbal 8/22/17.

Client / Person contacted:

Date contacted:

Contacted by:

Response:

Craig Chawla

From: Jank, Mary E [mary.jank@woodplc.com]

Sent: Monday, November 20, 2017 3:47 PM

To: Craig Chawla; Frank Capoccia

Subject: Additional Testing -

Please perform additional leaching procedure testing (TCLP or SPLP) for the following metals on the identified samples:

B-18A – chromium and manganese your sample # 17080321-011

B-6B – chromium your sample #17080265-014

ESB-2A – cobalt, iron – your sample #17080088-001

ESB-4A – iron your sample #17080223-001

ESB-5A – iron your sample #17080126-001

ESB-6A – iron, manganese your sample #17080177-001

Mary E. Jank

Senior Associate

Amec Foster Wheeler Environment & Infrastructure, Inc.

8745 W. Higgins Road, Suite 300

Chicago, IL

D 773-693-6030, ext. 8742

M 312-617-8342

mary.jank@amecfw.com

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November 27, 2017

AMEC Foster Wheeler Environment & Infrastructure
550 Warrenville Road
Lisle, IL 60532

Telephone: (630) 724-8517

Fax: (630) 724-8518

Analytical Report for STAT Work Order: 17080177 Revision 2

RE: 3205171606, City of Chicago JPSTA, Chicago, IL

Dear Mary Jank:

STAT Analysis received 6 samples for the referenced project on 8/4/2017 4:45:00 PM. The analytical results are presented in the following report.

This report is revised to reflect additional analysis requested after the last report revision.

All analyses were performed in accordance with the requirements of 35 IAC Part 186 / NELAP standards. Analyses were performed in accordance with methods as referenced on the analytical report. Those analytical results expressed on a dry weight basis are also noted on the analytical report.

All analyses were performed within established holding time criteria, and all Quality Control criteria met EPA or laboratory specifications except when noted in the Case Narrative or Analytical Report. If required, an estimate of uncertainty for the analyses can be provided. A listing of accredited methods/parameters can also be provided.

Thank you for the opportunity to serve you and I look forward to working with you in the future. If you have any questions regarding the enclosed materials, please contact me at (312) 733-0551.

Sincerely,



Martin Kucan

Project Manager

The information contained in this report and any attachments is confidential information intended only for the use of the individual or entities named above. The results of this report relate only to the samples tested. If you have received this report in error, please notify us immediately by phone. This report shall not be reproduced, except in its entirety, unless written approval has been obtained from the laboratory. This analytical report shall become property of the Customer upon payment in full. Otherwise, STAT will be under no obligation to support, defend or discuss the analytical report.

Client: AMEC Foster Wheeler Environment & Infrastructure
Project: 3205171606, City of Chicago JPSTA, Chicago, IL
Work Order: 17080177 Revision 2

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Tag Number	Collection Date	Date Received
17080177-001A	ESB-6A		8/4/2017 11:30:00 AM	8/4/2017
17080177-001B	ESB-6A		8/4/2017 11:30:00 AM	8/4/2017
17080177-002A	ESB-6B		8/4/2017 11:35:00 AM	8/4/2017
17080177-002B	ESB-6B		8/4/2017 11:35:00 AM	8/4/2017
17080177-003A	B-17A		8/4/2017 1:40:00 PM	8/4/2017
17080177-004A	B-17B		8/4/2017 1:50:00 PM	8/4/2017
17080177-005A	B-14A		8/4/2017 3:05:00 PM	8/4/2017
17080177-006A	B-14B		8/4/2017 3:10:00 PM	8/4/2017

CLIENT: AMEC Foster Wheeler Environment & Infr
Project: 3205171606, City of Chicago JPSTA, Chicago, IL
Work Order: 17080177 Revision 2

CASE NARRATIVE

The VOC soil Laboratory Control Sample (LCS) analyzed 08/11/2017 had recovery of Chloromethane outside of control limits (64.0% recovery, QC limits 70-130%). Recovery in the Laboratory Control Sample Duplicate (LCSD) and Relative Percent Difference (RPD) between the LCS and LCSD were within control limits.

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr
Work Order: 17080177 Revision 2
Project: 3205171606, City of Chicago JPSTA, Chicago, IL
Lab ID: 17080177-001

Client Sample ID: ESB-6A
Collection Date: 8/4/2017 11:30:00 AM
Matrix: Soil

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS						
	SW5035/8260B		Prep Date: 8/7/2017		Analyst: ART	
Acetone	ND	0.13		mg/Kg-dry	1	8/11/2017
Benzene	ND	0.0084		mg/Kg-dry	1	8/11/2017
Bromodichloromethane	ND	0.0084		mg/Kg-dry	1	8/11/2017
Bromoform	ND	0.0084		mg/Kg-dry	1	8/11/2017
Bromomethane	ND	0.017		mg/Kg-dry	1	8/11/2017
2-Butanone	ND	0.13		mg/Kg-dry	1	8/11/2017
Carbon disulfide	ND	0.084		mg/Kg-dry	1	8/11/2017
Carbon tetrachloride	0.15	0.0084		mg/Kg-dry	1	8/11/2017
Chlorobenzene	ND	0.0084		mg/Kg-dry	1	8/11/2017
Chloroethane	ND	0.017		mg/Kg-dry	1	8/11/2017
Chloroform	0.034	0.0084		mg/Kg-dry	1	8/11/2017
Chloromethane	ND	0.017		mg/Kg-dry	1	8/11/2017
Dibromochloromethane	ND	0.0084		mg/Kg-dry	1	8/11/2017
1,1-Dichloroethane	ND	0.0084		mg/Kg-dry	1	8/11/2017
1,2-Dichloroethane	ND	0.0084		mg/Kg-dry	1	8/11/2017
1,1-Dichloroethene	ND	0.0084		mg/Kg-dry	1	8/11/2017
cis-1,2-Dichloroethene	ND	0.0084		mg/Kg-dry	1	8/11/2017
trans-1,2-Dichloroethene	ND	0.0084		mg/Kg-dry	1	8/11/2017
1,2-Dichloropropane	ND	0.0084		mg/Kg-dry	1	8/11/2017
cis-1,3-Dichloropropene	ND	0.0034		mg/Kg-dry	1	8/11/2017
trans-1,3-Dichloropropene	ND	0.0034		mg/Kg-dry	1	8/11/2017
Ethylbenzene	ND	0.0084		mg/Kg-dry	1	8/11/2017
2-Hexanone	ND	0.034		mg/Kg-dry	1	8/11/2017
4-Methyl-2-pentanone	ND	0.034		mg/Kg-dry	1	8/11/2017
Methylene chloride	ND	0.017		mg/Kg-dry	1	8/11/2017
Methyl tert-butyl ether	ND	0.0084		mg/Kg-dry	1	8/11/2017
Styrene	ND	0.0084		mg/Kg-dry	1	8/11/2017
1,1,2,2-Tetrachloroethane	ND	0.0084		mg/Kg-dry	1	8/11/2017
Tetrachloroethene	ND	0.0084		mg/Kg-dry	1	8/11/2017
Toluene	ND	0.0084		mg/Kg-dry	1	8/11/2017
1,1,1-Trichloroethane	ND	0.0084		mg/Kg-dry	1	8/11/2017
1,1,2-Trichloroethane	ND	0.0084		mg/Kg-dry	1	8/11/2017
Trichloroethene	ND	0.0084		mg/Kg-dry	1	8/11/2017
Vinyl chloride	ND	0.0084		mg/Kg-dry	1	8/11/2017
Xylenes, Total	ND	0.025		mg/Kg-dry	1	8/11/2017
Volatile Organic Compounds by GC/MS						
	SW5035/8260B		Prep Date: 8/7/2017		Analyst: ART	
Trichlorofluoromethane	ND	0.0084		mg/Kg-dry	1	8/11/2017

Qualifiers:

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-6A

Work Order: 17080177 Revision 2

Collection Date: 8/4/2017 11:30:00 AM

Project: 3205171606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080177-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
SW8270C (SW3550B)			Prep Date: 8/8/2017		Analyst: DM	
Acenaphthene	ND	0.036		mg/Kg-dry	1	8/10/2017
Acenaphthylene	0.12	0.036		mg/Kg-dry	1	8/10/2017
Aniline	ND	0.36		mg/Kg-dry	1	8/10/2017
Anthracene	0.089	0.036		mg/Kg-dry	1	8/10/2017
Benz(a)anthracene	0.25	0.036		mg/Kg-dry	1	8/10/2017
Benzidine	ND	0.36		mg/Kg-dry	1	8/10/2017
Benzo(a)pyrene	0.26	0.036		mg/Kg-dry	1	8/10/2017
Benzo(b)fluoranthene	0.35	0.036		mg/Kg-dry	1	8/10/2017
Benzo(g,h,i)perylene	0.22	0.036		mg/Kg-dry	1	8/10/2017
Benzo(k)fluoranthene	0.25	0.036		mg/Kg-dry	1	8/10/2017
Benzoic acid	ND	0.89		mg/Kg-dry	1	8/10/2017
Benzyl alcohol	ND	0.18		mg/Kg-dry	1	8/10/2017
Bis(2-chloroethoxy)methane	ND	0.18		mg/Kg-dry	1	8/10/2017
Bis(2-chloroethyl)ether	ND	0.18		mg/Kg-dry	1	8/10/2017
Bis(2-ethylhexyl)phthalate	ND	0.89		mg/Kg-dry	1	8/10/2017
4-Bromophenyl phenyl ether	ND	0.18		mg/Kg-dry	1	8/10/2017
Butyl benzyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
Carbazole	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Chloroaniline	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Chloro-3-methylphenol	ND	0.36		mg/Kg-dry	1	8/10/2017
2-Chloronaphthalene	ND	0.18		mg/Kg-dry	1	8/10/2017
2-Chlorophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Chlorophenyl phenyl ether	ND	0.18		mg/Kg-dry	1	8/10/2017
Chrysene	0.34	0.036		mg/Kg-dry	1	8/10/2017
Dibenz(a,h)anthracene	0.094	0.036		mg/Kg-dry	1	8/10/2017
Dibenzofuran	ND	0.18		mg/Kg-dry	1	8/10/2017
1,2-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
1,3-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
1,4-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
3,3'-Dichlorobenzidine	ND	0.18		mg/Kg-dry	1	8/10/2017
2,4-Dichlorophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
Diethyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
2,4-Dimethylphenol	ND	0.18		mg/Kg-dry	1	8/10/2017
Dimethyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
4,6-Dinitro-2-methylphenol	ND	0.36		mg/Kg-dry	1	8/10/2017
2,4-Dinitrophenol	ND	0.89		mg/Kg-dry	1	8/10/2017
2,4-Dinitrotoluene	ND	0.036		mg/Kg-dry	1	8/10/2017
2,6-Dinitrotoluene	ND	0.036		mg/Kg-dry	1	8/10/2017

Qualifiers:
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J - Analyte detected below quantitation limits
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HT - Sample received past holding time
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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-6A

Work Order: 17080177 Revision 2

Collection Date: 8/4/2017 11:30:00 AM

Project: 3205171606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080177-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3550B)		Prep Date: 8/8/2017		Analyst: DM	
Di-n-butyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
Di-n-octyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
Fluoranthene	0.52	0.036		mg/Kg-dry	1	8/10/2017
Fluorene	ND	0.036		mg/Kg-dry	1	8/10/2017
Hexachlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
Hexachlorobutadiene	ND	0.18		mg/Kg-dry	1	8/10/2017
Hexachlorocyclopentadiene	ND	0.18		mg/Kg-dry	1	8/10/2017
Hexachloroethane	ND	0.18		mg/Kg-dry	1	8/10/2017
Indeno(1,2,3-cd)pyrene	0.17	0.036		mg/Kg-dry	1	8/10/2017
Isophorone	ND	0.18		mg/Kg-dry	1	8/10/2017
2-Methylnaphthalene	ND	0.18		mg/Kg-dry	1	8/10/2017
2-Methylphenol	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Methylphenol	ND	0.18		mg/Kg-dry	1	8/10/2017
Naphthalene	0.070	0.036		mg/Kg-dry	1	8/10/2017
2-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/10/2017
3-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/10/2017
2-Nitrophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Nitrophenol	ND	0.36		mg/Kg-dry	1	8/10/2017
Nitrobenzene	ND	0.036		mg/Kg-dry	1	8/10/2017
N-Nitrosodi-n-propylamine	ND	0.036		mg/Kg-dry	1	8/10/2017
N-Nitrosodimethylamine	ND	0.18		mg/Kg-dry	1	8/10/2017
N-Nitrosodiphenylamine	ND	0.036		mg/Kg-dry	1	8/10/2017
2, 2'-oxybis(1-Chloropropane)	ND	0.18		mg/Kg-dry	1	8/10/2017
Pentachlorophenol	ND	0.036		mg/Kg-dry	1	8/10/2017
Phenanthrene	0.45	0.036		mg/Kg-dry	1	8/10/2017
Phenol	ND	0.18		mg/Kg-dry	1	8/10/2017
Pyrene	0.52	0.036		mg/Kg-dry	1	8/10/2017
Pyridine	ND	0.72		mg/Kg-dry	1	8/10/2017
1,2,4-Trichlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
2,4,5-Trichlorophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
2,4,6-Trichlorophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
PCBs						
	SW8082 (SW3550B)		Prep Date: 8/5/2017		Analyst: GVC	
Aroclor 1016	ND	0.085		mg/Kg-dry	1	8/8/2017
Aroclor 1221	ND	0.085		mg/Kg-dry	1	8/8/2017
Aroclor 1232	ND	0.085		mg/Kg-dry	1	8/8/2017
Aroclor 1242	ND	0.085		mg/Kg-dry	1	8/8/2017
Aroclor 1248	ND	0.085		mg/Kg-dry	1	8/8/2017

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-6A

Work Order: 17080177 Revision 2

Collection Date: 8/4/2017 11:30:00 AM

Project: 3205171606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080177-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs						
	SW8082 (SW3550B)				Prep Date: 8/5/2017	Analyst: GVC
Aroclor 1254	ND	0.085		mg/Kg-dry	1	8/8/2017
Aroclor 1260	ND	0.085		mg/Kg-dry	1	8/8/2017
Pesticides						
	SW8081 (SW3550B)				Prep Date: 8/5/2017	Analyst: GVC
4,4'-DDD	0.042	0.0017		mg/Kg-dry	1	8/8/2017
4,4'-DDE	0.069	0.0017		mg/Kg-dry	1	8/8/2017
4,4'-DDT	0.042	0.0017		mg/Kg-dry	1	8/8/2017
Aldrin	ND	0.0017		mg/Kg-dry	1	8/8/2017
alpha-BHC	ND	0.0017		mg/Kg-dry	1	8/8/2017
alpha-Chlordane	ND	0.0017		mg/Kg-dry	1	8/8/2017
beta-BHC	ND	0.0017		mg/Kg-dry	1	8/8/2017
Chlordane	ND	0.017		mg/Kg-dry	1	8/8/2017
delta-BHC	ND	0.0017		mg/Kg-dry	1	8/8/2017
Dieldrin	ND	0.0017		mg/Kg-dry	1	8/8/2017
Endosulfan I	ND	0.0017		mg/Kg-dry	1	8/8/2017
Endosulfan II	ND	0.0017		mg/Kg-dry	1	8/8/2017
Endosulfan sulfate	ND	0.0017		mg/Kg-dry	1	8/8/2017
Endrin	ND	0.0017		mg/Kg-dry	1	8/8/2017
Endrin aldehyde	ND	0.0017		mg/Kg-dry	1	8/8/2017
Endrin ketone	ND	0.0017		mg/Kg-dry	1	8/8/2017
gamma-BHC	ND	0.0017		mg/Kg-dry	1	8/8/2017
gamma-Chlordane	ND	0.0017		mg/Kg-dry	1	8/8/2017
Heptachlor	ND	0.0017		mg/Kg-dry	1	8/8/2017
Heptachlor epoxide	ND	0.0017		mg/Kg-dry	1	8/8/2017
Methoxychlor	ND	0.0017		mg/Kg-dry	1	8/8/2017
Toxaphene	ND	0.035		mg/Kg-dry	1	8/8/2017
Herbicides in Soil						
	SW8321A (SW3550B)				Prep Date: 8/7/2017	Analyst: MEP
2,4,5-TP (Silvex)	ND	0.0036		mg/Kg-dry	1	8/8/2017
2,4-D	ND	0.0036		mg/Kg-dry	1	8/8/2017
Dalapon	ND	0.036		mg/Kg-dry	1	8/8/2017
Dinoseb	ND	0.0073		mg/Kg-dry	1	8/8/2017
Pentachlorophenol	ND	0.011	*	mg/Kg-dry	1	8/8/2017
Picloram	ND	0.0073	*	mg/Kg-dry	1	8/8/2017
Metals by ICP/MS						
	SW6020 (SW3050B)				Prep Date: 8/9/2017	Analyst: JG
Aluminum	4500	20		mg/Kg-dry	10	8/10/2017
Antimony	3.1	2.0		mg/Kg-dry	10	8/11/2017
Arsenic	18	0.98		mg/Kg-dry	10	8/10/2017
Barium	57	0.98		mg/Kg-dry	10	8/10/2017

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-6A

Work Order: 17080177 Revision 2

Collection Date: 8/4/2017 11:30:00 AM

Project: 3205171606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080177-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)				Prep Date: 8/9/2017	Analyst: JG
Beryllium	0.74	0.49		mg/Kg-dry	10	8/10/2017
Cadmium	1.7	0.49		mg/Kg-dry	10	8/10/2017
Calcium	49000	59		mg/Kg-dry	10	8/10/2017
Chromium	24	0.98		mg/Kg-dry	10	8/10/2017
Cobalt	7.1	0.98		mg/Kg-dry	10	8/10/2017
Copper	700	2.4		mg/Kg-dry	10	8/10/2017
Iron	39000	29		mg/Kg-dry	10	8/10/2017
Lead	420	0.49		mg/Kg-dry	10	8/10/2017
Magnesium	26000	29		mg/Kg-dry	10	8/10/2017
Manganese	1400	0.98		mg/Kg-dry	10	8/10/2017
Nickel	20	0.98		mg/Kg-dry	10	8/10/2017
Potassium	730	29		mg/Kg-dry	10	8/10/2017
Selenium	1.1	0.98		mg/Kg-dry	10	8/10/2017
Silver	ND	0.98		mg/Kg-dry	10	8/10/2017
Sodium	250	59		mg/Kg-dry	10	8/10/2017
Thallium	ND	0.98		mg/Kg-dry	10	8/10/2017
Vanadium	20	0.98		mg/Kg-dry	10	8/11/2017
Zinc	580	4.9		mg/Kg-dry	10	8/10/2017
SPLP Metals by ICP/MS	SW1312/6020A (SW3005A)				Prep Date: 11/24/2017	Analyst: JG
Iron	0.86	0.10		mg/L	2	11/24/2017
Manganese	0.012	0.0040		mg/L	2	11/24/2017
Mercury	SW7471A				Prep Date: 8/10/2017	Analyst: LB
Mercury	0.15	0.019		mg/Kg-dry	1	8/9/2017
Cyanide, Total	SW9012A				Prep Date: 8/8/2017	Analyst: MD
Cyanide	ND	0.27		mg/Kg-dry	1	8/8/2017
pH (25 °C)	SW9045C				Prep Date: 8/7/2017	Analyst: RW
pH	7.56			pH Units	1	8/7/2017
Percent Moisture	D2974				Prep Date: 8/7/2017	Analyst: KKA
Percent Moisture	8.1	0.2	*	wt%	1	8/8/2017

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-17A

Work Order: 17080177 Revision 2

Collection Date: 8/4/2017 1:40:00 PM

Project: 3205171606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080177-003

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS SW8270C (SW3550B) Prep Date: 8/8/2017 Analyst: DM						
Acenaphthene	ND	0.034		mg/Kg-dry	1	8/10/2017
Acenaphthylene	0.18	0.034		mg/Kg-dry	1	8/10/2017
Anthracene	0.089	0.034		mg/Kg-dry	1	8/10/2017
Benz(a)anthracene	0.18	0.034		mg/Kg-dry	1	8/10/2017
Benzo(a)pyrene	0.17	0.034		mg/Kg-dry	1	8/10/2017
Benzo(b)fluoranthene	0.23	0.034		mg/Kg-dry	1	8/10/2017
Benzo(g,h,i)perylene	0.15	0.034		mg/Kg-dry	1	8/10/2017
Benzo(k)fluoranthene	0.15	0.034		mg/Kg-dry	1	8/10/2017
Chrysene	0.31	0.034		mg/Kg-dry	1	8/10/2017
Dibenz(a,h)anthracene	0.066	0.034		mg/Kg-dry	1	8/10/2017
Fluoranthene	0.34	0.034		mg/Kg-dry	1	8/10/2017
Fluorene	ND	0.034		mg/Kg-dry	1	8/10/2017
Indeno(1,2,3-cd)pyrene	0.11	0.034		mg/Kg-dry	1	8/10/2017
Naphthalene	ND	0.034		mg/Kg-dry	1	8/10/2017
Phenanthrene	0.34	0.034		mg/Kg-dry	1	8/10/2017
Pyrene	0.45	0.034		mg/Kg-dry	1	8/10/2017
Metals by ICP/MS SW6020 (SW3050B) Prep Date: 8/9/2017 Analyst: JG						
Antimony	4.3	1.9		mg/Kg-dry	10	8/11/2017
Arsenic	34	0.95		mg/Kg-dry	10	8/10/2017
Beryllium	0.89	0.47		mg/Kg-dry	10	8/10/2017
Cadmium	1.9	0.47		mg/Kg-dry	10	8/11/2017
Chromium	18	0.95		mg/Kg-dry	10	8/10/2017
Copper	120	2.4		mg/Kg-dry	10	8/10/2017
Lead	300	0.47		mg/Kg-dry	10	8/10/2017
Nickel	24	0.95		mg/Kg-dry	10	8/10/2017
Selenium	2.0	0.95		mg/Kg-dry	10	8/10/2017
Silver	ND	0.95		mg/Kg-dry	10	8/10/2017
Thallium	ND	0.95		mg/Kg-dry	10	8/10/2017
Zinc	910	4.7		mg/Kg-dry	10	8/10/2017
Mercury SW7471A Prep Date: 8/10/2017 Analyst: LB						
Mercury	0.097	0.020		mg/Kg-dry	1	8/9/2017
pH (25 °C) SW9045C Prep Date: 8/7/2017 Analyst: RW						
pH	7.95			pH Units	1	8/7/2017
Percent Moisture D2974 Prep Date: 8/7/2017 Analyst: KKA						
Percent Moisture	5.7	0.2	*	wt%	1	8/8/2017

Qualifiers:

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HT - Sample received past holding time

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RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-14A

Work Order: 17080177 Revision 2

Collection Date: 8/4/2017 3:05:00 PM

Project: 3205171606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080177-005

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
	SW8270C (SW3550B)			Prep Date: 8/8/2017		Analyst: DM
Acenaphthene	ND	0.035		mg/Kg-dry	1	8/10/2017
Acenaphthylene	ND	0.035		mg/Kg-dry	1	8/10/2017
Anthracene	0.037	0.035		mg/Kg-dry	1	8/10/2017
Benz(a)anthracene	0.15	0.035		mg/Kg-dry	1	8/10/2017
Benzo(a)pyrene	0.17	0.035		mg/Kg-dry	1	8/10/2017
Benzo(b)fluoranthene	0.18	0.035		mg/Kg-dry	1	8/10/2017
Benzo(g,h,i)perylene	0.14	0.035		mg/Kg-dry	1	8/10/2017
Benzo(k)fluoranthene	0.12	0.035		mg/Kg-dry	1	8/10/2017
Chrysene	0.25	0.035		mg/Kg-dry	1	8/10/2017
Dibenz(a,h)anthracene	0.063	0.035		mg/Kg-dry	1	8/10/2017
Fluoranthene	0.22	0.035		mg/Kg-dry	1	8/10/2017
Fluorene	ND	0.035		mg/Kg-dry	1	8/10/2017
Indeno(1,2,3-cd)pyrene	0.10	0.035		mg/Kg-dry	1	8/10/2017
Naphthalene	0.082	0.035		mg/Kg-dry	1	8/10/2017
Phenanthrene	0.38	0.035		mg/Kg-dry	1	8/10/2017
Pyrene	0.29	0.035		mg/Kg-dry	1	8/10/2017
Metals by ICP/MS						
	SW6020 (SW3050B)			Prep Date: 8/9/2017		Analyst: JG
Antimony	ND	1.9		mg/Kg-dry	10	8/11/2017
Arsenic	11	0.96		mg/Kg-dry	10	8/10/2017
Beryllium	ND	0.48		mg/Kg-dry	10	8/10/2017
Cadmium	ND	0.48		mg/Kg-dry	10	8/10/2017
Chromium	7.2	0.96		mg/Kg-dry	10	8/10/2017
Copper	24	2.4		mg/Kg-dry	10	8/10/2017
Lead	53	0.48		mg/Kg-dry	10	8/10/2017
Nickel	11	0.96		mg/Kg-dry	10	8/10/2017
Selenium	ND	0.96		mg/Kg-dry	10	8/10/2017
Silver	ND	0.96		mg/Kg-dry	10	8/10/2017
Thallium	ND	0.96		mg/Kg-dry	10	8/10/2017
Zinc	80	4.8		mg/Kg-dry	10	8/10/2017
Mercury						
	SW7471A			Prep Date: 8/10/2017		Analyst: LB
Mercury	0.091	0.021		mg/Kg-dry	1	8/9/2017
pH (25 °C)						
	SW9045C			Prep Date: 8/7/2017		Analyst: RW
pH	7.21			pH Units	1	8/7/2017
Percent Moisture						
	D2974			Prep Date: 8/7/2017		Analyst: KKA
Percent Moisture	6.3	0.2	*	wt%	1	8/8/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

Sample Receipt Checklist

Client Name **AMEC**

Date and Time Received: **8/4/2017 4:45:00 PM**

Work Order Number **17080177**

Received by: **MGK**

Checklist completed by:

Martin G... 8/4/17
Signature Date

Reviewed by:

JOK 8/7/17
Initials Date

Matrix:

Carrier name: Client Delivered

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels/containers?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container or Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Temperature On Ice °C
Water - VOA vials have zero headspace?	No VOA vials submitted <input checked="" type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Water - Samples pH checked?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Checked by: _____
Water - Samples properly preserved?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	pH Adjusted? _____

Any No response must be detailed in the comments section below.

Comments: Report trichlorofluoromethane per Mary Jank verbal 8/22/17.

Client / Person
contacted: _____

Date contacted: _____

Contacted by: _____

Response: _____

Craig Chawla

From: Jank, Mary E [mary.jank@woodplc.com]

Sent: Monday, November 20, 2017 3:47 PM

To: Craig Chawla; Frank Capoccia

Subject: Additional Testing -

Please perform additional leaching procedure testing (TCLP or SPLP) for the following metals on the identified samples:

B-18A – chromium and manganese your sample # 17080321-011

B-6B – chromium your sample #17080265-014

ESB-2A – cobalt, iron – your sample #17080088-001

ESB-4A – iron your sample #17080223-001

ESB-5A – iron your sample #17080126-001

ESB-6A – iron, manganese your sample #17080177-001

Mary E. Jank

Senior Associate

Amec Foster Wheeler Environment & Infrastructure, Inc.

8745 W. Higgins Road, Suite 300

Chicago, IL

D 773-693-6030, ext. 8742

M 312-617-8342

mary.jank@amecfw.com

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November 27, 2017

AMEC Foster Wheeler Environment & Infrastructure
550 Warrenville Road
Lisle, IL 60532

Telephone: (630) 724-8517

Fax: (630) 724-8518

Analytical Report for STAT Work Order: 17080223 Revision 2

RE: 3205171606, City Of Chicago JPSTA, Chicago, IL

Dear Mary Jank:

STAT Analysis received 9 samples for the referenced project on 8/7/2017 3:45:00 PM. The analytical results are presented in the following report.

This report is revised to reflect additional analysis requested after the last report revision.

All analyses were performed in accordance with the requirements of 35 IAC Part 186 / NELAP standards. Analyses were performed in accordance with methods as referenced on the analytical report. Those analytical results expressed on a dry weight basis are also noted on the analytical report.

All analyses were performed within established holding time criteria, and all Quality Control criteria met EPA or laboratory specifications except when noted in the Case Narrative or Analytical Report. If required, an estimate of uncertainty for the analyses can be provided. A listing of accredited methods/parameters can also be provided.

Thank you for the opportunity to serve you and I look forward to working with you in the future. If you have any questions regarding the enclosed materials, please contact me at (312) 733-0551.

Sincerely,

Martin Kucan

Project Manager

The information contained in this report and any attachments is confidential information intended only for the use of the individual or entities named above. The results of this report relate only to the samples tested. If you have received this report in error, please notify us immediately by phone. This report shall not be reproduced, except in its entirety, unless written approval has been obtained from the laboratory. This analytical report shall become property of the Customer upon payment in full. Otherwise, STAT will be under no obligation to support, defend or discuss the analytical report.

Client: AMEC Foster Wheeler Environment & Infrastructure
Project: 3205171606, City Of Chicago JPSTA, Chicago, IL
Work Order: 17080223 Revision 2

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Tag Number	Collection Date	Date Received
17080223-001A	ESB-4A		8/7/2017 8:05:00 AM	8/7/2017
17080223-001B	ESB-4A		8/7/2017 8:05:00 AM	8/7/2017
17080223-002A	ESB-4B		8/7/2017 8:10:00 AM	8/7/2017
17080223-002B	ESB-4B		8/7/2017 8:10:00 AM	8/7/2017
17080223-003A	B-12 A		8/7/2017 10:10:00 AM	8/7/2017
17080223-004A	B-12 B		8/7/2017 10:15:00 AM	8/7/2017
17080223-005A	B-12 C		8/7/2017 10:18:00 AM	8/7/2017
17080223-006A	B-16 A		8/7/2017 11:45:00 AM	8/7/2017
17080223-007A	B-16 B		8/7/2017 11:50:00 AM	8/7/2017
17080223-008A	B-10 A		8/7/2017 2:05:00 PM	8/7/2017
17080223-009A	B-10 B		8/7/2017 2:10:00 PM	8/7/2017

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-4A

Work Order: 17080223 Revision 2

Collection Date: 8/7/2017 8:05:00 AM

Project: 3205171606, City Of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080223-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS						
	SW5035/8260B		Prep Date: 8/7/2017		Analyst: ERP	
Acetone	0.15	0.11		mg/Kg-dry	1	8/14/2017
Benzene	ND	0.0075		mg/Kg-dry	1	8/14/2017
Bromodichloromethane	ND	0.0075		mg/Kg-dry	1	8/14/2017
Bromoform	ND	0.0075		mg/Kg-dry	1	8/14/2017
Bromomethane	ND	0.015		mg/Kg-dry	1	8/14/2017
2-Butanone	ND	0.11		mg/Kg-dry	1	8/14/2017
Carbon disulfide	ND	0.075		mg/Kg-dry	1	8/14/2017
Carbon tetrachloride	ND	0.0075		mg/Kg-dry	1	8/14/2017
Chlorobenzene	ND	0.0075		mg/Kg-dry	1	8/14/2017
Chloroethane	ND	0.015		mg/Kg-dry	1	8/14/2017
Chloroform	ND	0.0075		mg/Kg-dry	1	8/14/2017
Chloromethane	ND	0.015		mg/Kg-dry	1	8/14/2017
Dibromochloromethane	ND	0.0075		mg/Kg-dry	1	8/14/2017
1,1-Dichloroethane	ND	0.0075		mg/Kg-dry	1	8/14/2017
1,2-Dichloroethane	ND	0.0075		mg/Kg-dry	1	8/14/2017
1,1-Dichloroethene	ND	0.0075		mg/Kg-dry	1	8/14/2017
cis-1,2-Dichloroethene	ND	0.0075		mg/Kg-dry	1	8/14/2017
trans-1,2-Dichloroethene	ND	0.0075		mg/Kg-dry	1	8/14/2017
1,2-Dichloropropane	ND	0.0075		mg/Kg-dry	1	8/14/2017
cis-1,3-Dichloropropene	ND	0.0030		mg/Kg-dry	1	8/14/2017
trans-1,3-Dichloropropene	ND	0.0030		mg/Kg-dry	1	8/14/2017
Ethylbenzene	ND	0.0075		mg/Kg-dry	1	8/14/2017
2-Hexanone	ND	0.030		mg/Kg-dry	1	8/14/2017
4-Methyl-2-pentanone	ND	0.030		mg/Kg-dry	1	8/14/2017
Methylene chloride	ND	0.015		mg/Kg-dry	1	8/14/2017
Methyl tert-butyl ether	ND	0.0075		mg/Kg-dry	1	8/14/2017
Styrene	ND	0.0075		mg/Kg-dry	1	8/14/2017
1,1,2,2-Tetrachloroethane	ND	0.0075		mg/Kg-dry	1	8/14/2017
Tetrachloroethene	ND	0.0075		mg/Kg-dry	1	8/14/2017
Toluene	ND	0.0075		mg/Kg-dry	1	8/14/2017
1,1,1-Trichloroethane	ND	0.0075		mg/Kg-dry	1	8/14/2017
1,1,2-Trichloroethane	ND	0.0075		mg/Kg-dry	1	8/14/2017
Trichloroethene	0.010	0.0075		mg/Kg-dry	1	8/14/2017
Vinyl chloride	ND	0.0075		mg/Kg-dry	1	8/14/2017
Xylenes, Total	ND	0.022		mg/Kg-dry	1	8/14/2017
Volatile Organic Compounds by GC/MS						
	SW5035/8260B		Prep Date: 8/7/2017		Analyst: ERP	
Trichlorofluoromethane	ND	0.0075		mg/Kg-dry	1	8/14/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-4A

Work Order: 17080223 Revision 2

Collection Date: 8/7/2017 8:05:00 AM

Project: 3205171606, City Of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080223-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS	SW8270C (SW3550B)		Prep Date: 8/9/2017		Analyst: DM	
Acenaphthene	0.41	0.035		mg/Kg-dry	1	8/10/2017
Acenaphthylene	0.11	0.035		mg/Kg-dry	1	8/10/2017
Aniline	ND	0.35		mg/Kg-dry	1	8/10/2017
Anthracene	1.3	0.035		mg/Kg-dry	1	8/10/2017
Benz(a)anthracene	3.1	0.035		mg/Kg-dry	1	8/10/2017
Benzidine	ND	0.35		mg/Kg-dry	1	8/10/2017
Benzo(a)pyrene	3.2	0.035		mg/Kg-dry	1	8/10/2017
Benzo(b)fluoranthene	3.3	0.035		mg/Kg-dry	1	8/10/2017
Benzo(g,h,i)perylene	1.9	0.035		mg/Kg-dry	1	8/10/2017
Benzo(k)fluoranthene	2.5	0.035		mg/Kg-dry	1	8/10/2017
Benzoic acid	ND	0.88		mg/Kg-dry	1	8/10/2017
Benzyl alcohol	ND	0.18		mg/Kg-dry	1	8/10/2017
Bis(2-chloroethoxy)methane	ND	0.18		mg/Kg-dry	1	8/10/2017
Bis(2-chloroethyl)ether	ND	0.18		mg/Kg-dry	1	8/10/2017
Bis(2-ethylhexyl)phthalate	ND	0.88		mg/Kg-dry	1	8/10/2017
4-Bromophenyl phenyl ether	ND	0.18		mg/Kg-dry	1	8/10/2017
Butyl benzyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
Carbazole	0.75	0.18		mg/Kg-dry	1	8/10/2017
4-Chloroaniline	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Chloro-3-methylphenol	ND	0.35		mg/Kg-dry	1	8/10/2017
2-Chloronaphthalene	ND	0.18		mg/Kg-dry	1	8/10/2017
2-Chlorophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Chlorophenyl phenyl ether	ND	0.18		mg/Kg-dry	1	8/10/2017
Chrysene	3.5	0.035		mg/Kg-dry	1	8/10/2017
Dibenz(a,h)anthracene	0.81	0.035		mg/Kg-dry	1	8/10/2017
Dibenzofuran	0.26	0.18		mg/Kg-dry	1	8/10/2017
1,2-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
1,3-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
1,4-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
3,3'-Dichlorobenzidine	ND	0.18		mg/Kg-dry	1	8/10/2017
2,4-Dichlorophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
Diethyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
2,4-Dimethylphenol	ND	0.18		mg/Kg-dry	1	8/10/2017
Dimethyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
4,6-Dinitro-2-methylphenol	ND	0.35		mg/Kg-dry	1	8/10/2017
2,4-Dinitrophenol	ND	0.88		mg/Kg-dry	1	8/10/2017
2,4-Dinitrotoluene	ND	0.035		mg/Kg-dry	1	8/10/2017
2,6-Dinitrotoluene	ND	0.035		mg/Kg-dry	1	8/10/2017

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-4A

Work Order: 17080223 Revision 2

Collection Date: 8/7/2017 8:05:00 AM

Project: 3205171606, City Of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080223-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3550B)		Prep Date: 8/9/2017		Analyst: DM	
Di-n-butyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
Di-n-octyl phthalate	ND	0.18		mg/Kg-dry	1	8/10/2017
Fluoranthene	7.7	0.17		mg/Kg-dry	5	8/10/2017
Fluorene	0.46	0.035		mg/Kg-dry	1	8/10/2017
Hexachlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
Hexachlorobutadiene	ND	0.18		mg/Kg-dry	1	8/10/2017
Hexachlorocyclopentadiene	ND	0.18		mg/Kg-dry	1	8/10/2017
Hexachloroethane	ND	0.18		mg/Kg-dry	1	8/10/2017
Indeno(1,2,3-cd)pyrene	1.7	0.035		mg/Kg-dry	1	8/10/2017
Isophorone	ND	0.18		mg/Kg-dry	1	8/10/2017
2-Methylnaphthalene	ND	0.18		mg/Kg-dry	1	8/10/2017
2-Methylphenol	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Methylphenol	ND	0.18		mg/Kg-dry	1	8/10/2017
Naphthalene	0.088	0.035		mg/Kg-dry	1	8/10/2017
2-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/10/2017
3-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/10/2017
2-Nitrophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
4-Nitrophenol	ND	0.35		mg/Kg-dry	1	8/10/2017
Nitrobenzene	ND	0.035		mg/Kg-dry	1	8/10/2017
N-Nitrosodi-n-propylamine	ND	0.035		mg/Kg-dry	1	8/10/2017
N-Nitrosodimethylamine	ND	0.18		mg/Kg-dry	1	8/10/2017
N-Nitrosodiphenylamine	ND	0.035		mg/Kg-dry	1	8/10/2017
2, 2'-oxybis(1-Chloropropane)	ND	0.18		mg/Kg-dry	1	8/10/2017
Pentachlorophenol	ND	0.035		mg/Kg-dry	1	8/10/2017
Phenanthrene	5.7	0.17		mg/Kg-dry	5	8/10/2017
Phenol	ND	0.18		mg/Kg-dry	1	8/10/2017
Pyrene	6.3	0.17		mg/Kg-dry	5	8/10/2017
Pyridine	ND	0.71		mg/Kg-dry	1	8/10/2017
1,2,4-Trichlorobenzene	ND	0.18		mg/Kg-dry	1	8/10/2017
2,4,5-Trichlorophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
2,4,6-Trichlorophenol	ND	0.18		mg/Kg-dry	1	8/10/2017
PCBs						
	SW8082 (SW3550B)		Prep Date: 8/8/2017		Analyst: GVC	
Aroclor 1016	ND	0.084		mg/Kg-dry	1	8/10/2017
Aroclor 1221	ND	0.084		mg/Kg-dry	1	8/10/2017
Aroclor 1232	ND	0.084		mg/Kg-dry	1	8/10/2017
Aroclor 1242	ND	0.084		mg/Kg-dry	1	8/10/2017
Aroclor 1248	ND	0.084		mg/Kg-dry	1	8/10/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-4A

Work Order: 17080223 Revision 2

Collection Date: 8/7/2017 8:05:00 AM

Project: 3205171606, City Of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080223-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs						
	SW8082 (SW3550B)				Prep Date: 8/8/2017	Analyst: GVC
Aroclor 1254	ND	0.084		mg/Kg-dry	1	8/10/2017
Aroclor 1260	ND	0.084		mg/Kg-dry	1	8/10/2017
Pesticides						
	SW8081 (SW3550B)				Prep Date: 8/8/2017	Analyst: GVC
4,4'-DDD	ND	0.0017		mg/Kg-dry	1	8/10/2017
4,4'-DDE	ND	0.0017		mg/Kg-dry	1	8/10/2017
4,4'-DDT	ND	0.0017		mg/Kg-dry	1	8/10/2017
Aldrin	ND	0.0017		mg/Kg-dry	1	8/10/2017
alpha-BHC	ND	0.0017		mg/Kg-dry	1	8/10/2017
alpha-Chlordane	ND	0.0017		mg/Kg-dry	1	8/10/2017
beta-BHC	ND	0.0017		mg/Kg-dry	1	8/10/2017
Chlordane	ND	0.017		mg/Kg-dry	1	8/10/2017
delta-BHC	ND	0.0017		mg/Kg-dry	1	8/10/2017
Dieldrin	ND	0.0017		mg/Kg-dry	1	8/10/2017
Endosulfan I	ND	0.0017		mg/Kg-dry	1	8/10/2017
Endosulfan II	ND	0.0017		mg/Kg-dry	1	8/10/2017
Endosulfan sulfate	ND	0.0017		mg/Kg-dry	1	8/10/2017
Endrin	ND	0.0017		mg/Kg-dry	1	8/10/2017
Endrin aldehyde	ND	0.0017		mg/Kg-dry	1	8/10/2017
Endrin ketone	ND	0.0017		mg/Kg-dry	1	8/10/2017
gamma-BHC	ND	0.0017		mg/Kg-dry	1	8/10/2017
gamma-Chlordane	ND	0.0017		mg/Kg-dry	1	8/10/2017
Heptachlor	ND	0.0017		mg/Kg-dry	1	8/10/2017
Heptachlor epoxide	ND	0.0017		mg/Kg-dry	1	8/10/2017
Methoxychlor	ND	0.0017		mg/Kg-dry	1	8/10/2017
Toxaphene	ND	0.035		mg/Kg-dry	1	8/10/2017
Metals by ICP/MS						
	SW6020 (SW3050B)				Prep Date: 8/11/2017	Analyst: JG
Aluminum	3900	19		mg/Kg-dry	10	8/15/2017
Antimony	2.0	1.9		mg/Kg-dry	10	8/15/2017
Arsenic	13	0.97		mg/Kg-dry	10	8/15/2017
Barium	79	0.97		mg/Kg-dry	10	8/15/2017
Beryllium	0.69	0.48		mg/Kg-dry	10	8/15/2017
Cadmium	2.1	0.48		mg/Kg-dry	10	8/15/2017
Calcium	42000	58		mg/Kg-dry	10	8/15/2017
Chromium	18	0.97		mg/Kg-dry	10	8/15/2017
Cobalt	6.3	0.97		mg/Kg-dry	10	8/15/2017
Copper	78	2.4		mg/Kg-dry	10	8/15/2017
Iron	28000	29		mg/Kg-dry	10	8/15/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

STAT Analysis Corporation

2242 West Harrison St., Suite 200, Chicago, IL 60612-3766

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-4A

Work Order: 17080223 Revision 2

Collection Date: 8/7/2017 8:05:00 AM

Project: 3205171606, City Of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080223-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)				Prep Date: 8/11/2017	Analyst: JG
Lead	180	0.48		mg/Kg-dry	10	8/15/2017
Magnesium	23000	29		mg/Kg-dry	10	8/15/2017
Manganese	360	0.97		mg/Kg-dry	10	8/15/2017
Nickel	19	0.97		mg/Kg-dry	10	8/15/2017
Potassium	630	29		mg/Kg-dry	10	8/15/2017
Selenium	ND	0.97		mg/Kg-dry	10	8/15/2017
Silver	ND	0.97		mg/Kg-dry	10	8/15/2017
Sodium	150	58		mg/Kg-dry	10	8/15/2017
Thallium	ND	0.97		mg/Kg-dry	10	8/15/2017
Vanadium	18	0.97		mg/Kg-dry	10	8/15/2017
Zinc	690	4.8		mg/Kg-dry	10	8/15/2017
TCLP Metals by ICP/MS	SW1311/6020A (SW3005A)				Prep Date: 11/21/2017	Analyst: JG
Iron	3.1	0.25		mg/L	5	11/22/2017
Mercury	SW7471A				Prep Date: 8/10/2017	Analyst: LB
Mercury	0.14	0.021		mg/Kg-dry	1	8/10/2017
Cyanide, Total	SW9012A				Prep Date: 8/9/2017	Analyst: MD
Cyanide	ND	0.27		mg/Kg-dry	1	8/12/2017
pH (25 °C)	SW9045C				Prep Date: 8/8/2017	Analyst: PBG
pH	7.86			pH Units	1	8/8/2017
Percent Moisture	D2974				Prep Date: 8/8/2017	Analyst: KKA
Percent Moisture	5.9	0.2	*	wt%	1	8/9/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-12 A

Work Order: 17080223 Revision 2

Collection Date: 8/7/2017 10:10:00 AM

Project: 3205171606, City Of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080223-003

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
	SW8270C (SW3550B)			Prep Date: 8/9/2017		Analyst: DM
Acenaphthene	ND	0.034		mg/Kg-dry	1	8/11/2017
Acenaphthylene	0.11	0.034		mg/Kg-dry	1	8/11/2017
Anthracene	0.16	0.034		mg/Kg-dry	1	8/11/2017
Benz(a)anthracene	0.73	0.034		mg/Kg-dry	1	8/11/2017
Benzo(a)pyrene	0.91	0.034		mg/Kg-dry	1	8/11/2017
Benzo(b)fluoranthene	0.63	0.034		mg/Kg-dry	1	8/11/2017
Benzo(g,h,i)perylene	0.66	0.034		mg/Kg-dry	1	8/11/2017
Benzo(k)fluoranthene	0.65	0.034		mg/Kg-dry	1	8/11/2017
Chrysene	0.79	0.034		mg/Kg-dry	1	8/11/2017
Dibenz(a,h)anthracene	0.25	0.034		mg/Kg-dry	1	8/11/2017
Fluoranthene	1.1	0.034		mg/Kg-dry	1	8/11/2017
Fluorene	ND	0.034		mg/Kg-dry	1	8/11/2017
Indeno(1,2,3-cd)pyrene	0.49	0.034		mg/Kg-dry	1	8/11/2017
Naphthalene	ND	0.034		mg/Kg-dry	1	8/11/2017
Phenanthrene	0.48	0.034		mg/Kg-dry	1	8/11/2017
Pyrene	1.5	0.034		mg/Kg-dry	1	8/11/2017
Metals by ICP/MS						
	SW6020 (SW3050B)			Prep Date: 8/11/2017		Analyst: JG
Antimony	ND	1.8		mg/Kg-dry	10	8/15/2017
Arsenic	7.2	0.90		mg/Kg-dry	10	8/15/2017
Beryllium	0.50	0.45		mg/Kg-dry	10	8/15/2017
Cadmium	0.60	0.45		mg/Kg-dry	10	8/15/2017
Chromium	12	0.90		mg/Kg-dry	10	8/15/2017
Copper	46	2.3		mg/Kg-dry	10	8/15/2017
Lead	86	0.45		mg/Kg-dry	10	8/15/2017
Nickel	15	0.90		mg/Kg-dry	10	8/15/2017
Selenium	ND	0.90		mg/Kg-dry	10	8/15/2017
Silver	ND	0.90		mg/Kg-dry	10	8/15/2017
Thallium	ND	0.90		mg/Kg-dry	10	8/15/2017
Zinc	160	4.5		mg/Kg-dry	10	8/15/2017
Mercury						
	SW7471A			Prep Date: 8/10/2017		Analyst: LB
Mercury	0.32	0.018		mg/Kg-dry	1	8/10/2017
pH (25 °C)						
	SW9045C			Prep Date: 8/8/2017		Analyst: PBG
pH	7.81			pH Units	1	8/8/2017
Percent Moisture						
	D2974			Prep Date: 8/8/2017		Analyst: KKA
Percent Moisture	5.2	0.2	*	wt%	1	8/9/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-16 A

Work Order: 17080223 Revision 2

Collection Date: 8/7/2017 11:45:00 AM

Project: 3205171606, City Of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080223-006

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
	SW8270C (SW3550B)			Prep Date: 8/9/2017		Analyst: DM
Acenaphthene	ND	0.034		mg/Kg-dry	1	8/11/2017
Acenaphthylene	ND	0.034		mg/Kg-dry	1	8/11/2017
Anthracene	ND	0.034		mg/Kg-dry	1	8/11/2017
Benz(a)anthracene	0.058	0.034		mg/Kg-dry	1	8/11/2017
Benzo(a)pyrene	0.089	0.034		mg/Kg-dry	1	8/11/2017
Benzo(b)fluoranthene	0.11	0.034		mg/Kg-dry	1	8/11/2017
Benzo(g,h,i)perylene	0.071	0.034		mg/Kg-dry	1	8/11/2017
Benzo(k)fluoranthene	0.081	0.034		mg/Kg-dry	1	8/11/2017
Chrysene	0.086	0.034		mg/Kg-dry	1	8/11/2017
Dibenz(a,h)anthracene	ND	0.034		mg/Kg-dry	1	8/11/2017
Fluoranthene	0.055	0.034		mg/Kg-dry	1	8/11/2017
Fluorene	ND	0.034		mg/Kg-dry	1	8/11/2017
Indeno(1,2,3-cd)pyrene	0.054	0.034		mg/Kg-dry	1	8/11/2017
Naphthalene	ND	0.034		mg/Kg-dry	1	8/11/2017
Phenanthrene	0.063	0.034		mg/Kg-dry	1	8/11/2017
Pyrene	0.096	0.034		mg/Kg-dry	1	8/11/2017
Metals by ICP/MS						
	SW6020 (SW3050B)			Prep Date: 8/11/2017		Analyst: JG
Antimony	ND	1.9		mg/Kg-dry	10	8/15/2017
Arsenic	8.8	0.94		mg/Kg-dry	10	8/15/2017
Beryllium	ND	0.47		mg/Kg-dry	10	8/15/2017
Cadmium	0.96	0.47		mg/Kg-dry	10	8/15/2017
Chromium	13	0.94		mg/Kg-dry	10	8/15/2017
Copper	46	2.3		mg/Kg-dry	10	8/15/2017
Lead	110	0.47		mg/Kg-dry	10	8/15/2017
Nickel	13	0.94		mg/Kg-dry	10	8/15/2017
Selenium	ND	0.94		mg/Kg-dry	10	8/15/2017
Silver	ND	0.94		mg/Kg-dry	10	8/15/2017
Thallium	ND	0.94		mg/Kg-dry	10	8/15/2017
Zinc	260	4.7		mg/Kg-dry	10	8/15/2017
Mercury						
	SW7471A			Prep Date: 8/10/2017		Analyst: LB
Mercury	0.075	0.021		mg/Kg-dry	1	8/10/2017
pH (25 °C)						
	SW9045C			Prep Date: 8/8/2017		Analyst: PBG
pH	8.36			pH Units	1	8/8/2017
Percent Moisture						
	D2974			Prep Date: 8/8/2017		Analyst: KKA
Percent Moisture	3.0	0.2	*	wt%	1	8/9/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-10 A

Work Order: 17080223 Revision 2

Collection Date: 8/7/2017 2:05:00 PM

Project: 3205171606, City Of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080223-008

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
	SW8270C (SW3550B)			Prep Date: 8/9/2017		Analyst: DM
Acenaphthene	ND	0.035		mg/Kg-dry	1	8/11/2017
Acenaphthylene	0.12	0.035		mg/Kg-dry	1	8/11/2017
Anthracene	0.28	0.035		mg/Kg-dry	1	8/11/2017
Benzo(a)anthracene	0.25	0.035		mg/Kg-dry	1	8/11/2017
Benzo(a)pyrene	0.31	0.035		mg/Kg-dry	1	8/11/2017
Benzo(b)fluoranthene	0.41	0.035		mg/Kg-dry	1	8/11/2017
Benzo(g,h,i)perylene	0.51	0.035		mg/Kg-dry	1	8/11/2017
Benzo(k)fluoranthene	0.29	0.035		mg/Kg-dry	1	8/11/2017
Chrysene	0.41	0.035		mg/Kg-dry	1	8/11/2017
Dibenz(a,h)anthracene	0.11	0.035		mg/Kg-dry	1	8/11/2017
Fluoranthene	0.39	0.035		mg/Kg-dry	1	8/11/2017
Fluorene	ND	0.035		mg/Kg-dry	1	8/11/2017
Indeno(1,2,3-cd)pyrene	0.30	0.035		mg/Kg-dry	1	8/11/2017
Naphthalene	0.064	0.035		mg/Kg-dry	1	8/11/2017
Phenanthrene	0.34	0.035		mg/Kg-dry	1	8/11/2017
Pyrene	0.40	0.035		mg/Kg-dry	1	8/11/2017
Metals by ICP/MS						
	SW6020 (SW3050B)			Prep Date: 8/11/2017		Analyst: JG
Antimony	4.1	1.9		mg/Kg-dry	10	8/15/2017
Arsenic	7.5	0.93		mg/Kg-dry	10	8/15/2017
Beryllium	ND	0.46		mg/Kg-dry	10	8/15/2017
Cadmium	0.96	0.46		mg/Kg-dry	10	8/15/2017
Chromium	12	0.93		mg/Kg-dry	10	8/15/2017
Copper	67	2.3		mg/Kg-dry	10	8/15/2017
Lead	130	0.46		mg/Kg-dry	10	8/15/2017
Nickel	16	0.93		mg/Kg-dry	10	8/15/2017
Selenium	ND	0.93		mg/Kg-dry	10	8/15/2017
Silver	ND	0.93		mg/Kg-dry	10	8/15/2017
Thallium	ND	0.93		mg/Kg-dry	10	8/15/2017
Zinc	200	4.6		mg/Kg-dry	10	8/15/2017
Mercury						
	SW7471A			Prep Date: 8/10/2017		Analyst: LB
Mercury	0.20	0.020		mg/Kg-dry	1	8/10/2017
pH (25 °C)						
	SW9045C			Prep Date: 8/8/2017		Analyst: PBG
pH	7.82			pH Units	1	8/8/2017
Percent Moisture						
	D2974			Prep Date: 8/8/2017		Analyst: KKA
Percent Moisture	6.4	0.2	*	wt%	1	8/9/2017

Qualifiers:

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E - Value above quantitation range

H - Holding time exceeded

Page 11 of 13

Sample Receipt Checklist

Client Name AMEC

Date and Time Received: 8/7/2017 3:45:00 PM

Work Order Number 17080223

Received by: JNW

Checklist completed by:

[Signature] 8/7/17
Signature Date

Reviewed by:

MK 8/7/17
Initials Date

Matrix:

Carrier name Client Delivered

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels/containers?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container or Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Temperature 4.4 °C
Water - VOA vials have zero headspace?	No VOA vials submitted <input checked="" type="checkbox"/>	Yes <input checked="" type="checkbox"/>	No <input checked="" type="checkbox"/>
Water - Samples pH checked?	Yes <input checked="" type="checkbox"/>	No <input checked="" type="checkbox"/>	Checked by: _____
Water - Samples properly preserved?	Yes <input checked="" type="checkbox"/>	No <input checked="" type="checkbox"/>	pH Adjusted? _____

Any No response must be detailed in the comments section below.

Comments: Report trichlorofluoromethane per Mary Jank verbal 8/22/17.

Client / Person contacted:

Date contacted:

Contacted by:

Response:

Craig Chawla

From: Jank, Mary E [mary.jank@woodplc.com]

Sent: Monday, November 20, 2017 3:47 PM

To: Craig Chawla; Frank Capoccia

Subject: Additional Testing -

Please perform additional leaching procedure testing (TCLP or SPLP) for the following metals on the identified samples:

B-18A – chromium and manganese your sample # 17080321-011

B-6B – chromium your sample #17080265-014

ESB-2A – cobalt, iron – your sample #17080088-001

ESB-4A – iron your sample #17080223-001

ESB-5A – iron your sample #17080126-001

ESB-6A – iron, manganese your sample #17080177-001

Mary E. Jank

Senior Associate

Amec Foster Wheeler Environment & Infrastructure, Inc.

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

November 27, 2017

AMEC Foster Wheeler Environment & Infrastructure
550 Warrenville Road
Lisle, IL 60532

Telephone: (630) 724-8517

Fax: (630) 724-8518

Analytical Report for STAT Work Order: 17080265 Revision 2

RE: 3205-17-1606, City of Chicago-JPSTA, 4301 W Chicago, Chicago, IL

Dear Mary Jank:

STAT Analysis received 15 samples for the referenced project on 8/8/2017 4:00:00 PM. The analytical results are presented in the following report.

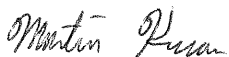
This report is revised to reflect additional analysis requested after the last report revision.

All analyses were performed in accordance with the requirements of 35 IAC Part 186 / NELAP standards. Analyses were performed in accordance with methods as referenced on the analytical report. Those analytical results expressed on a dry weight basis are also noted on the analytical report.

All analyses were performed within established holding time criteria, and all Quality Control criteria met EPA or laboratory specifications except when noted in the Case Narrative or Analytical Report. If required, an estimate of uncertainty for the analyses can be provided. A listing of accredited methods/parameters can also be provided.

Thank you for the opportunity to serve you and I look forward to working with you in the future. If you have any questions regarding the enclosed materials, please contact me at (312) 733-0551.

Sincerely,



Martin Kucan

Project Manager

The information contained in this report and any attachments is confidential information intended only for the use of the individual or entities named above. The results of this report relate only to the samples tested. If you have received this report in error, please notify us immediately by phone. This report shall not be reproduced, except in its entirety, unless written approval has been obtained from the laboratory. This analytical report shall become property of the Customer upon payment in full. Otherwise, STAT will be under no obligation to support, defend or discuss the analytical report.

Client: AMEC Foster Wheeler Environment & Infrastructure**Project:** 3205-17-1606, City of Chicago-JPSTA, 4301 W Chica**Work Order Sample Summary****Work Order:** 17080265 Revision 2

Lab Sample ID	Client Sample ID	Tag Number	Collection Date	Date Received
17080265-001A	B-11A		8/8/2017 8:05:00 AM	8/8/2017
17080265-001B	B-11A		8/8/2017 8:05:00 AM	8/8/2017
17080265-002A	B-11B		8/8/2017 8:10:00 AM	8/8/2017
17080265-002B	B-11B		8/8/2017 8:10:00 AM	8/8/2017
17080265-003A	B-11C		8/8/2017 8:15:00 AM	8/8/2017
17080265-004A	B-15A		8/8/2017 9:00:00 AM	8/8/2017
17080265-005A	B-15B		8/8/2017 9:05:00 AM	8/8/2017
17080265-006A	B-15C		8/8/2017 9:20:00 AM	8/8/2017
17080265-007A	B-9A		8/8/2017 10:15:00 AM	8/8/2017
17080265-008A	B-9B		8/8/2017 10:25:00 AM	8/8/2017
17080265-009A	B-9C		8/8/2017 10:35:00 AM	8/8/2017
17080265-010A	B-3A		8/8/2017 2:05:00 PM	8/8/2017
17080265-011A	B-3B		8/8/2017 2:20:00 PM	8/8/2017
17080265-011B	B-3B		8/8/2017 2:20:00 PM	8/8/2017
17080265-012A	B-3C		8/8/2017 2:25:00 PM	8/8/2017
17080265-012B	B-3C		8/8/2017 2:25:00 PM	8/8/2017
17080265-013A	B-6A		8/8/2017 12:10:00 PM	8/8/2017
17080265-014A	B-6B		8/8/2017 12:30:00 PM	8/8/2017
17080265-015A	B-6C		8/8/2017 12:40:00 PM	8/8/2017

CLIENT: AMEC Foster Wheeler Environment & Infr**Project:** 3205-17-1606, City of Chicago-JPSTA, 4301 W Chicago, Ch**Work Order:** 17080265 Revision 2**CASE NARRATIVE**

Due to sample matrix, the PNA extract for sample B-9A (17080265-007) was concentrated to a final volume of 10mL, resulting in a 10 fold increase in reporting limits.

STAT Analysis Corporation

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-11A

Work Order: 17080265 Revision 2

Collection Date: 8/8/2017 8:05:00 AM

Project: 3205-17-1606, City of Chicago-JPSTA, 4301 W Cl

Matrix: Soil

Lab ID: 17080265-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS		SW5035/8260B		Prep Date: 8/9/2017		Analyst: JNM
Acetone	ND	0.074		mg/Kg-dry	1	8/16/2017
Benzene	ND	0.0050		mg/Kg-dry	1	8/16/2017
Bromodichloromethane	ND	0.0050		mg/Kg-dry	1	8/16/2017
Bromoform	ND	0.0050		mg/Kg-dry	1	8/16/2017
Bromomethane	ND	0.0099		mg/Kg-dry	1	8/16/2017
2-Butanone	ND	0.074		mg/Kg-dry	1	8/16/2017
Carbon disulfide	ND	0.050		mg/Kg-dry	1	8/16/2017
Carbon tetrachloride	ND	0.0050		mg/Kg-dry	1	8/16/2017
Chlorobenzene	ND	0.0050		mg/Kg-dry	1	8/16/2017
Chloroethane	ND	0.0099		mg/Kg-dry	1	8/16/2017
Chloroform	ND	0.0050		mg/Kg-dry	1	8/16/2017
Chloromethane	ND	0.0099		mg/Kg-dry	1	8/16/2017
Dibromochloromethane	ND	0.0050		mg/Kg-dry	1	8/16/2017
1,1-Dichloroethane	ND	0.0050		mg/Kg-dry	1	8/16/2017
1,2-Dichloroethane	ND	0.0050		mg/Kg-dry	1	8/16/2017
1,1-Dichloroethene	ND	0.0050		mg/Kg-dry	1	8/16/2017
cis-1,2-Dichloroethene	ND	0.0050		mg/Kg-dry	1	8/16/2017
trans-1,2-Dichloroethene	ND	0.0050		mg/Kg-dry	1	8/16/2017
1,2-Dichloropropane	ND	0.0050		mg/Kg-dry	1	8/16/2017
cis-1,3-Dichloropropene	ND	0.0020		mg/Kg-dry	1	8/16/2017
trans-1,3-Dichloropropene	ND	0.0020		mg/Kg-dry	1	8/16/2017
Ethylbenzene	ND	0.0050		mg/Kg-dry	1	8/16/2017
2-Hexanone	ND	0.020		mg/Kg-dry	1	8/16/2017
4-Methyl-2-pentanone	ND	0.020		mg/Kg-dry	1	8/16/2017
Methylene chloride	ND	0.0099		mg/Kg-dry	1	8/16/2017
Methyl tert-butyl ether	ND	0.0050		mg/Kg-dry	1	8/16/2017
Styrene	ND	0.0050		mg/Kg-dry	1	8/16/2017
1,1,2,2-Tetrachloroethane	ND	0.0050		mg/Kg-dry	1	8/16/2017
Tetrachloroethene	ND	0.0050		mg/Kg-dry	1	8/16/2017
Toluene	ND	0.0050		mg/Kg-dry	1	8/16/2017
1,1,1-Trichloroethane	ND	0.0050		mg/Kg-dry	1	8/16/2017
1,1,2-Trichloroethane	ND	0.0050		mg/Kg-dry	1	8/16/2017
Trichloroethene	ND	0.0050		mg/Kg-dry	1	8/16/2017
Vinyl chloride	ND	0.0050		mg/Kg-dry	1	8/16/2017
Xylenes, Total	ND	0.015		mg/Kg-dry	1	8/16/2017
Volatile Organic Compounds by GC/MS		SW5035/8260B		Prep Date: 8/9/2017		Analyst: JNM
Trichlorofluoromethane	ND	0.0050		mg/Kg-dry	1	8/16/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-11A

Work Order: 17080265 Revision 2

Collection Date: 8/8/2017 8:05:00 AM

Project: 3205-17-1606, City of Chicago-JPSTA, 4301 W Cl

Matrix: Soil

Lab ID: 17080265-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
	SW8270C (SW3550B)			Prep Date: 8/9/2017		Analyst: DM
Acenaphthene	ND	0.039		mg/Kg-dry	1	8/11/2017
Acenaphthylene	ND	0.039		mg/Kg-dry	1	8/11/2017
Anthracene	0.066	0.039		mg/Kg-dry	1	8/11/2017
Benz(a)anthracene	0.19	0.039		mg/Kg-dry	1	8/11/2017
Benzo(a)pyrene	0.18	0.039		mg/Kg-dry	1	8/11/2017
Benzo(b)fluoranthene	0.18	0.039		mg/Kg-dry	1	8/11/2017
Benzo(g,h,i)perylene	0.12	0.039		mg/Kg-dry	1	8/11/2017
Benzo(k)fluoranthene	0.16	0.039		mg/Kg-dry	1	8/11/2017
Chrysene	0.21	0.039		mg/Kg-dry	1	8/11/2017
Dibenz(a,h)anthracene	0.066	0.039		mg/Kg-dry	1	8/11/2017
Fluoranthene	0.34	0.039		mg/Kg-dry	1	8/11/2017
Fluorene	ND	0.039		mg/Kg-dry	1	8/11/2017
Indeno(1,2,3-cd)pyrene	0.098	0.039		mg/Kg-dry	1	8/11/2017
Naphthalene	0.046	0.039		mg/Kg-dry	1	8/11/2017
Phenanthrene	0.19	0.039		mg/Kg-dry	1	8/11/2017
Pyrene	0.29	0.039		mg/Kg-dry	1	8/11/2017
Metals by ICP/MS						
	SW6020 (SW3050B)			Prep Date: 8/14/2017		Analyst: JG
Antimony	ND	2.0		mg/Kg-dry	10	8/16/2017
Arsenic	8.6	0.99		mg/Kg-dry	10	8/16/2017
Beryllium	0.78	0.50		mg/Kg-dry	10	8/16/2017
Cadmium	ND	0.50		mg/Kg-dry	10	8/16/2017
Chromium	20	0.99		mg/Kg-dry	10	8/16/2017
Copper	35	2.5		mg/Kg-dry	10	8/16/2017
Lead	38	0.50		mg/Kg-dry	10	8/16/2017
Nickel	31	0.99		mg/Kg-dry	10	8/16/2017
Selenium	ND	0.99		mg/Kg-dry	10	8/16/2017
Silver	ND	0.99		mg/Kg-dry	10	8/16/2017
Thallium	ND	0.99		mg/Kg-dry	10	8/16/2017
Zinc	67	5.0		mg/Kg-dry	10	8/16/2017
Mercury						
	SW7471A			Prep Date: 8/14/2017		Analyst: LB
Mercury	0.033	0.022		mg/Kg-dry	1	8/14/2017
pH (25 °C)						
	SW9045C			Prep Date: 8/9/2017		Analyst: PBG
pH	7.97			pH Units	1	8/9/2017
Percent Moisture						
	D2974			Prep Date: 8/9/2017		Analyst: KKA
Percent Moisture	15.4	0.2	*	wt%	1	8/10/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

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R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-15A

Work Order: 17080265 Revision 2

Collection Date: 8/8/2017 9:00:00 AM

Project: 3205-17-1606, City of Chicago-JPSTA, 4301 W Cl

Matrix: Soil

Lab ID: 17080265-004

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
	SW8270C (SW3550B)		Prep Date: 8/9/2017		Analyst: DM	
Acenaphthene	ND	0.035		mg/Kg-dry	1	8/11/2017
Acenaphthylene	ND	0.035		mg/Kg-dry	1	8/11/2017
Anthracene	0.11	0.035		mg/Kg-dry	1	8/11/2017
Benzo(a)anthracene	0.24	0.035		mg/Kg-dry	1	8/11/2017
Benzo(a)pyrene	0.22	0.035		mg/Kg-dry	1	8/11/2017
Benzo(b)fluoranthene	0.23	0.035		mg/Kg-dry	1	8/11/2017
Benzo(g,h,i)perylene	0.20	0.035		mg/Kg-dry	1	8/11/2017
Benzo(k)fluoranthene	0.16	0.035		mg/Kg-dry	1	8/11/2017
Chrysene	0.30	0.035		mg/Kg-dry	1	8/11/2017
Dibenz(a,h)anthracene	0.050	0.035		mg/Kg-dry	1	8/11/2017
Fluoranthene	0.33	0.035		mg/Kg-dry	1	8/11/2017
Fluorene	ND	0.035		mg/Kg-dry	1	8/11/2017
Indeno(1,2,3-cd)pyrene	0.13	0.035		mg/Kg-dry	1	8/11/2017
Naphthalene	0.079	0.035		mg/Kg-dry	1	8/11/2017
Phenanthrene	0.90	0.035		mg/Kg-dry	1	8/11/2017
Pyrene	0.35	0.035		mg/Kg-dry	1	8/11/2017
Metals by ICP/MS						
	SW6020 (SW3050B)		Prep Date: 8/14/2017		Analyst: JG	
Antimony	3.3	1.9		mg/Kg-dry	10	8/16/2017
Arsenic	11	0.96		mg/Kg-dry	10	8/16/2017
Beryllium	0.77	0.48		mg/Kg-dry	10	8/16/2017
Cadmium	0.80	0.48		mg/Kg-dry	10	8/16/2017
Chromium	11	0.96		mg/Kg-dry	10	8/16/2017
Copper	66	2.4		mg/Kg-dry	10	8/16/2017
Lead	170	0.48		mg/Kg-dry	10	8/16/2017
Nickel	15	0.96		mg/Kg-dry	10	8/16/2017
Selenium	1.3	0.96		mg/Kg-dry	10	8/16/2017
Silver	ND	0.96		mg/Kg-dry	10	8/16/2017
Thallium	ND	0.96		mg/Kg-dry	10	8/16/2017
Zinc	210	4.8		mg/Kg-dry	10	8/16/2017
Mercury						
	SW7471A		Prep Date: 8/14/2017		Analyst: LB	
Mercury	0.090	0.019		mg/Kg-dry	1	8/14/2017
pH (25 °C)						
	SW9045C		Prep Date: 8/9/2017		Analyst: PBG	
pH	7.49			pH Units	1	8/9/2017
Percent Moisture						
	D2974		Prep Date: 8/9/2017		Analyst: KKA	
Percent Moisture	7.7	0.2	*	wt%	1	8/10/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-9A

Work Order: 17080265 Revision 2

Collection Date: 8/8/2017 10:15:00 AM

Project: 3205-17-1606, City of Chicago-JPSTA, 4301 W Cl

Matrix: Soil

Lab ID: 17080265-007

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
	SW8270C (SW3550B)				Prep Date: 8/9/2017	Analyst: DM
Acenaphthene	ND	0.37		mg/Kg-dry	1	8/11/2017
Acenaphthylene	ND	0.37		mg/Kg-dry	1	8/11/2017
Anthracene	0.57	0.37		mg/Kg-dry	1	8/11/2017
Benz(a)anthracene	1.3	0.37		mg/Kg-dry	1	8/11/2017
Benzo(a)pyrene	1.2	0.37		mg/Kg-dry	1	8/11/2017
Benzo(b)fluoranthene	1.0	0.37		mg/Kg-dry	1	8/11/2017
Benzo(g,h,i)perylene	2.0	0.37		mg/Kg-dry	1	8/11/2017
Benzo(k)fluoranthene	0.38	0.37		mg/Kg-dry	1	8/11/2017
Chrysene	2.8	0.37		mg/Kg-dry	1	8/11/2017
Dibenz(a,h)anthracene	0.52	0.37		mg/Kg-dry	1	8/11/2017
Fluoranthene	1.2	0.37		mg/Kg-dry	1	8/11/2017
Fluorene	ND	0.37		mg/Kg-dry	1	8/11/2017
Indeno(1,2,3-cd)pyrene	0.73	0.37		mg/Kg-dry	1	8/11/2017
Naphthalene	1.2	0.37		mg/Kg-dry	1	8/11/2017
Phenanthrene	5.7	0.37		mg/Kg-dry	1	8/11/2017
Pyrene	2.8	0.37		mg/Kg-dry	1	8/11/2017
Metals by ICP/MS						
	SW6020 (SW3050B)				Prep Date: 8/14/2017	Analyst: JG
Antimony	8.0	1.9		mg/Kg-dry	10	8/16/2017
Arsenic	14	0.97		mg/Kg-dry	10	8/16/2017
Beryllium	0.56	0.49		mg/Kg-dry	10	8/16/2017
Cadmium	1.3	0.49		mg/Kg-dry	10	8/16/2017
Chromium	17	0.97		mg/Kg-dry	10	8/16/2017
Copper	90	2.4		mg/Kg-dry	10	8/16/2017
Lead	320	0.49		mg/Kg-dry	10	8/16/2017
Nickel	19	0.97		mg/Kg-dry	10	8/16/2017
Selenium	1.2	0.97		mg/Kg-dry	10	8/16/2017
Silver	ND	0.97		mg/Kg-dry	10	8/16/2017
Thallium	ND	0.97		mg/Kg-dry	10	8/16/2017
Zinc	370	4.9		mg/Kg-dry	10	8/16/2017
Mercury						
	SW7471A				Prep Date: 8/14/2017	Analyst: LB
Mercury	0.22	0.018		mg/Kg-dry	1	8/14/2017
pH (25 °C)						
	SW9045C				Prep Date: 8/9/2017	Analyst: PBG
pH	7.74			pH Units	1	8/9/2017
Percent Moisture						
	D2974				Prep Date: 8/9/2017	Analyst: KKA
Percent Moisture	10.6	0.2	*	wt%	1	8/10/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-3A

Work Order: 17080265 Revision 2

Collection Date: 8/8/2017 2:05:00 PM

Project: 3205-17-1606, City of Chicago-JPSTA, 4301 W Cl

Matrix: Soil

Lab ID: 17080265-010

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
	SW8270C (SW3550B)			Prep Date: 8/9/2017		Analyst: DM
Acenaphthene	ND	0.035		mg/Kg-dry	1	8/11/2017
Acenaphthylene	ND	0.035		mg/Kg-dry	1	8/11/2017
Anthracene	ND	0.035		mg/Kg-dry	1	8/11/2017
Benz(a)anthracene	0.11	0.035		mg/Kg-dry	1	8/11/2017
Benzo(a)pyrene	0.13	0.035		mg/Kg-dry	1	8/11/2017
Benzo(b)fluoranthene	0.11	0.035		mg/Kg-dry	1	8/11/2017
Benzo(g,h,i)perylene	0.097	0.035		mg/Kg-dry	1	8/11/2017
Benzo(k)fluoranthene	0.096	0.035		mg/Kg-dry	1	8/11/2017
Chrysene	0.13	0.035		mg/Kg-dry	1	8/11/2017
Dibenz(a,h)anthracene	ND	0.035		mg/Kg-dry	1	8/11/2017
Fluoranthene	0.16	0.035		mg/Kg-dry	1	8/11/2017
Fluorene	ND	0.035		mg/Kg-dry	1	8/11/2017
Indeno(1,2,3-cd)pyrene	0.075	0.035		mg/Kg-dry	1	8/11/2017
Naphthalene	ND	0.035		mg/Kg-dry	1	8/11/2017
Phenanthrene	0.088	0.035		mg/Kg-dry	1	8/11/2017
Pyrene	0.18	0.035		mg/Kg-dry	1	8/11/2017
Metals by ICP/MS						
	SW6020 (SW3050B)			Prep Date: 8/14/2017		Analyst: JG
Antimony	ND	1.9		mg/Kg-dry	10	8/16/2017
Arsenic	4.2	0.96		mg/Kg-dry	10	8/16/2017
Beryllium	ND	0.48		mg/Kg-dry	10	8/16/2017
Cadmium	ND	0.48		mg/Kg-dry	10	8/16/2017
Chromium	9.5	0.96		mg/Kg-dry	10	8/16/2017
Copper	18	2.4		mg/Kg-dry	10	8/16/2017
Lead	29	0.48		mg/Kg-dry	10	8/16/2017
Nickel	12	0.96		mg/Kg-dry	10	8/16/2017
Selenium	ND	0.96		mg/Kg-dry	10	8/16/2017
Silver	ND	0.96		mg/Kg-dry	10	8/16/2017
Thallium	ND	0.96		mg/Kg-dry	10	8/16/2017
Zinc	59	4.8		mg/Kg-dry	10	8/16/2017
Mercury						
	SW7471A			Prep Date: 8/14/2017		Analyst: LB
Mercury	0.075	0.016		mg/Kg-dry	1	8/14/2017
pH (25 °C)						
	SW9045C			Prep Date: 8/9/2017		Analyst: PBG
pH	7.77			pH Units	1	8/9/2017
Percent Moisture						
	D2974			Prep Date: 8/9/2017		Analyst: KKA
Percent Moisture	5.7	0.2	*	wt%	1	8/10/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-3B

Work Order: 17080265 Revision 2

Collection Date: 8/8/2017 2:20:00 PM

Project: 3205-17-1606, City of Chicago-JPSTA, 4301 W Cl

Matrix: Soil

Lab ID: 17080265-011

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS	SW5035/8260B			Prep Date: 8/9/2017		Analyst: JNM
Acetone	ND	0.081		mg/Kg-dry	1	8/16/2017
Benzene	ND	0.0054		mg/Kg-dry	1	8/16/2017
Bromodichloromethane	ND	0.0054		mg/Kg-dry	1	8/16/2017
Bromoform	ND	0.0054		mg/Kg-dry	1	8/16/2017
Bromomethane	ND	0.011		mg/Kg-dry	1	8/16/2017
2-Butanone	ND	0.081		mg/Kg-dry	1	8/16/2017
Carbon disulfide	ND	0.054		mg/Kg-dry	1	8/16/2017
Carbon tetrachloride	ND	0.0054		mg/Kg-dry	1	8/16/2017
Chlorobenzene	ND	0.0054		mg/Kg-dry	1	8/16/2017
Chloroethane	ND	0.011		mg/Kg-dry	1	8/16/2017
Chloroform	ND	0.0054		mg/Kg-dry	1	8/16/2017
Chloromethane	ND	0.011		mg/Kg-dry	1	8/16/2017
Dibromochloromethane	ND	0.0054		mg/Kg-dry	1	8/16/2017
1,1-Dichloroethane	ND	0.0054		mg/Kg-dry	1	8/16/2017
1,2-Dichloroethane	ND	0.0054		mg/Kg-dry	1	8/16/2017
1,1-Dichloroethene	ND	0.0054		mg/Kg-dry	1	8/16/2017
cis-1,2-Dichloroethene	ND	0.0054		mg/Kg-dry	1	8/16/2017
trans-1,2-Dichloroethene	ND	0.0054		mg/Kg-dry	1	8/16/2017
1,2-Dichloropropane	ND	0.0054		mg/Kg-dry	1	8/16/2017
cis-1,3-Dichloropropene	ND	0.0022		mg/Kg-dry	1	8/16/2017
trans-1,3-Dichloropropene	ND	0.0022		mg/Kg-dry	1	8/16/2017
Ethylbenzene	ND	0.0054		mg/Kg-dry	1	8/16/2017
2-Hexanone	ND	0.022		mg/Kg-dry	1	8/16/2017
4-Methyl-2-pentanone	ND	0.022		mg/Kg-dry	1	8/16/2017
Methylene chloride	ND	0.011		mg/Kg-dry	1	8/16/2017
Methyl tert-butyl ether	ND	0.0054		mg/Kg-dry	1	8/16/2017
Styrene	ND	0.0054		mg/Kg-dry	1	8/16/2017
1,1,2,2-Tetrachloroethane	ND	0.0054		mg/Kg-dry	1	8/16/2017
Tetrachloroethene	ND	0.0054		mg/Kg-dry	1	8/16/2017
Toluene	ND	0.0054		mg/Kg-dry	1	8/16/2017
1,1,1-Trichloroethane	ND	0.0054		mg/Kg-dry	1	8/16/2017
1,1,2-Trichloroethane	ND	0.0054		mg/Kg-dry	1	8/16/2017
Trichloroethene	ND	0.0054		mg/Kg-dry	1	8/16/2017
Vinyl chloride	ND	0.0054		mg/Kg-dry	1	8/16/2017
Xylenes, Total	ND	0.016		mg/Kg-dry	1	8/16/2017
Volatile Organic Compounds by GC/MS	SW5035/8260B			Prep Date: 8/9/2017		Analyst: JNM
Trichlorofluoromethane	ND	0.0054		mg/Kg-dry	1	8/16/2017

Qualifiers:

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S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-3B

Work Order: 17080265 Revision 2

Collection Date: 8/8/2017 2:20:00 PM

Project: 3205-17-1606, City of Chicago-JPSTA, 4301 W Cl

Matrix: Soil

Lab ID: 17080265-011

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS	SW8270C (SW3550B)		Prep Date: 8/9/2017		Analyst: DM	
Acenaphthene	ND	0.036		mg/Kg-dry	1	8/11/2017
Acenaphthylene	ND	0.036		mg/Kg-dry	1	8/11/2017
Aniline	ND	0.36		mg/Kg-dry	1	8/11/2017
Anthracene	ND	0.036		mg/Kg-dry	1	8/11/2017
Benz(a)anthracene	ND	0.036		mg/Kg-dry	1	8/11/2017
Benzidine	ND	0.36		mg/Kg-dry	1	8/11/2017
Benzo(a)pyrene	ND	0.036		mg/Kg-dry	1	8/11/2017
Benzo(b)fluoranthene	ND	0.036		mg/Kg-dry	1	8/11/2017
Benzo(g,h,i)perylene	ND	0.036		mg/Kg-dry	1	8/11/2017
Benzo(k)fluoranthene	ND	0.036		mg/Kg-dry	1	8/11/2017
Benzoic acid	ND	0.90		mg/Kg-dry	1	8/11/2017
Benzyl alcohol	ND	0.18		mg/Kg-dry	1	8/11/2017
Bis(2-chloroethoxy)methane	ND	0.18		mg/Kg-dry	1	8/11/2017
Bis(2-chloroethyl)ether	ND	0.18		mg/Kg-dry	1	8/11/2017
Bis(2-ethylhexyl)phthalate	ND	0.90		mg/Kg-dry	1	8/11/2017
4-Bromophenyl phenyl ether	ND	0.18		mg/Kg-dry	1	8/11/2017
Butyl benzyl phthalate	ND	0.18		mg/Kg-dry	1	8/11/2017
Carbazole	ND	0.18		mg/Kg-dry	1	8/11/2017
4-Chloroaniline	ND	0.18		mg/Kg-dry	1	8/11/2017
4-Chloro-3-methylphenol	ND	0.36		mg/Kg-dry	1	8/11/2017
2-Chloronaphthalene	ND	0.18		mg/Kg-dry	1	8/11/2017
2-Chlorophenol	ND	0.18		mg/Kg-dry	1	8/11/2017
4-Chlorophenyl phenyl ether	ND	0.18		mg/Kg-dry	1	8/11/2017
Chrysene	ND	0.036		mg/Kg-dry	1	8/11/2017
Dibenz(a,h)anthracene	ND	0.036		mg/Kg-dry	1	8/11/2017
Dibenzofuran	ND	0.18		mg/Kg-dry	1	8/11/2017
1,2-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/11/2017
1,3-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/11/2017
1,4-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/11/2017
3,3'-Dichlorobenzidine	ND	0.18		mg/Kg-dry	1	8/11/2017
2,4-Dichlorophenol	ND	0.18		mg/Kg-dry	1	8/11/2017
Diethyl phthalate	ND	0.18		mg/Kg-dry	1	8/11/2017
2,4-Dimethylphenol	ND	0.18		mg/Kg-dry	1	8/11/2017
Dimethyl phthalate	ND	0.18		mg/Kg-dry	1	8/11/2017
4,6-Dinitro-2-methylphenol	ND	0.36		mg/Kg-dry	1	8/11/2017
2,4-Dinitrophenol	ND	0.90		mg/Kg-dry	1	8/11/2017
2,4-Dinitrotoluene	ND	0.036		mg/Kg-dry	1	8/11/2017
2,6-Dinitrotoluene	ND	0.036		mg/Kg-dry	1	8/11/2017

Qualifiers:

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-3B

Work Order: 17080265 Revision 2

Collection Date: 8/8/2017 2:20:00 PM

Project: 3205-17-1606, City of Chicago-JPSTA, 4301 W Cl

Matrix: Soil

Lab ID: 17080265-011

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS	SW8270C (SW3550B)				Prep Date: 8/9/2017	Analyst: DM
Di-n-butyl phthalate	ND	0.18		mg/Kg-dry	1	8/11/2017
Di-n-octyl phthalate	ND	0.18		mg/Kg-dry	1	8/11/2017
Fluoranthene	0.040	0.036		mg/Kg-dry	1	8/11/2017
Fluorene	ND	0.036		mg/Kg-dry	1	8/11/2017
Hexachlorobenzene	ND	0.18		mg/Kg-dry	1	8/11/2017
Hexachlorobutadiene	ND	0.18		mg/Kg-dry	1	8/11/2017
Hexachlorocyclopentadiene	ND	0.18		mg/Kg-dry	1	8/11/2017
Hexachloroethane	ND	0.18		mg/Kg-dry	1	8/11/2017
Indeno(1,2,3-cd)pyrene	ND	0.036		mg/Kg-dry	1	8/11/2017
Isophorone	ND	0.18		mg/Kg-dry	1	8/11/2017
2-Methylnaphthalene	ND	0.18		mg/Kg-dry	1	8/11/2017
2-Methylphenol	ND	0.18		mg/Kg-dry	1	8/11/2017
4-Methylphenol	ND	0.18		mg/Kg-dry	1	8/11/2017
Naphthalene	ND	0.036		mg/Kg-dry	1	8/11/2017
2-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/11/2017
3-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/11/2017
4-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/11/2017
2-Nitrophenol	ND	0.18		mg/Kg-dry	1	8/11/2017
4-Nitrophenol	ND	0.36		mg/Kg-dry	1	8/11/2017
Nitrobenzene	ND	0.036		mg/Kg-dry	1	8/11/2017
N-Nitrosodi-n-propylamine	ND	0.036		mg/Kg-dry	1	8/11/2017
N-Nitrosodimethylamine	ND	0.18		mg/Kg-dry	1	8/11/2017
N-Nitrosodiphenylamine	ND	0.036		mg/Kg-dry	1	8/11/2017
2, 2'-oxybis(1-Chloropropane)	ND	0.18		mg/Kg-dry	1	8/11/2017
Pentachlorophenol	ND	0.036		mg/Kg-dry	1	8/11/2017
Phenanthrene	ND	0.036		mg/Kg-dry	1	8/11/2017
Phenol	ND	0.18		mg/Kg-dry	1	8/11/2017
Pyrene	0.043	0.036		mg/Kg-dry	1	8/11/2017
Pyridine	ND	0.73		mg/Kg-dry	1	8/11/2017
1,2,4-Trichlorobenzene	ND	0.18		mg/Kg-dry	1	8/11/2017
2,4,5-Trichlorophenol	ND	0.18		mg/Kg-dry	1	8/11/2017
2,4,6-Trichlorophenol	ND	0.18		mg/Kg-dry	1	8/11/2017
PCBs	SW8082 (SW3550B)				Prep Date: 8/9/2017	Analyst: GVC
Aroclor 1016	ND	0.087		mg/Kg-dry	1	8/9/2017
Aroclor 1221	ND	0.087		mg/Kg-dry	1	8/9/2017
Aroclor 1232	ND	0.087		mg/Kg-dry	1	8/9/2017
Aroclor 1242	ND	0.087		mg/Kg-dry	1	8/9/2017
Aroclor 1248	ND	0.087		mg/Kg-dry	1	8/9/2017

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-3B

Work Order: 17080265 Revision 2

Collection Date: 8/8/2017 2:20:00 PM

Project: 3205-17-1606, City of Chicago-JPSTA, 4301 W Cl

Matrix: Soil

Lab ID: 17080265-011

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs	SW8082 (SW3550B)				Prep Date: 8/9/2017	Analyst: GVC
Aroclor 1254	ND	0.087		mg/Kg-dry	1	8/9/2017
Aroclor 1260	ND	0.087		mg/Kg-dry	1	8/9/2017
Pesticides	SW8081 (SW3550B)				Prep Date: 8/9/2017	Analyst: GVC
4,4'-DDD	ND	0.0017		mg/Kg-dry	1	8/9/2017
4,4'-DDE	ND	0.0017		mg/Kg-dry	1	8/9/2017
4,4'-DDT	ND	0.0017		mg/Kg-dry	1	8/9/2017
Aldrin	ND	0.0017		mg/Kg-dry	1	8/9/2017
alpha-BHC	ND	0.0017		mg/Kg-dry	1	8/9/2017
alpha-Chlordane	ND	0.0017		mg/Kg-dry	1	8/9/2017
beta-BHC	ND	0.0017		mg/Kg-dry	1	8/9/2017
Chlordane	ND	0.017		mg/Kg-dry	1	8/9/2017
delta-BHC	ND	0.0017		mg/Kg-dry	1	8/9/2017
Dieldrin	ND	0.0017		mg/Kg-dry	1	8/9/2017
Endosulfan I	ND	0.0017		mg/Kg-dry	1	8/9/2017
Endosulfan II	ND	0.0017		mg/Kg-dry	1	8/9/2017
Endosulfan sulfate	ND	0.0017		mg/Kg-dry	1	8/9/2017
Endrin	ND	0.0017		mg/Kg-dry	1	8/9/2017
Endrin aldehyde	ND	0.0017		mg/Kg-dry	1	8/9/2017
Endrin ketone	ND	0.0017		mg/Kg-dry	1	8/9/2017
gamma-BHC	ND	0.0017		mg/Kg-dry	1	8/9/2017
gamma-Chlordane	ND	0.0017		mg/Kg-dry	1	8/9/2017
Heptachlor	ND	0.0017		mg/Kg-dry	1	8/9/2017
Heptachlor epoxide	ND	0.0017		mg/Kg-dry	1	8/9/2017
Methoxychlor	ND	0.0017		mg/Kg-dry	1	8/9/2017
Toxaphene	ND	0.036		mg/Kg-dry	1	8/9/2017
Metals by ICP/MS	SW6020 (SW3050B)				Prep Date: 8/14/2017	Analyst: JG
Aluminum	2600	20		mg/Kg-dry	10	8/16/2017
Antimony	ND	2.0		mg/Kg-dry	10	8/16/2017
Arsenic	2.7	0.98		mg/Kg-dry	10	8/16/2017
Barium	13	0.98		mg/Kg-dry	10	8/16/2017
Beryllium	ND	0.49		mg/Kg-dry	10	8/16/2017
Cadmium	ND	0.49		mg/Kg-dry	10	8/16/2017
Calcium	50000	59		mg/Kg-dry	10	8/16/2017
Chromium	6.7	0.98		mg/Kg-dry	10	8/16/2017
Cobalt	3.1	0.98		mg/Kg-dry	10	8/16/2017
Copper	7.7	2.5		mg/Kg-dry	10	8/16/2017
Iron	7600	29		mg/Kg-dry	10	8/16/2017

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-3B

Work Order: 17080265 Revision 2

Collection Date: 8/8/2017 2:20:00 PM

Project: 3205-17-1606, City of Chicago-JPSTA, 4301 W Cl

Matrix: Soil

Lab ID: 17080265-011

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)				Prep Date: 8/14/2017	Analyst: JG
Lead	6.4	0.49		mg/Kg-dry	10	8/16/2017
Magnesium	26000	29		mg/Kg-dry	10	8/16/2017
Manganese	200	0.98		mg/Kg-dry	10	8/16/2017
Nickel	7.4	0.98		mg/Kg-dry	10	8/16/2017
Potassium	440	29		mg/Kg-dry	10	8/16/2017
Selenium	ND	0.98		mg/Kg-dry	10	8/16/2017
Silver	ND	0.98		mg/Kg-dry	10	8/16/2017
Sodium	95	59		mg/Kg-dry	10	8/16/2017
Thallium	ND	0.98		mg/Kg-dry	10	8/16/2017
Vanadium	12	0.98		mg/Kg-dry	10	8/16/2017
Zinc	25	4.9		mg/Kg-dry	10	8/16/2017
Mercury	SW7471A				Prep Date: 8/14/2017	Analyst: LB
Mercury	0.047	0.021		mg/Kg-dry	1	8/14/2017
Cyanide, Total	SW9012A				Prep Date: 8/11/2017	Analyst: MD
Cyanide	ND	0.27		mg/Kg-dry	1	8/15/2017
pH (25 °C)	SW9045C				Prep Date: 8/9/2017	Analyst: PBG
pH	8.04			pH Units	1	8/9/2017
Percent Moisture	D2974				Prep Date: 8/9/2017	Analyst: KKA
Percent Moisture	8.2	0.2	*	wt%	1	8/10/2017

Qualifiers:

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-6A

Work Order: 17080265 Revision 2

Collection Date: 8/8/2017 12:10:00 PM

Project: 3205-17-1606, City of Chicago-JPSTA, 4301 W Cl

Matrix: Soil

Lab ID: 17080265-013

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS SW8270C (SW3550B) Prep Date: 8/9/2017 Analyst: MEP						
Acenaphthene	0.32	0.038		mg/Kg-dry	1	8/13/2017
Acenaphthylene	0.085	0.038		mg/Kg-dry	1	8/13/2017
Anthracene	2.0	0.038		mg/Kg-dry	1	8/13/2017
Benz(a)anthracene	4.9	0.38		mg/Kg-dry	10	8/15/2017
Benzo(a)pyrene	3.9	0.38		mg/Kg-dry	10	8/15/2017
Benzo(b)fluoranthene	3.5	0.038		mg/Kg-dry	1	8/13/2017
Benzo(g,h,i)perylene	3.3	0.038		mg/Kg-dry	1	8/13/2017
Benzo(k)fluoranthene	3.2	0.038		mg/Kg-dry	1	8/13/2017
Chrysene	5.1	0.38		mg/Kg-dry	10	8/15/2017
Dibenz(a,h)anthracene	1.1	0.038		mg/Kg-dry	1	8/13/2017
Fluoranthene	9.8	0.38		mg/Kg-dry	10	8/15/2017
Fluorene	0.46	0.038		mg/Kg-dry	1	8/13/2017
Indeno(1,2,3-cd)pyrene	2.5	0.038		mg/Kg-dry	1	8/13/2017
Naphthalene	0.061	0.038		mg/Kg-dry	1	8/13/2017
Phenanthrene	6.5	0.38		mg/Kg-dry	10	8/15/2017
Pyrene	13	0.38		mg/Kg-dry	10	8/15/2017
Metals by ICP/MS SW6020 (SW3050B) Prep Date: 8/14/2017 Analyst: JG						
Antimony	ND	2.0		mg/Kg-dry	10	8/16/2017
Arsenic	6.8	0.98		mg/Kg-dry	10	8/16/2017
Beryllium	0.56	0.49		mg/Kg-dry	10	8/16/2017
Cadmium	ND	0.49		mg/Kg-dry	10	8/16/2017
Chromium	20	0.98		mg/Kg-dry	10	8/16/2017
Copper	41	2.4		mg/Kg-dry	10	8/16/2017
Lead	66	0.49		mg/Kg-dry	10	8/16/2017
Nickel	29	0.98		mg/Kg-dry	10	8/16/2017
Selenium	ND	0.98		mg/Kg-dry	10	8/16/2017
Silver	ND	0.98		mg/Kg-dry	10	8/16/2017
Thallium	ND	0.98		mg/Kg-dry	10	8/16/2017
Zinc	100	4.9		mg/Kg-dry	10	8/16/2017
Mercury SW7471A Prep Date: 8/14/2017 Analyst: LB						
Mercury	0.077	0.022		mg/Kg-dry	1	8/14/2017
pH (25 °C) SW9045C Prep Date: 8/9/2017 Analyst: PBG						
pH	9.92			pH Units	1	8/9/2017
Percent Moisture D2974 Prep Date: 8/9/2017 Analyst: KKA						
Percent Moisture	14.3	0.2	*	wt%	1	8/10/2017

Qualifiers:

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Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-6B

Work Order: 17080265 Revision 2

Collection Date: 8/8/2017 12:30:00 PM

Project: 3205-17-1606, City of Chicago-JPSTA, 4301 W Cl

Matrix: Soil

Lab ID: 17080265-014

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
	SW8270C (SW3550B)		Prep Date: 8/9/2017		Analyst: MEP	
Acenaphthene	ND	0.040		mg/Kg-dry	1	8/13/2017
Acenaphthylene	0.10	0.040		mg/Kg-dry	1	8/13/2017
Anthracene	0.25	0.040		mg/Kg-dry	1	8/13/2017
Benz(a)anthracene	0.64	0.040		mg/Kg-dry	1	8/13/2017
Benzo(a)pyrene	0.68	0.040		mg/Kg-dry	1	8/13/2017
Benzo(b)fluoranthene	0.53	0.040		mg/Kg-dry	1	8/13/2017
Benzo(g,h,i)perylene	0.65	0.040		mg/Kg-dry	1	8/13/2017
Benzo(k)fluoranthene	0.67	0.040		mg/Kg-dry	1	8/13/2017
Chrysene	0.89	0.040		mg/Kg-dry	1	8/13/2017
Dibenz(a,h)anthracene	0.25	0.040		mg/Kg-dry	1	8/13/2017
Fluoranthene	0.97	0.040		mg/Kg-dry	1	8/13/2017
Fluorene	0.067	0.040		mg/Kg-dry	1	8/13/2017
Indeno(1,2,3-cd)pyrene	0.51	0.040		mg/Kg-dry	1	8/13/2017
Naphthalene	0.20	0.040		mg/Kg-dry	1	8/13/2017
Phenanthrene	0.91	0.040		mg/Kg-dry	1	8/13/2017
Pyrene	1.2	0.040		mg/Kg-dry	1	8/13/2017
Metals by ICP/MS						
	SW6020 (SW3050B)		Prep Date: 8/14/2017		Analyst: JG	
Antimony	3.4	2.2		mg/Kg-dry	10	8/16/2017
Arsenic	13	1.1		mg/Kg-dry	10	8/16/2017
Beryllium	0.57	0.54		mg/Kg-dry	10	8/16/2017
Cadmium	2.7	0.54		mg/Kg-dry	10	8/16/2017
Chromium	29	1.1		mg/Kg-dry	10	8/16/2017
Copper	170	2.7		mg/Kg-dry	10	8/16/2017
Lead	240	0.54		mg/Kg-dry	10	8/16/2017
Nickel	31	1.1		mg/Kg-dry	10	8/16/2017
Selenium	1.2	1.1		mg/Kg-dry	10	8/16/2017
Silver	ND	1.1		mg/Kg-dry	10	8/16/2017
Thallium	ND	1.1		mg/Kg-dry	10	8/16/2017
Zinc	650	5.4		mg/Kg-dry	10	8/16/2017
SPLP Metals by ICP/MS						
	SW1312/6020A (SW3005A)		Prep Date: 11/24/2017		Analyst: JG	
Chromium	ND	0.0040		mg/L	2	11/24/2017
Mercury						
	SW7471A		Prep Date: 8/14/2017		Analyst: LB	
Mercury	0.24	0.023		mg/Kg-dry	1	8/14/2017
pH (25 °C)						
	SW9045C		Prep Date: 8/9/2017		Analyst: PBG	
pH	8.22			pH Units	1	8/9/2017
Percent Moisture						
	D2974		Prep Date: 8/9/2017		Analyst: KKA	

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: November 27, 2017

ANALYTICAL RESULTS

Date Printed: November 27, 2017

Client:	AMEC Foster Wheeler Environment & Infr	Client Sample ID:	B-6B
Work Order:	17080265 Revision 2	Collection Date:	8/8/2017 12:30:00 PM
Project:	3205-17-1606, City of Chicago-JPSTA, 4301 W Cl	Matrix:	Soil
Lab ID:	17080265-014		

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Percent Moisture	D2974					
Percent Moisture	18.8	0.2	*	wt%	1	Prep Date: 8/9/2017 Analyst: KKA 8/10/2017

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

Company: QMec Foster Wheeler					
Project Number: 3205-17-1606		Client Tracking No.:			
Project Name: CITY OF CHICAGO - JCSTA					
Project Location: 4301 W CHICAGO, CHICAGO, IL					
Sampler(s): ERIC WALKOWIAK					
Report To: MARY JANK		Phone: 773-693-6030			
QC Level: 1		2	3	4	Fax:
e-mail: mary.jank@fosterwheeler.com					
Client Sample Number/Description:		Date Taken	Time Taken	Matrix	Comp.
B-11A		8-8-17	8:05	A/P	X
B-11B			8:10	A/P	
B-11C			8:15	A	
B-15A			9:00	A	
B-15B			9:05	A	
B-15C			9:20	A	
B-9A			10:15	A	
B-9B			10:25	A	
B-9C			10:35	A	
B-3A			14:05	A	
B-3B			14:20	A/F	
B-3C			14:25	A/F	
B-6A			12:10		
B-6B			12:30		
B-6C			12:40		
Relinquished by: (Signature)		Date/Time: 8-8-17 16:00			
Received by: (Signature)		Date/Time: 8/8/17 16:00			
Relinquished by: (Signature)		Date/Time:			
Received by: (Signature)		Date/Time:			
Relinquished by: (Signature)		Date/Time:			
Received by: (Signature)		Date/Time:			

Quote No.:					
P.O. No.:					
Turn Around Time (Days): START DATE					
1	2	3	4	5	7 10
Results Needed:					
Additional Information:					Lab No.:
HOLD					001
HOLD					002
HOLD					003
HOLD					004
HOLD					005
HOLD					006
HOLD					007
HOLD					008
HOLD					009
					010
					011
HOLD					012
					013
					014
HOLD					015
Laboratory Work Order No.: 17080265					
Received on Ice: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>					
Temperature: 41 °C					

Sample Receipt Checklist

Client Name **AMEC**

Date and Time Received: **8/8/2017 4:00:00 PM**

Work Order Number **17080285**

Received by: **JNW**

Checklist completed by:

Reviewed by:

Signature

Date

Initials

Date

Matrix:

Carrier name Client Delivered

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels/containers?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container or Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Temperature 4.1 °C
Water - VOA vials have zero headspace?	No VOA vials submitted <input checked="" type="checkbox"/>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Water - Samples pH checked?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Checked by: _____
Water - Samples properly preserved?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	pH Adjusted? _____

Any No response must be detailed in the comments section below.

Comments: Report trichlorofluoromethane per Mary Task verbal 8/22/17.

Client / Person contacted:

Date contacted:

Contacted by:

Response:

Craig Chawla

From: Jank, Mary E [mary.jank@woodplc.com]
Sent: Monday, November 20, 2017 3:47 PM
To: Craig Chawla; Frank Capoccia
Subject: Additional Testing -

Please perform additional leaching procedure testing (TCLP or SPLP) for the following metals on the identified samples:

B-18A – chromium and manganese your sample # 17080321-011

B-6B – chromium your sample #17080265-014

ESB-2A – cobalt, iron – your sample #17080088-001

ESB-4A – iron your sample #17080223-001

ESB-5A – iron your sample #17080126-001

ESB-6A – iron, manganese your sample #17080177-001

Mary E. Jank
Senior Associate
Amec Foster Wheeler Environment & Infrastructure, Inc.
8745 W. Higgins Road, Suite 300
Chicago, IL

D 773-693-6030, ext. 8742
M 312-617-8342
mary.jank@amecfw.com
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December 08, 2017

AMEC Foster Wheeler Environment & Infrastructure
550 Warrenville Road
Lisle, IL 60532

Telephone: (630) 724-8517

Fax: (630) 724-8518

Analytical Report for STAT Work Order: 17080321 Revision 3

RE: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Dear Mary Jank:

STAT Analysis received 13 samples for the referenced project on 8/9/2017 3:50:00 PM. The analytical results are presented in the following report.

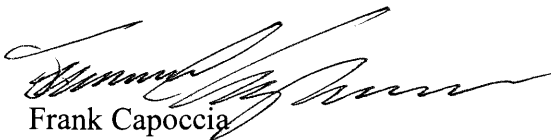
This report is revised to reflect additional analysis requested after the last report revision.

All analyses were performed in accordance with the requirements of 35 IAC Part 186 / NELAP standards. Analyses were performed in accordance with methods as referenced on the analytical report. Those analytical results expressed on a dry weight basis are also noted on the analytical report.

All analyses were performed within established holding time criteria, and all Quality Control criteria met EPA or laboratory specifications except when noted in the Case Narrative or Analytical Report. If required, an estimate of uncertainty for the analyses can be provided. A listing of accredited methods/parameters can also be provided.

Thank you for the opportunity to serve you and I look forward to working with you in the future. If you have any questions regarding the enclosed materials, please contact me at (312) 733-0551.

Sincerely,



Frank Capoccia

Project Manager

The information contained in this report and any attachments is confidential information intended only for the use of the individual or entities named above. The results of this report relate only to the samples tested. If you have received this report in error, please notify us immediately by phone. This report shall not be reproduced, except in its entirety, unless written approval has been obtained from the laboratory. This analytical report shall become property of the Customer upon payment in full. Otherwise, STAT will be under no obligation to support, defend or discuss the analytical report.

Client: AMEC Foster Wheeler Environment & Infrastructure
Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL
Work Order: 17080321 Revision 3

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Tag Number	Collection Date	Date Received
17080321-001A	ESB-5		8/9/2017 8:45:00 AM	8/9/2017
17080321-001B	ESB-5		8/9/2017 8:45:00 AM	8/9/2017
17080321-001C	ESB-5		8/9/2017 8:45:00 AM	8/9/2017
17080321-001D	ESB-5		8/9/2017 8:45:00 AM	8/9/2017
17080321-002A	ESB-6		8/9/2017 10:30:00 AM	8/9/2017
17080321-002B	ESB-6		8/9/2017 10:30:00 AM	8/9/2017
17080321-003A	B-2A		8/9/2017 7:50:00 AM	8/9/2017
17080321-004A	B-2B		8/9/2017 8:00:00 AM	8/9/2017
17080321-005A	ESB-1A		8/9/2017 9:30:00 AM	8/9/2017
17080321-006A	ESB-1B		8/9/2017 9:50:00 AM	8/9/2017
17080321-007A	ESB-1C		8/9/2017 9:55:00 AM	8/9/2017
17080321-008A	B-1A		8/9/2017 10:45:00 AM	8/9/2017
17080321-009A	B-1B		8/9/2017 11:00:00 AM	8/9/2017
17080321-010A	B-1C		8/9/2017 11:10:00 AM	8/9/2017
17080321-011A	B-18A		8/9/2017 12:25:00 PM	8/9/2017
17080321-011B	B-18A		8/9/2017 12:25:00 PM	8/9/2017
17080321-012A	B-18B		8/9/2017 12:30:00 PM	8/9/2017
17080321-013A	B-18C		8/9/2017 12:35:00 PM	8/9/2017

CLIENT: AMEC Foster Wheeler Environment & Infr
Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL
Work Order: 17080321 Revision 3

CASE NARRATIVE

At the customers request, sample ESB-6 (17080321-002) was prepared for VOC analysis from the unpreserved 1 L Amber Glass jar. The hold time was exceeded based on 7 day hold time for unpreserved sample. The request for analysis was made after the hold time expired. Methylene chloride present in the sample ESB-6 (17080321-002) is lab artifact.

STAT Analysis Corporation

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Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-5

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 8:45:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Aqueous

Lab ID: 17080321-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS						
	SW8260B (SW5030B)			Prep Date:		Analyst: ERP
Acetone	ND	0.020		mg/L	1	8/13/2017
Benzene	ND	0.0050		mg/L	1	8/13/2017
Bromodichloromethane	ND	0.0050		mg/L	1	8/13/2017
Bromoform	ND	0.0050		mg/L	1	8/13/2017
Bromomethane	ND	0.010		mg/L	1	8/13/2017
2-Butanone	ND	0.020		mg/L	1	8/13/2017
Carbon disulfide	ND	0.010		mg/L	1	8/13/2017
Carbon tetrachloride	ND	0.0050		mg/L	1	8/13/2017
Chlorobenzene	ND	0.0050		mg/L	1	8/13/2017
Chloroethane	ND	0.010		mg/L	1	8/13/2017
Chloroform	ND	0.0050		mg/L	1	8/13/2017
Chloromethane	ND	0.010		mg/L	1	8/13/2017
Dibromochloromethane	ND	0.0050		mg/L	1	8/13/2017
1,1-Dichloroethane	ND	0.0050		mg/L	1	8/13/2017
1,2-Dichloroethane	ND	0.0050		mg/L	1	8/13/2017
1,1-Dichloroethene	ND	0.0050		mg/L	1	8/13/2017
cis-1,2-Dichloroethene	ND	0.0050		mg/L	1	8/13/2017
trans-1,2-Dichloroethene	ND	0.0050		mg/L	1	8/13/2017
1,2-Dichloropropane	ND	0.0050		mg/L	1	8/13/2017
cis-1,3-Dichloropropene	ND	0.0010		mg/L	1	8/13/2017
trans-1,3-Dichloropropene	ND	0.0010		mg/L	1	8/13/2017
Ethylbenzene	ND	0.0050		mg/L	1	8/13/2017
2-Hexanone	ND	0.020		mg/L	1	8/13/2017
4-Methyl-2-pentanone	ND	0.020		mg/L	1	8/13/2017
Methylene chloride	ND	0.0050		mg/L	1	8/13/2017
Methyl tert-butyl ether	ND	0.0050		mg/L	1	8/13/2017
Styrene	ND	0.0050		mg/L	1	8/13/2017
1,1,2,2-Tetrachloroethane	ND	0.0050		mg/L	1	8/13/2017
Tetrachloroethene	ND	0.0050		mg/L	1	8/13/2017
Toluene	ND	0.0050		mg/L	1	8/13/2017
1,1,1-Trichloroethane	ND	0.0050		mg/L	1	8/13/2017
1,1,2-Trichloroethane	ND	0.0050		mg/L	1	8/13/2017
Trichloroethene	ND	0.0050		mg/L	1	8/13/2017
Vinyl chloride	ND	0.0020		mg/L	1	8/13/2017
Xylenes, Total	ND	0.015		mg/L	1	8/13/2017
Semivolatile Organic Compounds by GC/MS						
	SW8270C-SIM (SW3510C)			Prep Date: 8/10/2017		Analyst: TMB
Acenaphthene	ND	0.0010		mg/L	1	8/14/2017
Acenaphthylene	ND	0.0010		mg/L	1	8/14/2017

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-5

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 8:45:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Aqueous

Lab ID: 17080321-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
	SW8270C-SIM (SW3510C)		Prep Date: 8/10/2017		Analyst: TMB	
Anthracene	ND	0.0010		mg/L	1	8/14/2017
Benz(a)anthracene	ND	0.00010		mg/L	1	8/14/2017
Benzo(a)pyrene	ND	0.00010		mg/L	1	8/14/2017
Benzo(b)fluoranthene	ND	0.00010		mg/L	1	8/14/2017
Benzo(g,h,i)perylene	ND	0.0010		mg/L	1	8/14/2017
Benzo(k)fluoranthene	ND	0.00010		mg/L	1	8/14/2017
Chrysene	ND	0.00010		mg/L	1	8/14/2017
Dibenz(a,h)anthracene	ND	0.00010		mg/L	1	8/14/2017
Fluoranthene	ND	0.0010		mg/L	1	8/14/2017
Fluorene	ND	0.0010		mg/L	1	8/14/2017
Indeno(1,2,3-cd)pyrene	ND	0.00010		mg/L	1	8/14/2017
Naphthalene	ND	0.0010		mg/L	1	8/14/2017
Phenanthrene	ND	0.0010		mg/L	1	8/14/2017
Pyrene	ND	0.0010		mg/L	1	8/14/2017
Carbazole	ND	0.00010		mg/L	1	8/14/2017
2,4-Dinitrotoluene	ND	0.00010		mg/L	1	8/14/2017
2,6-Dinitrotoluene	ND	0.00010		mg/L	1	8/14/2017
N-Nitrosodi-n-propylamine	ND	0.00010		mg/L	1	8/14/2017
Nitrobenzene	ND	0.0010		mg/L	1	8/14/2017
Pentachlorophenol	ND	0.00050		mg/L	1	8/14/2017
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3510C)		Prep Date: 8/10/2017		Analyst: TMB	
Aniline	ND	0.0050		mg/L	1	8/14/2017
Benzidine	ND	0.0050		mg/L	1	8/14/2017
Benzoic acid	ND	0.025		mg/L	1	8/14/2017
Benzyl alcohol	ND	0.0050		mg/L	1	8/14/2017
Bis(2-chloroethoxy)methane	ND	0.0050		mg/L	1	8/14/2017
Bis(2-chloroethyl)ether	ND	0.0050		mg/L	1	8/14/2017
Bis(2-ethylhexyl)phthalate	ND	0.0050		mg/L	1	8/14/2017
4-Bromophenyl phenyl ether	ND	0.0050		mg/L	1	8/14/2017
Butyl benzyl phthalate	ND	0.0050		mg/L	1	8/14/2017
4-Chloroaniline	ND	0.0050		mg/L	1	8/14/2017
4-Chloro-3-methylphenol	ND	0.0050		mg/L	1	8/14/2017
2-Chloronaphthalene	ND	0.0050		mg/L	1	8/14/2017
2-Chlorophenol	ND	0.0050		mg/L	1	8/14/2017
4-Chlorophenyl phenyl ether	ND	0.0050		mg/L	1	8/14/2017
Dibenzofuran	ND	0.0050		mg/L	1	8/14/2017
1,2-Dichlorobenzene	ND	0.0050		mg/L	1	8/14/2017
1,3-Dichlorobenzene	ND	0.0050		mg/L	1	8/14/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-5

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 8:45:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Aqueous

Lab ID: 17080321-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3510C)			Prep Date: 8/10/2017		Analyst: TMB
1,4-Dichlorobenzene	ND	0.0050		mg/L	1	8/14/2017
3,3'-Dichlorobenzidine	ND	0.010		mg/L	1	8/14/2017
2,4-Dichlorophenol	ND	0.0050		mg/L	1	8/14/2017
Diethyl phthalate	ND	0.0050		mg/L	1	8/14/2017
2,4-Dimethylphenol	ND	0.0050		mg/L	1	8/14/2017
Dimethyl phthalate	ND	0.0050		mg/L	1	8/14/2017
4,6-Dinitro-2-methylphenol	ND	0.025		mg/L	1	8/14/2017
2,4-Dinitrophenol	ND	0.025		mg/L	1	8/14/2017
Di-n-butyl phthalate	ND	0.0050		mg/L	1	8/14/2017
Di-n-octyl phthalate	ND	0.0050		mg/L	1	8/14/2017
Hexachlorobenzene	ND	0.0050		mg/L	1	8/14/2017
Hexachlorobutadiene	ND	0.0050		mg/L	1	8/14/2017
Hexachlorocyclopentadiene	ND	0.0050		mg/L	1	8/14/2017
Hexachloroethane	ND	0.0050		mg/L	1	8/14/2017
Isophorone	ND	0.0050		mg/L	1	8/14/2017
2-Methylnaphthalene	ND	0.0050		mg/L	1	8/14/2017
2-Methylphenol	ND	0.0050		mg/L	1	8/14/2017
4-Methylphenol	ND	0.0050		mg/L	1	8/14/2017
2-Nitroaniline	ND	0.025		mg/L	1	8/14/2017
3-Nitroaniline	ND	0.025		mg/L	1	8/14/2017
4-Nitroaniline	ND	0.025		mg/L	1	8/14/2017
2-Nitrophenol	ND	0.0050		mg/L	1	8/14/2017
4-Nitrophenol	ND	0.025		mg/L	1	8/14/2017
N-Nitrosodimethylamine	ND	0.0050		mg/L	1	8/14/2017
N-Nitrosodiphenylamine	ND	0.0050		mg/L	1	8/14/2017
2, 2'-oxybis(1-Chloropropane)	ND	0.0050		mg/L	1	8/14/2017
Phenol	ND	0.0050		mg/L	1	8/14/2017
Pyridine	ND	0.0050		mg/L	1	8/14/2017
1,2,4-Trichlorobenzene	ND	0.0050		mg/L	1	8/14/2017
2,4,5-Trichlorophenol	ND	0.010		mg/L	1	8/14/2017
2,4,6-Trichlorophenol	ND	0.0050		mg/L	1	8/14/2017
PCBs						
	SW8082 (SW3510C)			Prep Date: 8/10/2017		Analyst: GVC
Aroclor 1016	ND	0.00050		mg/L	1	8/10/2017
Aroclor 1221	ND	0.00050		mg/L	1	8/10/2017
Aroclor 1232	ND	0.00050		mg/L	1	8/10/2017
Aroclor 1242	ND	0.00050		mg/L	1	8/10/2017
Aroclor 1248	ND	0.00050		mg/L	1	8/10/2017
Aroclor 1254	ND	0.00050		mg/L	1	8/10/2017

Qualifiers:	ND - Not Detected at the Reporting Limit	RL - Reporting / Quantitation Limit for the analysis
	J - Analyte detected below quantitation limits	S - Spike Recovery outside accepted recovery limits
	B - Analyte detected in the associated Method Blank	R - RPD outside accepted recovery limits
	HT - Sample received past holding time	E - Value above quantitation range
	* - Non-accredited parameter	H - Holding time exceeded

STAT Analysis Corporation

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Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com

Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-5

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 8:45:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Aqueous

Lab ID: 17080321-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs	SW8082 (SW3510C)					
Aroclor 1260	ND	0.00050		mg/L	1	8/10/2017
Pesticides	SW8081 (SW3510C)					
4,4'-DDD	ND	0.000050		mg/L	1	8/10/2017
4,4'-DDE	ND	0.000050		mg/L	1	8/10/2017
4,4'-DDT	ND	0.000050		mg/L	1	8/10/2017
Aldrin	ND	0.000050		mg/L	1	8/10/2017
alpha-BHC	ND	0.000050		mg/L	1	8/10/2017
alpha-Chlordane	ND	0.000050		mg/L	1	8/10/2017
beta-BHC	ND	0.000050		mg/L	1	8/10/2017
Chlordane	ND	0.0010		mg/L	1	8/10/2017
delta-BHC	ND	0.000050		mg/L	1	8/10/2017
Dieldrin	ND	0.000050		mg/L	1	8/10/2017
Endosulfan I	ND	0.000050		mg/L	1	8/10/2017
Endosulfan II	ND	0.000050		mg/L	1	8/10/2017
Endosulfan sulfate	ND	0.000050		mg/L	1	8/10/2017
Endrin	ND	0.000050		mg/L	1	8/10/2017
Endrin aldehyde	ND	0.000050		mg/L	1	8/10/2017
Endrin ketone	ND	0.000050		mg/L	1	8/10/2017
gamma-BHC	ND	0.000050		mg/L	1	8/10/2017
gamma-Chlordane	ND	0.000050		mg/L	1	8/10/2017
Heptachlor	ND	0.000050		mg/L	1	8/10/2017
Heptachlor epoxide	ND	0.000050		mg/L	1	8/10/2017
Methoxychlor	ND	0.000050		mg/L	1	8/10/2017
Toxaphene	ND	0.0010		mg/L	1	8/10/2017
Metals by ICP/MS	SW6020 (SW3005A)					
Aluminum	ND	0.040		mg/L	2	8/19/2017
Antimony	ND	0.0060		mg/L	2	8/19/2017
Arsenic	0.0074	0.0040		mg/L	2	8/19/2017
Barium	0.079	0.0040		mg/L	2	8/19/2017
Beryllium	ND	0.0020		mg/L	2	8/19/2017
Cadmium	ND	0.0020		mg/L	2	8/19/2017
Calcium	84	0.20		mg/L	2	8/19/2017
Chromium	ND	0.0040		mg/L	2	8/19/2017
Cobalt	ND	0.0040		mg/L	2	8/19/2017
Copper	ND	0.010		mg/L	2	8/19/2017
Iron	1.4	0.10		mg/L	2	8/19/2017
Lead	ND	0.0020		mg/L	2	8/19/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-5

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 8:45:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Aqueous

Lab ID: 17080321-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3005A)				Prep Date: 8/18/2017	Analyst: JG
Magnesium	28	0.10		mg/L	2	8/19/2017
Manganese	0.43	0.0040		mg/L	2	8/19/2017
Nickel	ND	0.0040		mg/L	2	8/19/2017
Potassium	3.6	0.10		mg/L	2	8/19/2017
Selenium	ND	0.0040		mg/L	2	8/19/2017
Silver	ND	0.0040		mg/L	2	8/19/2017
Sodium	9.6	0.30		mg/L	2	8/19/2017
Thallium	ND	0.0020		mg/L	2	8/19/2017
Vanadium	ND	0.0040		mg/L	2	8/19/2017
Zinc	0.040	0.020		mg/L	2	8/19/2017
Mercury	SW7470A				Prep Date: 8/9/2017	Analyst: LB
Mercury	ND	0.00020		mg/L	1	8/10/2017
Cyanide, Total	SW9012A				Prep Date: 8/17/2017	Analyst: MD
Cyanide	0.0055	0.0050		mg/L	1	8/17/2017
pH	E150.1				Prep Date: 8/9/2017	Analyst: RW
pH	7.3		HT*	pH units	1	8/9/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-6

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 10:30:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Aqueous

Lab ID: 17080321-002

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS						
	SW8260B (SW5030B)			Prep Date:		Analyst: ART
Acetone	ND	0.020	H	mg/L	1	8/22/2017
Benzene	ND	0.0050	H	mg/L	1	8/22/2017
Bromodichloromethane	ND	0.0050	H	mg/L	1	8/22/2017
Bromoform	ND	0.0050	H	mg/L	1	8/22/2017
Bromomethane	ND	0.010	H	mg/L	1	8/22/2017
2-Butanone	ND	0.020	H	mg/L	1	8/22/2017
Carbon disulfide	ND	0.010	H	mg/L	1	8/22/2017
Carbon tetrachloride	ND	0.0050	H	mg/L	1	8/22/2017
Chlorobenzene	ND	0.0050	H	mg/L	1	8/22/2017
Chloroethane	ND	0.010	H	mg/L	1	8/22/2017
Chloroform	ND	0.0050	H	mg/L	1	8/22/2017
Chloromethane	ND	0.010	H	mg/L	1	8/22/2017
Dibromochloromethane	ND	0.0050	H	mg/L	1	8/22/2017
1,1-Dichloroethane	ND	0.0050	H	mg/L	1	8/22/2017
1,2-Dichloroethane	ND	0.0050	H	mg/L	1	8/22/2017
1,1-Dichloroethene	ND	0.0050	H	mg/L	1	8/22/2017
cis-1,2-Dichloroethene	ND	0.0050	H	mg/L	1	8/22/2017
trans-1,2-Dichloroethene	ND	0.0050	H	mg/L	1	8/22/2017
1,2-Dichloropropane	ND	0.0050	H	mg/L	1	8/22/2017
cis-1,3-Dichloropropene	ND	0.0010	H	mg/L	1	8/22/2017
trans-1,3-Dichloropropene	ND	0.0010	H	mg/L	1	8/22/2017
Ethylbenzene	ND	0.0050	H	mg/L	1	8/22/2017
2-Hexanone	ND	0.020	H	mg/L	1	8/22/2017
4-Methyl-2-pentanone	ND	0.020	H	mg/L	1	8/22/2017
Methylene chloride	0.13	0.0050	H	mg/L	1	8/22/2017
Methyl tert-butyl ether	ND	0.0050	H	mg/L	1	8/22/2017
Styrene	ND	0.0050	H	mg/L	1	8/22/2017
1,1,2,2-Tetrachloroethane	ND	0.0050	H	mg/L	1	8/22/2017
Tetrachloroethene	ND	0.0050	H	mg/L	1	8/22/2017
Toluene	ND	0.0050	H	mg/L	1	8/22/2017
1,1,1-Trichloroethane	ND	0.0050	H	mg/L	1	8/22/2017
1,1,2-Trichloroethane	ND	0.0050	H	mg/L	1	8/22/2017
Trichloroethene	ND	0.0050	H	mg/L	1	8/22/2017
Vinyl chloride	ND	0.0020	H	mg/L	1	8/22/2017
Xylenes, Total	ND	0.015	H	mg/L	1	8/22/2017
Polynuclear Aromatic Hydrocarbons by GC/MS						
	SW8270C-SIM (SW3510C)			Prep Date: 8/10/2017		Analyst: TMB
Acenaphthene	ND	0.0010		mg/L	1	8/14/2017
Acenaphthylene	ND	0.0010		mg/L	1	8/14/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-6

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 10:30:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Aqueous

Lab ID: 17080321-002

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
		SW8270C-SIM (SW3510C)		Prep Date: 8/10/2017		Analyst: TMB
Anthracene	ND	0.0010		mg/L	1	8/14/2017
Benz(a)anthracene	ND	0.00010		mg/L	1	8/14/2017
Benzo(a)pyrene	ND	0.00010		mg/L	1	8/14/2017
Benzo(b)fluoranthene	ND	0.00010		mg/L	1	8/14/2017
Benzo(g,h,i)perylene	ND	0.0010		mg/L	1	8/14/2017
Benzo(k)fluoranthene	ND	0.00010		mg/L	1	8/14/2017
Chrysene	ND	0.00010		mg/L	1	8/14/2017
Dibenz(a,h)anthracene	ND	0.00010		mg/L	1	8/14/2017
Fluoranthene	ND	0.0010		mg/L	1	8/14/2017
Fluorene	ND	0.0010		mg/L	1	8/14/2017
Indeno(1,2,3-cd)pyrene	ND	0.00010		mg/L	1	8/14/2017
Naphthalene	ND	0.0010		mg/L	1	8/14/2017
Phenanthrene	ND	0.0010		mg/L	1	8/14/2017
Pyrene	ND	0.0010		mg/L	1	8/14/2017
Metals by ICP/MS						
		SW6020 (SW3005A)		Prep Date: 8/18/2017		Analyst: JG
Antimony	ND	0.0060		mg/L	2	8/19/2017
Arsenic	ND	0.0040		mg/L	2	8/19/2017
Beryllium	ND	0.0020		mg/L	2	8/19/2017
Cadmium	ND	0.0020		mg/L	2	8/19/2017
Chromium	ND	0.0040		mg/L	2	8/19/2017
Copper	ND	0.010		mg/L	2	8/19/2017
Lead	ND	0.0020		mg/L	2	8/19/2017
Nickel	ND	0.0040		mg/L	2	8/19/2017
Selenium	ND	0.0040		mg/L	2	8/19/2017
Silver	ND	0.0040		mg/L	2	8/19/2017
Thallium	ND	0.0020		mg/L	2	8/19/2017
Zinc	0.037	0.020		mg/L	2	8/19/2017
Mercury						
		SW7470A		Prep Date: 8/9/2017		Analyst: LB
Mercury	ND	0.00020		mg/L	1	8/10/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-2A

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 7:50:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080321-003

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
	SW8270C (SW3550B)			Prep Date: 8/11/2017		Analyst: DM
Acenaphthene	ND	0.035		mg/Kg-dry	1	8/15/2017
Acenaphthylene	ND	0.035		mg/Kg-dry	1	8/15/2017
Anthracene	0.045	0.035		mg/Kg-dry	1	8/15/2017
Benz(a)anthracene	0.16	0.035		mg/Kg-dry	1	8/15/2017
Benzo(a)pyrene	0.16	0.035		mg/Kg-dry	1	8/15/2017
Benzo(b)fluoranthene	0.15	0.035		mg/Kg-dry	1	8/15/2017
Benzo(g,h,i)perylene	0.13	0.035		mg/Kg-dry	1	8/15/2017
Benzo(k)fluoranthene	0.14	0.035		mg/Kg-dry	1	8/15/2017
Chrysene	0.19	0.035		mg/Kg-dry	1	8/15/2017
Dibenz(a,h)anthracene	0.064	0.035		mg/Kg-dry	1	8/15/2017
Fluoranthene	0.26	0.035		mg/Kg-dry	1	8/15/2017
Fluorene	ND	0.035		mg/Kg-dry	1	8/15/2017
Indeno(1,2,3-cd)pyrene	0.11	0.035		mg/Kg-dry	1	8/15/2017
Naphthalene	ND	0.035		mg/Kg-dry	1	8/15/2017
Phenanthrene	0.16	0.035		mg/Kg-dry	1	8/15/2017
Pyrene	0.22	0.035		mg/Kg-dry	1	8/15/2017
Metals by ICP/MS						
	SW6020 (SW3050B)			Prep Date: 8/15/2017		Analyst: JG
Antimony	ND	1.9		mg/Kg-dry	10	8/16/2017
Arsenic	12	0.96		mg/Kg-dry	10	8/16/2017
Beryllium	0.60	0.48		mg/Kg-dry	10	8/16/2017
Cadmium	0.76	0.48		mg/Kg-dry	10	8/16/2017
Chromium	18	0.96		mg/Kg-dry	10	8/16/2017
Copper	58	2.4		mg/Kg-dry	10	8/16/2017
Lead	85	0.48		mg/Kg-dry	10	8/16/2017
Nickel	29	0.96		mg/Kg-dry	10	8/16/2017
Selenium	ND	0.96		mg/Kg-dry	10	8/16/2017
Silver	ND	0.96		mg/Kg-dry	10	8/16/2017
Thallium	ND	0.96		mg/Kg-dry	10	8/16/2017
Zinc	180	4.8		mg/Kg-dry	10	8/16/2017
Mercury						
	SW7471A			Prep Date: 8/15/2017		Analyst: LB
Mercury	0.061	0.019		mg/Kg-dry	1	8/15/2017
pH (25 °C)						
	SW9045C			Prep Date: 8/15/2017		Analyst: PBG
pH	7.92			pH Units	1	8/15/2017
Percent Moisture						
	D2974			Prep Date: 8/14/2017		Analyst: KKA
Percent Moisture	5.9	0.2	*	wt%	1	8/15/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-1A

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 9:30:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080321-005

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
	SW8270C (SW3550B)			Prep Date: 8/11/2017		Analyst: DM
Acenaphthene	ND	0.034		mg/Kg-dry	1	8/15/2017
Acenaphthylene	ND	0.034		mg/Kg-dry	1	8/15/2017
Anthracene	ND	0.034		mg/Kg-dry	1	8/15/2017
Benz(a)anthracene	0.084	0.034		mg/Kg-dry	1	8/15/2017
Benzo(a)pyrene	0.074	0.034		mg/Kg-dry	1	8/15/2017
Benzo(b)fluoranthene	0.070	0.034		mg/Kg-dry	1	8/15/2017
Benzo(g,h,i)perylene	0.071	0.034		mg/Kg-dry	1	8/15/2017
Benzo(k)fluoranthene	0.066	0.034		mg/Kg-dry	1	8/15/2017
Chrysene	0.11	0.034		mg/Kg-dry	1	8/15/2017
Dibenz(a,h)anthracene	0.035	0.034		mg/Kg-dry	1	8/15/2017
Fluoranthene	0.13	0.034		mg/Kg-dry	1	8/15/2017
Fluorene	ND	0.034		mg/Kg-dry	1	8/15/2017
Indeno(1,2,3-cd)pyrene	0.057	0.034		mg/Kg-dry	1	8/15/2017
Naphthalene	ND	0.034		mg/Kg-dry	1	8/15/2017
Phenanthrene	0.13	0.034		mg/Kg-dry	1	8/15/2017
Pyrene	0.13	0.034		mg/Kg-dry	1	8/15/2017
Metals by ICP/MS						
	SW6020 (SW3050B)			Prep Date: 8/15/2017		Analyst: JG
Antimony	ND	1.8		mg/Kg-dry	10	8/16/2017
Arsenic	8.6	0.92		mg/Kg-dry	10	8/16/2017
Beryllium	0.53	0.46		mg/Kg-dry	10	8/16/2017
Cadmium	0.48	0.46		mg/Kg-dry	10	8/16/2017
Chromium	16	0.92		mg/Kg-dry	10	8/16/2017
Copper	39	2.3		mg/Kg-dry	10	8/16/2017
Lead	51	0.46		mg/Kg-dry	10	8/16/2017
Nickel	24	0.92		mg/Kg-dry	10	8/16/2017
Selenium	ND	0.92		mg/Kg-dry	10	8/16/2017
Silver	ND	0.92		mg/Kg-dry	10	8/16/2017
Thallium	ND	0.92		mg/Kg-dry	10	8/16/2017
Zinc	110	4.6		mg/Kg-dry	10	8/16/2017
Mercury						
	SW7471A			Prep Date: 8/15/2017		Analyst: LB
Mercury	0.043	0.019		mg/Kg-dry	1	8/15/2017
pH (25 °C)						
	SW9045C			Prep Date: 8/15/2017		Analyst: PBG
pH	8.05			pH Units	1	8/15/2017
Percent Moisture						
	D2974			Prep Date: 8/14/2017		Analyst: KKA
Percent Moisture	4.4	0.2	*	wt%	1	8/15/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

STAT Analysis Corporation

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: ESB-1C

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 9:55:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080321-007

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
SW8270C (SW3550B)				Prep Date: 8/11/2017		Analyst: DM
Acenaphthene	ND	0.034		mg/Kg-dry	1	8/15/2017
Acenaphthylene	ND	0.034		mg/Kg-dry	1	8/15/2017
Anthracene	ND	0.034		mg/Kg-dry	1	8/15/2017
Benzo(a)anthracene	ND	0.034		mg/Kg-dry	1	8/15/2017
Benzo(a)pyrene	ND	0.034		mg/Kg-dry	1	8/15/2017
Benzo(b)fluoranthene	ND	0.034		mg/Kg-dry	1	8/15/2017
Benzo(g,h,i)perylene	ND	0.034		mg/Kg-dry	1	8/15/2017
Benzo(k)fluoranthene	ND	0.034		mg/Kg-dry	1	8/15/2017
Chrysene	ND	0.034		mg/Kg-dry	1	8/15/2017
Dibenz(a,h)anthracene	ND	0.034		mg/Kg-dry	1	8/15/2017
Fluoranthene	ND	0.034		mg/Kg-dry	1	8/15/2017
Fluorene	ND	0.034		mg/Kg-dry	1	8/15/2017
Indeno(1,2,3-cd)pyrene	ND	0.034		mg/Kg-dry	1	8/15/2017
Naphthalene	ND	0.034		mg/Kg-dry	1	8/15/2017
Phenanthrene	ND	0.034		mg/Kg-dry	1	8/15/2017
Pyrene	ND	0.034		mg/Kg-dry	1	8/15/2017
Percent Moisture						
D2974				Prep Date: 8/14/2017		Analyst: KKA
Percent Moisture	4.0	0.2	*	wt%	1	8/15/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-1A

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 10:45:00 AM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080321-008

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS SW8270C (SW3550B) Prep Date: 8/11/2017 Analyst: DM						
Acenaphthene	ND	0.034		mg/Kg-dry	1	8/15/2017
Acenaphthylene	ND	0.034		mg/Kg-dry	1	8/15/2017
Anthracene	0.085	0.034		mg/Kg-dry	1	8/15/2017
Benz(a)anthracene	0.21	0.034		mg/Kg-dry	1	8/15/2017
Benzo(a)pyrene	0.20	0.034		mg/Kg-dry	1	8/15/2017
Benzo(b)fluoranthene	0.18	0.034		mg/Kg-dry	1	8/15/2017
Benzo(g,h,i)perylene	0.19	0.034		mg/Kg-dry	1	8/15/2017
Benzo(k)fluoranthene	0.16	0.034		mg/Kg-dry	1	8/15/2017
Chrysene	0.27	0.034		mg/Kg-dry	1	8/15/2017
Dibenz(a,h)anthracene	0.076	0.034		mg/Kg-dry	1	8/15/2017
Fluoranthene	0.34	0.034		mg/Kg-dry	1	8/15/2017
Fluorene	ND	0.034		mg/Kg-dry	1	8/15/2017
Indeno(1,2,3-cd)pyrene	0.14	0.034		mg/Kg-dry	1	8/15/2017
Naphthalene	0.051	0.034		mg/Kg-dry	1	8/15/2017
Phenanthrene	0.37	0.034		mg/Kg-dry	1	8/15/2017
Pyrene	0.34	0.034		mg/Kg-dry	1	8/15/2017
Metals by ICP/MS SW6020 (SW3050B) Prep Date: 8/15/2017 Analyst: JG						
Antimony	ND	1.8		mg/Kg-dry	10	8/16/2017
Arsenic	6.2	0.91		mg/Kg-dry	10	8/16/2017
Beryllium	ND	0.45		mg/Kg-dry	10	8/16/2017
Cadmium	0.47	0.45		mg/Kg-dry	10	8/16/2017
Chromium	16	0.91		mg/Kg-dry	10	8/16/2017
Copper	27	2.3		mg/Kg-dry	10	8/16/2017
Lead	75	0.45		mg/Kg-dry	10	8/16/2017
Nickel	10	0.91		mg/Kg-dry	10	8/16/2017
Selenium	ND	0.91		mg/Kg-dry	10	8/16/2017
Silver	ND	0.91		mg/Kg-dry	10	8/16/2017
Thallium	ND	0.91		mg/Kg-dry	10	8/16/2017
Zinc	93	4.5		mg/Kg-dry	10	8/16/2017
Mercury SW7471A Prep Date: 8/15/2017 Analyst: LB						
Mercury	0.073	0.020		mg/Kg-dry	1	8/15/2017
pH (25 °C) SW9045C Prep Date: 8/15/2017 Analyst: PBG						
pH	8.07			pH Units	1	8/15/2017
Percent Moisture D2974 Prep Date: 8/14/2017 Analyst: KKA						
Percent Moisture	3.0	0.2	*	wt%	1	8/15/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

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E - Value above quantitation range

H - Holding time exceeded

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-18A

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 12:25:00 PM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080321-011

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS						
	SW5035/8260B			Prep Date: 8/10/2017		Analyst: ART
Acetone	ND	0.11		mg/Kg-dry	1	8/17/2017
Benzene	ND	0.0071		mg/Kg-dry	1	8/17/2017
Bromodichloromethane	ND	0.0071		mg/Kg-dry	1	8/17/2017
Bromoform	ND	0.0071		mg/Kg-dry	1	8/17/2017
Bromomethane	ND	0.014		mg/Kg-dry	1	8/17/2017
2-Butanone	ND	0.11		mg/Kg-dry	1	8/17/2017
Carbon disulfide	ND	0.071		mg/Kg-dry	1	8/17/2017
Carbon tetrachloride	ND	0.0071		mg/Kg-dry	1	8/17/2017
Chlorobenzene	ND	0.0071		mg/Kg-dry	1	8/17/2017
Chloroethane	ND	0.014		mg/Kg-dry	1	8/17/2017
Chloroform	ND	0.0071		mg/Kg-dry	1	8/17/2017
Chloromethane	ND	0.014		mg/Kg-dry	1	8/17/2017
Dibromochloromethane	ND	0.0071		mg/Kg-dry	1	8/17/2017
1,1-Dichloroethane	ND	0.0071		mg/Kg-dry	1	8/17/2017
1,2-Dichloroethane	ND	0.0071		mg/Kg-dry	1	8/17/2017
1,1-Dichloroethene	ND	0.0071		mg/Kg-dry	1	8/17/2017
cis-1,2-Dichloroethene	ND	0.0071		mg/Kg-dry	1	8/17/2017
trans-1,2-Dichloroethene	ND	0.0071		mg/Kg-dry	1	8/17/2017
1,2-Dichloropropane	ND	0.0071		mg/Kg-dry	1	8/17/2017
cis-1,3-Dichloropropene	ND	0.0029		mg/Kg-dry	1	8/17/2017
trans-1,3-Dichloropropene	ND	0.0029		mg/Kg-dry	1	8/17/2017
Ethylbenzene	ND	0.0071		mg/Kg-dry	1	8/17/2017
2-Hexanone	ND	0.029		mg/Kg-dry	1	8/17/2017
4-Methyl-2-pentanone	ND	0.029		mg/Kg-dry	1	8/17/2017
Methylene chloride	ND	0.014		mg/Kg-dry	1	8/17/2017
Methyl tert-butyl ether	ND	0.0071		mg/Kg-dry	1	8/17/2017
Styrene	ND	0.0071		mg/Kg-dry	1	8/17/2017
1,1,2,2-Tetrachloroethane	ND	0.0071		mg/Kg-dry	1	8/17/2017
Tetrachloroethene	ND	0.0071		mg/Kg-dry	1	8/17/2017
Toluene	ND	0.0071		mg/Kg-dry	1	8/17/2017
1,1,1-Trichloroethane	ND	0.0071		mg/Kg-dry	1	8/17/2017
1,1,2-Trichloroethane	ND	0.0071		mg/Kg-dry	1	8/17/2017
Trichloroethene	ND	0.0071		mg/Kg-dry	1	8/17/2017
Vinyl chloride	ND	0.0071		mg/Kg-dry	1	8/17/2017
Xylenes, Total	ND	0.021		mg/Kg-dry	1	8/17/2017
Volatile Organic Compounds by GC/MS						
	SW5035/8260B			Prep Date: 8/10/2017		Analyst: ART
Trichlorofluoromethane	ND	0.0071		mg/Kg-dry	1	8/17/2017

Qualifiers:

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Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-18A

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 12:25:00 PM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080321-011

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3550B)		Prep Date: 8/11/2017		Analyst: DM	
Acenaphthene	ND	0.035		mg/Kg-dry	1	8/15/2017
Acenaphthylene	ND	0.035		mg/Kg-dry	1	8/15/2017
Aniline	ND	0.35		mg/Kg-dry	1	8/15/2017
Anthracene	0.061	0.035		mg/Kg-dry	1	8/15/2017
Benz(a)anthracene	0.16	0.035		mg/Kg-dry	1	8/15/2017
Benztidine	ND	0.35		mg/Kg-dry	1	8/15/2017
Benzo(a)pyrene	0.11	0.035		mg/Kg-dry	1	8/15/2017
Benzo(b)fluoranthene	0.14	0.035		mg/Kg-dry	1	8/15/2017
Benzo(g,h,i)perylene	0.13	0.035		mg/Kg-dry	1	8/15/2017
Benzo(k)fluoranthene	0.095	0.035		mg/Kg-dry	1	8/15/2017
Benzoic acid	ND	0.87		mg/Kg-dry	1	8/15/2017
Benzyl alcohol	ND	0.18		mg/Kg-dry	1	8/15/2017
Bis(2-chloroethoxy)methane	ND	0.18		mg/Kg-dry	1	8/15/2017
Bis(2-chloroethyl)ether	ND	0.18		mg/Kg-dry	1	8/15/2017
Bis(2-ethylhexyl)phthalate	ND	0.87		mg/Kg-dry	1	8/15/2017
4-Bromophenyl phenyl ether	ND	0.18		mg/Kg-dry	1	8/15/2017
Butyl benzyl phthalate	ND	0.18		mg/Kg-dry	1	8/15/2017
Carbazole	ND	0.18		mg/Kg-dry	1	8/15/2017
4-Chloroaniline	ND	0.18		mg/Kg-dry	1	8/15/2017
4-Chloro-3-methylphenol	ND	0.35		mg/Kg-dry	1	8/15/2017
2-Chloronaphthalene	ND	0.18		mg/Kg-dry	1	8/15/2017
2-Chlorophenol	ND	0.18		mg/Kg-dry	1	8/15/2017
4-Chlorophenyl phenyl ether	ND	0.18		mg/Kg-dry	1	8/15/2017
Chrysene	0.25	0.035		mg/Kg-dry	1	8/15/2017
Dibenz(a,h)anthracene	0.064	0.035		mg/Kg-dry	1	8/15/2017
Dibenzofuran	ND	0.18		mg/Kg-dry	1	8/15/2017
1,2-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/15/2017
1,3-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/15/2017
1,4-Dichlorobenzene	ND	0.18		mg/Kg-dry	1	8/15/2017
3,3'-Dichlorobenzidine	ND	0.18		mg/Kg-dry	1	8/15/2017
2,4-Dichlorophenol	ND	0.18		mg/Kg-dry	1	8/15/2017
Diethyl phthalate	ND	0.18		mg/Kg-dry	1	8/15/2017
2,4-Dimethylphenol	ND	0.18		mg/Kg-dry	1	8/15/2017
Dimethyl phthalate	ND	0.18		mg/Kg-dry	1	8/15/2017
4,6-Dinitro-2-methylphenol	ND	0.35		mg/Kg-dry	1	8/15/2017
2,4-Dinitrophenol	ND	0.87		mg/Kg-dry	1	8/15/2017
2,4-Dinitrotoluene	ND	0.035		mg/Kg-dry	1	8/15/2017
2,6-Dinitrotoluene	ND	0.035		mg/Kg-dry	1	8/15/2017

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
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Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-18A

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 12:25:00 PM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080321-011

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Semivolatile Organic Compounds by GC/MS						
	SW8270C (SW3550B)		Prep Date: 8/11/2017		Analyst: DM	
Di-n-butyl phthalate	ND	0.18		mg/Kg-dry	1	8/15/2017
Di-n-octyl phthalate	ND	0.18		mg/Kg-dry	1	8/15/2017
Fluoranthene	0.26	0.035		mg/Kg-dry	1	8/15/2017
Fluorene	ND	0.035		mg/Kg-dry	1	8/15/2017
Hexachlorobenzene	ND	0.18		mg/Kg-dry	1	8/15/2017
Hexachlorobutadiene	ND	0.18		mg/Kg-dry	1	8/15/2017
Hexachlorocyclopentadiene	ND	0.18		mg/Kg-dry	1	8/15/2017
Hexachloroethane	ND	0.18		mg/Kg-dry	1	8/15/2017
Indeno(1,2,3-cd)pyrene	0.092	0.035		mg/Kg-dry	1	8/15/2017
Isophorone	ND	0.18		mg/Kg-dry	1	8/15/2017
2-Methylnaphthalene	0.18	0.18		mg/Kg-dry	1	8/15/2017
2-Methylphenol	ND	0.18		mg/Kg-dry	1	8/15/2017
4-Methylphenol	ND	0.18		mg/Kg-dry	1	8/15/2017
Naphthalene	0.10	0.035		mg/Kg-dry	1	8/15/2017
2-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/15/2017
3-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/15/2017
4-Nitroaniline	ND	0.18		mg/Kg-dry	1	8/15/2017
2-Nitrophenol	ND	0.18		mg/Kg-dry	1	8/15/2017
4-Nitrophenol	ND	0.35		mg/Kg-dry	1	8/15/2017
Nitrobenzene	ND	0.035		mg/Kg-dry	1	8/15/2017
N-Nitrosodi-n-propylamine	ND	0.035		mg/Kg-dry	1	8/15/2017
N-Nitrosodimethylamine	ND	0.18		mg/Kg-dry	1	8/15/2017
N-Nitrosodiphenylamine	ND	0.035		mg/Kg-dry	1	8/15/2017
2, 2'-oxybis(1-Chloropropane)	ND	0.18		mg/Kg-dry	1	8/15/2017
Pentachlorophenol	ND	0.035		mg/Kg-dry	1	8/15/2017
Phenanthrene	0.48	0.035		mg/Kg-dry	1	8/15/2017
Phenol	ND	0.18		mg/Kg-dry	1	8/15/2017
Pyrene	0.25	0.035		mg/Kg-dry	1	8/15/2017
Pyridine	ND	0.70		mg/Kg-dry	1	8/15/2017
1,2,4-Trichlorobenzene	ND	0.18		mg/Kg-dry	1	8/15/2017
2,4,5-Trichlorophenol	ND	0.18		mg/Kg-dry	1	8/15/2017
2,4,6-Trichlorophenol	ND	0.18		mg/Kg-dry	1	8/15/2017
PCBs						
	SW8082 (SW3550B)		Prep Date: 8/11/2017		Analyst: GVC	
Aroclor 1016	ND	0.084		mg/Kg-dry	1	8/12/2017
Aroclor 1221	ND	0.084		mg/Kg-dry	1	8/12/2017
Aroclor 1232	ND	0.084		mg/Kg-dry	1	8/12/2017
Aroclor 1242	ND	0.084		mg/Kg-dry	1	8/12/2017
Aroclor 1248	ND	0.084		mg/Kg-dry	1	8/12/2017

Qualifiers:

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* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-18A

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 12:25:00 PM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080321-011

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
PCBs						
	SW8082 (SW3550B)				Prep Date: 8/11/2017	Analyst: GVC
Aroclor 1254	ND	0.084		mg/Kg-dry	1	8/12/2017
Aroclor 1260	ND	0.084		mg/Kg-dry	1	8/12/2017
Pesticides						
	SW8081 (SW3550B)				Prep Date: 8/11/2017	Analyst: GVC
4,4'-DDD	ND	0.0017		mg/Kg-dry	1	8/12/2017
4,4'-DDE	ND	0.0017		mg/Kg-dry	1	8/12/2017
4,4'-DDT	ND	0.0017		mg/Kg-dry	1	8/12/2017
Aldrin	ND	0.0017		mg/Kg-dry	1	8/12/2017
alpha-BHC	ND	0.0017		mg/Kg-dry	1	8/12/2017
alpha-Chlordane	ND	0.0017		mg/Kg-dry	1	8/12/2017
beta-BHC	ND	0.0017		mg/Kg-dry	1	8/12/2017
Chlordane	ND	0.017		mg/Kg-dry	1	8/12/2017
delta-BHC	ND	0.0017		mg/Kg-dry	1	8/12/2017
Dieldrin	ND	0.0017		mg/Kg-dry	1	8/12/2017
Endosulfan I	ND	0.0017		mg/Kg-dry	1	8/12/2017
Endosulfan II	ND	0.0017		mg/Kg-dry	1	8/12/2017
Endosulfan sulfate	ND	0.0017		mg/Kg-dry	1	8/12/2017
Endrin	ND	0.0017		mg/Kg-dry	1	8/12/2017
Endrin aldehyde	ND	0.0017		mg/Kg-dry	1	8/12/2017
Endrin ketone	ND	0.0017		mg/Kg-dry	1	8/12/2017
gamma-BHC	ND	0.0017		mg/Kg-dry	1	8/12/2017
gamma-Chlordane	ND	0.0017		mg/Kg-dry	1	8/12/2017
Heptachlor	ND	0.0017		mg/Kg-dry	1	8/12/2017
Heptachlor epoxide	ND	0.0017		mg/Kg-dry	1	8/12/2017
Methoxychlor	ND	0.0017		mg/Kg-dry	1	8/12/2017
Toxaphene	ND	0.035		mg/Kg-dry	1	8/12/2017
Metals by ICP/MS						
	SW6020 (SW3050B)				Prep Date: 8/15/2017	Analyst: JG
Aluminum	3500	19		mg/Kg-dry	10	8/16/2017
Antimony	3.0	1.9		mg/Kg-dry	10	8/16/2017
Arsenic	20	0.94		mg/Kg-dry	10	8/16/2017
Barium	99	0.94		mg/Kg-dry	10	8/16/2017
Beryllium	0.70	0.47		mg/Kg-dry	10	8/16/2017
Cadmium	3.1	0.47		mg/Kg-dry	10	8/16/2017
Calcium	19000	56		mg/Kg-dry	10	8/16/2017
Chromium	61	0.94		mg/Kg-dry	10	8/16/2017
Cobalt	7.7	0.94		mg/Kg-dry	10	8/16/2017
Copper	210	2.4		mg/Kg-dry	10	8/16/2017
Iron	64000	28		mg/Kg-dry	10	8/16/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

STAT Analysis Corporation

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Tel: (312) 733-0551 Fax: (312) 733-2386 STATinfo@STATAnalysis.com

Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-18A

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 12:25:00 PM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080321-011

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Metals by ICP/MS	SW6020 (SW3050B)					Prep Date: 8/15/2017 Analyst: JG
Lead	280	0.47		mg/Kg-dry	10	8/16/2017
Magnesium	9000	28		mg/Kg-dry	10	8/16/2017
Manganese	750	0.94		mg/Kg-dry	10	8/16/2017
Nickel	41	0.94		mg/Kg-dry	10	8/16/2017
Potassium	360	28		mg/Kg-dry	10	8/16/2017
Selenium	0.97	0.94		mg/Kg-dry	10	8/16/2017
Silver	ND	0.94		mg/Kg-dry	10	8/16/2017
Sodium	180	56		mg/Kg-dry	10	8/16/2017
Thallium	ND	0.94		mg/Kg-dry	10	8/16/2017
Vanadium	19	0.94		mg/Kg-dry	10	8/16/2017
Zinc	500	4.7		mg/Kg-dry	10	8/16/2017
SPLP Metals by ICP/MS	SW1312/6020A (SW3005A)					Prep Date: 11/24/2017 Analyst: JG
Chromium	0.0060	0.0040		mg/L	2	11/24/2017
Iron	2.8	0.10		mg/L	2	11/24/2017
Manganese	0.038	0.0040		mg/L	2	11/24/2017
Mercury	SW7471A					Prep Date: 8/15/2017 Analyst: LB
Mercury	0.25	0.020		mg/Kg-dry	1	8/15/2017
Cyanide, Total	SW9012A					Prep Date: 8/15/2017 Analyst: RLB
Cyanide	0.27	0.26		mg/Kg-dry	1	8/16/2017
pH (25 °C)	SW9045C					Prep Date: 8/15/2017 Analyst: PBG
pH	7.65			pH Units	1	8/15/2017
Percent Moisture	D2974					Prep Date: 8/14/2017 Analyst: KKA
Percent Moisture	4.8	0.2	*	wt%	1	8/15/2017

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

HT - Sample received past holding time

* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

H - Holding time exceeded

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: December 08, 2017

ANALYTICAL RESULTS

Date Printed: December 08, 2017

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: B-18B

Work Order: 17080321 Revision 3

Collection Date: 8/9/2017 12:30:00 PM

Project: 3205-17-1606, City of Chicago JPSTA, Chicago, IL

Matrix: Soil

Lab ID: 17080321-012

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Polynuclear Aromatic Hydrocarbons by GC/MS						
	SW8270C (SW3550B)				Prep Date: 8/11/2017	Analyst: DM
Acenaphthene	ND	0.034		mg/Kg-dry	1	8/15/2017
Acenaphthylene	ND	0.034		mg/Kg-dry	1	8/15/2017
Anthracene	ND	0.034		mg/Kg-dry	1	8/15/2017
Benzo(a)anthracene	ND	0.034		mg/Kg-dry	1	8/15/2017
Benzo(a)pyrene	ND	0.034		mg/Kg-dry	1	8/15/2017
Benzo(b)fluoranthene	ND	0.034		mg/Kg-dry	1	8/15/2017
Benzo(g,h,i)perylene	ND	0.034		mg/Kg-dry	1	8/15/2017
Benzo(k)fluoranthene	ND	0.034		mg/Kg-dry	1	8/15/2017
Chrysene	ND	0.034		mg/Kg-dry	1	8/15/2017
Dibenz(a,h)anthracene	ND	0.034		mg/Kg-dry	1	8/15/2017
Fluoranthene	ND	0.034		mg/Kg-dry	1	8/15/2017
Fluorene	ND	0.034		mg/Kg-dry	1	8/15/2017
Indeno(1,2,3-cd)pyrene	ND	0.034		mg/Kg-dry	1	8/15/2017
Naphthalene	ND	0.034		mg/Kg-dry	1	8/15/2017
Phenanthrene	ND	0.034		mg/Kg-dry	1	8/15/2017
Pyrene	ND	0.034		mg/Kg-dry	1	8/15/2017
Percent Moisture						
	D2974				Prep Date: 8/14/2017	Analyst: KKA
Percent Moisture	3.7	0.2	*	wt%	1	8/15/2017

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

CHAIN OF CUSTODY RECORD

N^o: 906945 Page: 1 of 1

Company: <u>AmcForte White</u>		Client Tracking No.:	
Project Number: <u>3205-17-1606</u>			
Project Name: <u>City of Chicago JPSA</u>			
Project Location: <u>Chicago, IL</u>			
Sampler(s): <u>Eric Unsworth and Andrew Hartings</u>			
Report To: <u>Mary Jane</u>		Phone: <u>773-693-6030</u>	
Andrew Hartings		Fax: <u>-</u>	
QC Level: 1 2 3 4		e-mail: <u>Mary Jane Unsworth</u>	

Client Sample Number/Description:	Date Taken	Time Taken	Matrix	Comp.	Grab	Preserv.	No. of Containers
ESB-5	8/19/17	845	Water			G	8
ESB-6	8/19/17	1030	Water			B	2
B-2A	↑	750	Soil			A	1
B-2B	↑	800	Soil			A	1
ESB-1A	↑	930	Soil			A	1
ESB-1B	↑	950	Soil			A	1
ESB-1C	↑	955	Soil			A	1
B-1A	↑	1045	Soil			A	1
B-1B	↑	1100	Soil			A	1
B-1C	↑	1110	Soil			A	1
B-1BA	↑	1225	Soil		F	5	
B-1BB	↓	1220	Soil		A	1	
B-1BC	8/19/17	1235	Soil		A	1	

Relinquished by: (Signature)	Date/Time: <u>8/17/17 15:30</u>
Received by: (Signature)	Date/Time: <u>8/17/17 15:50</u>
Relinquished by: (Signature)	Date/Time:
Received by: (Signature)	Date/Time:
Relinquished by: (Signature)	Date/Time:
Received by: (Signature)	Date/Time:

Comments:
SRP AHA TCL/HA PMA Priority Pollutant MTL PH

Quote No.:	
P.O. No.:	
Turn Around Time (Days):	1 2 3 4 5-7 10
Results Needed:	Standard
Additional Information:	Lab No.: 001 002 003 004 005 006 007 008 009 010 011 012 013

Laboratory Work Order No.:	1708321
Received on Ice:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Temperature:	4.9 °C

Preservation Code:	A = None B = HNO ₃ C = NaOH D = H ₂ SO ₄ E = HCl F = 5035/EnCore G = Other
--------------------	--

Sample Receipt Checklist

Client Name AMEC

Date and Time Received: 8/9/2017 3:50:00 PM

Work Order Number 17080321

Received by: JNW

Checklist completed by:

[Signature]
Signature

8/9/17
Date

Reviewed by:

MK
Initials

8/9/17
Date

Matrix:

Carrier name Client Delivered

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels/containers?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Container or Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Temperature 4.4 °C
Water - VOA vials have zero headspace?	No VOA vials submitted <input type="checkbox"/>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Water - Samples pH checked?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Checked by: <i>J.W.</i>
Water - Samples properly preserved?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	pH Adjusted? <i>No</i>

Any No response must be detailed in the comments section below.

Comments: *Sample ESB-5 was received past hold time for pH of water analysis. Additional analysis per Mary Jank verbal 8/22/17.*

Client / Person contacted:

Date contacted:

Contacted by:

Response:

Craig Chawla

From: Jank, Mary E [mary.jank@woodplc.com]

Sent: Monday, November 20, 2017 3:47 PM

To: Craig Chawla; Frank Capoccia

Subject: Additional Testing -

Please perform additional leaching procedure testing (TCLP or SPLP) for the following metals on the identified samples:

B-18A – chromium and manganese your sample # 17080321-011

B-6B – chromium your sample #17080265-014

ESB-2A – cobalt, iron – your sample #17080088-001

ESB-4A – iron your sample #17080223-001

ESB-5A – iron your sample #17080126-001

ESB-6A – iron, manganese your sample #17080177-001

Mary E. Jank

Senior Associate

Amec Foster Wheeler Environment & Infrastructure, Inc.

8745 W. Higgins Road, Suite 300

Chicago, IL

D 773-693-6030, ext. 8742

M 312-617-8342

mary.jank@amecfw.com

amecfw.com

Craig Chawla

From: Jank, Mary E [mary.jank@woodplc.com]
Sent: Thursday, December 07, 2017 6:48 PM
To: Craig Chawla; Frank Capoccia
Subject: More TCLP/SPLP for JPSTA

Please run TCLP/SPLP for the following samples for the listed metals:

B-18A – Iron your sample #17080321-011 – chromium and manganese were already done
ESB-3A – Iron - your sample #17080088-004

Thank you

Mary E. Jank
Senior Associate
Amec Foster Wheeler Environment & Infrastructure, Inc.
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D 773-693-6030, ext. 8742
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Analysis Corporation

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September 01, 2017

AMEC Foster Wheeler Environment & Infrastructure
550 Warrenville Road
Lisle, IL 60532

Telephone: (630) 724-8517
Fax: (630) 724-8518

Analytical Report for STAT Work Order: 17081066 Revision 0

RE: 3205-17-1606, Chicago JPSTA, Chicago, IL

Dear Mary Jank:

STAT Analysis received 2 samples for the referenced project on 8/29/2017 7:25:00 PM. The analytical results are presented in the following report.

All analyses were performed in accordance with the requirements of 35 IAC Part 186 / NELAC standards. Analyses were performed in accordance with methods as referenced on the analytical report. Those analytical results expressed on a dry weight basis are also noted on the analytical report.

All analyses were performed within established holding time criteria, and all Quality Control criteria met EPA or laboratory specifications except when noted in the Case Narrative or Analytical Report. If required, an estimate of uncertainty for the analyses can be provided. A listing of accredited methods/parameters can also be provided.

Thank you for the opportunity to serve you and I look forward to working with you in the future. If you have any questions regarding the enclosed materials, please contact me at (312) 733-0551.

Sincerely,



Justice Kwateng
Project Manager

The information contained in this report and any attachments is confidential information intended only for the use of the individual or entities named above. The results of this report relate only to the samples tested. If you have received this report in error, please notify us immediately by phone. This report shall not be reproduced, except in its entirety, unless written approval has been obtained from the laboratory. This analytical report shall become property of the Customer upon payment in full. Otherwise, STAT will be under no obligation to support, defend or discuss the analytical report.

Client: AMEC Foster Wheeler Environment & Infrastructure**Project:** 3205-17-1606, Chicago JPSTA, Chicago, IL**Work Order:** 17081066 Revision 0**Work Order Sample Summary**

Lab Sample ID	Client Sample ID	Tag Number	Collection Date	Date Received
17081066-001A	Well I		8/29/2017 11:50:00 AM	8/29/2017
17081066-002A	Well C		8/29/2017 2:45:00 PM	8/29/2017

STAT Analysis Corporation

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Accreditations: IEPA ELAP 100445; ORELAP IL300001; AIHA-LAP, LLC 101160; NVLAP LabCode 101202-0

Date Reported: September 01, 2017

Date Printed: September 01, 2017

ANALYTICAL RESULTS

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: Well I

Work Order: 17081066 Revision 0

Collection Date: 8/29/2017 11:50:00 AM

Project: 3205-17-1606, Chicago JPSTA, Chicago, IL

Matrix: Aqueous

Lab ID: 17081066-001

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS		SW8260B (SW5030B)		Prep Date:		Analyst: RRS
Acetone	ND	0.020		mg/L	1	8/31/2017
Benzene	ND	0.0050		mg/L	1	8/31/2017
Bromodichloromethane	ND	0.0050		mg/L	1	8/31/2017
Bromoform	ND	0.0050		mg/L	1	8/31/2017
Bromomethane	ND	0.010		mg/L	1	8/31/2017
2-Butanone	ND	0.020		mg/L	1	8/31/2017
Carbon disulfide	ND	0.010		mg/L	1	8/31/2017
Carbon tetrachloride	ND	0.0050		mg/L	1	8/31/2017
Chlorobenzene	ND	0.0050		mg/L	1	8/31/2017
Chloroethane	ND	0.010		mg/L	1	8/31/2017
Chloroform	ND	0.0050		mg/L	1	8/31/2017
Chloromethane	ND	0.010		mg/L	1	8/31/2017
Dibromochloromethane	ND	0.0050		mg/L	1	8/31/2017
1,1-Dichloroethane	ND	0.0050		mg/L	1	8/31/2017
1,2-Dichloroethane	ND	0.0050		mg/L	1	8/31/2017
1,1-Dichloroethene	ND	0.0050		mg/L	1	8/31/2017
cis-1,2-Dichloroethene	ND	0.0050		mg/L	1	8/31/2017
trans-1,2-Dichloroethene	ND	0.0050		mg/L	1	8/31/2017
1,2-Dichloropropane	ND	0.0050		mg/L	1	8/31/2017
cis-1,3-Dichloropropene	ND	0.0010		mg/L	1	8/31/2017
trans-1,3-Dichloropropene	ND	0.0010		mg/L	1	8/31/2017
Ethylbenzene	ND	0.0050		mg/L	1	8/31/2017
2-Hexanone	ND	0.020		mg/L	1	8/31/2017
4-Methyl-2-pentanone	ND	0.020		mg/L	1	8/31/2017
Methylene chloride	ND	0.0050		mg/L	1	8/31/2017
Methyl tert-butyl ether	ND	0.0050		mg/L	1	8/31/2017
Naphthalene	ND	0.015		mg/L	1	8/31/2017
Styrene	ND	0.0050		mg/L	1	8/31/2017
1,1,2,2-Tetrachloroethane	ND	0.0050		mg/L	1	8/31/2017
Tetrachloroethene	ND	0.0050		mg/L	1	8/31/2017
Toluene	ND	0.0050		mg/L	1	8/31/2017
1,1,1-Trichloroethane	ND	0.0050		mg/L	1	8/31/2017
1,1,2-Trichloroethane	ND	0.0050		mg/L	1	8/31/2017
Trichloroethene	ND	0.0050		mg/L	1	8/31/2017
Vinyl chloride	ND	0.0020		mg/L	1	8/31/2017
Xylenes, Total	ND	0.015		mg/L	1	8/31/2017

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

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Date Reported: September 01, 2017

Date Printed: September 01, 2017

ANALYTICAL RESULTS

Client: AMEC Foster Wheeler Environment & Infr

Client Sample ID: Well C

Work Order: 17081066 Revision 0

Collection Date: 8/29/2017 2:45:00 PM

Project: 3205-17-1606, Chicago JPSTA, Chicago, IL

Matrix: Aqueous

Lab ID: 17081066-002

Analyses	Result	RL	Qualifier	Units	DF	Date Analyzed
Volatile Organic Compounds by GC/MS		SW8260B (SW5030B)		Prep Date:		Analyst: RRS
Acetone	ND	0.020		mg/L	1	8/31/2017
Benzene	ND	0.0050		mg/L	1	8/31/2017
Bromodichloromethane	ND	0.0050		mg/L	1	8/31/2017
Bromoform	ND	0.0050		mg/L	1	8/31/2017
Bromomethane	ND	0.010		mg/L	1	8/31/2017
2-Butanone	ND	0.020		mg/L	1	8/31/2017
Carbon disulfide	ND	0.010		mg/L	1	8/31/2017
Carbon tetrachloride	ND	0.0050		mg/L	1	8/31/2017
Chlorobenzene	ND	0.0050		mg/L	1	8/31/2017
Chloroethane	ND	0.010		mg/L	1	8/31/2017
Chloroform	ND	0.0050		mg/L	1	8/31/2017
Chloromethane	ND	0.010		mg/L	1	8/31/2017
Dibromochloromethane	ND	0.0050		mg/L	1	8/31/2017
1,1-Dichloroethane	ND	0.0050		mg/L	1	8/31/2017
1,2-Dichloroethane	ND	0.0050		mg/L	1	8/31/2017
1,1-Dichloroethene	ND	0.0050		mg/L	1	8/31/2017
cis-1,2-Dichloroethene	ND	0.0050		mg/L	1	8/31/2017
trans-1,2-Dichloroethene	ND	0.0050		mg/L	1	8/31/2017
1,2-Dichloropropane	ND	0.0050		mg/L	1	8/31/2017
cis-1,3-Dichloropropene	ND	0.0010		mg/L	1	8/31/2017
trans-1,3-Dichloropropene	ND	0.0010		mg/L	1	8/31/2017
Ethylbenzene	ND	0.0050		mg/L	1	8/31/2017
2-Hexanone	ND	0.020		mg/L	1	8/31/2017
4-Methyl-2-pentanone	ND	0.020		mg/L	1	8/31/2017
Methylene chloride	ND	0.0050		mg/L	1	8/31/2017
Methyl tert-butyl ether	ND	0.0050		mg/L	1	8/31/2017
Naphthalene	ND	0.015		mg/L	1	8/31/2017
Styrene	ND	0.0050		mg/L	1	8/31/2017
1,1,2,2-Tetrachloroethane	ND	0.0050		mg/L	1	8/31/2017
Tetrachloroethene	ND	0.0050		mg/L	1	8/31/2017
Toluene	ND	0.0050		mg/L	1	8/31/2017
1,1,1-Trichloroethane	ND	0.0050		mg/L	1	8/31/2017
1,1,2-Trichloroethane	ND	0.0050		mg/L	1	8/31/2017
Trichloroethene	ND	0.0050		mg/L	1	8/31/2017
Vinyl chloride	ND	0.0020		mg/L	1	8/31/2017
Xylenes, Total	ND	0.015		mg/L	1	8/31/2017

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
HT - Sample received past holding time
* - Non-accredited parameter

RL - Reporting / Quantitation Limit for the analysis
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H - Holding time exceeded

CHAIN OF CUSTODY RECORD

[illegible]

Sample Receipt Checklist

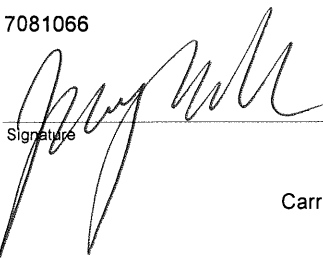
Client Name AMEC

Date and Time Received: 8/29/2017 7:25:00 PM

Work Order Number 17081066

Received by: MGK

Checklist completed by:

 8/29/17
Signature Date

Reviewed by:

JOK 8/30/17
Initials Date

Matrix:

Carrier name Client Delivered

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels/containers?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container or Temp Blank temperature in compliance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Temperature 4.9 °C
Water - VOA vials have zero headspace?	No VOA vials submitted <input type="checkbox"/>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Water - Samples pH checked?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Checked by: _____
Water - Samples properly preserved?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	pH Adjusted? _____

Any No response must be detailed in the comments section below.

Comments: _____

Client / Person
contacted: _____

Date contacted: _____

Contacted by: _____

Response: _____



APPENDIX D

Field Logs

7/28/17

①

900 AEH onsite. Have performed perimeter recon in vehicle. Walk-in entrance to site located along Kilbourn on south end Chicago Avenue on north. Tire tracks/ruts indicate a vehicle access point off Kostner just before CTA bus fenced entrance. Street parking appears legal on Chicago Ave north of site but not on Kilbourn or Kostner adjacent to the site.

MSET being locate folks expected to arrive ~900am.

915 MSET onsite.

930 MSET truck up on to berm onsite via vehicle path off Kostner. Berm slope down to site is steep, will probably try with truck but not until drill rig onsite to help if needed.

950 B-7 (first marked) complete
10' accuracy

(2)

7/28/17 cont

1200 Layout of all borings complete.

Painted stakes & ribbon above.

1220 MSET (Bill W. & helper) depart site

1300 AEH depart site



And E. Hestings

7/28/17

8/2/17

(3)

800 AEH arrive, meet Geoff Tuttle (Driller) on Kibbourn near SW entrance to site (barricaded).

810 AEH & Geoff drive around site to access path entrance near NE corner.

830 Review access point at NE, Ron Groff able to get down and up in Jeep.

840 Ron moves to evaluate parking situation and get drill rig to NE part of site.

845 Bill W. of MSET says Greg to arrive shortly to log borings for Geotech and is bringing well materials. Plan to start with env borings on south end because haven't had their locations revised. However Ron brought 2 1/4" FD auger today which he can't run with work with wells and wells are planned (to 20') for two Env borings on south.

945 Barrier open, prep work started at ESB-2 & ESB-3. South-center env borings. Barrier pulled in ward to site. Must replace at end of work at site.

(4)

8/2/17 (cont.)

1000 AEH stuck on conc pile (reel),
drill rig must pull free.

1020 Setting up at ESB-2, 1st
borings.

1035 Start ESB-2, 0-2' split screen.

1120 Done at ESB-2, moving to set up at
ESB-3.

1245 Done at ESB-2 on south berm.
Soon decide which borings next, possibly
Geotech.

1310 Setting up at Geotech B-7.
(SW corner of planned building 1)

1355 Continuation B-7, now geotech after
16' (not 8' cont). Ev 2.5' to 25',
then vary 5' 25-40'.
AEH still logging/observing.

1400 Bill Wyzga (MSET) has been
on site repositioning mound borings.
Leaves site, task complete.

Note - Site stinks awful today. Plants?
Weird because no well noted on Friday.
last week.

Note - Groff brought 2' (4" ID) augers today, mean
no 2" well possible unless hole stays open on own
and no Shelby tube possible.

8/2/17 (cont.)

(5)

1445 Done drilling at 40' B-7 hole. Must
pull augers, etc.

1500 Augers pulled, cuttings going down hole.

1525 Set to drill at B-4 (interim building, boring, 30')

1620 Drilling complete at B-4 and for
day. Clearing up cuttings.

1645 Drilling driving around debris
pile to knock down vegetation
for future GPR visit.

1700 AEH & MSET depart site. AEH at
carbon Kilborn. Groff Loading ATV
on trailer. Barriers to remain open
during work.

1715 AEH & Groff depart site.

Chris V 8/2/17

(6)

8/3/17

900 AEH and MSET onsite for day 2 of drilling.

935 Grotf arrives onsite, well unload off trailer.

1000 Grotf unloaded and carefully moving to ESB-5 (target for temp well env). New catoper at south end of site.

1020 Setting up at ESB-5.

1025 AEH tells dollars that they can leave rig at the site overnight but it is at their risk and city client advises against.

1050 Set to drill, hold drills, safety talk, review and sign off on plans, new Grotf helper. Review site hazards, contamination, and PPE.

1130 Byin buildings well at ESB-5.

1300 Well complete, moving to Building 1 geotech boring (out of sand & chips, so can't do more wells).

1310 Setting up on B-8. (No sample location)

1415 Done drilling at B-8, pulling access.

1435 Begins to rain.

1440 Thunder heard.

8/3/17 (cont.)

(7)

945 Waiting in vehicles on rain/thunder.

1500 End day. Thunder & rain continue.

1515 All depart site, AEH remains Fishing Cox. Heavy rain and thunder. Sam start planned tomorrow.

1535 AEH departs site

Amel E. Harts 8/3/17

③ 8/4/17 Friday

40
16
24
24
106 Total

8/17/17 Monday

⑨

850 Craig Cabrera on site

Met with:

Tim - Groff

847-450-9701

Greg - Midland Standard Eng
Ford Geotech Supplies

Kevin - Groff (Drillers)

- 1st B5 - Geotech (No sample)
then Env. Boring - well Setup

Discussed Scope & Safety Issues

805 arrived at B5 waiting for
driller to setup

845 Driller start boring

1000 Completed B5 to 40' bgs.

1050 Began setup at ESB6 for
well install

1310 Departed ESB6 to setup for B1

1545 Completed last Boring for day
B-14

1600 Departed Site to STAT for Sample
drop off

720 CTC on site; Met w/ Drivers
+ Greg from Midland

750 1st Location ESB-4 start

8:00 Mike from Work Smart arrived.
Coordinated parking & meetup.

830 Mike viewed area & said
he could not scan over the
debris pile. Just the area
around it that was flattened.

840 Midland working w/ driller to
set well @ 16 ft bgs

915 Work Smart called to say they were
done and they marked suspect pipe at
location of survey.

950 Mobilized to B12. Driller
cleared vegetation & began setup

1140 Started 3rd boring - B16

(10)

3-7-17

1210 left Boring B16 @ 14' bgs
to help Andy Survey

1235 Returned to B16 - already
completed & Demobing

1250 Started B13 - No soil sample to
be collected.

1355 Mob: lized B10

1455 Finished B10

Totals ESB-4 - 16 ft
B12 - 24 ft
B16 - 25 ft
B13 - 26 ft
B10 - 24

115

3-8-17

(11)

700 ~~ESB~~ E-WALKWAY ON THE (AMC FW)

TIM & KEVIN (GREG) ON THE

GREG (MSOT) ON THE

WEATHER: CLEAR HIGH TO 82°/5 TODAY

705 MOBILIZE @ B-11

CONDUCT TAILGATE SAFETY MEETING

730 RECALIBRATE MINIRAE 3000 PID MONITOR

w/ 100 ppm IS BUTYENE - LOT # 4616768

S/N 592-720041

EXP DATE = 6/20/19

POST CALIBRATION READING = 100.2 ppm (OK)

755-830 BORING B-11 TO 250'

855 MOBILIZE TO BORING B-15

855-940 BORING B-15 TO 250'

GREG INDICATED THAT HE HAD MISSED

B-16 & B-15 DIFFERENTIALLY THAN FIGURE

(SHAPED), WILL TELL HIM TO SWITCH THEM

1010 MOVE TO B-9

1015-1115 BORING B-9 TO 35'

MOVE TO B-6

3-8-17

(12)

8-3-17

8/9/17

1205-1300 Bring B-6 to 30'

1400-1500 Bring B-3 to 39.5'

1515 E. LAKEVIEW CATCH UP IN PROGRESS

DISCUSS W/ MSET ON HYDRAULIC CONDUCTIVITY

ALREADY SAMPLED. GREG INDICATES SAMPLE

WAS COLLECTED FROM CLAY NATIVE.

WILL CENTER IN NATIVE FILL (PERCHED ZONE)

PREFERRED.

1530 E. TW OESING

GREG & MSET ENDING FOR DAY

1600 DROP OFF SAMPLES @ STAT ANALYSIS.

COC # 906943

1710 DROP OFF TRUCK / FIELD NOTES AT

NIGGAS OFFICE

700 ESW onsite

715 AEH onsite

720 Drillers getting set for drilling at B-2,
north side of site up on berm.730 AEH meet up w/ driller after
equipment xfer w/ Eric. Eric
doing low flow sample at
ESB-5 (1st for TCh) and
ESB-6 (2nd for PPhos & PNA).740 Drilling at B-2 proceeds.
AASP review in field before
start.900 Done at B-2, positioning at
ESB-1 further up slope and
into trees a bit from B-2.915 Dr. to tree cover shifting ESB-1
~15' south. Still on berm, just not
in tree line.

925 Start drilling ESB-1

1015 Done at ESB-1 AEH runs and chambers
ESB. Almost done with well sample at
ESB-6.1035 Set to start at ~~ESB~~^{AEH} B-1.

E. LAKEVIEW

8/9/17 (cont.)

1100 ESW water sampling complete.
Departs site after refueling
bottles & equipment. Driller at
B-1 continues.

1240 Drilling & sampling complete. Driller
cleaning up at B-18, last hole.
Still must conduct infil test, pull
temp wells (2), fill all holes,
and pull barrier back in way
at SW entrance.

1315 Both temp wells (ESB-5 & ESB-6)
successfully pulled. Greg of MSET to
take all materials with Ben to the dump
hole. MSET (Greg) conducting infiltration
test. Driller to load rig (or close to it)
and will fill existing holes across site.

1320 AEH has located all but 2 of 11
existing wells shown on survey of site.

1400 Spent ~30 minutes solely trying to find SE
most well, south of nearby well path, with
no success. Giving up.

1402 Measuring well pair:

Well	DTW (ft TOC)	DTB (ft TOC)
Well B (NW pair)	29.15	51.28
Well C (SE pair)	10.03	15.09

Well	DTW (ft)	DTB (ft)
Well D (NE corner)	25.96	44.27
Well A (SE pair)	26.26	44.04

1425 All ready to depart site, must
clear barricade preventing vehicle
access.

1430 MSET offsite. AEH on Kilbourn
near entrance. Graft crew trying
to get barrier closed with jeep.

1450 Barricade looks good. Graft driller
in jeep will finish hole filling,
est 30-60 min more. Graft
drill rig on trailer offsite.

1500 AEH departure for Lds.

Andrew J. 8/9/17

8/11/17

800 AEH onsite. Plan today is
to land survey wells onsite and
meas. DTW/OTB in wells as yet
not measured (about half).

826 John Nordall: arrive for survey

830 Rain HS in tonight.

840 Begin survey.

Survey shots recorded on separate notes.

1230 Lunch and cool down break.

1330 Survey onsite resumes.

1600 Survey complete. Two circular transits
completed, all but 2 points included
in transits that tie back in.

AEH & JN depart site for day.

Andre S. Harts 8/11/17



GROUNDWATER SAMPLING FORM

Job Name CITY OF CHICAGO JPSTA
Job Number 320517 CLK6
Recorded By E. WALKERMAN
(signature)

Well No. ESB-5
Well Type ☒ Monitor ☐ Extraction ☐ Other TEMP
Well Material ☒ PVC ☐ St. Steel ☐ Other
Date 3-9-17 Time 8:45
Sampled By EW
(initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches) 10" SCREEN / TYPING @ MIDPOINT
☒ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC) 20.44
Water Level Depth (WL in feet BTOC) 9.65
Number of Well volumes to be purged (# Vols) 4.38' STICK W
☐ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Baller - Type
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.
☒ Other - Type PERISTALTIC

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other MIDPOINT
Depth in feet (BTOC) 20.44 Screen Interval in Feet (BTOC)
from 20.44 to 20.00
10.00

PURGE VOLUME CALCULATION

$$\left(\frac{20.44}{\text{TD (feet)}} - \frac{9.65}{\text{WL (feet)}} \right) \times \frac{2^2}{\text{D (inches)}} \times \frac{1 (\text{min})}{\text{\# Vols}} \times 0.0408 = \frac{1.76 \text{ GAL}}{\text{Calculated Purge Volume}}$$

PURGE TIME

8:04 Start 8:42 Stop 38 Elapsed Initial _____ gpm Final _____ gpm

PURGE RATE

ACTUAL PURGE VOLUME

_____ gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T <input checked="" type="checkbox"/> °C <input type="checkbox"/> °F	Other
<u>7.65</u> 0 <u>3:04</u> <u>203</u>		<u>632</u>	<u>23.42</u> <u>-32</u> <u>1.50</u> <u>124</u>	
<u>7.70</u> 1.76L <u>832</u> <u>722</u>		<u>555</u>	<u>29.48</u> <u>-75</u> <u>0.07</u> <u>2.9</u>	
<u>9.70</u> 2.0 GAL <u>837</u> <u>721</u>		<u>554</u>	<u>29.46</u> <u>-75</u> <u>0.00</u> <u>2.9</u>	
<u>12.70</u> 2.3 GAL <u>842</u> <u>722</u>		<u>553</u>	<u>29.47</u> <u>-77</u> <u>0.00</u> <u>2.9</u>	

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T <input type="checkbox"/> °C <input type="checkbox"/> °F	Other

Meter Nos.

Observations During Purging (Well Condition, Turbidity, Color, Odor) CLEAR

Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☐ Other

WELL SAMPLING

SAMPLING METHOD

☐ Baller - Type PERISTALTIC
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.

☐ Same as Above

☐ Grab - Type

☐ Other - Type

SAMPLING DISTRIBUTION

Sample Series

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
<u>ESB-5</u>		<u>TARGET ANALYTE LIST</u>	<u>(1) 500 mL PE w/ HCL</u>	<u>HNC3</u>	
			<u>(3) 1 L AMBER NO PRESERV</u>		
			<u>(1) 250 mL PE w/ NaOH</u>		
			<u>(5) 90 mL VOA w/ HCL</u>		

QUALITY CONTROL SAMPLES

Duplicate Samples	
Original Sample No.	Duplicate Sample No.

Blank Samples	
Type	Sample No.

Other Samples	
Type	Sample No.



GROUNDWATER SAMPLING FORM

Job Name CITY OF CHICAGO JPSTW
Job Number 3205170606
Recorded By E. Walker
(signature)

Well No. ESB-6
Well Type ☒ Monitor ☐ Extraction ☐ Other TEMP
Well Material ☒ PVC ☐ St. Steel ☐ Other
Date 8-5-17 Time 1030
Sampled By ESW
(initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D In Inches)

☒ 2-Inch ☐ 4-Inch ☐ 6-Inch ☐ OtherTotal Depth of Casing (TD In feet BTOC) 17.02 (17.5m)Water Level Depth (WL In feet BTOC) 18.67Number of Well volumes to be purged (# Vols) 1 min☐ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other3.00' stickup

PURGE METHOD

☐ Bailer - Type☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.☒ Other - Type PERISTALTIC PUMP

PUMP INTAKE SETTING

☒ Near Bottom ☐ Near Top ☐ Other MID-POINTDepth in feet (BTOC) _____ Screen Interval in Feet (BTOC)
from 2 to 17

PURGE VOLUME CALCULATION

$$\left(\frac{17.02}{\text{TD (feet)}} - \frac{18.67}{\text{WL (feet)}} \right) \times \frac{2^2}{\text{D (inches)}} \times \frac{1}{\text{\# Vols}} \times 0.0408 = \frac{1.03}{\text{Calculated Purge Volume}} \text{ gallons}$$

PURGE TIME

PURGE RATE

Start _____ Stop _____ Elapsed _____ Initial _____ gpm Final _____ gpm

FIELD PARAMETER MEASUREMENT

mv nsh mv
ORP DO TURB

Minutes Since Pumping Began	pH	Cond. (umhos/cm)	T <input checked="" type="checkbox"/> °C <input type="checkbox"/> °F	Other
10:67 940	6.99	364	26.64	27.76/343
10:87 1000	7.01	341	25.16	-9/0.64/337
10:88 1005	7.01	341	25.21	-20/0.18/209
10:89 1012	6.99	344	25.37	-21/0.20/114
10:90 1018	6.99	344	25.48	-24/0.20/77

Minutes Since Pumping Began	pH	Cond. (umhos/cm)	T <input checked="" type="checkbox"/> °C <input type="checkbox"/> °F	Other
10:23 2.8 GAL	6.98	342	25.55	-26/0.20/694/10.90
10:28 3.2 GAL	6.99	344	25.57	-26/0.20/783/10.90
SAMPLE @ 10:30				
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor) CLEAR TO CLEAR AND SAMPLINGDischarge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☐ Other

WELL SAMPLING

SAMPLING METHOD

☐ Bailer - Type PERISTALTIC PUMP☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.☐ Same as Above☐ Grab - Type☐ Other - Type

SAMPLING DISTRIBUTION

Sample Series

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
ESB-6	1L Ambient 500 mL PE	PMAS PP METALS	HNOS		

QUALITY CONTROL SAMPLES

Duplicate Samples	
Original Sample No.	Duplicate Sample No.

Blank Samples	
Type	Sample No.

Other Samples	
Type	Sample No.



GROUNDWATER SAMPLING FORM

Job Name Chicago JPSTA
Job Number 3205-17-1606
Recorded By Andr. J. Hester
(signature)

Well No. Well "I"
Well Type ☒ Monitor ☐ Extraction ☐ Other
Well Material ☒ PVC ☐ St. Steel ☐ Other
Date 8/29/17 Time 1150
Sampled By A E H
(initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches)
☐ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC) 47.80 (meas 8/11/17)
Water Level Depth (WL in feet BTOC) 30.46 (at start)
Number of Well volumes to be purged (# Vols)
☐ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type
☐ Submersible ☐ Centrifugal ☒ Bladder; Pump No.
☐ Other - Type

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC) 8/11/17 DTG=30.85 Screen Interval in Feet (BTOC)
DTB=47.80 from to
(MW-4)

PURGE VOLUME CALCULATION

(-) X ² X X 0.0408 = gallons
TD (feet) WL (feet) D (inches) # Vols Calculated Purge Volume

PURGE TIME

1030 Start 1035 Stop Elapsed Initial gpm Final gpm

PURGE RATE

ACTUAL PURGE VOLUME

 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T <input checked="" type="checkbox"/> °C <input type="checkbox"/> °F	Other <u>Turb</u>
<u>5</u>	<u>6.58</u>	<u>1.20 mS/cm</u>	<u>18.96</u>	<u>649 NTU</u>
<u>10</u>	<u>6.64</u>	<u>1.21</u>	<u>18.07</u>	<u>555</u>
<u>15</u> (<u>1045</u>)	<u>6.54</u>	<u>1.23</u>	<u>18.39</u>	<u>415</u>
<u>20</u>	<u>6.53</u>	<u>1.23</u>	<u>18.72</u>	<u>312</u>
<u>25</u>	<u>6.54</u>	<u>1.23</u>	<u>18.73</u>	<u>314</u>

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T <input checked="" type="checkbox"/> °C <input type="checkbox"/> °F	Other <u>Turb</u>
<u>32.50</u> <u>30 (1100)</u>	<u>6.56</u>	<u>1.23</u>	<u>18.70</u>	<u>313</u>
<u>35 (raining)</u>	<u>6.59</u>	<u>1.22</u>	<u>18.57</u>	<u>294</u>
<u>40</u>	<u>6.60</u>	<u>1.23</u>	<u>18.49</u>	<u>251</u>
<u>45</u>	<u>6.61</u>	<u>1.23</u>	<u>18.32</u>	<u>215</u>
Meter Nos. <u>Horiba U-52 (#J7X4CT4E)</u> <u>USE Env</u> <u>Manufact Jan 2015</u>				

Observations During Purging (Well Condition, Turbidity, Color, Odor) clear at start

Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other Discharge to ground surface away from well

WELL SAMPLING

SAMPLING METHOD

☐ Bailer - Type
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.
☒ Same as Above ☐ Grab - Type ☐ Other - Type

SAMPLING DISTRIBUTION

Sample Series

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
<u>3</u>	<u>40 mL vials</u>	<u>VOC + Naph.</u>	<u>HCl</u>	<u>STAT</u>	

QUALITY CONTROL SAMPLES

Duplicate Samples	
Original Sample No.	Duplicate Sample No.

Blank Samples	
Type	Sample No.

Other Samples	
Type	Sample No.

Readings cont.

<u>DTW</u>	<u>Min Since start pumping</u>	<u>pH</u>	<u>cond</u>	<u>Temp</u>	<u>Turb</u>
	50 (1120 raining)	6.68	1.23 mS/cm	18.15°C	189
32.90'	55	6.69	1.22	18.05	169
	60 (1130 raining)	6.72	1.23	17.99	133
	65	6.90	1.23	17.91	132
	70	6.92	1.23	17.80	129
33.20'	75 (1145 Light rain)	6.94	1.23	17.75	124

Sample @ 1150 8/29/17



GROUNDWATER SAMPLING FORM

Job Name Chicago JPSTA
Job Number 3205-17-1606
Recorded By Chris E. [signature]
(signature)

Well No. Well "C"
Well Type ☒ Monitor ☐ Extraction ☐ Other
Well Material ☒ PVC ☐ St. Steel ☐ Other
Date 8/29/17 Time 1445
Sampled By AEH
(initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches)
☐ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC) 15.09 (8/17/17)
Water Level Depth (WL in feet BTOC) 10.00 start
Number of Well volumes to be purged (# Vols)
☐ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type
☐ Submersible ☐ Centrifugal ☒ Bladder; Pump No.
☐ Other - Type

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC) 8/4/17: DTW = 10.03'
Screen Interval in Feet (BTOC) DTB = 15.09
from SE part of well B/well c pair to

PURGE VOLUME CALCULATION

$(TD - WL) \times D^2 \times \# Vols \times 0.0408 =$ gallons
TD (feet) WL (feet) D (inches) # Vols Calculated Purge Volume

PURGE TIME

1405 Start 1445 Stop 1500 Elapsed Initial 1405 gpm Final 1445 gpm
gallons

PURGE RATE

ACTUAL PURGE VOLUME

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (umhos/cm)	T <input type="checkbox"/> °C <input type="checkbox"/> °F	Other <u>Turb</u>
<u>0 (1405)</u>	<u>6.95</u>	<u>0.689</u>	<u>18.40</u>	<u>65.6</u>
<u>5</u>	<u>6.86</u>	<u>0.704</u>	<u>18.48</u>	<u>41.6</u>
<u>10</u>	<u>6.93</u>	<u>0.707</u>	<u>18.46</u>	<u>16.7</u>
<u>15</u>	<u>6.92</u>	<u>0.714</u>	<u>18.34</u>	<u>12.6</u>
<u>20</u>	<u>6.93</u>	<u>0.719</u>	<u>18.47</u>	<u>8.3</u>

Minutes Since Pumping Began	pH	Cond. (umhos/cm)	T <input type="checkbox"/> °C <input type="checkbox"/> °F	Other <u>Turb</u>
<u>25</u>	<u>6.92</u>	<u>0.717</u>	<u>18.47</u>	<u>8.1</u>
<u>30</u>	<u>6.93</u>	<u>0.708</u>	<u>18.72</u>	<u>3.6</u>
<u>35</u>	<u>6.93</u>	<u>0.707</u>	<u>18.70</u>	<u>3.4</u>
Meter Nos. <u>Horiba U-52</u>				

Observations During Purging (Well Condition, Turbidity, Color, Odor) clear to turbid throughout

Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other ground away from well

WELL SAMPLING

SAMPLING METHOD

☐ Bailer - Type
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No. 1405

☒ Same as Above
☐ Grab - Type
☐ Other - Type

SAMPLING DISTRIBUTION

Sample Series

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
<u>3</u>	<u>40 mL vials</u>	<u>VOC + Neph</u>	<u>HCl</u>	<u>STAT</u>	

QUALITY CONTROL SAMPLES

Duplicate Samples	
Original Sample No.	Duplicate Sample No.

Blank Samples	
Type	Sample No.

Other Samples	
Type	Sample No.



APPENDIX E

Averaging Input and Results

		Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene	Benzo(b)fluoranthene	D_benzo(b)fluoranthene	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene	Arsenic	D_Arsenic
SB1-1	1-3	0.14	1	0.25	1	0.26	1	0.044	1	8.84	1
SB2-1	1-3	0.093	1	0.094	1	0.13	1	0.017	1	13	1
SB3-1	1-3	0.47	1	0.48	1	0.13	1	0.071	1	12.2	1
SB4-1	1-3	0.004	1	0.0051	1	0.0077	1	0.00092	1	3.38	1
SB5-1	1-3	0.14	1	0.14	1	0.22	1	0.023	1	4.51	1
SB6-1	1-3	0.014	1	0.016	1	0.034	1	0.0017	0	3.53	1
SB8-1	1-3	0.027	1	0.033	1	0.051	1	0.0054	1	2.09	1
SB10-1	1-3	0.025	1	0.026	1	0.064	1	0.0007	0	5.45	1
GP-1A	0-2	0.78	1	0.9	1	1.9	1	0.31	1	7.9	1
GP-2B	2-4	0.59	1	0.55	1	1	1	0.13	1	8.5	1
GP-3A	0-2	7	1	6.3	1	8.7	1	1.7	1	4	1
GP-4B	2-4	1.2	1	1.1	1	1.5	1	0.18	1	5.2	1
GP-5A	0-2	0.092	1	0.072	1	0.16	1	0.057	0	6.8	1
GP-6A	0-2	0.099	1	0.086	1	0.18	1	0.056	0	7.7	1
GP-8A	0-2									5.8	1
GP-9B	2-4									5.5	1
GP-10B	2-4									3.4	1
GP-11B	2-4	0.067	1	0.056	0	0.07	1	0.056	0	9.2	1
GP-13A	0-2	0.2	1	0.16	1	0.29	1	0.075	1	8.1	1
GP-14B	2-4									3.9	1
GP-15A	0-2									12	1
GP-16B	2-4	0.052	0	0.052	0	0.052	0	0.052	0	2.6	1
GP-17A	0-2									18	1
GP-18B	2-4									2.4	1
GP-19A	0-2									5.4	1
ESB-1A	0-2	0.084	1	0.074	1	0.07	1	0.035	1	8.6	1
ESB-2A	1.5-2.5	0.045	1	0.038	0	0.038	0	0.038	0	8.6	1
ESB-3A	1-4	2.4	1	0.84	1	0.35	0	0.35	0	6.4	1
ESB-4A	0.5-1.5	3.1	1	3.2	1	3.3	1	0.81	1	13	1
ESB-5A	0-1	0.16	1	0.13	1	0.18	1	0.062	1	12	1
ESB-6A	2-4	0.25	1	0.26	1	0.35	1	0.094	1	18	1
B-1A	2-4	0.21	1	0.2	1	0.18	1	0.076	1	6.2	1
B-2A	0-2	0.16	1	0.16	1	0.15	1	0.064	1	12	1
B-3A	0-2	0.11	1	0.13	1	0.11	1	0.035	0	4.2	1
B-4A	0-2	0.75	1	0.71	1	0.56	1	0.27	1	12	1
B-6A	1-3	4.9	1	3.9	1	3.5	1	1.1	1	6.8	1
B-7A	0-2	0.17	1	0.039	0	0.042	1	0.14	1	12	1
B-9A	1-3	1.3	1	1.2	1	1	1	0.52	1	14	1
B-10A	0-1	0.25	1	0.31	1	0.41	1	0.11	1	7.5	1
B-11A	1-2	0.19	1	0.18	1	0.18	1	0.066	1	8.6	1
B-12A	0-2	0.73	1	0.91	1	0.63	1	0.25	1	7.2	1
B-14A	1-2	0.15	1	0.17	1	0.18	1	0.063	1	11	1
B-15A	1.5-3	0.24	1	0.22	1	0.23	1	0.05	1	11	1
B-16A	1-2	0.058	1	0.089	1	0.11	1	0.034	0	8.8	1
B-17A	0-2	0.18	1	0.17	1	0.23	1	0.066	1	34	1
B-18A	0-2	0.16	1	0.11	1	0.14	1	0.064	1	20	1

UCL Statistics for Data Sets with Non-Detects				
User Selected Options				
Date/Time of Computation	ProUCL 5.111/13/2017 4:03:55 PM			
From File	Average Input.xls			
Full Precision	OFF			
Confidence Coefficient	95%			
Number of Bootstrap Operations	2000			
Benzo(a)anthracene				
General Statistics				
Total Number of Observations	60	Number of Distinct Observations	49	
		Number of Missing Observations	10	
Number of Detects	51	Number of Non-Detects	9	
Number of Distinct Detects	43	Number of Distinct Non-Detects	6	
Minimum Detect	5.6000E-4	Minimum Non-Detect	6.0000E-4	
Maximum Detect	6.1	Maximum Non-Detect	0.054	
Variance Detects	1.603	Percent Non-Detects	15%	
Mean Detects	0.675	SD Detects	1.266	
Median Detects	0.16	CV Detects	1.875	
Skewness Detects	2.784	Kurtosis Detects	8.077	
Mean of Logged Detects	-2.006	SD of Logged Detects	2.159	
Normal GOF Test on Detects Only				
Shapiro Wilk Test Statistic	0.578	Normal GOF Test on Detected Observations Only		
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level		
Lilliefors Test Statistic	0.337	Lilliefors GOF Test		
5% Lilliefors Critical Value	0.123	Detected Data Not Normal at 5% Significance Level		
Detected Data Not Normal at 5% Significance Level				
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs				
KM Mean	0.575	KM Standard Error of Mean	0.154	
KM SD	1.18	95% KM (BCA) UCL	0.864	
95% KM (t) UCL	0.832	95% KM (Percentile Bootstrap) UCL	0.843	
95% KM (z) UCL	0.828	95% KM Bootstrap t UCL	0.974	
90% KM Chebyshev UCL	1.037	95% KM Chebyshev UCL	1.246	
97.5% KM Chebyshev UCL	1.536	99% KM Chebyshev UCL	2.106	
Gamma GOF Tests on Detected Observations Only				
A-D Test Statistic	1.306	Anderson-Darling GOF Test		
5% A-D Critical Value	0.837	Detected Data Not Gamma Distributed at 5% Significance Level		
K-S Test Statistic	0.206	Kolmogorov-Smirnov GOF		
5% K-S Critical Value	0.133	Detected Data Not Gamma Distributed at 5% Significance Level		
Detected Data Not Gamma Distributed at 5% Significance Level				

Gamma Statistics on Detected Data Only				
k hat (MLE)	0.407	k star (bias corrected MLE)	0.396	
Theta hat (MLE)	1.66	Theta star (bias corrected MLE)	1.705	
nu hat (MLE)	41.5	nu star (bias corrected)	40.39	
Mean (detects)	0.675			
Gamma ROS Statistics using Imputed Non-Detects				
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs				
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)				
For such situations, GROS method may yield incorrect values of UCLs and BTVs				
This is especially true when the sample size is small.				
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates				
Minimum	5.6000E-4	Mean	0.576	
Maximum	6.1	Median	0.14	
SD	1.19	CV	2.068	
k hat (MLE)	0.363	k star (bias corrected MLE)	0.356	
Theta hat (MLE)	1.587	Theta star (bias corrected MLE)	1.618	
nu hat (MLE)	43.53	nu star (bias corrected)	42.68	
Adjusted Level of Significance (β)	0.046			
Approximate Chi Square Value (42.68, α)	28.71	Adjusted Chi Square Value (42.68, β)	28.42	
95% Gamma Approximate UCL (use when n>=50)	0.856	95% Gamma Adjusted UCL (use when n<50)	0.864	
Estimates of Gamma Parameters using KM Estimates				
Mean (KM)	0.575	SD (KM)	1.18	
Variance (KM)	1.393	SE of Mean (KM)	0.154	
k hat (KM)	0.237	k star (KM)	0.237	
nu hat (KM)	28.5	nu star (KM)	28.4	
theta hat (KM)	2.422	theta star (KM)	2.43	
80% gamma percentile (KM)	0.818	90% gamma percentile (KM)	1.732	
95% gamma percentile (KM)	2.829	99% gamma percentile (KM)	5.771	
Gamma Kaplan-Meier (KM) Statistics				
Approximate Chi Square Value (28.40, α)	17.24	Adjusted Chi Square Value (28.40, β)	17.03	
95% Gamma Approximate KM-UCL (use when n>=50)	0.947	95% Gamma Adjusted KM-UCL (use when n<50)	0.959	
Lognormal GOF Test on Detected Observations Only				
Shapiro Wilk Approximate Test Statistic	0.953	Shapiro Wilk GOF Test		
5% Shapiro Wilk P Value	0.0741	Detected Data appear Lognormal at 5% Significance Level		
Lilliefors Test Statistic	0.119	Lilliefors GOF Test		
5% Lilliefors Critical Value	0.123	Detected Data appear Lognormal at 5% Significance Level		
Detected Data appear Lognormal at 5% Significance Level				

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.575	Mean in Log Scale	-2.539
SD in Original Scale	1.19	SD in Log Scale	2.397
95% t UCL (assumes normality of ROS data)	0.832	95% Percentile Bootstrap UCL	0.84
95% BCA Bootstrap UCL	0.919	95% Bootstrap t UCL	1.008
95% H-UCL (Log ROS)	6.01		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.628	KM Geo Mean	0.0722
KM SD (logged)	2.538	95% Critical H Value (KM-Log)	4.988
KM Standard Error of Mean (logged)	0.339	95% H-UCL (KM -Log)	9.39
KM SD (logged)	2.538	95% Critical H Value (KM-Log)	4.988
KM Standard Error of Mean (logged)	0.339		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.576	Mean in Log Scale	-2.496
SD in Original Scale	1.19	SD in Log Scale	2.44
95% t UCL (Assumes normality)	0.833	95% H-Stat UCL	7.364
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	1.246		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Benzo(a)pyrene			
General Statistics			
Total Number of Observations	60	Number of Distinct Observations	53
		Number of Missing Observations	10
Number of Detects	47	Number of Non-Detects	13
Number of Distinct Detects	43	Number of Distinct Non-Detects	10
Minimum Detect	7.1000E-4	Minimum Non-Detect	7.0000E-4
Maximum Detect	3.9	Maximum Non-Detect	0.056
Variance Detects	1.125	Percent Non-Detects	21.67%
Mean Detects	0.638	SD Detects	1.06
Median Detects	0.16	CV Detects	1.662
Skewness Detects	2.111	Kurtosis Detects	3.353
Mean of Logged Detects	-1.996	SD of Logged Detects	2.185
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.62	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.946	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.302	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.128	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.501	KM Standard Error of Mean	0.126
KM SD	0.964	95% KM (BCA) UCL	0.701
95% KM (t) UCL	0.712	95% KM (Percentile Bootstrap) UCL	0.723
95% KM (z) UCL	0.708	95% KM Bootstrap t UCL	0.784
90% KM Chebyshev UCL	0.879	95% KM Chebyshev UCL	1.05
97.5% KM Chebyshev UCL	1.287	99% KM Chebyshev UCL	1.753
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.873	Anderson-Darling GOF Test	
5% A-D Critical Value	0.833	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.149	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.138	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.422	k star (bias corrected MLE)	0.409
Theta hat (MLE)	1.512	Theta star (bias corrected MLE)	1.56
nu hat (MLE)	39.66	nu star (bias corrected)	38.46
Mean (detects)	0.638		

Gamma ROS Statistics using Imputed Non-Detects				
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs				
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)				
For such situations, GROS method may yield incorrect values of UCLs and BTVs				
This is especially true when the sample size is small.				
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates				
Minimum	7.1000E-4	Mean	0.502	
Maximum	3.9	Median	0.102	
SD	0.972	CV	1.936	
k hat (MLE)	0.358	k star (bias corrected MLE)	0.351	
Theta hat (MLE)	1.403	Theta star (bias corrected MLE)	1.43	
nu hat (MLE)	42.95	nu star (bias corrected)	42.14	
Adjusted Level of Significance (β)	0.046			
Approximate Chi Square Value (42.14, α)	28.26	Adjusted Chi Square Value (42.14, β)	27.98	
95% Gamma Approximate UCL (use when n>=50)	0.749	95% Gamma Adjusted UCL (use when n<50)	0.756	
Estimates of Gamma Parameters using KM Estimates				
Mean (KM)	0.501	SD (KM)	0.964	
Variance (KM)	0.93	SE of Mean (KM)	0.126	
k hat (KM)	0.27	k star (KM)	0.268	
nu hat (KM)	32.45	nu star (KM)	32.16	
theta hat (KM)	1.854	theta star (KM)	1.871	
80% gamma percentile (KM)	0.745	90% gamma percentile (KM)	1.497	
95% gamma percentile (KM)	2.377	99% gamma percentile (KM)	4.697	
Gamma Kaplan-Meier (KM) Statistics				
Approximate Chi Square Value (32.16, α)	20.2	Adjusted Chi Square Value (32.16, β)	19.97	
95% Gamma Approximate KM-UCL (use when n>=50)	0.798	95% Gamma Adjusted KM-UCL (use when n<50)	0.808	
Lognormal GOF Test on Detected Observations Only				
Shapiro Wilk Test Statistic	0.941	Shapiro Wilk GOF Test		
5% Shapiro Wilk Critical Value	0.946	Detected Data Not Lognormal at 5% Significance Level		
Lilliefors Test Statistic	0.13	Lilliefors GOF Test		
5% Lilliefors Critical Value	0.128	Detected Data Not Lognormal at 5% Significance Level		
Detected Data Not Lognormal at 5% Significance Level				
Lognormal ROS Statistics Using Imputed Non-Detects				
Mean in Original Scale	0.501	Mean in Log Scale	-2.783	
SD in Original Scale	0.973	SD in Log Scale	2.503	
95% t UCL (assumes normality of ROS data)	0.711	95% Percentile Bootstrap UCL	0.712	
95% BCA Bootstrap UCL	0.744	95% Bootstrap t UCL	0.789	
95% H-UCL (Log ROS)	7.075			

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.859	KM Geo Mean	0.0573
KM SD (logged)	2.607	95% Critical H Value (KM-Log)	5.106
KM Standard Error of Mean (logged)	0.353	95% H-UCL (KM -Log)	9.689
KM SD (logged)	2.607	95% Critical H Value (KM-Log)	5.106
KM Standard Error of Mean (logged)	0.353		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.503	Mean in Log Scale	-2.62
SD in Original Scale	0.971	SD in Log Scale	2.41
95% t UCL (Assumes normality)	0.713	95% H-Stat UCL	5.809
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	1.05		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Benzo(b)fluoranthene			
General Statistics			
Total Number of Observations	60	Number of Distinct Observations	48
		Number of Missing Observations	10
Number of Detects	51	Number of Non-Detects	9
Number of Distinct Detects	42	Number of Distinct Non-Detects	8
Minimum Detect	9.5000E-4	Minimum Non-Detect	7.0000E-4
Maximum Detect	6.4	Maximum Non-Detect	0.35
Variance Detects	1.722	Percent Non-Detects	15%
Mean Detects	0.682	SD Detects	1.312
Median Detects	0.18	CV Detects	1.925
Skewness Detects	2.819	Kurtosis Detects	8.236
Mean of Logged Detects	-2.034	SD of Logged Detects	2.178
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.567	Normal GOF Test on Detected Observations Only	
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.327	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.123	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.582	KM Standard Error of Mean	0.159
KM SD	1.221	95% KM (BCA) UCL	0.876
95% KM (t) UCL	0.848	95% KM (Percentile Bootstrap) UCL	0.855
95% KM (z) UCL	0.844	95% KM Bootstrap t UCL	0.965
90% KM Chebyshev UCL	1.06	95% KM Chebyshev UCL	1.276
97.5% KM Chebyshev UCL	1.577	99% KM Chebyshev UCL	2.167
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.347	Anderson-Darling GOF Test	
5% A-D Critical Value	0.839	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.176	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.133	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.399	k star (bias corrected MLE)	0.388
Theta hat (MLE)	1.709	Theta star (bias corrected MLE)	1.755
nu hat (MLE)	40.68	nu star (bias corrected)	39.62
Mean (detects)	0.682		

Gamma ROS Statistics using Imputed Non-Detects				
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs				
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)				
For such situations, GROS method may yield incorrect values of UCLs and BTVs				
This is especially true when the sample size is small.				
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates				
Minimum	9.5000E-4	Mean	0.581	
Maximum	6.4	Median	0.13	
SD	1.232	CV	2.121	
k hat (MLE)	0.357	k star (bias corrected MLE)	0.35	
Theta hat (MLE)	1.627	Theta star (bias corrected MLE)	1.658	
nu hat (MLE)	42.86	nu star (bias corrected)	42.05	
Adjusted Level of Significance (β)	0.046			
Approximate Chi Square Value (42.05, α)	28.19	Adjusted Chi Square Value (42.05, β)	27.91	
95% Gamma Approximate UCL (use when n>=50)	0.867	95% Gamma Adjusted UCL (use when n<50)	0.875	
Estimates of Gamma Parameters using KM Estimates				
Mean (KM)	0.582	SD (KM)	1.221	
Variance (KM)	1.492	SE of Mean (KM)	0.159	
k hat (KM)	0.227	k star (KM)	0.227	
nu hat (KM)	27.26	nu star (KM)	27.23	
theta hat (KM)	2.563	theta star (KM)	2.565	
80% gamma percentile (KM)	0.814	90% gamma percentile (KM)	1.757	
95% gamma percentile (KM)	2.898	99% gamma percentile (KM)	5.979	
Gamma Kaplan-Meier (KM) Statistics				
Approximate Chi Square Value (27.23, α)	16.33	Adjusted Chi Square Value (27.23, β)	16.12	
95% Gamma Approximate KM-UCL (use when n>=50)	0.971	95% Gamma Adjusted KM-UCL (use when n<50)	0.983	
Lognormal GOF Test on Detected Observations Only				
Shapiro Wilk Approximate Test Statistic	0.948	Shapiro Wilk GOF Test		
5% Shapiro Wilk P Value	0.044	Detected Data Not Lognormal at 5% Significance Level		
Lilliefors Test Statistic	0.116	Lilliefors GOF Test		
5% Lilliefors Critical Value	0.123	Detected Data appear Lognormal at 5% Significance Level		
Detected Data appear Approximate Lognormal at 5% Significance Level				
Lognormal ROS Statistics Using Imputed Non-Detects				
Mean in Original Scale	0.581	Mean in Log Scale	-2.493	
SD in Original Scale	1.232	SD in Log Scale	2.333	
95% t UCL (assumes normality of ROS data)	0.847	95% Percentile Bootstrap UCL	0.853	
95% BCA Bootstrap UCL	0.962	95% Bootstrap t UCL	0.982	
95% H-UCL (Log ROS)	4.969			

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.544	KM Geo Mean	0.0786
KM SD (logged)	2.408	95% Critical H Value (KM-Log)	4.699
KM Standard Error of Mean (logged)	0.323	95% H-UCL (KM -Log)	6.223
KM SD (logged)	2.408	95% Critical H Value (KM-Log)	4.699
KM Standard Error of Mean (logged)	0.323		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.585	Mean in Log Scale	-2.342
SD in Original Scale	1.23	SD in Log Scale	2.219
95% t UCL (Assumes normality)	0.85	95% H-Stat UCL	3.894
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	1.276		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Dibenzo(a,h)anthracene			
General Statistics			
Total Number of Observations	60	Number of Distinct Observations	45
		Number of Missing Observations	10
Number of Detects	33	Number of Non-Detects	27
Number of Distinct Detects	30	Number of Distinct Non-Detects	17
Minimum Detect	9.2000E-4	Minimum Non-Detect	3.4000E-4
Maximum Detect	1.1	Maximum Non-Detect	0.35
Variance Detects	0.0823	Percent Non-Detects	45%
Mean Detects	0.221	SD Detects	0.287
Median Detects	0.076	CV Detects	1.298
Skewness Detects	1.849	Kurtosis Detects	2.562
Mean of Logged Detects	-2.358	SD of Logged Detects	1.535
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.713	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.931	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.248	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.152	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.124	KM Standard Error of Mean	0.031
KM SD	0.236	95% KM (BCA) UCL	0.183
95% KM (t) UCL	0.176	95% KM (Percentile Bootstrap) UCL	0.178
95% KM (z) UCL	0.175	95% KM Bootstrap t UCL	0.191
90% KM Chebyshev UCL	0.217	95% KM Chebyshev UCL	0.259
97.5% KM Chebyshev UCL	0.317	99% KM Chebyshev UCL	0.432
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.696	Anderson-Darling GOF Test	
5% A-D Critical Value	0.791	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.15	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.16	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.711	k star (bias corrected MLE)	0.666
Theta hat (MLE)	0.311	Theta star (bias corrected MLE)	0.332
nu hat (MLE)	46.9	nu star (bias corrected)	43.97
Mean (detects)	0.221		

Gamma ROS Statistics using Imputed Non-Detects				
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs				
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)				
For such situations, GROS method may yield incorrect values of UCLs and BTVs				
This is especially true when the sample size is small.				
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates				
Minimum	9.2000E-4	Mean	0.126	
Maximum	1.1	Median	0.0135	
SD	0.236	CV	1.874	
k hat (MLE)	0.491	k star (bias corrected MLE)	0.477	
Theta hat (MLE)	0.257	Theta star (bias corrected MLE)	0.264	
nu hat (MLE)	58.88	nu star (bias corrected)	57.27	
Adjusted Level of Significance (β)	0.046			
Approximate Chi Square Value (57.27, α)	40.87	Adjusted Chi Square Value (57.27, β)	40.53	
95% Gamma Approximate UCL (use when n>=50)	0.177	95% Gamma Adjusted UCL (use when n<50)	0.178	
Estimates of Gamma Parameters using KM Estimates				
Mean (KM)	0.124	SD (KM)	0.236	
Variance (KM)	0.0556	SE of Mean (KM)	0.031	
k hat (KM)	0.276	k star (KM)	0.273	
nu hat (KM)	33.06	nu star (KM)	32.74	
theta hat (KM)	0.449	theta star (KM)	0.454	
80% gamma percentile (KM)	0.185	90% gamma percentile (KM)	0.369	
95% gamma percentile (KM)	0.583	99% gamma percentile (KM)	1.148	
Gamma Kaplan-Meier (KM) Statistics				
Approximate Chi Square Value (32.74, α)	20.66	Adjusted Chi Square Value (32.74, β)	20.42	
95% Gamma Approximate KM-UCL (use when n>=50)	0.196	95% Gamma Adjusted KM-UCL (use when n<50)	0.198	
Lognormal GOF Test on Detected Observations Only				
Shapiro Wilk Test Statistic	0.943	Shapiro Wilk GOF Test		
5% Shapiro Wilk Critical Value	0.931	Detected Data appear Lognormal at 5% Significance Level		
Lilliefors Test Statistic	0.149	Lilliefors GOF Test		
5% Lilliefors Critical Value	0.152	Detected Data appear Lognormal at 5% Significance Level		
Detected Data appear Lognormal at 5% Significance Level				
Lognormal ROS Statistics Using Imputed Non-Detects				
Mean in Original Scale	0.124	Mean in Log Scale	-3.809	
SD in Original Scale	0.238	SD in Log Scale	2.032	
95% t UCL (assumes normality of ROS data)	0.175	95% Percentile Bootstrap UCL	0.175	
95% BCA Bootstrap UCL	0.187	95% Bootstrap t UCL	0.189	
95% H-UCL (Log ROS)	0.496			

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.588	KM Geo Mean	0.0102
KM SD (logged)	2.886	95% Critical H Value (KM-Log)	5.532
KM Standard Error of Mean (logged)	0.405	95% H-UCL (KM -Log)	5.23
KM SD (logged)	2.886	95% Critical H Value (KM-Log)	5.532
KM Standard Error of Mean (logged)	0.405		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.13	Mean in Log Scale	-3.853
SD in Original Scale	0.236	SD in Log Scale	2.523
95% t UCL (Assumes normality)	0.18	95% H-Stat UCL	2.613
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Approximate Gamma UCL	0.196		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Arsenic			
General Statistics			
Total Number of Observations	65	Number of Distinct Observations	52
		Number of Missing Observations	4
Minimum	2.09	Mean	7.716
Maximum	34	Median	6.4
SD	5.426	Std. Error of Mean	0.673
Coefficient of Variation	0.703	Skewness	2.148
Normal GOF Test			
Shapiro Wilk Test Statistic	0.824	Shapiro Wilk GOF Test	
5% Shapiro Wilk P Value	2.195E-10	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.15	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.11	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	8.84	95% Adjusted-CLT UCL (Chen-1995)	9.015
		95% Modified-t UCL (Johnson-1978)	8.869
Gamma GOF Test			
A-D Test Statistic	0.783	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.76	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.109	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.112	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	2.621	k star (bias corrected MLE)	2.511
Theta hat (MLE)	2.944	Theta star (bias corrected MLE)	3.074
nu hat (MLE)	340.8	nu star (bias corrected)	326.4
MLE Mean (bias corrected)	7.716	MLE Sd (bias corrected)	4.87
		Approximate Chi Square Value (0.05)	285.5
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	284.7
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	8.82	95% Adjusted Gamma UCL (use when n<50)	8.847
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.959	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk P Value	0.0729	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.111	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.11	Data Not Lognormal at 5% Significance Level	
Data appear Approximate Lognormal at 5% Significance Level			

Lognormal Statistics			
Minimum of Logged Data	0.737	Mean of logged Data	1.841
Maximum of Logged Data	3.526	SD of logged Data	0.636
Assuming Lognormal Distribution			
95% H-UCL	9.017	90% Chebyshev (MVUE) UCL	9.657
95% Chebyshev (MVUE) UCL	10.55	97.5% Chebyshev (MVUE) UCL	11.79
99% Chebyshev (MVUE) UCL	14.22		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	8.823	95% Jackknife UCL	8.84
95% Standard Bootstrap UCL	8.808	95% Bootstrap-t UCL	9.102
95% Hall's Bootstrap UCL	9.245	95% Percentile Bootstrap UCL	8.845
95% BCA Bootstrap UCL	8.948		
90% Chebyshev(Mean, Sd) UCL	9.735	95% Chebyshev(Mean, Sd) UCL	10.65
97.5% Chebyshev(Mean, Sd) UCL	11.92	99% Chebyshev(Mean, Sd) UCL	14.41
Suggested UCL to Use			
95% Approximate Gamma UCL	8.82		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

		Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene	Benzo(b)fluoranthene	D_benzo(b)fluoranthene	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene	Arsenic	D_Arsenic
SB1-1	1-3	0.14	1	0.25	1	0.26	1	0.044	1	8.84	1
SB1-4	8.5-10.5	0.002	1	0.0025	1	0.0049	1	0.00035	0	3.44	1
SB2-1	1-3	0.093	1	0.094	1	0.13	1	0.017	1	13	1
SB2-3	6-8	0.002	1	0.0019	1	0.0035	1	0.00034	0	3.36	1
SB3-1	1-3	0.47	1	0.48	1	0.13	1	0.071	1	12.2	1
SB3-3	6-8	0.026	1	0.029	1	0.08	1	0.0018	0	2.77	1
SB4-1	1-3	0.004	1	0.0051	1	0.0077	1	0.00092	1	3.38	1
SB4-4	8.5-10.5	0.00056	1	0.00071	1	0.0011	1	0.00035	0	3.47	1
SB5-1	1-3	0.14	1	0.14	1	0.22	1	0.023	1	4.51	1
SB5-4	8.5-10.5	0.0056	1	0.0052	1	0.014	1	0.00034	0	5.42	1
SB6-1	1-3	0.014	1	0.016	1	0.034	1	0.0017	0	3.53	1
SB6-4	8.5-10.5	0.0025	1	0.0018	1	0.0036	1	0.00035	0	2.38	1
SB7-4	8.5-10.5	0.0006	0	0.0007	0	0.0007	0	0.0007	0	2.65	1
SB7-5	11-13	0.0006	0	0.0007	0	0.001	1	0.0007	0	2.72	1
SB8-1	1-3	0.027	1	0.033	1	0.051	1	0.0054	1	2.09	1
SB8-3	8.5-10.5	0.03	1	0.031	1	0.072	1	0.0074	1	3.15	1
SB9-2	3.5-5.5	0.0042	1	0.0042	1	0.0089	1	0.0007	0	3.26	1
SB9-3	6-8	0.0006	0	0.0007	0	0.00095	1	0.0007	0	2.94	1
SB10-1	1-3	0.025	1	0.026	1	0.064	1	0.0007	0	5.45	1
SB10-4	8.5-10.5	0.19	1	0.014	0	0.021	1	0.014	0	13.8	1
GP-1A	0-2		1	0.9	1	1.9	1	0.31	1	7.9	1
GP-2B	2-4	0.59	1	0.55	1	1	1	0.13	1	8.5	1
GP-3A	0-2	7	1	6.3	1	8.7	1	1.7	1	4	1
GP-4B	2-4	1.2	1	1.1	1	1.5	1	0.18	1	5.2	1
GP-4E	8-10	0.2	1	0.16	1	0.28	1	0.055	0	6.2	1
GP-5A	0-2	0.092	1	0.072	1	0.16	1	0.057	0	6.8	1
GP-6A	0-2	0.099	1	0.086	1	0.18	1	0.056	0	7.7	1
GP-6C	4-6	6.1	1	3.8	1	6.4	1	0.82	1	5.2	1
GP-7D	6-8	12	1	13	1	12	1	1	1	11	1
GP-7F	10-12	3.1	1	2.3	1	4.8	1	0.46	1	7.6	1
GP-8A	0-2									5.8	1
GP-9B	2-4									5.5	1
GP-10B	2-4									3.4	1
GP-11B	2-4	0.067	1	0.056	0	0.07	1	0.056	0	9.2	1
GP-11D	6-8	2	1	3.1	1	2.1	1	0.19	1	4.6	1
GP-13A	0-2	0.2	1	0.16	1	0.29	1	0.075	1	8.1	1
GP-13D	6-8	0.05	0	0.05	0	0.05	0	0.05	0	2.5	1
GP-14B	2-4									3.9	1
GP-15A	0-2									12	1
GP-16B	2-4	0.052	0	0.052	0	0.052	0	0.052	0	2.6	1
GP-16E	8-10	0.054	0	0.054	0	0.054	0	0.054	0	3.1	1
GP-17A	0-2									18	1
GP-18B	2-4									2.4	1
GP-19A	0-2									5.4	1
ESB-1A	0-2	0.084	1	0.074	1	0.07	1	0.035	1	8.6	1
ESB-1C	13-14	0.034	0	0.034	0	0.034	0	0.034	0		
ESB-2A	1.5-2.5	0.045	1	0.038	0	0.038	0	0.038	0	8.6	1
ESB-3A	1-4	2.4	1	0.84	1	0.35	0	0.35	0	6.4	1
ESB-3B	5.5-6.5	2.6	1	3	1	2.9	1	0.87	1		
ESB-4A	0.5-1.5	3.1	1	3.2	1	3.3	1	0.81	1	13	1
ESB-5A	0-1	0.16	1	0.13	1	0.18	1	0.062	1	12	1
ESB-6A	2-4	0.25	1	0.26	1	0.35	1	0.094	1	18	1
B-1A	2-4	0.21	1	0.2	1	0.18	1	0.076	1	6.2	1
B-2A	0-2	0.16	1	0.16	1	0.15	1	0.064	1	12	1
B-3A	0-2	0.11	1	0.13	1	0.11	1	0.035	0	4.2	1
B-3B	6-8	0.036	0	0.036	0	0.036	0	0.036	0	2.7	1
B-4A	0-2	0.75	1	0.71	1	0.56	1	0.27	1	12	1
B-6A	1-3	4.9	1	3.9	1	3.5	1	1.1	1	6.8	1
B-6B	8-10	0.64	1	0.68	1	0.53	1	0.25	1	13	1
B-7A	0-2	0.17	1	0.039	0	0.042	1	0.14	1	12	1
B-9A	1-3	1.3	1	1.2	1	1	1	0.52	1	14	1
B-10A	0-1	0.25	1	0.31	1	0.41	1	0.11	1	7.5	1
B-11A	1-2	0.19	1	0.18	1	0.18	1	0.066	1	8.6	1
B-12A	0-2	0.73	1	0.91	1	0.63	1	0.25	1	7.2	1
B-14A	0-2	0.15	1	0.17	1	0.18	1	0.063	1	11	1
B-15A	1.5-3	0.24	1	0.22	1	0.23	1	0.05	1	11	1
B-16A	1-2	0.058	1	0.089	1	0.11	1	0.034	0	8.8	1
B-17A	1-2	0.18	1	0.17	1	0.23	1	0.066	1	34	1
B-18A	0-2	0.16	1	0.11	1	0.14	1	0.064	1	20	1
B-18B	4.5-5.5	0.034	0	0.034	0	0.034	0	0.034	0		

UCL Statistics for Data Sets with Non-Detects				
User Selected Options				
Date/Time of Computation	ProUCL 5.111/13/2017 4:03:55 PM			
From File	Average Input.xls			
Full Precision	OFF			
Confidence Coefficient	95%			
Number of Bootstrap Operations	2000			
Benzo(a)anthracene				
General Statistics				
Total Number of Observations	60	Number of Distinct Observations	49	
		Number of Missing Observations	10	
Number of Detects	51	Number of Non-Detects	9	
Number of Distinct Detects	43	Number of Distinct Non-Detects	6	
Minimum Detect	5.6000E-4	Minimum Non-Detect	6.0000E-4	
Maximum Detect	6.1	Maximum Non-Detect	0.054	
Variance Detects	1.603	Percent Non-Detects	15%	
Mean Detects	0.675	SD Detects	1.266	
Median Detects	0.16	CV Detects	1.875	
Skewness Detects	2.784	Kurtosis Detects	8.077	
Mean of Logged Detects	-2.006	SD of Logged Detects	2.159	
Normal GOF Test on Detects Only				
Shapiro Wilk Test Statistic	0.578	Normal GOF Test on Detected Observations Only		
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level		
Lilliefors Test Statistic	0.337	Lilliefors GOF Test		
5% Lilliefors Critical Value	0.123	Detected Data Not Normal at 5% Significance Level		
Detected Data Not Normal at 5% Significance Level				
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs				
KM Mean	0.575	KM Standard Error of Mean	0.154	
KM SD	1.18	95% KM (BCA) UCL	0.864	
95% KM (t) UCL	0.832	95% KM (Percentile Bootstrap) UCL	0.843	
95% KM (z) UCL	0.828	95% KM Bootstrap t UCL	0.974	
90% KM Chebyshev UCL	1.037	95% KM Chebyshev UCL	1.246	
97.5% KM Chebyshev UCL	1.536	99% KM Chebyshev UCL	2.106	
Gamma GOF Tests on Detected Observations Only				
A-D Test Statistic	1.306	Anderson-Darling GOF Test		
5% A-D Critical Value	0.837	Detected Data Not Gamma Distributed at 5% Significance Level		
K-S Test Statistic	0.206	Kolmogorov-Smirnov GOF		
5% K-S Critical Value	0.133	Detected Data Not Gamma Distributed at 5% Significance Level		
Detected Data Not Gamma Distributed at 5% Significance Level				

Gamma Statistics on Detected Data Only				
k hat (MLE)	0.407	k star (bias corrected MLE)	0.396	
Theta hat (MLE)	1.66	Theta star (bias corrected MLE)	1.705	
nu hat (MLE)	41.5	nu star (bias corrected)	40.39	
Mean (detects)	0.675			
Gamma ROS Statistics using Imputed Non-Detects				
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs				
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)				
For such situations, GROS method may yield incorrect values of UCLs and BTVs				
This is especially true when the sample size is small.				
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates				
Minimum	5.6000E-4	Mean	0.576	
Maximum	6.1	Median	0.14	
SD	1.19	CV	2.068	
k hat (MLE)	0.363	k star (bias corrected MLE)	0.356	
Theta hat (MLE)	1.587	Theta star (bias corrected MLE)	1.618	
nu hat (MLE)	43.53	nu star (bias corrected)	42.68	
Adjusted Level of Significance (β)	0.046			
Approximate Chi Square Value (42.68, α)	28.71	Adjusted Chi Square Value (42.68, β)	28.42	
95% Gamma Approximate UCL (use when n>=50)	0.856	95% Gamma Adjusted UCL (use when n<50)	0.864	
Estimates of Gamma Parameters using KM Estimates				
Mean (KM)	0.575	SD (KM)	1.18	
Variance (KM)	1.393	SE of Mean (KM)	0.154	
k hat (KM)	0.237	k star (KM)	0.237	
nu hat (KM)	28.5	nu star (KM)	28.4	
theta hat (KM)	2.422	theta star (KM)	2.43	
80% gamma percentile (KM)	0.818	90% gamma percentile (KM)	1.732	
95% gamma percentile (KM)	2.829	99% gamma percentile (KM)	5.771	
Gamma Kaplan-Meier (KM) Statistics				
Approximate Chi Square Value (28.40, α)	17.24	Adjusted Chi Square Value (28.40, β)	17.03	
95% Gamma Approximate KM-UCL (use when n>=50)	0.947	95% Gamma Adjusted KM-UCL (use when n<50)	0.959	
Lognormal GOF Test on Detected Observations Only				
Shapiro Wilk Approximate Test Statistic	0.953	Shapiro Wilk GOF Test		
5% Shapiro Wilk P Value	0.0741	Detected Data appear Lognormal at 5% Significance Level		
Lilliefors Test Statistic	0.119	Lilliefors GOF Test		
5% Lilliefors Critical Value	0.123	Detected Data appear Lognormal at 5% Significance Level		
Detected Data appear Lognormal at 5% Significance Level				

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.575	Mean in Log Scale	-2.539
SD in Original Scale	1.19	SD in Log Scale	2.397
95% t UCL (assumes normality of ROS data)	0.832	95% Percentile Bootstrap UCL	0.84
95% BCA Bootstrap UCL	0.919	95% Bootstrap t UCL	1.008
95% H-UCL (Log ROS)	6.01		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.628	KM Geo Mean	0.0722
KM SD (logged)	2.538	95% Critical H Value (KM-Log)	4.988
KM Standard Error of Mean (logged)	0.339	95% H-UCL (KM -Log)	9.39
KM SD (logged)	2.538	95% Critical H Value (KM-Log)	4.988
KM Standard Error of Mean (logged)	0.339		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.576	Mean in Log Scale	-2.496
SD in Original Scale	1.19	SD in Log Scale	2.44
95% t UCL (Assumes normality)	0.833	95% H-Stat UCL	7.364
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	1.246		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Benzo(a)pyrene			
General Statistics			
Total Number of Observations	60	Number of Distinct Observations	53
		Number of Missing Observations	10
Number of Detects	47	Number of Non-Detects	13
Number of Distinct Detects	43	Number of Distinct Non-Detects	10
Minimum Detect	7.1000E-4	Minimum Non-Detect	7.0000E-4
Maximum Detect	3.9	Maximum Non-Detect	0.056
Variance Detects	1.125	Percent Non-Detects	21.67%
Mean Detects	0.638	SD Detects	1.06
Median Detects	0.16	CV Detects	1.662
Skewness Detects	2.111	Kurtosis Detects	3.353
Mean of Logged Detects	-1.996	SD of Logged Detects	2.185
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.62	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.946	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.302	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.128	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.501	KM Standard Error of Mean	0.126
KM SD	0.964	95% KM (BCA) UCL	0.701
95% KM (t) UCL	0.712	95% KM (Percentile Bootstrap) UCL	0.723
95% KM (z) UCL	0.708	95% KM Bootstrap t UCL	0.784
90% KM Chebyshev UCL	0.879	95% KM Chebyshev UCL	1.05
97.5% KM Chebyshev UCL	1.287	99% KM Chebyshev UCL	1.753
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.873	Anderson-Darling GOF Test	
5% A-D Critical Value	0.833	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.149	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.138	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.422	k star (bias corrected MLE)	0.409
Theta hat (MLE)	1.512	Theta star (bias corrected MLE)	1.56
nu hat (MLE)	39.66	nu star (bias corrected)	38.46
Mean (detects)	0.638		

Gamma ROS Statistics using Imputed Non-Detects				
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs				
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)				
For such situations, GROS method may yield incorrect values of UCLs and BTVs				
This is especially true when the sample size is small.				
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates				
Minimum	7.1000E-4	Mean	0.502	
Maximum	3.9	Median	0.102	
SD	0.972	CV	1.936	
k hat (MLE)	0.358	k star (bias corrected MLE)	0.351	
Theta hat (MLE)	1.403	Theta star (bias corrected MLE)	1.43	
nu hat (MLE)	42.95	nu star (bias corrected)	42.14	
Adjusted Level of Significance (β)	0.046			
Approximate Chi Square Value (42.14, α)	28.26	Adjusted Chi Square Value (42.14, β)	27.98	
95% Gamma Approximate UCL (use when n>=50)	0.749	95% Gamma Adjusted UCL (use when n<50)	0.756	
Estimates of Gamma Parameters using KM Estimates				
Mean (KM)	0.501	SD (KM)	0.964	
Variance (KM)	0.93	SE of Mean (KM)	0.126	
k hat (KM)	0.27	k star (KM)	0.268	
nu hat (KM)	32.45	nu star (KM)	32.16	
theta hat (KM)	1.854	theta star (KM)	1.871	
80% gamma percentile (KM)	0.745	90% gamma percentile (KM)	1.497	
95% gamma percentile (KM)	2.377	99% gamma percentile (KM)	4.697	
Gamma Kaplan-Meier (KM) Statistics				
Approximate Chi Square Value (32.16, α)	20.2	Adjusted Chi Square Value (32.16, β)	19.97	
95% Gamma Approximate KM-UCL (use when n>=50)	0.798	95% Gamma Adjusted KM-UCL (use when n<50)	0.808	
Lognormal GOF Test on Detected Observations Only				
Shapiro Wilk Test Statistic	0.941	Shapiro Wilk GOF Test		
5% Shapiro Wilk Critical Value	0.946	Detected Data Not Lognormal at 5% Significance Level		
Lilliefors Test Statistic	0.13	Lilliefors GOF Test		
5% Lilliefors Critical Value	0.128	Detected Data Not Lognormal at 5% Significance Level		
Detected Data Not Lognormal at 5% Significance Level				
Lognormal ROS Statistics Using Imputed Non-Detects				
Mean in Original Scale	0.501	Mean in Log Scale	-2.783	
SD in Original Scale	0.973	SD in Log Scale	2.503	
95% t UCL (assumes normality of ROS data)	0.711	95% Percentile Bootstrap UCL	0.712	
95% BCA Bootstrap UCL	0.744	95% Bootstrap t UCL	0.789	
95% H-UCL (Log ROS)	7.075			

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.859	KM Geo Mean	0.0573
KM SD (logged)	2.607	95% Critical H Value (KM-Log)	5.106
KM Standard Error of Mean (logged)	0.353	95% H-UCL (KM -Log)	9.689
KM SD (logged)	2.607	95% Critical H Value (KM-Log)	5.106
KM Standard Error of Mean (logged)	0.353		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.503	Mean in Log Scale	-2.62
SD in Original Scale	0.971	SD in Log Scale	2.41
95% t UCL (Assumes normality)	0.713	95% H-Stat UCL	5.809
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	1.05		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Benzo(b)fluoranthene			
General Statistics			
Total Number of Observations	60	Number of Distinct Observations	48
		Number of Missing Observations	10
Number of Detects	51	Number of Non-Detects	9
Number of Distinct Detects	42	Number of Distinct Non-Detects	8
Minimum Detect	9.5000E-4	Minimum Non-Detect	7.0000E-4
Maximum Detect	6.4	Maximum Non-Detect	0.35
Variance Detects	1.722	Percent Non-Detects	15%
Mean Detects	0.682	SD Detects	1.312
Median Detects	0.18	CV Detects	1.925
Skewness Detects	2.819	Kurtosis Detects	8.236
Mean of Logged Detects	-2.034	SD of Logged Detects	2.178
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.567	Normal GOF Test on Detected Observations Only	
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.327	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.123	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.582	KM Standard Error of Mean	0.159
KM SD	1.221	95% KM (BCA) UCL	0.876
95% KM (t) UCL	0.848	95% KM (Percentile Bootstrap) UCL	0.855
95% KM (z) UCL	0.844	95% KM Bootstrap t UCL	0.965
90% KM Chebyshev UCL	1.06	95% KM Chebyshev UCL	1.276
97.5% KM Chebyshev UCL	1.577	99% KM Chebyshev UCL	2.167
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.347	Anderson-Darling GOF Test	
5% A-D Critical Value	0.839	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.176	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.133	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.399	k star (bias corrected MLE)	0.388
Theta hat (MLE)	1.709	Theta star (bias corrected MLE)	1.755
nu hat (MLE)	40.68	nu star (bias corrected)	39.62
Mean (detects)	0.682		

Gamma ROS Statistics using Imputed Non-Detects				
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs				
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)				
For such situations, GROS method may yield incorrect values of UCLs and BTVs				
This is especially true when the sample size is small.				
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates				
Minimum	9.5000E-4	Mean	0.581	
Maximum	6.4	Median	0.13	
SD	1.232	CV	2.121	
k hat (MLE)	0.357	k star (bias corrected MLE)	0.35	
Theta hat (MLE)	1.627	Theta star (bias corrected MLE)	1.658	
nu hat (MLE)	42.86	nu star (bias corrected)	42.05	
Adjusted Level of Significance (β)	0.046			
Approximate Chi Square Value (42.05, α)	28.19	Adjusted Chi Square Value (42.05, β)	27.91	
95% Gamma Approximate UCL (use when n>=50)	0.867	95% Gamma Adjusted UCL (use when n<50)	0.875	
Estimates of Gamma Parameters using KM Estimates				
Mean (KM)	0.582	SD (KM)	1.221	
Variance (KM)	1.492	SE of Mean (KM)	0.159	
k hat (KM)	0.227	k star (KM)	0.227	
nu hat (KM)	27.26	nu star (KM)	27.23	
theta hat (KM)	2.563	theta star (KM)	2.565	
80% gamma percentile (KM)	0.814	90% gamma percentile (KM)	1.757	
95% gamma percentile (KM)	2.898	99% gamma percentile (KM)	5.979	
Gamma Kaplan-Meier (KM) Statistics				
Approximate Chi Square Value (27.23, α)	16.33	Adjusted Chi Square Value (27.23, β)	16.12	
95% Gamma Approximate KM-UCL (use when n>=50)	0.971	95% Gamma Adjusted KM-UCL (use when n<50)	0.983	
Lognormal GOF Test on Detected Observations Only				
Shapiro Wilk Approximate Test Statistic	0.948	Shapiro Wilk GOF Test		
5% Shapiro Wilk P Value	0.044	Detected Data Not Lognormal at 5% Significance Level		
Lilliefors Test Statistic	0.116	Lilliefors GOF Test		
5% Lilliefors Critical Value	0.123	Detected Data appear Lognormal at 5% Significance Level		
Detected Data appear Approximate Lognormal at 5% Significance Level				
Lognormal ROS Statistics Using Imputed Non-Detects				
Mean in Original Scale	0.581	Mean in Log Scale	-2.493	
SD in Original Scale	1.232	SD in Log Scale	2.333	
95% t UCL (assumes normality of ROS data)	0.847	95% Percentile Bootstrap UCL	0.853	
95% BCA Bootstrap UCL	0.962	95% Bootstrap t UCL	0.982	
95% H-UCL (Log ROS)	4.969			

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.544	KM Geo Mean	0.0786
KM SD (logged)	2.408	95% Critical H Value (KM-Log)	4.699
KM Standard Error of Mean (logged)	0.323	95% H-UCL (KM -Log)	6.223
KM SD (logged)	2.408	95% Critical H Value (KM-Log)	4.699
KM Standard Error of Mean (logged)	0.323		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.585	Mean in Log Scale	-2.342
SD in Original Scale	1.23	SD in Log Scale	2.219
95% t UCL (Assumes normality)	0.85	95% H-Stat UCL	3.894
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	1.276		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Dibenzo(a,h)anthracene			
General Statistics			
Total Number of Observations	60	Number of Distinct Observations	45
		Number of Missing Observations	10
Number of Detects	33	Number of Non-Detects	27
Number of Distinct Detects	30	Number of Distinct Non-Detects	17
Minimum Detect	9.2000E-4	Minimum Non-Detect	3.4000E-4
Maximum Detect	1.1	Maximum Non-Detect	0.35
Variance Detects	0.0823	Percent Non-Detects	45%
Mean Detects	0.221	SD Detects	0.287
Median Detects	0.076	CV Detects	1.298
Skewness Detects	1.849	Kurtosis Detects	2.562
Mean of Logged Detects	-2.358	SD of Logged Detects	1.535
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.713	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.931	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.248	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.152	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.124	KM Standard Error of Mean	0.031
KM SD	0.236	95% KM (BCA) UCL	0.183
95% KM (t) UCL	0.176	95% KM (Percentile Bootstrap) UCL	0.178
95% KM (z) UCL	0.175	95% KM Bootstrap t UCL	0.191
90% KM Chebyshev UCL	0.217	95% KM Chebyshev UCL	0.259
97.5% KM Chebyshev UCL	0.317	99% KM Chebyshev UCL	0.432
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.696	Anderson-Darling GOF Test	
5% A-D Critical Value	0.791	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.15	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.16	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.711	k star (bias corrected MLE)	0.666
Theta hat (MLE)	0.311	Theta star (bias corrected MLE)	0.332
nu hat (MLE)	46.9	nu star (bias corrected)	43.97
Mean (detects)	0.221		

Gamma ROS Statistics using Imputed Non-Detects				
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs				
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)				
For such situations, GROS method may yield incorrect values of UCLs and BTVs				
This is especially true when the sample size is small.				
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates				
Minimum	9.2000E-4	Mean	0.126	
Maximum	1.1	Median	0.0135	
SD	0.236	CV	1.874	
k hat (MLE)	0.491	k star (bias corrected MLE)	0.477	
Theta hat (MLE)	0.257	Theta star (bias corrected MLE)	0.264	
nu hat (MLE)	58.88	nu star (bias corrected)	57.27	
Adjusted Level of Significance (β)	0.046			
Approximate Chi Square Value (57.27, α)	40.87	Adjusted Chi Square Value (57.27, β)	40.53	
95% Gamma Approximate UCL (use when n>=50)	0.177	95% Gamma Adjusted UCL (use when n<50)	0.178	
Estimates of Gamma Parameters using KM Estimates				
Mean (KM)	0.124	SD (KM)	0.236	
Variance (KM)	0.0556	SE of Mean (KM)	0.031	
k hat (KM)	0.276	k star (KM)	0.273	
nu hat (KM)	33.06	nu star (KM)	32.74	
theta hat (KM)	0.449	theta star (KM)	0.454	
80% gamma percentile (KM)	0.185	90% gamma percentile (KM)	0.369	
95% gamma percentile (KM)	0.583	99% gamma percentile (KM)	1.148	
Gamma Kaplan-Meier (KM) Statistics				
Approximate Chi Square Value (32.74, α)	20.66	Adjusted Chi Square Value (32.74, β)	20.42	
95% Gamma Approximate KM-UCL (use when n>=50)	0.196	95% Gamma Adjusted KM-UCL (use when n<50)	0.198	
Lognormal GOF Test on Detected Observations Only				
Shapiro Wilk Test Statistic	0.943	Shapiro Wilk GOF Test		
5% Shapiro Wilk Critical Value	0.931	Detected Data appear Lognormal at 5% Significance Level		
Lilliefors Test Statistic	0.149	Lilliefors GOF Test		
5% Lilliefors Critical Value	0.152	Detected Data appear Lognormal at 5% Significance Level		
Detected Data appear Lognormal at 5% Significance Level				
Lognormal ROS Statistics Using Imputed Non-Detects				
Mean in Original Scale	0.124	Mean in Log Scale	-3.809	
SD in Original Scale	0.238	SD in Log Scale	2.032	
95% t UCL (assumes normality of ROS data)	0.175	95% Percentile Bootstrap UCL	0.175	
95% BCA Bootstrap UCL	0.187	95% Bootstrap t UCL	0.189	
95% H-UCL (Log ROS)	0.496			

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.588	KM Geo Mean	0.0102
KM SD (logged)	2.886	95% Critical H Value (KM-Log)	5.532
KM Standard Error of Mean (logged)	0.405	95% H-UCL (KM -Log)	5.23
KM SD (logged)	2.886	95% Critical H Value (KM-Log)	5.532
KM Standard Error of Mean (logged)	0.405		
DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.13	Mean in Log Scale	-3.853
SD in Original Scale	0.236	SD in Log Scale	2.523
95% t UCL (Assumes normality)	0.18	95% H-Stat UCL	2.613
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Gamma Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM Approximate Gamma UCL	0.196		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Arsenic			
General Statistics			
Total Number of Observations	65	Number of Distinct Observations	52
		Number of Missing Observations	4
Minimum	2.09	Mean	7.716
Maximum	34	Median	6.4
SD	5.426	Std. Error of Mean	0.673
Coefficient of Variation	0.703	Skewness	2.148
Normal GOF Test			
Shapiro Wilk Test Statistic	0.824	Shapiro Wilk GOF Test	
5% Shapiro Wilk P Value	2.195E-10	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.15	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.11	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	8.84	95% Adjusted-CLT UCL (Chen-1995)	9.015
		95% Modified-t UCL (Johnson-1978)	8.869
Gamma GOF Test			
A-D Test Statistic	0.783	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.76	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.109	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.112	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	2.621	k star (bias corrected MLE)	2.511
Theta hat (MLE)	2.944	Theta star (bias corrected MLE)	3.074
nu hat (MLE)	340.8	nu star (bias corrected)	326.4
MLE Mean (bias corrected)	7.716	MLE Sd (bias corrected)	4.87
		Approximate Chi Square Value (0.05)	285.5
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	284.7
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	8.82	95% Adjusted Gamma UCL (use when n<50)	8.847
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.959	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk P Value	0.0729	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.111	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.11	Data Not Lognormal at 5% Significance Level	
Data appear Approximate Lognormal at 5% Significance Level			

Lognormal Statistics			
Minimum of Logged Data	0.737	Mean of logged Data	1.841
Maximum of Logged Data	3.526	SD of logged Data	0.636
Assuming Lognormal Distribution			
95% H-UCL	9.017	90% Chebyshev (MVUE) UCL	9.657
95% Chebyshev (MVUE) UCL	10.55	97.5% Chebyshev (MVUE) UCL	11.79
99% Chebyshev (MVUE) UCL	14.22		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	8.823	95% Jackknife UCL	8.84
95% Standard Bootstrap UCL	8.808	95% Bootstrap-t UCL	9.102
95% Hall's Bootstrap UCL	9.245	95% Percentile Bootstrap UCL	8.845
95% BCA Bootstrap UCL	8.948		
90% Chebyshev(Mean, Sd) UCL	9.735	95% Chebyshev(Mean, Sd) UCL	10.65
97.5% Chebyshev(Mean, Sd) UCL	11.92	99% Chebyshev(Mean, Sd) UCL	14.41
Suggested UCL to Use			
95% Approximate Gamma UCL	8.82		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			



APPENDIX F

R-26 Calculations

SSL PARAMETERS

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Parameter	Symbol	Unit	Benzo(a)anthracene		Antimony		Chromium	
			Value ⁽¹⁾	Source ⁽¹⁾	Value ⁽¹⁾	Source ⁽¹⁾	Value ⁽¹⁾	Source ⁽¹⁾
Soil Remediation Objective (SSL Equation S17)								
Water-Filled Soil Porosity	Θ _w	L _{air} /L _{soil}	0.15	App. C, Table B, Surface Default ⁽²⁾	0.15	App. C, Table B, Surface Default ⁽²⁾	0.15	App. C, Table B, Surface Default ⁽²⁾
			0.3	App. C, Table B, Subsurface Default ⁽²⁾	0.3	App. C, Table B, Subsurface Default ⁽²⁾	0.3	App. C, Table B, Subsurface Default ⁽²⁾
Air-Filled Soil Porosity	Θ _a	L _{water} /L _{soil}	0.28	App. C, Table B, Surface Default ⁽²⁾	0.28	App. C, Table B, Surface Default ⁽²⁾	0.28	App. C, Table B, Surface Default ⁽²⁾
			0.13	App. C, Table B, Subsurface Default ⁽²⁾	0.13	App. C, Table B, Subsurface Default ⁽²⁾	0.13	App. C, Table B, Subsurface Default ⁽²⁾
Dry Soil Bulk Density	ρ _b	kg/L or g/cm ³	1.5	App. C, Table B, Default	1.5	App. C, Table B, Default	1.5	App. C, Table B, Default
Henry's Law Constant	H'	unitless	1.39E-04	App. C, Table E (chemical-specific)	0	Not applicable	0	Not applicable
Target Soil Leachate Concentration	C _w	mg/L	Calculated	App. C, Table A, SSL Eq. S18	Calculated	App. C, Table A, SSL Eq. S18	Calculated	App. C, Table A, SSL Eq. S18
Soil-Water Partition Coefficient	K _d	cm ³ /g	Calculated	App. C, Table A, SSL Eq. S19	Calculated	App. C, Table A, SSL Eq. S19	Calculated	App. C, Table A, SSL Eq. S19
Target Soil Leachate Concentration - C _w (SSL Equation S18)								
Groundwater Remediation Objective	GW _{obj}	mg/L	0.00013	App. B, Table E, Class I (chemical-specific)	0.006	App. B, Table E, Class I (chemical-specific)	0.1	App. B, Table E, Class I (chemical-specific)
Dilution Factor	DF	unitless	20	App. C, Table B, Default	20	App. C, Table B, Default	20	App. C, Table B, Default
Determination of Soil-Water Partition Coefficient - K _d (SSL Equation S19)								
Organic Carbon Partition Coefficient	K _{oc}	cm ³ /g or L/kg	4.00E+05	App. C, Table E (chemical-specific)	0	Not applicable	0	Not applicable
Organic Carbon Content of Soil	f _{oc}	g/g	0.002	Subsurface Default ⁽²⁾	0.002	Subsurface Default ⁽²⁾	0.002	Subsurface Default ⁽²⁾

Footnotes:

- (1) Parameter definitions and values are presented in IAC 742 at the references given.
- (2) Surface Soils are located in top meter, Subsurface Soils are located below 1 meter.

RBCA PARAMETERS

4301 W Chicago Ave
Chicago, Illinois

Parameter	Symbol	Unit	Benzo(a)anthracene		Antimony		Chromium	
			Value ⁽¹⁾	Source ⁽¹⁾	Value ⁽¹⁾	Source ⁽¹⁾	Value ⁽¹⁾	Source ⁽¹⁾
Determination of Groundwater Concentration at a Given Distance X From the Source - C _(x) (RBCA Equation R26)								
Groundwater Source Concentration (Soil Conc. x (GW _{obj} /RO)	C _{source}	mg/L	Calculated	See Footnote ⁽²⁾	Calculated	See Footnote ⁽²⁾	Calculated	See Footnote ⁽²⁾
Distance Along Centerline of Groundwater Plume	X	cm	304.8 cm = 10 feet	site-specific distance to concentration below Tier 1 Class II objective	30,480 cm = 1000 feet	site-specific distance to concentration below Tier 1 Class II objective	8230 cm = 270 ft	site-specific distance to concentration below Tier 1 Class II objective
Source Width Perpendicular to Groundwater Flow (horizontal)	S _w	cm	1524 cm = 50 ft	site-specific (estimated source, 50 feet)	1524 cm = 50 ft	site-specific (estimated source, 50 feet)	1524 cm = 50 ft	site-specific (estimated source, 50 feet)
Source Width Perpendicular to Groundwater Flow (vertical)	S _d	cm	200	App. C, Table D, Migration to GW Default	200	App. C, Table D, Migration to GW Default	200	App. C, Table D, Migration to GW Default
Specific Discharge	U	cm/d	Calculated	App. C, Table C RBCA, Eq. R19	Calculated	App. C, Table C RBCA, Eq. R19	Calculated	App. C, Table C RBCA, Eq. R19
First Order Degradation Constant	λ	d ⁻¹	5.10E-04	App. C, Table E	0.00E+00	Not applicable	0.00E+00	Not applicable
Longitudinal Dispersivity	α _x	cm	Calculated	App. C, Table C RBCA Eq. R16	Calculated	App. C, Table C RBCA Eq. R16	Calculated	App. C, Table C RBCA Eq. R16
Transverse Dispersivity	α _y	cm	Calculated	App. C, Table C RBCA Eq. R17	Calculated	App. C, Table C RBCA Eq. R17	Calculated	App. C, Table C RBCA Eq. R17
Vertical Dispersivity	α _z	cm	Calculated	App. C, Table C RBCA Eq. R18	Calculated	App. C, Table C RBCA Eq. R18	Calculated	App. C, Table C RBCA Eq. R18
Error Function Value	erf	unitless	Calculated	App. C, Table C RBCA Eq. R26	Calculated	App. C, Table C RBCA Eq. R26	Calculated	App. C, Table C RBCA Eq. R26
Concentration in Groundwater at Distance X from Source	C _(x)	mg/L	Calculated	App. C, Table C RBCA Eq. R26	Calculated	App. C, Table C RBCA Eq. R26	Calculated	App. C, Table C RBCA Eq. R26
Determination of Longitudinal Dispersivity - α _x (RBCA Equation R16)								
Longitudinal Dispersivity	α _x	cm	Calculated	App. C, Table C RBCA, Eq. R16	Calculated	App. C, Table C RBCA, Eq. R16	Calculated	App. C, Table C RBCA, Eq. R16
Determination of Transverse Dispersivity - α _y (RBCA Equation R17)								
Transverse Dispersivity	α _y	cm	Calculated	App. C, Table C RBCA, Eq. R17	Calculated	App. C, Table C RBCA, Eq. R17	Calculated	App. C, Table C RBCA, Eq. R17
Determination of Vertical Dispersivity - α _z (RBCA Equation R18)								
Vertical Dispersivity	α _z	cm	Calculated	App. C, Table C RBCA, Eq. R18	Calculated	App. C, Table C RBCA, Eq. R18	Calculated	App. C, Table C RBCA, Eq. R18
Determination of Specific Discharge - U (RBCA Equation R19)								
Aquifer Hydraulic Conductivity	K	cm/d	7.60E+01	site-specific	7.60E+01	site-specific	7.60E+01	site-specific
Hydraulic Gradient	i	cm/cm	0.0017	site-specific	0.0017	site-specific	0.0017	site-specific
Total Soil Porosity	Θ _T	cm ³ /cm ³	0.43	App. C, Table D, Default	0.43	App. C, Table D, Default	0.43	App. C, Table D, Default

Footnote:

- Parameter definitions and values are presented in 35 IAC 742 at the references given.
- C_{source} is calculated by multiplying the Soil Concentration (SOIL CONC) by the ratio of the groundwater remediation objective (GWobj) to the soil remediation objective (SOIL RO).

R-26 CALCULATIONS

4301 W Chicago Ave
Chicago, Illinois

TABLE 1 SOIL SCREENING LEVELS FOR MIGRATION TO GROUNDWATER (SSL Equation)

		Cw	Kd	Koc	foc	Default	Default	H'	pb
Constituent		(mg/L)	(cm³/g)			Theta w	Theta a		(g/cm³)
Benzo(a)anthracene	2007 GP-7D	0.0026	8.0E+02	4.00E+05	0.002	0.3	0.13	0.000139	1.5
Antimony	2007 GP-4E	0.12	0.0E+00	0	0	0.3	0.13	0.00	1.5
Chromium	2007 GP-19A	2	0.0E+00	0	0	0.15	0.28	0.00	1.5

		GWobj	Soil DF	Objective	DF	Soil Concentration	Calculation of GW Concentrations from Soils	
Constituent		(mg/L)	(Default)	(mg/kg)	(calculated)	mg/kg	(mg/L)	
Benzo(a)anthracene	2007 GP-7D	0.00013	2.0E+01	2.081	NA	12	7.50E-04	2007 GP-3A
Antimony	2007 GP-4E	0.006	2.0E+01	0.024	NA	23	5.75E+00	2007 GP-4E
Chromium	2007 GP-19A	0.1	2.0E+01	0.200	NA	35	1.75E+01	2007 GP-19A

Prepared by: MEJ Date: 12/18/2017
Checked by: EJW Date: 12/21/2017

TABLE 2 DETERMINATION OF GROUNDWATER CONCENTRATION at a Distance X from the Source

		Csource	X	X	alpha x	lamda	K	i	Theta T	Sw
Constituent		(mg/L)	(cm)	(ft)	(cm)	(day) ⁻¹	(cm/day)	(cm/cm)	(unitless)	(cm)
Benzo(a)anthracene	2007 GP-3A	7.5E-04	304.8	10	30.48	5.10E-04	7.60E+01	0.0017	0.43	1524
Antimony	2007 GP-4E	5.75E+00	30480	1000	3048	0.00E+00	7.60E+01	0.0017	0.43	1524
Chromium	2007 GP-19A	1.75E+01	8229.6	270	822.96	0.00E+00	7.60E+01	0.0017	0.43	1524

		alpha y	Sd	alpha z	C(x)	Class II Objective	erf(Sw)	erf(Sd)	Cx/Csource	(Sw)	(Sd)
Constituent		(cm)	(cm)	(cm)	(mg/L)	(mg/L)					
Benzo(a)anthracene		10.16	200.00	1.524	0.00046	0.00065	1.0000	1.0000	6.11E-01	6.846531969	4.639808276
Antimony		1016	200.00	152.4	0.0232	0.024	0.0771	0.0523	4.04E-03	0.06846532	0.046398083
Chromium		274.32	200.00	41.148	0.9412	1.00	0.2801	0.1920	5.38E-02	0.253575258	0.171844751

Prepared by: MEJ Date: 12/18/2017
Checked by: EJW Date: 12/21/2017



APPENDIX G

Soil Exploration and Analysis for Preliminary Site Development (Geotechnical Report)



www.msetinc.com

MIDLAND STANDARD ENGINEERING & TESTING, INC.

558 Plate Drive, Unit 6 East Dundee, Illinois
(847) 844-1895 f(847) 844-3875

November 6, 2017

Ms. Mary E. Jank
Amec Foster Wheeler Environment & Infrastructure, Inc.
8745 W. Higgins Road, Suite 300
Chicago, Illinois

Re: Soil Exploration and Analysis for Preliminary Site Development
Police & Fire Training Campus
Chicago, Illinois
MSET File No. 17439

Dear Ms. Jank:

Midland Standard Engineering & Testing, Inc. has completed a geotechnical exploration for the above referenced project.

Scope

The purpose of this exploration and analysis was to determine the various soil profile components, to determine the engineering characteristics of the subsurface materials and to provide criteria for use by the design engineers in preparing preliminary building foundation and site development plans. This report does not address environmental issues at the site. Environmental testing information is provided in a separate report by others.

The scope of this exploration included a geological reconnaissance of the site, subsurface exploration, soil testing and an engineering analysis and evaluation of the materials encountered.

General

The exploration and analysis of the foundation and subgrade conditions reported herein are considered sufficient in detail and scope to form a reasonable basis for preliminary design and project costing. This report has been prepared for the exclusive use and specific application to the proposed project.

The recommendations submitted are based on the available soil information and after discussion with the project engineer. Any revision in the plans for the proposed site development from those enumerated in this report should be brought to the attention of the Soils Engineer so that he may determine if changes in the recommendations are required. If deviations from the noted subsurface conditions are encountered during construction, they should also be brought to the attention of the Soils Engineer.

The Soils Engineer warrants that the findings, recommendations, specifications or professional advice contained herein have been promulgated after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics and engineering geology. No other warranties are implied or expressed.

After the plans and specifications are more complete, it is recommended that the Soils Engineer be provided the opportunity to review the final design and specifications, in order that the earthwork and foundation recommendations may be properly interpreted and implemented. At that time, it may be necessary to submit supplementary recommendations.

Field Explorations

Our exploration program for the two proposed buildings consisted of drilling seventeen (17) structure borings, labeled B-1 through B-17, to depths of twenty-five (25) to forty (40) feet below the existing ground surface. Additionally, seven (7) borings, labeled ESB-1 through ESB-6 and B-18 were located to assess site conditions and for environmental testing by others.

The borings locations were staked at the site by MSET; reference the attached Boring Location Map. The ground surface elevation at each boring location was determined relative to the rim of a manhole in the eastbound lane of Kilbourn Avenue, with an assumed elevation of 100.0.

Drilling and Sampling Procedures

The soil borings were drilled using a track mounted drill rig equipped with a rotary head using hollow stem augers to advance the hole. Representative samples were obtained by the use of split-spoon sampling procedures in accordance with A.S.T.M. Procedure D-1586. Continuous sampling, back to back split spoons to a depth of sixteen feet, was conducted at all but two boring locations.

Field Tests and Measurements

Standard Penetration Tests - During the split-spoon sampling procedures, a standard penetration test was performed in accordance with current A.S.T.M. D-1586 Procedures. At sampling intervals, the sampler was lowered into the hole and seated in undisturbed soil by pushing or tapping, taking suitable precautions that the rods were reasonably tight. The sampling spoon was then advanced by driving using an automatic drop hammer. During the sampling procedure, the standard penetration value (N) of the soil was determined. The standard penetration value (N) is defined as the number of blows of a one hundred-forty pound (140 lb.) hammer required to advance the spoon sampler one foot (12") into the soil.

The results of the standard penetration tests indicate the relative density and comparative consistency of the soils, and thereby provide a basis for estimating the relative strength and compressibility of the soil profile components. The results of standard penetration tests can be found on the boring logs included in the attached documents.

Strength Tests - During the field boring operations, samples of the predominantly cohesive soil from the split-spoon sampling device were tested using a calibrated soil penetrometer to aid in determining the strength of the soil. Consideration must be given to the manner in which the values of the unconfined compressive strengths were obtained. Split-spoon sampling techniques provide a representative, but somewhat disturbed, soil sample.

Water Level Measurements - Water level observations were made during and after the boring operations and are noted on the boring logs presented herewith. In relatively pervious soils, such as sandy soils, the indicated elevations are considered reliable ground water levels. In relatively impervious soils, the accurate determination of the ground water elevation may not be possible, even after several days of observation. Seasonal variations, temperature and recent rainfall conditions may influence the levels of the ground water table, and volumes of water that may influence construction conditions will depend on the permeability of the soils.

Well Installation and Field Permeability Test

Temporary ground water monitoring well pipes were installed in borings ESB-4 and ESB-6. At ESB-4, a falling head permeability test was conducted to determine the soil permeability. At this location, 15.5 feet of well pipe was installed to a depth of 13 feet below the ground surface with 2.5 feet of stick up. The screened interval is the lower 10 feet minus the end cap, set at roughly a depth of 2.75 feet to 12.75 feet. Clay at this location starts at a depth of 9 feet. The permeability test consists of filling the well pipe and timing the drop of the water level for several time intervals. A total of 4 trials were conducted.

Laboratory Testing

A laboratory testing program was conducted to ascertain engineering characteristics of the foundation materials necessary in preparing recommendations for the proposed construction. The soil laboratory work was performed in accordance with applicable ASTM standards.

The laboratory testing program included visual classification and moisture content, on all split-spoon samples. Cohesive soil samples obtained from the split-spoon were also tested for unconfined compressive strength (Q_u). A laboratory permeability test was conducted per ASTM 5084-90 on a clay sample from boring B-10. The results of this laboratory testing are presented on the attached boring logs.

Subsurface Conditions

Subsurface Soil Profile

The subsurface soil profile present at the site consists of 5.5 to 17.5 feet of FILL overlying natural buried Topsoil and stiff Silty CLAY grading to very stiff Silty CLAY glacial till and hard Clayey SILT to Silty CLAY glacial till.

The thicker sections of FILL are present in the berm areas along the north and south property lines/street borders. The FILL is mostly granular and classifies as SAND to SAND and GRAVEL, with varying amounts of clay and silt. Silty SAND, SM and Clayey SAND, SC are also present. The FILL is slightly to medium dense with most Standard Penetration test values of 6 to 20 blows per foot. The FILL contained Slag that is mixed in with the granular soil sporadically in all locations, and more prevalent at the base of the fill. Occasional concrete and brick fragments were noted as well as wood pieces in the FILL.

The natural soil profile underlying the FILL described above consists of stiff to very stiff CLAY buried Topsoil, typically 12 to 18 inches thick, overlying stiff to very stiff light grey Silt CLAY. With greater depth, very stiff brown and grey Silty CLAY overlies hard, and in some cases very hard grey Silty CLAY to Clayey SILT.

Moisture contents (Mc) in the buried Topsoil layer range from 25 to 42 percent with most Mc readings from 30 to 39 percent. Site borings ESB-3 and ESB-5 had high moisture readings in the buried Topsoil at Mc = 82 and 46 percent, respectively. The underlying light grey Silty CLAY had moisture contents, Mc of 23 to 29 percent and unconfined compressive strengths of (Qu) of 0.93 to 3.26 tons per square foot. Except at B-2, where the light grey Silty CLAY was very moist and soft, Mc = 43 to 44 percent and Qu=0.19 tsf, and at ESB-5 where Mc = 24 and Qu = 0.31 tsf.

The brown and grey Silty CLAY had Mc=18 to 25 percent and Qu=2.25 to 5.08 tsf, in all boring locations except B-13 and B-14, where Mc of 30 to 34 percent and Qu of 1.13 and 1.40, respectively, were recorded.

The hard to very hard Clayey SILT to Silty Clay glacial till had moisture contents Mc of 9 to 19 percent with typical Qu of 4.5 to 10.86 tsf and a few sample intervals of Qu = 2 to 3 tsf. At boring B-6, a SAND layer was present from a depth of 27.5 feet to 30 feet plus.

Details of the soil types encountered in the soil borings are presented on the attached Boring Logs.

Ground Water Observations

Ground water measurements were performed during and immediately after the drilling operations. Table 1 below summarizes the ground water level readings at the borehole locations. Details of the ground water measurements are presented on the attached boring logs.

Table 1 – Ground Water Measurements

Boring Number	Ground Water Depth, ft		Ground Water Elevation	
	During Drilling	Delayed	During Drilling	Delayed
<i>BUILDING 1</i>				
B-1	NA	dry	NA	dry
B-2	13.5	16.2' @ 5 hrs	95.4	92.7
B-3	7.0	12.3' @ 1 day	101.0	95.7
B-4	9.8	Dry Cave @ 24'	91.6	NA
B-5	8.5	9.1' @ 6 hrs	95.8	95.2
B-6	25.0	Dry Cave @ 13.4'	78.2	NA
B-7	11.5	32' @ 0 hrs	94.8	NA
B-8	8.0	8.9' @ 1 day	95.5	94.6
B-9	7.5	8.1' @ 1 day	94.9	94.3
<i>BUILDING 2</i>				
B-10	5.5	5.5' @ 1 day	93.0	93.0
B-11	6.0	7.1' @ 1 day	94.0	92.9
B-12	4.8	4.8' @ 1 day	93.5	93.5
B-13	5.0	5.8' @ 1 day	93.5	92.7
B-14	6.0	7.0' @ 3 days	91.9	90.9
B-15	6.0	8.1' @ 1 day	95.8	93.7
B-16	6.0	7.3' @ 1 day	93.9	92.6
B-17	6.5	7.2' @ 1 hr	92.7	92.0

Table 1 – Ground Water Measurements (cont.)

SITE				
B-18	12.5	Dry Cave @ 7.7'	93.8	NA
ESB-1	19.0	DC @ 16.3' (4 hrs)	93.4	NA
ESB-2	NA	NA	NA	NA
ESB-3	14.0	DC @ 10'	94.6	NA
ESB-4	6.5	7.1' @ 1 day	95.5	94.9
ESB-5	7.0	5.4' @ 1 day	92.5	94.1
ESB-6	7.0	well	93.5	

Site Description and Location

The site is a triangular piece of property that lies south of W. Chicago Avenue, between Kilbourn Avenue and Tripp Avenue, in the Garfield Park/Humbolt Park neighborhood in Chicago. The site dimensions are roughly 2300 feet east to west and 740 feet north to south in the middle. The property is currently overgrown with fill berms located along a good portion of the north line and to about the west half of the south line. Previously, the site had railroad spur tracks that led into the site at W. Chicago Street and Kilbourn Avenue, and then dead ended on the east side of the site. The tracks have been removed with occasional wood ties and ballast exposed at the ground surface. The west end of the site is elevated above street level and contained by retaining wall structures.

Project Discussion

The project site is planned for a training campus for Chicago Police and Fire workers. The current site plans include a three-story building, 120,000 to 150,000 square feet in plan dimension, with a possible basement along W. Chicago Avenue, designated Building 1. A second building, labeled Building 2, is planned one story, 100,000 SF, high bay metal structure located in the northeast portion of the site. Either of these buildings may have a pool for rescue training.

Planned site improvements include parking lots to the west of Building 1 and surrounding Building 2 on three sides. Along the north property line, fire training aids will be constructed. These may consist of 3 story towers to practice fire rescues. In the south central portion of the site, a paved area is planned for truck driver training and other vehicle training.

Recommendations

Site Mass Grading and Subgrade Preparation

The site has been filled to raise the grade for the former rail yard, and fill was used to form berms along the north and a portion of the south property lines. This fill is mostly granular, sands to sand and gravel with varying amounts of silt and clay and cinders or slag. The site sits high, compared to surrounding streets and final grade has not yet been determined.

In non-green areas, all surface vegetation, railroad debris, or unsuitable support materials should be removed at the start of fill operations. Depending on site design grades, the large fill berms along portions of the north and south property lines will be removed or used as site fill. The site is a former rail yard and the existing Fill is expected to have some debris throughout, including slag and cinders. Larger items such as clay and concrete pipe, and/or concrete slabs should not be incorporated in the fill unless crushed to 3 inches or less. Wood railroad ties

should be removed from the site. Other debris, exposed in the site grading, may occur that should not be allowed in the structural fill.

After stripping the existing vegetation, tree removal, and removal of unsuitable underlying soils, subgrade preparation can begin. The grade should be cleaned of debris or other unsuitable accumulation. In areas to receive Structural FILL or at design grade, the exposed subgrade soils should be compacted, with a minimum of five passes of a heavy vibratory roller, then proof-rolled and examined for soft, loose or unstable areas. Proof-rolling should be done with a loaded semi-dump truck, rubber tired end loader or similar equipment with a wheel load sufficient to locate any soft or unstable areas. Any localized areas of unstable or otherwise unsuitable materials should be removed to the depth encountered or treated with a stabilizing layer on which base course layers can be constructed.

Structural Fill

Material used as Structural FILL for the yard area should be a cohesive (clay type) material, classified as 'CL' 'CL-ML' or a clean (low fines content) granular material such as 'SP', 'SW', 'GP' or 'GW', in accordance with ASTM D-2487, Classification of Soils for Engineering Purposes. The structural FILL should be placed in 9-inch maximum lifts loose measure, dried to within 2 percent of its optimum moisture content, and compacted to 95 percent of the maximum dry density as defined by ASTM D-1557.

Utility Trench Backfill

The trenches for utilities should be backfilled in accordance with the requirements of the project specifications. Pipes should be bedded in the specified bedding material. All trenches within any building, pavement areas, or supporting adjacent pavement or sidewalks should be backfilled and compacted to a minimum 95 % of the maximum dry density as defined by ASTM D-1557. Outside the limits of the building and pavement areas, compaction to 90% of ASTM D-1557 will be satisfactory.

For backfill supporting pavements or other utilities, granular trench backfill such as well-graded sand, crushed stone, or sand and gravel mixtures should be used. Controlled backfilling should be accomplished by placing the backfill materials in lifts not exceeding 9" loose measure and compacting the material with the appropriate equipment. Where imported granular soils are used for backfill, these should be adjusted to the correct moisture content for compaction, then placed in a controlled manner. Jetting, inundation, or flooding is not considered an appropriate or effective method of compaction for granular trench backfill on this site. The specifications should prohibit the use of these methods.

Foundation Recommendations - Building 1 – 4-Story Campus Building

The former rail yard was filled considerably to provide rail access using an overpass of Chicago Avenue. The fill is medium dense with some slightly dense granular material that is typically looser with depth. This existing granular fill will be suitable for support of pavements and floor slabs, but not suitable for building foundations. As such, it is recommended that foundations be located in underlying natural deposits. The existing FILL at the site was not constructed to support foundation loads for a building structure and a conventional shallow depth wall and column footings cannot be used without reconstructing or treating the existing fill at considerable cost to the project.

Design floor grades and whether a basement will be incorporated in the design will dictate the most economical foundation type. Design elevations for the structure have not been established as of this report. Table 2 below shows the foundation bearing elevations and recommended bearing pressures for conventional wall and column footings and for drilled piers for use in preliminary design and project costing. Depending on the first-floor elevation, a structure with a deeper basement may result in minor footing undercuts in areas to reach bearing soil, and therefore, footings to support the building may be more feasible. A structure without a basement will likely result in a drilled pier foundation being more feasible.

Table 2 – Building 1 Foundation Bearing Depths/Elevations

Boring No.	Ground Surface Elev.	Depth to 5000 psf for Footings	Elevation 5000 psf Footings	Depth to 14 ksf for Drilled Piers	Elevation 14 ksf for Drilled Piers
B-1	108.9	18.0	90.9	27.5	81.4
B-2	108.0	21.5	86.5	23.0	85.0
B-3	101.4	14.0	87.4	20.5	80.9
B-4	104.3	12.5	91.8	21.5	82.8
B-5	103.2	15.5	87.7	21.0	82.2
B-6	110.3	20.5	89.8	32.0	78.2
B-7	106.3	17.5	88.8	22.0	84.3
B-8	103.5	13.0	90.5	23.0	80.5
B-9	102.4	14.0	88.4	23.0	79.4

Foundation Recommendations - Building 2 – Single Story, High Bay, Metal Building

We expect this building to have a floor slab elevation near the existing grade at project elevation 98 to 100. Suitable bearing soil is 8 to 12 feet below this level, so recommended foundation types, are stepped down footings or short, drilled piers with grade beams.

Table 3 – Building 2 Foundation Bearing Depths/Elevations

Boring No.	Ground Surface Elev.	Depth to 3000 psf for Footings	Elevation 3000 psf Footings	Depth to 4000 psf for Footings	Elevation 4000 psf Footings
B-10	98.5	8.5	90.0	10.5	88.0
B-11	100.0	9.0	91.0	12.0	88.0
B-12	98.3	6.5	91.8	8.5	89.8
B-13	98.5	8.0	90.5	12.0	86.5
B-14	97.9	6.5	91.4	10.0	91.4
B-15	101.8	13.0	88.8	14.5	88.8
B-16	99.9	11.0	88.9	11.0	88.9
B-17	99.2	10.0	89.2	10.0	89.2

This structure can also be constructed with frost depth footings if Geopiers are used to create bearing strength in the upper existing FILL. Geopiers consists of properly spaced compacted aggregate columns, compacted with specialized equipment to densify the column and surrounding soil. A load transfer pad, typically aggregate reinforced with a geogrid, is used across the column matrix, to convey building loads.

Seismic Design Parameters

For the site seismic design calculations, the Spectral Response Accelerations from the 2003 NEHRP Seismic Design Provisions have been computed using the USGS website. The International Building Code (IBC) site classification definition is Class D. Please reference "2012/2015 International Building Code" Spectral Response Acceleration calculation sheet that is attached to this report for the computed design parameters. The resulting seismic design parameters are $S_1=0.062\text{ g}$ (0.0 sec), $SM_1=0.149\text{ g}$ (0.2 sec), and $SD_1=0.099\text{ g}$ (1.0 sec).

Foundation Undercuts

Foundation undercut, where necessary and replaced with granular Structural Fill, should be extended horizontally one foot wider than the footing, on each side, plus one foot for each foot of undercut below the design footing elevation. Material used as granular Structural FILL under building foundations (undercuts) should be a crushed, select granular material such as Illinois Department of Transportation (IDOT) CA06, or approved equal. The material should be placed and compacted per the specification for 'Structural FILL'.

Design Parameters Slab-On-Grade - Interior

A six (6) inch minimum thickness granular FILL of well-graded aggregate such as IDOT CA-06 crushed stone should be used over the subgrade and under the slab. Based on the indicated thickness of granular sub base, a design subgrade modulus of 150 pounds per cubic inch for cohesive (clayey) subgrades and 200 pounds per cubic inch for granular subgrades (existing upper FILL) may be used for the slab design.

These values are representative of the design soil type and assume that the subgrade is properly dried and compacted prior to the slab construction. This means all areas disturbed by the superstructure erection are corrected in accordance with the plans and specifications.

Basement for Building 1

It is our understanding that a basement may be used for Building 1. Depending on final grades, a basement floor subgrade may be at or near the buried topsoil layer/ original ground elevation. If this is the case soft soil layers and or organic soil, as well as ground water may be present at this level. The basement floor subgrade should be inspected for strength and consistency and repaired with soil undercut/stone backfill replacement as necessary prior to floor construction. This would require a construction dewatering system in place during the work until the design basement dewatering, sumps and drains, and site storm sewer systems are in place and functioning.

Swimming Pool

A swimming pool for training is included in the plans for the campus. At this time, the pool may be located in either of the two buildings. The pool is expected to have similar soil subgrade problems as described in the basement section above. The pool will be below the prevailing ground water level in the borings and should be checked for buoyancy forces in the empty condition during pool service, and designed accordingly. Lateral earth pressures for design are shown below.

Lateral Earth Pressures for Structure Design

An undrained at rest earth pressure can develop for below grade concrete walls for pools and basements, rigidly restrained at the top by the floor slab. The following table outlines the earth pressure loading for design of these walls, based on these conditions. The effects of surcharge loads and live loads on the surface behind the wall must then also be added to these earth pressures.

Soil Description	Moist Unit Weight	Submerged Unit Weight	Angle of Internal Friction	At Rest Earth Pres. Coefficient	Equiv. Fluid Pressure
Granular FILL	125 pcf	63 pcf	30°	0.50	94 psf/ft*
Cohesive (Clayey)	130 pcf	68 pcf	28°	0.53	98 psf/ft*

Note * - Includes water pressure.

For sliding restraint, a soil to concrete friction coefficient of 0.30 for clays and 0.45 for the granular soil can be used.

Soil Permeability and Infiltration

Soil permeability testing was conducted on the existing granular FILL and underlying natural Silty CLAY. The granular FILL was tested for soil permeability in place at boring location ESB-4. The permeability of the Silty CLAY present at boring B-10 from a depth of 11 to 13 feet was determined by performing a laboratory hydraulic conductivity tests. The resulting soil permeability are:

Existing Granular FILL – Sand, little to some Gravel, trace Clay, SP-GP $k = 8.8 \times 10^{-4}$ cm/sec
Natural Silty CLAY–Brown & Grey Silty CLAY, trace Sand & Gravel, CL $k = 4.2 \times 10^{-7}$ cm/sec

Site surficial water infiltration will readily permeate or infiltrate through the upper granular fill and then essentially stop at the underlying natural clay soil profile.

Pavement Design Parameters

The pavement design should consider the strength of the subgrade soil, the number or frequency of vehicles and their axle load, the increase of traffic over the design life of the pavement, and the strengths and thickness of various pavement section materials. Both the AASHTO Design Method and the Mechanistic Design Method are commonly used to determine pavement section thicknesses. The results of these designs are subject to minimum standards provided by the local plan review agency. The materials used for the pavement section should be in accordance with the current Illinois Department of Transportation "Standard Specification for Road and Bridge Construction" and the "Supplemental Specifications and Recurring Special Provisions". A design bearing ratio of IBR=5 is appropriate for pavement section analysis for the subgrade soils prepared as recommended in this report.

Pavement Thickness

Recommended pavement sections have been selected using the AASHTO design method, and are adjusted for Illinois regional and material factors as recommended by the Illinois Department of Transportation "Pavement Design Manual". The design method takes into consideration traffic loading for a 20-year pavement design life, the subgrade support value and structural layer coefficients for each component of the pavement system.

It is our understanding that the facility will be used to train fire truck drivers. Considering an assumed truck traffic loading, the recommended pavement section thickness for these areas are listed below:

Flexible Pavement		Rigid Pavement	
Material	Layer Thickness	Material	Layer Thickness
Bituminous Surface	1.5"	PC Concrete	7.0"
Bituminous Binder	3.0"	Granular Base Course	4.0"
Granular Base Course	10.0"		

Notes

^{1,2} Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Section 406, Hot Mix Asphalt Binder and Surface Course and Section 1030, Hot Mix Asphalt, High ESAL, N50 Design.

³ Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Section 351, Aggregate Base Course and Section 1004, Coarse Aggregate, IDOT CA06 gradation.

⁴ Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Section 420, Concrete Pavement and Section 1020, Portland Cement Concrete, Type PV and SI.

General Construction Recommendations

Excavations

Excavations into the granular soil profile, especially below the prevailing ground water levels will not stand vertical throughout the construction phase and will require sloping back or bracing of the sidewalls. Please note that OSHA and local codes require the use of shoring and bracing in the excavations during foundation installation and other excavation work, therefore the contractor should be well versed in these requirements.

Excavations below project elevation 93 to 95 will likely encounter ground water inflow and the contractor should be prepared to pump this water to maintain stable work conditions to avoid softening or loosening of soil.

Structural FILL and Earthwork Controls

Moisture-density relationships should be developed from materials obtained from the site excavations and from off-site borrow sources. These relationships should be used to monitor FILL and backfill placement and compaction.

Construction Materials Engineering

Foundation installation procedures should be reviewed prior to construction. Bearing materials should be sampled and tested for adequate strengths. Excavated soils and borrow materials should be evaluated for use in the project earthwork. A representative of the Geotechnical Engineer should be present during earthwork operations and foundation installation to ensure compliance with the Plans and Specifications.

Summary

The recommendations presented herein are based on the information available at the time of this writing. After the plans and specifications are more complete, we welcome the opportunity to review them with respect to prevailing soil and ground water conditions.

At that time, it may be necessary to conduct further analysis and submit supplementary recommendations. If the plans are changed with respect to the locations of structures or loading conditions, the soils information must be reviewed to determine whether it is pertinent to the new plans.

Closure

Thank you for the opportunity to provide our services. Please contact us with any questions you have regarding foundation design, earthwork, and construction for the project.

Sincerely,
MIDLAND STANDARD ENGINEERING & TESTING, INC.



William J. Wyzgala, P.E.
Principal Engineer

WJW

Attachments

- Boring Location Diagram
- AMEC – Planned Land Development
- Records of Subsurface Exploration (B-1 to B-18 & ESB-1 to ESB-6)
- Soil Profile Drawings
- USGS Seismic Report
- Laboratory Data Sheets
- General Notes

Boring Location Map

Police & Fire Training Campus
W. Chicago Ave. & Kilbourne Ave.
Chicago, IL MSET# 17439

Legend

- Environmental Soil Boring
- Structure Soil Boring





LEGEND:

- ◆ = APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (CARLSON 2007)
- = APPROXIMATE GEOTECHNICAL SOIL BORING LOCATION (WARZYN 1998)
- = APPROXIMATE ENVIRONMENTAL SOIL BORING LOCATION (WARZYN 1991)
- = APPROXIMATE ENVIRONMENTAL SOIL BORING/TEMPORARY MONITORING WELL LOCATION (CARLSON 1991)
- ◆ = PROPOSED GEOTECHNICAL ENVIRONMENTAL SOIL BORING LOCATION (2017)
- = PROPOSED ENVIRONMENTAL SOIL BORING LOCATION (2017)

FIGURE 3

Map Showing Planned Land Development & Boring Locations

Vacant Parcel
4303 W. Chicago Avenue
Chicago, IL

PROJECT NUMBER
3205171606

DATE
8/1/17

APPROVED

DRAWN
GAP

REV. NO.

amc foster wheeler

Amec Foster Wheeler
Environment & Infrastructure, Inc.

TEC FOODS (4300 OHIO)

GRAND WAREHOUSE & DISTRIBUTION

GRAND WORLDWIDE LOGISTICS (4350 OHIO)


(4444 W. OHIO)





MSET PROJECT NO.: 17439		LOG OF BORING NO. B-1			Page 1 of 2		
PROJECT: Police and Fire Training Campus				SITE LOCATION: Chicago, Illinois			
BORING LOCATION: See Location Map				CLIENT: AMEC Foster Wheeler			

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Brown and Black Silty SAND, some Gravel, little Slag, trace Scrap Metal, SM, meium dense	108.9	SS	1	21	5			
		trace Concrete at 1.5'		SS	2	25	3			
4		trace RAP at 4.5'		SS	3	20	2			
		FILL: Black and Brown Clayey SAND to Sandy CLAY, some Gravel, trace Slag, SC, medium dense	102.9	SS	4	20	11			
8		FILL: Black SAND, some Gravel, trace Brick, SP, medium dense	100.4	SS	5	28	7			
		Brown and Black Clay at 10.0'		SS	6	23	7			
12		FILL: Brown, Black and Grey Silty CLAY, some Sand, little Gravel, trace Slag, CL, moist, slightly dense	96.9	SS	7	4	18	103	1.98	
				SS	8A	6	14		1.0 Qp	
16		Black to Dark Grey CLAY, CL-CH	93.4	SS	8B	10	39		1.25 Qp	
		Brown and Grey Silty CLAY, trace Sand, trace Gravel, CL, stiff to very stiff	92.4							
20				SS	9	9	22	100	3.96	
				SS	10	9	24	97	3.18	
24	Grey Silty CLAY, little Sand, trace Gravel, CL, hard	85.9	SS	11	12	17		4.5 + Qp		
28	Grey SILT, little Sand, ML, very dense	81.4	SS	12	39	16				








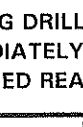
WATER LEVEL OBSERVATIONS, ft. DURING DRILLING: None IMMEDIATELY AFTER DRILLING: Dry DELAYED READING AFTER		BORING STARTED: 8/9/17 BORING COMPLETED: 8/9/17 LOGGED BY: GPF BORING METHOD: H.S.A.
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MSET PROJECT NO.: 17439		LOG OF BORING NO. B-1				Page 2 of 2		
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois			
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler			

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
32		Grey SILT, little Sand, ML very dense	77.4							
		Grey Clayey SILT, some Sand, CL-ML	76.4							
				SS	13A	31	11			
				SS	13B	42	13	121	--	10.75
36		Grey Silty CLAY, little Sand, trace Gravel, CL	74.4							
				SS	14	48	10	113	5.01	
40		End of Boring at 40 feet	68.9							

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING:  None IMMEDIATELY AFTER DRILLING:  Dry DELAYED READING AFTER 	 MSET	BORING STARTED: 8/9/17 BORING COMPLETED: 8/9/17 LOGGED BY: GPF BORING METHOD: H.S.A.
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875

MSET PROJECT NO.: 17439		LOG OF BORING NO. B-2				Page 1 of 1				
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois					
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler					
DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Black and Brown Sandy CLAY, some Gravel, SC, medium dense	108.0	SS	1	15	9			
		FILL: Black Sand, SP Concrete at 2.5'	106.5	SS	2	50/ 3"	7			
4		FILL: Black Silty SAND, little Clay, some Gravel, trace Slag, SM, medium dense	104.0	SS	3	18	6			
				SS	4A	14	9			
		FILL: Brown SAND (f-c), little to some Gravel, SP, medium dense	101.5	SS	4B	20	3			
8		FILL: Brown and Black Clayey SAND, SC, slightly dense	99.5	ST	5					
				SS	6	7	14			
12		FILL: Brown SAND, with Clay seams, SP-CL	96.0	SS	7	6	17			
		wet at 13.5'		SS	8A	6	10			
16		Black to Dark Grey CLAY, CL-CH	92.5	SS	8B	4	42	80	1.16	
20		Grey, trace Dark Grey CLAY, trace Sand, fe stains, CL-CH, moist, very soft	91.0	SS	9	4	44	80	0.19	
				SS	10A	WOH	43	78	0.04	
				SS	10B	11	15	124	4.81	
24		Grey Silty CLAY, little Sand, trace Gravel, CL, hard	86.5	SS	11	23	12	116	7.49	
28		to very stiff								
		End of Boring at 30 feet		SS	12	54	11	107	2.83	

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING:  13.5' IMMEDIATELY AFTER DRILLING:  27.2' DELAYED READING AFTER 5.25 Hrs  16.2'	 MSET	BORING STARTED: 8/9/17 BORING COMPLETED: 8/9/17 LOGGED BY: GPF BORING METHOD: H.S.A.
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PROJECT: Police and Fire Training Campus

SITE LOCATION: Chicago, Illinois

BORING LOCATION: See Location Map

CLIENT: AMEC Foster Wheeler

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Brown and Black SAND to Sandy CLAY, little to some Gravel, SP-SC, medium dense	101.4	SS	1	11	8			
4				SS	2	11	12		1.5 Qp	
		FILL: Brown SAND (f-m), little Gravel, SP, medium to slightly dense	96.9	SS	3	13	6			
8		wet at 7.0'		SS	4	6	17			
		Black to Dark Grey CLAY, CL-CH	92.4	SS	5	4	30			very poor recovery
12		Dark Grey to Light Grey Silty CLAY, trace Sand, fe stains, CL, stiff	90.4	SS	6	9	29		2.0 Qp	
				SS	7	10	29	91	1.82	
16		Brown and Grey Silty CLAY, little to trace Sand, trace Gravel, CL, very stiff	87.4	SS	8	8	18	107	3.14	
		Grey Silty CLAY, little to trace Sand, trace Gravel, CL, stiff	85.4							
20				SS	9	7	24	97	1.90	
		Grey Silty CLAY to Clayey SILT, little Sand, trace Gravel, CL-ML, hard	80.9	SS	10	28	11	120	7.34	
24				SS	11	18	15	113	6.63	
28		Grey SILT, little Sand, ML, very dense	73.9	SS	12	37	9			

WATER LEVEL OBSERVATIONS, ft.

DURING DRILLING:

7.0'

IMMEDIATELY AFTER DRILLING:

Dry

DELAYED READING AFTER 24 Hrs

12.3'



MSET

BORING STARTED: 8/8/17

BORING COMPLETED: 8/8/17

LOGGED BY: GPF

BORING METHOD: H.S.A.

PROJECT: Police and Fire Training Campus

SITE LOCATION: Chicago, Illinois

BORING LOCATION: See Location Map

CLIENT: AMEC Foster Wheeler

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Black Silty SAND, little Gravel, SM, slightly dense	104.3	SS	1	9	13			poor recovery
4		FILL: Brown SAND (f-m), little Gravel, trace Clay, trace Silt, SP slightly dense	102.3	SS	2	5	3			
				SS	3	8	15			
8		Brown and Black, moist to wet at 9.8'		SS	4	9	6			
				SS	5	6	16			
12		Dark Grey to Light Grey Silty CLAY, trace Sand, fe stains, CL, very stiff	94.3	SS	6	5	23	96	2.17	
16		Brown and Grey Silty CLAY, little Sand, trace Gravel, CL, hard to very stiff	91.8	SS	7	7	22	99	4.66	
				SS	8	6	24	95	2.75	
20		Grey Silty CLAY, little Sand, trace Gravel, CL, very stiff	86.8	SS	9	14	19	105	3.23	
				SS	10A	9	13	118	7.49	
24		Grey Silty CLAY to Clayey SILT, little Sand, trace Gravel, CL-ML	82.3	SS	10B	44	12			
28				SS	11	42	10			
				SS	12	44	9	113	7.09	
		End of Boring at 30 feet								

WATER LEVEL OBSERVATIONS, ft.

DURING DRILLING:

IMMEDIATELY AFTER DRILLING:

DELAYED READING AFTER



MSET

BORING STARTED: 8/2/17

BORING COMPLETED: 8/2/17

LOGGED BY: GPF

BORING METHOD: H.S.A.

MSET PROJECT NO.: 17439		LOG OF BORING NO. B-5				Page 1 of 2				
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois					
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler					
DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Black Silty SAND, SM	103.2							
		FILL: Brown SAND (f-m), little to some Gravel, SP, medium dense	102.2	SS	1	11	4			
4				SS	2	10	3			
				SS	3	18	9			
8		moist at 7.5'								
		FILL: Brown and Black SAND and GRAVEL, some Clay, GP-SP, wet	95.2	SS	4A	7	31			
		Black to Dark Grey CLAY, trace Sand, CL-CH, very stiff	93.7	SS	4B	4	31	85		2.10
12		Grey and Dark Grey, trace Brown Silty CLAY, trace Sand, fe stains, CL, very stiff to stiff	92.2	ST	5	NA	25	105		2.75 Qp
				SS	6	5	35	83		1.01
16		moist Grey Silty CLAY, trace Sand, trace Gravel, CL, very stiff	87.7	SS	7	9	20	104		2.56
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML, medium dense to dense	85.7	SS	8	24	15	113		
20				SS	9	33	13			
24				SS	10	35	11			
28		Grey Silty CLAY, little to some Sand, trace to little Gravel, CL, hard	75.7	SS	11	28	19	109		7.64

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING: 8.5' IMMEDIATELY AFTER DRILLING: 9.8' DELAYED READING AFTER 6 Hrs 9.1'	MSET	BORING STARTED: 8/4/17 BORING COMPLETED: 8/4/17 LOGGED BY: GPF BORING METHOD: H.S.A.
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875

PROJECT: Police and Fire Training CampusSITE LOCATION: Chicago, IllinoisBORING LOCATION: See Location MapCLIENT: AMEC Foster Wheeler

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
32		Grey Silty CLAY, little to some Sand, 71.7 trace to little Gravel, CL hard								no recovery
				SS	12	50/ 5"				
36										
		to very stiff	65.2	SS	13	92/ 9"	12	123	3.62	
40		End of Boring at 40 feet	63.2							

WATER LEVEL OBSERVATIONS, ft.

DURING DRILLING:

8.5'

IMMEDIATELY AFTER DRILLING:

9.8'

DELAYED READING AFTER 6 Hrs






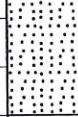
9.1'







MSET

BORING STARTED: 8/4/17BORING COMPLETED: 8/4/17LOGGED BY: GPFBORING METHOD: H.S.A.

MSET PROJECT NO.: 17439		LOG OF BORING NO. B-6				Page 1 of 1			
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois				
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler				

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Brown and Black Silty CLAY, some Sand, some Gravel, some Concrete, CL-SC, dense	110.3	SS	1	46	10			poor recovery
			SS	2	29	2			poor recovery	
4			SS	3	8			no recovery		
			SS	4	4	21		1.0 Qp		
8		FILL: Black Silty SAND, little Gravel, SM, medium dense	101.8	SS	5A	4	27	91	0.5 Qp	
			SS	5B	29	14				
12		FILL: Brown SAND (f-m) little to some Gravel, trace Silt, SP, slightly to medium dense	100.3	SS	6	27	4			
			SS	7	7	6				
16			SS	8	8	12				
20		Black to Dark Grey CLAY, CL-CH, very stiff	92.8	SS	9A	6	25	95	2.83	
			SS	9B	6	24	96	3.26		
		Light Grey Silty CLAY, trace Sand, fe stains, CL, very stiff	91.3							
24		Brown and Grey Silty CLAY, trace Sand, trace Gravel, CL, very stiff	89.8	SS	10	8	23		3.69	
		Grey Silty CLAY, little Sand, trace Gravel, CL, very stiff	87.3	SS	11	11	19		2.37	
28		Grey SAND (f-c), little Gravel, SP, wet medium dense	82.8	SS	12	10	18			
		End of Boring at 30 feet								

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING:  25.0' IMMEDIATELY AFTER DRILLING:  dry DELAYED READING AFTER 24 Hrs  dry	 MSET	BORING STARTED: 8/8/17 BORING COMPLETED: 8/8/17 LOGGED BY: GPF BORING METHOD: H.S.A.
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875

MSET PROJECT NO.: 17439		LOG OF BORING NO. B-7				Page 1 of 2				
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois					
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler					
DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0	[Pattern: Dotted]	FILL: Black Silty SAND, trace Clay, some Gravel, SM, medium dense	106.3	SS	1	10	6			
4		FILL: Brown SAND (f-m), little Gravel, trace to little Clay, little Silt, SP-SM slightly dense	103.8	SS	2	9	7			
				SS	3	6	11			
				SS	4	5	7			
8				SS	5	9	4			
				SS	6	8	7			
12	[Pattern: Dotted]	FILL: Black SAND, some Gravel, SP, medium dense, moist to wet	94.3	SS	7A	11	10			--
		Black to Dark Grey CLAY, CL-CH,	93.3	SS	7B	5	26	95		2.0 Qp
		Light Grey Silty CLAY, trace Sand, fe stains, CL, very stiff	92.3	SS	8	11	24	101		2.87
16										
		Brown and Grey to Grey Silty CLAY with intermittent Sandy Silt seams, little Sand, trace to little Gravel, CL hard	88.8	SS	9	10	18	105		5.08
20				SS	10	17	12	114		5.07
24	[Pattern: Diagonal Lines]	wet at 22.0'		SS	11	31	9	110		7.99
28		to very hard	78.3	SS	12	23	13	120		13.58

WATER LEVEL OBSERVATIONS, ft.

DURING DRILLING: 11.5'

IMMEDIATELY AFTER DRILLING: 32.0'

DELAYED READING AFTER

MSET

BORING STARTED: 8/2/17

BORING COMPLETED: 8/2/17

LOGGED BY: GPF

BORING METHOD: H.S.A.

MSET PROJECT NO.: 17439		LOG OF BORING NO. B-7				Page 2 of 2			
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois				
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler				

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE		TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	
32		Brown and Grey Silty CLAY, little Sand, trace to little Gravel, CL hard	74.8						
			SS	13	38	12	114	4.5 + Qp	
36									
40		Grey SILT, trace Sand, ML	67.8	SS	14	73	10		
		End of Boring at 40 feet	66.3						

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING: 11.5' IMMEDIATELY AFTER DRILLING: 32.0' DELAYED READING AFTER	 MSET	BORING STARTED: 8/2/17 BORING COMPLETED: 8/2/17 LOGGED BY: GPF BORING METHOD: H.S.A.
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875


MSET PROJECT NO.: 17439		LOG OF BORING NO. B-8			Page 1 of 1		
PROJECT: <u>Police and Fire Training Campus</u>				SITE LOCATION: <u>Chicago, Illinois</u>			
BORING LOCATION: <u>See Location Map</u>				CLIENT: <u>AMEC Foster Wheeler</u>			





DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Black SAND, Topsoil, 12"	103.5							
		FILL: Brown, trace Black SAND, little to some Gravel, trace Silt, SP-GP medium to slightly dense	102.5	SS	1	14	3			
4		little Silt	99.5	SS	2	7	10			
		trace slag, moist to wet	96.5	SS	3	17	11			
8		clayey seam at 9 feet	94.5	SS	4A	8	13			
		Black CLAY, CL-CH stiff	94.0	SS	4B	10	31	85	1.82	
12		Light Grey Silty CLAY, trace Sand, trace Gravel, CL very stiff	93.0	ST	5				2.25 Qp	
		Brown and Grey Silty CLAY, trace Sand, trace Gravel, CL very stiff	90.5	SS	6	8	24	97	3.38	
16		Grey Silty CLAY, trace Sand, trace Gravel, CL very stiff	87.5	SS	7	12	18	106	3.84	
		Grey Clayey SILT, CL-ML medium dense	85.5	SS	8A	10	15			
		Grey SAND & GRAVEL, trace Silt, GP-SP medium dense	84.5	SS	8B	12	9			
20		to SAND, trace Silt, SP		SS	9A	11	29			
		Grey SILT, ML medium dense	81.5	SS	9B	12	21			
24		Grey Silty CLAY, little Sand, trace Gravel, CL hard	80.5	SS	10	40	13	121	4.5 + Qp	
28		End of Boring at 30 Feet		SS	11	44	11	122	6.60	

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING: 8.0' IMMEDIATELY AFTER DRILLING: 11.5' DELAYED READING AFTER 1 day: 8.9'	 MSET	BORING STARTED: <u>8/3/17</u> BORING COMPLETED: <u>8/3/17</u> LOGGED BY: <u>GPF</u> BORING METHOD: <u>HJSA</u>
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875

MSET PROJECT NO.: 17439		LOG OF BORING NO. B-9				Page 1 of 2			
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois				
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler				

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Brown & Black Silty CLAY, some Sand, some Gravel, SC	102.4	SS	1A	13	12		4.5+ Qp	
		FILL: Black SAND, some Gravel, trace Slag, SP-GP medium dense	101.4		1B	21	10			
				SS	2A	21	13			
					2B	20	7			
4		FILL: Brown SAND, little Gravel, some Silt & Clay, SM medium dense	99.4							
				SS	3	15	7			
		Black & Brown SAND & GRAVEL to Clayey SAND seam at 7 to 8 feet	96.4		SS	4	13	8		
8		some slag	93.9		SS	5	22	9		
		FILL: Brown and Grey SAND & GRAVEL, little Clay, GM-SP medium dense	93.4		SS	6A	13	12		
					6B	4	38	89	2.17	
12		Black and Dark Grey CLAY, CL-CH stiff	91.4							
	Light Grey Silty CLAY, trace Sand, trace Gravel, CL stiff	90.4		SS	7	6	25	97	1.98	
	Brown & Grey Silty CLAY, trace Sand, trace Gravel, CL very stiff	88.4		SS	8	5	23	100	2.79	
16										
	Grey Silty CLAY, trace Sand, trace Gravel, CL very stiff	84.9		SS	9	9	21		2.25 Qp	
20										
	Grey Clayey SILT, little Sand, trace Gravel, CL-ML, very stiff moist seam at 21.5'	81.9		SS	10	24	12	117	2.37	
24				SS	11	49	12			
28										
	Grey Silty CLAY, little Sand, trace Gravel, CL very hard	73.9		SS	12	43	10	119	9.31	

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING:  7.5' IMMEDIATELY AFTER DRILLING:  9.2' DELAYED READING AFTER 1 Day:  8.1'	 MSET	BORING STARTED: 8/8/17 BORING COMPLETED: 8/8/17 LOGGED BY: GPF BORING METHOD: HSA
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875

MSET PROJECT NO.: 17439		LOG OF BORING NO. B-9				Page 2 of 2			
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois				
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler				

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
32	[Hatched Pattern]	Grey Silty CLAY, little Sand, trace Gravel, CL, very hard	70.9							
				SS	13	70/ 9"	12	121	10.86	
36	[Hatched Pattern]	Possible Boulder at 36.0'	67.4							
					14	50/ 2"	8			
		End of Boring, Refusal at 36 Feet	66.4							

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING: 7.5' IMMEDIATELY AFTER DRILLING: 9.2' DELAYED READING AFTER 1 Day: 8.1'	 MSET	BORING STARTED: 8/8/17 BORING COMPLETED: 8/8/17 LOGGED BY: GPF BORING METHOD: HSA
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875


MSET PROJECT NO.: 17439		LOG OF BORING NO. B-10				Page 1 of 1	
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois		
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler		





DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Black Sandy CLAY Topsoil 6"	98.5	SS	1	15	2			
		FILL: Brown SAND, little to some Gravel, SP, medium dense	98.0		2	22	3			
4						3	16	9		
		FILL: Black & Brown SAND & GRAVEL, little Clay, Gm-SM trace Slag	93.5	SS	4	4	27	89	1.20	
		Black & Dark Grey CLAY, CL-CH	92.5							
8		Grey & Dark Grey Silty CLAY, trace Sand, stiff, CL to light grey with fe stains	91.5							
			91.0	SS	5	4	25	95	1.51	
12		Brown and Grey to Grey Silty CLAY, trace Sand, trace Gravel, CL very stiff	88.0							
				SS	7	10	24	100	3.10	
16										
		Grey Silty CLAY to Clayey SILT, little Sand, trace Gravel, CL-ML	81.0	SS	8	19	19	106	2.33	
20		sand seam at 19'								
		Grey Silty CLAY, little Sand, trace Gravel, CL very stiff to hard	78.0							
				SS	9	23	16	115	2.10	
24										
					10	20	11	117	7.72	
		End of Boring at 25 Feet	73.5							

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING: 5.5' IMMEDIATELY AFTER DRILLING: 18.2' DELAYED READING AFTER 1 Day: 5.5'		BORING STARTED: 8/7/17 BORING COMPLETED: 8/7/17 LOGGED BY: GPF BORING METHOD: HSA
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 (847) 844-3875

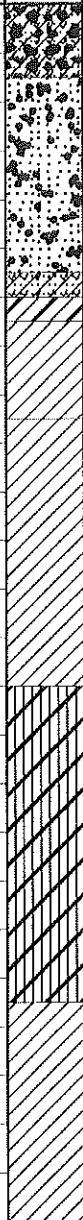
MSET PROJECT NO.: 17439		LOG OF BORING NO. B-11				Page 1 of 1			
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois				
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler				





DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Brown & Black Silty CLAY, some Sand, Little to some Gravel, SC-GC hard	100.0	SS	1	14	16		4.5 + Qp	
		FILL: Black SAND, little Clay, SC medium dense	98.0	SS	2A	18	11			
			97.0		2B	19	2			
4		FILL: Brown SAND, little to some Gravel, SP-GP medium dense	96.0	SS	3	19	5			
		Dark Brown Clay FILL layer at 4 Feet								
		FILL: Brown SAND & GRAVEL, GP-SP, wet, slightly dense	93.5	SS	4A	9	11			
			92.5		4B	4	18			
8		Black & Dark Grey CLAY, CL-CH		SS	5	4	-			
		Grey to Dark Grey Silty CLAY, trace Sand, trace fibers, fe stains, CL, very stiff	91.0	SS	6	7	24	97	2.06	
12		Brown & Grey Silty CLAY, trace Sand, trace Gravel, CL very stiff moist seams at 14 & 14.5 feet	88.0	SS	7	7	21	103	3.76	
			SS	8	7	27	92	2.44		
16										
	Grey Clayey SILT, little Sand, CL-ML, medium dense	82.5	SS	9	16	18				
20	Grey Silty CLAY, little Sand, trace Gravel, CL hard to very hard	79.5	SS	10	20	15	114	8.94		
24			SS	11	21	16	113	7.95		
		End of Boring at 25 Feet	75.0							

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING:  6.0' IMMEDIATELY AFTER DRILLING:  Dry DELAYED READING AFTER 1 Day:  0.4 ft	 <div style="font-size: 24pt; font-weight: bold; margin-top: 5px;">MSET</div>	BORING STARTED: 8/8/17 BORING COMPLETED: 8/8/17 LOGGED BY: GPF BORING METHOD: HSA
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875

MSET PROJECT NO.: 17439		LOG OF BORING NO. B-12				Page 1 of 1	
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois		
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler		

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Black SAND, little Clay, some Gravel, SC-GC Topsoil	98.3	SS	1	16	6			
		FILL: Brown SAND, little to some Gravel, SP-GP medium dense	96.8	SS	2	15	6			
4				SS	3A	16	11			
		moist	93.3							
		Black Sandy CLAY, SC stiff	92.8		3B	8	34		1.0 Qp	
		Black CLAY, CL-CH stiff	92.3	SS	4A	4	37		1.0 Qp	
		Grey & Dark Grey Silty CLAY, trace Sand, CL, very stiff	91.8		4B	6	25	94	2.29	
8				SS	5	5	21	102	2.99	
		Brown & Grey Silty CLAY, trace Sand, trace Gravel, CL very stiff	89.8							
				SS	6	6	23	100	2.29	
12				SS	7	8	25	95	2.68	
		Grey SILT to Clayey SILT, trace Sand, CL-ML medium dense	84.3	SS	8	21	18			
16										
		to little sand, trace Gravel	79.3	SS	9	28	10	118	6.28	
20										
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	77.8	SS	10	18	15	111	7.33	
24										
				SS	11	23	12	116	7.64	
		End of Boring at 25 Feet	73.3							

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING:  5.0' IMMEDIATELY AFTER DRILLING:  19.4' DELAYED READING AFTER 1 Day:  4.8'	 MSET	BORING STARTED: 8/7/17 BORING COMPLETED: 8/7/17 LOGGED BY: GPF BORING METHOD: HSA
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875

MSET PROJECT NO.: 17439		LOG OF BORING NO. B-13			Page 1 of 1		
PROJECT: <u>Police and Fire Training Campus</u>				SITE LOCATION: <u>Chicago, Illinois</u>			
BORING LOCATION: <u>See Location Map</u>				CLIENT: <u>AMEC Foster Wheeler</u>			

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Black SAND, little Gravel, trace Clay, Topsoil 12"	98.5							
		FILL: Brown SAND, little to some Gravel, trace Silt, GP-GP medium dense	97.5	SS	1	19	5			
4		FILL: Black SAND & GRAVEL, trace Slag, trace Clay, wet, slightly dense to brown at 6 Feet	94.0							
		Dark Grey CLAY, CL-CH stiff	92.0	SS	2	15	12			
8		Light Grey, trace Dark Grey Silty CLAY, trace Sand, fe stains, CL stiff	90.5							
				SS	3A	10	11			
		Brown & Grey Silty CLAY, trace Sand, trace Gravel, CL stiff	88.0							
				SS	3B	4	38			1.0 Qp
12		Grey Clayey SILT, little Sand, CL-ML, hard sand seam at 17' clay seam at 17.2'	85.5							
				SS	4	5	25	103		1.94
16		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	5	6	23	100		1.40
20		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	6	7	25	100		2.10
24		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	7	22	20	106		5.03
28		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	8	28	12			
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	9	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	10	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	11	21	12	119		7.53
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	12	28	12			
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	13	22	20	106		5.03
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	14	28	12			
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	15	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	16	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	17	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	18	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	19	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	20	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	21	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	22	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	23	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	24	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	25	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	26	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	27	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	28	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	29	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	30	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	31	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	32	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	33	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	34	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	35	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	36	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	37	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	38	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	39	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	40	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	41	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	42	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	43	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	44	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	45	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	46	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	47	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	48	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	49	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	50	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	51	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	52	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	53	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	54	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	55	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	56	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	57	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	58	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	59	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	60	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	61	18	16	111		7.22
		Grey Clayey SILT, little Sand, trace Gravel, CL-ML hard	75.5							
				SS	62	26	11	117		4.66
		Grey Silty CLAY, little Sand, trace Gravel, CL hard	78.0							
				SS	63	18	16	111		7.22

MSET PROJECT NO.: 17439		LOG OF BORING NO. B-14				Page 1 of 1			
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois				
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler				

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0	[Pattern: Dotted]	FILL: Black SAND, little Gravel, SP	97.9	SS	1	8	11			
		Topsoil 12"	96.9							
	[Pattern: Dotted]	FILL: Brown SAND, little to some Gravel, SP-GP slightly dense	95.4	SS	2	7	21		2.5 Qp	
4		FILL: Dark Brown Sandy CLAY, little Gravel, SC, slightly dense	93.9							
	[Pattern: Dotted]	FILL: Brown SAND, little to some Gravel, moist, SP, medium dense	91.9	SS	3	16	8			
		Dark Grey CLAY, CL-CH stiff	91.4							
8	[Pattern: Diagonal Lines]	Grey & Dark Grey Silty CLAY, trace Sand, fe stains, CL	89.4	SS	4	5	26	92	1.86	
		trace wood/organics								
	[Pattern: Diagonal Lines]	Brown, Grey & Dark Grey Silty CLAY, trace Sand, CL very stiff to stiff	87.9	SS	5	6	26	83	1.40	
12	[Pattern: Diagonal Lines]			SS	6	8	30	89	2.06	
	[Pattern: Diagonal Lines]	very moist at 13'		SS	7	6	34	100	1.13	
	[Pattern: Diagonal Lines]	Grey Clayey SILT, little Sand, trace Gravel, CL-ML, medium dense	83.4	SS	8A	6	19	104	2.83	
16										
	[Pattern: Diagonal Lines]				8B	18	15	111		
	[Pattern: Diagonal Lines]	Grey Silty CLAY, little Sand, trace Gravel, CL hard to very hard	80.4							
20	[Pattern: Diagonal Lines]			SS	9	23	12	115	9.47	
	[Pattern: Diagonal Lines]			SS	10	28	16	114	8.26	
24	[Pattern: Diagonal Lines]			SS	11	21	12	121	6.79	
28	[Pattern: Diagonal Lines]									
	[Pattern: Diagonal Lines]			SS	12	20	12	120	4.58	
	End of Boring at 30 Feet		68.4							

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING: ▽ 6.0' IMMEDIATELY AFTER DRILLING: ▽ dry DELAYED READING AFTER 3 Days: ▽ 7.0'	 MSET	BORING STARTED: <u>8/4/17</u> BORING COMPLETED: <u>8/4/17</u> LOGGED BY: <u>GPF</u> BORING METHOD: <u>HSA</u>
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875


MSET PROJECT NO.: 17439		LOG OF BORING NO. B-15				Page 1 of 1	
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois		
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler		





DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Black Clayey SAND, little Gravel, SC Topsoil 18"	101.8	SS	1A	8	11			
		FILL: Black SAND & SLAG, SP, slightly to medium dense	100.3	SS	1B 2A	8 11	65 10			
4		FILL: Brown SAND, little Gravel, trace to little Silt, SP medium to slightly dense	98.8		2B	10	6			
				SS	3	12	8			
		moist	96.3							
		FILL: Brown to Black Sandy CLAY, little Gravel, wet, SC, slightly to medium dense	95.8	SS	4	6	23			
8				SS	5	11	19			
				SS	6A	7	13			
					6B	4	34		1.25 Qp	
12		Black & Dark Grey CLAY, CL-CH stiff	90.3	SS	7	6	27			
		Grey to Dark Grey Silty CLAY, trace Sand, fe stains, CL, trace fibers, stiff	89.3							
			SS	8	6	25	101	3.49		
16	Brown & Grey Silty CLAY, little Sand, trace Gravel, CL, very stiff	87.3								
			SS	9	27	15	117	3.65		
20	Grey Clayey SILT, little Sand, trace Gravel, CL medium dense to dense	84.3								
			SS	10	30	11	117	5.05		
24	Grey Silty CLAY, little Sand, trace Gravel, CL, hard	81.3								
			SS	11	12	17	110	5.41		
		End of Boring at 25 Feet	76.8							

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING: 6.0' IMMEDIATELY AFTER DRILLING: 12.6' DELAYED READING AFTER 1 Day: 8.1'	 MSET	BORING STARTED: 8/8/17 BORING COMPLETED: 8/8/17 LOGGED BY: GPF BORING METHOD: HSA
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875

MSET PROJECT NO.: 17439		LOG OF BORING NO. B-16				Page 1 of 1			
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois				
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler				

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Black SAND, little Clay, SP-SC Topsoil 18"	99.9	SS	1	18	6			
		FILL: Brown SAND, little to some Gravel, SP-GP medium dense	98.4	SS	2	17				
4				SS	3	16	4			
		Silty SAND layer	93.4	SS	4	7	34			
8		FILL: Black SAND & GRAVEL, little Silt, trace Slag, wood, SM-GM	92.9							
		Black CLAY, CL-CH stiff	91.9	SS	5	4	32			1.0
		Grey and Dark Grey Silty CLAY, trace Sand, CL firm	91.4							
				SS	6A	4	26	104		0.93
				SS	6B	5	22	100		3.45
12		Brown & Grey Silty CLAY, little Sand, trace Gravel, CL very stiff	88.9							
	moist	86.4	SS	7	4	24	97		1.55	
			SS	8	4	23	97		2.10	
16										
	Grey Silty CLAY, little Sand, trace Gravel, CL hard	82.4								
20			SS	9	26	12	120		5.90	
			SS	10	19	16	111		5.86	
24			SS	11	17	16	113		5.63	
		End of Boring at 25 Feet	74.9							

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING:  6.0' IMMEDIATELY AFTER DRILLING:  7.7' DELAYED READING AFTER 1 Day:  7.3'	 <div style="font-size: 2em; font-weight: bold; margin-top: 5px;">MSET</div>	BORING STARTED: 8/7/17 BORING COMPLETED: 8/7/17 LOGGED BY: GPF BORING METHOD: HSA
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875

MSET PROJECT NO.: 17439		LOG OF BORING NO. B-17				Page 1 of 1			
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois				
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler				

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0	[Pattern]	FILL: Black SAND, trace Silt, SP	99.2	SS	1A	10	8			Poor Recovery
		Topsoil 12"	98.2		1B	24	4			
		FILL: Brown SAND & GRAVEL, little clay, GP-SP medium dense		SS	2	19	-			
4	[Pattern]	FILL: Brown SAND, little to some Gravel, little Silt, SP-GP, medium dense	95.2	SS	3	13	14			
				SS	4A	6	44			
				4B	4	36		1.25 Qp		
8	[Pattern]	Black, trace Slag, wet	92.2							
		Dark Grey & Black CLAY, CL-CH stiff	91.7	SS	5	4	28	90	1.20	
		Light Grey and Dark Grey Silty CLAY, trace Sand, fe stains, CL very stiff	90.7	SS	6	8	27	90	2.25	
12	[Pattern]									
		Brown & Grey Silty CLAY, little Sand, trace Gravel, CL very stiff	86.7	ST	7		20	108		
16	[Pattern]	Grey Clayey SILT, trace to little Sand, trace Gravel, CL-ML very stiff	83.7	SS	8	19	17	107	2.91	
				SS	9	24	13	116	3.75	
20	[Pattern]									
		to Silty CLAY, hard	78.7	SS	10	24	11	114	9.00	
24	[Pattern]			SS	11	22	12	112	9.47	
		End of Boring at 25 Feet	74.2							

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING: 6.5' IMMEDIATELY AFTER DRILLING: 16.5' DELAYED READING AFTER 1 Day: 7.2'	 MSET	BORING STARTED: 8/4/17 BORING COMPLETED: 8/4/17 LOGGED BY: GPF BORING METHOD: HSA
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875


MSET PROJECT NO.: 17439		LOG OF BORING NO. B-18			Page 1 of 1		
PROJECT: Police and Fire Training Campus				SITE LOCATION: Chicago, Illinois			
BORING LOCATION: See Location Map				CLIENT: AMEC Foster Wheeler			





DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Brown to Black Silty SAND, some Gravel, little Slag, SM-GM medium to slightly dense	106.3	SS	1	13	7			
			SS	2	7	15				
4				SS	3	14	3			
			SS	4	6	7				
8			SS	5	8	4				
			SS	6	7	5				
12		FILL: Brown & Dark Grey SAND & GRAVEL, trace Slag, wet, GP-SP slightly dense	94.3	SS	7A	6	22			
				SS	7B	4	32	90	1.71	
			Black to Dark Grey CLAY, CL-CH stiff	92.1						
16			Light Grey Silty CLAY, trace Sand, trace Gravel, CL very stiff	90.3	SS	8	6	23	97	3.30
		End of Boring at 16 Feet								

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING: 12.5' IMMEDIATELY AFTER DRILLING: Dry DELAYED READING AFTER 2 hrs: 009.7'	 MSET	BORING STARTED: 8/9/17 BORING COMPLETED: 8/9/17 LOGGED BY: GPF BORING METHOD: HSA
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875


MSET PROJECT NO.: 17439		LOG OF BORING NO. ESB-1				Page 1 of 1			
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois				
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler				





DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Brown & Black Sandy CLAY, some Gravel, SC-GC medium dense Concrete	106.3	SS	1	19	6			
			104.8							
		FILL: Black SAND, some Gravel, little clay, trace Slag, SP-GP slightly dense	103.8	SS	2	7	6			
4				SS	3	7	8			
		Wood, Organics	99.8	SS	4	10	6			
8				SS	5	6	22			
		FILL: Black Sandy CLAY, some Gravel, trace slag, SC-GC, slightly to medium dense	97.8							
		scrap metal	96.3	SS	6	17	12			
12		brick fragments	94.5							
		FILL: Brown SAND, little to some Gravel, SP-GP, dense	93.8	SS	7	31	4			
		FILL: Dark Brown & Black Silty CLAY, some Sand, some Gravel, SC-GC, very stiff	92.3	SS	8A	11	16		2.5 Qp	
16			90.8		8B	18	4			
		FILL: Brown SAND, little to some Gravel, SP medium dense								
		FILL: Brown Silty SAND, SM, wet, slightly dense	88.8							
20		86.8	SS	9A	9	20				
		86.3		9B	4	34	84	2.29		
		Black to Dark Grey CLAY, CL-CH very stiff								
		End of Boring at 20 Feet								

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING:  19.0' IMMEDIATELY AFTER DRILLING:  Dry DELAYED READING AFTER 4 hrs  Dayc	 MSET	BORING STARTED: 8/9/17 BORING COMPLETED: 8/9/17 LOGGED BY: GPF BORING METHOD: HISA
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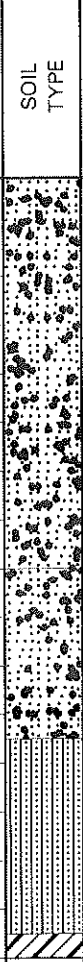
MSET PROJECT NO.: 17439		LOG OF BORING NO. ESB-2				Page 1 of 1			
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois				
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler				





DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Brown, Grey, & Black Silty CLAY, some Sand, little Gravel, CL very stiff	112.4	SS	1	6	11		3.5 Qp	
		heavy roots at 5"	110.9							
		FILL: Black Clayey SAND, SC Topsoil	110.4	SS	2	18	3			
4		FILL: Brown SAND, little to some Gravel, SP-GP, medium to slightly dense		SS	3	6	-			
				SS	4	11	5			
8				SS	5	9	3			
				SS	6	25	5			
12		Black, moist	100.9	SS	7	4	27	88	2.60	
	Black to Dark Grey Silty CLAY, trace Sand, CL-CH very stiff	99.4								
	Light Grey, trace Dark Grey Silty CLAY, trace Sand, fe stains, CL, very stiff	98.4	SS	8	7	21	99	2.83		
16	End of Boring at 16 Feet	96.4								

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING:  None IMMEDIATELY AFTER DRILLING:  Dry DELAYED READING AFTER Completion:  Dry	 <div style="font-size: 24pt; font-weight: bold; margin-top: 5px;">MSET</div>	BORING STARTED: 8/2/17 BORING COMPLETED: 8/2/17 LOGGED BY: GPF BORING METHOD: HSA
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875

MSET PROJECT NO.: 17439		LOG OF BORING NO. ESB-3			Page 1 of 1		
PROJECT: Police and Fire Training Campus				SITE LOCATION: Chicago, Illinois			
BORING LOCATION: See Location Map				CLIENT: AMEC Foster Wheeler			

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Black SAND, some Gravel, little clay, little RAP, SP-GP, medium dense to dense	106.2	SS	1	11	7			
			SS	2	11	8				
4			SS	3	10	7				
			SS	4	30	7				
8		FILL: Brown SAND, little to some Gravel, SP-GP medium dense	98.2	SS	6	16	7			
			SS	7	12	5				
12		FILL: Brown Silty SAND, little to some Gravel, SM, slightly dense	94.7	SS	8	7	10			
		moist	92.7							
			91.2	SS	9A	7	32			
		fine slag or glass	90.7		9B	2	82	57	1.09	
16		Black to Dark Grey CLAY, CL-CH, stiff	90.2							
		End of Boring at 16 Feet								

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING:  14.0' IMMEDIATELY AFTER DRILLING:  dry DELAYED READING AFTER 	 MSET	BORING STARTED: 8/2/17 BORING COMPLETED: 8/2/17 LOGGED BY: GPF BORING METHOD: HSA
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875


MSET PROJECT NO.: 17439		LOG OF BORING NO. ESB-4			Page 1 of 1		
PROJECT: Police and Fire Training Campus				SITE LOCATION: Chicago, Illinois			
BORING LOCATION: See Location Map				CLIENT: AMEC Foster Wheeler			





DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Black Clayey SAND, some Gravel, little Concrete, SC-GC Topsoil	108.6	SS	1	50/3"				
		FILL: Brown SAND, little to some Gravel, trace Clay, SP-GP medium to slightly dense	107.1	SS	2	10	4			
4			SS	3	10	6				
			SS	4	7					
8		Silty sand layer, wet	101.6							
		Black Slag	100.6	SS	5A	8	12			
		Brown & Grey SAND & GRAVEL	100.1							
		Dark Grey & Black CLAY, CL-CH stiff	99.6		5B	4	20		1.0 Qp	
		Grey & Dark Grey Silty clay, trace Sand, trace Gravel, CL stiff	98.6	SS	6	7	25	93	1.90	
12				SS	7	8	25	93	2.25	
		Brown, Grey, & Dark Grey Silty CLAY, trace Sand, trace Gravel, CL very stiff	96.1							
		moist seam	95.1	SS	8	6	-			
16		End of Boring at 16 Feet	92.6							

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING: 6.5' IMMEDIATELY AFTER DRILLING: 7.2' DELAYED READING AFTER 1 Day: 7.1'	 MSET	BORING STARTED: <u>8/7/17</u> BORING COMPLETED: <u>8/7/17</u> LOGGED BY: <u>GPF</u> BORING METHOD: <u>HSA</u>
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875

MSET PROJECT NO.: 17439		LOG OF BORING NO. ESB-5			Page 1 of 1		
PROJECT: Police and Fire Training Campus				SITE LOCATION: Chicago, Illinois			
BORING LOCATION: See Location Map				CLIENT: AMEC Foster Wheeler			

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Black SAND, some Gravel, SP-GP medium dense	102.0	SS	1A	19	5			
			101.0		1B	16	3			
		FILL: Brown SAND, little to some Gravel, SP-GP, medium dense		SS	2	19	6			
4				SS	3	16	11			
		moist	96.5							
				SS	4A	3	12			
		Brown & Black, wet	95.0							
8		Dark Grey CLAY, CL-CH firm	94.5		4B	2	46		0.75 Qp	
		Light Grey Silty CLAY, trace Sand, fe stains, CL soft	94.0	SS	5	3	24	107	0.31	
				SS	6	7	21	105	3.18	
12			SS	7	12	18	112	4.62		
		sand seam at 13.5'	88.5							
		Grey Silty CLAY, trace Sand, trace Gravel, CL very stiff	88.0	SS	8	8	20	107	2.95	
16		End of Boring at 16 Feet	86.0							

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING:  7.0' IMMEDIATELY AFTER DRILLING:  -- DELAYED READING AFTER 1 Day:  5.4'	 MSET	BORING STARTED: 8/3/17 BORING COMPLETED: 8/3/17 LOGGED BY: GPF BORING METHOD: HSA
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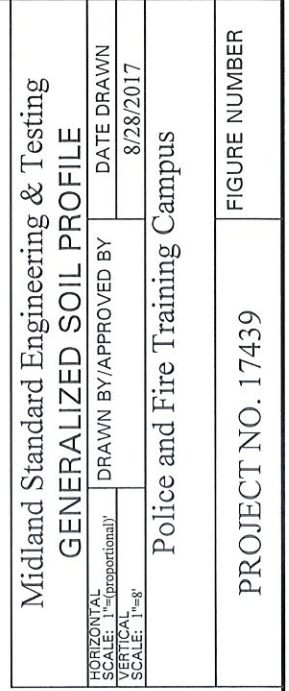
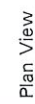
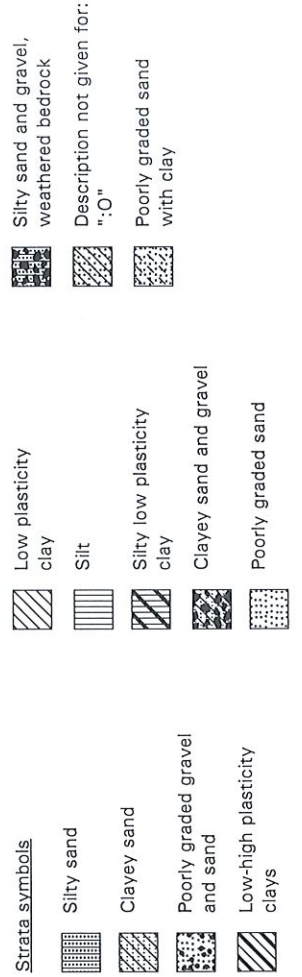
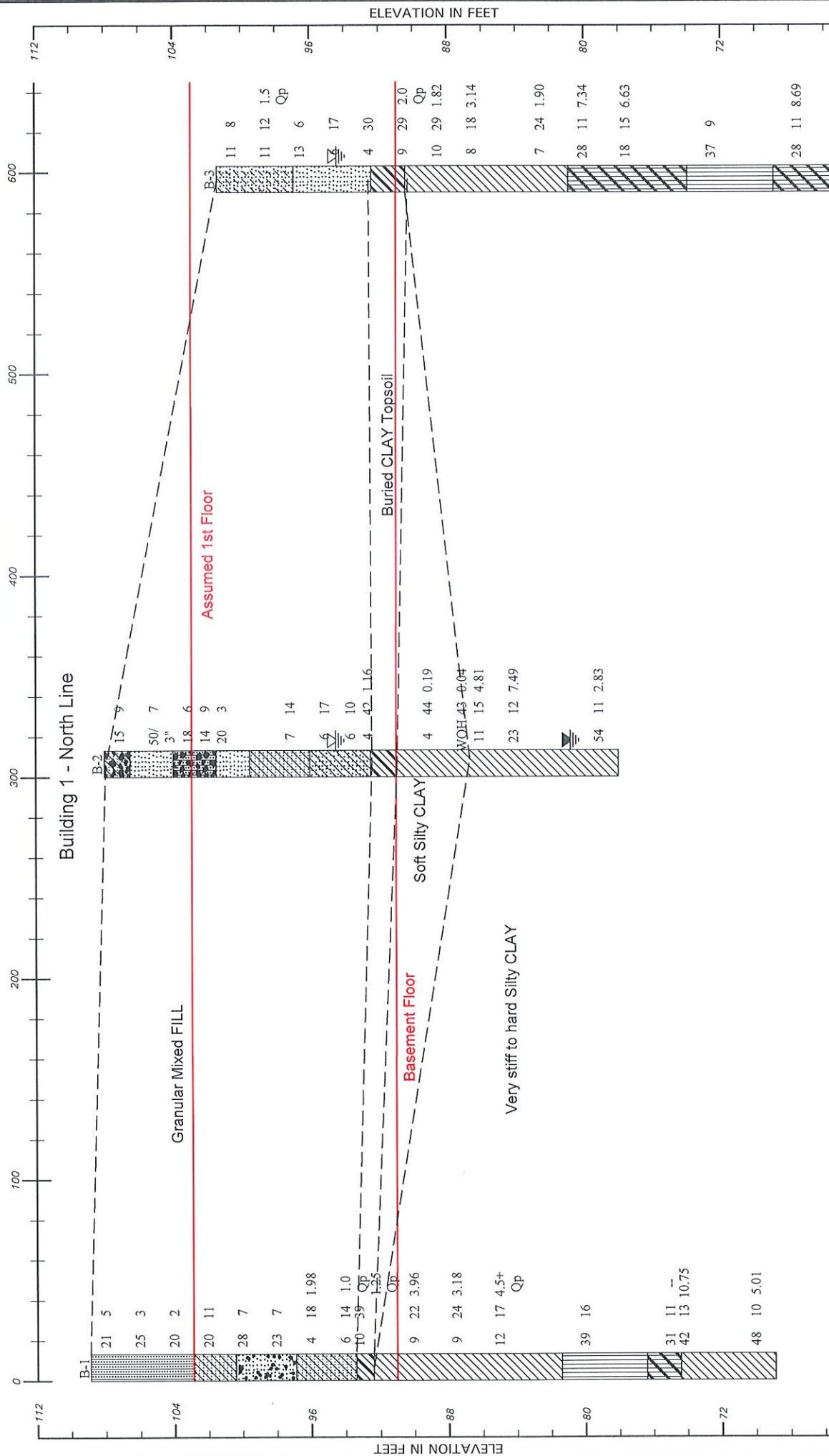
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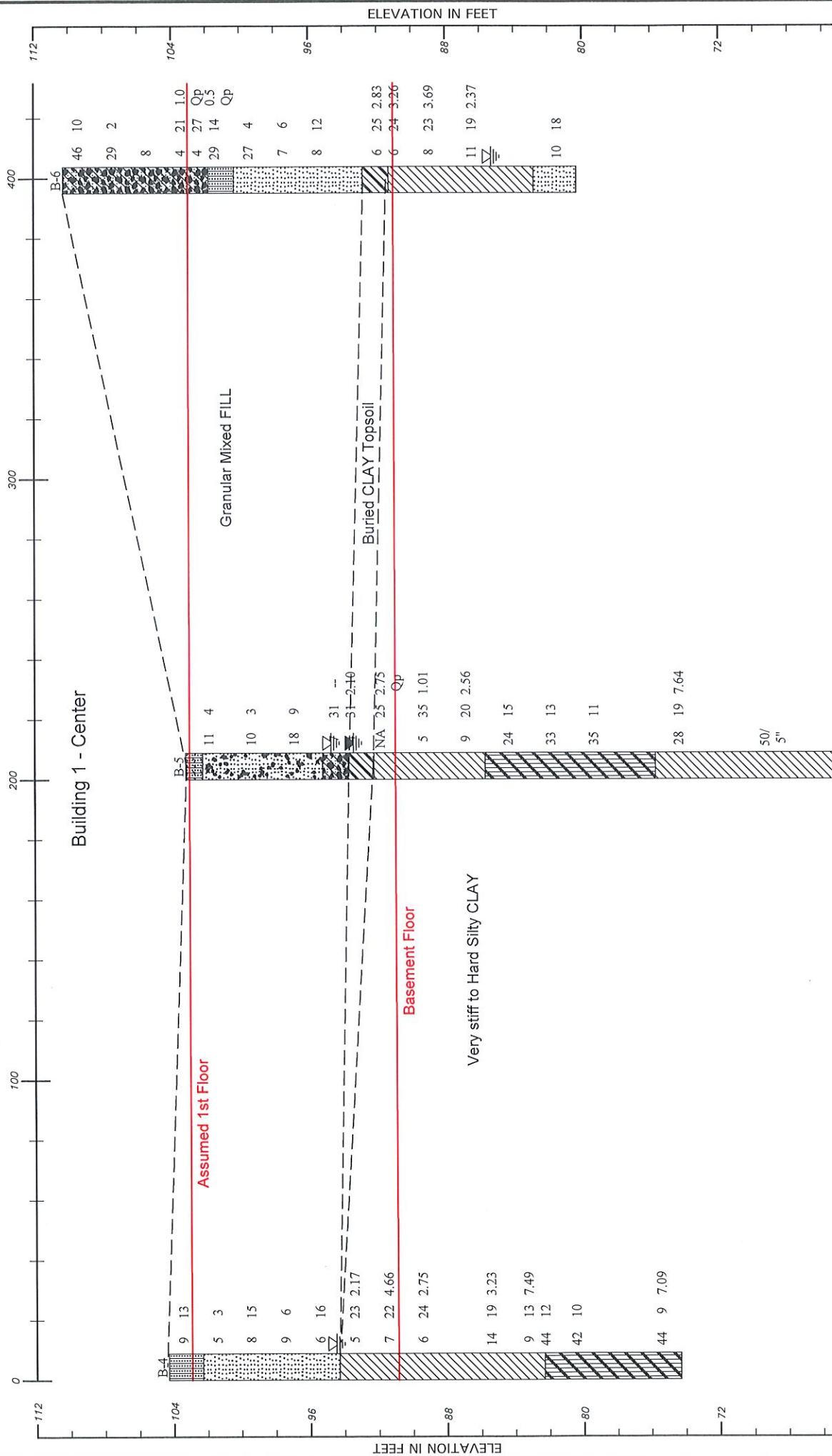
MSET PROJECT NO.: 17439		LOG OF BORING NO. ESB-6				Page 1 of 1			
PROJECT: Police and Fire Training Campus					SITE LOCATION: Chicago, Illinois				
BORING LOCATION: See Location Map					CLIENT: AMEC Foster Wheeler				

DEPTH (feet)	SOIL TYPE	Material Description	Elevation	SAMPLE			TESTS			REMARKS
				TYPE/ INTERVAL	NO.	N-VALUE Blows per ft.	Wc%	Dry Unit Weight, pcf	Unconfined Compressive Strength, tsf	
0		FILL: Black SAND, little Gravel, SP, Topsoil	100.5	SS	1	14	10			
				SS	2	38	9			
4		to Brown & Black, some Gravel	97.0							
		FILL: Brown SAND, little Gravel, trace clay, SP dense to medium dense	96.5	SS	3	13	5			
		wet	94.0	SS	4	8	18			
8		Black, trace Slag	93.0							
				SS	5A	10	13			
					5B	4	29	83	1.28	
		Dark Grey & Black CLAY, trace Sand, CL-CH stiff	91.0							
		Light Grey & Dark Grey Silty CLAY, trace Sand, fe stains, CL very stiff	90.0	SS	6	7	24	104	2.33	
12		Brown, Grey & Dark Grey Silty CLAY, little Sand, trace Gravel, CL very stiff	88.5	SS	7	5	26	98	2.33	
				SS	8	9	23		3.0 Qp	
16		End of Boring at 16 Feet	84.5							

WATER LEVEL OBSERVATIONS, ft. DURING DRILLING: 7.0' IMMEDIATELY AFTER DRILLING: 11.5' DELAYED READING AFTER Well		BORING STARTED: 8/4/17 BORING COMPLETED: 8/4/17 LOGGED BY: GPF BORING METHOD: HSA
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Midland Standard Engineering & Testing, Inc. 558 Plate Drive Unit 6, East Dundee, IL 60118 (847) 844-1895 f(847) 844-3875





Plan View

Strata symbols

 Silt

	Silty sand
	Poorly graded sand
	Low plasticity clay
	Silty low plasticity clay

Symbol	Description not given for: "OT"
	Poorly graded gravel and sand
	Clayey sand and gravel
	Low-high plasticity clays

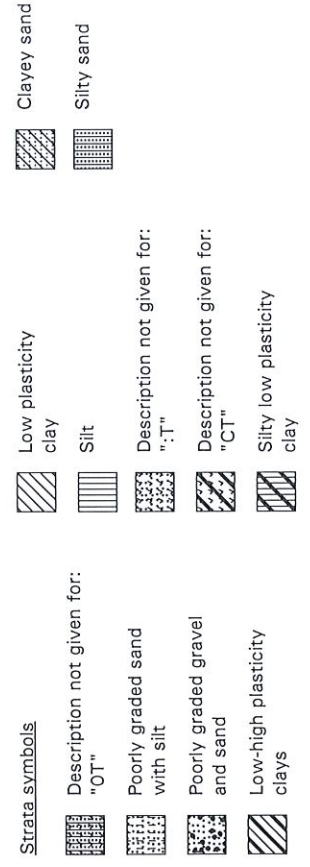
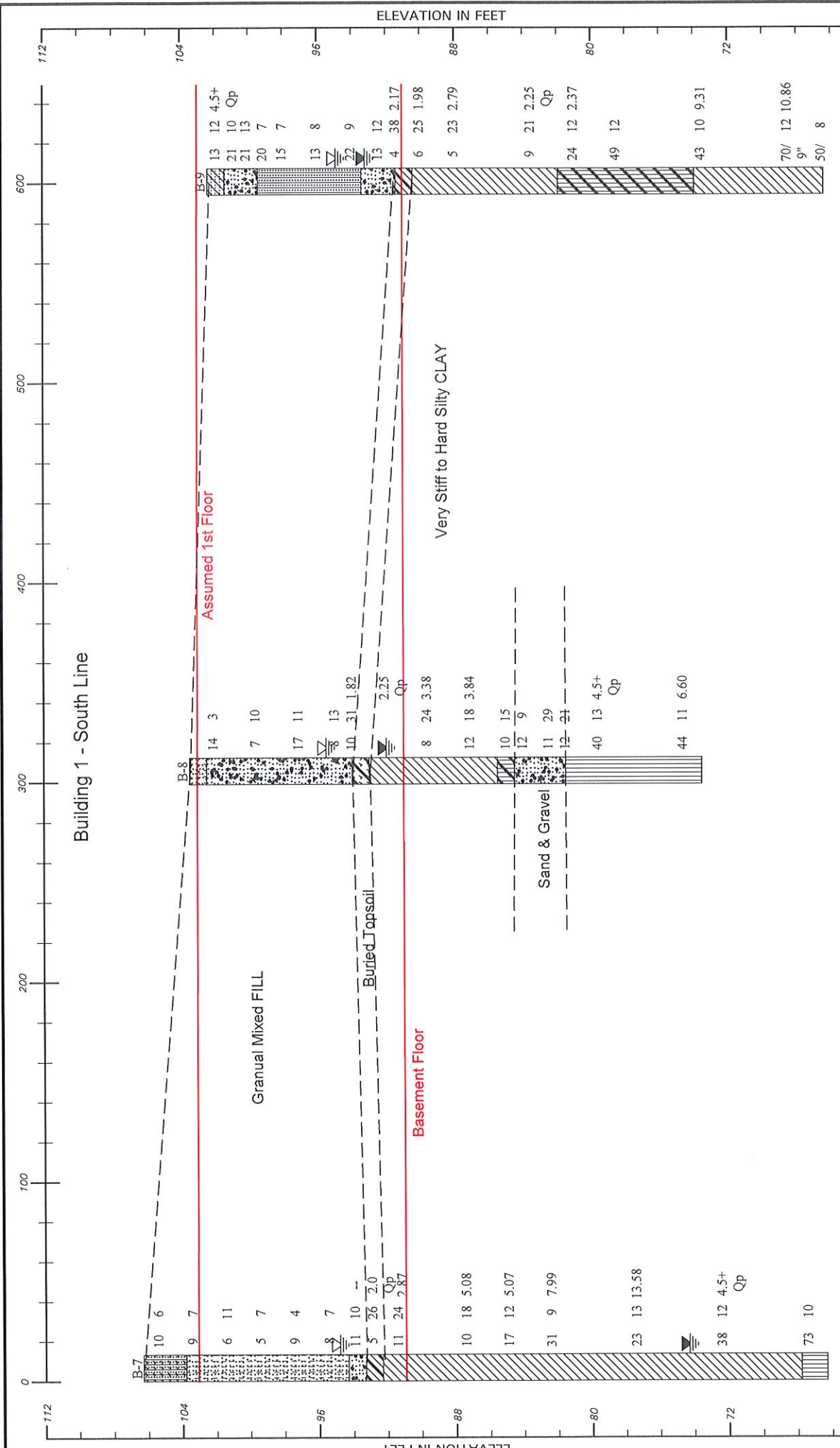
Midland Standard Engineering & Testing GENERALIZED SOIL PROFILE

HORIZONTAL SCALE: 1"=6'	DRAWN BY/ APPROVED BY		DATE DRAWN 8/28/2017
	VERTICAL SCALE: 1"=8'		

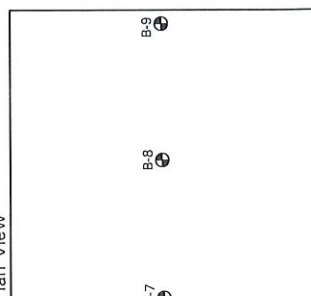
Police and Fire Training Campus

PROJECT NO. 17439

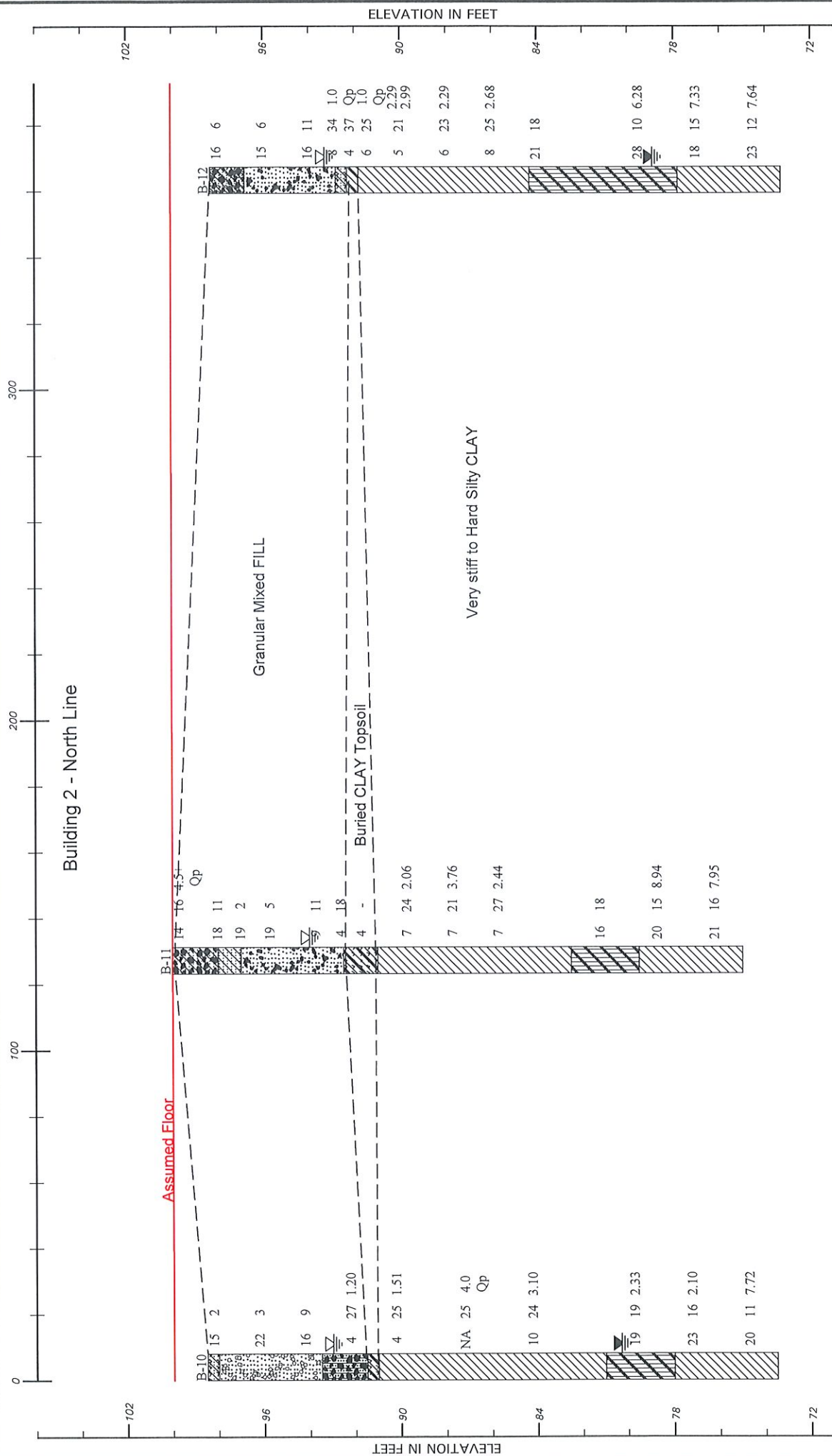
FIGURE NUMBER



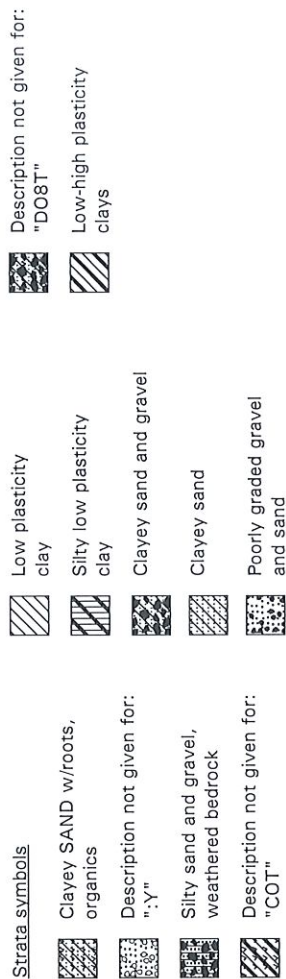
Plan View



Midland Standard Engineering & Testing	
GENERALIZED SOIL PROFILE	
HORIZONTAL SCALE: 1" = 100'	DRAWN BY/APPROVED BY
DATE: 8/28/2017	DATE DRAWN
Police and Fire Training Campus	
PROJECT NO. 17439	
FIGURE NUMBER	



Plan View

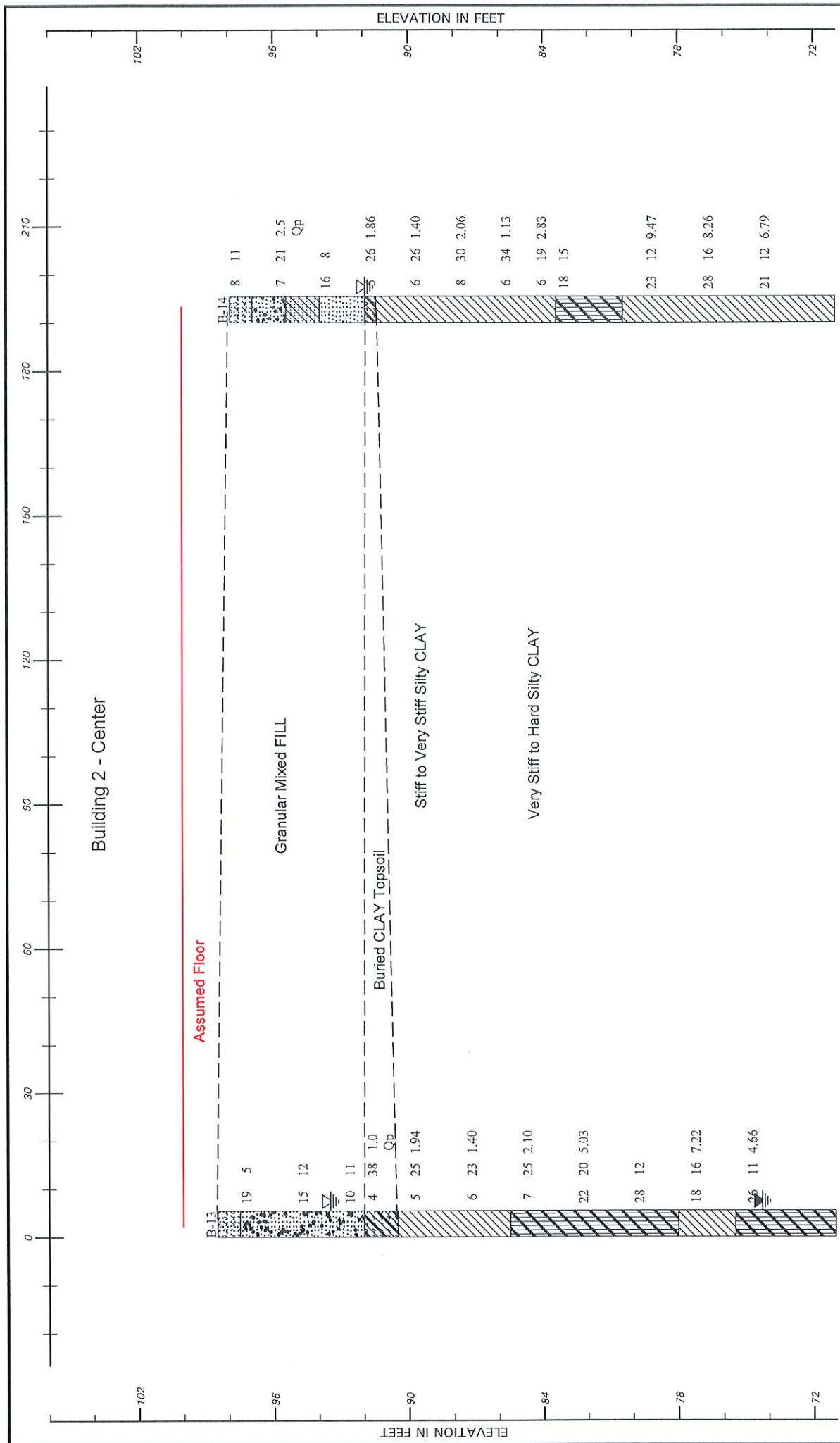
Midland Standard Engineering & Testing
GENERALIZED SOIL PROFILE

HORIZONTAL SCALE: 1"=6'	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=6'		

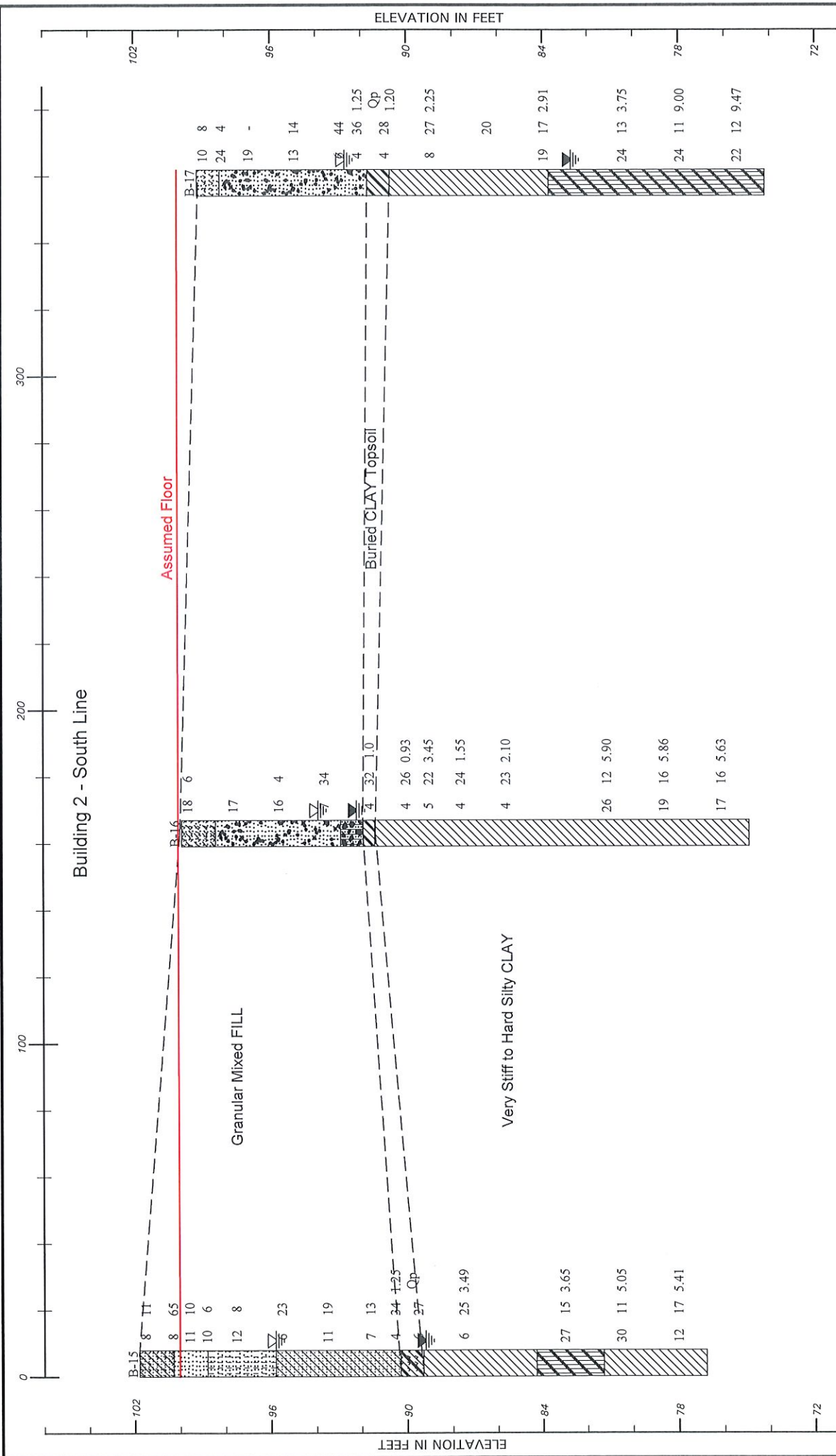
Police and Fire Training Campus

PROJECT NO. 17439

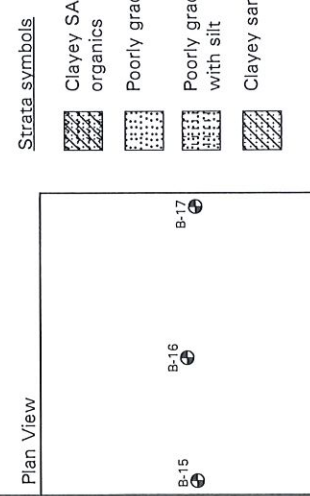
FIGURE NUMBER



Midland Standard Engineering & Testing	
GENERALIZED SOIL PROFILE	
HORIZONTAL SCALE: 1"=60' (proportional)	DRAWN BY/APPROVED BY
VERTICAL SCALE: 1"=6'	DATE DRAWN
Police and Fire Training Campus	
PROJECT NO. 17439	
FIGURE NUMBER	



- Strata symbols**
- Clayey SAND w/roots, organics
 - Poorly graded sand
 - Poorly graded sand with silt
 - Clayey sand
- Description not given for:**
- "COT"
 - Low plasticity clay
 - Silty low plasticity clay
 - Description not given for: ".RT"
 - Poorly graded gravel and sand
- Description not given for:**
- Silty sand and gravel, weathered bedrock
 - Low-high plasticity clays
 - Description not given for: ".T"



Midland Standard Engineering & Testing

GENERALIZED SOIL PROFILE

HORIZONTAL SCALE: 1"=60' (proportional)
 VERTICAL SCALE: 1"=6'

DRAWN BY/APPROVED BY: DATE DRAWN: 8/28/2017

Police and Fire Training Campus

PROJECT NO. 17439

FIGURE NUMBER

USGS Design Maps Summary Report

User-Specified Input

Report Title Chicago Police & Fire Training Campus
Fri August 25, 2017 14:09:23 UTC

Building Code Reference Document 2012/2015 International Building Code
(which utilizes USGS hazard data available in 2008)

Site Coordinates 41.89368°N, 87.73813°W

Site Soil Classification Site Class D – “Stiff Soil”

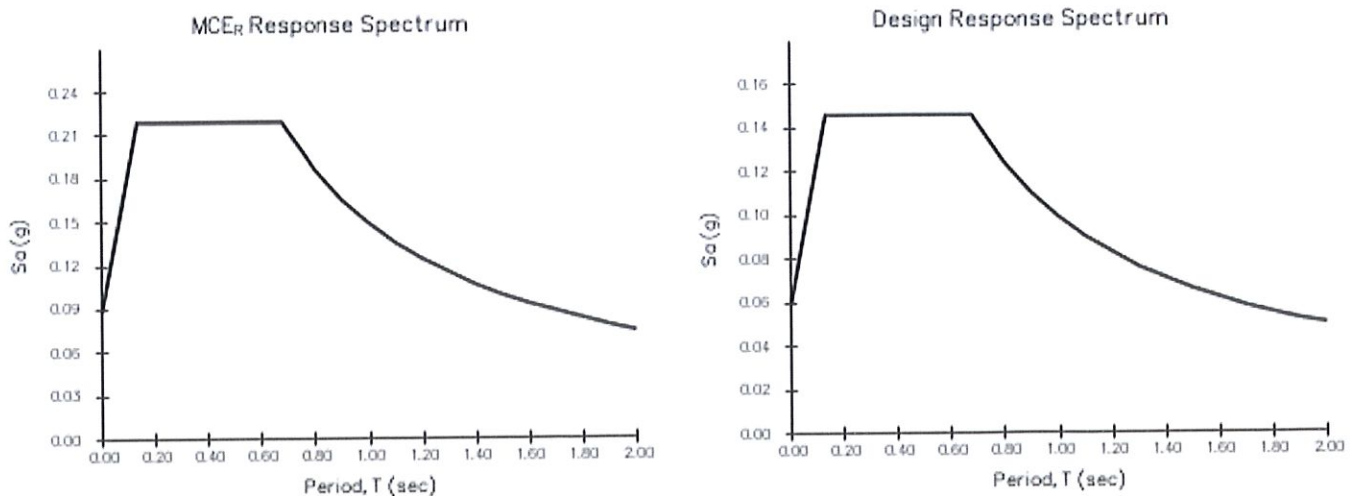
Risk Category I/II/III



USGS–Provided Output

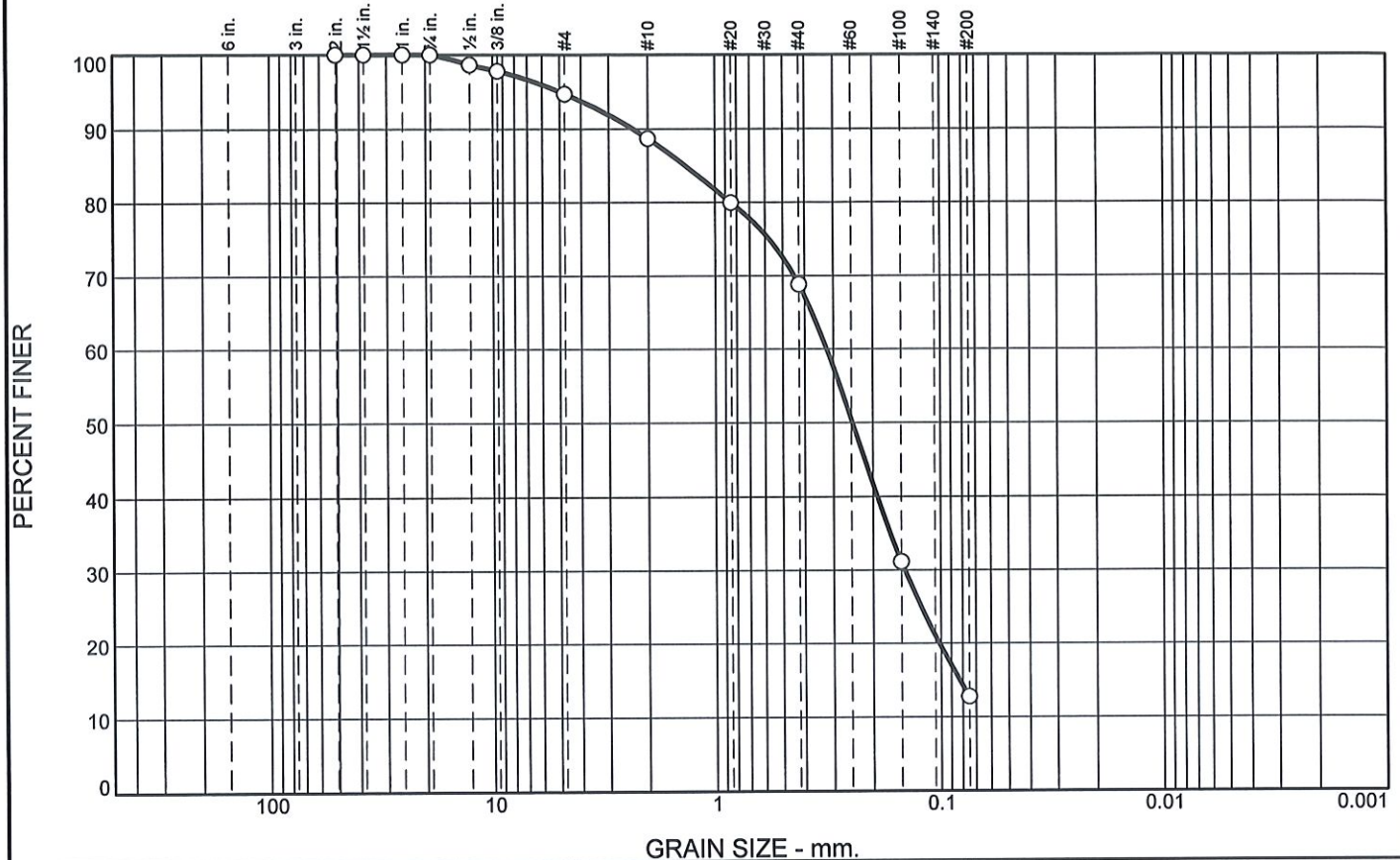
$S_s = 0.137 \text{ g}$	$S_{MS} = 0.219 \text{ g}$	$S_{DS} = 0.146 \text{ g}$
$S_1 = 0.062 \text{ g}$	$S_{M1} = 0.149 \text{ g}$	$S_{D1} = 0.099 \text{ g}$

For information on how the S_s and S_1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the “2009 NEHRP” building code reference document.



Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	5	6	20	56	13	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2"	100		
1 1/2"	100		
1"	100		
3/4"	100		
1/2"	99		
3/8"	98		
#4	95		
#10	89		
#20	80		
#40	69		
#100	31		
#200	13		

* (no specification provided)

Soil Description
Brown some Dark Grey SAND, trace Gravel, little Silt

Atterberg Limits
 PL= NP LL= NV PI= NP
Coefficients
 D₉₀= 2.3341 D₈₅= 1.3592 D₆₀= 0.3209
 D₅₀= 0.2466 D₃₀= 0.1449 D₁₅= 0.0826
 D₁₀= C_u= C_c=

Classification
 USCS= SM AASHTO= A-2-4(0)

Remarks

Location: B-7

Sample Number: SS-4

Depth: 6.0'-8.0'

Date:

Midland Standard Engineering & Testing

East Dundee, IL

Client: AMEC Foster Wheeler

Project: Police and Fire Training Campus

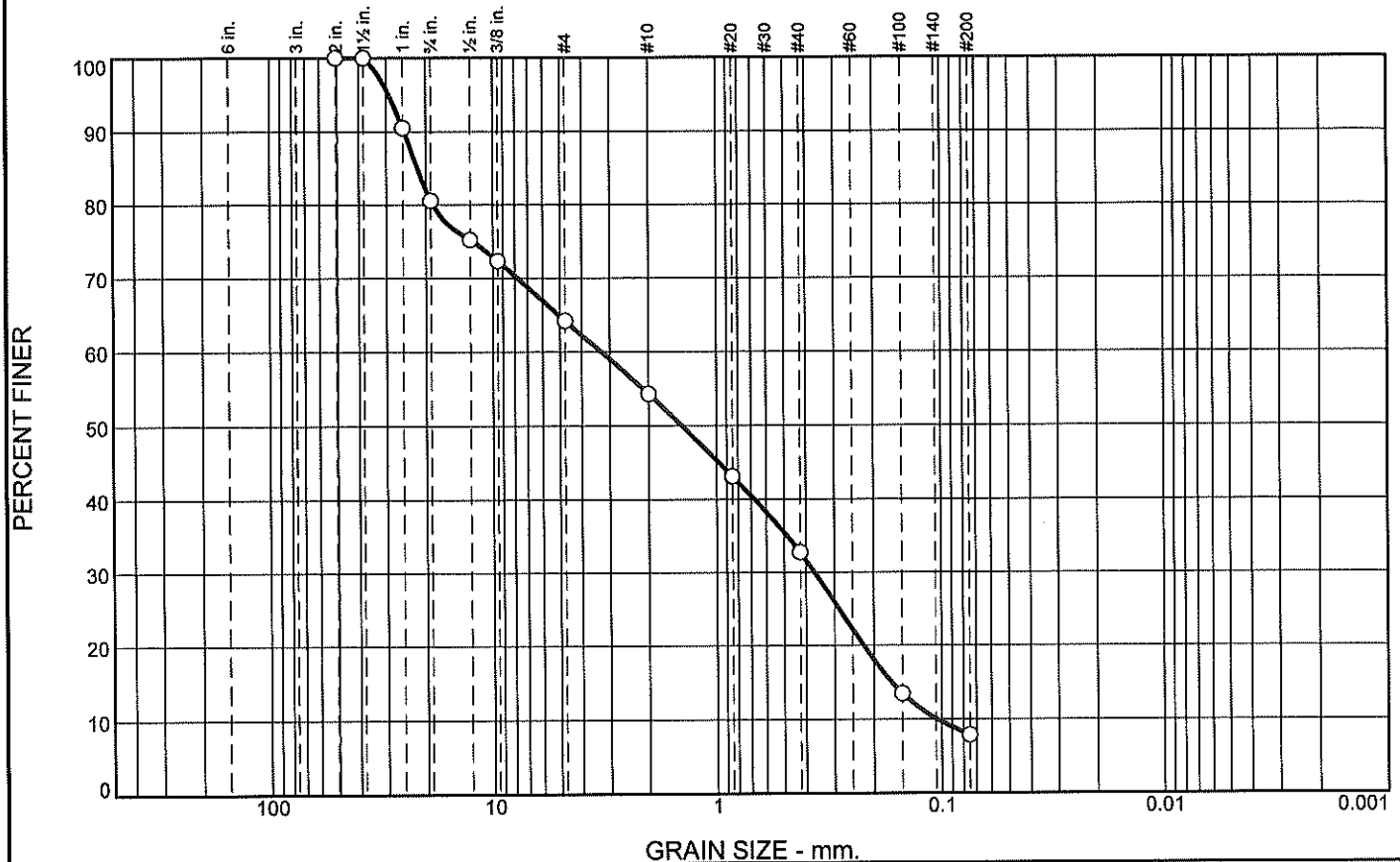
Project No: 17439

Figure

Tested By: JDS

Checked By: KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	19	17	10	21	25	8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2"	100		
1 1/2"	100		
1"	90		
3/4"	81		
1/2"	75		
3/8"	72		
#4	64		
#10	54		
#20	43		
#40	33		
#100	14		
#200	7.9		

* (no specification provided)

Soil Description
Brown Poorly graded SAND, and Gravel, trace Silt

Atterberg Limits
PL= NP LL= NV PI= NP

Coefficients
 D₉₀= 25.0518 D₈₅= 21.8775 D₆₀= 3.2763
 D₅₀= 1.4209 D₃₀= 0.3669 D₁₅= 0.1665
 D₁₀= 0.1053 C_u= 31.12 C_c= 0.39

Classification
USCS= SP-SM AASHTO= A-1-b

Remarks

Location: B-11
Sample Number: SS-3 Depth: 4.0'-6.0'

Date:

Midland Standard Engineering & Testing

Client: AMEC Foster Wheeler
Project: Police and Fire Training Campus

East Dundee, IL

Project No: 17439

Figure

Tested By: JDS

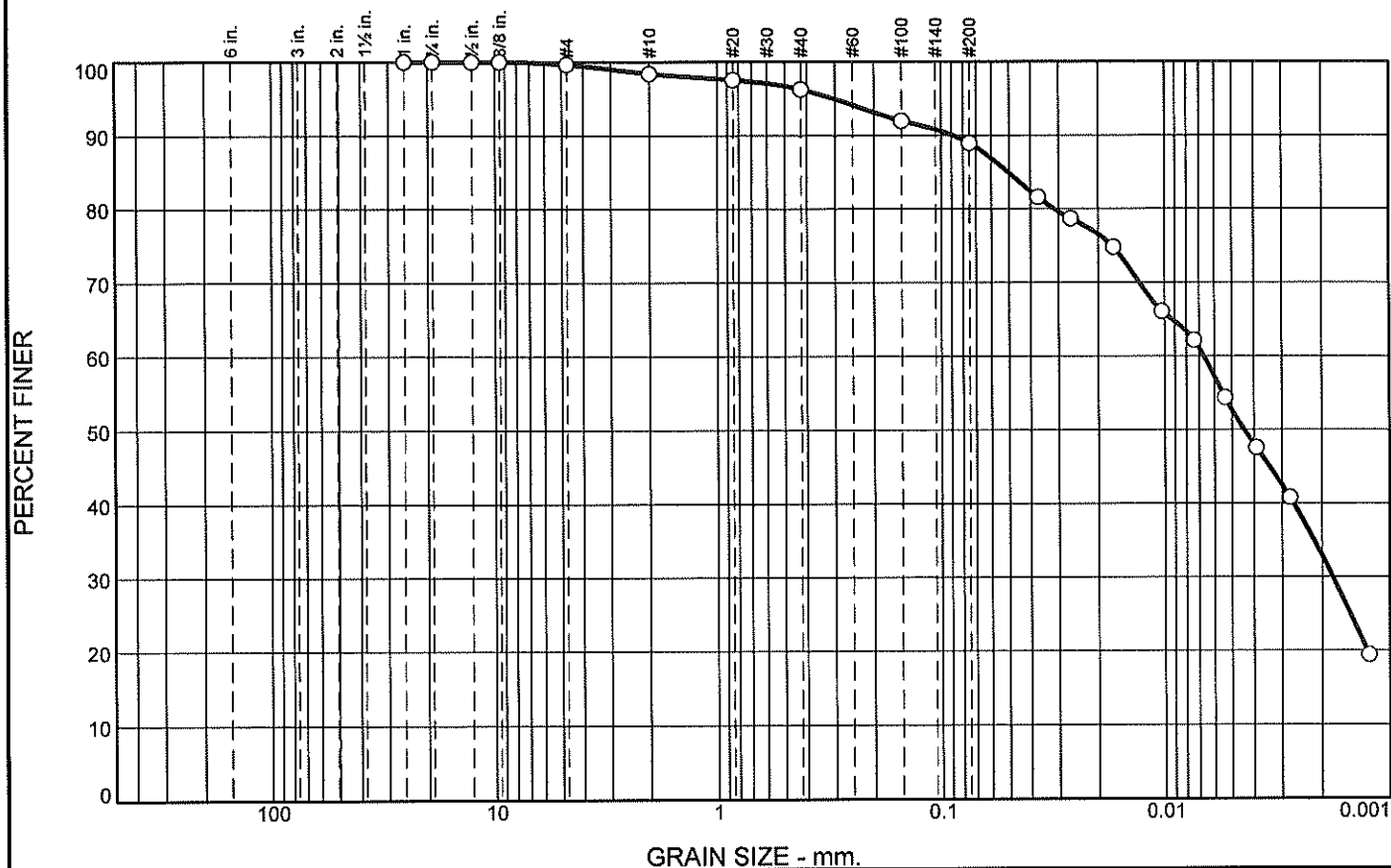
Checked By: KP

The graph displays the grain size distribution of a soil sample. The y-axis represents the percentage of soil finer than a given grain size, ranging from 0 to 100. The x-axis represents the grain size in millimeters on a logarithmic scale, ranging from 100 mm to 0.001 mm. The curve shows that the soil is predominantly fine-grained, with most of the material passing through a No. 20 sieve (0.85 mm) and only about 7% passing through a No. 200 sieve (0.075 mm).

Grain Size (mm)	Percent Finer (%)
6 in.	100
3 in.	100
2 in.	100
1½ in.	100
¾ in.	100
½ in.	100
3/8 in.	98
#4	97
#10	94
#20	91
#30	90
#40	88
#60	80
#100	73
#140	62
#200	51
0.85 mm	47
0.6 mm	40
0.425 mm	30
0.3 mm	25
0.25 mm	19
0.15 mm	15
0.075 mm	11
0.06 mm	8

Checked By: KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	2	2	7	56	33

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100		
3/4"	100		
1/2"	100		
3/8"	100		
#4	100		
#10	98		
#20	98		
#40	96		
#100	92		
#200	89		
0.0371 mm.	82		
0.0266 mm.	79		
0.0171 mm.	75		
0.0103 mm.	66		
0.0074 mm.	62		
0.0054 mm.	54		
0.0039 mm.	48		
0.0028 mm.	41		
0.0012 mm.	19		

* (no specification provided)

<u>Soil Description</u>		
Brown and Grey Lean CLAY		
<u>Atterberg Limits</u>		
PL= 17	LL= 35	PI= 18
<u>Coefficients</u>		
D ₉₀ = 0.0884	D ₈₅ = 0.0505	D ₆₀ = 0.0067
D ₅₀ = 0.0044	D ₃₀ = 0.0018	D ₁₅ =
D ₁₀ =	C _u =	C _c =
<u>Classification</u>		
USCS= CL	AASHTO= A-6(15)	
<u>Remarks</u>		

Location: B-15
Sample Number: SS-8

Date:

Midland Standard Engineering & Testing

Client: AMEC Foster Wheeler
Project: Police and Fire Training Campus

East Dundee, IL

Project No: 17439

Figure

Tested By: JDS

Checked By: KP

MIDLAND STANDARD ENGINEERING & TESTING, INC.

558 PLATE DRIVE UNIT 6 EAST DUNDEE, ILLINOIS 60118 (847) 844-1895 F (847) 844-3875

REPORT OF PERMEABILITY TESTING

PROJECT NAME Police and Fire Training Campus

SAMPLE NO. B-10 ST-6 11.0'-13.0'

CLASSIFICATION Dark Grey CLAY

SAMPLE TYPE Shelby Tube

REPORT NO: 1 perm

DATE: 8/11/17

PROJECT NO: 17439

METHOD OF TEST ASTM D-5084-90

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

PERMEANT LIQUID Tap Water

TEMPERATURE, °C 20

CELL PRESSURE, psi 40

TOTAL BACK PRESSURE 30 psi

EFF. CONSOLIDATION STRESS, max 0.72 tsf

EFF. CONSOLIDATION STRESS, min 0.5 tsf

HYDRAULIC GRADIENT, i 14.5

		PERMEABILITY, k (cm/sec)
TEST INTERVAL	1	4.79E-07
TEST INTERVAL	2	4.18E-07
TEST INTERVAL	3	4.06E-07
TEST INTERVAL	4	3.82E-07
AVERAGE k		4.21E-07
k ₂₀		4.21E-07

SAMPLE DATA:

	INITIAL	FINAL
DIAMETER, in	2.85	2.84
LENGTH, in	5.75	5.71
VOLUME, cu in	36.73	36.10
WEIGHT, gm	1281.2	1276.8
UNIT WEIGHT, pcf	132.8	134.6
MOIST. CONTENT, %	16.3	15.9
DRY DENSITY, pcf	114.1	116.2
DEGREE OF SATUR, %	92	95

Respectfully Submitted:
William D. Prigge, P.E.

WEIGHT VOLUME RELATIONSHIPS OF SOIL

PROJECT NAME Police and Fire Training Campus

DATE: 8/11/17

SAMPLE ID: B-10 ST-6 11.0'-13.0'
SOIL CLASS: Dark Grey CLAY

PROJ NO. 17439

		Va=0.02 cf
	Vv=0.32 cf	
		Vw=0.30 cf
V=1.0 cf		Vs=0.68 cf

AIR
WATER
SOLIDS

Wa=0 lb	
Ww=18.6	
Ws=114.2	Wt=132.8 lb

ENTER LABORATORY MOISTURE CONTENT, %- -

	START	FINISH
Mc=	<u>16.3</u>	<u>15.9</u>

ENTER SAMPLE WEIGHT, grams- - - - -

W=	<u>1281</u>	<u>1277</u>
----	-------------	-------------

ENTER SAMPLE DIAMETER, inches- - - - -

Ds=	<u>2.85</u>	<u>2.84</u>
-----	-------------	-------------

ENTER SAMPLE LENGTH, inches- - - - -

Ls=	<u>5.75</u>	<u>5.71</u>
-----	-------------	-------------

ENTER ESTIMATED/KNOWN SPECIFIC GRAVITY, Gs

Gs=	<u>2.700</u>	<u>2.700</u>
-----	--------------	--------------

SAMPLE VOLUME, cubic inches- - - - -

V=	<u>36.73</u>	<u>36.10</u>
----	--------------	--------------

WET DENSITY, #/cu ft- - - - -

Wt=	<u>132.8</u>	<u>134.6</u>
-----	--------------	--------------

WEIGHT OF SOLIDS, pounds- - - - -

Ws=	<u>114.2</u>	<u>116.1</u>
-----	--------------	--------------

WEIGHT OF WATER, pounds- - - - -

Ww=	<u>18.6</u>	<u>18.5</u>
-----	-------------	-------------

VOLUME OF SOLIDS, cubic feet- - - - -

Vs=	<u>0.68</u>	<u>0.69</u>
-----	-------------	-------------

VOLUME OF WATER, cubic feet- - - - -

Vw=	<u>0.30</u>	<u>0.30</u>
-----	-------------	-------------

VOLUME OF AIR, cubic feet- - - - -

Va=	<u>0.02</u>	<u>0.01</u>
-----	-------------	-------------

VOLUME OF VOIDS, cubic feet- - - - -

Vv=	<u>0.32</u>	<u>0.31</u>
-----	-------------	-------------

POROSITY, n- - - - -

n=	<u>0.32</u>	<u>0.31</u>
----	-------------	-------------

VOID RATIO, e- - - - -

e=	<u>0.48</u>	<u>0.45</u>
----	-------------	-------------

DEGREE OF SATURATION, Sr- - - - -

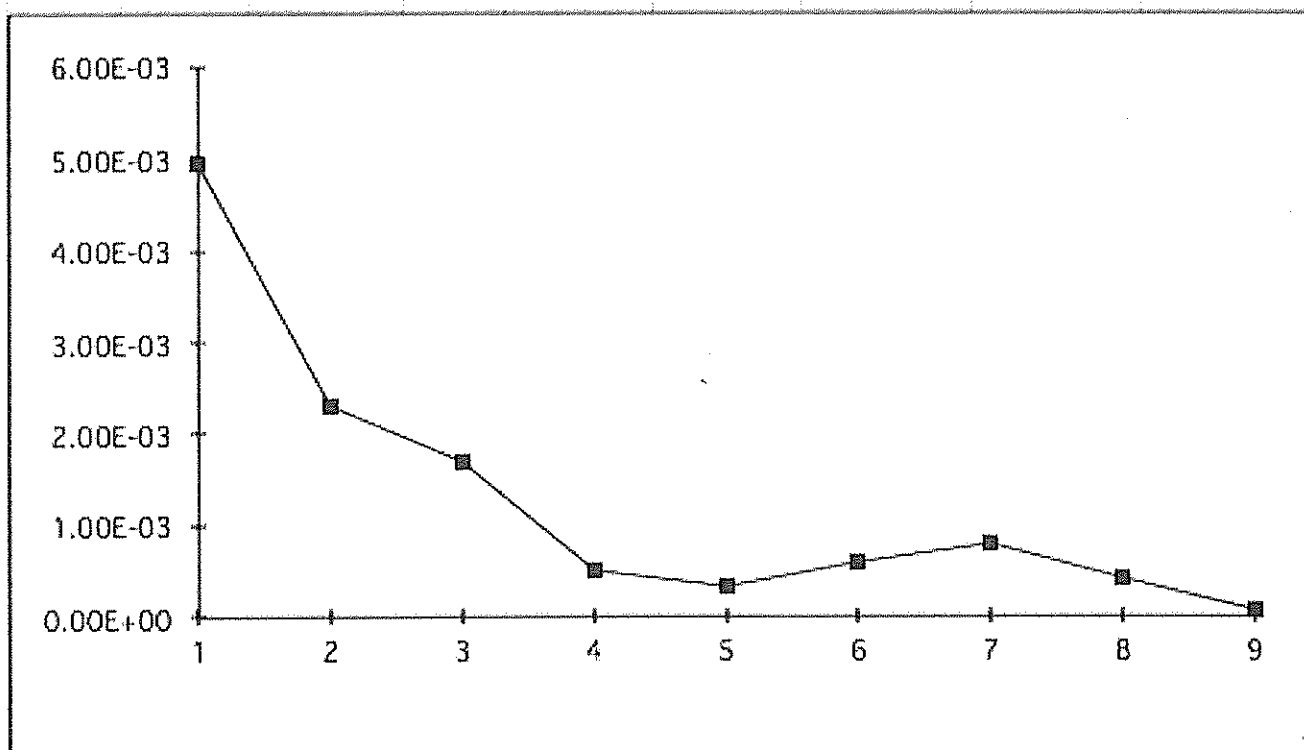
Sr=	<u>92%</u>	<u>95%</u>
-----	------------	------------

Respectfully Submitted:
William D. Prigge, P.E.

FIELD PERMEABILITY TEST

TEST WELL NO. ES8-4 BORING DIA. (in) D= 8.5 TRIAL 1
WELL PIPE LENGTH, (in) WPL= 186 STAND PIPE DIA. (in) d= 2
SCREEN LENGTH, IN. L= 120
WELL DEPTH, FT. 13

TEST NO.	T	H2O DEPTH	Δ T	H1(ft)	H2(ft)	k(IN./MIN.)	k(FT/SEC)	k(CM/SEC)
	min.	feet	min.					
	0	7.21						
1	0.25	8.12	0.25	8.29	7.38	1.17E-01	1.62E-04	4.95E-03
2	0.50	8.51	0.25	7.38	6.99	5.46E-02	7.59E-05	2.31E-03
3	0.75	8.78	0.25	6.99	6.72	3.96E-02	5.50E-05	1.68E-03
4	1.00	8.86	0.25	6.72	6.64	1.20E-02	1.67E-05	5.10E-04
5	1.25	8.91	0.25	6.64	6.59	7.60E-03	1.06E-05	3.22E-04
6	1.50	9.00	0.25	6.59	6.50	1.38E-02	1.92E-05	5.86E-04
7	1.75	9.12	0.25	6.50	6.38	1.87E-02	2.60E-05	7.94E-04
8	2.00	9.18	0.25	6.38	6.32	9.51E-03	1.32E-05	4.02E-04
9	2.50	9.20	0.50	6.32	6.30	1.59E-03	2.21E-06	6.75E-05
				6.30				
Readings						AVE.	AVE.	AVE.
2 to 9						1.97E-02	2.74E-05	8.34E-04

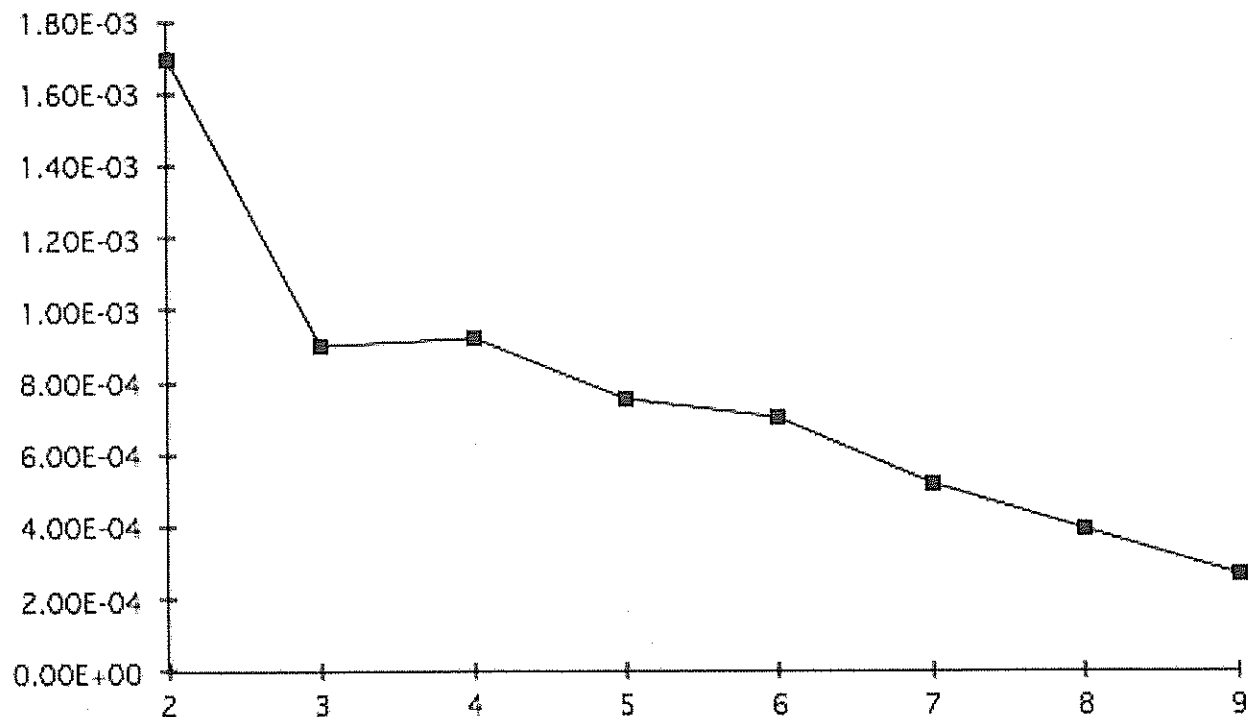


FIELD PERMEABILITY TEST

TEST WELL NO. ES3-4 BORING DIA. (in) D= 8.5 TRIAL 2
WELL PIPE LENGTH, (in) WPL= 186 STAND PIPE DIA. (in) d= 2
SCREEN LENGTH, IN. L= 120
WELL DEPTH, FT 13

TEST NO.	T	H2O DEPTH	Δ T	H1(ft)	H2(ft)	k(IN./MIN.)	k(FT/SEC)	k(CM/SEC)
	min.	feet	min.					
	0	4.45						
1	0.25	8.06	0.25	11.05	7.44	3.98E-01	5.53E-04	1.68E-02
2	0.50	8.35	0.25	7.44	7.15	4.00E-02	5.56E-05	1.69E-03
3	0.75	8.50	0.25	7.15	7.00	2.13E-02	2.96E-05	9.03E-04
4	1.00	8.65	0.25	7.00	6.85	2.18E-02	3.03E-05	9.23E-04
5	1.25	8.77	0.25	6.85	6.73	1.78E-02	2.47E-05	7.53E-04
6	1.50	8.88	0.25	6.73	6.62	1.66E-02	2.30E-05	7.02E-04
7	1.75	8.96	0.25	6.62	6.54	1.22E-02	1.70E-05	5.18E-04
8	2.00	9.02	0.25	6.54	6.48	9.27E-03	1.29E-05	3.93E-04
9	2.50	9.10	0.50	6.48	6.40	6.25E-03	8.68E-06	2.65E-04

Readings 2 to 9 AVE. 1.82E-02 AVE. 2.52E-05 AVE. 7.69E-04



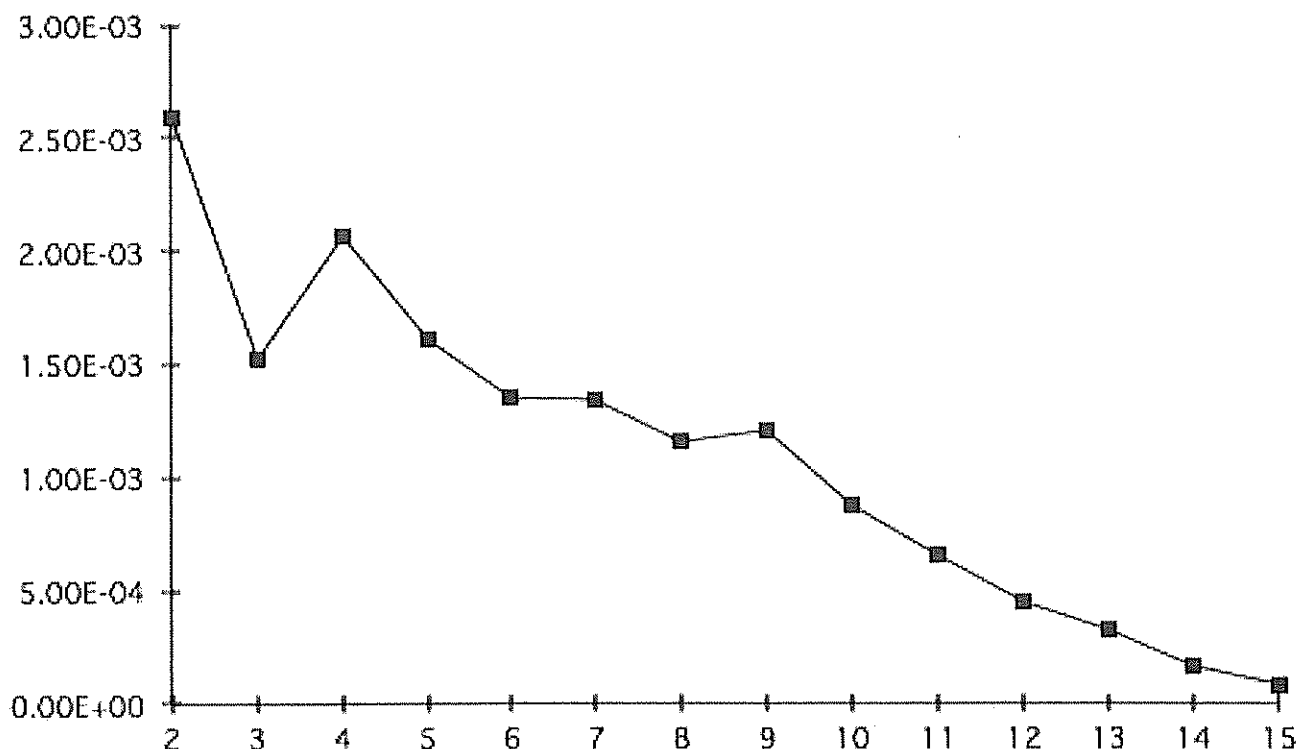
FIELD PERMEABILITY TEST

TEST WELL NO. ES8-4
WELL PIPE LENGTH, (in) WPL= 186
SCREEN LENGTH, IN. L= 120
WELL DEPTH, FT 13

BORING DIA. (in) D= 8.5
STAND PIPE DIA. (in) d= 2

TRIAL 3

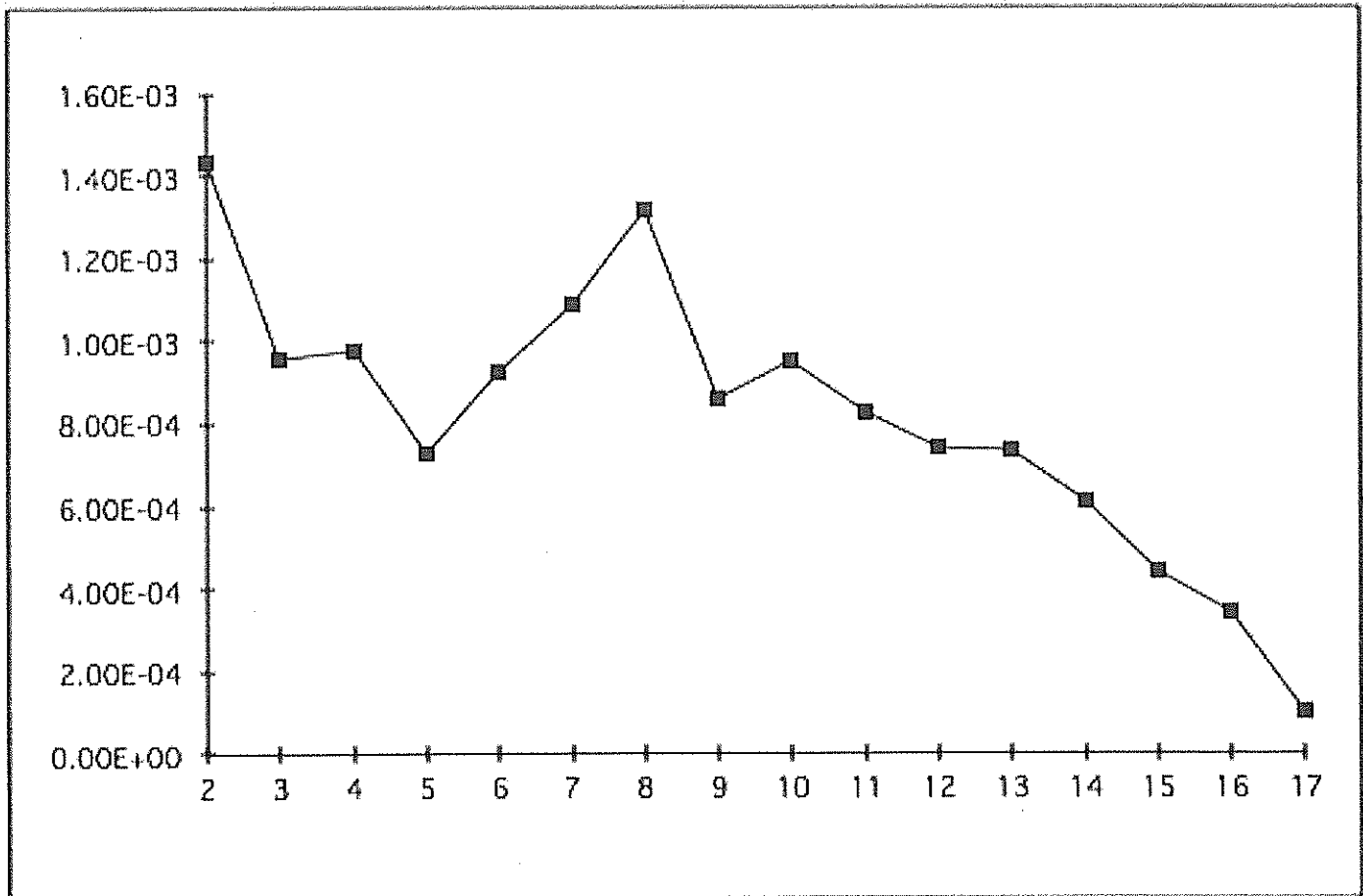
TEST NO.	T	H2O DEPTH	Δ T	H1(ft)	H2(ft)	k(IN./MIN.)	k(FT/SEC)	k(CM/SEC)
	min.	feet	min.					
	0	4.00						
1	0.25	5.50	0.25	11.50	10.00	1.41E-01	1.95E-04	5.95E-03
2	0.50	6.09	0.25	10.00	9.41	6.12E-02	8.50E-05	2.59E-03
3	0.75	6.42	0.25	9.41	9.08	3.59E-02	4.99E-05	1.52E-03
4	1.00	6.85	0.25	9.08	8.65	4.88E-02	6.78E-05	2.07E-03
5	1.25	7.17	0.25	8.65	8.33	3.79E-02	5.27E-05	1.61E-03
6	1.50	7.43	0.25	8.33	8.07	3.19E-02	4.43E-05	1.35E-03
7	1.75	7.68	0.25	8.07	7.82	3.17E-02	4.40E-05	1.34E-03
8	2.00	7.89	0.25	7.82	7.61	2.74E-02	3.80E-05	1.16E-03
9	2.50	8.31	0.50	7.61	7.19	2.86E-02	3.97E-05	1.21E-03
10	3.00	8.60	0.50	7.19	6.90	2.07E-02	2.88E-05	8.77E-04
11	3.50	8.81	0.50	6.90	6.69	1.55E-02	2.16E-05	6.58E-04
12	4.00	8.95	0.50	6.69	6.55	1.06E-02	1.48E-05	4.50E-04
13	4.50	9.05	0.50	6.55	6.45	7.74E-03	1.07E-05	3.28E-04
14	5.00	9.10	0.50	6.45	6.40	3.91E-03	5.44E-06	1.66E-04
15	6.00	9.15	1.00	6.40	6.35	1.97E-03	2.74E-06	8.35E-05
				6.35				
			Readings	2 to 15		AVE. 2.60E-02	AVE. 3.61E-05	AVE. 1.10E-03



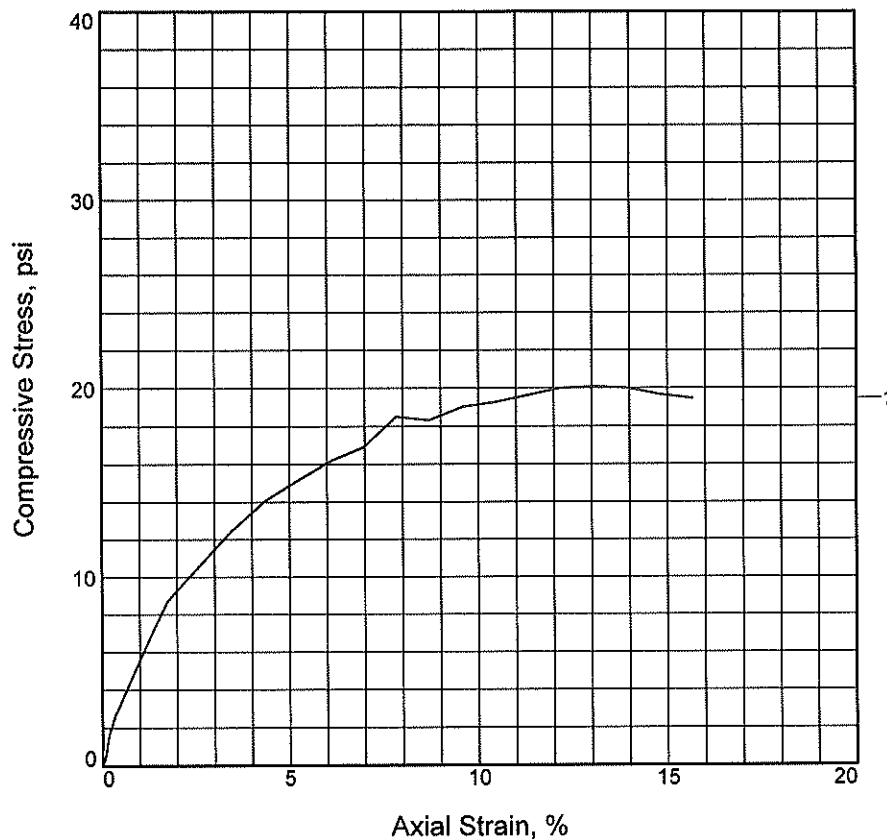
FIELD PERMEABILITY TEST

TEST WELL NO. ES8-4 BORING DIA. (in) D= 8.5 TRIAL 4
WELL PIPE LENGTH, (in) WPL= 186 STAND PIPE DIA. (in) d= 2
SCREEN LENGTH, IN. L= 120
WELL DEPTH, FT 13

TEST NO.	T	H2O DEPTH	Δ T	H1(ft)	H2(ft)	k(IN./MIN.)	k(FT/SEC)	k(CM/SEC)
	min.	feet	min.					
	0	4.4						
1	0.25	5.25	0.25	11.10	10.25	8.01E-02	1.11E-04	3.39E-03
2	0.50	5.59	0.25	10.25	9.91	3.39E-02	4.71E-05	1.44E-03
3	0.75	5.81	0.25	9.91	9.69	2.26E-02	3.14E-05	9.56E-04
4	1.00	6.03	0.25	9.69	9.47	2.31E-02	3.21E-05	9.78E-04
5	1.25	6.19	0.25	9.47	9.31	1.71E-02	2.38E-05	7.26E-04
6	1.50	6.39	0.25	9.31	9.11	2.18E-02	3.03E-05	9.25E-04
7	1.75	6.62	0.25	9.11	8.88	2.57E-02	3.57E-05	1.09E-03
8	2.00	6.89	0.25	8.88	8.61	3.11E-02	4.31E-05	1.32E-03
9	2.50	7.23	0.50	8.61	8.27	2.03E-02	2.81E-05	8.58E-04
10	3.00	7.59	0.50	8.27	7.91	2.24E-02	3.11E-05	9.48E-04
11	3.50	7.89	0.50	7.91	7.61	1.94E-02	2.70E-05	8.23E-04
12	4.00	8.15	0.50	7.61	7.35	1.75E-02	2.43E-05	7.40E-04
13	4.50	8.40	0.50	7.35	7.10	1.74E-02	2.42E-05	7.37E-04
14	5.00	8.60	0.50	7.10	6.90	1.44E-02	2.00E-05	6.08E-04
15	6.00	8.88	1.00	6.90	6.62	1.04E-02	1.45E-05	4.41E-04
16	7.00	9.09	1.00	6.62	6.41	8.11E-03	1.13E-05	3.43E-04
17	8.00	9.15	1.00	6.41	6.35	2.37E-03	3.29E-06	1.00E-04
				6.35				
			Readings	2 to 17		AVE. 1.92E-02	AVE. 2.67E-05	AVE. 8.14E-04



UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psi	20.07			
Undrained shear strength, psi	10.03			
Failure strain, %	13.1			
Strain rate, in./min.	0.870			
Water content, %	25.3			
Wet density, pcf	128.1			
Dry density, pcf	102.3			
Saturation, %	102.3			
Void ratio	0.6789			
Specimen diameter, in.	2.84			
Specimen height, in.	5.75			
Height/diameter ratio	2.02			

Description: Dark Grey CLAY

LL = **PL =** **PI =** **GS= 2.75** **Type: Shelby Tube**

Project No.: 17439

Date Sampled: 8/11/17

Remarks:

Client: AMEC Foster Wheeler

Project: Police and Fire Training Campus

Location: B-5

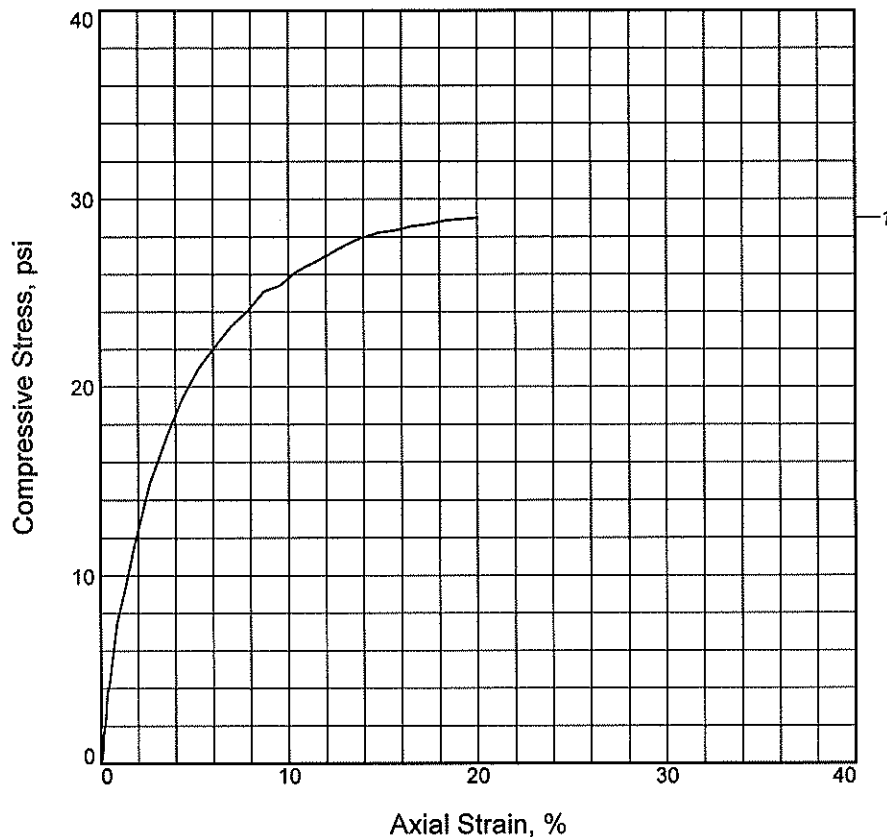
Sample Number: ST-5 **Depth:** 11.0'-13.0'

UNCONFINED COMPRESSION TEST
Midland Standard Engineering & Testing
East Dundee, IL

Figure _____

Tested By: JDS **Checked By:** KP

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psi	29.00			
Undrained shear strength, psi	14.50			
Failure strain, %	20.0			
Strain rate, in./min.	0.870			
Water content, %	24.8			
Wet density, pcf	126.5			
Dry density, pcf	101.3			
Saturation, %	98.4			
Void ratio	0.6943			
Specimen diameter, in.	2.85			
Specimen height, in.	5.74			
Height/diameter ratio	2.02			

Description: Dark Grey to Brown and Grey CLAY

LL = **PL =** **PI =** **GS= 2.75** **Type: Shelby Tube**

Project No.: 17439

Date Sampled: 8/11/17

Remarks:

Client: AMEC Foster Wheeler

Project: Police and Fire Training Campus

Location: B-8

Sample Number: ST-5 **Depth:** 11.0'-13.0'

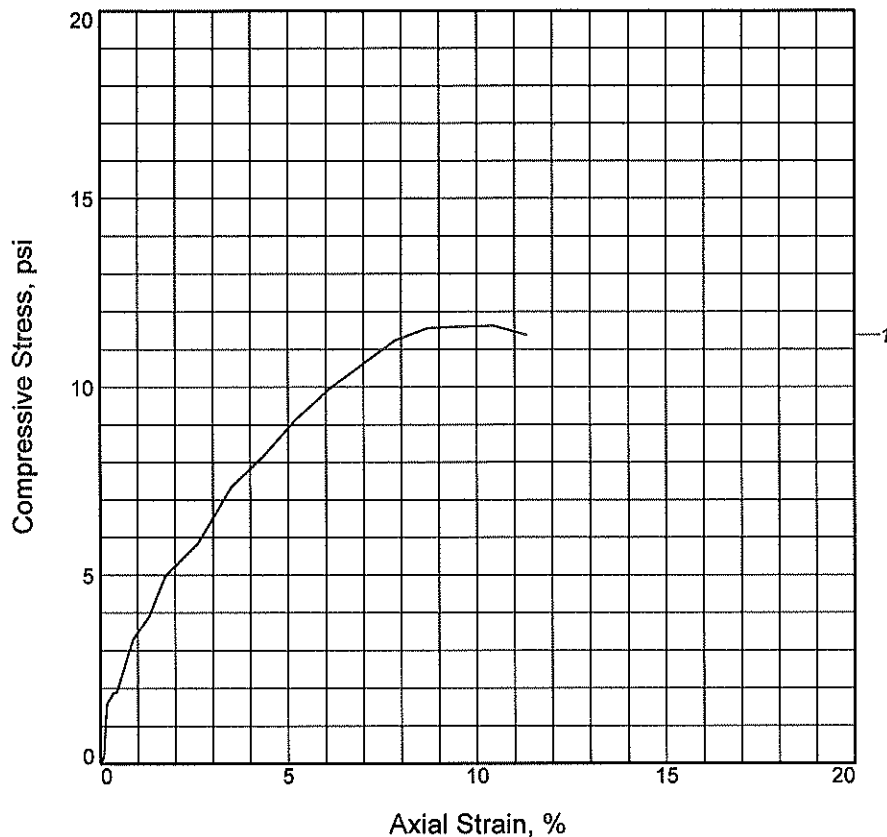
UNCONFINED COMPRESSION TEST
Midland Standard Engineering & Testing
East Dundee, IL

Figure _____

Tested By: JDS

Checked By: KP

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psi	11.62			
Undrained shear strength, psi	5.81			
Failure strain, %	10.5			
Strain rate, in./min.	0.870			
Water content, %	25.3			
Wet density, pcf	124.5			
Dry density, pcf	99.3			
Saturation, %	95.6			
Void ratio	0.7290			
Specimen diameter, in.	2.84			
Specimen height, in.	5.74			
Height/diameter ratio	2.02			

Description: Brown and Grey CLAY

LL = **PL =** **PI =** **GS= 2.75** **Type: Shelby Tube**

Project No.: 17439

Date Sampled: 8/11/17

Remarks:

Client: AMEC Foster Wheeler

Project: Police and Fire Training Campus

Location: B-10

Sample Number: ST-6 **Depth:** 11.0'-13.0'

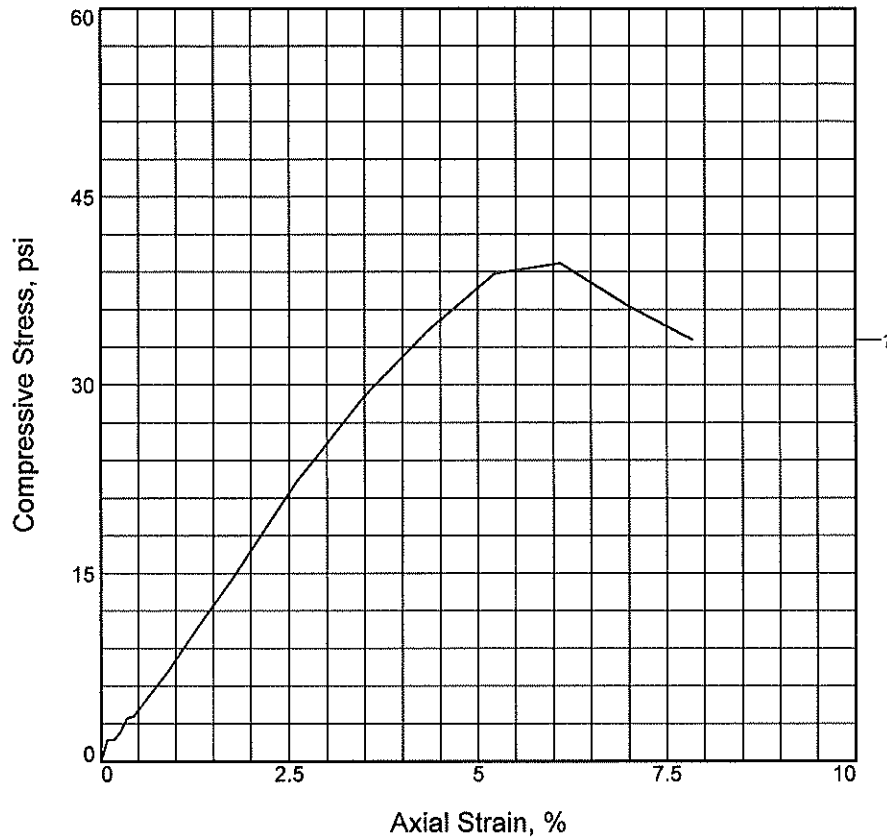
UNCONFINED COMPRESSION TEST
Midland Standard Engineering & Testing
East Dundee, IL

Figure _____

Tested By: JDS

Checked By: KP

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psi	39.66			
Undrained shear strength, psi	19.83			
Failure strain, %	6.1			
Strain rate, in./min.	0.870			
Water content, %	20.1			
Wet density, pcf	129.4			
Dry density, pcf	107.7			
Saturation, %	93.2			
Void ratio	0.5933			
Specimen diameter, in.	2.85			
Specimen height, in.	5.74			
Height/diameter ratio	2.01			

Description: Brown, little Grey CLAY

LL = **PL =** **PI =** **GS= 2.75** **Type: Shelby Tube**

Project No.: 17439

Date Sampled: 8/11/17

Remarks:

Client: AMEC Foster Wheeler

Project: Police and Fire Training Campus

Location: B-17

Sample Number: ST-7 **Depth:** 12.5'-14.5'

UNCONFINED COMPRESSION TEST
Midland Standard Engineering & Testing
East Dundee, IL

Figure _____

Tested By: JDS **Checked By:** KP

GENERAL NOTES

PARTICLE SIZE DESCRIPTION & TERMINOLOGY

Coarse Grained or Granular Soils have more than 50% of their dry weight retained on a #200 sieve; they are described as: boulders, cobbles, gravel or sand. Fine Grained soils have less than 50% of their dry weight retained on a #200 sieve; they are described as: clays or clayey silts if they are cohesive and silts if they are non-cohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and the fine grained soils on the basis of their strength or consistency and their plasticity.

Major Component of Sample	Size Range	Descriptive Term of Components Also Present in Sample	Approximate Quantity (Percent)
Boulders	Over 8 in. (200 mm)		
Cobbles	8 inches to 3 inches (200 mm to 75mm)	Trace	1 - 9
Gravel	3 inches to #4 sieve (75mm to 4.75mm)	Little	10 - 19
Sand	#4 to #200 sieve (4.75mm to 0.075mm)	Some	20 - 34
Silt	Passing #200 sieve (0.075mm to 0.002mm)	And	35 - 50
Clay	Smaller than 0.002mm		

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

GRANULAR SOILS

DENSITY CLASSIFICATION	APPROXIMATE RANGE OF N *
Very Loose	0 - 3
Slightly Dense	4 - 9
Medium Dense	10 - 29
Dense	30 - 49
Very Dense	50 - 80
Extremely Dense	80 +

COHESIVE SOILS

CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH, Q_u - TSF	APPROXIMATE RANGE OF N *
Very Soft	0.25	0 - 2
Soft	0.25 - 0.49	3 - 4
Firm	0.50 - 0.99	5 - 8
Stiff	1.00 - 1.99	9 - 15
Very Stiff	2.00 - 3.99	16 - 30
Hard	4.00 - 8.00	31 - 50
Very Hard	8.00 +	Over 50

* STANDARD PENETRATION TEST (ASTM D1586) - A 2.0" outside-diameter, split barrel sampler is driven into undisturbed soil by means of a 140 pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven 3 successive 6 inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).