REMEDIAL INVESTIGATION WORK PLAN
For

FORMER HAIGHT /AMERICAN HIDE TANNERY SITE
125 Bath Street
Ballston Spa, New York, Saratoga County

NYSDEC BCP Site No. C546055-10-12

Prepared For:

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Remedial Investigation Work Plan (RIWP)

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1.0 Introduction

1.1 Project Introduction

This Remedial Investigation Work Plan (RIWP) has been prepared by Environmental Compliance, Inc. (ECI) on behalf of volunteer participant Angelica Textile Services, Inc. ("Angelica") for the Former Haight / American Hide Tannery site located at 125 Bath Street in Ballston Spa, New York, Saratoga County (Tax Block 216.32.1.96.2; hereinafter the "Site"). The purpose of the RIWP is to further evaluate and delineate the nature and extent of sub-surface contamination, if any, at the Site. The project location and surrounding vicinity are shown on Figure 1 the Site Vicinity Map.

1.1.1 Coordination With Other Documents

This RIWP is to be used and implemented in conjunction with the Citizen Participation Plan (CPP), the Health and Safety Plan (HASP), and the Quality Assurance Project Plan (QAPP) each attached as Appendices E, F, and G respectively. The remedial investigation (RI) approach to be implemented is intended to analyze the RI information and data generated by the implementation of these plans; develop a remedial approach to the site, if applicable; and the information, data and findings summarized in the final Remedial Investigation Report (RIR).

1.2 Remedial Investigation Work Plan Objectives

The overall RIWP objects are as follows:

1. Identify the subsurface contaminant(s) of concern (COC) that may have been released to the environment.
2. Determine the nature, extent and distribution of the COC in affected media on-site.
3. Identify on-site migration pathways and receptors of COC.
4. Identify data requirements.
5. Develop the information necessary to evaluate remedial action alternatives and select a remedial action(s).
6. Generate or use data of sufficient quality for site characterization, and the subsequent analysis, and selection of remedial alternatives.

1.3 Site Location and Description

The "Site" that will be the subject of this application constitutes one lot (Lot 2) totaling approximately 6.35 acres in the Village of Ballston Spa, New York, Saratoga County. *See* Exhibit D of the BCP application, and the Site Survey Map (Figure 2 of the RIWP) for the 6.35 acre site. The Site is located at 125 Bath Street, immediately north of Gordon Creek, and northwest of the intersection of Bath Street and Hamilton Ave. Private residences are located to the north, south, and east of the site. The western portion is an undeveloped wood lot. Saratoga

County fairgrounds are located to the northwest. Porter's Auto Body Shop is adjacent, across Gordon Creek. Ballston Spa Lanes bowling alley is to the southeast, across Bath Street.

An 80,000 square foot building occupies the eastern portion of the Site. This building was constructed between 1945 and 1950 according to Sanborn maps, and replaced many of the former tannery buildings (*See* Figure 4). A machine shop and administrative areas occupy the eastern portion of this building; former laundering and garment storage areas are located in the western and central areas of the building. The northern portion of the building has most recently been used for shipping and receiving laundry. A wastewater treatment sump/wastewater pit and a boiler room occupy a subgrade area of the building's center. The Site's southeastern border and central portion contain several buildings associated with former Site tannery operations (former "sewage disposal" and chlorine plant"). These buildings were reportedly never used by Angelica or its predecessors. Asphalt driveways join the southern and northern portions of the building. Only remnants of these buildings remain present. A metal trailer previously used for linens storage is located in an asphalt parking lot west of the building. The eastern portion of the building's exterior faces Bath Street, where the main foot access entrance is present. A wooded lot occupies the western portion of the Site.

1.4 Site History

1.4.1 General

The most recent owners and occupants of the Site were Angelica Textile Services, Inc. ("Angelica"), a New York State corporation, which acquired the entity, Linen Systems for Hospitals, Inc. ("Linen Systems") in 1977, and officially changed Linen Systems name to Angelica in or about 1984. Linen Systems acquired title to the Site in 1977. The deed remains in the name of Linen Systems for Hospitals, Inc. *See* Exhibit B of the BCP application, including the deed. Linen Systems and later Angelica performed laundering of garments with detergents on the Site and warehoused linens from approximately 1977 through 2011 without the use of dry cleaning chemicals. Angelica recently ceased operations on the Site. Therefore, the Site is now vacant.

Historically, industrial development began at the Site in 1881. Tannery operations occurred from 1887 to 1960 according to historic Sanborn maps and other local historical resources. Three tanneries – Haight and Company, American Hide & Leather, and Howes Leather – occupied the Site during these years. The former tanneries also spanned over the adjacent Gordon Creek to a second lot (Tax Block 216.32.1.96.1; hereinafter "Lot 1"). However, this lot was not purchased by Linen Systems in 1977, and, is therefore, not part of the BCP Site. *See* Exhibits B & C of the BCP application, including Title Information and Deed to Rickett's, Inc. for Lot 1; Phase I at 4.

After all tannery operations ceased in or about 1960, there was an approximately ten year period in time the Site was not occupied. An individual and then his estate owned the site from 1960 to 1969. There may have been an antique dealer (Gordon Creek Inc.), which owned and occupied the Site for a year between 1969 and 1970. Gordon Creek sold the Site to Paul J. Rickett Sr., which was later purchased by Rickett's, Inc. The operator was Northern Hospital Linen Service, Inc., Mr. Rickett's company. Northern Hospital Linens operated the site from 1970 to 1976.

Ricketts, Inc. sold Parcel 2 (not Parcel 1 located across the creek on the Southside) and his newly formed corporation named Linen Systems for Hospitals Inc. to Angelica in 1977. Angelica kept the Linen Systems name until 1983, when it changed its corporate name to Angelica Healthcare Services Group, Inc. In 1996, there was another corporate name change to Angelica Textile Services, Inc. Rickett's is still a local Ballston Spa laundry company. As noted above, title to the Site remains under the name Linen Systems which, is still a valid New York corporation.

Laundering operations continued from 1977 until recently in 2011, when Angelica ceased all laundering and warehousing operations at this facility. Therefore, the Site is now vacant. Angelica would like to sell or lease this facility to another volunteer for a viable reuse, and intends to work with any interested buyer to resolve the contamination issues.

As of 1904, there were 15 buildings associated with tannery operations. The former tannery conducted bulk storage of chlorine, fuel oil, and stored tanning liquors and wastes in containers ranging in size from 55 gallon drums to 100,000 gallon above ground storage tanks (ASTs) during what appears to be its entire more than 70 year history. Historically tannery sites in general have used suspected contaminants of concern (COC) in their operations such as: chlorine, formaldehyde, sulfuric acid, glycol ether EB, glycol ether PMA, methyl isobutyl ketone, toluene, xylol, phosphoric acid, methanol, manganese sulfate, chromium III, ethylene glycol, lead, copper, lime, and zinc. To date, only limited investigation has been performed by Angelica in the tank area (See EP1 location for the former 100,000 gallon above ground vertical No. 6 fuel oil tank) in the Northern portion of the Site. Only metals and COC for No. 6 fuel oil have been found to date. Additional areas of tannery related contamination may be found during additional BCP site-wide remedial investigation activities

Environmental contamination associated with this Site was first discovered in July 2010 in the vicinity of a former 100,000 gallon former fuel oil above ground storage tank (AST) in the northwest corner of the Site during an unusual release of No.6 fuel oil from under the ground to the surface due to what is believed to be saturated soil conditions from extensive rain events that had occurred at this time. Observations of the oil release were reported to the NYSDEC upon discovery. DEC Spill #1004405 was assigned to this release. *See* Exhibit K of the BCP application. A subsequent Site investigation and sampling program performed by Environmental Compliance, Inc. (ECI) confirmed the presence of petroleum contamination in the vicinity of the former AST. Leather waste and ash material associated with the former tannery later discovered to be buried in the vicinity of the base of the former AST.

It is important to note that even though the 100,000 gallon tank was formerly an AST, no remnants of this tank were visible from the ground surface. This area was covered with 30-40 foot high trees when discovered by ECI suggesting the AST was not known to exist by Angelica since the top three quarters of the tank was cut off and removed and the bottom portion was found under the ground surface. The bottom portion or scrap metal from remnants of the tank was still present subsurface. It appeared, based upon observations from ECI that the prior owners pushed the side of the then existing hill of dirt on top of the remaining portion of the above ground open top tank bottom (lower quarter) and rolled over the scrap steel with heavy machinery to flatten it as much as possible. The tank remnants were full of soil and what

appeared to be coal ash. Therefore, it did not appear to ECI that the tank remnants buried rather deep in the ground caused the spill observed, but rather some other historic spill event caused a surface oil spill since the oil found is still present in the soils close to the surface of the ground. Scraps of leather soaked with No. 6 fuel oil were found immediately north of the historic tank. There is a reference to a "bit or pit dyke" on a historic drawing of the facility (*see* Exhibit O of the BCP application), which when compared to the 1950 Sanborn map in the Phase I Report, reveals this former tank and the scrap leather were in adjacent historic locations. Since the historic map is undated, it is not known if the bit/pit dyke pre-dates the tank spill and the leather scraps were used to soak up the historic surface spill, or if the scraps pre-dated the spill and had the subsequent effect of soaking up some of the spill. Investigation performed in this area to date has revealed the soils contain multiple low level SVOCs and metals, including arsenic, barium, chromium, and lead (*See* Section 1.4.2).

1.4.2 Recent Spill Remedial Action

On or about 7/20/2010, a test pit was excavated due to the oily, petroleum type substance observed to be coming up through the parking lot asphalt on the north side of the property, by a site employee. NYSDEC STARS analysis was performed on the substance. The DEC was notified and Spill No. 1004405 was assigned to the "spill". During the various times throughout the remediation of the spill the DEC was present. Mr. Andy Frank was the DEC representative that was on-site during these remedial activities and at times brought other DEC personnel like Ms. Alesha Thorn on-site to view the remedial progress. Mr. Frank was kept updated through his numerous site visits, emails to and from Angelica personnel, and phone conversations with Mr. Marc Schneckenberger of ECI and Angelica personnel.

On September 29, 2010, excavation work was performed in and around the area of the discovered petroleum. Approximately 102.07 tons of petroleum contaminated soil (PCS) was removed and sent to Environmental Soil Management Inc. (ESMI) for incineration. ECI's subcontractor Galloway Technical Services (GTS) had to cease excavation on or about October 1, 2010 due to wet weather issues.

On October 18, 2010, further excavation was performed until October 21, 2010. PCS was stockpiled on-site for disposal.

On November 28th through December 13th, 2010, further excavation was performed in an attempt to fully determine the nature and extent of the PCS. Approximately 270.7 tons of additional PCS was removed from the Site and sent to the Colonie Landfill and 14,933 gallons of ground water was sent to a wastewater treatment facility. The 270.7 tons of PCS sent to the landfill represented PCS that had been excavated from the pit since October 2010.

Before the remnants of the vertical steel tank and concrete pad could be uncovered and removed, first the soil deposition and tree growth had to be removed. Since some of the trees were 30 to 40 feet tall, a third party, Donavan Tree Service, was calling in to remove eight (8) of the largest trees in early December 2010.

On May 21, 2011 through June 17, 2011, further excavation was performed with the goal of removing the remaining soil, trees and the tank bottom and additional contaminated soil. The tank was estimated to be about 25 feet in diameter; this would estimate the height of the tank to be about 27 to 30 feet tall in order to contain 100,000 gallons. What remained of the bottom portion of the tank was the bottom and about 7 feet of a collapsed vertical section of the sidewall of the steel tank. The remnants of the tank bottom and collapsed side wall were filled with ash and soil backfill. GTS removed the contents of the tank bottom and then cut up the remaining portion of the steel. The condition of the above ground vertical petroleum tank indicated it had previously undergone demolition.

The vertical tank sat on a heavily reinforced concrete pad that was supported by a number of piers that were in the ground. The piers are still in place and the depth of the piers has not yet been determined.

GTS removed an additional 379.26 tons of PCS, which was sent to the Fulton County Landfill, and 54,112 gallons of contaminated groundwater was sent to a wastewater treatment facility. The remnants of the vertical steel wall and bottom of the tank and concrete pad was cut up and sent for recycling and disposal. The location of this tank bottom corresponds to the location of a former 100,000 gallon AST vertical steel tank and structural support pad shown on historic Sanborn maps. On or about June 17, 2011, leather scraps were unearthed, and the excavation was halted. There is a current stock pile(s) of petroleum contaminated leather scrap on-site. The Baker 20,000 gallon tank used to store ground water from the excavation was cleaned on October 23rd, 2012 and removed from the site on October 24th, 2012. At that time another 1,477 gallons of ground water and rinse water extracted from the Baker tank was sent to a wastewater treatment facility.

In addition, a 5,000 gallon above ground diesel tank was permanently closed on July 18, 2012 as reflected in the DEC's Petroleum Bulk Storage (PBS) registration documentation.

All of the above excavation started at the location of the initial test pit and moved in an outward direction from the initial point in an attempt to delineate the contaminated area. Despite several rounds of excavation, the full extent of the PCS still has not yet determined because tannery related material was uncovered. Completing the nature and extent investigation of the tannery material and the petroleum contaminated area will be part of this RIWP scope of work.

There were 18 laboratory reports prepared by Paradigm Environmental Services, Inc. of which five (5) of the total 18 reports were re-issued reports. All of the previous sampling effort and reports were used to determine waste characteristics for proper waste disposal required by the disposal company (incinerator or landfill). None of the previous sampling effort and reports was used for the purpose of remedial investigation. The list of the laboratory reports is as follows:

Lab Project Number	Project Name	Report Complete Date
10-3425	Angelica/ B. Spa	8/30/2010
10-3425R	Angelica/ B. Spa	9/7/2010
10-4046	Angelica - Ballston Spa	10/11/2010
10-2717	Angelica Ballston Spa	7/8/2010
10-2717R	Angelica Ballston Spa	7/16/2010
10-4859R	Angelica - Ballston Spa	12/3/2010
10-4888	Angelica - Ballston Spa	12/8/2010
10-4929	Angelica - Ballston Spa	12/6/2010
10-4942	Angelica - Ballston Spa	12/7/2010
10-4961	Ballston Spa - Angelica	12/9/2010
10-4961R	Ballston Spa - Angelica	12/10/2010
11-0486	ATS/Ballston Spa	2/16/2011
11-2112	Angelica, Ballston Spa	6/3/2011
11-2158	Angelica-Ballston Spa	6/2/2011
11-2159	Angelica-Ballston Spa	6/7/2011
11-2159R	Angelica Ballston Spa	6/8/2011
11-2213	Angelica Textiles - Ballston Spa	6/10/2011
11-2370	Angelica Ballston Spa	6/15/2011

Note: The lab reports are attached hereto on a CD. There are 18 total lab reports dated from 8/30/2010 through 6/15/2011 for the project due to disposal facility laboratory analysis requirements. However, it should be noted that five (5) lab reports were re-issued reports based on different disposal facility report requirements. In addition, it should be noted that all of the PCS that was tested prior to June 2011 has been removed from the site and has either been incinerated or disposed of at an appropriate landfill with laboratory tests results that confirm the proper disposal of the PCS.

Out of the above listed laboratory reports, only two (2) reports were used to determine the total metals and Semi-volatiles contained in the excavation pit: Lab Numbers 10-3425 and 10-4046 are the reports for this sampling. Other sampling efforts were also used primarily for waste characterization, but required TCLP metals and STARS organics none of which were used for

the purposes of site investigation at that time. The following Table 1 contains the laboratory results in these two reports that were greater than the "Soil Cleanup Objectives" listed in either Table 6NYCRR Part 375-6(a) or (b):

Table 1			
Lab Results Greater Than Unrestricted and Restricted Residential Use Soil Cleanup Objectives Level			
Lab Project Number & Compound	Lab Report Result (ppm)	Table 6NYCRR Part 375-6.8(a) Objective (ppm)	Table 6NYCRR Part 375-6.8(b) Objective (ppm)
Lab No. 10-3425			
Arsenic	30.3	13	16
Barium	9610	350	400
Chromium	509	~30	~180
Lead	252	63	400
Mercury	0.524	0.18	0.81
Benzo (a) anthracene	14.9	1	1
Benzo (a) pyrene	25.1	1	1
Chrysene	32.8	1	3.9
Pyrene	104	100	100
Acetone	0.397	0.05	100
Lab No. 10-4046			
Arsenic	32.6	13	16
Barium	2860	350	400
Chromium	765	~30	~180
Lead	371	63	400
Mercury	0.872	0.18	0.81
Benzo (a) anthracene	17.9	1	1
Benzo (a) pyrene	15.4	1	1
Benzo (b) fluoranthene	13.2	1	1
Benzo (k)fluoranthene	10	0.8	3.9
Chrysene	15.9	1	3.9
Dibenz (a,h) anthracene	2.33	0.33	0.33
Indeno (1,2,3-cd) pyrene	8.15	0.5	0.5

Note: The above lab report results are for those results that exceeded either Table 375-6(a) or (b) unrestricted or restricted residential Soil Cleanup Objective levels. It should be noted that a number of lab report results that were identified as non-detect had detection limits greater than the cleanup objective levels; these were not included in the above results.

Note: There were a total of 18 laboratory reports issued for the project, with five (5) of these laboratory reports re-issued based on specific disposal facility requirements. The vast majority of laboratory reports were generated to determine disposal alternatives and were not used to determine if the soil met specific cleanup objectives. As noted above, only two (2) laboratory reports were used to determine the type of petroleum compounds potentially contained in the excavation pit: Lab Numbers. 10-3425 and 10-4046. The total metals analysis was required for disposal at the incinerator. These two lab reports (i.e., sampling effort) were performed early on in the project and were used as the basis for the data summary table above.

These results confirmed that the oil that was discovered close to the ground surface was No. 6 fuel oil. This surface spill extended down in certain areas as deep as approximately 12 feet. There is a steep slope/hillside where the petroleum contamination was found which likely contributed to the deeper location of the contamination. Portions of the hillside appeared to be pushed on top of the remaining scrap steel during demolition. The area of the tank is located directly adjacent to and uphill of a tannery disposal pit as identified on historical site drawing(s).

In total, there has been 752.03 tons of PCS removed from the site that went to either a landfill or incinerator. There are about 200 more tons of PCS that is currently staged on-site, placed on plastic and covered with plastic. In addition, there is a quantity of leather scrap (possibly 150 tons) that has been staged in separate piles from the PCS and is placed on plastic and covered with plastic. Given the identification of tannery related waste, Angelica began to explore its legal options and decided to enter the BCP Program and identify former responsibility parties.

2.0 Previous Investigations and Physical Setting

2.1 Previous Investigations

2.1.1 June 2008 Phase I Environmental Site Assessment ("Phase I Report")

A Phase I Environmental Site Assessment E-1527-05 (ASTM-05) was performed by GaiaTech in June 2008. The Phase I report was prepared in relation to due diligence required for a financial transaction. This was essentially the first time the long industrial history associated with the Site was summarized and became known to Angelica. The Phase I Report concluded that Angelica's use of the Site to launder garments did not create recognized environmental conditions (RECs), but prior tannery operations may have caused RECs. Prior to Angelica's operations, three tanneries operations were present dating back to the 1880's. The first tannery – Haight and Company Tannery – was operational by 1887. The Phase I Report describes the Haight Tannery's operations as including a bark mill, a leach house, an engine room, and finishing areas. The Site's central area included a "vat yard." Several tanning liquor tanks, and a rail spur, were present on the western portion of the Site by the late 1890s. *See* Sanborn Maps attached to

the Phase I Report. The Haight Tannery extended southward from the Lot 2 Site across Gordon Creek in a Southern direction to Lot 1 by this time. According to the updated Phase I February 2012 Addendum, the Haight Tannery was present from 1881 to 1899.

Subsequently, American Hide & Leather was present from 1899 to 1955. By 1904, the Tannery contained 15 buildings. *See* Exhibit N of the BCP application. A 1924 map reveals the presence of "waste tanks" added to the main Tannery building. Additionally, a sewage disposal and a chlorine plant were present along Gordon Creek. A large area of empty barrels appeared to be present in the Site's northeast portion at this time. By 1942, a 100,000 gallon fuel oil AST and 100,000 gallon water AST were present on the Site's northern portion. The Tannery discharged water containing lime, salt, tanning liquors, and lactic acid into Gordon Creek; the effluent was highly colored.

In 1945, the current Site building was constructed on the south and east portions of the Site to replace a former building. By 1950, the Tannery was expanded to include a fuel handling building, coal silos, ash silos, additional fuel oil tanks, and paint shed. *See* 1950 Sanborn Map in Phase I. According to the updated Phase I February 2012 Addendum, for one year the Site was owned by General American Industries, Inc. from 1955 to 1956. *See* Exhibit N of the BCP application. General American sold the Site to Howes Leather Company, Inc., which continued to operate the tannery from 1956 to 1960 when Tannery operations apparently ceased. An individual then purchased the Site, and this individual and his estate owned the Site from 1960 to 1969. A new owner, Gordon Creek, Inc. purchased the Site in 1969 and may have operated portions of it as an antique dealer business until 1970. However, for the most part, the Site was vacant from 1960 until 1970.

Laundering of linens began at the Site in 1970 by a company named Northern Hospital Linen Service, Inc., which was owned by a man by the name Ricketts, who purchased the Site individually at that time. By the late 1970s, several tannery buildings on the Site's western portion had been razed. By 1976, Ricketts transferred the Site into a corporate entity named Rickett's, Inc. and changed the name of his laundering company to Linen Systems for Hospitals, Inc. Ricketts, Inc. sold the Site and Linen Systems to Angelica in 1977, but Angelica kept the name Linen Systems for Hospitals, Inc., which owned and operated the Site until 1983-1984. In 1983, Angelica subsequently changed the name Linen Systems to Angelica Healthcare Services Group, Inc. but title to the property remains in the name Linen Systems. Angelica Healthcare Services Group, Inc. changed its name again in 1996 to Angelica Textile Services, Inc. (Angelica).

According to the Phase I Report, there are no underground storage tanks (USTs) currently at the site. A single UST was installed in 1973 and removed in 1993; this stored 4,000 gallons of diesel fuel. No spills, leaks, or indications of product release were reported. The tank was allegedly removed in accordance with DEC regulatory requirements, and soil tests beneath the tank performed by the DEC found no impact. One 5,000 gallon fuel oil AST that stores back up fuel when natural gas is unavailable was on-site from November 2000 until July 2012. *See* Exhibit D of the BCP application Site Layout and Area Map. [NOTE: This AST was present west of the Site building, but was permanently closed on or about July 18th, 2012.] Additionally, two water ASTs located in the boiler room do not represent an impact of concern. Angelica formerly stored

laundering chemicals in state registered plastic ASTs, but changed to using portable totes and drums early in the 2000s; these did not represent a REC in the Phase I Report.

According to the Phase I, Angelica did not generate or dispose of hazardous waste and no waste disposal occurs on site. Sanitary wastewater was discharged to the municipal sewer system by Angelica. Wash water was discharged through a network of grate drains equipped with lint filters to a concrete sump/wastewater pit in the boiler room, which pH adjusts the water prior to discharge to the sewer system. The sump/wastewater was inspected and pumped out every 3 to 5 years. However, the Phase I did not contain any data confirming no impacts from the sump. Two natural gas-fired boilers were identified as the Site's only combustion emissions, but were not deemed as posing a physical impact to the Site by GaiaTech. Gaiatech also concluded the Site's transformers did not appear to pose a PCB hazard.

The Phase I Report also evaluated if there was any potential environmental impact to the Site from surrounding properties. The most significant adjacent former use was located across the channelized creek to the South, and was known as the former Ballston Spa Electric Light & Power Company, which was present southwest of the Site from 1982 to 1911, and may have been a manufactured gas plant site. However, other than this historic use, which is separated by the Site via the creek, there were no other former adjacent uses noted of any environmental significance. See Exhibit I of the BCP application - Adjacent Property Owner Map.

There have been release incidents on adjacent or nearby sites, which were identified and are summarized below:

A. Old Village Garage, Thompson Street. This site, which is approximately 350 feet north-northeast, is down-gradient from the Site, and reported a leaking gasoline UST in 1998. NYSDEC has not apparently issued a closure letter, but this spill is listed as "corrective action taken", and therefore, was not deemed as having a potential impact on the site in the Phase I Report.

B. Vicinity Oil Spills. Four spills with minimal potential for hazard have been closed after corrective action was taken in the vicinity, and were not deemed to represent a potential impact concern in the Phase I Report. These were all within 650 feet of the site, and included: a diesel fuel spill south-southeast of the site in 1998, an oil and gas spill in 1993 at a commercial business east-southeast, a gasoline spill at Cumberland Farms east-northeast in 1988, and a water spill at a dentist office south of the site in 1993.

C. Herbicides and Pesticides Spill. Herbicides and pesticides were released by an Agway store that burned down in 1977, 750 feet south of the site. This site is allegedly under continued DEC monitoring, although materials are buried and leachate is allegedly being controlled. Because of this site's status, it cross-gradient relationship to the Site, and distance from the Site, the Agway site was not deemed to pose an impact on this Site in the Phase I Report.

2.1.2. 1993 UST Removal Investigation

In 1993, Angelica removed a 4,000 gallon UST of diesel fuel and pump. This tank was located near the location of MW2 (See Sampling Plan Map, Appendix A). The investigation of soils in 1993 beneath the excavated UST did not detect contamination. The tank registration lists this tank as closed as of August 1, 1993.

2.1.3. July 2010 Surface Soil Petroleum Incident Data

The July 2010 petroleum spill incident and the subsequent investigation was described above in Section 1.4.2 entitled Recent Remedial Spill Action. No reports were generated in relation to excavation work but the data investigation results have been shared with the Department and are summarized above in Section 1.4.2 of this RIWP.

The data collected confirms No. 6 fuel oil was present in the ground/excavation area. During the recent spill excavations identified above, soil and groundwater samples were collected and analyzed. Site sampling has confirmed the presence of No. 6 fuel oil as Diesel Range Organics (mostly identified as a match to Lube Oil based on laboratory analysis/comparison); the petroleum contamination on the site. Additionally, soils contain multiple SVOCs, including acenapthhene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i) perylene, benzo(k)fluoranthene, chrysene, 2-methylnapthalene, dibenz(a,h) anthracene, fluoranthene, fluorene, indeno(1,2,3-cd) pyrene, phenanthyrene, and pyrene. The VOCs m,p-xylene and o-xylene were also detected but only in one sample and at levels slightly above non-detect levels. Low levels of heavy metals, including but not limited to, arsenic, barium, chromium, and lead were also detected (under TCLP standards), with barium identified in most samples. TCLP testing for metals indicate that the metals are not subject to leaching.

2.1.4 February 2012 Phase I Addendum Report

GaiaTech received DEC FOIL documents, which it summarized in its updated February 2012 Phase I Addendum Report. In addition, since the initial Phase I Report did not contain any data confirming there were no impacts from Angelica's own operations to the sump, GaiaTech asked Angelica for its past data for analysis.

Based on updated information and data provided by Angelica, and documented in the February 2012 report, May 2009 analysis of sludge from the sump pit (located inside the main building), was analyzed for pH, solids, TCLP, semi-volatile organic compounds (SVOCs), acids, halocarbons, aromatics, ketones, carbon disulfide and vinyl acetate. The analysis was performed so that the sludge could be characterized for disposal. The data indicated that the pH was slightly basic, barium was detected at 1.79 micrograms per kilogram (µg/kg), toluene was detected at 19.6 µg/kg, acetone was detected at 1,350 µg/kg, 2-butanone was identified at 142 µg/kg, and carbon disulfide was identified at 224 µg/kg. GaiaTech concluded these concentrations suggested that: this sump pit is unlikely to have received large discharges of oils, solvents or other unauthorized materials while in use. Furthermore, all detections were below the unrestricted use cleanup standards in 6 NYCRR 375-6.8(a), which are 0.7 parts per million (ppm) toluene and 350 ppm barium; and 4.8 ppm acetone for residential restricted use soil cleanup objectives

pursuant to 6 NYCRR 375-6.8(b). While there are no regulatory standards for 2-butanone and carbon disulfide, the residential cleanup guidance standard in DEC CP-51 is 100 ppm for each of these substances. Given the nature of material laundered and detergents used, that no staining or indications of releases to the wastewater system were observed in 2008, and the results of sludge sampling in 2009, the potential for significant impact to the site as a result of unauthorized releases to the wastewater system appears low. *See* Exhibit P of the BCP application– Sump Pit Data

2.2 Physical Setting

2.2.1 Geology

The Site is located within the Village of Ballston Spa, Saratoga County, New York. Specifically, the Site is situated in a low valley at an approximate elevation of 244 feet above mean sea level (AMSL). Half a mile north and south of the Site, elevations increase by approximately 100 feet.

This area experienced major drainage changes during Pleistocene glaciation. Nearby to the southeast and east, respectively, Round and Saratoga Lakes are thought to be kettle lakes that lie in glacial debris, which now fills the pre-glacial Colonie Channel (Van Diver, B.B., 1985). The Site is bordered on the south by Gordon Creek, a small tributary of the more significant Kayaderosseras Creek. Gordon Creek flows easterly to its confluence with Kayaderosseras Creek approximately 0.5 miles northeast of the site. The latter creek meanders further north and east to enter Saratoga Lake. At some point the Gordon Creek adjacent to the Site was channelized with concrete and rocks. The creek bed itself is concrete and rock and allows for very shallow ponding of water and gradual decrease in elevation.

Bedrock beneath the Site (estimated at 10 to 40 feet below the ground surface) is mapped as the Canajoharie Shale, Unit NYOc;1 (D.W. Fischer, et al., 1961). This black shale is a member of the Trenton Group of black shale(s). The Trenton Group is of Middle Ordovician age, formed approximately 460.90 - 471.80 million years ago. The depth to bedrock beneath the Site is not known and was not encountered in excavation on the north part of the site. The excavation pit is approximately eight to ten feet deep.

Middle Ordovician Canajoharie Shale is one of several black shales in a belt of autochthonous Paleozoic rocks (exclusive of the Taconic sequence) that occupies the Champlain, Hudson, and Mohawk valleys. Also included in the Trenton Group are the Utica and Snake Hill Shale members. The Snake Hill member is found to the northeast in the Saratoga Springs area. Found east of the site is the Normanskill Formation of the Trenton Group – Taconic Area. This formation is comprised of greywacke, black and gray and black shale(s), also of Middle Ordovician age.

Structurally, the area contains a number of sub-parallel, generally north-south oriented faults. The Saratoga fault is a normal fault located approximately one mile east of Ballston Spa. Another significant normal fault, the McGregor fault is located to the northeast and controls the location of several carbonated mineral springs in the Saratoga region.

According to the Surficial Geologic Map of New York, the overburden at the Site consists of lacustrine delta (ld) deposits of coarse to fine gravel and sand, stratified, generally well sorted, deposited at a former shore line, and variable with thicknesses of 3 to 15 meters (Caldwell, D.H., et al. 1978). Further west of the Site is the contact between this lacustrine delta material and glacial till (t), variable texture, (e.g., clay, silt clay, boulder clay), usually poorly sorted, deposited beneath glacial ice, and variable with thicknesses of 1 to 50 meters.

There are two United States Department of Agriculture (USDA) soil types identified at the Site. Chenango silt loam, loamy substratum, undulating [ChB] occupies the east-central and north portions of the site. This very deep, well-drained soil is formed in water sorted sand and gravel on outwash plains, kames eskers, and alluvial fans. Oakville and Windsor [OeE] soils – 25 to 30 percent slopes occupy the western portion of the site. These very deep well drained to excessively drained soils are formed in water sorted sand. Additionally, a third soil type, Tioga fine sandy loam [Tg] may occupy the areas near the banks of Gordon Creek on the south part of the site. This very deep well drained soil formed in recent alluvium and is found in floodplain areas. It should be noted that the uppermost sequences of these soils may have been altered through onsite construction and demolition activities over time.

Currently, there are no wells at the site. However, groundwater has been observed at 4 to 6 feet below ground surface (BGS) in the aforementioned soil excavation area at the north side of the site. It should be noted this observation was made during a period frequent precipitation and may represent a higher than average water level at this location. Also to note is that water levels are expected to vary at other parts of the site, such as near the creek or during significant rain events. While there are no wells at the Site, it anticipated that the direction(s) of groundwater flow mimic the topography with eventual discharge to Gordon and Kayaderosseras Creeks.

Residences located to the north, south, and east of the Site and are connected to municipal utilities. The village obtains its water from Great Flats Aquifer through the Town of Glenville. There are no public water supply wells located within 1,500 feet of the site. No potable or private domestic use wells are located down-gradient from the site. Therefore, an impact to wellhead protection or groundwater recharge areas does not appear possible (*See* Phase I Report at 6).

3.0 Evaluation of Contaminants of Concern and Potential Migration Pathways

3.1 Nature and Extent of Contamination

Only limited Site sampling has been performed. To date, Site sampling has confirmed the presence of No. 6 fuel oil as Diesel Range Organics petroleum contamination (mostly identified as a match to Lube Oil based on laboratory analysis/comparison) in the northwest corner of the Site. This area of the Site is identified as EP1 on Sampling Plan Map located in Appendix A. Additionally, sampling to date has confirmed that soils in this area contain multiple SVOCs, including acenapthhene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i) perylene, benzo(k)fluoranthene, chrysene, 2-methylnapthalene, dibenz(a,h) anthracene, fluoranthene, fluorene, indeno(1,2,3-cd) pyrene, phenanthyrene, and pyrene all of which are indicative of the presence of No. 6 fuel oil. The VOCs m,p-xylene and o-xylene were also detected in one sample from EP1 and only slightly above non-detect levels again indicative

of the presence of No. 6 fuel oil. Low levels of heavy metals, including but not limited to, arsenic, barium, chromium, and lead were also detected (under TCLP standards), with barium identified in most samples in this area. TCLP testing for metals indicate that the metals are not subject to leaching.

Since tannery operations are known to utilize different types of COC, including but not limited to chlorine, formaldehyde, sulfuric acid, glycol ether EB, glycol ether PMA, methyl isobutyl ketone, toluene, xylol, phosphoric acid, methanol, manganese sulfate, chromium III, ethylene glycol, lead, copper, lime, and zinc, further sampling in other Site locations may identify additional tannery related contamination during the future remedial investigation.

3.2 Contaminants of Concern (COC)

3.2.1 Volatile Organic Compounds

Volatile Organic compounds (VOCs) were sample for and analyzed for during the excavation of EP1 and none of the compounds were found in excess of cleanup standards. The VOCs m,p-xylene and o-xylene were detected in only one sample and only slightly above non-detect levels. This is most likely because the petroleum has been in the ground for so many years the volatile compounds have been driven off. However, Target Compound List (TCL) VOC sampling and analysis will be conducted as part of the Site investigation effort. The TCL VOC list can be seen in Lab Project #10-4046 issued October 11, 2010 performed by Paradigm Environmental Services, Incorporated; located in the BCP application.

3.2.2 Semi-Volatile Organic Compounds

Semi-volatile organic compounds (SVOCs) were detected in a number of samples at various levels during the tank and soil excavation work in EP1. However, it should be noted that most, if not all, of the SVOCs found are consistent with the petroleum contamination from the area around the above ground vertical No. 6 fuel oil tank (EP1). Target Compound List (TCL) SVOCs will be sampled and analyzed for during the site investigation. The TCL SVOCs list can be seen in Lab Project #10-4046 issued October 11, 2010 performed by Paradigm Environmental Services, Incorporated; located in the BCP application.

3.2.3 Metals

Metals were detected in a number of samples at various levels during the excavation of EP1. Moreover, metals are a COC at this Site due to past tannery operations. For the EP1 excavated soils, both TCLP and Total metals analysis was performed. All TCLP metal analysis indicated that the COC metals detected did not leach and were orders of magnitude below hazardous waste regulatory limits. However, some of total metal analyses/results for individual metals were above cleanup standards. Therefore, Total Analyte List (TAL) Metals will be sampled and analyzed for during the Site investigation. However, due to past tannery operations, the Site investigation will focus on the following metals:

- Arsenic;
- Barium;

- Chromium (hexavalent);
- Lead; and
- Mercury.

3.3 Potential Routes of Migration

While the Metals detected to date have shown they are not leachable and as such should not migrate far from the excavation pit EP1, there is no groundwater data yet to reach any conclusions about potential routes of migration. However, a number of samples are located what is thought to be down gradient from EP1 to characterize the flow and COC in the groundwater if any. Soils in this area are a sandy loam and noticeable groundwater flow from the side of the hill has been documented. The normal routes of migration in this area are from surface water and groundwater. Therefore, groundwater, which may be a viable migration route, will be analyzed in this this area during this RI.

The creek may also be a potential route of migration from past tannery operations. However, Gordon Creek was channelized at the turn of the century and is now more of a canal than a creek with a granite flat stone bottom and stone walls. Therefore, it is not possible to sample in this creek since there is no longer a sediment bottom.

4.0 Remedial Investigation Scope of Work

4.1 COC Sample Locations

Table A2 and the Sample Plan Map in Appendix A identify the proposed RI sampling GPS locations for the sampling points. The samples to be taken are depicted in Table A1 of Appendix A. VOCs, SVOCs, Metals, PCBs and Pesticides will be sampled and analyzed as potential contaminants of concern (COC). The rationale for the sampling locations selected are discussed which link to former historic tannery uses on the Site (See Section 4.1.2 for details).

4.1.1 Sampling Objectives

Table A1 and the Sampling Plan Map in Appendix A depicts the Sampling Plan and provides guidance for the Site investigation effort. The objective is to identify potential areas of concern based on historical tannery operations and previous sampling and analysis that has taken place on-Site.

4.1.2 Sampling Location, Frequency, and Rationale

Figure 3 the “Site Survey Map with Identified Delineated Soils” was used as the base map to develop the Sampling Plan Map shown in Appendix A. The Sampling Plan Map depicts the sampling locations while Table A1 also contained in Appendix A depicts the sampling frequency.

The sampling plan rationale first looked at the Sanborn maps and where buildings/processes were present. The buildings/processes were identified and areas surrounding these areas were

given designations such as Fuel Oil Building (FOB), Previous Maintenance Building (PMB), and Rail Road Spur (RRS). The on-going excavation pit area was also identified by a previous sketch/map that showed it as a "bit or pit dyke". The excavation pit (EP) area is currently identified as EP1.

In addition to the aforementioned areas, sample locations were placed in areas where process vats, drying ovens, warehouses, and other significant activities occurred during the time period when the tannery was in operation (See Figure 4). It should be noted that where the drying ovens are located on a 1924 map previous maps showed a vat yard and tanning vats. So processes were moved and relocated over the time period when the tannery was in operation.

Once the buildings/processes were identified, a sampling plan for exterior sampling areas outside the Site buildings was laid out. The outside sampling points were located adjacent to and around the designated areas based primarily on former tannery uses. The sampling points were limited to safe access areas and areas where possible hand augers or hand tools could be used to dig to the proper soil depths. Specifically on the West side of the Site, where access by a drill rig will be very limited due to construction debris, building foundations and walls, and overgrowth of trees and brush, hand auger use may be required.

The sampling point inside the Site main building is the sump pit where sediments samples from the buildings sanitary sewer drain/pipe drains can be taken. In addition, two sub-slab air samples for VOCs will be taken in the main building.

The monitoring wells were located in 6 areas based on groundwater flow that comes off the steep hill to the West of the property and flows towards Bath Street (Eastern direction) and/or Gordon Creek (Southern direction). The monitoring well locations create a triangle (i.e., MW1, MW2, and MW3 create a triangle and MW4, MW5, and MW 6 create a triangle) where groundwater flow patterns could be confirmed. The monitoring well locations avoided areas that were unsafe such as near partially collapsed buildings or near construction debris. The monitoring well locations also avoided the areas where underground utilities such as pipelines that were depicted on the Sanborn maps. Areas that were relatively flat and accessible with a drilling rig were selected for the monitoring well locations.

Once the above sampling locations were identified, then the remaining areas on the map where potential contaminated areas were selected. This included the concrete pad where the former location of the drying ovens/building was located and an area below (downhill/slope) from the excavation pit (EP1).

4.1.3 Sampling Designations

Table A1 depicts the sampling method, number of samples in a given area (See Appendix A, Sampling Plan Map for sample locations and areas) and depicts the sampling method and sample analysis. Also see Appendix G "QAPP" for more specific information.

4.1.4 Sampling Handling and Analysis

The Site manager will be responsible for ensuring the samples are appropriately taken using the Sampling Plan Map, Table A1 and Table A2 contained in Appendix A. The Site manager will either take the samples or designate someone else to remove the samples. The samples will be appropriately marked and sent to the laboratory with a "Chain of Custody" report. Once the laboratory has performed the analysis the information will be disseminated among the appropriate and designated personnel.

4.2 Utility Markouts

Prior to digging or excavation activities the proper authorities will be notified to mark the utility lines. It is anticipated that buried utility lines are present beneath various portions of the Site. These utility lines will need to be located and identified prior to performing this work. The New York State Dig Safe utility locating service will be notified prior to performing intrusive activities to mark buried utilities that enter the Site. This service will notify the local utility providers including electric, gas, water, sewer, and communications and these companies will mark respective buried utilities where they enter the Site along perimeter roads.

Buried utilities will also need to be identified at locations where drilling or other intrusive activities are planned. Any site-specific utility drawings or other knowledge of buried utilities onsite will be reviewed. Further, location-specific geophysical surveys will be performed in an effort to identify any buried metallic objects such as electric conduit, pipes, etc., as described below.

The Western property boundary may contain an old buried water supply line. At this time the appropriate utilities do not know the exact location. Prior to drilling the geophysical survey described in the next section will be conducted in the area around the proposed bore hole or monitoring well location (i.e., when use of a drill rig or other deep ground penetrating equipment is used) to avoid hitting any buried and unknown utilities.

4.3 Geophysical Survey

A significant portion of the 6.35 acre site is currently occupied by buildings or remnant building foundations. Steel-reinforced concrete (rebar) is observed to be present in these structures. Rebar is known to cause electromagnetic interference and geophysical anomalies. In addition, the terrain on the west side of the site is steeply sloped and thickly wooded. Performing geophysical surveys in these areas would be ineffective due to interference and terrain complications. Furthermore, with the exception of the leather scrap area located at the EP1 excavation area (identified on a map as a bit/pit dike), there is no history or evidence of burial or landfills at the site. There is also no history or evidence of underground storage tanks (USTs) at the Site. Therefore, performing an electromagnetic survey for the entire site would be ineffective and the results likely useless.

Rather, focused geophysical surveys will be conducted at each of the drilling locations (i.e., drill rig usage only) at the Site to assist with clearing subsurface utilities and identification of any

buried metallic objects that could pose a safety concern for the drilling operations. Electromagnetic (EM-31) and proton precession magnetometer instruments will be utilized for the geophysical surveys.

Prior to the surveys, the EM-31 instrument will be "zeroed" in a background location free of anomalies or interference from overhead power lines. Electromagnetic readings will be taken in the vertical and horizontal dipole positions. The magnetometer will be set to the appropriate earth magnetic reading (in gammas) that corresponds to the site.

Survey grids, 20 foot by 20 foot square with 5-foot station spacing, will be established at each drilling location. The data will be processed and mapped at appropriate contour intervals to show geophysical anomalies or other data patterns. Anomalies or other data patterns will be reviewed to determine if they potentially represent buried utilities or metal objects of concern (e.g., steel reinforced concrete). If buried utilities or other objects are identified, the respective drilling location will be moved accordingly with prior approval of the Department.

4.4 Soil Borings and Soil Samples

4.4.1 Soil Borings

Seven (7) Soil Borings, eight (8) Deep Borings, and six (6) additional deep borings (which will be converted into groundwater monitoring wells) will be performed for a total of 21 investigation locations. In addition, there are excavation pit samples and sub-slab samples that will be taken. Specific sampling areas as identified in Table A1, sample locations as shown on the Sampling Plan Map and GPS coordinates shown in Table A2 are located in Appendix A. The sampling locations are at strategic points that allow for historical use and down-gradient groundwater and/or soil sampling. Please note that no soil boring (i.e., depth) will enter the bedrock zone.

The specific locations of each of the surface (0 to 2 inch depth), subsurface (6 to 24 inch depth), and deeper subsurface (0 to 16 foot depth) soil boring/groundwater well sample locations are all shown on the Sampling Plan Map in Appendix A. Depending on site conditions deeper subsurface boring/groundwater wells may be required to be drilled.

Areas that are relevant to potential COC identified on historical Sanborn maps have sample locations near or down-gradient to them as follows:

- PMB – Previous Maintenance Building (SB5, SB6, SB7, DB3, DB4 and MW5);
- RRS – Rail Road Spur (SB2, SB3, and MW3);
- EP1 – Test Pit Area (TP1, TP2, TP3, SB4, DB8, MW1, and MW2);
- Tanning Yard (SB5, SB6, SB7, DB3, DB4 and MW5);
- Drying Ovens and Tanning Vats (DB1, DB2, MW2, MW3, and MW6)
- Maintenance Shop, Building No.5 (SB6 and DB5);
- Bark Mill (SB2, SB3, and MW3);
- Hide Sheds (SB5); and
- Main Building (Inside samples, IS1 and two sub-slab air samples).

Each of the areas above corresponds with an area of the Site that potentially may have been impacted by former tannery operations.

As shown on Table A1 in Appendix A, the sampling scope of work for the RI will include the collection of surface (0 to 2 inch depth) and subsurface (6 to 24 inch depth) samples at each of the proposed locations with the exceptions of the Gordon Creek and Inside Building locations. The inside building locations are sediment samples from the drains. Hand-held sampling equipment will be used to collect the surface and subsurface soil samples with the exception of SB4 that will be drilled. The soil sample will be logged using American Scientific Testing Method (ASTM) D2488 Standard for the Visual - Manual Description of Soils.

Additionally, deeper subsurface (0 to 16 foot depth) soil borings will be drilled at each of six monitoring well locations, eight deep bore locations and one soil bore location (SB4). These borings will be advanced using 3.25 to 4.25 inch inside diameter (ID) hollow-stem augers (HSAs). Split-spoon (barrel) sampling equipment will be used to collect these subsurface soil samples at continuous 2 foot intervals. These soils will also be logged in the field using the above-referenced methods. ASTM D1586 Standard for Penetration and Split Barrel Sampling of Soils will be used. Blow counts will be recorded for each 6 inch advancement of the split spoons. Soil sample recoveries will be recorded for each 2 foot sampling interval.

Split-spoon sampling equipment will be thoroughly decontaminated between sampling intervals using biodegradable detergent and clean water. The associated waste water will be kept onsite until such time that associated sample results indicate the proper means of disposal.

4.4.2 Soil Sample Analysis

Due to the former tannery operations at the Site, the principle COC are metals. In addition, semi-volatile organics associated with fuel oil and coal that were used at the Site are COC. Therefore, surface (0 to 2 inch depth), subsurface (6 to 24 inch depth), and deeper subsurface (0 to 16 foot depth) soil boring samples will be analyzed for Target Analyte List (TAL) Metals, Target Compound List (TCL) VOCs and SVOCs, PCBs, and Pesticides. Table A1 in Appendix A shows the sample matrices numbers, depths, and analyses for each of the samples.

The sampling methodology identified for soil samples and ground water samples for the RIWP is as follows:

Drill Rig Sampling: Subsurface soil samples will be collected from each of the six well borings, the two deep soil borings, and soil boring SB4. These samples will be collected using the American Standards for Testing and Materials (ASTM) D 1586-11 Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils. Penetration blow counts (N-values) will be determined and recorded for each 6-inch interval of (split-barrel) advancement. Soil recoveries will be logged by an on-site geologist using ASTM D 2488-00 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). The split-barrel sampling equipment will be thoroughly cleaned using a detergent, rinsing with potable water, and air drying.

Each split-barrel soil recovery will be immediately screened upon opening using a photo ionization detector (PID) for the presence of volatile organic compounds (VOCs). These readings and respective depth intervals will be recorded in the field. Any zones of relatively elevated instrument response will be identified and recorded. The PID instrument will be calibrated according to manufacturer specifications and daily background readings will be recorded.

Representative soil samples for VOC, semi-volatile organic compounds (SVOCs), and metals analysis will be collected from the entire length of the respective 2-foot soil sample recovery. Based on the anticipated depth (4 to 6 feet) of groundwater beneath the site, the well borings will be approximately 10 feet in depth. There will be no samples collected from the 0- to 2-foot depth interval in well borings below the existing asphalt driveway to prevent potential sample contamination associated with this material. The two deep soil borings will be six feet in depth. The soil samples will be collected using dedicated stainless-steel sampling spoons. Nitrile gloves to be worn by the sampler will be changed between sampling intervals. Every effort will be made to minimize disturbance and volatilization of VOCs during sample collection. Soil samples for SVOC and metals analysis will be thoroughly homogenized.

All soils and debris generated as part of the boring/drilling operation will be put back into the drill hole. The exception will be the monitoring wells where the soil and debris will be staged on-site.

Hand Augur and Surface Sampling: As shown on Table A1 in Appendix A, the sampling scope of work for the RI will include the collection of surface (0 to 2 inch depth) and subsurface (6 to 24 inch depth) samples at each of the proposed seven locations with the exception of SB4 as it is located on asphalt. Hand-held sampling equipment will be used to collect the surface and subsurface soil samples. The soil sample will be logged using American Scientific Testing Method (ASTM) D2488 Standard for the Visual - Manual Description of Soils. Hand held augurs will most likely be the equipment of choice for this sampling effort.

Soil Sample Handling and Analysis:

The soil samples will be subject to the analyses found in Appendix G "QAPP" Table 4.2 "Reporting Limits and Analytical Data Quality Objectives For Soil Analysis".

The samples will be placed directly in pre-labeled sample containers (See Table 5.2 of the QAPP in Appendix G for details) to be supplied by the analytical laboratory. These sample containers and preservation (where applicable) will meet Analytical Service Protocol (ASP) Exhibit 1 criteria. The soil samples will be placed in coolers containing ice following their collection. Full chain-of-custody will be utilized from sample collection through sample transportation or shipping to a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Procedure (ELAP) approved laboratory.

Additional environmental soil boring and waste characterization samples will be collected if there is evidence of a petroleum spill and the spill is reported to NYSDEC. If collection of these samples is necessary, analysis will be performed for Diesel Range Organics (DRO).

Further analysis of some of these samples may also be needed for waste characterization purposes. The frequency of such analyses will be determined by the anticipated disposal site requirements, as will the additional analytes. Table 5.2 of Appendix G describes details of the sampling containers, preservatives, and holding times for these samples.

The contaminants present at this site will likely pose no significant risk due to the low level of contaminants; therefore, modified Level D personnel protection is required.

The QAPP Table 4.2 (Appendix G) details the sampling data validation that will be performed on the soil samples.

Investigation Derived Waste:
Any potentially contaminated investigation derived waste (e.g., personal protective equipment [PPE]) will be securely contained onsite for appropriate disposal.

4.5 Groundwater Investigation

4.5.1 Monitoring Wells

Six (6) groundwater monitoring wells will be installed as part of the RI as shown on Table A1 and the Sampling Plan Map in Appendix A. These monitoring wells will be located at MW1 through MW6. The purpose of the wells is to determine groundwater quality and provide information regarding groundwater flow direction and gradient. The location of the six monitoring wells establishes a triangle for monitoring wells MW1, MW2, and MW3 and monitoring wells MW4, MW5, and MW6. This triangle approach is used to establish groundwater flow direction and aids in the determination of migration direction of COC should the later be required.

These wells will be installed inside the six deeper subsurface (0 to 16 foot depth) soil borings described above. The wells will consist of 2 inch ID polyvinyl chloride (PVC) riser and number 10 slot (0.010 inch wide) screen. It is anticipated that the depth to groundwater is approximately 8 feet below the site. Therefore, the targeted depth of the well screens will be approximately 6 to 16 feet below the ground surface (bgs) to intersect the top of the water table. While this is the targeted depth of these wells, it may be adjusted based on the apparent depth of the water table, as evidenced by moisture content in split-spoon soil recoveries.

Upon reaching the target depth of the well boring, the 10-foot PVC well screen and riser casing will be lowered into the HSA. Clean quartz sand pack that is compatible with the 10 slot screen (US Standard Sieve Size 20-40) will be carefully added to the annular space between the screen/ riser and HSAs. The well will be carefully raised approximately 6 inches off the bottom of the boring to allow the sand pack to provide additional filtration of fine media from beneath the well screen. The sand pack will be slowly added and HSAs incrementally raised to provide a continuous filtration medium to a depth of approximately one foot above the top of the screen. Finer sand is to be used for the upper 1 foot of the sand pack. A 2 foot pelletized bentonite seal

will be slowly placed in the annual space above the sand pack and hydrated with water. After the bentonite seal is fully hydrated, a Portland cement and bentonite grout mixture will be added to the annular space to a depth of approximately 2 feet bgs. A cement mixture and steel riser casing will be used as surface completion for the well.

Following an approximately 48 hour set up time, each well will be thoroughly developed through surging and pumping. This development will be performed to remove fines and will continue until pH, specific conductance, turbidity, redox, and dissolved oxygen and measurements of the well water have stabilized. Well development water will be contained until groundwater sampling results are available to determine appropriate disposal.

Following development, the locations and elevations of the well casings will be surveyed. Groundwater levels will be taken in each of the wells using an electric water level indicator and converted to elevations above mean sea level (AMSL) based on the survey. Groundwater flow direction will then be contoured and gradient calculated.

4.5.2 Groundwater Sampling

As shown on Table A1, groundwater samples will be collected at each of the six new wells. The groundwater samples will be analyzed for TAL Metals, Target Compound List (TCL) VOCs and SVOCs, PCBs, and Pesticides.

The groundwater sampling methodology will be as follows:

Prior To Sampling:

One set of groundwater samples will be collected from each of the six new monitoring wells. The monitoring well locations are identified on the Sampling Plan Map (Appendix A). All samples will be collected using methods consistent with Test Methods For Evaluating Solid Waste; [SW-846, U.S. Environmental Protection Agency (EPA) Office of Solids Waste and Emergency Response, Washington, D.C. 3rd Edition 1986; and the U.S. EPA Low-Flow (Minimal Drawdown) Ground Water Sampling Procedures (1996) (Authors R.W. Puls and M. J. Barcelona)].

ECI field sampling personnel will wear Level D PPE including but not limited to clean latex gloves (or equivalent) during all sample collection procedures and equipment decontamination. Gloves will be changed if they become soiled and at any time when starting at a new sample location to prevent cross contamination. The groundwater contaminants present at this site will likely pose no significant risk due to the low level of contaminants; therefore, Level D personnel protection is anticipated.

The location coordinates and casing elevations of the new monitoring wells will be surveyed following installation. Location coordinates will be surveyed to the nearest 0.01 foot. Casing elevations will be surveyed to the nearest 0.1 feet above mean sea level (AMSL). All survey measurements will be referenced to the nearest US Geological Survey (USG) geodetic benchmark.

Water levels will be measured in the new monitoring wells prior to sampling using a commercial water level indicator. The measurements are made by lowering a sensor slowly to the surface of water in the well. When the audible alarm sounds, the depth is recorded to the nearest 0.01 foot. This information will be used for well volume calculations and for determination of groundwater flow direction. The probe of the water level indicator will be thoroughly cleaned between well locations.

Following development, groundwater samples will be collected using low flow sampling techniques. A variable speed electric submersible pump will be lowered into the well to approximately the middle of the screened interval. Low flow purging will be performed at a rate not to exceed 0.5 liters per minute. If necessary, efforts will be taken to reduce the flow rate so that drawdown in the water level in the well does not exceed 4 inches. Field measurements for temperature, pH, specific conductance, dissolved oxygen, redox, and turbidity will be obtained using a flow through cell. Purging will continue until these measurements stabilize. These readings and pump flow rate will be recorded on a groundwater sampling log form in the field.

Groundwater Sample Collection:

ECI will use a submersible low flow pump to purge and condition the wells. The low flow ground water will be allowed to accumulate and soak into the surface soils as the well is purged and conditioned for sampling. The pump will be selected to have a pump rate of less than one liter per minute. Dedicated drinking water grade polyethylene tubing will be used for pump discharges. The submersible pump will be cleaned after use at each well according to the following parameters:

- Thorough wash of pump exterior with laboratory grade non-phosphate detergent in water;
- Laboratory grade nonphosphate detergent in water will be circulated through the pump for 5 minutes;
- Rinse the pump exterior and interior with deionized water;
- Rinse the pump exterior with laboratory grade isopropyl alcohol; and
- Air dry pump and cover with clean plastic.

The pump rate will be checked periodically, because it may decrease if the height of the water column changes. At no time during the purging will the pumping rate be high enough to cause the groundwater to cascade back into the well. This can cause excessive aeration.

In-situ field measurements for temperature, pH, specific conductivity, dissolved oxygen, redox, and turbidity will be performed on ground-water samples from each monitoring well sampled. These measurements will be taken at initiation of the well purge, throughout the purge, and at the end of the purge prior to the collection of samples for laboratory analysis. The parameters will be stabilized before measurements are recorded. The accuracy of the measurements for each parameter is provided in the following table.

Groundwater Sample Handling and Analysis:

Samples collected from each of the monitoring wells will be analyzed for the list of analytes/compounds contained in Table 4.1 of Appendix G “Reporting Limits and Analytical Data Quality Objectives For Groundwater Analysis”.

The use of a low flow pump should eliminate the need for filtering metals samples. Permission to filter groundwater samples in the field may be requested in accordance with DER-10 in the event turbidity limits cannot be achieved. If filtered samples are taken, unfiltered samples will be taken for comparison.

Low-flow pumping (0.1 to 0.5 liters/minute) methods will be used to collect groundwater samples that minimize drawdown of the aquifer and exhibit stable field parameters (pH, ORP, DO, specific conductance, and turbidity). This method has been shown to result in improved sample quality and precision and reduced purge volume and need for filtration.

The QAPP Table 4.1 (Appendix G) details the sampling data validation that will be performed on the groundwater samples.

4.6 Remedial Investigation Data Analysis

The remedial investigation data that has been sampled and analyzed will be reviewed/analyzed by the appropriate project personnel to determine the need for further sampling if required.

Groundwater samples will be collected at the Site according to the procedures described in Section 5.0 of the QAPP (See Appendix G). All samples will be submitted to a laboratory NYSDOH ELAP certified for the parameters of interest and able to provide a Category B data package.

These samples will then be analyzed to determine the presence of

1. Volatile Organic Compounds - analyzed by EPA Method 8260B, method detection limit 2-10 ug/L for groundwater (or at or below MCL's for those VOCs that have corresponding potable water MCL's) and 10-25 ug/L for soils.
2. Semi-Volatile Organic Compounds - analyzed by EPA Method 8270C, method detection limit 10-25 ug/L for groundwater (or at or below MCL's for those SVOCs that have corresponding potable water MCL's) and 286-714 for soils.
3. Target Analyte List Metals – Aluminum, Antimony, Arsenic, Barium, Berylium, Cadmium, Calcium, Chromium (total), Cobalt, Copper, Iron, Lead, Mercury, Magnesium, Manganese, Mercury, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc - analyzed by EPA Methods as outlined in Tables 4.1 and 4.2 of the QAPP (See Appendix G).
4. Pesticides - analyzed by EPA Method 8081 for groundwater and 8081B for soils, method detection limit 0.1 ug/L for groundwater (or at or below MCL's for those pesticides that have corresponding potable water MCL's) and 3.0 ug/L for soils.
5. PCBs - analyzed by EPA Method 8082 for groundwater and 8082A for soils, method detection limit 1.0 ug/L for groundwater (or at or below MCL's for those PCBs that have corresponding potable water MCL's) and 0.3 ug/L for soils.

Please note that the above listed detection limits are for samples that do not require dilution to bring contaminants into calibration range. For more details see Tables 4.1 and 4.2 of the QAPP (See Appendix G).

The soil and groundwater samples collected by ECI will be prepared and analyzed by the laboratory according to the matrix specific methods listed above from the following references.

1. Test Methods for Evaluating Solid Waste; SW-846. USEPA Office of Solids Waste and Emergency Response, Washington, D.C. 3rd Edition, 1986.
2. Standard Methods for the Analysis of Water and Wastewater, American Public Health Association, Washington, D.C. 16th Edition, 1985
3. EPA Water and Wastewater 600/4-79-020

The laboratory does not anticipate the need to modify standard procedures for referenced methods. The laboratory may use more stringent criteria based on statistical evaluation or laboratory practice. In such instances the laboratory-specific criteria will be used for data validation purposes as long as the criteria are more stringent than the targets set for this project. The reporting limits have been listed in Table 4.1 and 4.2 of the QAPP (See Appendix G).

4.7 Remedial Investigation Report

At the completion of the RI, a Remedial Investigation Report (RIR) will be prepared summarizing all the data collected during this RI effort. The data collected will be compared to the unrestricted cleanup standards published in 6 NYCRR Part 375-6(a) and the restricted industrial, commercial and residential standards in 6 NYCRR Part 375-6.8(b) since the future use of the Site is not yet known at this time.

5.0 Quality Assurance

The Quality Assurance protocols are contained in the QAPP attached hereto in Appendix G. Trip Blanks, Duplicate Samples and other Field Equipment Procedures and Preventive Maintenance will be used to generate valid data. Data Validation on all data will be performed and a Data Usability Study Report ("DUSR") will be prepared.

6.0 Health and Safety & Community Participation

This RIWP also attaches appendices containing the Citizen Participation Plan (CPP) and the Health and Safety Plan (HASP), each attached as Appendices E and F respectively, which will be used as RIWP project plans to maintain the health and safety requirements in the HASP and the community participation objectives in the CPP

7.0 Interim Remedial Measure of the Petroleum Excavation Pit

Depending on the additional results in and around EP-1, an interim remediation measure (IRM) shall be implemented during implementation of the RI for the excavation pit EP1 as depicted on the Sampling Plan Map in Appendix A. It is intended that the area around the excavation EP1 will continue to be excavated moving outwards from the current center until grossly contaminated soils are removed based on visual observations. End point samples shall be taken and compared to all relevant standards.

In the event the IRM is implemented, the PCS and other materials excavated will be placed on plastic in segregated piles for disposal off-site at either a landfill or incinerator. The groundwater will be transported off-site for disposal at a licensed/certified wastewater disposal facility.

In the event the excavation pit extends more than 50 feet from its current location, the IRM may cease at that point and a different remedial solution may become more suitable and will be proposed by Angelica in a future Remedial Action Work Plan.

8.0 Schedule

It is anticipated that the RI will commence approximately one to two months after the NYSDEC has reviewed and approved the RIWP, dependent upon weather conditions.