Remedial Investigation Work Plan

25 Rano Street Site
BCP Site No. C915323
Buffalo, New York

January 2018

B0418-017-005

Prepared For:

Rano Development, LLC

Prepared By:

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

In Association With:

TURNKEY ENVIRONMENTAL RESTORATION, LLC

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RI WORK PLAN

25 Rano Street Site, Buffalo, New York
BCP Site No. (C915323)

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1.0 INTRODUCTION

This document presents the proposed scope of work and implementation procedures for completion of a Remedial Investigation (RI) at the 25 Rano Street Site, located in the City of Buffalo, Erie County , New York (Site; see Figures 1 and 2).

The Applicant, Rano Development, LLC, acting as a Volunteer, has elected to pursue cleanup and redevelopment of the Site under the New York State Brownfield Cleanup Program (BCP). Rano Development, LLC's BCP application was deemed complete on July 31, 2017 and was advertised for public comment between August 4 and September 8, 2017; no comments were received. Rano Development, LLC entered into Brownfield Cleanup Agreement (BCA) Index No. C915323-09-17 with the New York State Department of Environmental Conservation (NYSDEC) on October 27, 2017.

The RI will be completed by Benchmark Environmental Engineering and Science, PLLC in association with TurnKey Environmental Restoration, LLC (referred to jointly hereafter as "Benchmark-TurnKey"), on behalf of Rano Development, LLC. The work will be completed in general accordance with NYSDEC DER-10 guidelines.

1.1 Site Background

The BCP Site is comprised of an approximate 7.63-acre parcel located at 25 Rano Street in the City of Buffalo, New York (see Figures 1 and 2). The Site is improved by a 312,760 square foot industrial structure that is currently vacant. The remainder of the property is covered by concrete sidewalks, asphalt parking areas, landscaping, and trees.

The Site historically included numerous former commercial, industrial, and residential structures. Historic operations of potential environmental concern included metal plating, manufacturing, and a planing mill. The Site was formerly occupied by Marlette National, a plating facility that closed in October 2008.

1.2 Project Objectives

For sites entering the BCP at the point of investigation, NYSDEC requires completion of a RI. The primary objectives of the RI are to:

- Identify sources of contamination, migration pathways, and actual or potential receptors of contaminants on or through air, soil, bedrock, sediment, groundwater, surface water, utilities, and structures without regard to property boundaries.

- Collect additional soil/fill and groundwater samples, under appropriate quality assurance/quality control criteria, to better delineate the nature and extent of contamination.
- Collect sufficient data to evaluate the actual and potential threats to public health and the environment.
- Collect the data necessary to evaluate the remedial action alternatives.
- Where appropriate, identify removal, treatment, containment, or other interim remedial measures (IRMs), pursuant to DER-10 Section 1.11 to remove, treat or contain any source areas identified and prevent, mitigate, or remedy environmental damage or human exposure to contaminants while remedial alternatives are being evaluated.

The cleanup objectives employed during the remedial measures will be a Track 4 cleanup using 6NYCRR Part 375 commercial soil cleanup objectives (CSCOs); however, the applicant may choose to remediate to a higher level of cleanup (e.g., unrestricted, residential, restricted-residential) during the course of remedial work.

1.3 Project Organization and Responsibilities

The Applicant, Rano Development, LLC, applied for acceptance into the New York State BCP as a Volunteer per ECL§27-1405. Benchmark-TurnKey will manage the RI and cleanup on behalf of Rano Development, LLC. The NYSDEC Division of Environmental Remediation (Region 9), in consultation with the New York State Department of Health (NYSDOH), will monitor the investigation and remedial actions to verify that the work is performed in accordance with the BCA, the approved work plans, and NYSDEC DER-10 guidance (Ref. 1).

Benchmark-TurnKey field personnel and key subcontractors for this project have not been determined at this time. Once pricing is secured, subcontract agreements are in place, and a field schedule determined, resumes for the selected project team will be provided to the Department, if requested. Benchmark-TurnKey's Project Manager's résumé, however, has been included in Appendix A. The table below presents the planned project team.

Company	Role	Name	Contact Information
Benchmark-TurnKey	Principal Engineer	Tom Forbes, P.E.	(716) 856-0599
Benchmark-TurnKey	Project Manager	Lori Riker, P.E.	(716) 856-0599
Benchmark-TurnKey	Field Personnel	TBD	(716) 856-0599
Rano Development, LLC	Site Contact	James Jerge	(716) 445-9473
Alpha Analytical	Analytical Testing	Patrick Filey	(716) 783-9291
Nature's Way	Drilling Services	Eric Warren	(716) 572-6503
Data Validation Services	Data Usability Summary Report	Judy Harry	(518) 251-4429

2.0 SITE DESCRIPTION

2.1 General

The BCP Site, referenced throughout this document as the "Site" or "BCP Site," is defined as an approximate 7.63-acre parcel located in the City of Buffalo, Erie County, New York. The Site is currently vacant with an abandoned 312,760 square foot industrial structure and consists of one individual tax parcel legally described as SBL #77.73-5-1. The Site is located in an industrial, commercial and residential area of the City of Buffalo (see Figures 1 and 2). The Site is bound by Rano Street and residential homes to the north; Tonawanda Street, a gasoline station, and residential homes to the west; vacant vegetated land, an automotive repair facility, and residential homes to the south; and manufacturing and commercial buildings to the east followed by River Rock Drive (see Figure 2).

2.2 Site Topography and Drainage

The Site topography is relatively flat at an approximate elevation of 584 feet above mean sea level. The remainder of the property (approx. 0.45 acres) surrounding the building is covered by concrete sidewalks, asphalt parking areas, landscaping, trees, and scrub brush. Precipitation (i.e., rain or melting snow) that does not otherwise infiltrate appears to discharge toward the southeast then southwest along the former railroad bed toward the Niagara River.

2.3 Geology and Hydrogeology

2.3.1 Overburden

The Site is located within the Lake Erie-Niagara River major drainage basin, which is typified by little topographic relief that gently slope westward towards the Niagara River, except in the immediate vicinity of major drainage ways. The surficial geology of the Erie Plain consists of a thin glacial till (if present), glaciolacustrine deposits, recent alluvium, and the soils derived from these deposits. Based on the New York State Surficial Geologic Map of New York[1], surficial soil at the Site is described as a lacustrine silt and clay. However, due to a heavy urbanization and industrial past, surface soils within the City of Buffalo are characterized as

[1] Surficial Geologic Map of New York, Niagara Sheet, Compiled and edited by Donald H. Cadwell, University of the State of New York, The State Education Department, 1988.

urban land (Ud) with level to gently sloping land in which 80 percent or more of the soil surface is covered by asphalt, concrete, buildings, or other impervious structures, typical of an urban environment. The presence of overburden fill material is widespread and common throughout the City of Buffalo.

The U.S. Department of Agriculture (USDA) Soil Conservation Service soil survey map of Erie County indicates the majority (~85%) of the Site consists of urban land (Ud) and, to a lesser extent, urban land-Schoharie complex (Uu ~12%) and urban land-Odessa complex (Ut ~2%) soils (Ref. 2) (see Appendix B). The urban land-Schoharie complex material is moderately well drained silt loam and silty clay with slopes ranging from 0 to 3 percent. The urban land-Odessa complex material is somewhat poorly drained silt loam and silty clay loam with slope ranging from 0 to 3 percent.

As described in Section 2.8, a recent test pit investigation performed at the Site described the overburden soil from grade as fill material at depths ranging from 0-13 feet below ground surface (fbgs) overlying clayey native soils. Fill materials were typically comprised of well graded sand and gravel with varying fragments of brick, cinders, metal, and slag. The overburden geology of the Site will be further characterized as part of the RI activities.

2.3.2 Bedrock

Based on the New York State Geologic Map of New York[2], the Site is situated over the Akron Dolostone and Salina Group. The Group is comprised of the Camilus, Syracuse, and Vernon Formations, commonly described as shale, dolostone, salt, and gypsum. The bedrock generally ranges between 400 and 700 feet thick. Based on the July 2010 Request for a Removal Action at the Marlette Plating Facility Site Report, the bedrock is approximately 30 feet below ground surface (fbgs) at the Site. The type and depth to bedrock will be confirmed during the RI. The depth to and type of bedrock below the Site has not been determined.

2.3.3 Hydrogeology

The Site is located in the Lake Erie-Niagara River Basin. In the Erie-Niagara Basin, the major areas of groundwater are within coarser overburden deposits and limestone and shale

[2] Geologic Map of New York, Niagara Sheet, Compiled and Edited by Lawrence V. Rickard and Donald W. Fisher, University of the State of New York, The State Education Department, March 1970.

bedrock. Regional groundwater flow in the vicinity of the Site is likely to the west toward the Niagara River located approximately 0.37 miles west of the Site. Local groundwater flow, however, may be influenced by subsurface features, such as excavations, utilities, and localized fill conditions. During the Phase II investigation, groundwater was encountered within soil borings at depths generally ranging from 8 to 11 fbgs (exceptions included water at 4 fbgs in boring SB-7 and no water at 16 fbgs in boring SB-10). On-site groundwater flow patterns and quality will be determined during the RI.

2.4 Climate

Western New York has a cold continental climate, with moisture from Lake Erie causing increased precipitation. Average annual precipitation is reportedly 40.5 inches and snowfall is 93.6 inches (Ref. 3) to the northern part of the watershed with over 150 inches per year falling on the southern portion of the watershed. Average monthly temperatures range from 24.5 degrees Fahrenheit in January to 70.8 degrees Fahrenheit in July (Ref. 3). The ground and lakes typically remain frozen from December to March. Winds are generally from the southwest (240 degrees) with a mean velocity of 10 miles per hour (Buffalo Airport, 1999).

2.5 Population and Land Use

The City of Buffalo, encompassing 40.38 square miles, has a population of 261,310 (2010 US Census Bureau). The Site is located within Census Tract 57 and currently zoned D-IL, Light Industrial. It is located in a mixed an industrial, commercial and residential area of the City of Buffalo. Residential areas are located directly across Rano Street to the north, across Tonawanda Street to the southwest, and south of the vacant land along Grace Street (see Figure 2).

2.6 Buffalo Green Code

According to the City of Buffalo Green Code Land Use Plan (September 2016), the current zoning map indicates residential and urban neighborhood mixed-use (edge) to the north; vacant green space to the south with light industrial, urban center mixed-use (edge), and residential beyond; light industrial to the east, and flex commercial, green space, and urban neighborhood mixed-use (edge) to the west. The end use will be consistent with local zoning laws and requirements.

2.7 Utilities and Groundwater Use

The subject property has access to all major public and private utilities, including potable water (Buffalo Water Authority), sanitary and storm sewers (Buffalo Sewer Authority), electric (National Grid), and natural gas (National Fuel Gas).

Currently, there are no known deed restrictions on the use of groundwater at the Site; however, there are no groundwater supply wells on the property. Regionally, groundwater in the area has not been developed for industrial, agriculture, or public supply purposes. Municipal potable water service is provided on-site and off-site.

2.8 Wetlands and Floodplains

There are no State or Federal wetlands located on-site. The nearest national wetlands are a freshwater emergent wetland (PEM1B) with an adjacent freshwater forested/shrub wetland (PSS1/FO1B) located approximately 1.8 miles north of the Site. The Site is not located within the 100-yr floodplain of the Niagara River, which is approximately 0.37 miles west of the Site.

2.9 USEPA Removal Action

The United States Environmental Protection Agency (USEPA) completed a request for a Removal Action at the Marlette Plating Facility Site in July 2010 based on Site conditions observed in 2007. Between October and December 2011, the USEPA removed the following wastes from the Site:

- 91,000 gallons of plating waste contaminated water.
- 3,100 drums of hazardous and non-hazardous waste including empty containers.
- 280 cubic yards of plating waste contaminated soil and debris.

The USEPA also abated and repaired some, but not all, of the asbestos in the building. Post-cleanup air monitoring results indicated that asbestos was safely removed and that metals and other hazardous materials were safely cleaned up. Appendix C includes the November 2011 USEPA Pollution/Situation Report (POLREP) #13, which outlines the work completed between October 13 and November 18, 2011.

2.10 Previous Investigations

A Geophysical Investigation, Phase I Environmental Site Assessment (ESA), Phase II Investigation, and Supplemental Soil Investigation have been performed on the Site. These investigations are summarized below and the reports are included electronically in Appendix C.

2.10.1 March 2011 – Geophysical Investigation

NAEVA Geophysics Inc. completed a geophysical investigation on February 23, 2011 at the Marlette Plating Site (Ref. 4). The purpose of the investigation was to identify the location and orientation of a suspected underground storage tank (UST) located beneath a concrete pad located off of the southwest corner of the facility building. The findings are listed below.

- Two fill ports and vent pipes were observed in the vicinity of the concrete pad along with two 10,000-gallon capacity indicators and production/return lines within the facility boiler room.
- The ground penetrating radar (GPR) was inconclusive over the suspected location of the two USTs due to poor penetration of the GPR signal. The UST-related and suspected pipes were traced using utility line locators. The depth to top and bottom of the northern UST suggests the diameter of the tank is at least 8 feet (typical of a 10,000-gallon tank that is 27 feet long).
- The orientation of the two USTs was determined to be parallel to the building wall.

2.10.2 May 2017 – Phase I Environmental Site Assessment

Benchmark completed a Phase I Environmental Site Assessment (ESA) and Phase II Investigation on the subject property in May 2017. The Recognized Environmental Conditions (RECs) discussed in the August 2017 Phase I/II ESA report (Ref. 5) are as follows:

- The Site has an extensive industrial history with former and active USTs and ASTs; numerous regulatory listings (i.e., UST, AST, CBS, RCRA, Spills, LTANKS, SEMS Archive, ECHO, etc.); former electrical/ transformer areas; and floor drain/trench and storm water systems with unknown discharges.
- Areas of environmental impacts, reasonably attributed to historic metal plating operations, were identified during a previous study completed by the EPA. The extensive EPA cleanup that took place at the Site is considered an REC as no subsurface testing was completed.

- An inactive boiler system has labels indicating the use of oil/fuel oil, which is considered an REC due to the potential for current/former petroleum tanks.
- Several process-related items such as ASTs, wastewater tanks, and numerous feed/return lines remain within the building. Additional items observed within the building during the Site reconnaissance include a small inactive structure, suspected to be a drying oven.
- Review of historical sources revealed at least five USTs installed at the Site. Suspect vent/fill ports protruding from exterior walls at the north, south and west sides of the building are suspected to be associated with former/current USTs. The on-site USTs are considered RECs as insufficient tank closure documentation was available.
- Staining noted during the Site reconnaissance is considered an REC as surface soils were visually impacted and some areas of concrete staining within the building were proximate to cracks in the concrete flooring.
- Unknown below-ground structure located to the north of the former office area.
- Floor drains were noted throughout the interior of the building, including former production areas.
- Adjacent properties have a history of commercial and industrial uses including gasoline stations and automotive repair operations.

The following historic RECs were identified:

- Multiple "closed" and "inactive" spills were identified for the Site.
- "Closed" and "inactive" spill incidents were identified in connection with adjacent and nearby properties.

Per ASTM E1527-13, non-scope considerations are described as ancillary observations during performance of the on-site investigation. Non-scope considerations are not considered RECs under ASTM E1527 but may represent health or environmental issues impacting the Site and/or property value. Based on the age of the structure, the potential for asbestos containing material (ACMs) and lead should be anticipated. Mold growth was also noted within the building.

2.10.3 April 2017 – Phase II Investigation

A Phase II Site Investigation was completed on April 19, 2017 to further assess RECs identified by the Phase I ESA. The investigation consisted of advancing soil borings in the interior and exterior of the vacant industrial structure. Seven soil borings, designated as SB-1 through SB-7, and one hand augured boring (HA-1) were completed across the Site. Boreholes were advanced to the top of native soils and/or top of the water table, with bottom depths generally ranging from 12 to 16 feet below ground surface (fbgs). The physical characteristics of all soil borings were classified using the ASTM D2488 Visual-Manual Procedure Description.

Soil Borings SB-2, SB-4, SB-5, SB-7 and HA-1 were collected and analyzed for NYSDEC Commissioners Policy (CP)-51 List and Target Compound List (TCL) volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and RCRA metals plus zinc and cyanide.

Soil samples collected across the Site had multiple exceedances of the 6NYCRR Part 375 SCOs, with the exception of soil boring SB-4. Toluene was detected at a concentration exceeding its Part 375 RRSCO in SB-5, which was completed in the area identified in municipal records as having a 5,000-gallon toluene UST. Soil boring SB-7, completed proximate to a suspected UST fill port, had elevated SVOC concentrations. In particular, several polyaromatic hydrocarbons (PAHs), such as benzo(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene exceeded Part 375 RRSCOs; benzo(a)pyrene exceeded its respective Part 375 CSCO. Cadmium was detected in HA-1, completed proximate to the fuel oil USTs south of the building, at a concentration exceeding its CSCO. In addition, chromium, lead, and zinc were also identified at HA-1 exceeding the Part 375 USCOs. Figure 3 shows the sample locations and exceedances of the SCOs. Table 1 summarizes the analytical results. Additional details are presented in the August 2017 Phase I/II ESA report (Ref. 5).

2.10.4 June 2017 – Supplemental Test Pit Investigation

Based on the results of the April 2017 Phase II Investigation, a supplemental soil boring and surface soil investigation was performed on June 7, 2017. Three additional soil borings (SB-8 through SB-10) were completed; one in the vicinity of the 5,000-gallon toluene UST and the two inside the building in areas of suspected contamination. A surface soil sample (SS-1) was collected of black fines located west of the two 11,000-gallon fuel oil USTs.

Analytical results from the soil borings and surface soil sample showed elevated VOCs and metals. Several VOCs were detected in boring SB-8, located north of the suspected 5,000-gallon toluene UST, including 1,1-dichloroethane, benzene, and methylene chloride above Part 375 USCOs and toluene above its Part 375 RRSCO. Zinc (SB-9) and chromium (SB-10), located within the vacant building, were detected at concentrations above USCOs. Cadmium and cyanide were detected in surface soil sample SS-1 at concentrations above their CSCOs. Figure 3 shows the sample locations and exceedances of the SCOs. Table 1 summarizes the analytical results. Additional details are presented in the August 2017 Phase I/II ESA report (Ref. 5).

2.11 Primary Constituents of Potential Concern (COPCs)

Based on findings to date, the Constituents of Potential Concern (COPCs) are presented by media below:

- ***Surface Soil/Fill:*** SVOCs (PAHs) and metals
- ***Subsurface Soil/Fill:*** VOCs, SVOCs (PAHs) and metals
- ***Groundwater:*** To be determined

3.0 REMEDIAL INVESTIGATION SCOPE OF WORK

The RI scope of work is focused on defining the nature and extent of contamination within the BCP Site boundary, identifying the source of contamination, defining chemical constituent migration pathways, qualitatively assessing human health and ecological risks (if necessary), and obtaining data of sufficient quantity and quality to perform the alternatives analysis report. Data submittals will be provided to the NYSDEC in accordance with the most current electronic data deliverables (EDD) protocols.

An investigation will be completed on the accessible portions of the Site to further assess potential impacts related to the historic use of the Site.

The RI will include excavation of exploratory test pits (TPs); advancement of soil boreholes (SBs) to install groundwater monitoring wells (MWs); and collection of soil and groundwater samples. During all field screening and community air monitoring activities performed during this investigation, a PID equipped with a 10.6 eV lamp will be used to assure all possible VOCs are accurately screened.

3.1 Pre-Investigation Activities

3.1.1 Building Demolition

On October 17, 2017, Mr. Gerald P. Sullivan, P.E., a structural engineering with Professional Engineering Solutions, visually inspected the Site building including the reinforced concrete roof; steel supports, equipment hangers, and framing; window frames; and brick walls. Mr. Sullivan concluded that the building is unsafe for completion of subsurface drilling required for the RI, and recommended that the building be demolished prior to commencement of any field investigation. Appendix C includes the November 7, 2017 letter report prepared by Mr. Sullivan summarizing his findings and recommendations.

Therefore, Rano Development intends to retain a demolition contractor to remove the building prior to completion of RI field activities. A pre-demolition survey will be performed to quantify asbestos-containing materials that will require abatement prior to demolition work.

3.1.2 Utility Clearance

Prior to any intrusive activities, Dig Safely New York (Call 811 or similar) will be contacted by the Site contractor a minimum of three business days in advance of the work and informed of the intent to perform intrusive work at the Site.

3.1.3 Site Reconnaissance

The purpose of the Site reconnaissance is to determine the suitability of each proposed sample location. Upon consultation with the Project Manager and NYSDEC, field modifications to proposed sample locations may be necessary to avoid existing Site conditions (e.g., manholes, catch basins, light stanchions, etc.) and/or underground/overhead utilities.

3.2 Soil/Fill Investigation

The soil/fill investigation will be completed across the BCP Site to assess potential impacts related to the historic use of the Site. The investigation will include advancement of 24 soil boreholes, collection of 58 soil samples and, if warranted, excavation of test pits. In accordance with DER-10 screening criteria, soil/fill sampling will include the collection of 14 surface, 24 near-surface, and 24 subsurface samples.

Figure 4 presents the proposed RI sampling locations. Table 2 summarizes the proposed sampling program. Soil/fill samples described in the following sections will be collected using dedicated stainless steel sampling tools. Representative soil/fill samples will be placed in pre-cleaned laboratory provided sample bottles, cooled to 4ºC in the field, and transported under chain-of-custody command to a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory for analysis.

Additional surface, near-surface, and/or subsurface locations, beyond those discussed in the following sections, showing evidence of impact (e.g., visual/olfactory, elevated PID, staining, stressed vegetation, etc.) may be added to the sampling program upon consultation with the Project Manager and NYSDEC. Upon consensus, any such location(s) determined during the investigation to be impacted will be analyzed for an agreed upon list of parameters depending the nature of the observed impact (e.g., oily stained areas will be analyzed for TCL VOCs, SVOCs, and PCBs).

3.2.1 Surface Soil/Fill

At 14 outdoor locations, one soil sample will be collected at a depth of 0-2" (or 0-6" if testing for VOCs) (i.e., below vegetative or hardscape cover). Proposed sample locations have been strategically positioned across the BCP Site to supplement the two previously collected surface soil/fill samples for a total of 16 near-surface soil/fill samples. Each RI surface soil/fill sample will be analyzed for TCL plus CP-51 List VOCs (plus tentatively identified compounds, TICs), TCL plus CP-51 List SVOCs (plus TICs), and Target Analyte List (TAL) metals (plus cyanide). In addition, four surface soil/fill samples will be analyzed for TCL PCBs, TCL pesticides, and TCL herbicides.

3.2.2 Near-Surface Soil/Fill

Near-surface soil/fill samples will be collected at each of the 24 soil borehole locations at a depth of 1 to 2 fbgs. Proposed sample locations have been strategically positioned across the BCP Site to supplement the three previously collected near-surface soil/fill samples for a total of 27 near-surface soil/fill samples. Each RI near-surface soil/fill sample will be analyzed for TCL plus CP-51 List VOCs (plus TICs), TCL plus CP-51 List SVOCs (plus TICs), and TAL metals (plus cyanide). In addition, six near-surface soil/fill samples will be analyzed for TCL PCBs, TCL pesticides, and TCL herbicides.

3.2.3 Subsurface Soil/Fill

Twenty-four subsurface soil exploratory borings will be advanced during the RI, five of which will be converted to monitoring wells as discussed in Section 3.4. Proposed sample locations have been strategically positioned across the BCP Site to supplement the four previously collected subsurface soil samples for a total of 28 subsurface soil samples. Drill cuttings will be placed back into each borehole unless non-native soil/fill or gross contamination (i.e., visible product) is encountered, in which case soil cuttings will be placed in sealed NYSDOT-approved drums and labeled for subsequent characterization and disposal (see Section 3.7).

Each boring will be advanced from existing grade to native soils (approximately 2 to 13 fbgs or refusal, whichever occurs first, using 4.25-inch I.D. hollow stem augers (HSA) and continuous split-spoon sampling drilling methods. Recovered samples will be described in the field by qualified Benchmark-TurnKey personnel by visual-manual observation in accordance with ASTM Method D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), scanned for total volatile organic vapors with a calibrated MiniRAE 3000 PID equipped with a 10.6 eV lamp (or equivalent), and characterized for impacts via visual and/or olfactory observations in approximate 2-foot depth intervals. PID screening not only ensures the health and safety of personnel at the Site, results will also be used to identify potentially impacted soil samples for laboratory analysis.

Upon reaching the completion of each non-monitoring well boring, field results including PID, visual, and olfactory results will be reviewed and recorded. The sample interval identified as the most impacted (i.e., greatest PID scan result and/or evidence of visual/ olfactory impact) from each boring location will be selected for analysis. The subsurface soil samples will be analyzed for TCL plus CP-51 List VOCs (plus TICs), TCL plus CP-51 List SVOCs (plus TICs), and TAL metals (plus cyanide). In addition, six select subsurface soil/fill samples will be analyzed for TCL PCBs, TCL pesticides, and TCL herbicides. If differentiable impacts are noted across separate horizons within a particular boring, additional samples may be collected to characterize the impacts in that depth horizon/location in consultation with the Project Manager and NYSDEC as previously discussed. In the event that either the impacts are ubiquitous from grade to final depth or no impacts are identified, the native soils directly below the fill unit will be selected for analysis.

3.3 Test Pit Investigation

If visual impacts are noted during advancement of soil boreholes, the extent of impact will be determined vertically and laterally via a test pit investigation (borings may be employed in lieu of test pits if conditions are not amenable to test pit investigation). The number of samples, depth, and analyses will depend on the impacts observed.

3.4 Groundwater Investigation

3.4.1 Monitoring Well Installation

As previously mentioned, five soil boreholes will be advanced across the BCP Site and completed as groundwater monitoring wells to assess groundwater quality and flow direction. Figure 4 shows the proposed groundwater monitoring well locations. The actual locations of the new groundwater wells will be based on field observations recorded during the soil/fill boring investigation. Specifically, well locations will be adjusted, if necessary, based on the presence of elevated PID readings or other observed impacts following consultation with the Project Manager and NYSDEC.

The five soil boreholes will be advanced into the unconsolidated overburden material (soil/fill and/or native soils) as described in Section 3.2.3 to a depth of approximately 13 fbgs with a target minimum of five feet below the first encountered groundwater. The presence of a confining unit or refusal (anthropogenic or bedrock) will preclude this target depth. If the refusal is not determined to be bedrock, then the boring location will be moved approximately 10 feet in any direction and an attempt to advance the boring below the refusal depth will be made. Boring site selection and advancement will continue until bedrock is verified, the stated depth is attained, or it is determined, upon consultation with NYSDEC, that a boring is not practicable at that location. Recovered samples will be visually described and scanned for total volatile organic vapors with a PID as previously described.

Subsequent to boring completion, each monitoring well will be constructed of 2-inch I.D. flush-joint Schedule 40 PVC solid riser and machine slotted screen (0.010-inch slot size). Groundwater conditions will dictate the vertical placement of the well screen but, in general, the monitoring well screen length will be approximately five feet. The well screen and attached riser will be placed within the borehole and the filter sand pack installed within the borehole annulus to a level of 2- to 3-feet above the top of the well screen. A bentonite seal 2- to 3-feet thick will be installed immediately above the sand layer. The bentonite seal will be constructed with 3/8-inch bentonite pellets or medium bentonite chips and allowed to hydrate sufficiently. Due to the shallow nature of these wells, bentonite chips will be used in lieu of cement/ bentonite grout to complete well construction to within one foot of the ground surface.

The top of the well riser pipe will extend approximately three feet above grade and be fitted with a lockable J-plug and protected by a vented, 4-inch diameter protective steel casing. The steel casing will be installed to a depth of approximately 2 fbgs and anchored in a 2-foot by 2-foot concrete surface pad. Each steel protective casing will be fitted with a locking cap, keyed alike lock, and labeled with permanent markings for identification. The concrete surface pad will be constructed around the protective steel casing to allow surface water to drain away from the well.

Drill cuttings will be placed on-site in unpaved areas unless non-native soil/fill or gross contamination (i.e., visible product) is encountered, in which case they will be placed in sealed NYSDOT-approved drums and labeled for subsequent characterization and disposal (see Section 3.7).

3.4.2 Well Development

After installation, but not within 24 hours, newly installed monitoring wells will be developed in accordance with Benchmark-TurnKey and NYSDEC protocols. Well development may occur sooner as cement/bentonite grout will not be used in well construction and as long as groundwater levels are near or approaching static conditions. Development of the monitoring wells will be accomplished with dedicated disposable polyethylene bailers via surge and purge methodology. Field parameters including pH, temperature, turbidity, dissolved oxygen (DO), oxidation-reduction potential (ORP), and specific conductance will be measured periodically (i.e., every well volume or as necessary) during development. Field measurements will continue until they become relatively stable. Stability is defined as variation between measurements of approximately 10 percent or less with no overall upward or downward trend in the measurements. Depending on the yield of the formation, a minimum of three well volumes will be evacuated from each monitoring well.

Initially, development water will be containerized in NYSDOT-approved drums and labeled per monitoring well location. If light non-aqueous phase liquid (LNAPL), dense non-aqueous phase liquid (DNAPL), odors, or sheen are encountered during well development, water will be properly characterized and disposed accordingly. Based on the RI groundwater analytical results, it will be determined, in consultation with NYSDEC, if the containerized development water is acceptable for surface discharge in the vicinity of the monitoring well being developed or requires subsequent on-site treatment and/or off-site disposal (see Section 3.7).

3.4.3 Groundwater Sample Collection

Prior to sample collection, static water levels will be measured and recorded from all on-site monitoring wells to facilitate the preparation of an isopotential map. Following water level measurement, field personnel will purge and sample monitoring wells using a submersible pump with dedicated pump tubing following low-flow/minimal drawdown purge and sample collection procedures (see Appendix D for FOP). In the event of pump failure or the saturated unit does not permit the proper implementation of low-flow sampling, a dedicated polyethylene bailer will be used to purge and sample the well. Prior to sample collection via low-flow methodology, groundwater will be evacuated from each well at a low-flow rate (typically less than 0.1 L/min) while maintaining a generally consistent water level. Field measurements for pH, temperature, turbidity, DO, ORP, specific conductance and water level, as well as visual and olfactory field observations will be periodically recorded and monitored for stabilization. Low-flow purging will be considered complete when the field measurements stabilize and turbidity falls below 50 Nephelometric Turbidity Units (NTU), or becomes stable above 50 NTU regardless of volume purged. Purging via disposable bailer, if necessary, will be considered complete following the removal of three well volumes and field parameter stabilization or to dryness, whichever occurs first. Upon stabilization of field parameters, groundwater samples will be collected and analyzed.

Depending on purging methodology, sample collection methods to be implemented during the RI include:

- **Submersible Pump with Dedicated Pump Tubing:**
  All monitoring wells will be purged and sampled using a non-dedicated submersible pump and dedicated pump tubing following low-flow (minimal drawdown) purge and sample collection procedures, as described above. Non-dedicated pumps will require decontamination prior to use at each well location and the collection of an equipment blank.
- **Polyethylene Disposable Bailer**
  Wells of any depth (up to 100 fbgs) may be purged and sampled using a polyethylene disposable bailer via direct grab. In general, a bottom filling dedicated polyethylene bailer is attached to a length of dedicated hollow-braid polypropylene rope and lowered into the well smoothly and slowly as not to agitate the groundwater or damage the well. Purging continues until a predetermined volume of water has been removed (typically three well volumes) or to dryness.

Prior to and immediately following collection of groundwater samples, field measurements for pH, specific conductance, temperature, DO, ORP, turbidity and water level, as well as visual and olfactory field observations will be recorded. Collected groundwater samples will be placed in pre-cleaned, pre-preserved laboratory provided sample bottles, cooled to 4°C in the field, and transported under chain-of-custody command to a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory for the analyses indicated in Table 2.

3.4.4 Groundwater Sample Analyses

Five groundwater samples will be collected and analyzed for TCL plus CP-51 list VOCs (plus TICs), TCL plus CP-51 List SVOCs (plus TICs), TAL metals, PCBs, pesticides, and herbicides in accordance with USEPA SW-846 methodology with equivalent NYSDEC Category B deliverables to allow for independent third-party data usability assessment (see Section 4.10). In the event groundwater sample turbidity levels exceed 50 NTUs, an additional groundwater sample will be collected and field filtered (or filtered in the laboratory) for TAL dissolved metals analysis. One groundwater sample will also be analyzed for 1,4-dioxane and perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), which two types of emerging groundwater contaminants referred to as per- and polyfluoroalkyl substances

(PFAS). Based on the initial groundwater results, the need for additional monitoring wells and/or monitoring events will be evaluated and discussed with NYSDEC.

3.4.5 Groundwater Flow Evaluation

Static depth to groundwater measurements will be obtained from the newly installed RI monitoring wells. Groundwater elevation data will be calculated and used to develop an isopotential map that will indicate the general direction of groundwater flow. Groundwater elevations will be relative to an arbitrary Site-specific vertical datum and benchmark (e.g., fire hydrant). A well construction summary table will be prepared and include top of riser and grade elevations as well as construction depths (elevations) and materials.

3.4.6 In-Situ Hydraulic Conductivity Testing

If groundwater impacts necessitating remedial alternatives evaluation are identified, in-situ permeability of the first water bearing zone screened by all newly installed monitoring wells will be determined using the variable-head test method ("rising head") (Bouwer and Rice Method, 1976). The hydraulic conductivity testing will be performed in accordance with Benchmark-TurnKey's FOP (see Appendix D).

3.5 Field Specific Quality Assurance/Quality Control Sampling

In addition to the surface soil/fill, subsurface soil, and groundwater samples described above, field-specific quality assurance/quality control (QA/QC) samples will be collected and analyzed to ensure the reliability of the generated data as described in the QAPP and support the required third-party data usability assessment effort (see Section 4.10). Site-specific QA/QC samples will include matrix spikes (MS), matrix spike duplicates (MSD), blind duplicates, trip blanks, and equipment blanks.

3.6 Decontamination & Investigation-Derived Waste Management

Every attempt will be made to use dedicated sampling equipment during the RI; however, if non-dedicated equipment is required and/or used, the equipment will be decontaminated, at a minimum, with a non-phosphate detergent (i.e., Alconox®) and potable water mixture, rinsed with distilled water, and air-dried before each use in accordance with Benchmark-TurnKey's FOPs (see Appendix D). All decontaminated sampling equipment will be kept in a clean environment prior to sample collection. Heavy equipment, such as an excavator (if used) and drilling tools, will be decontaminated via high-pressure steam cleaning on a temporary decontamination pad between grab sample locations and composite groups (i.e., test pits, borings, etc.), as necessary.

RI generated drilling spoils, groundwater, or decontamination rinse water not exhibiting gross contamination (i.e., visible product, odor, sheen, etc.) will be either returned to the borehole from which it was removed (soil/fill) or discharged to the ground surface (groundwater and rinse water). Those materials exhibiting gross contamination will be placed in sealed NYSDOT-approved drums and labeled for subsequent characterization and disposal. All generated drums will be labeled alpha-numerically with regard to contents, origin, and date of generation using a paint stick marker on two sides and the top of each drum. Characterization analytical results of containerized material will be used to determine if spoils can be returned to the ground surface, used on-site, or require treatment and/or off-site disposal. Drums will be securely staged on-site pending characterization analyses and remedial measures assessment. Field personnel will coordinate the on-site handling and temporary storage of drums, including transportation, characterization sampling, and off-site disposal arrangements, as necessary.

Discarded personal protective equipment (PPE) (i.e., latex gloves, Tyvek, paper towels, etc.) and disposable sampling equipment (i.e., bailers or stainless steel spoons) will be placed in sealed plastic garbage bags and disposed as municipal solid waste.

3.7 Site Mapping & Survey

A Site map will be developed during the field investigation. All sample locations and relevant Site features will be located on the map. Benchmark-TurnKey will employ a handheld Trimble GeoXH GPS unit to identify the locations of all surface soil/fill, soil boring, and newly installed well locations relative to State planar grid coordinates. Additional geospatial data may be collected related to debris piles, structure locations, and/or subsurface structures. Monitoring well elevations will be measured by Benchmark-TurnKey's surveyor using an arbitrary Site-specific vertical datum and benchmark (e.g., fire hydrant). If an Environmental Easement is required, a NYS Licensed Land Surveyor will prepare the legal description and metes and bounds for the Site.

3.8 Documentation

All investigation field activities will be documented in a Project Field Book and/or handheld RuggedReader® Handheld PC. This logbook/PC will provide a record of activities conducted at the Site. All entries will be signed and dated at the end of each day of fieldwork (or as produced) by the Field Team Leader. Field notes will include, at a minimum: date and time of all entries, names of all personnel on-site, weather conditions (temperature, precipitation, etc.), location of activity, and description of activity. Sampling activities will be logged and photographed to document the activities at the Site. Field personnel will, at a minimum, complete the following standard field forms (see Appendix E):

- Chain of Custody (COC) Form (per selected laboratory)
- Equipment Calibration Log
- Field Activity Daily Log (FADLs)
- Field Borehole/Geoprobe/Monitoring Well Log
- Groundwater Field Form
- Investigative-Derived Waste Container Log (if necessary)
- Photographic Log
- Tailgate Safety Meeting Form
- Problem Identification Report (if necessary)
- Corrective Measures Report (if necessary)

4.0 QUALITY ASSURANCE PROJECT PLAN

A Quality Assurance Project Plan (QAPP) has been prepared in support of the RI activities. The QAPP dictates implementation of the investigation tasks delineated in this Work Plan. Section 4.7 presents a sampling and analysis plan identifying methods for sample collection, decontamination, handling, and shipping.

The QAPP will assure the accuracy and precision of data collection during the Site characterization and data interpretation periods. The QAPP identifies procedures for sample collection to mitigate the potential for cross-contamination, as well as analytical requirements necessary to allow for independent data validation. The QAPP has been prepared in accordance with USEPA's Requirements for Quality Assurance Project Plans for Environmental Data Operations (Ref. 6); the USEPA Region II CERCLA Quality Assurance Manual (Ref. 7), and NYSDEC's DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 1).

Field team personnel will collect environmental samples in accordance with the rationale and protocols described in the QAPP. USEPA and NYSDEC-approved sample collection and handling techniques will be used. RI samples for chemical analysis will be analyzed in accordance with USEPA SW-846 methodology with an equivalent Category B deliverable package to meet the definitive-level data requirements. RI analytical results will be evaluated by a third-party data validation expert in accordance with provisions described in the QAPP. Data submittals will be provided to the NYSDEC in accordance with their electronic data deliverables (EDD) protocols.

4.1 Scope of the QAPP

This QAPP was prepared to provide QA guidelines to be implemented during the RI activities. This document may be modified for subsequent phases of investigative work, as necessary. The QAPP provides:

- A means to communicate to the persons executing the various activities exactly what is to be done, by whom, and when.
- A culmination to the planning process that ensures that the program includes provisions for obtaining quality data (e.g., suitable methods of field operations).
- A historical record that documents the investigation in terms of the methods used, calibration standards, and frequencies planned, and auditing planned.

- A document that can be used by the Project Manager's and QA Officer to assess if the activities planned are being implemented and their importance for accomplishing the goal of quality data.
- A plan to document and track project data and results.
- Detailed descriptions of the data documentation materials and procedures, project files, and tabular and graphical reports.

The QAPP is primarily concerned with the QA/QC aspects of the procedures involved in the collection, preservation, packaging, and transportation of samples; field testing; record keeping; data management; chain-of-custody procedures; laboratory analyses; and other necessary matters to assure that the investigation activities, once completed, will yield data whose integrity can be defended.

QA refers to the conduct of all planned and systematic actions necessary to perform satisfactorily all task-specific activities and to provide information and data confidence as a result of such activities. The QA for task-specific activities includes the development of procedures, auditing, monitoring, and surveillance of the performance.

QC refers to the activity performed to determine if the work activities conform to the requirements. This includes activities such as inspections of the work activities in the field (e.g., verification that the items and materials installed conform to applicable codes and design specifications). QA is an overview monitoring of the performance of QC activities through audits rather than first time inspections.

4.2 QAPP Organization and Responsibility

The principal organizations involved in verifying achievement of data collection goals for the 25 Rano Street Site include: the NYSDEC, NYSDOH, Applicant, Benchmark-TurnKey (Volunteer's Consultant), the drilling subcontractor(s), the independent environmental laboratory, and the independent third party data validator. Roles, responsibilities, and required qualifications of these organizations are discussed in the following subsections. Appendix A includes resumes.

4.2.1 NYSDEC and NYSDOH

It is the responsibility of the NYSDEC, in conjunction with NYSDOH, to review the RI Work Plan and supporting documents, for completeness and conformance with the site-specific cleanup objectives and to make a decision to accept or reject these documents based on this review. The NYSDEC also has the responsibility and authority to review and approve all QA documentation collected during brownfield cleanup construction and to confirm that the QA Plan was followed.

4.2.2 Applicant

The Applicant (Rano Development, LLC) will be responsible for complying with the QA requirements as specified herein and for monitoring and controlling the quality of the Brownfield cleanup construction either directly or through their designated environmental consultant and/or legal counsel. The Applicant will also have the authority to select Remedial Action Contractor(s) to assist them in fulfilling these responsibilities. The designated Project Manager is responsible for implementing the project, and has the authority to commit the resources necessary to meet project objectives and requirements.

4.2.3 Benchmark-TurnKey

Benchmark Environmental Engineering & Science, PLLC in association with TurnKey Environmental Restoration, LLC (Benchmark-TurnKey), are the prime engineering and scientific consultants, respectively, on this project and are responsible for the implementation of the RI Work Plan, including, but not limited to, field operations, laboratory testing, data management, data analysis and reporting. Any one member of Benchmark's or TurnKey's staff may fill more than one of the identified project positions (e.g., field team leader and site safety and health officer). The various quality assurances, field, laboratory, and management responsibilities of key project personnel are defined below.

- *Benchmark-TurnKey Project Manager (PM):* *Lori E. Riker, P.E.*
  The Benchmark-TurnKey PM has the responsibility for ensuring that the project meets the Work Plan objectives. The PM will report directly to the Applicants Project Coordinator and the NYSDEC/NYSDOH Project contacts, and is responsible for technical and project oversight. The PM will:
  - Define project objectives and develop a detailed work plan schedule.
  - Establish project policy and procedures to address the specific needs of the project as a whole, as well as the objectives of each task.
  - Acquire and apply technical and corporate resources as needed to assure performance within budget and schedule constraints.
  - Develop and meet ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task product.

- o Review the work performed on each task to assure its quality, responsiveness, and timeliness.
- o Review and analyze overall task performance with respect to planned requirements and authorizations.
- o Review and approve all deliverables before their submission to NYSDEC.
- o Develop and meet ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task product.
- o Ultimately be responsible for the preparation and quality of interim and final reports.
- o Represent the project team at meetings.

▪ *Benchmark-TurnKey FTL/SSHO:* *To Be Determined*

The Field Team Leader (FTL) has the responsibility for implementation of specific project tasks identified at the Site, and is responsible for the supervision of project field personnel, subconsultants, and subcontractors. The FTL reports directly to the Project Manager. The FTL will:

- o Define daily work activities.
- o Orient field staff concerning the project's special considerations.
- o Monitor and direct subcontractor personnel.
- o Review the work performed on each task to ensure its quality, responsiveness, and timeliness.
- o Assure that field activities, including sample collection and handling, are carried out in accordance with this QAPP.

For this project the FTL will also serve as the Site Safety and Health Officer (SSHO). As such, the SSHO is responsible for implementing the procedures and required components of the Site Health and Safety Plan (HASP), determining levels of protection needed during field tasks, controlling site entry/exit, briefing the field team and subcontractors on site-specific health and safety issues, and all other responsibilities as identified in the HASP.

4.3 Quality Assurance (QA) Responsibilities

The QA Officer will have direct access to corporate executive staff as necessary, to resolve any QA dispute, and is responsible for auditing the implementation of the QA program in conformance with the demands of specific investigations and Benchmark-TurnKey policies, and NYSDEC requirements. The QA Officer has sufficient authority to stop work on the investigation as deemed necessary in the event of serious QA issues.

- *Benchmark-TurnKey Project QA Officer:* *Thomas H. Forbes, P.E.*
  Specific function and duties include:
  - Performing QA audits on various phases of the field operations
  - Reviewing and approving QA plans and procedures
  - Providing QA technical assistance to project staff
  - Reporting on the adequacy, status, and effectiveness of the QA program on a regular basis to the Project Manager for technical operations
  - Responsible for assuring third party data review of all sample results from the analytical laboratory

4.4 Field Responsibilities

Benchmark-TurnKey field staff for this project is drawn from a pool of qualified resources. The Project Manager will use staff to gather and analyze data, and to prepare various task reports and support materials. All of the designated technical team members are experienced professionals who possess the degree of specialization and technical competence required to effectively and efficiently perform the required work.

4.5 Quality Assurance Objectives for Measurement Data

The overall objectives and criteria for assuring quality for this effort are discussed below. This QAPP addresses how the acquisition and handling of samples and the review and reporting of data will be documented. The objectives of this QAPP are to address the following:

- The procedures to be used to collect, preserve, package, and transport groundwater samples.
- Field data collection.
- Record keeping.
- Data management.
- Chain-of-custody procedures.
- Precision, accuracy, completeness, representativeness, decision rules, comparability, and level of quality control effort conformance for sample analysis

and data management by the analytical laboratory under USEPA analytical methods.

4.6 Level of QC Effort for Sample Parameters

Field blank, equipment blank, method blank, trip blank, field duplicate, laboratory duplicate, laboratory control, standard reference materials (SRM), and matrix spike samples will be analyzed to assess the quality of the data resulting from the field sampling and analytical programs. QC samples are discussed below.

- Equipment and trip blanks consisting of distilled water will be submitted to the analytical laboratories to provide the means to assess the quality of the data resulting from the field-sampling program. Equipment blank samples are analyzed to check for procedural chemical constituents at the facility that may cause sample contamination. Trip blanks are used to assess the potential for contamination of samples due to contaminant migration during sample shipment and storage.
- Method blank samples are generated within the laboratory and used to assess contamination resulting from laboratory procedures.
- Blind Duplicate samples will be collected sequentially as grab samples after collection of the initial sample to allow determination of analytical precision. The Blind Duplicate sample location will not be disclosed to the analytical laboratory.
- Matrix spike/matrix spike duplicate (MS/MSD) samples provide information about the effect of the sample matrix on the digestion and measurement methodology. Depending on site-specific circumstances, one MS/MSD should be collected for every 20 or fewer investigative samples to be analyzed for organic and inorganic chemicals of a given matrix.

The general level of QC effort will be one field blind duplicate and one field equipment blank (when non-dedicated equipment is used) for every 20 or fewer investigative samples of a given matrix. Additional sample volume will also be provided to the laboratory to allow one site-specific MS/MSD for every 20 or fewer investigative samples of a given matrix. One trip blank consisting of distilled, deionized water will be included along with each sample delivery group of aqueous VOC samples.

4.7 Sampling and Analysis Plan

The selection and rationale for the RI sampling program is discussed in Section 3.0 above. Methods and protocol to be used to collect environmental samples (i.e., soil/fill and groundwater) for this investigation are described in the Benchmark-TurnKey Field Operating Procedures (FOPs) presented electronically in Appendix D.

Table 2 summarizes the number and types of environmental samples to be collected during the RI. Table 3 presents sample parameter lists, holding times and sample container requirements. The sampling program and related site activities are discussed below. To the extent allowed by existing physical conditions at the Site, sample collection efforts will adhere to the specific methods presented herein. If alternative sampling locations or procedures are implemented in response to Site-specific constraints, each will be selected on the basis of meeting data objectives. Such alternatives will be approved by NYSDEC before implementation and subsequently documented for inclusion in the project file.

4.7.1 Custody Procedures

Sample custody is controlled and maintained through chain-of-custody procedures. Chain of custody (COC) is the means by which the possession and handling of samples will be tracked from the source (field) to their final disposition, the laboratory. Sample containers will be cleaned and preserved at the laboratory before shipment to the Site. The following sections describe procedures for maintaining sample custody from the time samples are collected to the time they are received by the analytical laboratory, sample storage, as well as sample tracking. Benchmark-TurnKey's FOP 046.0: *Sample Labeling, Storage, and Shipment*, presented electronically in Appendix D, will provide the appropriate guidance for field personnel.

4.7.2 Sample Storage

Samples are stored in secure limited-access areas. Walk-in coolers or refrigerators are maintained at 4°C ±2°C or as required by the applicable regulatory program. The temperatures of all refrigerated storage areas are monitored and recorded a minimum of once per day. Deviations of temperature from the applicable range require corrective action, including moving samples to another storage location if necessary.

4.7.3 Sample Custody

Sample custody is defined by this document as when any of the following occur:

- It is in someone's actual possession.
- It is in someone's view after being in his or her physical possession.

- It was in someone's possession and then locked, sealed, or secured in a manner that prevents unsuspected tampering.
- It is placed in a designated and secured area.

Samples are removed from storage areas by the sample custodian or analysts and transported to secure laboratory areas for analysis. Access to the laboratory and sample storage areas is restricted to laboratory personnel and escorted visitors only; all areas of the laboratory are therefore considered secure. If required by the applicable regulatory program, internal chain-of-custody is documented in a log by the person moving the samples between laboratory and storage areas.

Laboratory documentation used to establish COC and sample identification may include the following:

- Field COC forms or other paperwork that arrives with the sample.
- The laboratory COC.
- Sample labels or tags are attached to each sample container.
- Sample custody seals.
- Sample preparation logs (i.e., extraction and digestion information) recorded in hardbound laboratory books that are filled out in legible handwriting, and signed and dated by the chemist.
- Sample analysis logs (e.g., metals, GC/MS, etc.) information recorded in hardbound laboratory books that are filled out in legible handwriting, and signed and dated by the chemist.
- Sample storage log (same as the laboratory COC).
- Sample disposition log, which documents sample disposal by a contracted waste disposal company.

4.7.4 Sample Tracking

All samples are maintained in the appropriate coolers prior to and after analysis. The analysts remove and return their samples as needed. Samples that require internal COC are relinquished to the analysts by the sample custodians. The analyst and sample custodian must sign the original COC relinquishing custody of the samples from the sample custodian to the analyst. When the samples are returned, the analyst will sign the original COC returning sample custody to the sample custodian. Sample extracts are relinquished to the instrumentation analysts by the preparatory analysts. Each preparation department tracks internal COC through their logbooks/spreadsheets. Any change in the sample during the time of custody will be noted on the COC (e.g., sample breakage or depletion).

4.7.5 Split Sampling

NYSDEC may split any environmental sample (e.g., waste, soil, soil/fill, groundwater, etc.) collected during this RI. Benchmark-TurnKey personnel will cooperate with the NYSDEC to facilitate split sampling, as necessary.

4.8 Calibration Procedures and Frequency

This section describes the calibration procedures and the frequency at which these procedures will be performed for both field and laboratory instruments.

4.8.1 Field Instrument Calibration

Quantitative field data to be obtained during soil and soil/fill sampling include screening for the presence of volatile organic constituents using a PID. Quantitative field data to be obtained during groundwater sampling include pH, turbidity, specific conductance, temperature, dissolved oxygen, oxygen reduction potential, and depth to groundwater. Quantitative water level measurements will be obtained with an electronic water level indicator, which requires no calibration.

FOPs located in Appendix D describe the field instruments used to monitor for these parameters and the calibration methods, standards, and frequency requirements for each instrument. Calibration results will be recorded on the appropriate field forms (see Appendix E).

4.9 Analytical Procedures

Samples collected during field sampling activities of this investigation will be analyzed by a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory.

4.9.1 Field Analytical Procedures

Field procedures for collecting and preserving groundwater and soil samples are described in Benchmark-TurnKey's FOPs located in Appendix D. Table 4 summarizes Benchmark-TurnKey's FOPs.

4.10 Data Usability Evaluation

Data usability evaluation procedures shall be performed for both field and laboratory operations as described below.

4.10.1 Procedures Used to Evaluate Field Data Usability

Procedures to validate field data for this project will be facilitated by adherence to Benchmark-TurnKey's FOPs (see Appendix D). The performance of all field activities, calibration checks on all field instruments at the beginning of each day of use, manual checks of field calculations, checking for transcription errors and review of field log books is the responsibility of the Field Team Leader.

4.10.2 Procedures Used to Evaluate Laboratory Data Usability

Data evaluation will be performed by the third party data validator using the most current methods and quality control criteria from the USEPA's Contract Laboratory Program (CLP) *National Functional Guidelines for Organic Data Review*, and Contract Laboratory Program, *National Functional Guidelines for Inorganic Data Review* (Refs. 8, 9 and 10). The data review guidance will be used only to the extent that it is applicable to the SW-846 methods; SW-846 methodologies will be followed primarily and given preference over CLP when differences occur. Also, results of blanks, surrogate spikes, MS/MSDs, and laboratory control samples will be reviewed/evaluated by the data validator. All sample analytical data for each sample matrix shall be evaluated. The third party data validation expert will also evaluate the overall completeness of the data package. Completeness checks will be administered on all data to determine whether deliverables specified in this QAPP are present. The reviewer will determine whether all required items are present and request copies of missing deliverables.

5.0 INVESTIGATION SUPPORT DOCUMENTS

5.1 Health and Safety Protocols

Benchmark-TurnKey has prepared a Site-Specific Health and Safety Plan (HASP) for use by our employees in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120. The HASP, provided in Appendix F, includes the following site-specific information:

- A hazard assessment.
- Training requirements.
- Definition of exclusion, contaminant reduction, and other work zones.
- Monitoring procedures for site operations.
- Safety procedures.
- Personal protective clothing and equipment requirements for various field operations.
- Disposal and decontamination procedures.

The HASP also includes a contingency plan that addresses potential site-specific emergencies, and a Community Air Monitoring Plan (CAMP) that describes required particulate and vapor monitoring to protect the neighboring community during intrusive site investigation and remediation activities.

Health and safety activities will be monitored throughout the field investigation. A member of the field team will be designated to serve as the on-site Health and Safety Officer throughout the field program. This person will report directly to the Project Manager and the Corporate Health and Safety Coordinator. The HASP will be subject to revision as necessary, based on new information that is discovered during the field investigation and/or remedial activities.

5.2 Community Air Monitoring

Real-time community air monitoring will be performed during all ground intrusive activities at the Site. A CAMP is included with Benchmark-TurnKey's HASP (Appendix F). The CAMP is consistent with the requirements for community air monitoring at remediation sites as established by the NYSDOH and NYSDEC. Accordingly, it follows procedures and practices outlined under NYSDEC's DER-10 (Ref. 1) Appendix 1A (NYSDOH's Generic

Community Air Monitoring Plan) and Appendix 1B (Fugitive Dust and Particulate Monitoring).

5.3 Citizen Participation Activities

NYSDEC will coordinate and lead community relations throughout the course of the project. Benchmark-TurnKey will support NYSDEC's community relations activities, as necessary. A Citizen Participation (CP) Plan has been prepared by Benchmark-TurnKey and was submitted to NYSDEC under separate cover. The CP Plan follows NYSDEC's Citizen Participation Plan template for sites entering the Brownfield Cleanup Program at the point of site investigation per NYSDEC DER-23 (Ref. 11).

6.0 REPORTING AND SCHEDULE

Upon completion of the RI fieldwork, a comprehensive Remedial Investigation/ Alternatives Analysis (RI/AA) Report will be prepared summarizing the RI tasks completed as described below.

6.1 Remedial Investigation Reporting

The RI/AA Report will include the following information and documentation, consistent with the NYSDEC's DER-10 Technical Guidance for Site Investigation and Remediation (Ref. 1).

- Introduction and background.
- A description of the site and the investigation areas.
- A description of the field procedures and methods used during the RI.
- A discussion of the nature and rationale for any significant variances from the scope of work described in this RI Work Plan.
- The data obtained during the RI and historical data considered by Benchmark-TurnKey to be of useable quality. This will include geochemical data, field measurements, etc.
- A discussion of contaminant fate and transport. This will provide a description of the hydrologic parameters of the Site, and an evaluation of the lateral and vertical movement of groundwater.
- Conclusions regarding the extent and character of environmental impact in the media being investigated.
- The conclusions of the qualitative human health and environmental risk assessments, including any recommendations for more detailed assessments, if applicable.
- Supporting materials for RI data. These will include boring logs, monitoring well construction diagrams, laboratory analytical reports, and similar information.

In addition, Benchmark-TurnKey will require third-party data review by a qualified, independent data validation expert. Specifically, a Data Usability Summary Report (DUSR) will be prepared, with appropriate data qualifiers added to the results. The DUSR will follow NYSDEC format per the NYSDEC's September 1997 DUSR guidelines and May 2010 DER-

10 guidance. The DUSR and any necessary qualifications to the data will be appended to the RI/AA Report.

Benchmark-TurnKey will provide all submittals to the NYSDEC in accordance with its electronic data deliverables (EDD) requirements.

6.2 Alternatives Analysis Report

An alternatives analysis will be included with the RI/AA Report to provide a forum for evaluating and selecting a recommended remedial approach. Based on the findings of the RI, a list of remedial action objectives (RAOs) will be developed with the requirement for the selected remedial measures to be protective of public health and the environment under the proposed future use scenario. Proposed SCOs for the property will also be presented based on the proposed future use of the Site. SCOs will be based on published standards, criteria, and guidance (SCGs) and other NYSDEC and NYSDOH-accepted values.

Based on the RAOs and SCOs, volumes and areas of media potentially requiring additional remediation will be calculated. General response actions will then be delineated to address each of the Site problem areas. These response actions will form the foundation for the development and screening of applicable remedial alternatives against the following criteria as described in 6NYCRR Part 375-1.8(f):

- Overall Protection of Public Health and the Environment
- Compliance with Standards, Criteria, & Guidance (SCGs)
- Long-Term Effectiveness & Permanence
- Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment
- Short-Term Impacts and Effectiveness
- Implementability
- Cost-Effectiveness
- Land Use

In addition, the criteria of community acceptance will be considered based on public comments on the AA Report and proposed remedial action. Following the screening of alternatives, a comparative analysis will be performed against the above criteria. The comparative analysis will allow for better understanding of the relative advantages and disadvantages of each of the alternatives, and will facilitate identification of a recommended remedial approach.

6.3 Project Schedule

Figure 5 presents an estimated project schedule for the RI showing major environmental tasks to be performed.

6.4 Electronic Copy of RI Work Plan

Appendix G includes an electronic version of this RI Work Plan.

7.0 REFERENCES

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8. U.S. Environmental Protection Agency, *Methods for Chemical Analysis of Water and Wastes*, EPA 600/4-70-020. 1983b.
9. U.S. Environmental Protection Agency. *National Functional Guidelines for Organic Data Review (EPA-540/R-94-012)*, 1994a.
10. U.S. Environmental Protection Agency. *National Functional Guidelines for Inorganic Data Review (EPA-540/R-94-013)*, 1994b.
11. New York State Department of Environmental Conservation. *DER-23, Citizen Participation Handbook for Remedial Programs*. January 21, 2010.

TABLES

TABLE 1

SUMMARY OF SOIL/FILL ANALYTICAL RESULTS - PHASE II AND SUPPLEMENTAL INVESTIGATION

25 RANO STREET SITE
BUFFALO, NEW YORK

PARAMETER [1]	Unrestricted Use SCOs [2]	Restricted Residential Use SCOs [2]	Commercial Use SCOs [2]	SAMPLE LOCATION (DEPTH)										
				Phase II ESA (4/19/17)					Supplemental Investigation (6/7/2017)				UST Post-Ex (6/9/2017)[4]	
				SB-2 (6"-3.5')	SB-4 (6"-1.5')	SB-5 (4"-1.5')	SB-7 (3"-2')	HA-1 (3-4')	SB-8 (3"-6")	SB-9 (4"-2.5')	SB-10 (5'-5.5')	SS-1 (0-2")	Bottom North	Bottom South
Volatile Organic Compounds (VOCs) - mg/kg [3]														
1,1,2,2-Tetrachloroethane	--	--	--	ND	ND	ND	ND	ND	0.5 J D	ND	ND	--	--	--
1,1,1-Trichloroethane	**0.68**	**100**	**500**	ND	0.001	ND	ND	0.032 J	ND	0.002	ND	--	--	--
1,1,2-Trichloroethane	--	--	--	ND	ND	ND	ND	ND	0.47 J D	ND	ND	--	--	--
1,1-Dichloroethane	**0.33**	**26**	**240**	ND	ND	ND	ND	ND	**0.36 J D**	0.016	ND	--	--	--
1,2,4-Trimethylbenzene	**3.6**	**52**	**190**	ND	ND	ND	ND	ND	0.23 J D	0.0005 J	ND	--	ND < 1.05	0.00846
1,2-Dichlorobenzene	**1.1**	**100**	**500**	ND	ND	ND	ND	ND	0.28 J D	ND	ND	--	--	--
1,2-Dichloropropane	--	--	--	ND	ND	ND	ND	ND	0.37 J D	ND	ND	--	--	--
1,3,5-Trimethylbenzene	**8.4**	**52**	**190**	ND	ND	ND	ND	ND	0.2 J D	0.00038 J	ND	--	ND < 1.05	ND < 0.006
1,4-Dichlorobenzene	**1.8**	**13**	**130**	ND	ND	ND	ND	ND	0.26 J D	ND	ND	--	--	--
Acetone	**0.05**	**100**	**500**	0.0079 J	0.014	ND	**0.22 J**	**0.22 J**	ND	0.012	0.021	--	--	--
Benzene	**0.06**	**4.8**	**44**	ND	0.00054 J	ND	ND	ND	**0.4 J D**	0.00021 J	0.00037 J	--	**ND < 1.05**	ND < 0.006
Bromodichloromethane	--	--	--	ND	ND	ND	ND	ND	0.4 J D	ND	ND	--	--	--
Carbon disulfide	--	--	--	ND	ND	10 J D	11	ND	ND	ND	ND	--	--	--
Chloromethane (Methyl chloride)	--	--	--	ND	ND	ND	ND	ND	ND	ND	0.0017 J	--	--	--
cis-1,3-Dichloropropene	--	--	--	ND	ND	ND	ND	ND	0.35 J D	ND	ND	--	--	--
Cyclohexane	--	--	--	ND	0.0013 J	ND	ND	ND	ND	0.006 J	ND	--	--	--
Dibromochloromethane	--	--	--	ND	ND	ND	ND	ND	0.43 J D	ND	ND	--	--	--
Ethylbenzene	**1**	**41**	**390**	ND	ND	ND	ND	ND	0.33 J D	ND	0.00026 J	--	**ND < 1.05**	ND < 0.006
Isopropylbenzene (Cumene)	--	--	--	--	ND	ND	ND	ND	ND	ND	ND	--	ND < 1.05	ND < 0.006
Methyl tert butyl ether (MTBE)	**0.93**	**100**	**500**	--	ND	ND	ND	ND	0.56 J D	ND	ND	--	**ND < 1.05**	ND < 0.006
Methylcyclohexane	--	--	--	ND	0.001 J	ND	0.029 J	0.038 J	ND	0.0076	ND	--	--	--
Methylene chloride	**0.05**	**100**	**500**	ND	ND	ND	ND	ND	**2.1 J D**	ND	0.0024 J	--	--	--
Naphthalene	--	--	--	--	ND	ND	ND	ND	ND	ND	ND	--	ND < 2.62	ND < 0.015
n-Butylbenzene	**12**	--	--	--	ND	ND	ND	ND	ND	ND	ND	--	1.67	ND < 0.006
n-Propylbenzene	**3.9**	**100**	**500**	--	ND	ND	ND	ND	ND	ND	ND	--	ND < 1.05	ND < 0.006
p-Isopropyltoluene	--	--	--	--	ND	ND	ND	ND	ND	ND	ND	--	ND < 1.05	ND < 0.006
sec-Butylbenzene	**11**	**100**	**500**	--	ND	ND	ND	ND	ND	ND	ND	--	ND < 1.05	ND < 0.006
tert-Butylbenzene	**5.9**	**100**	**500**	--	ND	ND	ND	ND	ND	ND	ND	--	ND < 1.05	ND < 0.006
Tetrachloroethene	**1.3**	**19**	**150**	ND	0.0042	ND	ND	**2**	ND	ND	0.0027	--	--	--
Toluene	**0.7**	**100**	**500**	0.0076	0.0038	**400 D**	0.11	0.19	**170 D**	0.0094	0.013	--	**ND < 1.05**	ND < 0.006
trans-1,3-Dichloropropene	--	--	--	ND	ND	ND	ND	ND	0.4 J D	ND	ND	--	--	--
m&p-Xylene	**0.26**	**100**	**500**	ND	ND	ND	ND	ND	**0.7 J D**	0.00032 J	ND	--	**ND < 1.05**	ND < 0.006
o-Xylenes	**0.26**	**100**	**500**	--	ND	ND	ND	ND	**0.57 J D**	ND	ND	--	**ND < 1.05**	ND < 0.006
Total Tentatively Identified Compounds	--	--	--	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*0.0267 J*	*0.0594 J*	--	--	--

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
TURNKEY ENVIRONMENTAL RESTORATION, LLC

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TABLE 1

SUMMARY OF SOIL/FILL ANALYTICAL RESULTS - PHASE II AND SUPPLEMENTAL INVESTIGATION

25 RANO STREET SITE
BUFFALO, NEW YORK

PARAMETER [1]	Unrestricted Use SCOs [2]	Restricted Residential Use SCOs [2]	Commercial Use SCOs [2]	SAMPLE LOCATION (DEPTH)										
				Phase II ESA (4/19/17)					Supplemental Investigation (6/7/2017)				UST Post-Ex (6/9/2017)[4]	
				SB-2 (6"-3.5')	SB-4 (6"-1.5')	SB-5 (4"-1.5')	SB-7 (3"-2')	HA-1 (3-4')	SB-8 (3"-6")	SB-9 (4"-2.5')	SB-10 (5'-5.5')	SS-1 (0-2")	Bottom North	Bottom South
Semi-Volatile Organic Compounds (SVOCs) - mg/kg [3]														
2-Methylnaphthalene	**--**	**--**	**--**	0.15 J	0.13 J	ND	0.08 J	0.092 J	--	0.2 J	ND	1.4	--	--
Acenaphthene	**20**	**100**	**500**	ND	ND	ND	0.21	ND	--	0.021 J	ND	ND	4.07	ND < 0.31
Acenaphthylene	**100**	**100**	**500**	ND	ND	ND	0.044 J	ND	--	ND	ND	0.076 J	ND < 1.69	ND < 0.31
Acetophenone	**--**	**--**	**--**	ND	ND	ND	ND	ND	--	ND	ND	0.18	--	--
Anthracene	**100**	**100**	**500**	0.039 J	ND	ND	0.52	ND	--	0.041 J	ND	0.12	ND < 1.69	ND < 0.31
Benzo(a)anthracene	**1**	**1**	**5.6**	0.14	0.053 J	ND	**1.4**	0.11 J	--	0.16	ND	0.14	**ND < 1.69**	ND < 0.31
Benzo(a)pyrene	**1**	**1**	**1**	0.16	0.049 J	ND	**1.4**	0.11 J	--	0.17	ND	0.12 J	**ND < 1.69**	ND < 0.31
Benzo(b)fluoranthene	**1**	**1**	**5.6**	0.24	0.076 J	ND	**1.8**	0.17	--	0.26	ND	0.24	**ND < 1.69**	ND < 0.31
Benzo(ghi)perylene	**100**	**100**	**500**	0.12 J	0.037 J	ND	0.89	0.082 J	--	0.13 J	ND	0.24	ND < 1.69	0.328
Benzo(k)fluoranthene	**0.8**	**3.9**	**56**	0.064 J	ND	ND	0.61	0.054 J	--	0.062 J	ND	0.066 J	**ND < 1.69**	ND < 0.31
Biphenyl	**--**	**--**	**--**	ND	ND	ND	ND	ND	--	ND	ND	0.098 J	--	--
Bis(2-ethylhexyl) phthalate	**--**	**--**	**--**	ND	ND	ND	ND	0.31	--	ND	ND	ND	--	--
Carbazole	**--**	**--**	**--**	0.024 J	ND	ND	0.2	ND	--	0.028 J	ND	ND	--	--
Chrysene	**1**	**3.9**	**56**	0.16	0.075 J	ND	**1.4**	0.11 J	--	0.18	ND	0.26	**ND < 1.69**	ND < 0.31
Dibenz(a,h)anthracene	**0.33**	**0.33**	**0.56**	0.029 J	ND	ND	0.2	ND	--	ND	ND	ND	**ND < 1.69**	ND < 0.31
Dibenzofuran	**7**	**59**	**350**	0.041 J	0.043 J	ND	0.11 J	0.022 J	--	0.044 J	ND	0.18	--	--
Fluoranthene	**100**	**100**	**500**	0.24	0.11	ND	3.2	0.23	--	0.3	ND	0.16	2.02	ND < 0.31
Fluorene	**30**	**100**	**500**	0.019 J	ND	ND	0.2	ND	--	0.033 J	ND	ND	4.63	ND < 0.31
Indeno(1,2,3-cd)pyrene	**0.5**	**0.5**	**5.6**	0.12 J	0.033 J	ND	**0.92**	0.09 J	--	0.14 J	ND	0.24	**ND < 1.69**	0.325
Naphthalene	**12**	**100**	**500**	0.16 J	0.18	ND	0.14 J	0.12 J	--	0.15 J	ND	0.51	ND < 1.69	0.407
Phenanthrene	**100**	**100**	**500**	0.22	0.18	ND	2	0.14	--	0.26	ND	0.5	11.8	ND < 0.31
Pyrene	**100**	**100**	**500**	0.21	0.086 J	ND	2.7	0.18	--	0.25	ND	0.25	2	ND < 0.31
Total Tentatively Identified Compounds	**--**	**--**	**--**	*ND*	*ND*	*ND*	*ND*	*ND*	--	*2.04 J*	*ND*	*5.06 J*	--	--
Metals - mg/kg														
Arsenic	**13**	**16**	**16**	5.6	8.3	2.4	4.3	12	--	8.85	7.03	7.21	--	--
Barium	**350**	**400**	**400**	60	56	19	59	83	--	36.2	76.5	47.6	--	--
Cadmium	**2.5**	**4.3**	**9.3**	0.243 J	0.423 J	0.1 J	0.08 J	**12**	--	0.369 J	ND	**10.6**	--	--
Chromium	**30**	**180**	**1500**	12	17	5.9	13	**37**	--	15.8	**45**	28.7	--	--
Lead	**63**	**400**	**1000**	31	59	6.6	48	**64**	--	52.1	6.95	41.8	--	--
Mercury	**0.18**	**0.81**	**2.8**	0.06 J	0.05 J	ND	0.05 J	0.08 J	--	0.09	ND	0.06 J	--	--
Selenium	**3.9**	**180**	**1500**	ND	ND	ND	ND	ND	--	1.29	1.14	1.04	--	--
Silver	**2**	**180**	**1500**	ND	ND	ND	ND	ND	--	ND	0.582	0.172 J	--	--
Zinc	**109**	**10000**	**10000**	100	66	31	44	**670**	--	**1990**	10.5	722	--	--
Cyanide - Total	**27**	**27**	**27**	0.27 J	ND	ND	10	20	--	0.33 J	20	**42**	--	--

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC — TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE 1

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25 RANO STREET SITE
BUFFALO, NEW YORK

PARAMETER [1]	Unrestricted Use SCOs [2]	Restricted Residential Use SCOs [2]	Commercial Use SCOs [2]	SAMPLE LOCATION (DEPTH)										
				Phase II ESA (4/19/17)					Supplemental Investigation (6/7/2017)				UST Post-Ex (6/9/2017)[4]	
				SB-2 (6"-3.5')	SB-4 (6"-1.5')	SB-5 (4"-1.5')	SB-7 (3"-2')	HA-1 (3-4')	SB-8 (3"-6")	SB-9 (4"-2.5')	SB-10 (5'-5.5')	SS-1 (0-2")	Bottom North	Bottom South
Polychlorinated biphenyls (PCBs) - mg/kg														
Aroclor 1260	**--**	**--**	**--**	ND	0.00827 J	ND	0.0274 J	0.00772 J	--	--	--	--	--	--
Total PCBs	**0.1**	**1**	**1**	ND	0.00827 J	ND	0.0274 J	0.00772 J	--	--	--	--	--	--

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table; all other compounds were reported as non-detect.
2. Values per 6NYCRR Part 375 Soil Cleanup Objectives (SCOs).
3. Sample results were reported by the laboratory in ug/kg and converted to mg/kg for comparisons to SCOs
4. Collected from excavation bottom following removal of two 11,000-gallon USTs per Consent Order.

Definitions:

ND = Parameter not detected above laboratory detection limit.
"--" = No value available for the parameter or sample not analyzed for parameter.
J = Estimated value; result is less than the sample quantitation limit but greater than zero.
D = Compounds were identified in an analysis at the secondary dilution factor.

Bold (green)	= Result exceeds Unrestricted Use SCOs and CP-51 SCLs.
Bold (blue)	= Result exceeds Restricted Residential Use SCOs.
Bold (yellow)	= Result exceeds Commercial Use SCOs.
Bold (orange)	= Result is less than the MDL; however, the MDL is greater than the respective analyte's SCO.

TABLE 2
SAMPLING AND ANALYSIS PLAN

25 RANO STREET SITE
BUFFALO, NEW YORK

Location	Number of Planned Locations	Matrix	Parameter [1]							
			TCL VOCs (+TICs)	TCL SVOCs (+TICs)	TAL Metals (+cyanide)	PCBs	Herbicides	Pesticides	PFOA/PFOS 1,4-Dioxane [2]	TCLP Metals [3]
Soil/Fill										
Surface	14	Soil/Fill	-	14	14	4	4	4	-	1
Near-Surface	24	Soil/Fill	24	24	24	6	6	6	-	1
Sub-Surface	24	Soil/Fill	24	24	24	6	6	6	-	-
Blind Duplicate [4]	-	Soil/Fill	1	3	3	1	1	1	-	-
MS/MSD [4]	-	Soil/Fill	1	3	3	1	1	1	-	-
Soil/Fill Subtotal			50	68	68	18	18	18	0	2
Groundwater [5]										
Monitoring Well	5	Groundwater	5	5	5	5	5	5	1	-
Blind Duplicate [4]	-	Groundwater	1	1	1	1	1	1	-	-
MS/MSD [4]	-	Groundwater	1	1	1	1	1	1	-	-
Trip Blank [6]	-	Water	1	-	-	-	-	-	-	-
Groundwater Subtotal			8	7	7	7	7	7	1	0

Notes:

1. Analyses will be performed via USEPA SW-846 methodology with equivalent Category B deliverables package.
2. NYSDEC requirement for perfluorinated chemicals (PFCs): PFOA/PFOS via Method 537 and low level 1,4-dioxane via Method 8270 SIM.
3. TCLP metals analysis will be completed on the two soil samples exhibiting the highest total metals concentrations.
4. Blind duplicate and MS/MSD samples will be collected at a frequency of 1 per 20 samples/media collected.
5. Groundwater samples will be filtered in the laboratory for dissolved metals analysis.
6. Trip blanks will be submitted to the laboratory each day aqueous volatile organic samples are collected.

TABLE 3
SAMPLE CONTAINER, VOLUME, PRESERVATION & HOLDING TIME REQUIREMENTS

25 RANO STREET SITE
BUFFALO, NEW YORK

Matrix	Parameter [1]	Method [2]	Container Type	Minimum Volume	Preservation (Cool to 2-4 °C for all samples)	Holding Time from Sample Date
Soil/Fill	TCL VOCs (+TICs)	5035/8260B	En Core Sampler	(3) 5 gram samples	Cool to 2-4°C, Zero Headspace	48 hours extraction/14 days
	TCL SVOCs (+TICs)	8270C	WMG	4 oz.	Cool to 2-4°C	14 days extract/40 days
	TAL Metals	6010B	WMG	4 oz.	Cool to 2-4°C	6 months/Hg 28 days
	Pesticides	8081	WMG	8 oz.	Cool to 2-4°C	14 days extract/40 days
	Herbicides	8151	WMG	8 oz.	Cool to 2-4°C	14 days extract/40 days
	PCBs	8082	WMG	8 oz.	Cool to 2-4°C	14 days extract/40 days
Groundwater	TCL VOCs (+TICs)	8260B	glass vial	3-4 oz.	HCl to pH<2, Zero Headspace Cool to 2-4°C	14 days
	TCL SVOCs (+TICs)	8270C	amber glass	2000 mL	Cool to 2-4°C	7 days extract/40 days
	TAL Metals	6010B	plastic	600 mL	HNO_3 to pH<2, Cool to 2-4°C	6 months/Hg 28 days
	Pesticides	8081	amber glass	1000 mL	Cool to 2-4°C	7 days extract/40 days
	Herbicides	8151	amber glass	1000 mL	Cool to 2-4°C	7 days extract/40 days
	PCBs	8082	amber glass	1000 mL	Cool to 2-4°C	7 days extract/40 days

Notes:

1. EPA-approved methods published in Note 2 may be used.
2. Test Methods for Evaluating Solid Wastes, USEPA SW-846, Update III, 1991.

Acronyms:

VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds
TCL = Target Compound List
TAL = Target Analyte List
PCBs = Polychlorinated Biphenyls
WMG = Wide Mouth Glass

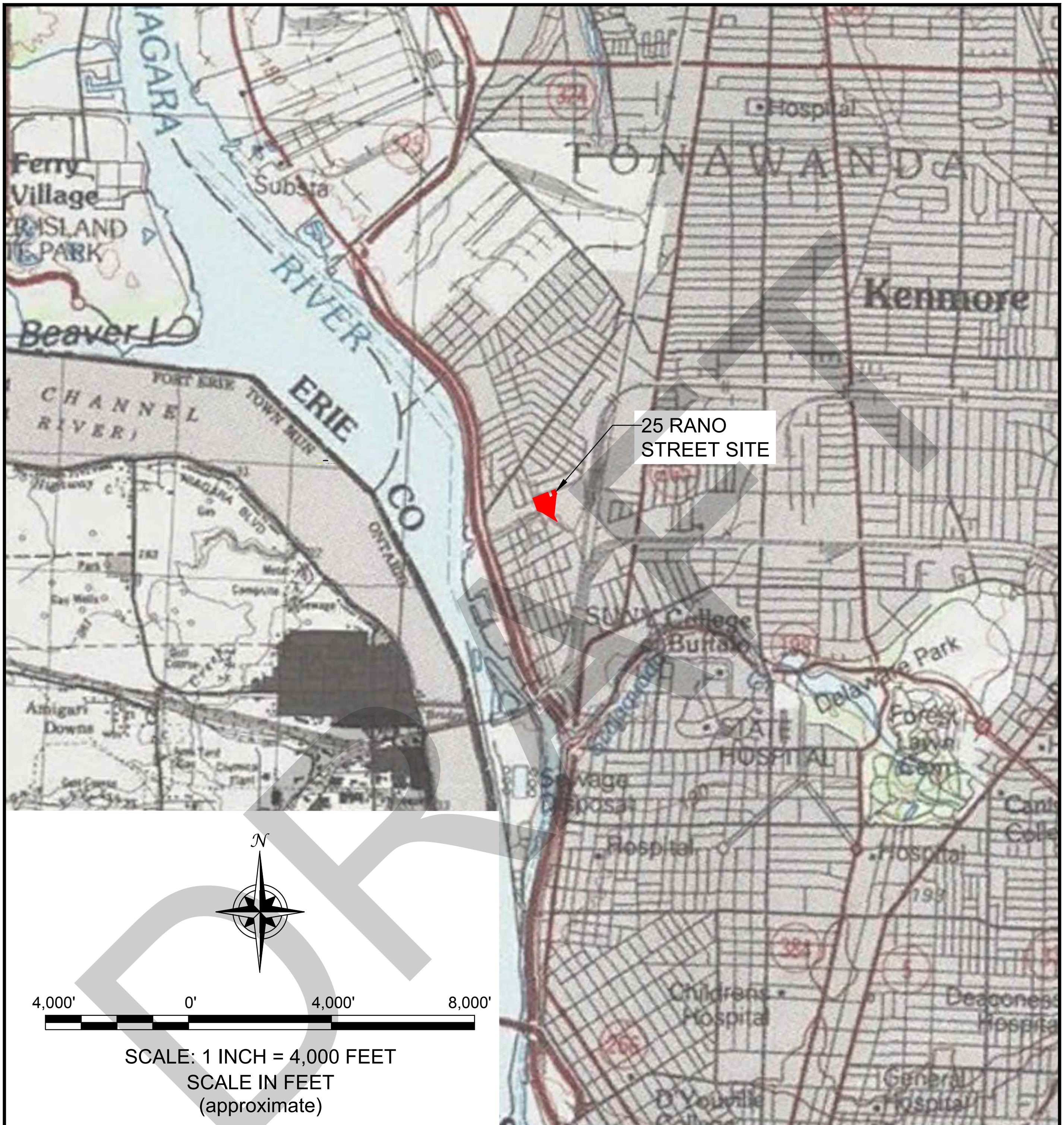
TABLE 4
SUMMARY OF FIELD OPERATING PROCEDURES

25 RANO STREET SITE
BUFFALO, NEW YORK

TurnKey FOP No.	Procedure
001.1	Abandonment of Borehole Procedures
007.0	Calibration and Maintenance of Portable Dissolved Oxygen Meter
008.0	Calibration and Maintenance of Portable Field pH/Eh Meter
009.0	Calibration and Maintenance of Portable Field Turbidity Meter
011.0	Calibration and Maintenance of Portable Photoionization Detector
012.0	Calibration and Maintenance of Portable Specific Conductance Meter
013.0	Composite Sample Collection Procedure for Non-Volatile Organic Analysis
015.0	Documentation Requirements for Drilling and Well Installation
017.0	Drill Site Selection Procedure
018.0	Drilling and Excavation Equipment Decontamination Procedures
021.0	Establishing Horizontal and Vertical Control
022.0	Groundwater Level Measurement
023.1	Groundwater Purging Procedures Prior to Sample Collection
024.1	Groundwater Sample Collection Procedures
026.1	Hollow Stem Auger (HSA) Drilling Procedures
031.2	Low Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedure
032.1	Management of Investigation-Derived Waste (IDW)
033.0	Monitoring Well Construction for Hollow Stem Auger Boreholes
036.0	Monitoring Well Development Procedures
040.1	Non-Disposable and Non-Dedicated Sampling Equipment Decontamination
046.0	Sample Labeling, Storage and Shipment Procedures
047.0	Screening of Soil Samples for Organic Vapors During Drilling Activities
054.2	Soil Description Procedures Using The Visual-Manual Method
063.2	Surface and Subsurface Soil Sampling Procedures
065.1	Test Pit Excavation & Logging Procedures
073.1	Real-Time Air Monitoring During Intrusive Activities
076.0	"Before Going Into the Field" Procedure
078.0	Geoprobe Drilling Procedure
079.0	Stockpile Sampling Procedures for Chemical Analysis
080.0	Stockpile-Borrow Source Sampling Procedures for Physical Analysis
084.0	Calibration and Maintenance of Portable Particulate Meter
085.0	Field Quality Control Procedures

FIGURES

FIGURE 1



BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TURNKEY ENVIRONMENTAL RESTORATION, LLC

2558 HAMBURG TURNPIKE, SUITE 300, BUFFALO, NY 14218, (716) 856-0599

PROJECT NO.: 0418-017-005

DATE: DECEMBER 2017

DRAFTED BY: CMC

SITE LOCATION & VICINITY MAP

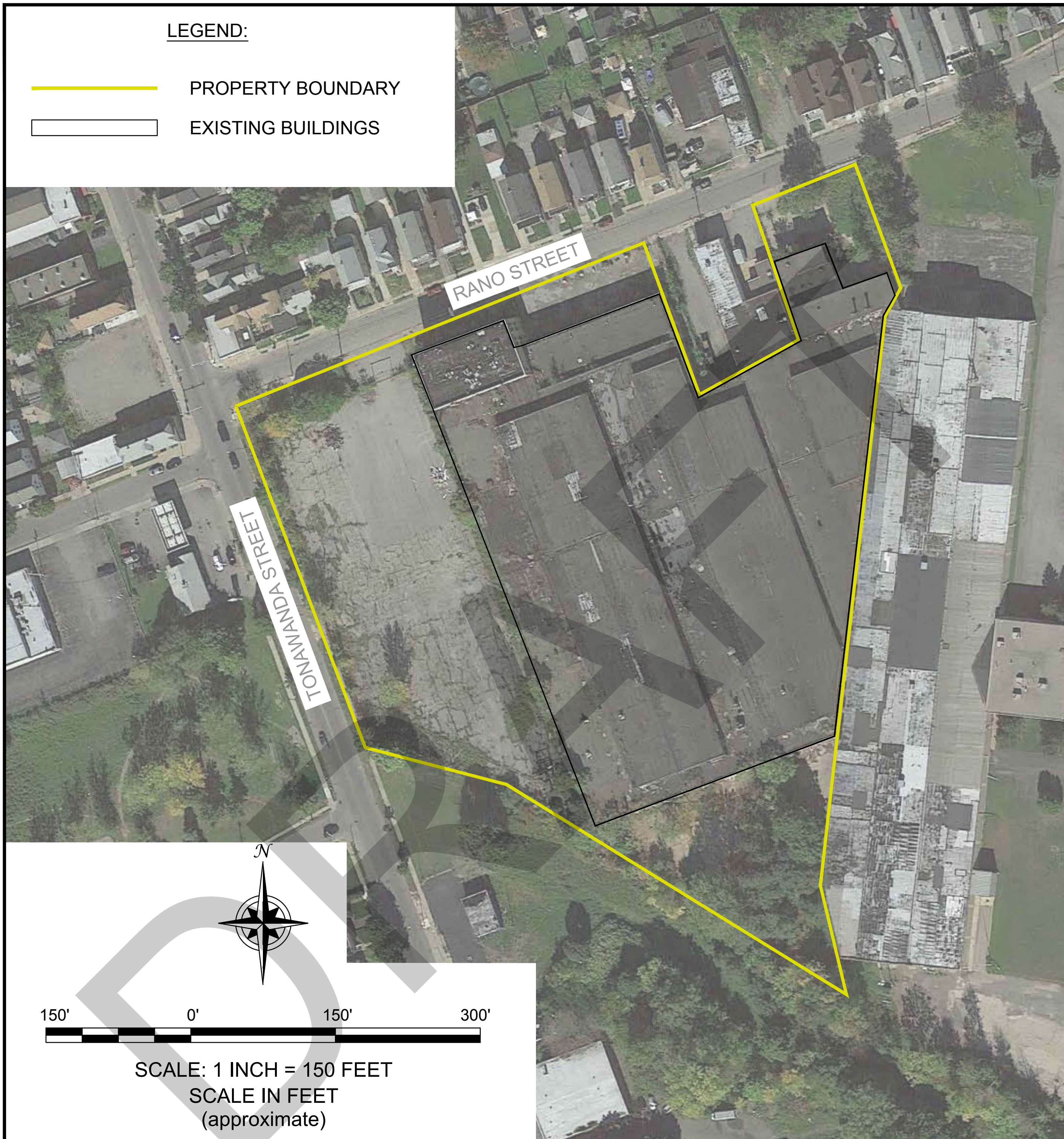
REMEDIAL INVESTIGATION WORK PLAN

25 RANO STREET
BUFFALO, NEW YORK

PREPARED FOR

RANO DEVELOPMENT, LLC

FIGURE 2



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PROJECT NO.: 0418-017-005

DATE: DECEMBER 2017

DRAFTED BY: CMC

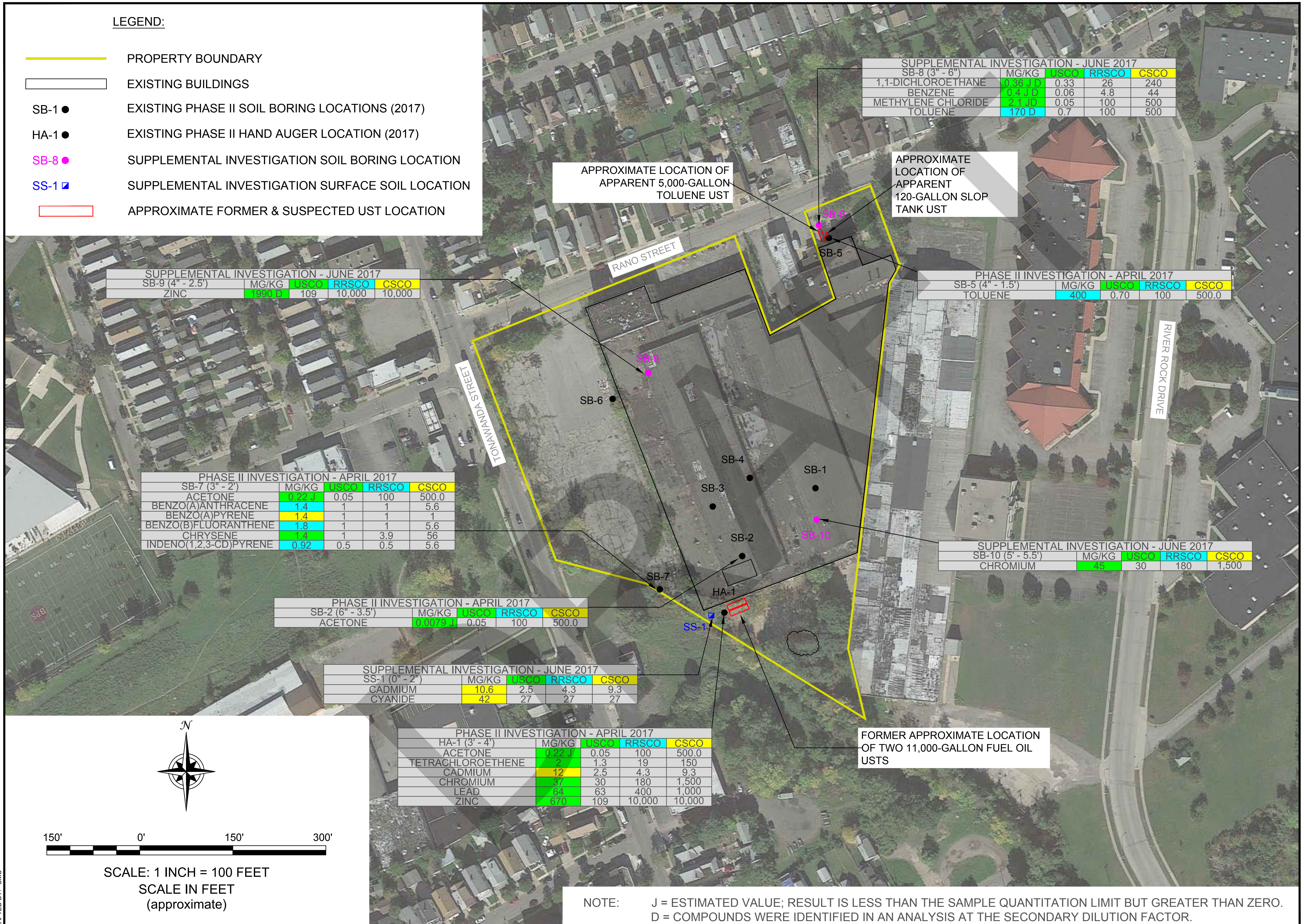
SITE PLAN (AERIAL)

REMEDIAL INVESTIGATION WORK PLAN

25 RANO STREET
BUFFALO, NEW YORK

PREPARED FOR

RANO DEVELOPMENT, LLC



SUPPLEMENTAL INVESTIGATION - JUNE 2017				
SB-8 (3" - 6")	MG/KG	USCO	RRSCO	CSCO
1,1-DICHLOROETHANE	0.36 J D	0.33	26	240
BENZENE	0.4 J D	0.06	4.8	44
METHYLENE CHLORIDE	2.1 JD	0.05	100	500
TOLUENE	170 D	0.7	100	500

SUPPLEMENTAL INVESTIGATION - JUNE 2017				
SB-9 (4" - 2.5')	MG/KG	USCO	RRSCO	CSCO
ZINC	1990 D	109	10,000	10,000

PHASE II INVESTIGATION - APRIL 2017				
SB-5 (4" - 1.5')	MG/KG	USCO	RRSCO	CSCO
TOLUENE	400	0.70	100	500.0

PHASE II INVESTIGATION - APRIL 2017				
SB-7 (3" - 2')	MG/KG	USCO	RRSCO	CSCO
ACETONE	0.22 J	0.05	100	500.0
BENZO(A)ANTHRACENE	1.4	1	1	5.6
BENZO(A)PYRENE	1.4	1	1	1
BENZO(B)FLUORANTHENE	1.8	1	1	5.6
CHRYSENE	1.4	1	3.9	56
INDENO(1,2,3-CD)PYRENE	0.92	0.5	0.5	5.6

SUPPLEMENTAL INVESTIGATION - JUNE 2017				
SB-10 (5' - 5.5')	MG/KG	USCO	RRSCO	CSCO
CHROMIUM	45	30	180	1,500

PHASE II INVESTIGATION - APRIL 2017				
SB-2 (6" - 3.5')	MG/KG	USCO	RRSCO	CSCO
ACETONE	0.0079 J	0.05	100	500.0

SUPPLEMENTAL INVESTIGATION - JUNE 2017				
SS-1 (0" - 2")	MG/KG	USCO	RRSCO	CSCO
CADMIUM	10.6	2.5	4.3	9.3
CYANIDE	42	27	27	27

PHASE II INVESTIGATION - APRIL 2017				
HA-1 (3' - 4')	MG/KG	USCO	RRSCO	CSCO
ACETONE	0.22 J	0.05	100	500.0
TETRACHLOROETHENE	2	1.3	19	150
CADMIUM	12	2.5	4.3	9.3
CHROMIUM	37	30	180	1,500
LEAD	64	63	400	1,000
ZINC	670	109	10,000	10,000

NOTE: J = ESTIMATED VALUE; RESULT IS LESS THAN THE SAMPLE QUANTITATION LIMIT BUT GREATER THAN ZERO.
D = COMPOUNDS WERE IDENTIFIED IN AN ANALYSIS AT THE SECONDARY DILUTION FACTOR.

DATE: DECEMBER 2017
DRAFTED BY: CMC

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
TURNKEY ENVIRONMENTAL RESTORATION, LLC
2558 HAMBURG TURNPIKE, SUITE 300, BUFFALO, NY 14218, (716) 856-0599

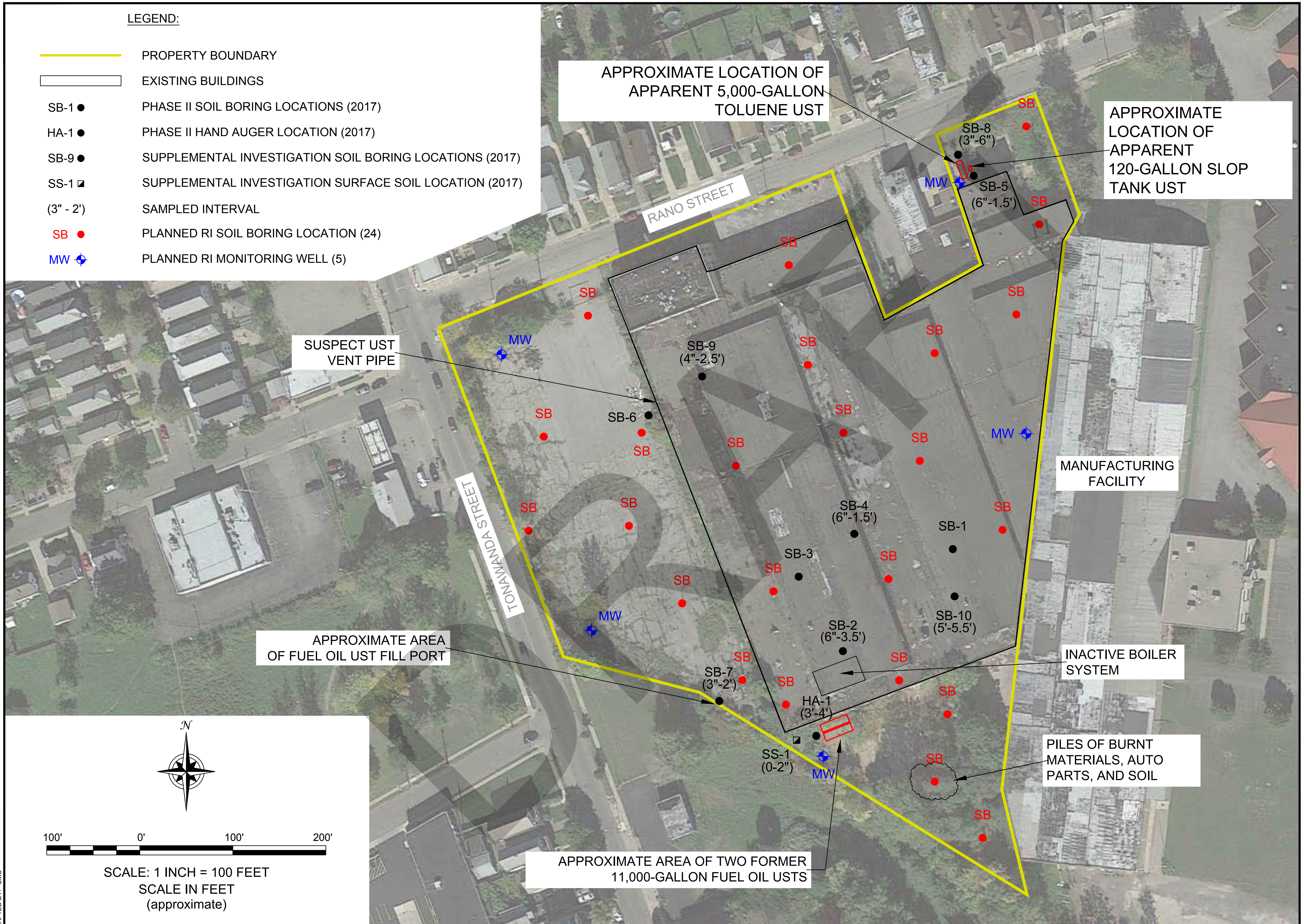
JOB NO.: 0418-017-005

HISTORIC SAMPLE LOCATIONS AND EXCEEDANCES OF SCOs

REMEDIAL INVESTIGATION WORK PLAN

25 RANO STREET
BUFFALO, NEW YORK
PREPARED FOR
RANO DEVELOPMENT, LLC

FIGURE 3



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2558 HAMBURG TURNPIKE, SUITE 300, BUFFALO, NY 14218, (716) 856-0599

JOB NO.: 0418-017-005

PLANNED REMEDIAL INVESTIGATION SAMPLE LOCATIONS

REMEDIAL INVESTIGATION WORK PLAN

25 RANO STREET
BUFFALO, NEW YORK

PREPARED FOR

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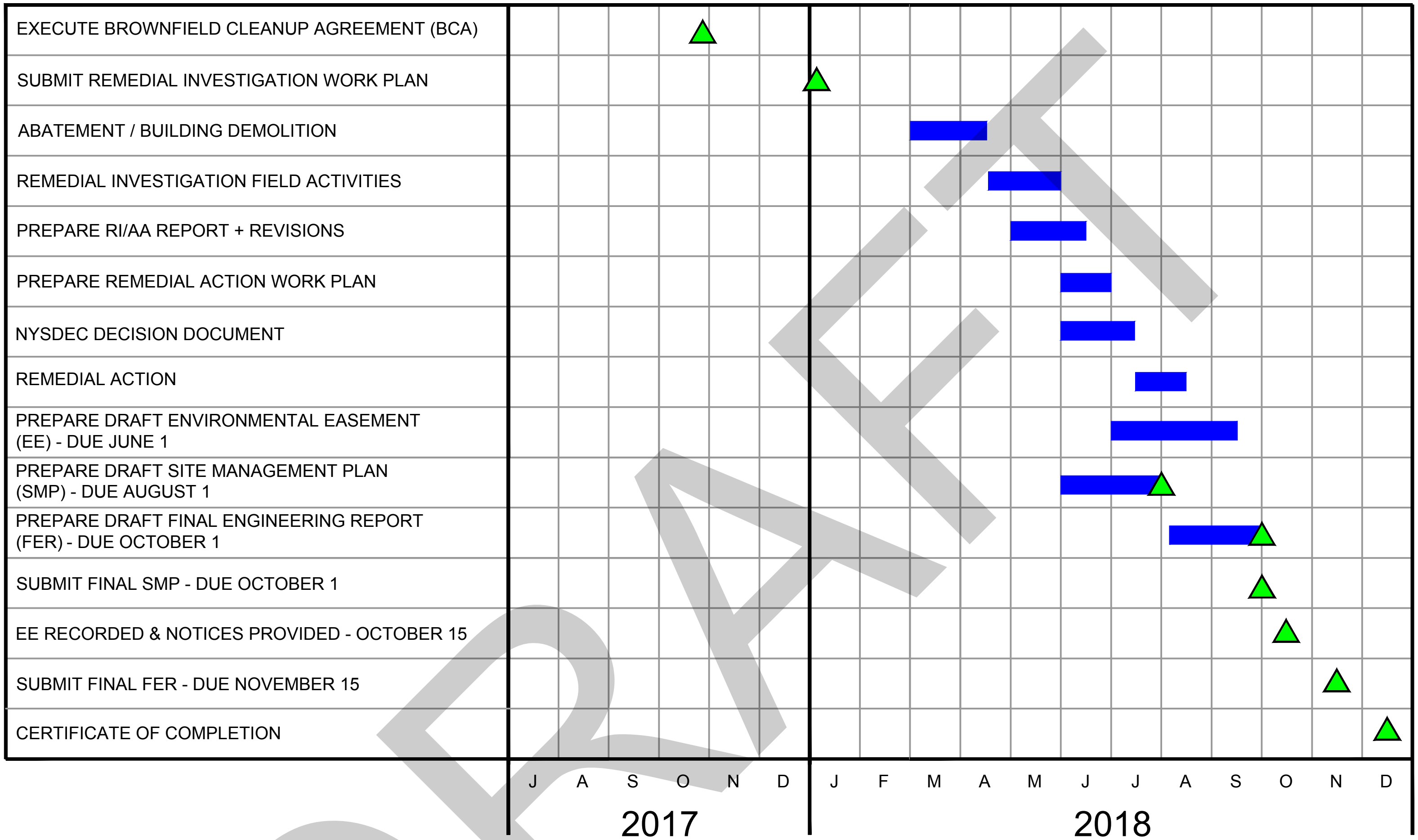
FIGURE 4

PROJECT TASKS:



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PROJECT NO.: 0418-017-005

DATE: DECEMBER 2017

DRAFTED BY: CMC

PROJECT SCHEDULE

REMEDIAL INVESTIGATION WORK PLAN

25 RANO STREET SITE
BUFFALO, NEW YORK

PREPARED FOR

RANO DEVELOPMENT, LLC

FIGURE 5

APPENDIX A

RESUMES OF PROJECT PERSONNEL

APPENDIX B

NRCS WEB SOIL SURVEY REPORT

APPENDIX C

PREVIOUS INVESTIGATION REPORTS

APPENDIX D

FIELD OPERATING PROCEDURES

APPENDIX E

PROJECT FIELD FORMS

APPENDIX F

SITE-WIDE HEALTH AND SAFETY PLAN (HASP)

APPENDIX G

ELECTRONIC COPY OF WORK PLAN