REPORT

REMEDIAL INVESTIGATION /INTERIM REMEDIAL MEASURES/ ALTERNATIVES ANALYSIS (RI/IRM/AA) REPORT

89 LaSalle Avenue Site
Buffalo, New York
BCP Site No. C915283

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1.0 INTRODUCTION

This Remedial Investigation/ Interim Remedial Measures/Alternatives Analysis (RI/IRM/AA) Report has been prepared on behalf of Legacy LaSalle LLC (Legacy) for the 89 LaSalle Avenue Site in the City of Buffalo.

Legacy executed a Brownfield Cleanup Agreement (BCA) for the 89 LaSalle Avenue Site (Site No. C915283) in June 2014, under the New York State Brownfield Cleanup Program (BCP). Golder performed RI activities at the site during June of 2014 in accordance with the RI Work Plan, approved by NYSDEC on June 9, 2014. Subsequent to submittal of a draft RI/AA report in August 2014 and receipt of comments from the New York State Department of Environmental Conservation (NYSDEC), supplemental remedial investigation activities were performed to more fully characterize groundwater and soil/fill impacts at certain RI locations at the Site.

The Site consists of three parcels comprising a total of approximately 10.6 acres located in the Main-LaSalle neighborhood just to the north of McCarthy Park (refer to Figure 1-1). Portions of the Site encompass the former Buffalo Crushed Stone quarry. Legacy is proposing to construct a high density, multifamily student housing community primarily for rent to the State University at Buffalo students. The project will consist of 4 separate residential buildings, a community building, parking facilities, a maintenance building and common area. Buildings will range in height from 3 to 5 stories and will contain approximately 300,000 square feet of space.

1.1 Purpose and Scope

This RI/AA Report has been prepared on behalf of Legacy to describe and present the findings of the RI and evaluate the potential remedial alternatives that meet the BCP criteria for the Site.

The Report is structured as follows:

- Section 2 summarizes the soil and groundwater investigation approach;
- Section 3 describes the physical characteristics of the Site as they relate to the investigation findings;
- Section 4 presents the investigation results by media;
- Section 5 describes the fate and transport of the constituents of primary concern (COPCs);
- Section 6 presents the qualitative risk assessment;
- Section 7 presents and evaluation of remedial alternatives for the Site;
- Section 8 presents the RI/AA summary and conclusions; and
- Section 9 contains a list of references for this report.

1.2 Background

1.2.1 Site Description

The Site consists of three parcels comprising a total of approximately 10.6 acres and addressed at 67 and 89 LaSalle Avenue and portions of 71 NY L&W RR (71 Cordova Ave.) in the City of Buffalo, New York (Erie County S.B.L No. 79.70-2-1.1, 79.70-2-11, 79.70-2-16.11. The site is located in the Main-LaSalle neighborhood just to the north/northwest of McCarthy Park and south of LaSalle Ave.

The southern portions of the 89 LaSalle parcel and associated unaddressed parcels to the south, including the City of Buffalo parcel, were used as a stone quarry from approximately 1915 through 1950 by the Buffalo Crushed Stone company. Subsequently the quarried areas were used by the City of Buffalo as a landfill in the 1950s and 1960s for the disposal of a variety of demolition debris, ash, railroad ballast and reportedly some municipal waste. A building located on the northern portion of 89 LaSalle (proximate to LaSalle Ave.) was apparently constructed in the 1950's and at various times has housed a residential heating contractor, catering service and most recently, a local radio station. Several towers and antennas associated with the radio station are located to the south and southwest of the building on the 89 LaSalle Avenue parcel.

The 67 LaSalle parcel was historically used as a lumber yard since the early 1900s, more recently some of the structures on the parcel have been used for automotive storage after lumber yard operations ceased. Remaining buildings on the parcel are now vacant.

The parcel at 71 Cordova Avenue is generally vacant with the exception of a parking lot and tennis courts that are in need of repairs and upgrades. The portions of the 71 Cordova parcel associated with the parking lot and tennis courts have been excluded from BCP Site metes and bounds definition (i.e., they are ineligible under the BCP program) as shown on Figure 3-1 and are therefore not part of the proposed RI. The acreages associated with each parcel described above are presented on Figure 3-1 (i.e., 89 LaSalle parcel - 4.67 acres; 67 Lasalle - 1.23 acres; and 71 Cordova – 4.71 acres). The Site is bordered by: various Lasalle Ave parcels to the north; William Price Memorial Parkway properties to the west and south; Cordova Ave. to the east; and City of Buffalo property (McCarthy Park) also located to the south.

1.2.2 Summary of Previous Investigations

A detailed description of the previous investigations conducted at the Site is presented in Section 1.3 of the Remedial Investigation Work Plan prepared by Golder Associates, Inc. in December 2013 (Ref. 1). In summary, Two Phase I Environmental Site Assessments (ESAs) were completed and five previous limited surface and subsurface soil/fill investigations were conducted on the Site related to both the examination of potential historic impacts and the potential cleanup at the Site itself.

An abbreviated summary of the previous investigations is presented below.

1.2.2.1 Phase I ESAs

1985 RECRA Environmental - Phase I ESA

A Phase I ESA of the so-called LaSalle Reservoir site that encompassed approximately 50 acres and a substantial portion of the BCP Site was completed by RECRA Environmental in 1985 (Ref. 2) for the NYSDEC. The resulting conclusions were based on a US EPA hazard ranking system that is no longer in use and therefore of limited informational value. The report reiterated that the northern portion of the quarry was used as a landfill area by the City of Buffalo from approximately 1951 through 1972.

2013 LCS Inc. - Phase I ESA

A Phase I ESA was completed by LCS Inc. in September 2013 (Ref. 3) in conjunction with preparation of the BCP Application. The known or suspect Recognized Environmental Conditions (RECs) and de minimis conditions found during the conduct of the ESA are listed below as presented in the LCS Phase I ESA summary of findings:

- The subject property and adjacent properties were initially identified as being part of a quarry from approximately 1916 until at least 1950. Sanborn maps indicate a gasoline tank on-site from approximately 1935 until 1950.
- The subject property and/or its immediate adjacent properties were identified as a Historic VCP site, two State Sites, a Federal Brownfield site and a CERCLIS NFRAP site. The LaSalle Reservoir site includes two State sites and a CERCLIS NFRAP site. The narrative in the third party database states that this site was an approximately 50 acre limestone quarry. The limestone quarry was later utilized by the City of Buffalo as a landfill for municipal refuse, incinerator ash, household appliances, tree parts and construction and demolition debris, and may have also received suspected paint wastes mixed with sawdust, floor sweepings. The prior investigations completed at this LaSalle Reservoir site identified several potential concerns associated with typical solid waste landfill operations. It should be noted that within the third party database there is limited information regarding the geographical limits the 50-acre site, including the extent of the investigation, if any, completed on the subject property.
- LaSalle Reservoir, addressed at East Amherst Street, was identified in the Orphan Summary of the EDR report as a CERCLIS-NFRAP site; this listing may in part be associated with portions of the subject property historically utilized as a quarry and municipal landfill.
- A railroad track extended onto a portion of the property from approximately 1935 through at least 1950.
- Railroad tracks have been historically located south adjacent from approximately 1935 through at least 1950 and west adjacent to the subject property from approximately 1916 until at least 1990.
- South and east adjacent properties were identified as being a portion of a quarry from at least 1916 until at least 1950.
- A west adjacent property was utilized as an iron/steel works facility from approximately 1957 until at least 2005.
- A filling station with automotive repair was located north adjacent to the subject property in 1935 until at least 1950.

- An automotive repair facility is located north of the subject property.
- A north adjacent property was identified in the RCRA Non-Generator, FINDS database and Manifest databases.

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The following de minimis conditions in connection with the Site were identified in the Phase I ESA:

- Partially hydric soils are located on portions of the subject property.

1.2.2.2 Soil/Fill Investigations

1991 Ecology and Environment – Phase II Investigation

In 1991, the NYSDEC contracted Ecology and Environment to conduct a Phase II environmental site investigation of the LaSalle Reservoir Site that included portions of the BCP Site (Ref. 4). The investigation included an electromagnetic terrain conductivity survey, a magnetometer survey, completion of 3 bedrock monitoring wells and collection and analysis of soil, fill and groundwater samples. The results of the investigation indicated that:

- The depth of the quarry is approximately 45 feet below the adjacent ground surface;
- The depth to groundwater in the bedrock wells ranged from 33 to 45 feet below grade surface, with flow to the northwest;
- Soil samples had concentrations of polycyclic aromatic hydrocarbons (PAHs) at concentrations which, at that time, exceeded NYSDEC's recommended Soil Cleanup Objectives presented in NYSDEC Technical and Administrative Guidance Memorandum;
- Groundwater samples had exceedances of Class GA Ambient Water Quality Standards for iron and magnesium only; and
- "Waste:" samples exhibited concentrations of lead which exceeded the typical background levels for soils in the eastern United States.

1995 Frontier Technical Associates – Environmental Site Assessment (ESA)

In September 1995, Frontier Technical Associates conducted an ESA of 5 acre parcel (referred to as Parcel 16) located in the northern portion of the LaSalle Reservoir Site that encompasses a portion of the proposed BCP Site (Ref. 5). This assessment included a review of historical records, completion of 7 soil borings and analysis of 4 composite samples.

The results of the investigations indicated that the area had been backfilled with up to 44 feet of fill materials including gravel, sand, clay, bricks, glass, ash, wood, metal and miscellaneous debris. There appeared to be between zero and two feet of water above the top of bedrock (at the bottom of the fill). Contaminants identified in the fill materials included total petroleum hydrocarbons, elevated concentrations of lead, zinc and mercury and PAHs (in one sample). These findings were consistent with the 1989 LaSalle Reservoir Site investigation findings.

1997 URS – Site Investigation Report

Investigations were conducted in August, November and December of 1996 by URS under contract to the Buffalo Urban Renewal Agency to further investigate the general 50 acre area known as the LaSalle Reservoir Site (Ref. 6). It appears that approximately 25 test pits were completed within the limits of the proposed BCP Site and at nine of these test pits shallow (i.e., 2- 4 inches below grade surface) soil samples were collected for the analysis of TCL VOCs, SVOCs, pesticides and PCBs as well as TAL metals and cyanide. The contamination identified consisted primarily of PAHs and metals which were described as “widespread across the site at concentrations which exceed both recommended cleanup levels (prior to establishment of Part 375 SCOs) and USEPA Risk Based Concentrations” (Main-LaSalle Revitalization Project, Site Investigation Report, Rev. April 1997, URS Greiner, Inc.).

The report also provided the results of an extensive depth to bedrock assessment in portions of the proposed BCP Site which delineated the former quarry high wall location to differentiate between shallow bedrock and the deeper quarried areas where more extensive landfilling occurred. This delineation is included on the survey plans submitted as part of the BCP application.

2013 EnSol Inc. – Phase II ESA

Legacy retained EnSol Inc. to conduct a limited environmental investigation of the 89 LaSalle properties and the City of Buffalo property (i.e., 71 Cordova Ave.) to assess the potential eligibility of these parcels for the New York Brownfield Cleanup Program (Ref. 7).

The investigation of these properties consisted of:

- Advancement of 10 test pits to a maximum depth of 15 feet below ground surface with a minimum of two test pits in the area of a suspected Underground Storage Tank (UST) (no tank was found in the field);
- Visual and olfactory inspection of soil samples as well as headspace screening with a photoionization detector; and,
- Analysis of six soil samples for target compounds list (TCL) volatile organic compounds (VOCs), TCL semi volatile organic compounds (SVOCs), target analyte list (TAL) metals, cyanide, polychlorinated biphenyls (PCBs), herbicides, and pesticides via United States Environmental Protection Agency (USEPA) SW-846 Test Methods 8260, 8270, 6010/7470, 9012, 8082, 8151, and 8081, respectively.

The results of the 2013 Phase II test pit soil sampling investigation indicated that concentrations of certain SVOC, metals and pesticide compounds were detected at concentrations exceeding the 6 NYCRR Part 375 soil cleanup objectives for residential or restricted uses at several locations on the properties. No definitive pattern of impact or potential “source” areas were found and concentrations in excess of SCOs in soil/fill were found to be widespread across the six sample locations.

A summary of the soil sampling results for the test pit locations is presented in Table 1-1 of this report as well as Table 1 of the Limited Phase II ESA (a full electronic file of the report is included on the CD provided in Appendix A of the approved RI Work Plan) and a site map illustrating sample locations on the property is presented on Figure 2 – Test Pit Location Map in the report.

2013 Golder Associates, Inc. – Supplemental Phase II Investigation

A supplemental Phase II investigation of the 67 LaSalle Avenue parcel was conducted by Golder on August 6, 2013. This investigation consisted of collecting two composite soil samples from the sidewalls and bottom of shallow test pits located on the parcel. Each test pit was excavated to bedrock refusal approximately 3 to 3.5 feet below grade surface. The lithology of the test pits indicated a predominant layer of dark fill (possibly consisting of cinders or ash-like material) mixed with gravel in the upper 1 to 1.5 feet of both test pits with the remaining depth consisting of soils with large quantities of stone or gravel. A representative composite sample was collected from each test pit for the analysis of TCL SVOCs, TAL metals, PCBs, and TCL herbicides and pesticides.

In one of the test pits (TP67-1), a total of seven (7) semi-volatile organic compounds (SVOCs) and one metal were detected at concentrations exceeding the 6NYCRR Part 375 Restricted Residential Soil Cleanup Objectives (SCOs). No other compounds analyzed were detected above Part 375 SCOs.

1.3 Constituents of Primary Concern (COPCs)

Based on historic investigations, the Constituents of Primary Concern (COPCs) in the soil/fill and/or groundwater are identified as Polycyclic Aromatic Hydrocarbons (PAHs), and heavy metals. The Remedial Investigation approach described in the RI Work Plan (Ref. 1) focused on these COPCs as well as collecting data on volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and cyanide based on the historic use of the Site as a landfill.

2.0 INVESTIGATION APPROACH

The Remedial Investigation focused on identifying contaminants in soil/fill and groundwater that had not been characterized as part of the previous soil/fill investigations and to more fully characterize areas of the site for COPCs that were not addressed by previous investigations since they were not previously a part of the BCP Site.

The RI supplements the soil/fill data for areas of the Site where data gaps from the previous investigations existed. A total of three (3) shallow soil samples were collected from test pits located in the northwest portion of the Site. In addition, four (4) surface soil samples were collected, fifteen (15) subsurface soil borings were advanced, and one (1) groundwater monitoring well was installed for collection/characterization of representative subsurface soil/fill and groundwater analysis for the RI.

Subsequent to receiving NYSDEC approval of the proposed sampling locations and testing parameters for the RI Work Plan, Golder performed the RI activities in June 2014. The major components of the completed RI tasks are described in detail below. Remedial Investigation samples and groundwater monitoring well locations are illustrated on Figure 2-1. Any deviations from the proposed sampling and analyses proposed in the RI Work Plan are described in the following sections.

For clarity the following sections (2.1 through 4.3) cover only the RI activities performed in June 2014 and remain essentially unchanged from the August 2014 Draft RI/AA Report. A detailed discussion of the results and conclusions derived from supplemental RI activities performed to address comments received from the Department in a letter dated October 7, 2014 are presented in a new Section 5.0 – “Supplemental BCP RI Investigation – November 2014).

2.1 June 2014 Remedial Investigation Activities

2.1.1 Soil/Fill Investigation

Initially, four surface soil samples (0-6 inches below grade) were collected and analyzed for TCL SVOCs, TAL metals, and cyanide at the locations designated as SS-1 through SS-4 on Figure 2-1. These locations were selected due to a lack of previous surface or near-surface data relative to the presence of COPCs in these areas of the Site. The samples were collected manually using a stainless steel trowel, which was decontaminated with an alkaline soap cleaning solution and deionized water rinse between each sample location.

A soil boring program was also implemented to thoroughly characterize the subsurface soil/fill and groundwater media, and to better characterize the overall site soil/fill overburden material for other potential contaminants of concern. The subsurface soil sampling program consisted of a total of fifteen (15) soil samples (B-1A through B-15) at evenly spaced intervals across the Site. Borehole locations as depicted on Figure 2-1 were adjusted in the field based on site conditions, accessibility, and NYSDEC requests to allow for successful completion of the borings. In general, very few adjustments were required and the final boring locations were nearly identical to those proposed in the RI Work Plan, however, where a boring was initially installed and was not successfully completed due to fill obstructions, the drill rig was moved approximately 5 feet from the original location and the boring was completed in that location. This occurred at two locations and the revised boring location was designated with an “A”, i.e., B-1A and B-10A which are used to identify the soil samples collected at these locations.

A drilling rig using direct push drilling methods via a Geoprobe® equipped with a concrete core barrel was used to advance fifteen subsurface soil borings into the underlying soil/fill to a target depth of twelve feet or refusal. Soil/fill material was encountered in soil borings from 2-4 inches below ground surface (bgs) to bedrock across the Site. Drilling methods used during RI activities utilized a 1.5-inch diameter, 4-foot core sampler with a dedicated PVC sleeve to advance and retrieve soil core samples at four foot intervals. Visual or olfactory contaminant impacts were not noted in any of the borings and saturated conditions were also not encountered; The majority of borings completed meet refusal at bedrock.

Upon retrieval of each soil/fill core, the soil/fill samples were screened for total organic vapors using a photo-ionization detector (PID). The organic vapor measurements were recorded and the soil/fill material described on boring logs by a Golder field representative (provided in Appendix A). The recovered soils were characterized by visual observation in accordance with ASTM Method D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Subsurface soil samples were collected for chemical analysis at the boring locations. The depth from which samples were collected was determined based on screening results of visual and olfactory observations and PID measurements. Samples were collected from the discrete depth interval that displayed the greatest evidence of contamination, if any. If there were no discernable differences across the entire boring depth based on the visual, olfactory or PID screening methods, the default sample collection approach consisted of collecting a composite from the 0 to 12 feet bgs strata.

2.1.2 Soil/Fill Sample Analyses

As previously noted, surface and test pit subsurface soil/fill samples were collected using a stainless steel trowel. Subsurface soil/fill samples collected in borings were collected using a 1.5-inch diameter, 4-foot core sampler with a dedicated PVC sleeve. All non-dedicated, downhole sampling equipment was decontaminated between soil boring locations in accordance with accepted drilling practices using a high-pressure hot water “steam” cleaner, or scrubbed using Alconox® and a hot water followed by a clean potable water rinse. Representative soil samples were placed in pre-cleaned laboratory-provided sample bottles, cooled to 4^{o}C in the field, and transported under chain-of-custody command to Test America, located in Amherst, NY, a New York State Department of Health (NYSDOH) ELAP-certified analytical laboratory. All soil samples (surface, test pits and subsurface borings) were analyzed for the COPCs: semi-volatile organic compounds (SVOCs); target analyte list (TAL) metals; and cyanide. Six of the fifteen subsurface soil/fill samples collected from borings were also analyzed for volatile organic compounds (VOCs) to confirm findings from previous investigations that VOCs are not present at significant concentrations across the Site.

All samples were collected and analyzed in accordance with USEPA SW-846 methodology. The laboratory is required to furnish an equivalent ASP Category B deliverables package to facilitate data evaluation and preparation of a DUSR by a third party validation expert. Accordingly, the samples were analyzed by an NYSDOH ELAP-approved laboratory certified to perform CLP work.

2.1.3 Groundwater Investigation

The RI Work Plan proposed the completion of three overburden ground water monitoring wells at boring locations B-1, B-11 and B-15. At boring locations B-11A and B-15, the boreholes were extended through the fill until refusal was encountered (assumed to be at top of bedrock), however both borings were dry and no groundwater was encountered. The completed boring was monitored for a minimum of 30 minutes after completion but no groundwater was detected and therefore no monitoring wells were installed at those locations. Golder personnel provided oversight for the installation of one groundwater monitoring well (MW-1) at boring location B-1A on June 9, 2014 to investigate groundwater quality. Figure 2-1 shows the location of the overburden monitoring well. Monitoring well installation, well development, and groundwater sample collection are discussed in the following sections.

2.1.4 Monitoring Well Installation

Monitoring well MW-1 was installed in accordance with the approved RI Work Plan. Monitoring Well construction details are presented on the Monitoring Well Completion Log in Appendix B.

The well boring was advanced using 4.25-inch I.D. hollow stem augers (HSA). A 2-inch diameter, 2-foot long split spoon sampler was advanced ahead of the auger string with a standard 140-pound hammer. Recovered samples were examined by qualified Golder personnel and characterized 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 PID equipped with a 10.6 eV lamp, and characterized for impacts via visual and/or olfactory observations. All non-dedicated drilling tools and equipment were decontaminated between boring locations using potable tap water and a phosphate-free detergent (i.e., Alconox).

The monitoring well was installed to a depth of 40.9’ bgs with a 2-inch I.D. flush-joint Schedule 40 PVC solid riser and machine slotted screen (0.010-inch slot size). The monitoring well screen measured approximately 5.5 feet in length. Approximately 6 inches of silica sand was placed at the bottom of each boring as a base for the well screen and as part of the sand pack. The well screen and attached riser were placed within the borehole on top of the 6-inch sand layer and the remainder of the sand pack was installed within the borehole annulus to a level of about 2 feet above the top of the well screen. A bentonite seal (3 feet thick) was installed immediately above the sand layer. The bentonite seal was constructed with 3/8-inch bentonite pellets or medium bentonite chips and allowed to hydrate sufficiently to mitigate the potential for down-hole grout contamination. The top of the well riser pipes extended approximately 3 feet above grade and were fitted with a lockable J-plug.

2.1.5 Groundwater Sample Collection

The newly-installed monitoring well was developed prior to sampling to remove residual sediments and ensure hydraulic connection within the water-bearing zone. The development procedure required purging of the groundwater and periodical surging of the groundwater in the well to loosen and remove suspended fines from the well screen and sandpack. Measurements of the water volume removed and water quality parameters including temperature, pH, conductivity, and turbidity were recorded at regular intervals throughout the development process. Development continued until water quality measurements stabilized to within 10 percent of the previous measurement.

Originally, groundwater was to be collected from each well using low flow sampling techniques (typically less than 0.1 L/min) via dedicated plastic flex tubing and a peristaltic pump. However, it was determined that low-flow sampling was not feasible due to insufficient groundwater recharge rate. Therefore, new and dedicated disposable HDPE bailers were used to collect the groundwater samples.

Field measurements for pH, specific conductivity, temperature, turbidity and water level as well as visual and olfactory field observations were periodically recorded and monitored for stabilization during well purging prior to sampling. A copy of the well development field record is provided in Appendix B. Purging was considered complete when pH, specific conductivity and temperature stabilize. Stability is defined as variation of between field measurements of 10 percent or less and no overall upward or downward trend in the measurements. Turbidity was determined by visual inspection of the purge water. The purge water remained slightly turbid with a brown to gray color with little variation in appearance throughout purging. Turbidity was therefore not considered as an indicator that the groundwater had stabilized.

Prior to and immediately following collection of groundwater samples, field measurements for pH, specific conductivity, temperature, turbidity and water level as well as visual and olfactory field observations were recorded. All groundwater samples were collected in the pre-cleaned and pre-preserved laboratory sample bottles in accordance with the RI Work Plan protocols for analyses. Subsequent to sample collection all groundwater samples were placed on ice and shipped under chain of custody to the selected analytical laboratory.

2.1.6 Groundwater Sample Analyses

Groundwater samples were collected from MW-1 on June 10, 2014. Collected groundwater samples were analyzed for VOCs, SVOCs, TCL Pesticides, PCBs, TAL metals, and cyanide. All samples were collected and analyzed in accordance with USEPA SW-846 methodology. The laboratory is required to furnish an equivalent ASP Category B deliverables package to facilitate data evaluation and preparation of a DUSR by a third party validation expert. Accordingly, the samples were analyzed by an NYSDOH ELAP-approved laboratory certified to perform CLP work.

2.1.7 Field Specific Quality Assurance/Quality Control Sampling

In addition to the soil/fill and groundwater samples described above, field-specific quality Assurance/Quality Control (QA/QC) samples were collected and analyzed to confirm the reliability of the reported data as described in the QAPP and to support the required third-party data usability assessment. Site specific QA/QC samples included one trip blank (accompanying VOC groundwater sample only), four matrix spike (MS), four matrix spike duplicate (MSD), and four field duplicate samples (one each for surface soils, test pit soils, subsurface soils and groundwater sampling events).

2.2 Site Mapping

Figure 2-1 shows the relevant features of the Site, monitoring well and sample locations, and property boundaries. Surface soil/fill and boring locations were field located based on measurements from known benchmarks (e.g., rebar, pins, etc.). The MW-1 monitoring well location depicted on Figure 2-1 is based on a surveyed location subsequent to installation.

The base map for Figure 2-1 was prepared by a New York State licensed surveyor. The surveyor established the horizontal and vertical elevations using the New York State Plane Coordinate System and most recent vertical datum. Elevations of the ground surface and top of PVC riser were measured and recorded for the MW-1 monitoring well.

3.0 SITE PHYSICAL CHARACTERISTICS

The physical characteristics of the Site observed during the RI are described in the following sections.

3.1 Site Topography and Surface Features

The Site is comprised of three separate parcels. The 67 LaSalle Ave parcel on the north end of the Site is generally flat and covered primarily with asphalt pavement and three vacant buildings that was formerly used as a commercial lumber yard. The southern portion of the Site included on the 89 LaSalle and 71 Cordova Avenue parcels consists of undeveloped, vacant land covered by a mixture of grassy vegetation, dense brush and trees. There are a few structures consisting of large radio transmitting antennae and small fenced areas protecting equipment that were associated with a former radio station located adjacent to the Site. The southern portion of the Site slopes slightly to the north with limited distinguishable Site features.

3.2 Geology and Hydrogeology

3.2.1 Overburden

Observations of the soil borings performed during the RI and documented on the boring logs in Appendix A are consistent with the findings from historical investigations both within and adjacent to the BCP Site. The RI borings confirmed that the portion of the Site referred to as the “High Bedrock Area” comprising the majority of the western and northern sections of the Site is overlain by a heterogeneous fill layer that varies in thickness from 1.25 to 12.9 feet thick. The fill is shallower on the northern portion of the High Bedrock Area and increases in thickness to the south. The fill generally extends to the top of bedrock with little or no presence of native soils. In the southeastern and southern portion of the site located in the “Former Quarry Area” the RI borings indicated the presence of a heterogeneous fill layer that varies in thickness from 19.5 to 45.5 feet thick across this area. Three borings in this area were completed to the top of bedrock (B-1A, B-11 and B-15) and in each location the fill spanned the entire depth of the borings with no evidence of native soils due to the documented historical rock quarrying and landfilling practices.

3.2.2 Bedrock

The Site is situated over the Akron Dolostone Formation of the Upper Siberian Series based on a review of the bedrock geologic map of Erie County. The Akron Dolostone is comprised of very fine grained rocks in the Canadian sections and approaches a mottled waterlime in character. The unit has an approximate thickness of 3 – 5 meters. Structurally, the bedrock formations strike in an east-west direction and exhibit a regional dip that approximates 40 feet per mile (3 to 5 degrees) toward the south and southwest. As a result of this dip, the older Onondaga limestone outcrops or subcrops north of the Hamilton Group. Based on test pits and geotechnical borings performed during RI activities, bedrock was encountered at 2 - 2.5 fbgs in test pits at the north end of the Site (i.e., on the former 67 LaSalle parcel), and from 5 to 45.5 fbgs in borings across the remainder of the Site as described in Section 3.2.1 above.

3.2.3 Hydrogeology

Soil borings advanced on the Site during the June 2014 soil/fill investigation were typically completed to the top of bedrock which varied across the site depending on the extent of the historical quarrying in a particular area. The maximum depth encountered was 45.5 fbgs at B-11.Groundwater or saturated soils were not encountered in any of the boring locations with the exception B-1A/MW-1. Historical groundwater information is very limited within the footprint of the proposed BCP Site and not generally available based on the absence of monitoring wells installed in the footprint of the Site and associated lack of historical monitoring well data.

Three potential well borings were completed. However, only MW-1 was installed due to a lack of groundwater or presence of saturated soils at the B-11 and B-15 boring locations in the southeastern and southern portions of the Site, respectively. Water was only found only in the northern portion of the site at the MW-1 location where development indicated marginal recovery. Based on the information attained from the well borings completed during the initial remedial investigation on the BCP property, limited hydrogeological information about the BCP Site can be interpolated from the single well location. Although it can be inferred that Site groundwater appears to be mostly absent from the fill overburden based on borings completed to the top of rock in both the high bedrock and former quarry area of the Site.

Three additional bedrock wells (RW-1, RW-2 and RW-3) were installed as part of the supplemental groundwater RI activities discussed more fully in Section 5.2. The bedrock wells were then used to evaluate Site hydrogeology in the underlying bedrock layer following communication with NYSDEC, concerning a lack of groundwater data obtained during the initial RI in the Site overburden soil/fill. Table 3-1 lists groundwater elevations at each bedrock well location, based on the well elevation survey conducted by McIntosh & McIntosh at the Site on December 1, 2014. Figure 3-1 illustrates the groundwater isopotential flow on Site based on the resulting groundwater elevations. The measured bedrock groundwater elevations confirmed that groundwater is flowing northwest across the Site, toward Main Street.. These findings confirm previous assumptions on the direction of groundwater that were noted in earlier Main-LaSalle investigations conducted in the 1990s based on regional hydrogeological data. The determination of the direction of flow across the Site also confirms that the stormwater overflow retention facility located to the south/southwest of the Site (adjacent to McCarthy Park and East Amherst St.) does not influence or impact groundwater flow on the Site and this reservoir is not a receptor for groundwater from the Site.

4.0 JUNE 2014 REMEDIAL INVESTIGATION RESULTS BY MEDIA

The following sections discuss the analytical results of the Remedial Investigation. Tables 4-1 and 4-2 summarize the soil/fill and groundwater analytical data, respectively. Analytical laboratory data reports are included in Appendix C. Electronic data deliverable (EDD) files are also included in Appendix C. Figure 4-1 presents the soil/fill and groundwater results for compounds detected in soil/fill above Restricted Residential Use SCOs or compounds in groundwater detected above Class GA Groundwater Quality Standards (GWQS).

4.1 Soil/Fill

Table 4-1 presents a comparison of the detected soil/fill parameters to Restricted Residential Use and Protection of Groundwater Soil Cleanup Objectives (SCOs) contained in 6NYCRR Part 375-6.4. The Site is intended to be used for restricted residential purposes. Soil/fill analytical data is also compared to Part 375 Restricted Protection of Groundwater SCOs due to detection of some Site COPCs in the limited groundwater data that was analyzed and is further discussed in Section 4.2. Sample results are described below according to contaminant class.

4.1.1 Volatile Organic Compounds

A total of six soil/fill samples were analyzed for VOCs including one grab sample from a test pit and five grab samples from representative soil borings. The majority of the analyzed VOCs were reported as non-detectable or qualified as estimated concentrations below the sample reporting limits. Detected VOC sample concentrations did not exceed Part 375 Restricted Residential Use SCOs. Acetone was detected in two boring locations above Protection of Groundwater SCOs; however acetone is a common laboratory contaminant and was identified in conjunction with low level detections of other common lab contaminants in the samples.

4.1.2 Semi-Volatile Organic Compounds

A total of 22 soil/fill samples were analyzed for SVOCs. The samples analyzed included 4 surface soil locations, 3 test pits and 15 soil boring locations. As presented in Table 4-1, many SVOCs detected in soil/fill samples were reported as non-detectable or qualified as estimated concentrations below the sample reporting limit. SVOCs were detected in surface and subsurface soil sample locations at concentrations above Part 375 Restricted Residential Use and Protection of Groundwater SCOs. Three surface soil sample locations (SS-1, SS-2, and SS-4), and twelve boring sample locations (B-1A, B-2, B-3, B-4, B-5, B-6, B-8, B-9, B-10A, B-12, B-13, and B-15), reported detections of polycyclic aromatic hydrocarbon (PAHs) above Restricted Residential Use SCOs. Based on the absence of elevated PID readings and no observations of visual and/or olfactory impacts from contamination, the general low level SVOC concentrations appear to be associated with the historic fill found at each sampling location, consistent with concentrations for these compounds in urban, developed areas in the city of Buffalo. At two of the twelve locations (i.e., B-5 and B-8) SCOs were exceeded by an order of magnitude, at all other locations the concentrations were marginally elevated above the Restricted Residential Use SCO.

4.1.3 Metals

A total of 22 soil/fill samples were analyzed for TAL metals. As presented in Table 4-1, ten of the sampling locations had metals detected in the soil/fill above the Restricted Residential Use SCOs. Metals exceeding the Restricted Residential Use SCOs at the surface or boring sample locations SS-1, SS-2, B-1A, B-5, B-6, B-7, B-9, B-13, B-14, and B-15 included arsenic, barium, copper, lead and mercury.

4.1.4 Cyanide

Cyanide detected in the soil/fill samples did not exceed the Part 375 Restricted Residential Use or Protection of Groundwater SCOs at any of the sampling locations.

4.1.5 Summary

As described above, concentrations of VOCs and cyanide were below Part 375 Restricted Residential Use and Protection of Groundwater SCOs with the exception of acetone in two boring locations above Protection of Groundwater SCOs. SVOCs including: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, Chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrenenaphthalene, phenanthrene and pyrene exceeded Part 375 Restricted Residential Use SCOs Metals exceeding Part 375 Restricted Residential Use SCOs including: arsenic, barium, copper, lead, and mercury. SVOC PAHs tend to be ubiquitous in the environment, as they are produced from incomplete combustion of fossil fuels and other organic fuel sources, and are often found at similar concentrations in historic fill throughout the City of Buffalo. Similarly elevated metals concentrations are common in historic fill associated with foundry sands, sandblasting activities, combustion residuals, etc. The soil/fill samples collected from the majority of the locations within the former landfill areas of the Site were observed to contain ash, cinders, foundry sands and other common fill materials that typically contain PAH and metals residuals. Copies all analytical data reports are provided in Appendix C.

4.2 Groundwater

Table 4-2 presents a comparison of the detected groundwater parameters to the Class GA Groundwater Quality Standards (GWQS) per NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (June 1988). The sampling results for groundwater monitoring completed June 2014 sampling event for MW-1 is discussed in the following sections.

4.2.1 Volatile Organic Compounds

VOCs were not detected in the groundwater sample collected from monitoring well MW-1.

4.2.2 Semi-Volatile Organic Compounds

Five SVOCs, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene and Indeno[1,2,3-cd]pyrene were detected at concentrations exceeding the GWQS.

4.2.3 Metals

Six metals, arsenic, chromium, iron, lead, manganese, and sodium were detected at concentrations above the GWQS.

4.2.4 Pesticides, Herbicides and Cyanide

Two pesticide compounds, alpha-BHC and Endrin were detected at concentrations above the GWQS.

4.2.5 PCBs

PCBs were not detected in groundwater samples analyzed.

4.2.6 Summary

As described above and summarized in Table 4-2, there were no detected concentrations of VOCs, cyanide, and PCBs in MW-1 exceeding the GWQS. Five SVOCs, six metals and two pesticide compounds were detected in MW-1 at concentrations above the New York State GWQS. The sample collected from this well was not filtered and was high in turbidity (even with repeated efforts to develop and stabilize the well). We believe the presence of elevated suspended solids in this sample may have influenced the resulting elevated concentrations of many of the compounds (i.e., metals and SVOCs) that exceeded GWQS.

4.3 Data Usability Summary

In accordance with the RI Work Plan, the laboratory analytical data from this investigation was independently assessed and, as required, submitted for independent review. Ms. Judy Harry of Data Validation Services located in North Creek, New York performed the data usability summary assessment, which involved a review of the summary form information and sample raw data, and a limited review of associated QC raw data. Specifically, the following items were reviewed:

- Laboratory Narrative Discussion
- Custody Documentation
- Holding Times
- Surrogate and Internal Standard Recoveries
- Matrix Spike Recoveries/Duplicate Recoveries
- Field Duplicate Correlation
- Preparation/Calibration Blanks
- Control Spike/Laboratory Control Samples
- Instrumental IDLs

- Calibration/CRI/CRA Standards
- ICP Interference Check Standards
- ICP Serial Dilution Correlations
- Sample Results Verification

The Data Usability Summary Report (DUSR) was conducted using guidance from the USEPA Region 2 validation Standard Operating Procedures, the USEPA National Functional Guidelines for Data Review, as well as professional judgment.

In summary, most sample results are usable as reported, or with minor qualification. However, the following issues were noted:

- Laboratory case narrative does not discuss some of the outlying LCS recoveries associated with the project samples.
- Unacceptable field duplicate evaluations resulted in qualification of the following sample type parameters, as "estimated in value":
  - Test pit samples – calcium
  - Boring samples – iron, lead, and magnesium
  - Groundwater – endosulfan, iron, and lead
- Internal response standard d12-perylene falls below the required limit for all samples in analytical package 480-61167-1, except B-1A, B-15, and B-15 Dup. Results for the following semi-volatile organic compounds were qualified as estimated in value: di-n-octylphthalatem benzo(a)pyrene, benzo(g,h,i)perylene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene.
- Internal response standard d12-chrysene falls below the required limit for samples B-2, B-3, B-4, B-5, B-8, and B-13 in analytical package 480-61167-1. Results for the following semi-volatile organic compounds were qualified as estimated in value: butyl benzyl phthalate, benzo(a)anthracene, bis(2-ethylhexyl)-phthalate, chrysene, pyrene, and 3,3'-dichlorobenzidine.
- Results for two semi-volatile organic compounds, 2-methylphenol and di-n-octylphthalate, were rejected in groundwater samples due to the presence of analytes in the associated method blank.
- Non-compliant recoveries in associated LCS were reported in all samples in analytical package 480-61167-1, except B-1A, B-15, and B-15 Dup. Results for analytes 2,4-dinitrophenol and pyrene were qualified as estimated in value.
- Results for 4,4'-DDE, were rejected in groundwater samples due to the presence of the analyte in the associated method blank.
- Matrix spike/duplicate evaluations of metal samples resulted in qualification of specific metals detections, in samples RITP-3, SS-4, and B-4, as estimated in value.

Any additional qualifications of the data have been incorporated to the summary data tables. The DUSR is included in Appendix D.

5.0 NOVEMBER 2014 SUPPLEMENTAL RI INVESTIGATION

The following sections discuss the investigation approach and analytical results of the Supplemental Remedial Investigation work conducted on the 89 LaSalle Avenue BCP Site in October and November 2014. The Supplemental RI was conducted to more fully characterize the impacts identified during the initial RI activities at the Site. Additional RI activities were conducted to satisfy NYSDEC concerns identified in the Department's Draft RI/AA Report comment letter dated October 7, 2014.

Supplemental test pits were excavated to assess the horizontal and vertical extent of contamination at four of the original direct push soil boring locations (B-5, B-7, B-8 and B-9) identified by the Department as having significant concentrations of semi-volatile organic compounds (SVOCs) and metals.

Three bedrock wells were installed on the Site as part of supplemental RI activities in November 2014. The completed wells were installed to collect groundwater elevation data and quality data to assess groundwater flow patterns and evaluate potential impacts to groundwater within the underlying bedrock on the Site.

5.1 Supplemental Soil/Fill Investigation

5.1.1 Test Pit Investigation Summary

As described above, four tests pits were excavated in a north, south, east and west orientation around each of the four original soil boring locations (refer to Figure 5-1) where elevated concentrations of metals or SVOCs were detected during the initial June 2014 RI. The 16 test pits were excavated to bedrock refusal or a depth of approximately 10 feet, whichever was achieved first. The test pits were located approximately 2 to 10 feet away from each RI sample location. Soil/fill in each directional test pit was then field screened with a photoionization detector, a handheld X-ray Fluorescence (XRF) Spectrometer and visually in two foot intervals to assess the presence of any obvious signs of contamination (i.e., stained soils, evidence of free product, odors, etc.). Field screening results were then used for selecting representative samples for laboratory analysis.

5.1.2 Supplemental Soil/Fill Investigation Results

Table 5-1 presents a comparison of the detected supplemental soil/fill parameters to Restricted Residential Use and Protection of Groundwater Soil Cleanup Objectives (SCOs) contained in 6NYCRR Part 375-6.4. The Site is intended to be used for restricted residential purposes. Supplemental soil/fill analytical data is also compared to Part 375 Restricted Protection of Groundwater SCOs due to detection of some Site COPCs in the limited groundwater data that was analyzed and is further discussed in Section 5.2. Sample results are described below according to contaminant class.

5.1.2.1 Semi-Volatile Organic Compounds

Two of the four hotspot locations (B-5, B-8) were identified as containing elevated concentrations of SVOCs. Each of the four test pits performed at the boring locations were sampled in 2 foot intervals, then field screened to determine which representative sample set would be submitted for additional laboratory analysis. A total of nine (9) supplemental soil/fill samples, five (5) from TP-B5-S and four from TP-B8-N were submitted for additional laboratory analysis of SVOCs. The was no observed difference in the soil/fill at any of the test pits surrounding Boring B-5 therefore the south test pit was selected for sample analysis since the full 10 foot depth was achieved at that location and samples from each 2-foot interval could be collected. At Boring B-8, small pieces of scrap tire were observed in the north test pit where otherwise no distinction was observed across the test pits, therefore the north test pit was selected for sampling.

As presented in Table 5-1, many SVOCs detected in soil/fill samples were reported as non-detectable or qualified as estimated concentrations below the sample reporting limit. SVOCs were detected in six of the nine supplemental soil sample locations at concentrations above Part 375 Restricted Residential Use and Protection of Groundwater SCOs. Six supplemental soil/fill samples, taken in 2 foot intervals from two sample locations, (TP-B5-S (2-4), TP-B5-S (4-6), TP-B5-S (6-8), TP-B8-N (0-2), TP-B8-N (2-4), TP-B8-N (4-6)) reported detections of PAHs above Restricted Residential Use SCOs. Based on the absence of elevated PID readings and no observations of visual and/or olfactory impacts from contamination, the SVOC concentrations were consistent with the initial RI results in soil/fill found across the majority of the Site.

5.1.2.2 Metals

Two of the four hotspot locations (B-7, B-9) were identified as containing elevated concentrations of metals including lead and arsenic. Each location was investigated with four supplemental test pits, one in each cardinal direction. Each test pit was sampled in 2 foot intervals, and then field screened to determine which representative sample set would be submitted for additional laboratory analysis. A total of seven (7) supplemental soil/fill samples, two (2) from TP-B7-S and five (5) from TP-B9-N, were submitted for additional laboratory analysis of lead based on results of field screening with the XRF instrument that indicated these samples may have elevated lead concentrations. Samples from TP-B9-N were also analyzed for arsenic as a result of elevated XRF screening for arsenic. As presented in Table 5-1, all five samples from the TP-B9-N sample location noted detections of lead above Restricted Residential Use SCOs.

5.1.3 Summary

As described above, concentrations of arsenic and lead were below Part 375 Restricted Residential Use and Protection of Groundwater SCOs with the exception of lead in all five samples from the TP-B9-N location. SVOCs including: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, Chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrenenaphthalene, exceeded Part 375 Restricted Residential Use SCOs in six samples at locations TP-B5-S and TP-B8-N. SVOC PAHs tend to be ubiquitous in the environment, as they are produced from incomplete combustion of fossil fuels and other organic fuel sources, and are often found at similar concentrations in historic fill throughout the City of Buffalo. Similarly elevated metals concentrations are common in historic fill areas associated with foundry sands, sandblasting activities, combustion residuals, etc. Copies all analytical data reports are provided in Appendix C.

5.2 Supplemental Groundwater Investigation

5.2.1 Bedrock Monitoring Well Installation

Three bedrock groundwater monitoring wells were installed in November 2014 to more fully characterize groundwater flow and quality on the Site. The wells were located (Refer to Figure 5-1) proximate to the eastern (RW-1), southern (RW-2) and western (RW-3) borders of the Site to facilitate the assessment of the flow gradient across the site.

The well borings were first advanced through the overburden using 6.25-inch I.D. hollow stem augers (HSA) until bedrock was encountered (auger refusal). No soil samples were collected during the bedrock well drilling program, however, the overburden drill cuttings were examined by qualified Golder personnel and characterized in general accordance with ASTM Method D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Once bedrock was encountered at each location, a 5 7/8-inch diameter tri-cone roller bit was attached and inserted through the augers. Drilling proceeded through the augers using compressed air and the borehole was typically advanced a minimum of 5-ft into the underlying bedrock unit to provide a socket for setting the well casing. Next, a 4-inch I.D. flush-joint Schedule 80 PVC solid riser was grouted in place to the bottom of the socket in the bedrock at each location.

Following installation of the 4-inch I.D. well casing and curing of the grout, the boreholes were further advanced a minimum of 10-ft into the underlying bedrock unit using a 2-13/16-inch tri-cone roller bit to ream out the borehole through the well casing. Drilling proceeded until the target zone was reached. Each well was completed as an unscreened (i.e. open-hole) monitoring well. All non-dedicated drilling tools and equipment were decontaminated between boring locations using potable tap water and a phosphate-free detergent (i.e., Alconox).

Monitoring well RW-2 was drilled first, to a total depth of 56.5' bgs, to establish the approximate elevation of the water table. RW-1 and RW-3 were subsequently drilled and cased to approximately the same depth below the surface at RW-2 so as to target the same rock horizon (i.e. the "target depth") for water sampling. Note that at RW-3, this procedure resulted in a greater surface casing length because of the shallow bedrock in that location. A copy of the well installation logs for the bedrock wells are presented in Appendix B.

Following installation the wells were developed until turbidity stabilized by a combination of air-lift surging (using the rig air compressor and a tremie pipe) and manually bailing.

5.2.2 Supplemental Groundwater Sampling Results

Following development of the wells, groundwater samples for locations RW-1, RW-2, and RW-3 were collected and analyzed for TCL Volatiles, TCL SVOCs (including Pesticides/Herbicides), cyanide and TAL Metals. The sampling results for the supplemental groundwater monitoring completed November 2014 is summarized in the following sections. Table 5-2 presents a comparison of detected parameters in the supplemental groundwater well samples to Class GA Groundwater Quality Standards (GWQS) per NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (June 1988).

5.2.2.1 Volatile Organic Compounds

As presented in Table 5-2, the majority of VOCs detected in supplemental groundwater samples were reported as non-detectable or qualified as estimated concentrations below the sample reporting limit. No VOCs were detected in exceedance of GWQS.

5.2.2.2 Semi-Volatile Organic Compounds

As presented in Table 5-2, a majority of SVOCs detected in supplemental groundwater samples were reported as non-detectable or qualified as estimated concentrations below the sample reporting limit. No SVOCs were detected at concentrations exceeding the GWQS.

5.2.2.3 Metals

Two (2) metals antimony and sodium were detected at concentrations above the GWQS in bedrock wells on the BCP Site. Antimony was detected in RW-1 above the GWQS of 0.003 mg/L at 0.0098 mg/L and sodium was detected at all three supplemental groundwater sample locations in exceedance of GWQS.

5.2.2.4 Pesticides, Herbicides and Cyanide

No pesticide, herbicide or cyanide compounds were detected at concentrations above the GWQS.

5.2.3 Summary

As described above and summarized in Table 5-2, there were no detected concentrations of VOCs, SVOCs, and pesticides in sample locations RW-1, RW-2, and RW-3 exceeding the GWQS. Two metals were detected in samples at concentrations above the New York State GWQS, including antimony at RW-1 and sodium at all three supplemental locations. The results indicate that the Site bedrock groundwater has not been impacted by elevated concentrations of metals or PAHs detected in some of the soil/fill overburden samples and the one localized overburden groundwater sample and is not a potential source of off-site groundwater contamination.

5.3 Data Usability Summary

In accordance with the RI Work Plan, the laboratory analytical data from this investigation was independently assessed and, as required, submitted for independent review. Ms. Judy Harry of Data Validation Services located in North Creek, New York performed the data usability summary assessment, which involved a review of the summary form information and sample raw data, and a limited review of associated QC raw data. Specifically, the following items were reviewed:

- Laboratory Narrative Discussion
- Custody Documentation
- Holding Times
- Surrogate and Internal Standard Recoveries
- Matrix Spike Recoveries/Duplicate Recoveries
- Field Duplicate Correlation
- Preparation/Calibration Blanks
- Control Spike/Laboratory Control Samples
- Instrumental IDLs
- Calibration/CRI/CRA Standards
- ICP Interference Check Standards
- ICP Serial Dilution Correlations
- Sample Results Verification

The Data Usability Summary Report (DUSR) was conducted using guidance from the USEPA Region 2 validation Standard Operating Procedures, the USEPA National Functional Guidelines for Data Review, as well as professional judgment.

In summary, most sample results are usable as reported, or with minor qualification. However, the following issues were noted:

- The custody form for the aqueous samples should not show a preservation code for the metals fraction, as they were sent to the laboratory without preservation, prior to laboratory filtration.
- Laboratory case narrative should have noted the delayed metals filtration/preservation.
- The field duplicate evaluations of RW-2 shows an unacceptable correlation for manganese (>±CRDL), results for which have been qualified as estimated in value in the parent sample and the duplicate.
- Due to presence in the associated method blanks, the detected results of 2-methlphenol, bis(2-ethylhexyl)phthalate, and benzaldehyde in the aqueous samples are considered external contamination and edited to reflect non-detection.

- The following results are qualified as tentative in identification and estimated in value due to interference in the mass specra:
  - Benzo(k)fluoranthene in TP-B8-N (0-2)
  - Fluorine in TP-B8-(0-2)
  - Benzo(a)anthracene in TP-B8-N (6-8)
- The detections of benzo(a)anthracene in TP-B5-S (0-2) and TP-B8-N (0-2) are edited to reflect non-detection due to very poor mass spectral quality.
- Matrix spikes of RW-2 show an unacceptable recovery for bis(2-ethylhexyl) phthalate (50% and 42%). The result for that analyte in the parent sample has been qualified as estimated in value. The laboratory should have evaluated all target analytes in the matrix spikes and LCSs.
- Calibration standards show unacceptable responses for benzaldehyde and carbazole (39%D and 24%D) in the CCV of 11/19/14, results for which are qualified as estimated in the associated sample RW-1. Benzaldehyde shows very poor linearity that is consistent with the method blank reported detected concentrations. This further supports the negation of the sample detections.
- The following detected results have been edited to reflect non-detection due to presence in the associated method blanks:
  - Chromium in all samples
  - Barium in RW-2
- The ICP serial dilution evaluations were performed on RW-2 and TP-B9-N (4-6), and correlations were within validation guidelines, with the exception of that for lead in the latter, which showed a very poor correlation (428%). Matrix effect is suspected, and the results for that element in TP-B9-N (4-6) is qualified as estimated.

Any additional qualifications of the data have been incorporated to the summary data tables. The DUSR prepared for the supplemental investigation sample analytical results is included in Appendix D.

6.0 INTERIM REMEDIAL MEASURES SCOPE OF WORK

As described in Section 5.0, analytical results from the initial RI identified elevated heavy metals and/or PAH concentrations in soil/fill at several soil boring locations across the central portion of the Site. Specifically, four (4) impacted locations identified by the NYSDEC were subject to a supplemental remedial investigation delineating the impacts detected in these areas of concern. Findings from the supplemental test pit investigation of the four impacted areas of interest confirmed that there was no evidence of significant lateral or vertical contamination surrounding the original soil boring locations. The levels of metals and PAHs detected in the supplemental test pits indicated the concentrations of these same constituents, where detected, are consistent with observations of the soil/fill analytical results across the site in both RI soil borings and test pits. A statistical analysis of the most common Site-wide contaminants was also performed and described in further detail in Section 6.1.1 as a tool to establish site specific statistical means for the COPCs for use in confirming that proposed IRM excavation limits are appropriate.

The heterogeneous nature of the soil/fill across the Site and the results indicating that there is widespread low level concentrations of metals and PAHs above the Restricted Residential SCOs throughout the soil/fill overburden at all depths demonstrates that no source or sources of the original impact at the four original boring locations was present. Although the supplemental results did not provide evidence of elevated contamination beyond the originally identified hotspots, an Interim Remedial Measure (IRM) is being proposed as a conservative measure to remediate the soil/fill in and around the original sample location to mitigate these areas as hotspots.

6.1 Objectives

The objective of the IRM is to:

- Reduce the potential for exposure to impacted soil/fill;
- Reduce the potential for sol/fill impacts migrating to groundwater beneath the Site and off Site locations.

The proposed approach for the implementation of the IRM includes:

A. Removal and off-site disposal of impacted soil/fill within the impacted areas of interest

B. Post-excavation field screening/sampling to establish removal of soil/fill to the extent of the impacted areas has been achieved

C. Backfill placement (if required)

Each of these tasks is discussed below:

6.1.1 Removal of Impacted Soil/Fill

Four of the initial RI boring sample locations were identified with heavy metal and PAH impacted soil/fill exceeding NYSDEC Restricted Residential SCOs by a significant amount and were further investigated by supplemental test pits, delineating the impacts at each respective location. As discussed above, the findings of the supplemental investigation of these impacted areas indicate the lateral and vertical extent of the impacts identified in the initial RI are limited and relatively isolated to the sample location as described in Section 5.1.

Removal of the impacted areas identified is proposed to be completed as an IRM. The proposed IRM would involve the excavation of a total of four (4) impacted locations; including two (2) heavy metal and two (2) PAH impacted areas. The two (2) heavy metal impacted areas, identified as B-7 and B-9 would be excavated as follows: at B-7 a 10' by 10' grid centered at the boring location will be excavated to bedrock (approximately 3 fbgs in this area) will be excavated and disposed off-site. At B-9 a 20' by 20' grid centered at the boring location to bedrock (approximately 3 fbgs in this area) will be excavated to a depth of approximately 5 fbgs or bedrock and disposed of off-Site. The PAH impacted areas identified as B-8 and B-5 would be excavated as two 20' by 20' foot grids centered at the boring location to a depth of approximately 5 fbgs or bedrock, whichever is achieved first. The excavation footprints were sized to encompass the identified hotspot and the lateral extent of the test pits which indicated no significantly elevated concentrations of either metals or PAHs present beyond these areas. The depth of the excavations was selected to match the maximum planned depth of excavation in these areas for building structures or utilities based on proposed final grades, including two feet of final cover across the Site. The test pit findings of no significant differences in concentrations of metals or PAHs from 0-5 fbgs and 5-10 fbgs confirmed that no additional hotspots would be encountered below the maximum proposed excavation depth. Figure 6-1 illustrates the proposed IRM excavation areas and their locations on the Site.

To establish further justification and criteria for determining that the proposed lateral and vertical extent of the excavation grids are appropriate given the Site-wide soil/fill investigation findings, a statistical analysis of the RI data (both initial and supplemental) was completed on three (3) metals (arsenic, barium and lead) and eight (8) semi-volatile compounds (Benzo (a) anthracene, Benzo (a) pyrene, Benzo (b) floranthene, Benzo (k) floranthene, Biphenyl, Chyrsene, Dibenz (a,h) anthracene, and Indeno (1,2,3-cd) pyrene) that were the most common contaminants found across the Site with exceedances above the Restricted Residential SCOs. The results of the analysis are presented in Table 6-1 and establish Site Specific SCOs (95 percent confidence interval plus two standard deviations) for the compounds identified that are consistent with the Restricted Residential SCOs but take into account Site specific data for soil/fill and are proposed for use in determining that that the horizontal and vertical limits of the proposed IRM excavations are appropriate and can be terminated or need to be continued until the Site Specific SCOs are achieved, The impacted soil/fill at each grid will be removed using an excavator and placed either directly into trucks for off-site disposal, or stockpiled on 6-mil polyethylene sheeting adjacent to the excavation pending characterization and subsequent disposal. To prevent potential run-off in the event of precipitation, stockpiled soil/fill will be covered at the end of each day's excavation activities with 6-mil polyethylene sheeting. In the event the stockpiled material remains on site for more than 5 days pending receipt of analytical data, erosion control silt fencing will be installed around the perimeter of the stockpile.

6.1.2 Post Excavation Soil Sampling

Upon completion of IRM excavations of soil/fill impact areas, field screening will be performed and soil samples collected from the extent of impacted area excavations to confirm removal of grossly impacted material. Verification samples and field screening results will confirm achievement of remedial objectives for subsurface soils. The extent of metals impacted areas will be confirmed through screening with a handheld X-ray Fluorescence Spectrometer (XRF) device to quantify field measurements of metals impacts. Confirmation sampling for PAH impacted areas will include composite sidewall samples from each cardinal direction as well as a composite of the bottom of the excavation, to be submitted for laboratory analysis of semi volatile organic compounds (SVOCs). Table 6-2 presents the proposed minimum number of environmental and quality control samples to be collected and analyzed as part of the post-excavation verification sampling program of the excavated PAH impacted areas.

TABLE 6-2
89 LaSalle BCP Parcel
IRM Post-Excavation Verification Soil Samples

Parameter	Method	Soil	Matrix Spike	Matrix Spike Duplicate	Duplicate	Total
TCL SVOCs	3550/8270	15	1	1	1	18
TAL Metals: Lead & Arsenic	6010	20	1	1	1	23

6.1.3 Backfill Placement

Material imported to the Site for use as backfill shall be comprised of soil or other unregulated materials as defined in NYCRR Part 375 6.7(d) which states that the soil not exceed the applicable soil cleanup objectives for the use of the Site, as set forth in Tables 375-6.8(b), the lower of the protection of groundwater or the protection of public health soil cleanup objectives, for the identified use of the Site.

Analytical data is required to demonstrate that the material complies with these requirements. The number of samples required to confirm compliance is as follows:

- Virgin soils (soils that are known to have not been developed upon or moved since their formation) should be subject to collection of one representative composite sample per source. The sample should be analyzed for TCL VOCs, SVOCs, pesticides, PCBs, and TAL metals plus cyanide.
- Non-virgin soils will be tested via collection of one composite sample per 500 cubic yards of material from each source area. If more than 1,000 cubic yards of soil are imported from a single off-Site, non-virgin soil source area and both samples of the first 1,000 cubic yards meet the criteria specified above, the sample collection frequency will be reduced to one composite for every 2,500 cubic yards of additional soils from the same source, up to 5,000 cubic yards. For borrow sources greater than 5,000 cubic yards, sampling frequency may be reduced to one sample per 5,000 cubic yards, provided all earlier samples met the specified criteria.

Site specific exemptions for the analytical testing requirements described above may be possible, based upon documentation of the origin and composition of the proposed imported material.

7.0 FATE AND TRANSPORT OF COPCS

The soil/fill and groundwater sample analytical results were correlated with the physical characterization of the Site to evaluate the fate and transport of Constituents of Primary Concern (COPCs) in Site media. The mechanisms by which the COPCs can migrate to other areas or media are briefly outlined below.

7.1 Fugitive Dust Generation

Volatile and non-volatile chemicals present in soil can be released to ambient air as a result of fugitive dust generation. As the Site was primarily characterized as gently sloping with limited distinguishable features and is heavily vegetated, suspension of soil particulates due to wind erosion or physical disturbance of surface soil/fill is unlikely. Continuous particulate monitoring will be performed during all intrusive activities associated with the remediation and redevelopment of the Site. Particulate monitoring will be documented and quantified against background levels during any excavation, grading and associated redevelopment activities.

Under the planned redevelopment of the Site, the majority of the Site will be developed for restricted residential use and will be covered by structures, paved (asphalt) parking and access roads, concrete sidewalks and clean soils planted with vegetative cover in all areas not otherwise covered by manmade materials. Therefore, this migration pathway is not considered relevant (other than requiring short–term dust management strategies during redevelopment activities) under the current and reasonably anticipated future land use.

7.2 Volatilization

Volatile chemicals present in soil/fill and groundwater may be released to ambient or indoor air through volatilization either from or through the soil/fill underlying current or future building structures. Volatile chemicals typically have a low organic-carbon partition coefficient (Koc), low molecular weight, and a high Henry's Law constant. Since no volatile organic compounds were detected during the RI sampling program in on-Site soil/fill above 6NYCRR Part 375 Restricted Residential Use SCOs, (refer to Table 4-1), this is not considered to be a potential exposure pathway.

VOCs were not detected above GWQS in the Site monitoring well, MW-1. Accordingly, the volatilization pathway from groundwater is not considered relevant at the Site.

7.3 Surface Water Runoff

Erosion and transport of surface soils and associated sorbed chemicals in surface water runoff is a potential migration pathway. The potential for impacted soil particle transport with surface water runoff is low, as the impacted soil/fill exhibits relatively low level exceedances of the Restricted Residential Use SCOs, as documented by the RI and Supplemental RI data discussed above. Under the reasonably anticipated future restricted residential land use proposed, a significant portion of the Site will be covered with impervious man-made materials, (e.g., asphalt, concrete, buildings, etc.). Furthermore, the redevelopment of the Site will incorporate a new stormwater collection, retention, and discharge system designed in accordance with New York State stormwater design standards to provide a mechanism for controlled surface water transport that will result in minimization of sediment erosion. Therefore the surface runoff migration pathway will be mitigated under the reasonably anticipated future land use plan. However, since stormwater generated during excavation activities under current use scenarios and during redevelopment activities could entrain sediment particles potentially containing low concentrations of COPCs; this pathway is potentially relevant during remediation and for the current site use.

7.4 Leaching

Leaching refers to chemicals present in soil/fill migrating downward to groundwater as a result of infiltration of precipitation. Several PAHs present in on-Site soil/fill were detected in groundwater sampled at MW-1 at low concentrations. The detected PAHs have very low mobility and solubility characteristics in soil matrices. Heavy metals identified in the soil/fill were also detected in groundwater, namely arsenic and lead above Part 375 Restricted Residential Use SCOs; therefore, leaching is considered a relevant migration pathway.

7.5 Groundwater Transport

Groundwater sampling conducted during the RI and Supplemental RI indicate that the primary bedrock groundwater has not been impacted by on-Site soil/fill as only one low level exceedance of arsenic was detected in one of the bedrock wells (sodium exceedances were not evaluated as a concern) and all other compounds analyzed did not exceed GWQS. Based on these supplemental findings, the depth of groundwater present at the Site, the absence of groundwater use, and lack of exposure to groundwater to receptors in the area; groundwater transport is considered an unlikely migration pathway.

7.6 Exposure Pathways

Based on the analysis of chemical fate and transport provided above, the potential exposure pathway by which COPCs may reach offsite receptors is surface water migration and leaching . These potential exposure pathways are anticipated to be substantially mitigated over the long term by the completion of the Site-wide redevelopment plan that incorporates re-grading of the Site and placement of impervious materials/Structures and/or soil cover as well as the installation and implementation of a Site stormwater collection and management system designed in accordance with New York State design standards to significantly mitigate the potential for Site soil erosion and the potential for off-site transport of soil particles in the form of sediment.

The Site Management Plan (SMP) will be prepared for the Site, prior to redevelopment, to evaluated and determine the effectiveness of planned remedial measures, and whether additional measures are required to further reduce off-site exposures to impacted Site materials.

During proposed construction activities, erosion and sediment control strategies required under a NYSDEC Construction Stormwater permit and Stormwater Pollution Prevention Plan (SWPPP) will be implemented to mitigate off-site exposure from stormwater generated during construction related activities.

8.0 QUALIATIVE RISK ASSESSMENT

8.1 Potential Human Health Risks

The Site is presently unoccupied and a significant portion of the Site is not secured from entry by the public. As discussed, the planned redevelopment of the site is for a multi-unit residential housing development for primarily medical students. As such, under current and future conditions, human contact with the Site can be expected to occur primarily by three types of receptors: trespassers/visitors who may traverse the property, construction workers involved in redevelopment related construction activities and future residents. With the exception of construction workers who would be adults, trespassers/visitors and future residents may be comprised primarily of adolescents or adults, however, children may be residents or visitors. The Site is located in an area where the adjacent land use is presently residential and public recreation (i.e., McCarthy Park) with a few commercial properties located on LaSalle Ave.

Under the anticipated future use scenario of the Site, the potential for significant exposures would extremely limited and short in duration, primarily for occasional construction workers who may access subsurface utilities during non-routine maintenance activities. Remediation of the site is intended to remove contaminated soils or provide two feet of clean cover (or buildings and pavement) over contaminants exceeding restricted use SCOs under a proposed Part 375 Track 4 cleanup track. Therefore, subsequent to completion of the planned redevelopment the Site remediation and cover components will meet the Protection of Public Health criteria under Part 375 for the restricted residential end use.

The proposed design of the dedicated stormwater collection and management facilities at the Site will not introduce stormwater runoff to impacted soils beneath the planned cover system and mitigates the potential for routine, direct human contact or ingestion. Non-routine contact with Site stormwater is expected to be limited to short durations under specific construction conditions (e.g., a construction worker managing accumulated stormwater during subsurface excavation work). Given the limited frequency and duration of these non-routine activities, and the relatively low level of remaining COPC impacted soils, direct stormwater exposure pathways for onsite and offsite receptors are considered relevant but minimal in risk.

8.2 Potential Ecological Risks

The 89 LaSalle Avenue BCP Site is a located within a highly developed, commercial, and residential area in the City of Buffalo and has a long history of use as a stone quarry from approximately 1915 through 1950 by the Buffalo Crushed Stone company, and subsequently as a landfill in the 1950s and 1960s by the City of Buffalo. The Site is currently vacant with a few structures and paved areas, providing minimal wildlife habitat or food value. Due to the past use and man-made formation of the majority of the site through landfilling activities, naturally occurring waterways, wetlands or other unique ecological features are not present on or adjacent to the Site. The reasonably anticipated future use is residential with the majority of the Site covered by buildings, asphalt and associated concrete structures. As such, no unacceptable ecological risks are anticipated under the current or reasonably anticipated future use scenario.

9.0 REMEDIAL ALTERNATIVES EVALUATION

9.1 Remedial Action Objectives

The final remedial measures for the LaSalle Ave Site must satisfy Remedial Action Objectives (RAOs). Remedial Action Objectives are site specific statements that convey the goals for minimizing or eliminating substantial risks to public health and the environment. Appropriate RAOs for the 89 LaSalle Avenue Site are:

- Removal of COPC impacted soil/fill within the Site to levels protective of human health for the intended future use of the Site (Restricted Residential Use SCOs)
- Minimize loadings to groundwater from residual COPC impacted soil/fill.

As discussed in Section 5.0, Part 375 Restricted Residential Use SCOs will be employed as soil cleanup goals to provide a measure of performance against these RAOs. The SCOs are soil concentration limits protective of human health and groundwater quality. Achievement of the SCOs will be confirmed through verification sampling following completion of remedial activates.

In addition to achieving RAOs, NYSDEC's Brownfield Cleanup Program calls for remedy evaluation in accordance with DER-10 Technical Guidance for Site Investigation and Remediation. Specifically, the guidance states "When proposing an appropriate remedy, the person responsible for conducting the investigation and/or remediation should identify and develop a remedial action that is based on the following criteria..:"

- **Overall Protection of Public Health and the Environment.** This criterion is an evaluation of the remedy's ability to protect public health and the environment, assessing how risks posed through each existing or potential pathway of exposure are eliminated, reduced, or controlled through removal, treatment, engineering controls, or institutional controls.
- **Compliance with Standards, Criteria, and Guidance (SCGs).** Compliance with SCGs addresses whether a remedy will meet applicable environmental laws, regulations, standards, and guidance.
- **Long-Term Effectiveness and Permanence**. This criterion evaluates the long term effectiveness of the remedy after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: (i) the magnitude of the remaining risks (i.e., will there be any significant threats, exposure pathways, or risks to the community and environment from the remaining wastes or treated residuals), (ii) the adequacy of the engineering and institutional controls intended to limit the risk, (iii) the reliability of these controls, and (iv) the ability of the remedy to continue to meet RAOs in the future.
- **Reduction of Toxicity, Mobility or Volume with Treatment.** This criterion evaluates the remedy's ability to reduce the toxicity, mobility, or volume of Site contamination. Preference is given to remedies that permanently and significantly reduce the toxicity, mobility, or volume of the wastes at the Site.
- **Short-Term Effectiveness**. Short-term effectiveness is an evaluation of the potential short-term adverse impacts and risks of the remedy upon the community, the workers,

and the environment during construction and/or implementation. This includes a discussion of how the identified adverse impacts and health risks to the community or workers at the Site will be controlled, and the effectiveness of the controls. This criterion also includes a discussion of engineering controls that will be used to mitigate short term impacts (i.e., dust control measures), and an estimate of the length of time needed to achieve the remedial objectives.

- **Implementation.** The implementation criterion evaluates the technical and administrative feasibility of implementing the remedy. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.
- **Cost.** Capital, operation, maintenance, and monitoring costs are estimated for the remedy and presented on a present worth basis.
- **Community Acceptance.** This criterion evaluates the public's comments, concerns, and overall perception of the remedy.

9.2 Future Land Use Evaluation

In developing and screening remedial alternatives, NYSDEC's Part 375 regulations require that the reasonableness of the anticipated future land be factored into the evaluation. The regulations identify 16 criteria that must be considered. These criteria were reviewed for the 89 LaSalle Avenue BCP Site and the evaluation supports restricted residential redevelopment as the reasonably anticipated future use of the Site, consistent with current City of Buffalo zoning ordinances, the Main-LaSalle Revitalization planning efforts, surrounding land use, historical use, flood plains or cultural resources, absence of significant natural resources, wetlands or other State or Federal land use designations. Accordingly, remedial alternatives to clean up the Site to restricted residential end use are identified and evaluated herein.

In addition to the evaluation of alternatives to remediate the Site to its likely end use, NYSDEC regulation and policy calls for evaluation of less restrictive end-use scenarios.

The less restrictive end use alternative evaluation includes an unrestricted use scenario (considered under 6NYCRR Part 375-2.8 to be representative of cleanup to pre-disposal conditions). Per NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, evaluation of a "no action" alternative is also required to provide a baseline for comparison against other alternatives.

The alternatives discussed in greater detail in Section 8.3 include:

- No Further Action;
- Restricted Residential Use Track 4 Cleanup and Implementation of a Site Management Plan; and
- Unrestricted Use

9.3 Alternatives Evaluation

9.3.1 No Further Action

Under this alternative, the Site would remain in its current state with no additional controls in-place.

Overall Protection of Public Health and the Environment – The Site as it exists is not protective of human health and the environment, due to the presence of elevated concentrations of COPCs in the surface soil/fill and the absence of institutional controls to prevent less restrictive forms of future site use (e.g., unrestricted). Accordingly, no further action is not protective of public health and does not satisfy the RAOs.

Compliance with SCGs – Under the current and reasonably anticipated future use scenario, the concentrations of constituents detected in the soil/fill and limited overburden groundwater exceed Restricted Residential Use SCOs and GWQS, and therefore is not protective of public health and does not satisfy the RAOs.

Long-Term Effectiveness and Permanence – The no further action alternative involves no additional equipment, institutional controls or facilities subject to maintenance, but provides no long-term effectiveness toward achieving the RAOs.

Reduction of Toxicity, Mobility, or Volume with Treatment – The RI identified low-level exceedances of PAHs and metals in Site surface soil/fill. Therefore reduction in toxicity, mobility, or volume of COPCs in the soil/fill is necessary based on the RI findings.

Short-Term Effectiveness – There would be no short-term adverse impacts and risks to the community, workers, or the environment attributable to implementation of the no further action alternative.

Implementation – No technical or action-specific administrative implementation issues are associated with the No Further Action alternative.

Cost – There would be no capital or long-term operation, maintenance, or monitoring costs associated with the no further action alternative.

Community Acceptance – The RI Work Plan was made available for comment from March 31, 2014 through April 25, 2014. No comments were received opposing the proposed work plan. The no-action alternative would result in the Site continuing to be underutilized and a negative economic influence to the surrounding community and property owners.

9.3.2 Restricted Residential Use Track 4 Cleanup and Implementation of a Site Management Plan

A Restricted Residential Use Track 4 Cleanup alternative would necessitate remediation of soil/fill COPCs exceeding Restricted Residential Use SCOs per 6NYCRR Part 375 Table 6.8(b) that are not located beneath planned building footprints, pavement and other impervious surfaces as proposed as part of the Site redevelopment plan.

To meet the Track 4 Restricted Residential Use criteria at the Site this alternative assumes that based on the ubiquitous nature of the COPC exceedences at the majority of the RI sample locations and depths in the fill across the Site (Refer to Figure 4-1) that general excavation and removal of impacted soils above SCOs is not practical and would require the removal of the majority of fill at depths up to 15 feet below grade surface across the Site. Therefore, this alternative proposes only the removal of significantly impacted soil/fill in four hotspot locations identified and detailed in the proposed IRM and soil/fill that is necessary to achieve subgrade elevations prior to the construction of buildings, paved parking/roadways and concrete sidewalks and other impervious surfaces. The excavation of soil/fill will also be performed in areas where soil cover for vegetation is planned and excavation of existing fill is necessary to provide for the placement of a minimum of two feet of clean soil to achieve final grades.

For this scenario, approximately 1.6 acres of the Site are planned as soil based green space with vegetation, planted either as grassy areas or landscaped with shrubs or other ornamental vegetation. At these locations, depending on the existing grades, up to two feet of the existing soil/fill will be excavated and relocated to portions of the site where subgrade is below the design requirements and covered with a minimum of two feet of clean imported soil cover that meets the lower of the protection of groundwater or the protection of public health SCOs for Restricted Residential Use as set forth in Part 375 Table 375-6.8(b) to achieve the final desired grades. A layer of geotextile fabric will be placed between the subgrade and the two feet of clean soil to act as a demarcation layer for future site management activities.

The remaining areas of the Site (i.e., approximately 85 percent) will be covered by buildings, asphalt pavement and concrete. The estimated total volume of soil/fill that would be removed under this scenario from the Site utilizing the existing grades and assuming a worst case excavation depth of 2 feet for the soil cover locations is approximately 2,500 cubic yards. The limited IRM proposed for remedial excavation of soil/fill in four hotspot areas where significant exceedences of Restricted Residential Use SCOs in shallow soil/fill were detected is expected to result in the excavation and disposal of approximately 250 - 300 cubic yards of contaminated soil. The proposed IRM in combination with the Site re-grading and final cover approach will be protective of anticipated on-Site construction workers and long-term residential occupants and will also substantially eliminate potential for the off-site stormwater exposure pathway. The implementation of a Site Management Plan (SMP) will include:

- **An Institutional Control Plan.** Institutional controls at the site will include groundwater use restrictions and use restrictions of the Site to restricted use (i.e. restricted residential).
- **Engineering Control Plan.** Engineering controls at the Site will include a cover system to mitigate contact with historic fill material across the Site were buildings, pavement, or other impervious surfaces are not planned for redevelopment.
- **A Soil/Fill Management Plan** to assure that future intrusive activities and soil/fill handling at the Site are completed in a safe and environmentally responsible manner.
- **A Site Monitoring Plan** that includes: a Site-wide Inspection program to assure that the Engineering and Institutional controls have not been altered and remain effective.

Overall Protection of Public Health and the Environment – Since the restricted residential cleanup will remove impacted soil/fill to below Restricted Residential Use SCOs or provide an engineered cover that meets the Part 375 Track 4 clean-up criteria, the alternative is fully protective of human health and the environment, and successfully achieves all RAOs for the Site. The Site Management Plan will include a stormwater monitoring plan to monitor residual COPCs in stormwater, a soil/fill management plan to address any impacted soil/fill encountered during post-development maintenance activities; and a Site-wide inspection program to assure that the Engineering and Institutional controls placed on the Site have not been altered and remain effective.

Compliance with SCGs – The restricted residential cleanup will be performed in accordance with applicable, relevant, and appropriate standards, guidance, and criteria. The restricted residential cleanup will involve the covering or removal of impacted soil/fill that exceeds Restricted Residential Use SCOs with either structures, impervious materials or two feet of clean soil, this alternative is fully protective of human health and the environment, and successfully achieves all RAOs for the Site. The Site Management Plan will include a soil/fill management plan to address any impacted soil/fill encountered during post-development maintenance activities; and a Site-wide Inspection program to assure that the Engineering and Institutional controls placed on the Site have not been altered and remain effective.

Long-Term Effectiveness and Permanence – The restricted residential cleanup will involve the covering or removal of COPC impacted soil/fill across the entire Site since soil/fill impacts were known to exceed Restricted Residential Use SCOs. The Site Management Plan will include a soil/fill management plan to address any impacted soil/fill encountered during post-development maintenance activities; and a Site-wide Inspection program to assure that the Institutional controls placed on the Site have not been altered and remain effective. As such, this alternative is expected to provide long-term effectiveness and permanence.

Reduction of Toxicity, Mobility, or Volume with Treatment – Through the removal and covering of impacted soil/fill exceeding Restricted Residential Use SCOs, the restricted residential cleanup will significantly reduce the toxicity, mobility, and volume of Site contamination. The Site Management Plan will include a soil/fill management plan to address management of any impacted soil/fill encountered during post-development maintenance activities; and a Site-wide Inspection program to assure that the Engineering and Institutional controls placed on the Site have not been altered and remain effective. Accordingly, this alternative satisfies this criterion.

Short-Term Effectiveness – The short-term adverse impacts and risks to the community, workers, and environment during implementation of the restricted residential cleanup will effectively be controlled. During soil/fill excavation and loading activities, continuous dust and VOC monitoring will be performed to assure conformance with NYSDOH-approved community air monitoring action levels. The potential for chemical exposures and physical injuries will be reduced through safe work practices; proper personal protection equipment; environmental monitoring; establishment of work zones and Site control; and appropriate decontamination procedures. The Track 4 Restricted Residential Cleanup will achieve the RAOs for the Site in approximately three to four months.

Implementation – No technical or action-specific administrative implementation issues are associated with implementation of the restricted residential cleanup or the SMP. An Environmental Easement will be filed with Erie County documenting the controls placed on the Site.

Cost –The capital cost of the restricted residential cleanup is approximately $431,000. Annual certification is estimated at approximately $2,500 per year. Based on an assumed 30 years of annual certifications, the net present value of this alternative is approximately $483,000 as shown on Table 9-1. Table 9-3 is a summary of costs of each of the alternatives.

Community Acceptance – Community acceptance will be evaluated based on comments to be received from the public in response to Fact Sheets and other planned Citizen Participation activities.

9.3.3 Unrestricted Use Alternative

The Unrestricted Use alternative would necessitate remediation of all soil/fill where COPC concentrations exceed the Unrestricted Use SCOs per 6NYCRR Part 375 Table 6.8(a). For this scenario, excavation and off-site disposal of impacted soil/fill with concentrations of COPCs exceeding Unrestricted Use SCOs would be regarded as the most applicable remedial measure. The Unrestricted Use alternative assumes that based on the RI sample results that approximately 75 percent of the of the Site's soil/fill exceed the Unrestricted Use SCOs and would be required to be excavated down to bedrock and disposed at an off-site commercial solid waste landfill. The estimated total volume of impacted soil/fill that would be removed under this scenario based on the remedial investigation is approximately 159,000 cubic yards.

Overall Protection of Public Health and the Environment – The Unrestricted Use alternative would achieve the corresponding Part 375 SCOs, which are designed to be protective of human health under any unrestricted reuse scenario.

Compliance with SCGs – The Unrestricted Use alternative would need to be performed in accordance with applicable, relevant, and appropriate standards, guidance, and criteria.

Long-Term Effectiveness and Permanence – The Unrestricted Use alternative would achieve removal of residual impacted soil/fill; therefore, soil/fill exceeding the Unrestricted Use SCOs would be removed from the Site. As such, the Unrestricted Use alternative would provide long-term effectiveness and permanence.

Reduction of Toxicity, Mobility, or Volume with Treatment – Through removal all impacted soil/fill exceeding Unrestricted Use SCOs, the Unrestricted Use alternative would permanently and significantly reduce the toxicity, mobility, and volume of Site contamination. Accordingly, this alternative satisfies this criterion.

Short-Term Effectiveness – The short-term adverse impacts and risks to the community, workers, and environment during implementation of the Unrestricted Use alternative are not considered significant and are controllable, but would increase the duration of time community, workers, and the environment is exposed to fugitive dust emissions at the site or stormwater migrating off the site during remediation activities.

Implementation – No technical implementation issues would be encountered in implementation of the Unrestricted Use alternative.

Cost – The capital cost of implementing an Unrestricted Use alternative is estimated to be $15,700,000 (see Table 9-2). Post remedial annual certification costs would not be incurred. Table 9-3 is a summary of costs of each of the alternatives.

Community Acceptance – Community acceptance will be evaluated based on comments to be received from the public in response to Fact Sheets and other planned Citizen Participation activities.

9.4 Recommended Remedial Measure

Based on the Alternatives Analysis evaluation, the Restricted Residential Use Track 4 and implementation of the proposed Site Management Plan alternative fully satisfies the remedial action objectives and is fully protective of human health and the environment. Accordingly, the implementation of a Site Management Plan encompassing institutional controls mandated by the Site's recorded Environmental Easement and periodic monitoring, and engineering controls including a cover system is the recommended final remedial approach for the 89 LaSalle Avenue BCP Site.

10.0 RI/AA SUMMARY AND CONCLUSIONS

Based on the data and analyses presented in the preceding sections, we offer the following summary and conclusions:

- Based on the soil data collected during the RI, concentrations of VOCs in on-Site soil/fill are below Part 375 Restricted Residential Use SCOs. Concentrations of SVOCs, comprised of PAHs, and heavy metals were identified in soil/fill above their respective 6NYCRR Part 375 Restricted Residential Use SCOs at many sampling locations across the Site, however at levels in most cases just above the respective SCOs. However four hotspot areas were identified where elevated metals or PAHs were present and are proposed for excavation as a proposed IRM. Based on the observation of widespread historic fill materials in all boring and test pit locations, the lack of elevated PID readings, as well as absence of any visual or olfactory evidence of contamination, the elevated SVOC and metals concentrations are inferred to be attributable to background concentrations of these compounds associated with types of historic fill found on the Site (i.e., foundry sands, cinders and ash from combustion processes, brick and related demolition debris, etc.) and commonly found at other fill locations in the City of Buffalo.
- Based on the supplemental groundwater investigation performed in November 2014, a contiguous groundwater table was identified within the Site bedrock and sampled. The results of the sampling indicated that no impacts from the impacted Site soil/fill to the groundwater have occurred and that groundwater is not a potential exposure pathway for these contaminants..
- Based on the Alternatives Analysis evaluation, the Restricted Residential Use Tack 4 cleanup (inclusive of the proposed IRM) satisfies the remedial action objectives and is protective of human health and the environment. Accordingly, a Track 4 Restricted Residential cleanup combining selective soil/fill remediation, impervious structures and cover systems and implementation of a Site Management Plan is the recommended final remedial approach for the 89 LaSalle Avenue BCP Site.

11.0 REFERENCES

1. Golder Associates Inc., Remedial Investigation Work Plan, 89 LaSalle Avenue Site, Buffalo, New York, prepared for New York State Department of Environmental Conservation, May 2014.

2. RECRA Environmental, Inc., Phase I Environmental Site Assessment, LaSalle Reservoir Site, Buffalo, New York, prepared for New York State Department of Environmental Conservation, March 1986.

3. LCS Inc., Phase I Environmental Site Assessment Report, 67, 73, and 89 LaSalle Avenue and Cordova Avenue, Buffalo, New York, prepared for Legacy Development, September 2013.

4. Ecology and Environment Engineering, P.C., Phase II Investigation, LaSalle Reservoir Site, Buffalo, New York, prepared for New York State Department of Environmental Conservation, April 1991

5. Frontier Technical Associates, Inc., Environmental Site Assessment, Main/LaSalle Redevelopment Area, Buffalo, New York, prepared for Buffalo Urban Renewal Agency, March 1995.

6. URS Greiner Inc., Site Investigation Report, Main-LaSalle Revitalization Project, Buffalo, New York, prepared for Buffalo Urban Renewal Agency, April 1997.

7. EnSol, Inc., Limited Phase II Environmental Site Assessment, 89 LaSalle Avenue Site, Buffalo, New York, prepared for Legacy Development, April 2013.

TABLES

TABLE 1-1
RI/AA REPORT
2013 PHASE II SOIL/FILL ANALYTICAL SUMMARY RESULTS
COMPARISON TO NYSDEC PART 375 SOIL CLEANUP OBJECTIVES

89 LASALLE AVENUE
BCP SITE # C915283
LEGACY LASALLE, LLC.
BUFFALO, NY

Lab ID	Restricted Residential SCOs Table 375-6.8(b) (PPM)	Residential SCOs Table 375-6.8(b) (PPM)	Soil Cleanup Objectives for the Protection of Groundwater Subpart 375-6.5 (PPM)	130847-01		130847-02		130847-03		130847-04		130847-05		130847-06		133004-01 130808015-001		133004-03 130808015-002	
Sample ID				**TP-1**		**TP-3**		**TP-7**		**TP-9**		**TP-11**		**TP-15**		**TP-67-1**		**TP-67-1**	
Sample Date				**3/7/2013**		**3/7/2013**		**3/7/2013**		**3/7/2013**		**3/7/2013**		**3/7/2013**		**8/6/2013**		**8/6/2013**	
Sample Depth				**0-10 ft**		**0-10 ft**		**0-8 ft**		**0-6 ft**		**0-3 ft**		**0-12 ft**		**--**		**--**	
Units				**PPM**		**PPM**		**PPM**		**PPM**		**PPM**		**PPM**		**PPM**		**PPM**	
Volatile Organics (8260B)																			
2-Butanone (MEK)	100	100	0.12											0.027					
Acetone	100	100	0.05											0.21		0.0191	JB		
Carbon Disulfide	NA	100 [1]	NA											0.0045					
Methylene Chloride	100	51	0.05	0.18												0.00691	J		
Tetrachloroethene	19	5.5	1.3													0.00591			
Xylenes, total	100	100	1.6			0.0021	J			0.0022	J			0.0049					
Semivolatile Organics (GC/MS)																			
2-Methylnaphthalene	NA	NA	NA															0.284	J
Acenaphthene	100	100	98													0.515	J		
Acenaphthylene	100	100	107											0.54		0.35	J		
Anthracene	100	100	1000			0.98	J	0.57				1.1	J	0.8		1.97			
Benzo[a]anthracene	1	1	1	0.2	J	2.4		0.97		0.56		3.8		2.2		4.47		0.445	
Benzo[a]pyrene	1	1	22	0.19	J	2.5		0.78		0.54		3.7		2		3.57		0.441	
Benzo[b]fluoranthene	1	1	1.7	0.19	J	2		0.76		0.47		3.8		2.1		3.73		0.478	
Benzo[g,h,i]perylene	100	100	1000			1.7		0.43		0.36		2.5		1.4		1.87		0.3	
Benzo[k]fluoranthene	3.9	1	1.7	0.2	J	2.1		0.59		0.47		2.8		1.6		3		0.397	
Carbazole	NA	NA	NA					0.24	J					0.26	J	0.723			
Chrysene	3.9	1	1	0.2	J	2.6		0.99		0.6		4.2		2.3		4.49		0.528	
Dibenz[a,h]anthracene	0.33	0.33	1000											0.32	J	0.667	J		
Dibenzofuran	NA	NA	NA					0.18	J							0.407	J		
Fluoranthene	100	100	1000	0.36		4.8		2.1		1		8.7		4.4		9.19		0.771	
Fluorene	100	100	386					0.26	J					0.21	J	0.772			
Indeno[1,2,3-cd]pyrene	0.5	0.5	8.2			2.2		0.61		0.54		3.5		1.6		1.99		0.267	
Phenanthrene	100	100	1000	0.2	J	3.4		2.1		0.51		5.1		2.4		7.3		0.503	
Pyrene	100	100	1000	0.31	J	4.3		1.8		0.93		7.3		3.7		7.43		0.688	
Pesticides and Herbicides																			
4,4'-DDD	13	2.6	14													0.00266	CJ		
4,4'-DDE	8.9	1.8	17													0.00491	C	0.00226	J
4,4'-DDT	7.9	1.7	136	0.0018	J											0.00509	C		
alpha-BHC	0.49	0.097	0.02													0.00185	CJ		
cis-Chlordane	4.2	0.91	2.9													0.00224	CJ		
Dieldrin	0.2	0.039	0.1											5.5	C				
Endrin Aldehyde	11	2.2	0.06													0.0053	C		
Endosulfan Sulfate	24	4.8	1000			0.0044	C							7	C				
Endrin Ketone	NA	NA	NA			0.01	C									0.00663	C		
Silvex	100	58	3.8	0.0058		0.0057		0.006		0.0061		0.0055		0.0058					
Polychlorinated biphenyls (PCBs)																			
PCB-1254	1	1	3.2											0.036				0.022	J
PCB-1260	1	1	3.2											0.024	J				
Total Metals (SW 846 Series)																			
Aluminum	NA	NA	NA	9300		7300		9400		10000		6100		3500		12100		6790	
Arsenic	16	16	16	36		6.9		9.3		8.6		11		68		7.53		3.76	
Barium	400	350	820	69		160		150		100		92		100		224		78.3	
Beryllium	72	14	47	0.43		0.51		0.57		0.56	J	0.52	J	0.37	J	0.791		0.67	
Cadmium	4.3	2.5	7.5	0.56		1.3		1.3		5.1		0.71		1.1		1.74		0.425	J
Calcium	NA	NA	NA	56000		39000		65000		31000		19000		23000		22900		42400	
Chromium	180	36	NS	17		16		19		19		17		15		21.9		13.2	
Cobalt	NA	30 [1]	NA	4.5		6.1		6		6.2		4.2	J	3.2	J	9.47		9.49	
Copper	270	270	1720	30		52		100		69		25		56		54.3		26.8	
Hexavalent Chromium	110	22	19					4.49											
Iron	NA	2000 [1]	NA	19000		15000		20000		24000		14000		11000		32300		23100	
Lead	400	400	450	51		200		350		130		79		260		505		49.2	

TABLE 1
RI/AA REPORT
SOIL/FILL ANALYTICAL Summary RESULTS
COMPARISON TO NYSDEC PART375 SOIL CLEANUP OBJECTIVES

89 LASALLE AVENUE
BCP SITE # C915283
LEGACY LASALLE, LLC.
BUFFALO, NY

Data Qualifiers:

B = Analyte was detected in associated method blank.
J = Analyte detected at a level less than the reporting limit (RL) and greater than or equal to the Method Detection Limit (MDL). Concentrations within this range are estimated.
***** = LCS or LCSD exceeds the control limits.
J = Qualified per DUSR included as Appendix D.

Footnotes:

All values are in Parts per Million (PPM).
blank = Not detected above the practical quantitation limits (PQL), lower limit of quantitation (LLQ), or reporting limit (RL).
0.34 = Sample concentration exceeds NYSDEC Part 375 Restricted Residential Use Soil Cleanup Objectives (SCOs)
0.34 = Sample concentration exceeds NYSDEC Part 375 Protection of Groundwater Soil Cleanup Objectives (SCOs)
NA = Not Applicable
NS = Not Specified.

TABLE 3-1
RI/AA REPORT
GROUNDWATER ELEVATION

89 LASALLE AVENUE
BCP SITE # C915283
LEGACY LASALLE, LLC.
BUFFALO, NY

Well Location	Instalation Date	Depth to water from top of riser (ft)	Top of riser elevation (ft)	Groundwater elevation (ft)
RW-1	11/7/2014	42.3	96.67	54.37
RW-2	11/7/2014	48.28	100.08	51.8
RW-3	11/7/2014	44.5	87.83	43.33

TABLE 4-1
RI/AA REPORT
SOIL/FILL ANALYTICAL RESULTS
COMPARISON TO NYSDEC PART 375 SOIL CLEANUP OBJECTIVES

89 LASALLE AVENUE
BCP SITE # C915283
LEGACY LASALLE, LLC.
BUFFALO, NY

Lab ID	Restricted Residential SCOs Table 375-6.8(b) (PPM)	Residential SCOs Table 375-6.8(b) (PPM)	Soil Cleanup Objectives for the Protection of Groundwater Subpart 375-6.5	480-60957-2 - Solid	480-60957-1 - Solid	480-60957-3 - Solid	480-60957-4 - Solid	480-60957-5 - Solid	480-60957-6 - Solid	480-60957-9 - Solid	480-60957-7 - Solid	480-60957-8 - Solid	480-61167-1 - Solid	480-61167-2 - Solid	480-61544-9 - Solid	480-61544-7 - Solid
Sample ID				R1TP-1	R1TP-2	R1TP-3	R1TP-Dup	SS-1	SS-2	SS-3	SS-4	SS-DUP	B-1A	B-1A (18-20')	B-2 (0-12')	B-3 (0-9')
Sample Date				6/2/2014	6/2/2014	6/2/2014	6/2/2014	6/2/2014	6/2/2014	6/2/2014	6/2/2014	6/2/2014	6/4/2014	6/4/2014	6/9/2014	6/9/2014
Sample Depth				0-2.5 ft	2-2.5 ft	0-2 ft	0-2.5 ft	0-2 in	0-2 in	0-2 in	0-2 in	0-2 in	18-20 ft	18-20 ft	0-12 ft	0-9 ft
Units				PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
Volatile Organics (8260B)																
2-Butanone (MEK)	100	100	0.12	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --		-- --	-- --
Acetone	100	100	0.05	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	0.0098 J	-- --	-- --
Benzene	4.8	2.9	0.06	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	0.0066 J	-- --	-- --
Cyclohexane	NA	NA	NA	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	0.0013 J	-- --	-- --
Methylcyclohexane	NA	NA	NA	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	0.0025 J	-- --	-- --
Methylene Chloride	100	51	0.05	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --		-- --	-- --
Toluene	100	100	0.7	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	0.0038 J	-- --	-- --
Vinyl Chloride	0.9	0.21	0.02	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --		-- --	-- --
Xylenes, total	100	100	1.6	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	-- --	0.0068 J	-- --	-- --
Semivolatile Organics (GC/MS)																
2-Methylnaphthalene	NA	NA	NA		0.036 J	0.014 J			0.084 J					-- --		
2-Methylphenol	NA	NA	NA											-- --		
Acenaphthene	100	100	98			0.028 J*		0.22 J	0.24		0.075 J	0.1 J		-- --		0.025 J
Acenaphthylene	100	100	107					0.15 J	0.079 J					-- --	0.48 J	
Anthracene	100	100	1000		0.077 J	0.077 J		0.62 J	0.78		0.28 J	0.34 J	0.27 J	-- --	1.1 J	0.1 J
Benzo[a]anthracene	1	1	1		0.38	0.27	0.25 J	***1.8***	***2***	0.078 J	0.99 J	***1.2***	1 J	-- --		0.54 J
Benzo[a]pyrene	1	1	22		0.4	0.26	0.23 J	***1.7***	***1.9***	0.086 J	0.97 J	***1.2***	0.98 J	-- --	***2.6*** J	0.46 J
Benzo[b]fluoranthene	1	1	1.7		0.58	0.38	0.39 J	***2.2***	***3.1***	0.12 J	***1.4***	***1.9***	**1.3 J**	-- --	***2.8*** J	0.45 J
Benzo[g,h,i]perylene	100	100	1000		0.14 J	0.11 J		1.2	0.58		0.34 J	0.44 J	0.65 J	-- --		0.16 J
Benzo[k]fluoranthene	3.9	1	1.7		0.21 J	0.13 J	0.1 J	***1.1***	***1.2***	0.058 J	0.43 J	0.54 J	0.49 J	-- --	***2.3*** J	0.34 J
Biphenyl	1	1	3.2						0.023 J					-- --		
Bis(2-ethylhexyl) phthalate	NA	NA	NA											-- --		
Carbazole	NA	NA	NA			0.041 J		0.31 J	0.35			0.15 J		-- --		0.029 J
Chrysene	3.9	1	1		0.48	0.32	0.28 J	***2.1***	***2.1***	0.093 J	0.98 J	***1.3***	***1.1*** **J**	-- --	***3.6*** J	0.61 J
Dibenz[a,h]anthracene	0.33	0.33	1000											-- --		0.13 J
Dibenzofuran	NA	NA	NA						0.2 J					-- --		
Fluoranthene	100	100	1000		0.88	0.58	0.58 J	4.2	4.7	0.17 J	2	2.5	2	-- --	3.6 J	0.67 J
Fluorene	100	100	386					0.28 J	0.38					-- --		0.04 J
Indeno[1,2,3-cd]pyrene	0.5	0.5	8.2		0.15 J	0.11 J	0.085 J	1.1	***0.58***	0.33 J	0.35 J	0.42 J	***0.59*** **J**	-- --	***3.4*** J	***0.55*** J
Naphthalene	100	100	12						0.11 J					-- --		
Phenanthrene	100	100	1000		0.4	0.35	0.4 J	3.1	3.2	0.091 J	1.2	1.5	1.3 J	-- --	2.8 J	0.43 J
Pyrene	100	100	1000		0.56	0.4	0.35 J	3	2.8	0.12 J	1.4	1.7	1.5 J	-- --	6.5 J	1.3 J
Total Metals (SW 846 Series)																
Aluminum	NA	NA	NA	7150	11800	6330	5530	5450	6420	5710	5090	5440	5670	-- --	7640	7070
Antimony	NA	NA	NA		0.65 J			2.3	1.1 J			0.71 J	1.5 J	-- --		1.3 J
Arsenic	16	16	16	3.4	16	9.6	9	14.9	14.8	3.2	4.3	4.1	13.5	-- --	5.7	9.4
Barium	400	350	820	35.7	108	82.3	61.4	198	184	32.1	63.6	62.7	***422***	-- --	84.3	138
Beryllium	72	14	47	0.32	1.2	0.52	0.47	0.63	0.75	0.27	0.28	0.29	0.39	-- --	0.48	0.61
Cadmium	4.3	2.5	7.5	0.37	0.7	0.6	0.58	1.6	1.6	0.51	0.83	0.72	0.95	-- --	0.46	0.93
Calcium	NA	NA	NA	3100 B	26300 B	28200 J	9310 J	11900 B	18700 B	17800 B	23500 B	24200 B	45700 B	-- --	37800 B	22200 B
Chromium	180	36	NS	7.7 J	13.7 J	12 J	12.4 J	18.2 J	14.5 J	6.6 J	8.4 J	9 J	16.9	-- --	14.6	11.8
Cobalt	NA	NA	NA	3.9	6.3	5.7	5.6	6.1	5.6	3.1	3.8	3.7	5.1 B	-- --	5.4	6
Copper	270	270	1720	5.4	25.5	18.5	16.2	108	114	11	26	25.1	***348***	-- --	34.5	51.6
Iron	NA	NA	NA	10300 B	31000 B	14600 B	14100 B	25100 J	13500 J	8420 J	10000 J	10200 J	18100 B	-- --	12300 B	12900 B
Lead	400	400	450	8.9	60.6	97.7	73.5	***595***	***447***	27.4	123	119	***1020***	-- --	127	218
Magnesium	NA	NA	NA	1860 J	3530 J	3550 J	3350 J	4010 J	3750 J	9390 J	11000 J	10500 J	12000	-- --	9440 B	5560 B
Manganese	2000	2000	2000	256 J	1450 J	587 J	507 J	251 J	194 J	245 J	255 J	248 J	461 B	-- --	234 B	551 B
Mercury	0.81	0.81	0.73	0.046	0.23	0.27	0.26	**0.84**	0.41	0.065	0.31	0.34	0.51	-- --	0.53	0.22
Nickel	310	140	130	9.2	19.1	23.4	25	20.5	16.4	7.2	10.2	10	26.7	-- --	16.2	15.9
Potassium	NA	NA	NA	396	877	809	804	589	745	636	965	737	746	-- --	813	707
Selenium	180	36	4		1.5 J	1.1 J	0.8 J	1.4 J	1.7 J		0.66 J		1.4 J	-- --	0.58 J	1.1 J
Silver	180	36	8.3						0.32 J					-- --		
Sodium	NA	NA	NA	37.4 J	80.9 J	46.6 J	46.4 J	153 J	180 J	59.9 J	75.8 J	76.9 J	128 J	-- --	181	149
Vanadium	NA	NA	NA	14	23.6	15.7	15.2	28.4	25.2	11.2	12.7	12.7	13.7	-- --	18.9	21.2
Zinc	10000	2200	2480	30.2 J	107 J	84.2 J	72.2 J	367 J	364 J	86.3 J	193 J	192 J	344 B	-- --	106 B	184 B
General Chemistry Parameters																
Cyanide	27	27	40		1.4	0.52 J		0.58 J					ND		ND	ND
Percent Solids	NA	NA	NA	80%	74%	87%	88%	80%	72%	86%	76%	77%	84%	86%	80%	88%

TABLE 4-1
RI/AA REPORT
SOIL/FILL ANALYTICAL RESULTS
COMPARISON TO NYSDEC PART 375 SOIL CLEANUP OBJECTIVES

89 LASALLE AVENUE
BCP SITE # C915283
LEGACY LASALLE, LLC.
BUFFALO, NY

Lab ID	Restricted Residential SCOs Table 375-6.8(b) (PPM)	Residential SCOs Table 375-6.8(b) (PPM)	Soil Cleanup Objectives for the Protection of Groundwater Subpart 375-6.5	480-61544-6 - Solid		480-61544-8 - Solid		480-61544-10 - Solid		480-61544-4 - Solid		480-61544-5 - Solid		480-61544-3		480-61544-11 - Solid		480-61544-1 - Solid		480-61544-12 - Solid		480-61544-2 - Solid		480-61411-1		480-61411-2	
Sample ID				B-4 (4-12')		B-5 (1-12')		B-6 (0-12')		B-7 (0-7.5')		B-8 (0-5.3')		B-9 (0-12')		B-10A (0-12')		B-12 (0-10.7')		B-13 (4-8')		B-14 (0-12')		B-15 (0-12')		B-15 (0-12') Dup	
Sample Date				6/9/2014		6/9/2014		6/9/2014		6/9/2014		6/9/2014		6/9/2014		6/9/2014		6/9/2014		6/8/2014		6/9/2014		6/6/2014		6/6/2014	
Sample Depth				4-12 ft		1-12 ft		0-12 ft		0-7.5 ft		0-5.3 ft		0-12 ft		0-12 ft		0-10.7 ft		4-8 ft		0-12 ft		0-12 ft		0-12 ft	
Units				PPM		PPM		PPM		PPM		PPM		PPM		PPM		PPM		PPM		PPM		PPM		PPM	
Volatile Organics (8260B)																											
2-Butanone (MEK)	100	100	0.12	0.014		0.038		--	--	--	--	--	--	--	--	--	--	--	--								
Acetone	100	100	0.05	0.062		0.17		--	--	--	--	--	--	--	--	--	--	--	--	0.044				0.012			
Benzene	4.8	2.9	0.06					--	--	--	--	--	--	--	--	--	--	--	--								
Cyclohexane	NA	NA	NA					--	--	--	--	--	--	--	--	--	--	--	--	0.0013	J						
Methylcyclohexane	NA	NA	NA					--	--	--	--	--	--	--	--	--	--	--	--	0.0026	J						
Methylene Chloride	100	51	0.05			0.0032	J	--	--	--	--	--	--	--	--	--	--	--	--								
Toluene	100	100	0.7			0.00057	J	--	--	--	--	--	--	--	--	--	--	--	--								
Vinyl Chloride	0.9	0.21	0.02					--	--	--	--	--	--	--	--	--	--	--	--	0.0012	J						
Xylenes, total	100	100	1.6					--	--	--	--	--	--	--	--	--	--	--	--								
Semivolatile Organics (GC/MS)																											
2-Methylnaphthalene	NA	NA	NA	0.077	J	7.6	J	0.043	J	0.031	J	42				0.025	J	0.063	J	0.18	J	0.031	J	0.54	J	0.34	J
2-Methylphenol	NA	NA	NA									0.87	J														
Acenaphthene	100	100	98	0.17	J	20	J	0.049	J	0.059	J	61		0.11	J	0.087	J	0.026		0.68	J	0.023	J				
Acenaphthylene	100	100	107	0.046	J	5	J	0.022	J	0.049	J	0.83	J	0.067	J	0.08	J	0.044	J	0.094	J	0.01	J	1	J	0.45	J
Anthracene	100	100	1000	0.41		62		0.11	J	0.19	J	120		0.38	J	0.34	J	0.56		0.91	J	0.065	J	6.8	J	4	J
Benzo[a]anthracene	1	1	1	1.1	J	93	J	0.27	J	0.6	J	110	J	0.89	J	1.1		1.3	J	1.8	J	0.19	J	12		8.3	
Benzo[a]pyrene	1	1	22	0.96	J	20	J	0.27	J	0.51	J	24	J	0.77	J	0.91	J	0.36	J	1.5	J	0.16	J	8.5		6.1	J
Benzo[b]fluoranthene	1	1	1.7	0.97	J	85	J	0.27	J	0.56	J	91	J	0.83	J	0.9	J	1.2	J	1.4	J	0.19	J	11		8.2	
Benzo[g,h,i]perylene	100	100	1000	0.68	J	16	J	0.082	J	0.082	J	22	J			0.45	J	0.21	J					4.1	J	4.3	J
Benzo[k]fluoranthene	3.9	1	1.7	0.92	J	74	J	0.25	J	0.53	J	66	J	0.66	J	0.9	J	1.1	J			0.16	J	5.7	J	3.8	J
Biphenyl	1	1	3.2			3.3	J					12	J					0.02	J								
Bis(2-ethylhexyl) phthalate	NA	NA	NA							0.97								0.11	J								
Carbazole	NA	NA	NA	0.21	J	48		0.056	J	0.1	J	58		0.16	J	0.083	J	0.36		0.29	J	0.036	J	1.6	J	1.7	J
Chrysene	3.9	1	1	1.1	J	110	J	0.31	J	0.67	J	100	J	0.93	J	1.2		1.5	J	1.9	J	0.21	J	12		8	
Dibenz[a,h]anthracene	0.33	0.33	1000	0.15	J	11	J	0.98	J	0.22	J	13	J	0.15	J*	0.21	J	0.16	J	0.59	J	0.075	J	1.4	J	1.3	J
Dibenzofuran	NA	NA	NA	0.12	J	28		0.046	J	0.049	J	63		0.08	J	0.06	J	0.18	J	0.33	J	0.018	J	1.7	J	1.1	J
Fluoranthene	100	100	1000	2.1		230		0.5		1.2		220		2		2		2.6		3.5	J	0.36	J	29		20	
Fluorene	100	100	386	0.22	J	60		0.056	J	0.073	J	87		0.15	J	0.11	J	0.27		0.78	J	0.23	J	0.97	J		
Indeno[1,2,3-cd]pyrene	0.5	0.5	8.2	0.79	J	61	J	0.22	J	0.45	J	63	J	0.66	J	0.77	J	1	J	1.3	J	0.17	J	4.5	J	3.7	J
Naphthalene	100	100	12	0.19	JB	14	JB	0.18	JB	0.043	JB	140	B	0.048	JB	0.053	JB	0.14	JB	0.35	JB						
Phenanthrene	100	100	1000	1.7		250		0.43		0.82	J	300		1.5	J	1.2		2.4		2.9	J	0.26	J	23		15	
Pyrene	100	100	1000	2.7	J	270	J	0.62	J	1.3	J	280	J	1.9	J	2.8	J	3.6	J	4.6	J	0.38	J	27		19	J
Total Metals (SW 846 Series)																											
Aluminum	NA	NA	NA	6590	J	5020		5430		4780		2500		5260		7740		5900		6340		6280		5540		5720	
Antimony	NA	NA	NA	1.2	J	2.5	J	2.3	J	4.6	J			5.8	J					2.6	J	1.8	J	3.3	J	2.5	J
Arsenic	16	16	16	11.2		20.5		21.4		10.1		2.5		104		5.1		7.3		10.3		9.5		10.7		7.3	
Barium	400	350	820	144		105		99.7		231		23.7		134		92.4		31.9		302		172		1730		1420	
Beryllium	72	14	47	0.38		0.56		0.55		0.35		0.16	J	0.6		0.37		0.5		0.38		0.42		0.49		0.45	
Cadmium	4.3	2.5	7.5	1.3		3.4		0.84		1.8		0.26		1.4		0.47		0.53		2.8		1.9		1.5		0.91	
Calcium	NA	NA	NA	31900	B	44300	B	32600	B	68800	B	80500	B	12000	B	61100	B	5530	B	64500	B	88700	B	31200	B	48000	B
Chromium	180	36	NS	18.2		14.3		68.4		15.4		7.3		19		13.3		16.5		29.2		18.6		24.6		20.5	
Cobalt	NA	NA	NA	5.8		3.4		5.9		5.9		1.6		3.7		6.5		5.1		8.8		5		5.1	B	4.7	B
Copper	270	270	1720	63.1		69		194		141		8.1		256		51		11.6		129		90.3		180		122	
Iron	NA	NA	NA	16700	J	14000	B	71500	B	28300	B	4470	B	16400	B	15300	B	13600	B	40000	B	13400	J	22400	B	13200	J
Lead	400	400	450	291	J	675		476		4220		36.4		2370		129		17.5		522		605		641		360	J
Magnesium	NA	NA	NA	10800	B	8650	B	3950	B	6110	B	16800	B	3010	B	24000	B	1300	B	12000	B	18800	J	7890		16500	J
Manganese	2000	2000	2000	371	B	394	B	440	B	397	B	139	B	118	B	385	B	388	B	491	B	333	B	328	B	275	B
Mercury	0.81	0.81	0.73	0.24		0.28		0.18		0.31		0.043		0.26		0.65		0.15		2.1		0.2		0.34		0.36	
Nickel	310	140	130	24.2	J	22.9		21.9		19.4		7		18.9		19.2		23.2		40.7		17.8		15.2		12.8	
Potassium	NA	NA	NA	906		645		403		600		443		352		1440		694		941		901		598		837	
Selenium	180	36	4	0.77	J	1.5	J	1.1	J	1.1	J	0.73	J	0.6	J	1.3	J			1.2	J	0.95	J	0.99		0.56	J
Silver	180	36	8.3			0.5	J	0.25	J	0.39	J			0.24	J									0.22	J		
Sodium	NA	NA	NA	108	J	211		226		97.2	J	125	J	107	J	243		55.8	J	175		177		143	J	154	J
Vanadium	NA	NA	NA	15.5		9.3		18.2		16		6		15.2		15.5		13.6		16.3		14.9		18.8		14.4	
Zinc	10000	2200	2480	286	B	278	B	318	B	356	B	64.3	B	383	B	136	B	110	B	737	B	387	B	556	B	340	B
General Chemistry Parameters																											
Cyanide	27	27	40	ND		ND		ND		1.2		ND		ND		ND		ND		3.1		ND		3.2		4.4	
Percent Solids	NA	NA	NA	83%		77%		88%		89%		87%		84%		85%		87%		87%		88%		84%		84%	

TABLE 4-1
RI/AA REPORT
SOIL/FILL ANALYTICAL SUMMARY RESULTS
COMPARISON TO NYSDEC PART375 SOIL CLEANUP OBJECTIVES

89 LASALLE AVENUE
BCP SITE # C915283
LEGACY LASALLE, LLC.
BUFFALO, NY

Data Qualifiers:

B = Analyte was detected in associated method blank.
J = Analyte detected at a level less than the reporting limit (RL) and greater than or equal to the Method Detection Limit (MDL). Concentrations within this range are estimated.
J = Qualified per DUSR included as Appendix D.

Footnotes:

All values are in Parts per Million (PPM).
blank = Not detected above the practical quantitation limits (PQL), lower limit of quantitation (LLQ), or reporting limit (RL).
0.34 = Sample concentration exceeds NYSDEC Part 375 Restricted Residential Use Soil Cleanup Objectives (SCOs)
0.35 = Sample concentration exceeds NYSDEC Part 375Residential Use Soil Cleanup Objectives (SCOs)
0.34 = Sample concentration exceeds NYSDEC Part 375 Protection of Groundwater Soil Cleanup Objectives (SCOs)
0.35 = Sample concentration exceeds NYSDEC Part 375 Restrictive Use SCOs, but not Protection of Groundwater Soil Cleanup Objectives (SCOs)
NA = Not Applicable
NS = Not Specified.

TABLE 4-2
RI/AA REPORT
GROUNDWATER ANALYTICAL RESULTS
COMPARISON TO 6 NYCRR PART 703 WATER QUALITY STANDARDS

89 LASALLE AVENUE
BCP SITE # C915283
LEGACY LASALLE, LLC.
BUFFALO, NY

Lab ID	**Water Quality Standards Surface Waters and Groundwater (6 NYCRR Part 703) (PPM)**	**480-61568-1 - Water**		**480-61568-2 - Water**	
Sample ID		**MW-1**		**MW-1 DUP**	
Sample Date		**6/10/14**		**6/10/14**	
Units		**PPM**		**PPM**	
Volatile Organics (GC/MS)					
Acetone	0.05	0.0084	J	0.0093	J
Bromodichloromethane	0.05	0.001			
Carbon disulfide	NA	0.0013			
Chloroform	0.007	0.0017		0.0018	
Cyclohexane	NA	0.00031	J		
Methylcyclohexane	NA	0.00031	J	0.00031	J
Semivolatile Organics (GC/MS)					
Acenaphthene	0.02			0.00042	J
Acenaphthylene	NA			0.00055	J
Anthracene	0.05	0.00036	J	0.00077	J
Benzaldehyde	NA	0.00061	JB	0.00056	JB
Benzo[a]anthracene	0.000002	***0.00076***	J	***0.0022***	J
Benzo[a]pyrene	ND	0.00066	J	0.0023	J
Benzo[b]fluoranthene	0.000002	***0.0014***	J	***0.0047***	J
Benzo[g,h,i]perylene	NA			0.00096	J
Benzo[k]fluoranthene	0.000002			***0.0021***	J
Carbazole	NA	0.00035	J	0.00044	J
Chrysene	0.000002	***0.00073***	J	***0.0027***	J
Di-n-butyl phthalate	0.05	0.00037	J	0.00035	J
Diethyl phthalate	NA	0.00026	J	0.00033	J
fluoranthene	0.05	0.0016	J	0.0042	J
Fluorene	0.05	0.00065	J	0.00091	J
Indeno[1,2,3-cd]pyrene	0.000002			***0.00075***	J
Phenanthrene	NA	0.0019	J	0.0033	J
Pyrene	0.05	0.0014	J	0.0042	J
Organochlorine Pesticides (8081A)					
4,4'-DDD	0.0003	0.000012	J	0.0000096	J
4,4'-DDT	0.0002	0.00003	NJ	0.000028	J
alpha-BHC	0.00001	***0.000013***	J	***0.000018***	J
beta-BHC	NA			0.00034	
Endosulfan I	NA			0.00012	J
Endrin	ND	***0.000046***	J		
Endrin aldehyde	0.005	0.000019	NJ	0.000023	J
Endrin ketone	0.005				
gamma-BHC (Lindane)	0.00005	0.000021	J	0.0000086	J

RI/AA REPORT
GROUNDWATER ANALYTICAL RESULTS
COMPARISON TO 6 NYCRR PART 703 WATER QUALITY STANDARDS

89 LASALLE AVENUE
BCP SITE # C915283
LEGACY LASALLE, LLC.
BUFFALO, NY

Lab ID	Water Quality Standards Surface Waters and Groundwater (6 NYCRR Part 703) (PPM)	480-61568-1 - Water		480-61568-2 - Water	
Sample ID		MW-1		MW-1 DUP	
Sample Date		6/10/14		6/10/14	
Units		PPM		PPM	
Total Metals (SW 846 Series)					
Aluminum	NA	28.5		47.6	
Arsenic	0.025	0.019		***0.027***	
Barium	NA	0.25		0.4	
Beryllium	0.003	0.0011	J	0.0018	J
Cadmium	0.003	0.0013	J	0.002	
Calcium	NA	172		191	
Chromium	0.05	0.039		***0.065***	
Cobalt	NA	0.015		0.023	
Copper	0.2	0.068		0.12	
Iron	0.3	***45.8***	J	***78.1***	J
Lead	0.025	***0.2***	J	***0.32***	J
Magnesium	NA	33.9		45.5	
Manganese	0.3	***1.3***		***1.9***	B
Mercury	0.0007	0.00019	J	0.00033	
Nickel	0.1	0.039		0.059	
Potassium	NA	17		16.4	
Sodium	20	***97.8***		***103***	
Vanadium	NA	0.051		0.089	
Zinc	NA	0.41		0.65	

TABLE 5-1
RI/AA REPORT
SUPPLEMENTAL SOIL/FILL ANALYTICAL SUMMARY RESULTS
COMPARISON TO NYSDEC PART 375 SOIL CLEANUP OBJECTIVES

89 LASALLE AVENUE
BCP SITE # C915283
LEGACY LASALLE, LLC.
BUFFALO, NY

Lab ID	Restricted Residential SCOs Table 375-6.8(b) (PPM)	Residential SCOs Table 375-6.8(b) (PPM)	Soil Cleanup Objectives for the Protection of Groundwater Subpart 375-6.5	480-70547-1		480-70547-2		480-70547-3		480-70547-4		480-70547-5		480-70547-6		480-70547-7	
Sample ID				TP-B7-S (0-2)		TP-B7-S (2-4)		TP-B9-N (0-2')		TP-B9-N (2-4')		TP-B9-N (4-6')		TP-B9-N (6-8')		TP-B9-N (8-10')	
Sample Date				10/30/2014		10/30/2014		10/30/2014		10/30/2014		10/30/2014		10/30/2014		10/30/2014	
Sample Depth				0-2 ft		2-4 ft		0-2 ft		2-4 ft		4-6 ft		6-8 ft		8-10 ft	
Units				PPM		PPM		PPM		PPM		PPM		PPM		PPM	
Semivolatile Organics (GC/MS)																	
Acenaphthene	100	100	98	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	100	100	107	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	100	100	1000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[a]anthracene	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[a]pyrene	1	1	22	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[b]fluoranthene	1	1	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	100	100	1000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[k]fluoranthene	3.9	1	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	3.9	1	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenz[a,h]anthracene	0.33	0.33	1000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	100	100	1000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	100	100	386	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	0.5	0.5	8.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	100	100	12	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	100	100	1000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	100	100	1000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Metals (SW 846 Series)																	
Arsenic	16	16	16	--	--	--	--	10		11.9		10.1		12.7		13	
Lead	400	400	450	248		199		**474**		481		**605**	J-	**690**		**580**	

TABLE 5-1
RI/AA REPORT
SUPPLEMENTAL SOIL/FILL ANALYTICAL SUMMARY RESULTS
COMPARISON TO NYSDEC PART 375 SOIL CLEANUP OBJECTIVES

89 LASALLE AVENUE
BCP SITE # C915283
LEGACY LASALLE, LLC.
BUFFALO, NY

Lab ID	Restricted Residential SCOs Table 375-6.8(b) (PPM)	Residential SCOs Table 375-6.8(b) (PPM)	Soil Cleanup Objectives for the Protection of Groundwater Subpart 375-6.5	480-70547-8		480-70547-9		480-70547-10		480-70547-11		480-70547-12		480-70547-13		480-70547-14		480-70547-15		480-70547-16	
Sample ID				TP-B5-S (0-2)		TP-B5-S (2-4)		TP-B5-S (4-6)		TP-B5-S (6-8)		TP-B5-S (8-10)		TP-B8-N (0-2)		TP-B8-N (2-4)		TP-B8-N (4-6)		TP-B8-N (6-8)	
Sample Date				10/31/2014		10/31/2014		10/31/2014		10/31/2014		10/31/2014		10/30/2014		10/31/2014		10/31/2014		10/31/2014	
Sample Depth				0-2 ft		2-4 ft		4-6 ft		6-8 ft		8-10 ft		0-2 ft		2-4 ft		4-6 ft		6-8 ft	
Units				PPM		PPM		PPM		PPM		PPM		PPM		PPM		PPM		PPM	
Semivolatile Organics (GC/MS)																					
Acenaphthene	100	100	98	0.02	J	0.043	J	0.078	J	0.57	J	0.13	J	0.08	J	0.075	J	0.085	J		
Acenaphthylene	100	100	107			0.019	J	0.03	J	0.062	J					0.078	J	0.016	J		
Anthracene	100	100	1000	0.064	J	0.16	J	0.42		3.2		0.14	J			0.42		0.34	J		
Benzo[a]anthracene	1	1	1		U	0.81		0.93		**8.2**		0.43			U	**1.4**		**1.3**		0.079	NJ
Benzo[a]pyrene	1	1	22	0.24		1		0.89		**7.1**		0.45		0.37		**1.4**		**1.2**		0.071	
Benzo[b]fluoranthene	1	1	1.7	0.31		**1.3**		1		**8.8**		0.54		0.59		**1.7**		**1.3**		0.11	
Benzo[g,h,i]perylene	100	100	1000	0.23	J	1		0.72		5.1		0.37	J	0.93		1		0.91		0.069	J
Benzo[k]fluoranthene	3.9	1	1.7	0.12		0.43		0.42		**3.7**		0.16		0.2	NJ	0.64		0.41		0.039	
Chrysene	3.9	1	1	0.23	J	0.94		0.93		**7.8**		0.5	J	0.37	J	**1.4**		**1.7**		0.092	J
Dibenz[a,h]anthracene	0.33	0.33	1000	0.098		0.32		0.27		**1.6**		0.16		0.21		0.34		0.29		0.039	
Fluoranthene	100	100	1000	0.33	J	1.2		1.6		15		0.84		0.43	J	2.4		1.7		0.12	J
Fluorene	100	100	386	0.03	J	0.064	J	0.13	J	1.2	J	0.042	J	0.025	NJ	0.15	J	0.13	J	0.0092	NJ
Indeno[1,2,3-cd]pyrene	0.5	0.5	8.2	0.31		**1.2**		**0.92**		**6.2**		0.38		**0.97**		**1.3**		**0.98**		0.085	
Naphthalene	100	100	12	0.025	J	0.077	J	0.1	J	0.16	J	0.065	J	0.11	J	0.16	J	0.12	J	0.028	J
Phenanthrene	100	100	1000	0.28	J	0.67		1.2		12		0.28	J	0.33	J	1.7		1.5		0.11	J
Pyrene	100	100	1000	0.35	J	1.1		1.3		15		0.56	J	0.39	J	1.5		2.5		0.12	J
Total Metals (SW 846 Series)																					
Arsenic	16	16	16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	400	400	450	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

RI/AA REPORT
SUPPLEMENTAL SOIL/FILL ANALYTICAL SUMMARY RESULTS
COMPARISON TO NYSDEC PART375 SOIL CLEANUP OBJECTIVES

89 LASALLE AVENUE
BCP SITE # C915283
LEGACY LASALLE, LLC.
BUFFALO, NY

Data Qualifiers:

B = Analyte was detected in associated method blank.
J = Analyte detected at a level less than the reporting limit (RL) and greater than or equal to the Method Detection Limit (MDL). Concentrations within this range are estimated.
J = The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.

J- = The analyte was positively identified; the associated numerical value is an estimated quantity that may be biased low.
U = The analyte was analyzed for, but was not detected above the level of the associated reported quantitatin limit
NJ = The detection is tentative in identification and estimated in value. Although threre is presumptive evidence of the analyte, the result should be used with caution as a potential false positive and/or elevated quantitative value.

Footnotes:

All values are in Parts per Million (PPM).
blank = Not detected above the practical quantitation limits (PQL), lower limit of quantitation (LLQ), or reporting limit (RL).
0.34 = Sample concentration exceeds NYSDEC Part 375 Restricted Residential Use Soil Cleanup Objectives (SCOs)
0.35 = Sample concentration exceeds NYSDEC Part 375Residential Use Soil Cleanup Objectives (SCOs)
0.34 = Sample concentration exceeds NYSDEC Part 375 Protection of Groundwater Soil Cleanup Objectives (SCOs)
0.35 = Sample concentration exceeds NYSDEC Part 375 Restrictive Use SCOs, but not Protection of Groundwater Soil Cleanup Objectives (SCOs)
NA = Not Applicable
NS = Not Specified.

TABLE 5-2
RI/AA REPORT
SUPPLEMENTAL GROUNDWATER ANALYTICAL RESULTS
COMPARISON TO 6 NYCRR PART 703 WATER QUALITY STANDARDS

89 LASALLE AVENUE
BCP SITE # C915283
LEGACY LASALLE, LLC.
BUFFALO, NY

Lab ID	**Water Quality Standards Surface Waters and Groundwater (6 NYCRR Part 703) (PPM)**	**480-71096-1 - Water**		**480-71096-2 - Water**		**480-71096-3 - Water**		**480-71096-5 - Water**	
Sample ID		**RW-1**		**RW-2**		**RW-3**		**Blind Dup**	
Sample Date		**11/10/14**		**11/10/14**		**11/10/14**		**11/10/14**	
Units		**PPM**		**PPM**		**PPM**		**PPM**	
Volatile Organics (GC/MS)									
Acetone	0.05	0.0094	J			0.052		0.0041	J
Carbon disulfide	NA	0.0014							
Cyclohexane	NA	0.00089	J			0.00092	J		
Methylcyclohexane	NA	0.0011				0.0012			
Toluene	0.005					0.00097	J		
Trichloroethene	0.005							0.00074	J
Total Xylenes	0.005					0.00099	J		
Semivolatile Organics (GC/MS)									
2-Methylphenol	NA						U		
Benzaldehyde	NA	0.00094	UJ		UJ		UJ		UJ
Bis(2-ethylhexyl) phthalate	0.005		U	0.0034	JB		U		
Total Metals (SW 846 Series)									
Aluminum	NA	0.11	J		UJ	0.12	J		UJ
Antimony	0.003	***0.0098***	J		UJ		UJ		UJ
Arsenic	0.025	0.017	J		UJ		UJ		UJ
Barium	NA	0.032	J	0.083	U	0.095	J	0.077	J
Calcium	NA	107	J	0.0031	J	96.4	J	169	J
Chromium	0.05		UJ		UJ	0.0041	UJ		UJ
Copper	0.2		UJ	0.0085	J		UJ	0.009	J
Iron	0.3		UJ		UJ	0.25	J	0.022	J
Magnesium	NA	30.9	J	105	J	43.7	J	101	J
Manganese	0.3	0.0088	J	0.019	J	0.0067	J	0.011	J
Nickel	0.1	0.0021	J	0.008	J	0.0026	J	0.0089	J
Potassium	NA	8.2	J	21	J	20.3	J	21.5	J
Sodium	20	***63.6***	J	***89.2***	J	***107***	J	***90.8***	J
Zinc	NA	0.0072	J	0.041	J	0.0099	J	0.041	J

RI/AA REPORT
SUPPLEMENTAL GROUNDWATER ANALYTICAL RESULTS
COMPARISON TO 6 NYCRR PART 703 WATER QUALITY STANDARDS

89 LASALLE AVENUE
BCP SITE # C915283
LEGACY LASALLE, LLC.
BUFFALO, NY

Data Qualifiers:

B = Analyte was detected in associated method blank.
J = Analyte detected at a level less than the reporting limit (RL) and greater than or equal to the Method Detection Limit (MDL). Concentrations within this range are estimated.
J = The analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was nt detected above the level of the associated reported quantitation limit.
UJ = The analyte was analyzed for, bu was not detected. The associated reported quantitation limit is approximate and may be inaccurate or imprecise.

Footnotes:

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. All results are in Parts per Million (PPM) unless stated otherwise.
3. Blind Dup sample taken from RW-2 location.

0.79 = Sample concentration exceeds the respective Water Quality Standards from 6 NYCRR Part 703.
NA = Not applicable
ND = Non detectable concentration by approved analytical methods; water quality standard.
NJ = The detection if tentative in identification and estimated in value. Athough there is presumptive evidence of the analyte, the result should be used with caution as a potential false positive and/or elevated quantitative value.

TABLE 6-1
RI/AA REPORT
SUMMARY OF STATISTICAL ANALYSIS OF SOIL/FILL RI DATA FOR EXCAVATION VERIFICATION SAMPLES

89 LASALLE AVENUE
BCP SITE # C915283
LEGACY LASALLE, LLC
BUFFALO, NY

Parameter	Sample Size (n)	Statistical Mean (M)	Standard Deviation (σ)	95% Confidence Interval	Site Specific SCOs [95% CI + 2σ] (ppm)
Semivolatile Organics					
Benzo[a]anthracene	33	7.7	11.7	4.0	27.4
Benzo[a]pyrene	33	2.7	3.2	1.1	7.4
Benzo[b]fluoranthene	33	7.0	10.2	3.5	24.0
Benzo[k]fluoranthene	33	5.1	7.9	2.7	18.5
Biphenyl	24	0.8	1.2	0.5	2.9
Chrysene	33	8.0	12.0	4.1	28.1
Dibenz[a,h]anthracene	33	1.0	1.4	0.5	3.3
Indeno[1,2,3-cd]pyrene	33	4.8	7.0	2.4	16.4
Metals					
Arsenic	29	13.3	7.7	2.8	18.3
Barium	24	248.2	240.1	96.1	576.2
Lead	31	533.5	430.1	151.4	1011.6

Table 9-1

89 LASALLE AVE. BCP SITE # C915283 - LEGACY LASALLE, LLC
BUFFALO, NEW YORK

COST ESTIMATE FOR RESTRICTED RESIDENTIAL USE TRACK 4 CLEANUP & SITE MANAGEMENT PLAN

Direct Capital Cost ($)						
Item	Unit Cost	Unit	Quantity	Years Incurred	Total Cost	30 Yr. Present Value @ 5%
IRM Hotspot Soil/Fill Excavation & Staging	$25	CY	300	1	$7,500	$7,500
IRM Soil/Fill Transport & Disposal	$75	Ton	450	1	$33,750	$33,750
Impacted Soil/Fill Excavation, Re-grading & Staging	$18	CY	2500	1	$45,000	$45,000
Impacted Non-Hazardous Soil/Fill Trans & Disposal	$45	TON	3750	1	$168,750	$168,750
Import and Place Clean Cover Soils	$25	CY	5200	1	$130,000	$130,000
	Subtotal, Direct Capital Costs				$343,750	$385,000
Indirect Capital Costs ($)						
					Total Cost	Present Value Cost @ 5%
Engineering/Administration	12% of Capital Costs				$41,250	$46,200
	Subtotal, Indirect Capital Costs				$41,250	$46,200
	Total Capital Costs (Direct and Indirect)				$385,000	$431,200
Annual Operations Maintenance & Monitoring (OM & M), Direct						
Item	Unit Cost	Unit	Quantity	Years Incurred	Annual Cost	Present Value Cost @ 5%
Annual Certifications	$2,500	Year	1	30	$2,500	$37,881
	Total Annual Cost				$2,500	
	Subtotal, Direct O&M Costs (30 Years)				$75,000	$37,881
Annual Operation Maintenance & Monitoring (OM & M), Indirect					Annual Cost	Present Value Cost @ 5%
Engineering/Administration	12% of O&M Costs				$300	$4,546
Contingencies	25% of O&M Costs				$625	$9,470
	Subtotal, Indirect O&M Costs				$925	$14,016
	Total Annual O&M Cost (Direct and Indirect)				$3,425	
	Total O&M Costs (Direct and Indirect)				$102,750	$51,896
Total Present Worth (PW): IRM Costs + OM & M PW						
					Total 30 Year Cost	Present Value Cost @ 5%
	Total Cost of Alternative				$487,750	$483,096

Notes/Assumptions:

A 5% rate of return was used for calculating present value costs.

TABLE 9-2

89 LASALLE AVE. BCP SITE # C915283 - LEGACY LASALLE, LLC
BUFFALO, NEW YORK

COST ESTIMATE FOR UNRESTRICTED USE

Direct Capital Cost ($)						
Item	Unit Cost	Unit	Quantity	Years Incurred	Total Cost	
Impacted Soil/Fill Excavation, Staging & Hauling	$18	CY	179250	1	$3,226,500	
Imapcted Non-Hazardous Soil/Fill Disposal	$40	TON	268875	1	$10,755,000	
Verification Sampling	$150	EA	60	1	$9,000	
	Subtotal, Direct Capital Costs				$13,990,500	
Indirect Capital Costs ($)						
					Total Cost	
Engineering/Administration	12% of Capital Costs				$1,678,860	
	Subtotal, Indirect Capital Costs				$1,678,860	
	Total Capital Costs (Direct and Indirect)				**$15,669,360**	

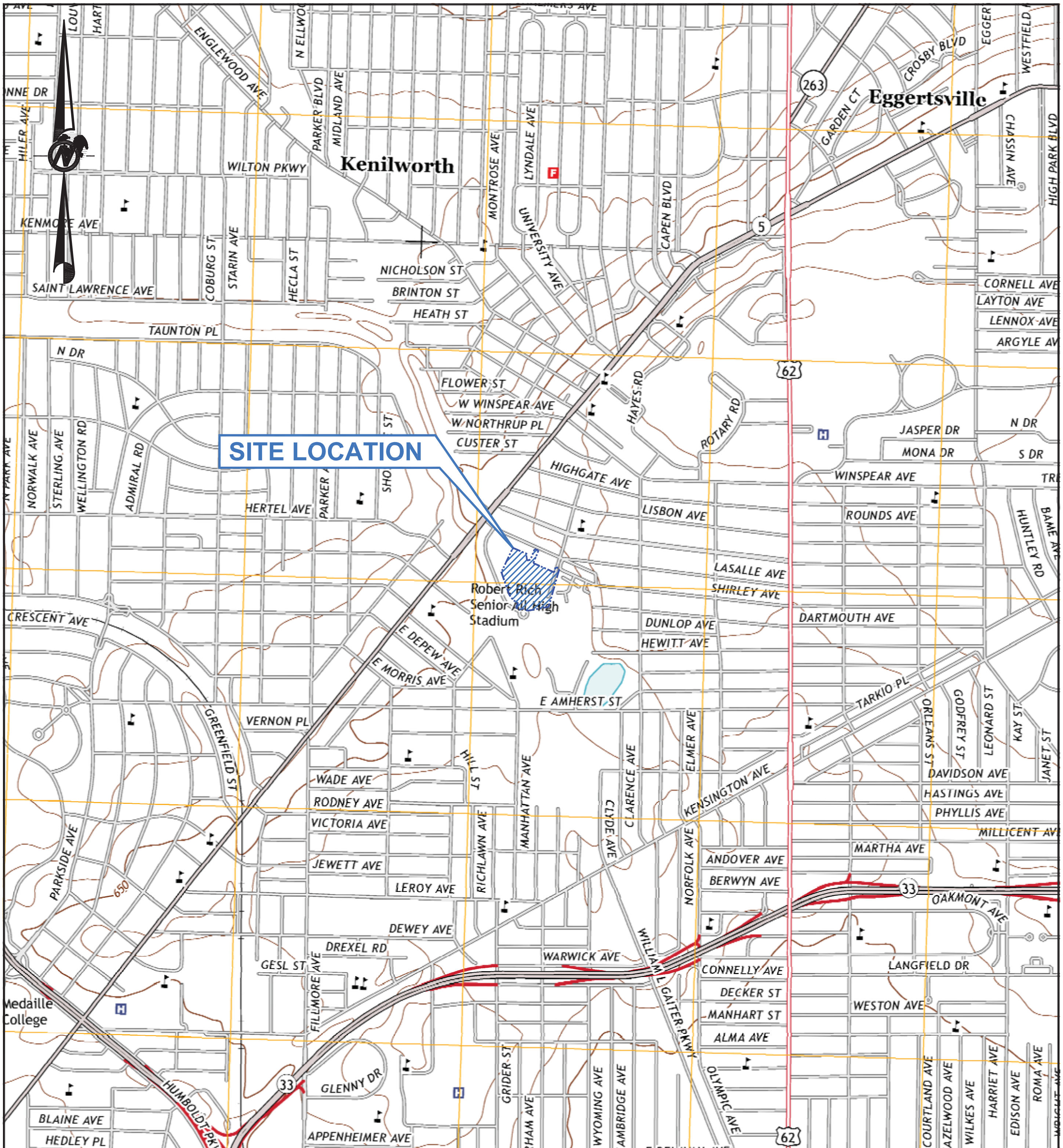
TABLE 9-3

89 LASALLE AVE. BCP SITE # C915283 - LEGACY LASALLE, LLC
BUFFALO, NEW YORK

SUMMARY OF REMEDIAL COST ALTERNATIVES

REMEDIAL ALTERNATIVE	ESTIMATED 30 YR PRESENT WORTH COST
No Further Action	**$0**
Restricted Residential Use Track 4 Cleanup & SMP Cost of Track 4 Completed Remediation with IRM, plus SMP and Future OM & M	**$483,000**
Unrestricted Use Cleanup (Cost of Completed Remdiation - No Annual Certifications)	**$15,700,000**

FIGURES



REFERENCE

1.) BASE FROM 7.5 MINUTE QUADRANGLE OF BUFFALO NORTHEAST, NEW YORK DATED 2013.

2000 0 2000
SCALE FEET

Golder Associates
Mt. Laurel, New Jersey

SCALE	AS SHOWN
DATE	08/08/13
DESIGN	AML
CADD	AM
CHECK	
REVIEW	

FILE No.

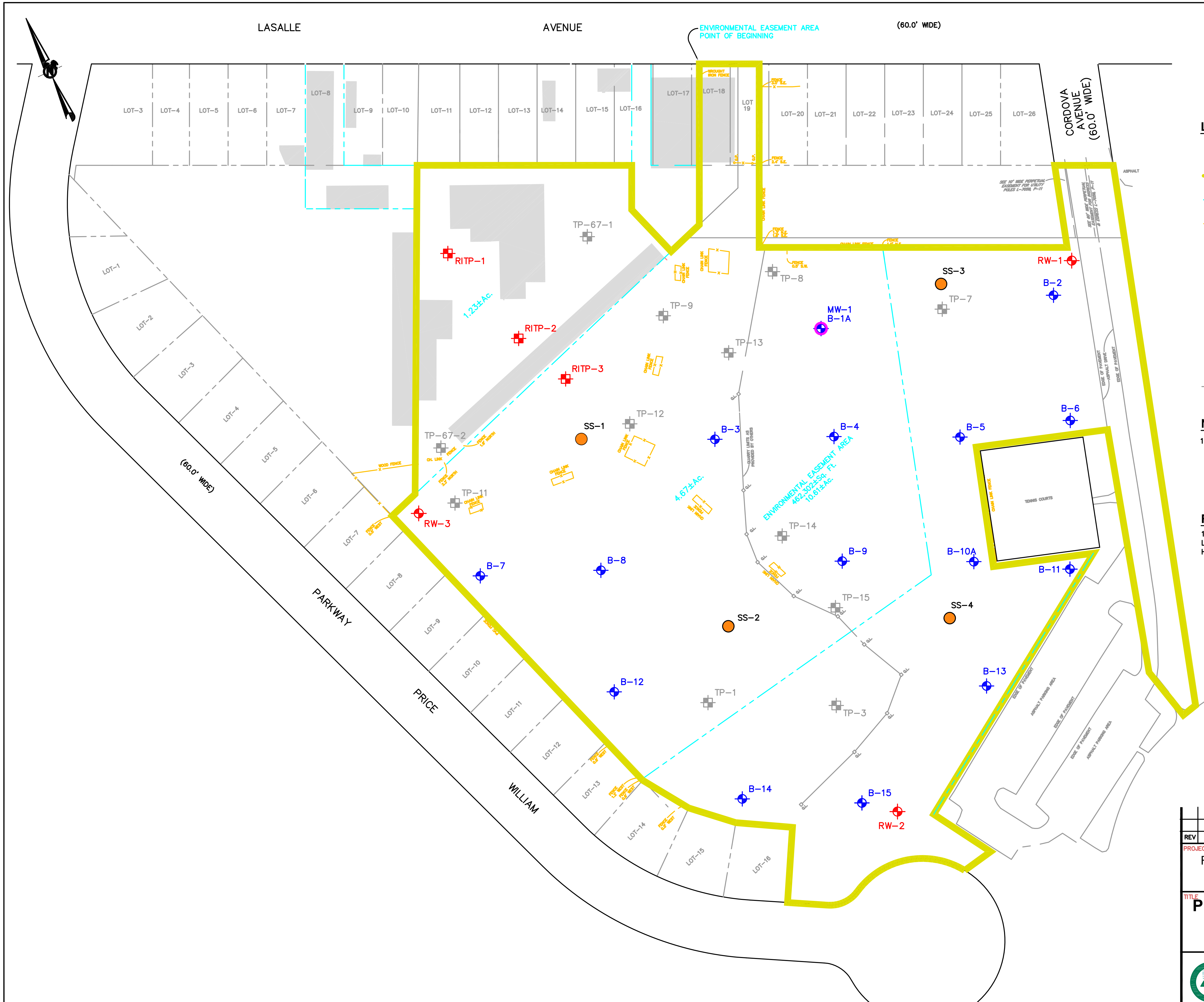
PROJECT No. REV. 0

TITLE

SITE VICINITY MAP

LEGACY LASALLE LLC

FIGURE 1-1



LEGEND

- RW-1 — PROPOSED BEDROCK MONITORING WELL LOCATION
- BCP SITE BOUNDARY
- PARCEL BOUNDARY
- FENCING
- TP-9 — 3/7/13 TEST PIT LOCATION
- TP-67-1 — 8/6/13 TEST PIT LOCATION
- RITP-2 — RI TEST PIT LOCATION
- B-2 — RI BORING SAMPLE LOCATION
- MW-1 — RI MONITORING WELL LOCATION
- SS-1 — RI SURFACE SOIL SAMPLE LOCATION
- QUARRY LIMIT

NOTES

1.) ALL TEST PIT AND BORING LOCATIONS ARE APPROXIMATE.

REFERENCE

1.) BASE MAP FROM DIGITAL FILE PROVIDED BY McINTOSH & McINTOSH, P.C., LOCKPORT, NEW YORK, ENTITLED "SURVEY OF PART OF LOT-46, TWP.-11, R.-8, HOLLAND PURCHASE," DATED MARCH 20, 2012.

SCALE 50 0 50 FEET

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

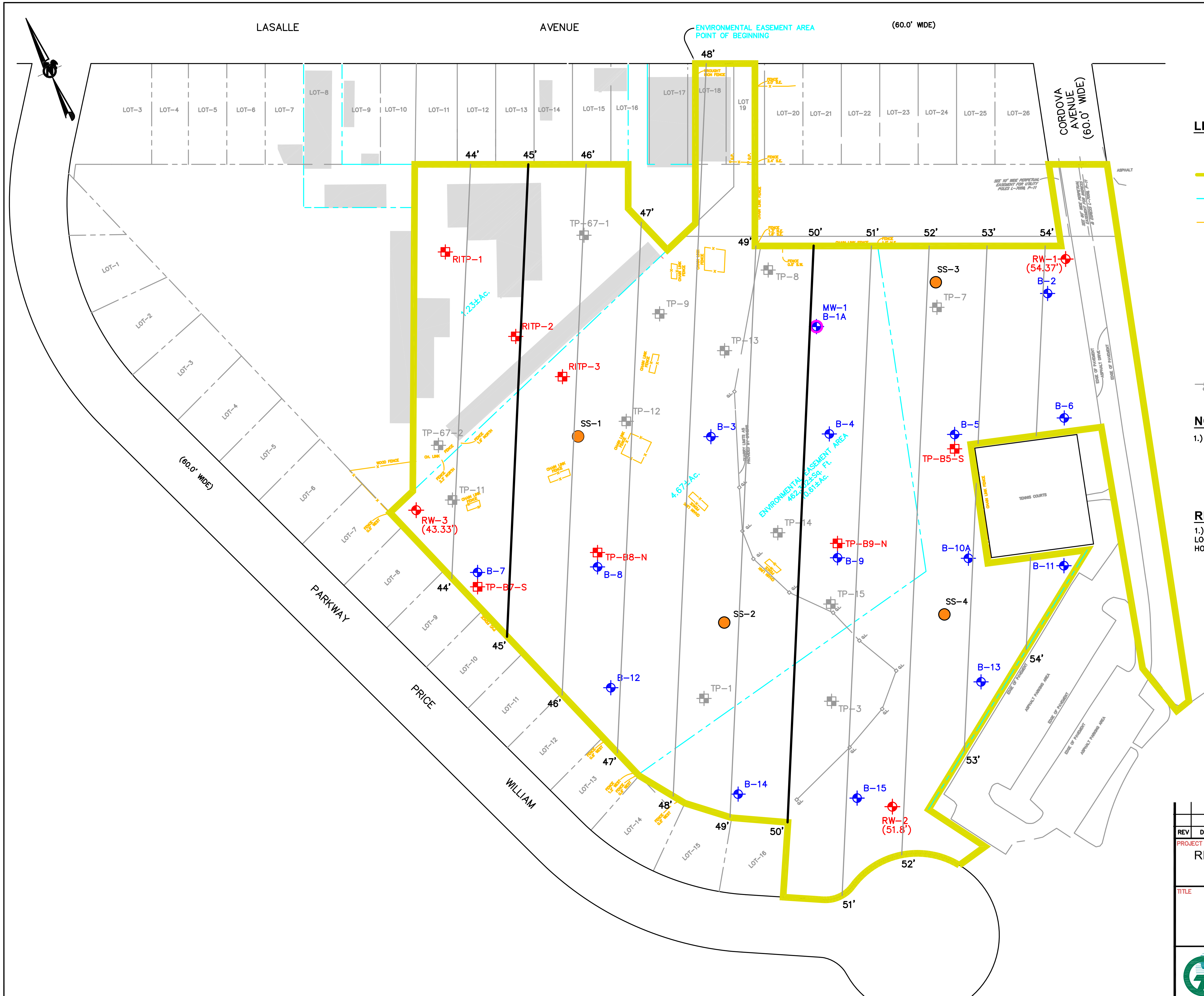
PROJECT
REMEDIAL INVESTIGATION / ALTERNATIVES ANALYSIS
LEGACY LASALLE, LLC - BUFFALO, NEW YORK

TITLE
PROPOSED BEDROCK MONITORING WELL LOCATIONS
89 LASALLE AVENUE SITE

Golder Associates
Buffalo, New York

PROJECT No.			FILE No.
DESIGN	AML	10/30/13	SCALE AS SHOWN REV. 0
CADD	JGT	7/8/14	
CHECK			
REVIEW			

FIGURE 2-1



LEGEND

RW-1 (54.37')	BEDROCK MONITORING WELL LOCATION (ELEVATION)
	BCP SITE BOUNDARY
	PARCEL BOUNDARY
	FENCING
TP-9	3/7/13 TEST PIT LOCATION
TP-67-1	8/6/13 TEST PIT LOCATION
RITP-2	RI TEST PIT LOCATION
B-2	RI BORING SAMPLE LOCATION
MW-1	RI MONITORING WELL LOCATION
SS-1	RI SURFACE SOIL SAMPLE LOCATION
	QUARRY LIMIT

NOTES

1.) ALL TEST PIT AND BORING LOCATIONS ARE APPROXIMATE.

REFERENCE

1.) BASE MAP FROM DIGITAL FILE PROVIDED BY McINTOSH & McINTOSH, P.C., LOCKPORT, NEW YORK, ENTITLED "SURVEY OF PART OF LOT-46, TWP.-11, R.-8, HOLLAND PURCHASE," DATED MARCH 20, 2012.

50 0 50
SCALE FEET

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

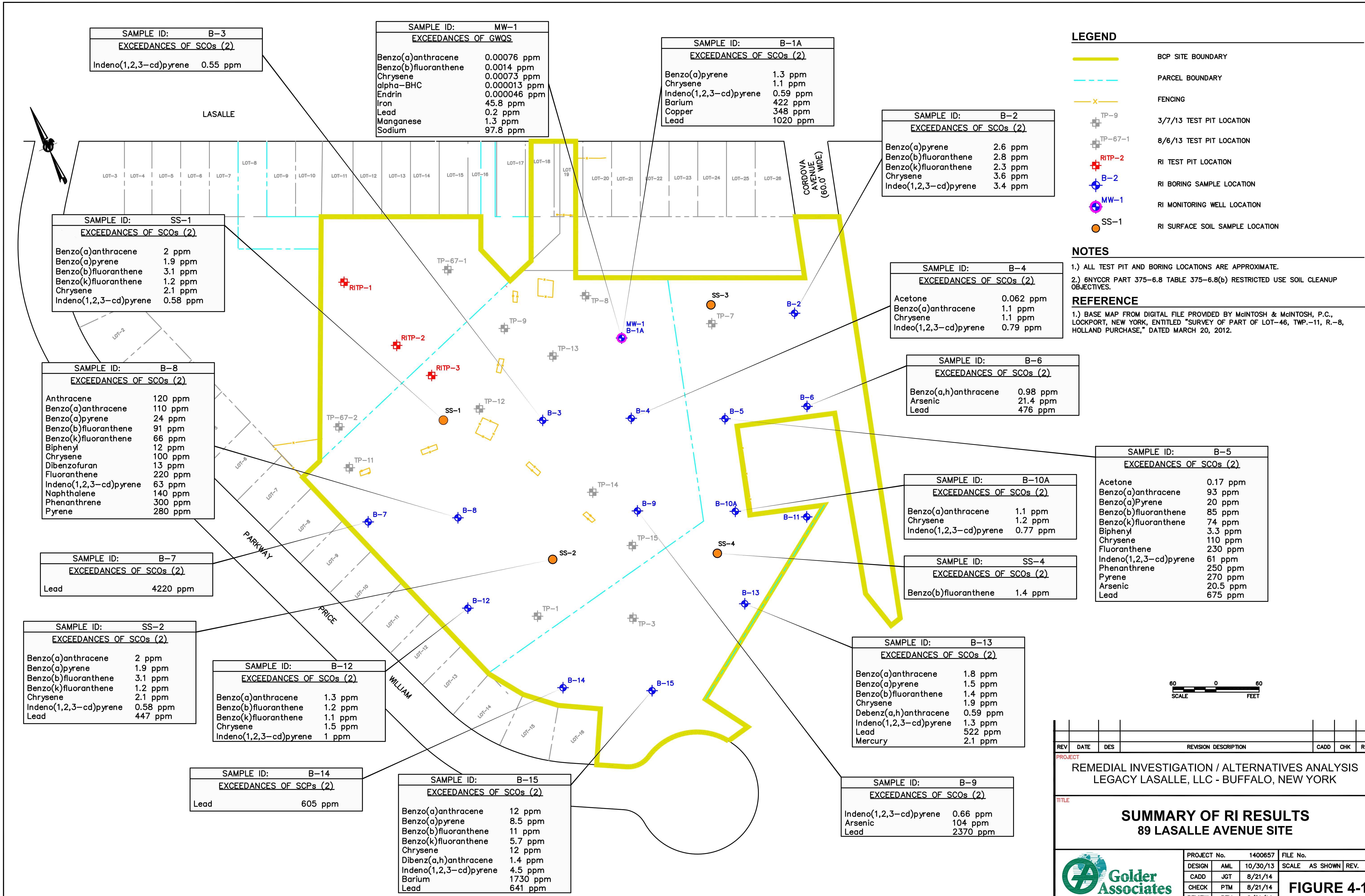
REMEDIAL INVESTIGATION / ALTERNATIVES ANALYSIS
LEGACY LASALLE, LLC - BUFFALO, NEW YORK

TITLE

BEDROCK MONITORING WELL ISOPOTENTIAL MAP
89 LASALLE AVENUE SITE

Golder Associates
Buffalo, New York

PROJECT No.			FILE No.	
DESIGN	AML	10/30/13	SCALE AS SHOWN	REV. 0
CADD	JGT	11/17/14		
CHECK			FIGURE 3-1	
REVIEW				



REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

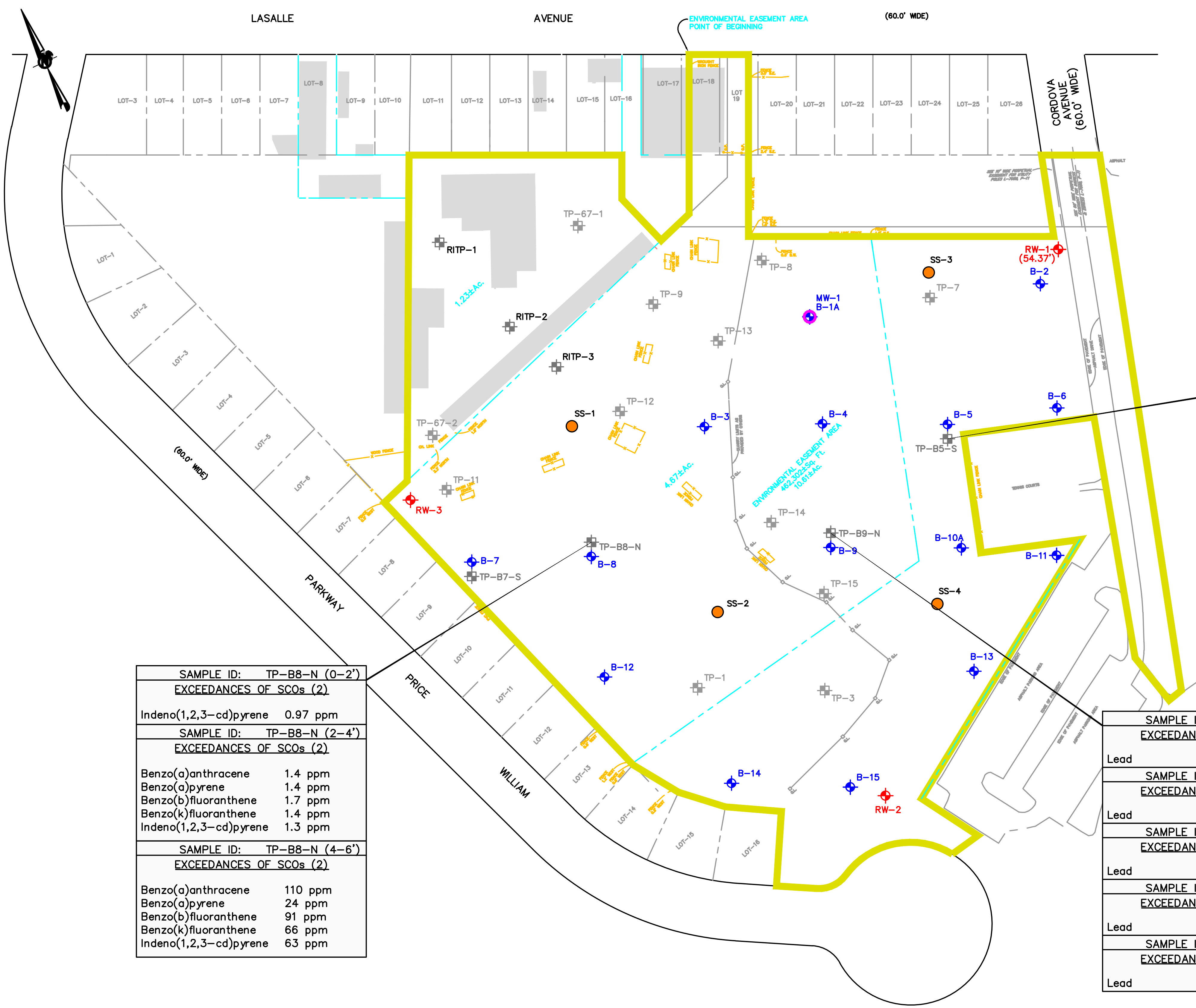
PROJECT
REMEDIAL INVESTIGATION / ALTERNATIVES ANALYSIS
LEGACY LASALLE, LLC - BUFFALO, NEW YORK

TITLE
SUMMARY OF RI RESULTS
89 LASALLE AVENUE SITE

Golder Associates
Buffalo, New York

PROJECT No.		1400657	FILE No.	
DESIGN	AML	10/30/13	SCALE AS SHOWN	REV. 0
CADD	JGT	8/21/14		
CHECK	PTM	8/21/14		
REVIEW	PTM	8/21/14		

FIGURE 4-1



LEGEND

RW-1	BEDROCK MONITORING WELL LOCATION
TP-B9-N	SUPPLEMENTAL RI TEST PIT LOCATION
	BCP SITE BOUNDARY
	PARCEL BOUNDARY
x	FENCING
TP-9	3/7/13 TEST PIT LOCATION
TP-67-1	8/6/13 TEST PIT LOCATION
RITP-2	RI TEST PIT LOCATION
B-2	RI BORING SAMPLE LOCATION
MW-1	RI MONITORING WELL LOCATION
SS-1	RI SURFACE SOIL SAMPLE LOCATION

NOTES

1.) ALL TEST PIT AND BORING LOCATIONS ARE APPROXIMATE.

2.) 6NYCCR PART 375-6.8 TABLE 375-6.8(b) RESTRICTED USE SOIL CLEANUP OBJECTIVES.

REFERENCE

1.) BASE MAP FROM DIGITAL FILE PROVIDED BY McINTOSH & McINTOSH, P.C., LOCKPORT, NEW YORK, ENTITLED "SURVEY OF PART OF LOT-46, TWP.-11, R.-8, HOLLAND PURCHASE," DATED MARCH 20, 2012.

SAMPLE ID: TP-B5-S (0-2')	
EXCEEDANCES OF SCOs (2)	
Benzo(b)fluoranthene	1.3 ppm
Indeno(1,2,3-cd)pyrene	1.2 ppm

SAMPLE ID: TP-B5-S (2-4')	
EXCEEDANCES OF SCOs (2)	
Indeno(1,2,3-cd)pyrene	0.92 ppm

SAMPLE ID: TP-B5-S (4-6')	
EXCEEDANCES OF SCOs (2)	
Benzo(a)anthracene	8.2 ppm
Benzo(a)Pyrene	7.1 ppm
Benzo(b)fluoranthene	8.8 ppm
Benzo(k)fluoranthene	3.7 ppm
Chrysene	7.8 ppm
Diben(a,h)anthracene	1.6 ppm
Indeno(1,2,3-cd)pyrene	6.2 ppm

SAMPLE ID: TP-B8-N (0-2')	
EXCEEDANCES OF SCOs (2)	
Indeno(1,2,3-cd)pyrene	0.97 ppm

SAMPLE ID: TP-B8-N (2-4')	
EXCEEDANCES OF SCOs (2)	
Benzo(a)anthracene	1.4 ppm
Benzo(a)pyrene	1.4 ppm
Benzo(b)fluoranthene	1.7 ppm
Benzo(k)fluoranthene	1.4 ppm
Indeno(1,2,3-cd)pyrene	1.3 ppm

SAMPLE ID: TP-B8-N (4-6')	
EXCEEDANCES OF SCOs (2)	
Benzo(a)anthracene	110 ppm
Benzo(a)pyrene	24 ppm
Benzo(b)fluoranthene	91 ppm
Benzo(k)fluoranthene	66 ppm
Indeno(1,2,3-cd)pyrene	63 ppm

SAMPLE ID: TP-B9-N (0-2')	
EXCEEDANCES OF SCOs (2)	
Lead	474 ppm

SAMPLE ID: TP-B9-N (2-4')	
EXCEEDANCES OF SCOs (2)	
Lead	481 ppm

SAMPLE ID: TP-B9-N (4-6')	
EXCEEDANCES OF SCOs (2)	
Lead	605 ppm

SAMPLE ID: TP-B9-N (6-8')	
EXCEEDANCES OF SCOs (2)	
Lead	690 ppm

SAMPLE ID: TP-B9-N (8-10')	
EXCEEDANCES OF SCOs (2)	
Lead	580 ppm

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

REMEDIAL INVESTIGATION / ALTERNATIVES ANALYSIS
LEGACY LASALLE, LLC - BUFFALO, NEW YORK

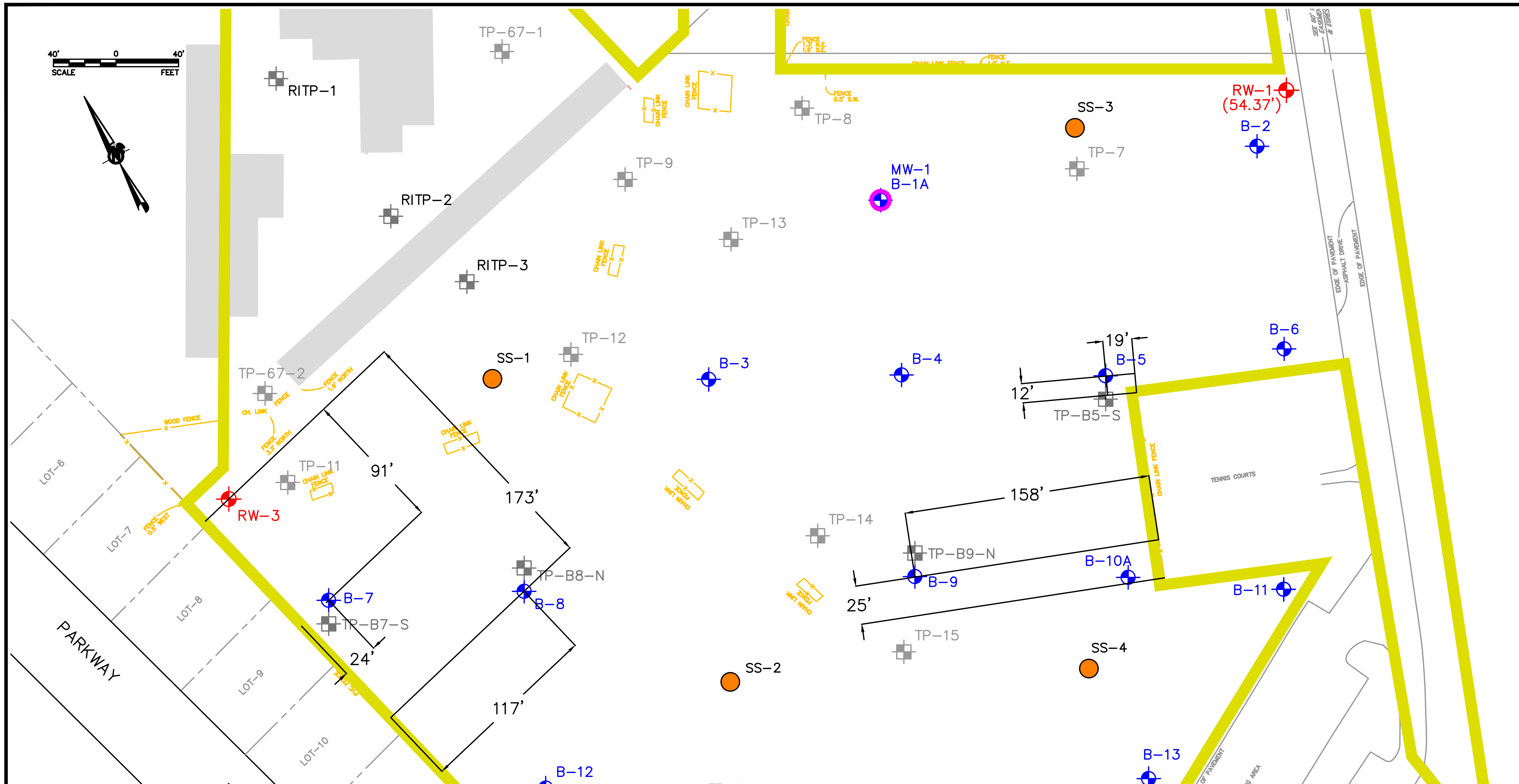
TITLE

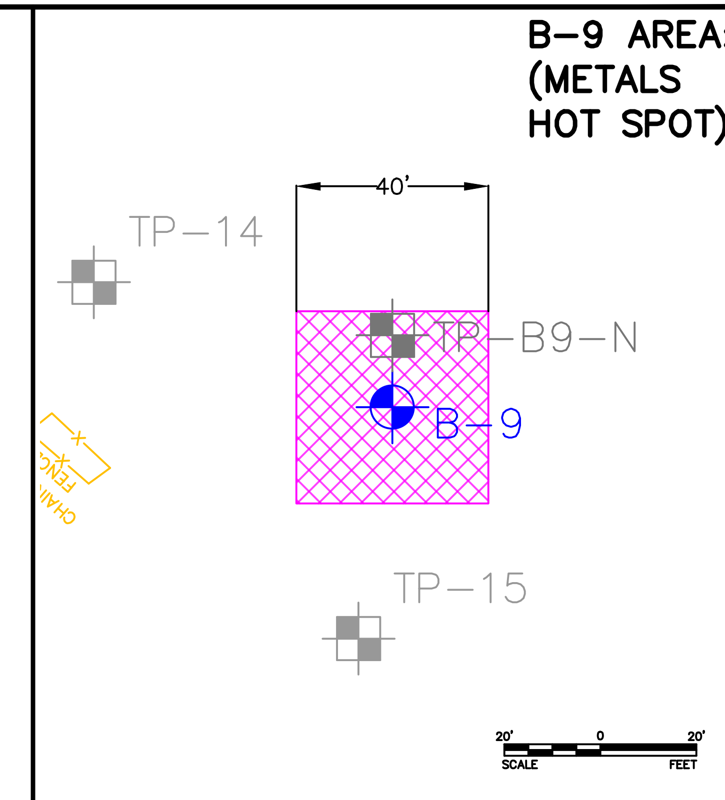
SUMMARY OF SUPPLEMENTAL RI RESULTS
89 LASALLE AVENUE SITE

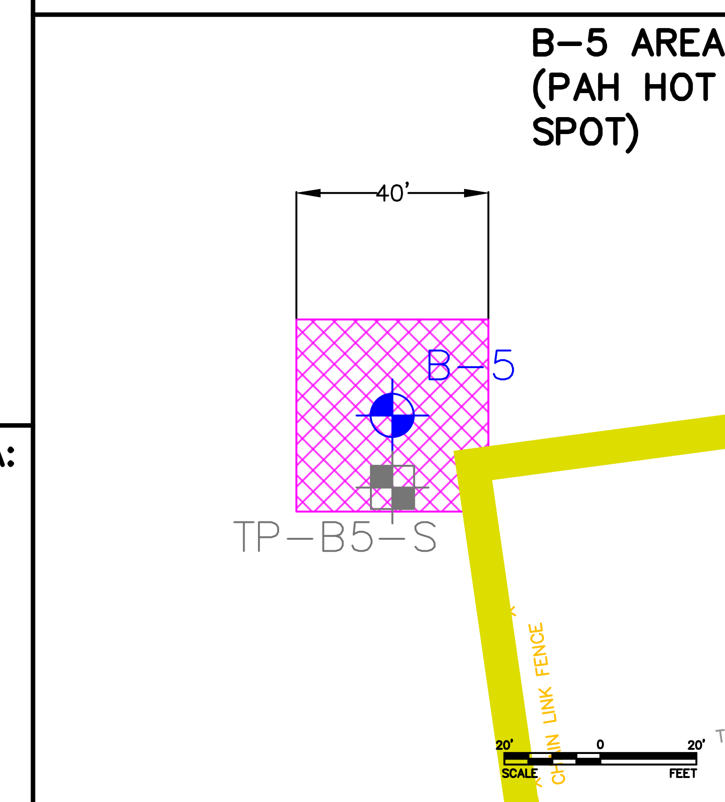
Golder Associates
Buffalo, New York

PROJECT No.		1400657	FILE No.
DESIGN	AML	10/30/13	SCALE AS SHOWN REV. 0
CADD	JGT	12/9/14	
CHECK			
REVIEW			

FIGURE 5-1







LEGEND

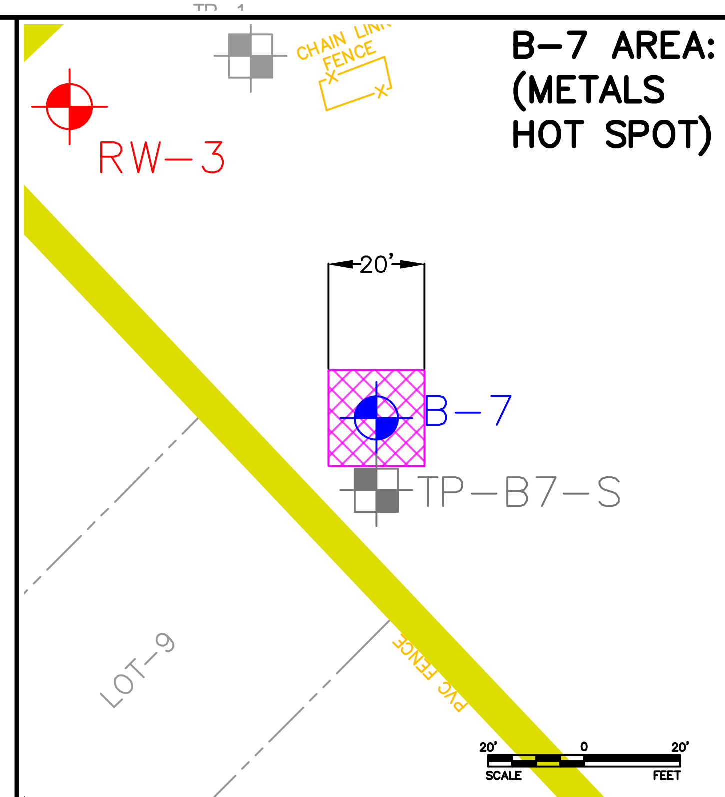
RW–1	BEDROCK MONITORING WELL LOCATION (ELEVATION)
	BCP SITE BOUNDARY
	FENCING
B–2	RI BORING SAMPLE LOCATION
	PROPOSED IRM EXCAVATION AREAS

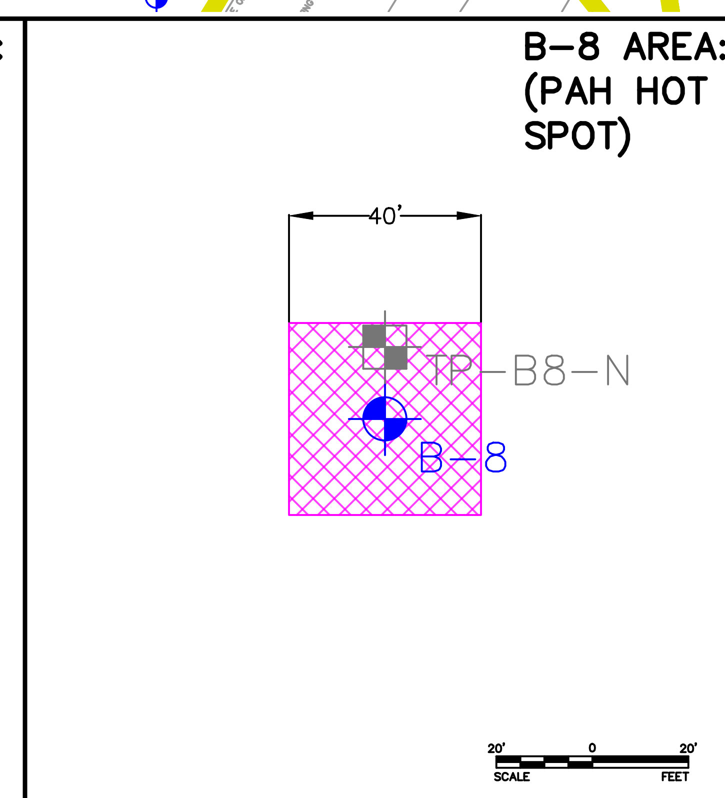
NOTES

1.) ALL TEST PIT AND BORING LOCATIONS ARE APPROXIMATE.

REFERENCE

1.) BASE MAP FROM DIGITAL FILE PROVIDED BY McINTOSH & McINTOSH, P.C., LOCKPORT, NEW YORK, ENTITLED "SURVEY OF PART OF LOT–46, TWP.–11, R.–8, HOLLAND PURCHASE," DATED MARCH 20, 2012.





REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW

PROJECT

REMEDIAL INVESTIGATION / ALTERNATIVES ANALYSIS
LEGACY LASALLE, LLC - BUFFALO, NEW YORK

TITLE

PROPOSED IRM EXCAVATION AREAS
89 LASALLE AVENUE SITE

Golder Associates
Buffalo, New York

PROJECT No.			FILE No.			
DESIGN	JGT	1/22/15	SCALE	AS SHOWN	REV.	0
CADD	JGT	1/22/15				
CHECK						
REVIEW						

FIGURE 6-1