dewatering is considered a remedial component inasmuch as it is necessary to facilitate excavation of contaminated material.

Dewatered fluids will not be recharged back to the land surface or subsurface. Dewatering fluids will be managed off-site. Discharge of water generated during remedial construction to surface waters (i.e., a local pond, stream, and/or river) is prohibited without a SPDES permit.

5.4.8 Backfill from Off-Site Sources

Materials proposed for import onto the site will be approved by the RE and will be in compliance with the provisions in this RAWP prior to receipt at the site. The Final Engineering Report (FER) will include the following certification by the Remedial Engineer: "I certify that all import of soils from off-site, including source evaluation, approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan".

Imported soils will meet NYSDEC-approved backfill or cover soil quality objectives for this site. These NYSDEC-approved backfill or cover soil quality objectives are the lower of the PGW or RURR SCOs for restricted use as set forth in Table 375-6.8(b) of 6 NYCRR Part 375 and listed in Table 2. Non-compliant soils will not be imported onto the site without prior approval by NYSDEC. Nothing in the approved RAWP or its approval by NYSDEC should be construed as an approval for this purpose. Material from industrial sites, spill sites, other environmental remediation sites, or other potentially contaminated sites will not be imported to the site. Solid waste will not be imported onto the site. Backfill material will consist of clean fill (as described in the following paragraph) or other acceptable fill material such as virgin stone from a quarry or RCA. If RCA is imported to the site, it will be from a NYSDEC-registered facility in compliance with 6 NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require chemical testing, unless required by the NYSDEC under the terms for operation of the facility. RCA imported to the site must be derived from recognizable and uncontaminated concrete, with no more than 10% by weight passing through a No. 10 sieve. RCA is not acceptable for and will not be used as cover or drainage material. If required, a site-specific BUD will be obtained by the NYSDEC for import of RCA.

Imported soil (i.e., clean fill) will meet the lower of PGW or RURR SCOs. Non-compliant soils will not be imported to the site. Clean fill will be segregated at a source/facility that is free of environmental contaminants. Qualified environmental personnel will collect representative samples at a frequency consistent with NYSDEC CP-51. The samples will be analyzed for Part 375 VOCs, SVOCs, pesticides/herbicides, PCBs, cyanide, metals including trivalent and hexavalent chromium, 1,4-dioxane, and PFAS by a NYSDOH ELAP-certified laboratory. Upon meeting these criteria, the certified-clean fill will be transported to the site and segregated from impacted material, as necessary, on plastic sheeting until it is used as backfill.

Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this site, will not be imported onto the site without prior approval by the NYSDEC. The contents of this RAWP and NYSDEC approval of this RAWP should not be construed as an approval for this purpose.

Trucks entering the site with imported soils will be secured with tight fitting covers.

5.4.9 Stormwater Pollution Prevention

A SWPPP is not required because the site is less than 1 acre in size. Silt fencing or hay bales will be installed around the perimeter of the remedial construction area, as needed, and details are included in Appendix G. Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by NYSDEC. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering. Erosion and sediment control measures identified in the RAWP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to the sewer system.

5.4.10 Contingency Plan

If USTs or other previously unidentified contaminant sources are found during on-site remedial excavation or development-related construction, sampling will be performed on product, if encountered, and surrounding subsurface materials (e.g., soil, stone, etc.). Chemical analyses will be for full scan parameters (Part 375 TCL VOCs, SVOCs, PCBs, pesticides, TAL metals, 1,4-dioxane and PFAS). Analyses will not be otherwise limited without NYSDEC approval.

Identification of unknown or unexpected contaminated media identified by screening during ground-intrusive work will be promptly communicated by phone to the NYSDEC Project Manager. These findings will also be detailed in the daily reports and the subsequent monthly BCP progress report.

5.4.11 Community Air Monitoring Plan

Community air monitoring will be conducted in compliance with the NYSDOH Generic CAMP outlined below. Exceedances observed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers and included in the Daily Report.

The CAMP will include real-time monitoring for VOCs and particulates at the downwind perimeter of each designated work area when ground-intrusive work is in progress. Continuous monitoring will be required for all ground-intrusive work. Ground-intrusive work includes, but is not limited to, soil/fill excavation and handling and utility trenching. Periodic monitoring for VOCs may be required during non-intrusive work such as the collection of soil samples. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location and taking a reading prior to leaving a sample location.

CAMP monitoring of total VOC levels will be conducted using PIDs, and monitoring for particulates will be conducted using particulate sensors equipped with filters that can detect airborne particulates less than 10 microns in diameter (PM10). Monitoring for particulates and odors will be conducted during ground-intrusive work by a Langan field representative under the supervision of the RE. The work zone is defined as the general area in which machinery is operating in support of remediation. A portable PID will be used to monitor the work zone and for periodic monitoring of total VOC levels during work such as soil sampling. The site perimeter will be visually monitored for fugitive dust emissions.

The following actions will be taken based on total VOC measurements:

- If total VOC levels exceed 5 ppm above background for the 15-minute average at the perimeter, work will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work will resume with continued monitoring.
- If total VOC levels at the downwind perimeter of the work zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work will resume provided that the total VOC level 200 feet downwind of the hot zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less – but in no case less than 20 feet, is below 5 ppm above background for the 15-minute average.
- If the total VOC level is above 25 ppm at the perimeter of the hot zone, work will be shut down.

The following actions will be taken based on PM10 measurements and visual dust observations:

- If the downwind PM10 level is 100 µg/m³ greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression must be employed. Work may continue with dust suppression techniques

provided that downwind PM10 levels do not exceed 150 µg/m³ above the background level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM10 levels are greater than 150 µg/m³ above the background level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM10 concentration to within 150 µg/m³ of the upwind level and in preventing visible dust migration.

Sustained concentrations of VOCs or PM10 will be reported to the NYSDEC and NYSDOH Project Managers and included in the daily report. In addition, a map showing the location of the downwind and upwind CAMP stations will be included in the daily report.

5.4.12 Odor, Dust and Nuisance Control Plan

Dust, odor, and nuisance control will be accomplished by the remediation contractor as described in this section. The FER will include the following certification by the RE: "I certify that ground-intrusive work during remediation and development-related construction was conducted in accordance with dust and odor suppression methodology defined in the RAWP."

5.4.12.1 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-site. Specific odor control methods to be used as needed will include application of foam suppressants or tarps over the odor or VOC source areas, if encountered. If nuisance odors are identified, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of all other complaints about the project. Implementation of site perimeter odor monitoring, including notifying the contractor and NYSDEC of exceedances, will be the responsibility of the Volunteers' RE, who is responsible for certifying the FER. Application of odor controls is the responsibility of the Remedial Contractor.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, procedures may include: (a) limiting the area of open excavations; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (a) direct load-out of soils to trucks for off-site disposal; (b) use of chemical odorants in spray or misting systems; and, (b) use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-site conditions or close

proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

5.4.12.2 Dust Control Plan

A dust suppression plan that addresses dust management during ground-intrusive on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved through the use of a dedicated water distribution system or on-site water truck for road wetting. Where required, the truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles
- Gravel will be used on roadways to provide a clean and dust-free road surface
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling

5.4.12.3 Other Nuisances

A plan for rodent control will be developed and used by the remediation contractor during site preparation (including clearing and grubbing) and during remedial work.

A plan for noise control will be developed and used by the remediation contractor during site preparation and remedial work and will conform, at a minimum, to the NYCDEP noise control standards.

5.5 Remedial Action: In-Situ Groundwater Treatment

A remedial design investigation was completed in May 2019 that included soil and groundwater sampling for use in a soil oxidant demand (SOD) test. Based on sample results, ISCO and oxygen release compound were selected to provide rapid and sustained degradation of the targeted petroleum-related VOCs and SVOCs. Soil below the groundwater table and groundwater will be treated with one round of ISCO (PersulfOx®) followed by a second round of combined ISCO and oxygen release compound (ORC Advanced®). ISCO and oxygen release compound will be applied directly to the petroleum-impacted soil and groundwater via about 160 temporary injection points or direct mixing with an excavator in the northern half of the site. The approximate treatment area is shown on Figure 12. The treatment depth will target the approximate depth of saturated zone petroleum impacts (assumed to be about 11 to 20 feet bgs on Lot 3 and 18 to 28 feet bgs on Lots 12 and 20).

A complete description of the chemical oxidant application, including quantities and specific chemical information, is provided in the remedial design memorandum, provided as Appendix I. Langan will oversee the application of the oxidant and document operations. Follow-up oxidant application may be required, depending on the groundwater monitoring results.

After completion of the ISCO treatment, groundwater samples will be collected from select monitoring wells within the groundwater treatment area, and analyzed for petroleum-related VOCs (VOCs listed in CP-51 Table 2). Groundwater samples will be collected prior to remedial injections to serve as a baseline for performance monitoring. Groundwater monitoring activities to assess the performance of the remedy, or natural attenuation following the removal of contaminant sources, will continue, as determined by NYSDOH and NYSDEC, until residual groundwater concentrations are found to be below NYSDEC standards or have become asymptotic over an extended period. Monitoring will continue until permission to discontinue is granted in writing by NYSDEC and NYSDOH. Monitoring activities will be outlined in the Monitoring Plan of the SMP. It is anticipated that, following remediation, a minimum of eight quarterly monitoring events will be performed.

6.0 CONTAMINATION TO REMAIN ON-SITE

Exposure to residual contaminated soils will be prevented by an engineered, composite cover system that will be built on the site. The FER will report the results of post-excavation documentation soil samples in tabular and map form. The FER will also include surveyed limits of excavation and location of all final documentation samples.

Since residual contaminated soil will exist beneath the site after the remedy is complete, ECs and ICs are required to protect human health and the environment. These ECs and ICs are described hereafter. Long-term management of EC/ICs and of residual contamination will be executed under a site specific SMP that will be developed and included in the FER.

ECs will be implemented to protect public health and the environment by appropriately managing residual contamination. The Controlled Property (the site) will have one primary EC system; a composite cover system will be comprised of at least 2 feet of clean soil that meets the lower of PGW or RURR SCOs in areas not covered by a concrete building slab.

The FER will report residual contamination on the site in tabular and map form. This will include presentation of exceedances of both Track 1 and Track 4 sites.

7.0 ENGINEERING CONTROLS

Following completion of the remedy, it is anticipated that the site will meet Track 4 SCOs as previously defined. Long-term engineering controls will be required as part of the remedial action. Exposure to residual contaminated soils will be prevented by an engineered, composite cover system that will be built on the site. An engineered composite cap consisting of a building foundation, sidewalks, asphalt cover, or at least 2 feet of clean soil that meets the lower of PGW or RURR SCOs will be installed. A vapor barrier/waterproofing membrane will be installed as part of the composite cap, and also will serve to mitigate potential soil vapor intrusion into the planned building. A minimum 20-mil-thick vapor barrier membrane will be installed under the slab of the entire proposed building and along all foundation sidewalls to grade. The specifications for the product will be provided to the NYSDEC for review and approval.

As-built waterproofing/vapor barrier plans prepared by the Contractor responsible for installing and inspecting the waterproofing/vapor barrier system will be submitted with the FER. The FER will include photographs of the installation process, a copy of a PE/RA-certified letter (on company letterhead) from the Contractor responsible for installation and field inspections, and a copy of the manufacturer's certificate of warranty. A PE will certify that the vapor barrier membrane system was installed per manufacturer's instructions

The composite cover system will be a permanent EC. A vapor barrier/waterproofing membrane will be installed as part of the composite cover. The composite cover will be inspected and its performance certified at specified intervals as required by this RAWP and the SMP. The SMP (to be included in the FER) will outline maintenance requirements and the procedures to be followed in the event that the composite cover system with underlying vapor barrier membrane system is disturbed after the remedial action is complete. A diagram showing the aerial distribution and design detail for each cover type is shown in Figure 13.

A Soil Materials Management Plan (SMMP) will be included in the SMP and will outline the procedures to be followed in the event that the composite cover system and underlying residual contamination are disturbed after the Remedial Action is complete.

8.0 INSTITUTIONAL CONTROLS

After the remedy is complete, the site will have residual contamination remaining in place. ECs for the residual contamination have been incorporated into the remedy to render the overall site remedy protective of public health and the environment. Two elements have been designed to ensure continual and proper management of residual contamination in perpetuity: an EE and a SMP.

All as-built drawings, diagrams, calculation and manufacturer documentation for treatment systems will be presented in the FER.

A site-specific EE will be recorded with Bronx County to provide an enforceable means of ensuring the continual and proper management of residual contamination and protection of public health and the environment in perpetuity or until released in writing by NYSDEC. It requires that the grantor of the EE and the grantor's successors and assigns adhere to all ECs and ICs placed on this site by this NYSDEC-approved remedy. ICs provide restrictions on site usage and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. The SMP describes appropriate methods and procedures to ensure compliance with all ECs and ICs that are required by the EE. Once the SMP has been approved by the NYSDEC, compliance with the SMP is required by the grantor of the EE and grantor's successors and assigns.

8.1 Environmental Easement

An EE, as defined in Article 71 Title 36 of the Environmental Conservation Law, is required when residual contamination above UU SCOs is left on-site after the Remedial Action is complete. If the site will have residual contamination after completion of all Remedial Actions, then an EE is required. As part of this remedy, an EE approved by NYSDEC will be filed and recorded with the Bronx County Clerk. The EE will be submitted as part of the FER.

The EE renders the site a Controlled Property. The EE must be recorded with the Bronx County Clerk or City Register before the Certificate of Completion can be issued by NYSDEC. A series of ICs is required under this remedy to implement, maintain and monitor these EC systems, prevent future exposure to residual contamination by controlling disturbances of the subsurface soil and restricting the use of the site to restricted-residential, industrial and commercial use(s) only. These ICs are requirements or restrictions placed on the site that are listed in, and required by, the EE. ICs can, generally, be subdivided between controls that support ECs, and those that place general restrictions on site usage or other requirements. ICs in both of these groups are closely integrated with the SMP, which provides all of the methods and procedures to be followed to comply with this remedy.

Under the Track 4 scenario, the EC will be in the form of a long-term composite cover (vapor barrier/waterproofing membrane, concrete building foundation, sidewalks, asphalt cover and/or two feet of imported material that meets the lower of PGW or RURR SCOs) and vapor barrier. The ICs that support the ECs are:

- On-site environmental monitoring devices, including but not limited to, groundwater monitor wells, must be protected and replaced as necessary to ensure proper functioning in the manner specified in the SMP;
- Compliance with the EE by the Grantee and the Grantee's successors and adherence of all elements of the SMP is required.
- All ECs must be operated and maintained as specified in the SMP.
- All ECs on the Controlled Property must be inspected and certified at a frequency and in a manner defined in the SMP. A composite cover system consisting of concrete building slabs must be inspected, certified and maintained as required in the SMP;
- Environmental or public health monitoring must be performed as defined in the SMP.
- Data and information pertinent to Site Management for the Controlled Property must be reported at the frequency and in a manner defined in the SMP.
- ECs may not be discontinued without an amendment or extinguishment of the EE. The EE may be extinguished only by release by the Commissioner of NYSDEC, or the Commissioner's designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

Adherence to these ICs for the site is mandated by the EE and will be implemented under the SMP (discussed in the next section).

The Controlled Property (site) will also have a series of ICs in the form of site restrictions and requirements. The site restrictions that apply to the Controlled Property are:

- Vegetable gardens and farming in residual site soil on the Controlled Property are prohibited.
- Use of groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended purpose as approved by NYSDOH and NYSDEC.
- All future activities on the Controlled Property that will disturb residual contaminated material, if present, are prohibited unless they are conducted in accordance with the soil management provisions in the SMP.

- The Controlled Property may be used for restricted-residential, commercial and industrial use only (as allowed by zoning), provided the long-term ECs and ICs included in the SMP are employed.
- The Controlled Property may not be used for a higher level of use, such as unrestricted or residential (single family) use without an amendment or extinguishment of this EE.
- Grantor agrees to submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow. This statement must be certified by an expert that the NYSDEC finds acceptable.

8.2 Site Management Plan

The SMP in the FER will include a monitoring plan for groundwater at the down-gradient site perimeter to evaluate site -wide performance of the remedy. Appropriately placed groundwater monitor wells will also be installed immediately down-gradient of all VOC remediation areas for the purpose of evaluation of the effectiveness of the remedy that is implemented.

Site Management is the last phase of remediation and begins with the approval of the FER and issuance of the Certificate of Completion for the Remedial Action. The SMP is submitted as part of the FER but will be written in a manner that allows its use as a complete and independent document. Site Management continues in perpetuity or until released in writing by NYSDEC. The property owner is responsible to ensure that all Site Management responsibilities defined in the EE and the SMP are performed.

The SMP is intended to provide a detailed description of the procedures required to manage residual contamination left in place at the site following completion of the Remedial Action in accordance with the BCA with the NYSDEC. This includes: (1) development, implementation, and management of all ECs and ICs; (2) development and implementation of monitoring systems and a Monitoring Plan; (3) development of a plan to operate and maintain any treatment, collection, containment, or recovery systems (including, where appropriate, preparation of an Operation and Maintenance Manual); (4) submittal of Site Management Reports, performance of inspections and certification of results, and demonstration of proper communication of site information to NYSDEC; and (5) defining criteria for termination of treatment system operation, if applicable.

To address these needs, this SMP will include four plans: (1) an Engineering and Institutional Control Plan for implementation and management of IC/ECs; (2) a Monitoring Plan for implementation of Site Monitoring; (3) an Operation and Maintenance Plan for implementation of remedial collection, containment, treatment, and recovery systems; and (4) a Site Management Reporting Plan for submittal of data, information, recommendations, and certifications to NYSDEC. The SMP will be prepared in accordance with the requirements in NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation and the guidelines provided by NYSDEC. The SMP will include a provision for evaluation of the potential for soil vapor intrusion for any occupied buildings on the site, including a provision for implementing actions recommended to address exposures related to soil vapor intrusion.

Site management, reporting, and IC/EC certification will be scheduled on a certification period basis. The certification period will be annual, unless otherwise approved by NYSDEC. The SMP will be based on a calendar year and will be due for submission to NYSDEC by three months following the end of the reporting period.

No exclusions for handling of remaining contaminated soil will be provided in the SMP. All handling of remaining contaminated material will be subject to provisions contained in the SMP.

9.0 FINAL ENGINEERING REPORT

A FER will be submitted to NYSDEC following implementation of the Remedial Action defined in this RAWP. The FER provides documentation that the remedial work required under this RAWP has been completed and performed in compliance with this plan. The FER will provide a comprehensive account of the locations and characteristics of all material removed from the Site including the surveyed map(s) of all sources. The FER will include as-built drawings for all constructed elements, manufacturer documentation for treatment systems, certifications, manifests, bills of lading, and the complete Site Management Plan (formerly the Operation and Maintenance Plan). The FER will provide a description of the changes in the Remedial Action from the elements provided in the RAWP and associated design documents. The FER will provide a tabular summary of all performance evaluation sampling results and all material characterization results and other sampling and chemical analysis performed as part of the Remedial Action. The FER will provide test results demonstrating that all mitigation and remedial systems are functioning properly. The FER will be prepared in conformance with DER-10.

Where determined to be necessary by NYSDEC, a Financial Assurance Plan will be required to ensure the sufficiency of revenue to perform long-term operations, maintenance and monitoring tasks defined in the SMP and EE. This determination will be made by NYSDEC in the context of the FER review.

The FER will include written and photographic documentation of all remedial work performed under this remedy.

The FER will include an itemized tabular description of actual costs incurred during all aspects of the Remedial Action.

The FER will provide a thorough summary of all residual contamination left on the Site after the remedy is complete. Residual contamination includes all contamination that exceeds the Track 1 Unrestricted Use SCO in 6NYCRR Part 375-6. A table that shows exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the Site after the Remedial Action and a map that shows the location and summarizes exceedances from Track 1 Unrestricted SCOs for all soil/fill remaining at the site after the Remedial Action will be included in the FER.

The FER will provide a thorough summary of all residual contamination that exceeds the SCOs defined for the site in the RAWP and must provide an explanation for why the material was not removed as part of the Remedial Action. A table that shows residual contamination in excess of Site SCOs and a map that shows residual contamination in excess of Site SCOs will be included in the FER.

The Final Engineering Report will include an accounting of the destination of all material removed from the Site, including excavated contaminated soil, historic fill, solid waste, hazardous waste, non-regulated material, and fluids. Documentation associated with disposal of all material must also include records and approvals for receipt of the material. It will provide an accounting of the origin and chemical quality of all material imported onto the Site.

Before approval of a FER and issuance of a Certificate of Completion, all project reports must be submitted in digital form on electronic media (PDF).

9.1 Certifications

The following certification will appear in front of the FER Executive Summary. The certification will be signed by the RE, Jason J. Hayes, who is a NYS-licensed Professional Engineer. The certification will be appropriately signed and stamped. The certification will include the following statements:

I, _____, am currently a registered professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the Gerard Avenue and East 146th Street Site

I certify that the site description presented in this Final Engineering Report is identical to the site descriptions presented in the Environmental Easement, Site Management Plan, Brownfield Cleanup Agreement for the Gerard Avenue and East 146th Street site and related amendments.

I certify that the Remedial Action Work Plan dated [month day year] and Stipulations [if any] in a letter dated [month day year] and approved by the NYSDEC were implemented and that all requirements in those documents have been substantively complied with.

I certify that the remedial activities were observed by qualified environmental professionals under my supervision and that the remediation requirements set forth in the Remedial Action Work Plan and any other relevant provisions of ECL 27-1419 have been achieved.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and all operation and maintenance requirements applicable to the Site are contained in an Environmental Easement created and recorded pursuant ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded. A Site Management Plan has been submitted by the [Applicant / Volunteer / Participant] for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by the NYSDEC.

I certify that the export of contaminated soil, fill, water, or other material from the property was performed in accordance with the Remedial Action Work Plan, and were taken to facilities licensed to accept this material in full compliance with all federal, state, and local laws.

I certify that import of soils from off-site, including source approval and sampling, has been performed in a manner that is consistent with the methodology defined in the Remedial Action Work Plan.

I certify that ground-intrusive work during remediation and development-related construction was conducted in accordance with dust and odor suppression methodology defined in the Remedial Action Work Plan.

I certify that all information and statements in this certification are true. I understand that a false statement made herein is punishable as Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

It is a violation of Article 130 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 130, New York State Education Law.

10.0 SCHEDULE

Remedial activities are anticipated to take about 4 to 6 months. Within 90 days of completion of all remedial activities at the site, an FER will be submitted to NYSDEC as detailed in Section 9.0. The project is anticipated to start in May 2020. A Gantt chart showing a detailed project schedule is included in Appendix H.

11.0 REFERENCES

1. AEI, Phase II Subsurface Investigation for 445 Gerard Avenue, dated March 7, 2012
2. AEI, Phase I Environmental Site Assessment for 445 Gerard Avenue, dated April 16, 2012
3. GEI, Phase I Environmental Site Assessment for 417 Gerard Avenue, dated June 2015
4. AEI, Phase I Environmental Site Assessment for 440 Exterior Street, dated August 28, 2015
5. AEI, Limited Phase II Subsurface Investigation, dated October 12, 2015
6. AEI, Phase I Environmental Site Assessment, dated August 16, 2016
7. Langan, Subsurface Investigation Letter Report, dated March 2, 2018
8. Langan, Draft Geotechnical Engineering Report, dated September 24, 2018
9. Langan, Phase I Environmental Site Assessment for 404 Exterior Street, dated April 3, 2019
10. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, DPC., Remedial Investigation Report, dated August 2019.
11. New York State Department of Health, Final Guidance for the Evaluation of Soil Vapor Intrusion in the State of New York, dated October 2006.
12. New York State Department of Environmental Conservation, Division of Environmental Remediation, Draft Brownfield Cleanup Program Guide, dated May 2004.
13. New York State Department of Environmental Conservation, Division of Environmental Remediation, Technical and Administrative Guidance Memorandum No. 4031 Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Waste Sites, dated October 27, 1989.
14. New York State Department of Environmental Conservation, Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated May 3, 2010; effective June 18, 2010.
15. New York State Department of Environmental Conservation, Part 375 of Title 6 of the New York Compilation of Codes, Rules, and Regulations, Effective December 14, 2006.
16. New York State Division of Water Technical and Operational Guidance Series (TOGS) (1.1.1) dated June 1998.
17. New York State Division of Water Technical and Operational Guidance Series (TOGS) 5.1.8 New York State Stormwater Management Design Manual, dated June 2008.
18. United States Environmental Protection Agency, Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, "EPA/540/S-95/504, April 1996.

19. United States Census Bureau, July 2018 Census Data, dated 2018.

TABLES

Table 1
Remedial Action Work Plan
Track 1 Soil Cleanup Objectives

Gerard Avenue and East 146th Street
Bronx, New York
BCP Site No. C203111
Langan Project Number. 170487001

VOCS (mg/kg)	
1,1,1-Trichloroethane	0.68
1,1-Dichloroethane	0.27
1,1-Dichloroethylene	0.33
1,2-Dichlorobenzene	1.1
1,2-Dichloroethane	0.02
cis-1,2-Dichloroethene	0.02
trans-1,2-Dichloroethene	0.25
1,3-Dichlorobenzene	0.19
1,4-Dichlorobenzene	1.8
1,4-Dioxane	0.1
2-Butanone	0.12
Acetone	0.05
Benzene	0.06
Carbon tetrachloride	0.76
Chlorobenzene	1.1
Chloroform	0.37
Ethyl Benzene	1
Hexachlorobenzene	0.33
Methyl tert-butyl ether (MTBE)	0.93
Methylene chloride	0.05
n-Propylbenzene	3.9
sec-Butylbenzene	11
tert-Butylbenzene	5.9
Tetrachloroethylene	1.3
Toluene	0.7
Trichloroethylene	0.47
1,2,4-Trimethylbenzene	3.6
1,3,5-Trimethylbenzene	8.4
Vinyl Chloride	0.02
Xylenes, Total	0.26
Metals (mg/kg)	
Arsenic	13
Barium	350
Beryllium	7.2
Cadmium	2.5
Chromium, hexavalent	1
Chromium, trivalent	30
Copper	50
Total Cyanide	27
Lead	63
Manganese	1600
Mercury	0.18
Nickel	30
Selenium	3.9
Silver	2
Zinc	109

SVOCS (mg/kg)	
Acenaphthene	20
Acenaphthylene	100
Anthracene	100
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1
Benzo(g,h,i)perylene	100
Benzo(k)fluoranthene	0.8
Chrysene	1
Dibenzo(a,h)anthracene	0.33
Fluoranthene	100
Fluorene	30
Indeno(1,2,3-cd)pyrene	0.5
m-Cresol	0.33
Naphthalene	100
o-Cresol	0.33
p-Cresol	0.33
Pentachlorophenol	0.8
Phenanthrene	100
Phenol	0.33
Pyrene	100
PCBs/Pesticides (mg/kg)	
2,4,5-TP Acid (Silvex)	3.8
4,4'-DDE	0.0033
4,4'-DDT	0.0033
4,4'-DDD	0.0033
Aldrin	0.005
alpha-BHC	0.02
beta-BHC	0.036
Chlordane (alpha)	0.094
delta-BHC	0.04
Dibenzofuran	7
Dieldrin	0.005
Endosulfan I	2.4
Endosulfan II	2.4
Endosulfan sulfate	2.4
Endrin	0.014
Heptachlor	0.042
Lindane	0.1
Polychlorinated biphenyls	0.1

Notes:
1. SCO = Soil Cleanup Objective
2. SVOC = semivolatile organic compound
3. VOC = volatile organic compound
4. PCB = polychlorinated biphenyl
5. mg/kg = milligram per kilogram
6. SCO values are the lower of Protection of Groundwater and Unrestricted Use guidance values.

Table 2
Remedial Action Work Plan
Track 4 Soil Cleanup Objectives

Gerard Avenue and East 146th Street
Bronx, New York
BCP Site No. C203111
Langan Project Number. 170487001

VOCS (mg/kg)	
1,1,1-Trichloroethane	0.68
1,1-Dichloroethane	0.27
1,1-Dichloroethene	0.33
1,2,4-Trimethylbenzene	3.6
1,2-Dichlorobenzene	1.1
1,2-Dichloroethane	0.02
1,3,5-Trimethylbenzene (Mesitylene)	8.4
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
1,4-Dioxane (P-Dioxane)	0.1
Acetone	0.05
Benzene	0.06
Carbon Tetrachloride	0.76
Chlorobenzene	1.1
Chloroform	0.37
Cis-1,2-Dichloroethene	0.25
Ethylbenzene	1
Methyl Ethyl Ketone (2-Butanone)	0.12
Methylene Chloride	0.05
Naphthalene	12
n-Butylbenzene	12
n-Propylbenzene	3.9
Sec-Butylbenzene	11
T-Butylbenzene	5.9
Tert-Butyl Methyl Ether	0.93
Tetrachloroethene (PCE)	1.3
Toluene	0.7
Total Xylenes	1.6
Trans-1,2-Dichloroethene	0.19
Trichloroethene (TCE)	0.47
Vinyl Chloride	0.02
SVOCS (mg/kg)	
1,2-Dichlorobenzene	1.1
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
1,4-Dioxane (P-Dioxane)	0.1
2-Methylphenol (o-Cresol)	0.33
Acenaphthene	98
Acenaphthylene	100
Anthracene	100
Benzo(a)Anthracene	1
Benzo(a)Pyrene	1
Benzo(b)Fluoranthene	1
Benzo(g,h,i)Perylene	100
Benzo(k)Fluoranthene	1
Chrysene	1
Dibenz(a,h)Anthracene	0.33
Dibenzofuran	14
Fluoranthene	100
Fluorene	100
Hexachlorobenzene	0.33
Indeno(1,2,3-c,d)Pyrene	0.5
Naphthalene	12
Pentachlorophenol	0.8
Phenanthrene	100
Phenol	0.33
Pyrene	100

Pesticides (mg/kg)	
4,4'-DDD	2.6
4,4'-DDE	1.8
4,4'-DDT	1.7
Aldrin	0.019
Alpha BHC (Alpha Hexachlorocyclohexane)	0.02
Alpha Chlordane	0.91
Alpha Endosulfan	4.8
Beta Bhc (Beta Hexachlorocyclohexane)	0.072
Beta Endosulfan	4.8
Delta Bhc (Delta Hexachlorocyclohexane)	0.25
Dieldrin	0.039
Endosulfan Sulfate	4.8
Endrin	0.06
Gamma Bhc (Lindane)	0.1
Heptachlor	0.38
Herbicides (mg/kg)	
Silvex (2,4,5-Tp)	3.8
Polychlorinated Biphenyls (mg/kg)	
Total PCBs	1
Inorganics (mg/kg)	
Arsenic	16
Barium	350
Beryllium	14
Cadmium	2.5
Chromium, Hexavalent	19
Chromium, Trivalent	36
Copper	270
Cyanide	27
Lead	400
Manganese	2,000
Mercury	0.73
Nickel	130
Selenium	4
Silver	8.3
Zinc	2,200

Notes:
1. SCO = Soil Cleanup Objective
2. SVOC = semivolatile organic compound
3. VOC = volatile organic compound
4. PCB = polychlorinated biphenyl
5. mg/kg = milligram per kilogram
6. SCO values are the lower of Protection of Groundwater and Restricted Use Restricted-Residential Use guidance values.

Track 1 Remedial Cost Estimate
Gerard Avenue and East 146th Street

New York, New York
Langan Project Number. 170487001
BCP Site No. C203111

Item No.	Description of Environmental Item	Quantity		Premium Unit Price		Estimated Premium
A - REMEDIAL ACTION CONTRACTOR FEES						
A-1	Abatement: - Accounts for abatment of asbestos-contaning materials, lead based paint, and other universal waste and hazardous wastes; and air monitoring during abatement activities	--		Allowance		$300,000
A-2	In-situ Groundwater Treatment - Accounts for the mobilization of the remediation contractor, installation of injection points, application of chemicals, chemical product costs, and implementation	--		Allowance		$1,000,000
A-3	Demolition - Accounts for demolition of existing building	--		Allowance		$945,000
A-4	Remediation Facilities, Equipment, Mobilization, Demobilization, Permits, and Site Maintenance - Remediation and decontamination facilities include trailer, truck cleaning facilities, etc.	--		Allowance		$100,000
A-5	Support of Excavation (SOE) - Includes installation of a secant-pile wall along the south and west perimeter of Lots 3 and 20, respectively. The secant-pile wall will be installed bedrock, which is at approximately 75 feet below grade surface (bgs). 109 piles will be required to construct the secant-pile wall.	9,000	LF	$350	per LF	$3,200,000
A-6	Support of Excavation (SOE) - Includes installation of a soil-mix wall along the perimeter of Lots 3, 12, and 20. The soil-mix wal will be installed bedrock, which is at approximately 75 feet below grade surface (bgs). 455 piles will be required to construct the soil-mix wall.	35,000	LF	$300	per LF	$10,500,000
A-7	Management and Handling of Excavated Materials - Accounts for excavation of material containing concentrations exceeding Unrestricted Use Soil Cleanup Objectives.	33,000	CY	$37	per CY	$1,221,000
A-8	Transport and Disposal of Historic Fill that Exceeds Unrestriced Use Soil Cleanup Objectives - Includes transport vehicles and disposal of material at a permitted facility.	49,500	Tons	$57	per Ton	$2,821,500
A-9	Transport and Disposal of Hazardous Lead-Impacted Historic Fill Material - Includes transport vehicles and disposal of a hazardous lead hotspot in Lot 3.	10	Tons	$125	per Ton	$1,250
A-10	Aboveground/Underground Storage Tank (AST/UST) Removal - Cleaning, removal, and disposal of three oil-water separators, four ASTs, and four suspect USTs across the site.	11	Tanks	$20,000	per Tank	$220,000
A-11	Dewatering/Fluid Treatment - Accounts for design and installation and for the fees to operate and maintain the dewatering and treatment system for 4 months.	4	Months	$70,000	per Month	$280,000
A-12	Dust, Odor and Vapor Control - Includes odor, dust, and organic vapor control during remediation of the site. Assumes control measures will include, but not be limited to application of odor suppressant, foam or water.	6	Months	$20,000	per Month	$120,000
A-13	Backfill - Import and placement of clean fill material to bring hotspots to development grade. An additional 10% of material is included to account for compaction.	21,000	CY	$30	CY	$630,000
				REMEDIAL ACTION CONTRACTOR FEES SUBTOTAL		**$21,339,000**
B - ENGINEERING FEES						
B-1	Waste Characterization	--		Allowance		$60,000
B-2	Engineering Support, Construction Administration, and Agency Coordination (During Remediation)	6	Months	$15,000	per Month	$90,000
B-3	Community Air Monitoring - This fee includes equipment rental fees associated with implementation of CAMP, which will be performed during ground-intrusive work including excavation and backfill, the presence of an on-site engineer to observe and document the site remediation, remediation health and safety including purchase and maintenance of appropriate personal protective equipment (PPE), and daily field reporting to the NYSDEC.	6	Months	$40,000	per Month	$240,000
B-4	Engineering Special Inspection of Support of Excavation	6	Months	$35,000	per Month	$210,000
B-5	Post-Remediation Groundwater Treatment - This fee includes installation of post-remediation groundwater monitoring wells and quarterly groundwater monitoring and reporting for two years after product application has been completed.	--		Allowance		$150,000
B-6	Documentation Sampling - To confirm source material removal (assumes analysis for VOCs, SVOCs, PCBs, pesticides, cyanide and metals including hexavalent and trivalent chromium for each sample).	51	Samples	$1,200	per Sample	$62,000
B-7	Regulatory Agency Required Reporting - Remedial Design, Closure Reporting (Final Engineering Report)	--		Allowance		$100,000
				ENGINEERING FEES SUBTOTAL		**$912,000**
				GC, CM Fee, Insurance, Contingency (16.8% of Contractor Fee Subtotal)		**$3,585,000**
				Total Estimated Fee		**$25,836,000**
				ESTIMATED REMEDIATION FEE - ALTERNATIVE I		**$25.8 MM**

General Assumptions and Conditions:

1. The density used for conversion from cubic yards to tons was 1.5 tons per cubic yard.
2. Excavation depths were estimated using Remedial Investigation soil sample results, field observations, and observed fill depths. Assumes 25 feet of excavation across Lots 1, 3, 12, and 20.
3. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this fee estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in fee elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This fee estimate is expected to be within -30% to +50% of the actu fee. Utilization of this fee estimate information beyond the stated purpose is not recommended. Langan is not licensed to provide financial or legal consulting services; as such, this fee estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability services.
4. A six month period is assumed for remediation and soil handling.
5. VOC = volatile organic compound; SVOC = semivolatile organic compound; PCBs = polychlorinated biphenyls

Contractor Fee Assumptions:

A-2 - The cost assumes an allowance for treatment of groundwater impacts across the site and off-site through implementation of in-situ chemical oxidation (ISCO). The proposed treatment includes injections of a remedial technology (e.g. Oxygen Release Compound [ORC®] or PlumeStop®) into the contaminated soil depth interval (10 to 20 feet bgs on Lot 3 and 20 to 30 feet bgs on Lot 12) prior to site-wide excavation.

A-7 - The unit rate provided reflects OSHA-certified construction labor.

A-7 - The site footprint is about 38,100 square feet. Assumes excacation to 18 feet bgs across Lots 1 and 3, and 28 feet bgs across Lots 12 and 20.

A-8 and A-9 - The unit rate provided reflects average disposal facility fees and may vary depending on time of year and facility.

A-9 - Hazardous lead-impacted soil was identified during the RI at the RB06 location on Lot 3 from 0 to 2 feet below grade surface (bgs). The volume assumed a 5-foot wide by 5-foot long, by 5-foot deep hotspot excavation.

A-11 - The fee is associated with treating the effluent before discharge into the sewer. Estimate is based on dewatering for 6 months of on-site operation. The fee includes mobilization, demobilization, freight, and equipment rental. Based o the depth-to-groundwater measurements recorded during the Remedial Investigation, dewatering will be necessary to accommodate a portion of the work associated with remedial excavation and SOE installation.

A-12 - Fee estimate includes application of dust suppression methods to open excavations and soil loaded into trucks. Labor provided by excavation, handling, and disposal contractor provided above; this line item estimate reflects material, freight, and equipment fees.

A-13 - Backfill placement and compaction assumes soil handling and management fees for the New York City area. Backfill will not contain concentrations of compounds above Track 1 Unrestricted Use Soil Cleanup Objectives (6NYCRR-Part 375-6.8(a)). The quantity of soil has been increased by 10% to account for compaction.

Engineering Fee Assumptions:

B-3 - The assumed duration of the community air monitoring program (CAMP) is six months to accommodate the estimated remediation timeline. CAMP fees include full-time equipment rental to facilitate perimeter dust and VOC monitoring.

B-6 - The fee assumes collection of 51 post-excavation confirmation soil samples including quality assurance/quality control samples. Sample analysis will be for Part 375 VOCs, SVOCs, PCBs, pesticides, cyanide, and metals (including hexavalent and trivalent chromium). The fee includes subcontracted laboratory analysis by a NYSDOH ELAP-certified laboratory and ASP Category B deliverables.

Table 4 - Track 4 Remedial Cost Estimate
Gerard Avenue and East 146th Street

New York, New York
Langan Project Number. 170487001
BCP Site No. C203111

Item No.	Description of Environmental Item	Quantity		Premium Unit Price		Estimated Premium
A - REMEDIAL ACTION CONTRACTOR FEES						
A-1	Abatement - Accounts for abatment of asbestos-contaning materials, lead based paint, and other universal waste and hazardou wastes; and air monitoring during abatement activities	--		Allowance		$300,000
A-2	In-situ Groundwater Treatment - Accounts for the mobilization of the remediation contractor, installation of injection points, application of chemicals, chemical product costs, and implementation	--		Allowance		$750,000
A-3	Demolition - Accounts for demolition of existing buildings	--		Allowance		$945,000
A-4	Remediation Facilities, Equipment, Mobilization, Demobilization, Permits, and Site Maintenance - Remediation and decontamination facilities include trailer, truck cleaning facilities, etc.	--		Allowance		$100,000
A-5	Support of Excavation (SOE) - Includes installation of a soldier pile and lagging to 3 feet on Lots 1 and 3 and 15 feet on Lots 12 and 20.	--		Allowance		$2,300,000
A-6	Management and Handling of Excavated Materials - Accounts for excavation of material containing concentrations exceeding Track 4 Soil Cleanup Objectives and/or to development depth.	13,000	CY	$37	per CY	$481,000
A-7	Transport and Disposal of Historic Fill for a Track 4 SCOs - Includes transport vehicles and disposal of material at a permitted facility.	20,000	Tons	$45	per Ton	$900,000
A-8	Transport and Disposal of Hazardous Lead-Impacted Historic Fill Material - Includes transport vehicles and disposal of a hazardous lead hotspot in Lot 3.	30	Tons	$165	per Ton	$4,950
A-9	Waterproofing/Vapor Barrier Membrane - Assumes a continuous waterproofing membrane will be installed below the foundation slab and along vertical foundation walls up to the proposed finished development grade.	46,100	SF	$9	per SF	$414,900
A-10	Aboveground/Underground Storage Tank (AST/UST) Removal - Cleaning, removal, and disposal of three oil-water separators, four ASTs, and four suspect USTs across the site.	11	Tanks	Allowance		$50,000
A-11	Dust, Odor and Vapor Control - Includes odor, dust, and organic vapor control during remediation of the site. Assumes control measures will include, but not be limited to application of odor suppressant, foam or water.	6	Months	$20,000	per Month	$120,000
A-12	Management and Handling of Backfilled Materials - Accounts for placement and compaction of backfilled materials to development grade	3,000	CY	$37	per CY	$111,000
A-13	Backfill - Import and placement of clean fill material to development grade. An additional 10% of material is included to accoun for compaction.	3,000	CY	$25	CY	$75,000
A-14	Site Cover System - Installation of a site cover system consisting of the building foundation slab and/or two feet of clean fill in areas of the site that may not be covered by the building foundation.	3,000	CY	$25	CY	$75,000
				REMEDIAL ACTION CONTRACTOR FEES SUBTOTAL		**$6,627,000**
B - ENGINEERING FEES						
B-1	Waste Characterization	--		Allowance		$60,000
B-2	Engineering Support, Construction Administration, and Agency Coordination (During Remediation)	6	Months	$20,000	per Month	$120,000
B-3	Community Air Monitoring - This fee includes equipment rental fees associated with implementation of CAMP, which will be performed during ground-intrusive work including excavation and backfill, the presence of an on-site engineer to observe and document the site remediation and implementation of the IRM, RAWP, Remedial Design Memo, remediation health and safety including purchase and maintenance of appropriate personal protective equipment (PPE), and daily field reporting to the NYSDEC.	6	Months	$45,000	per Month	$270,000
B-4	Engineering Special Inspection of Support of Excavation	6	Months	$35,000	per Month	$210,000
B-5	Post-Remediation Groundwater Treatment - This fee includes installation of post-remediation groundwater monitoring wells and quarterly groundwater monitoring and reporting for two years after product application has been completed.	--		Allowance		$150,000
B-6	Documentation Sampling - To confirm source material removal (assumes analysis for VOCs, SVOCs, PCBs, pesticides, cyanide and metals including hexavalent and trivalent chromium for each sample), PFAS. Includes data validation	55	Samples	$1,750	per Sample	$97,000
B-7	Regulatory Agency Required Reporting - Remedial Design, Closure Reporting (Final Engineering Report and Site Management Plan)	--		Allowance		$75,000
B-8	Site Management - Management of long-term EC/IC, which includes site visits, annual reporting fees, and operations and maintenance costs.	10	Years	$20,000	per Year	$200,000
				ENGINEERING FEES SUBTOTAL		**$1,182,000**
				GC, CM Fee, Insurance, Contingency (16.8% of Contractor Fee Subtotal)		**$1,114,000**
				Total Remedial Action Contractor Fees and Engineering Fees		**$8,923,000**
				ESTIMATED REMEDIATION FEE - ALTERNATIVE II		**$8.9 MM**

General Assumptions and Conditions:

1. The density used for conversion from cubic yards to tons was 1.5 tons per cubic yard.
2. Excavation depths were estimated using Remedial Investigation soil sample results, field observations, and observed fill depths. Assumes about 2 feet of excavation on Lot 1, 8 feet of excavation on Lot 3, 18 feet of excavation on Lots 1
3. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this fee estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in fee elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This fee estimate is expected to be within -30% to +50% of the actual fee. Utilization of this fee estimate information beyond the stated purpose is not recommended. Langan is not licensed to provide financial or legal consulting services; as such, this fee estimate information is not intended to be utiliz for complying with financial reporting requirements associated with liability services.
4. A four month period is assumed for remediation and soil handling.
5. VOC = volatile organic compound; SVOC = semivolatile organic compound; PCBs = polychlorinated biphenyls

Contractor Fee Assumptions:

A-2 - The cost assumes an allowance for treatment of groundwater impacts across the site through implementation of in-situ chemical oxidation (ISCO). The proposed treatment includes injections of a remedial technology (e.g. Oxygen Release Compound [ORC®] and Persulfox®) into the contaminated soil depth interval (8 to 18 feet bgs on Lot 3 and 18 to 28 feet bgs on Lot 12) prior to site-wide excavation.

A-6 - The unit rate provided reflects OSHA-certified construction labor.

A-6 - The site footprint is about 38,000 square feet. Assumes about 2 feet of excavation on Lot 1, 8 feet of excavation on Lot 3, 18 feet of excavation on Lots 12 and 20.

A-7 and A-8 - The unit rate provided reflects average disposal facility fees and may vary depending on time of year and facility.

A-8 - Hazardous lead-impacted soil was identified during the RI at the RB06 location on Lot 3 from 0 to 2 feet below grade surface (bgs). The volume assumed a 10-foot wide by 10-foot long, by 5-foot deep hotspot excavation.

A-11 - Fee estimate includes application of dust suppression methods to open excavations and soil loaded into trucks. Labor provided by excavation, handling, and disposal contractor provided above; this line item estimate reflects material, freight, and equipment fees.

A-13 - Backfill may be required to bring the site up to development grade. Backfill placement and compaction assumes soil handling and management fees for the New York City area. Backfill will meet Track 4 Site-Specific SCOs (6 NYCRR Part 375-6.8(b)). The quantity of soil has been increased by 10% to account for compaction.

A-14 - The cost of the site cover system (i.e. building foundation) is equal to the cost of two feet of clean fill across the entire site footprint.

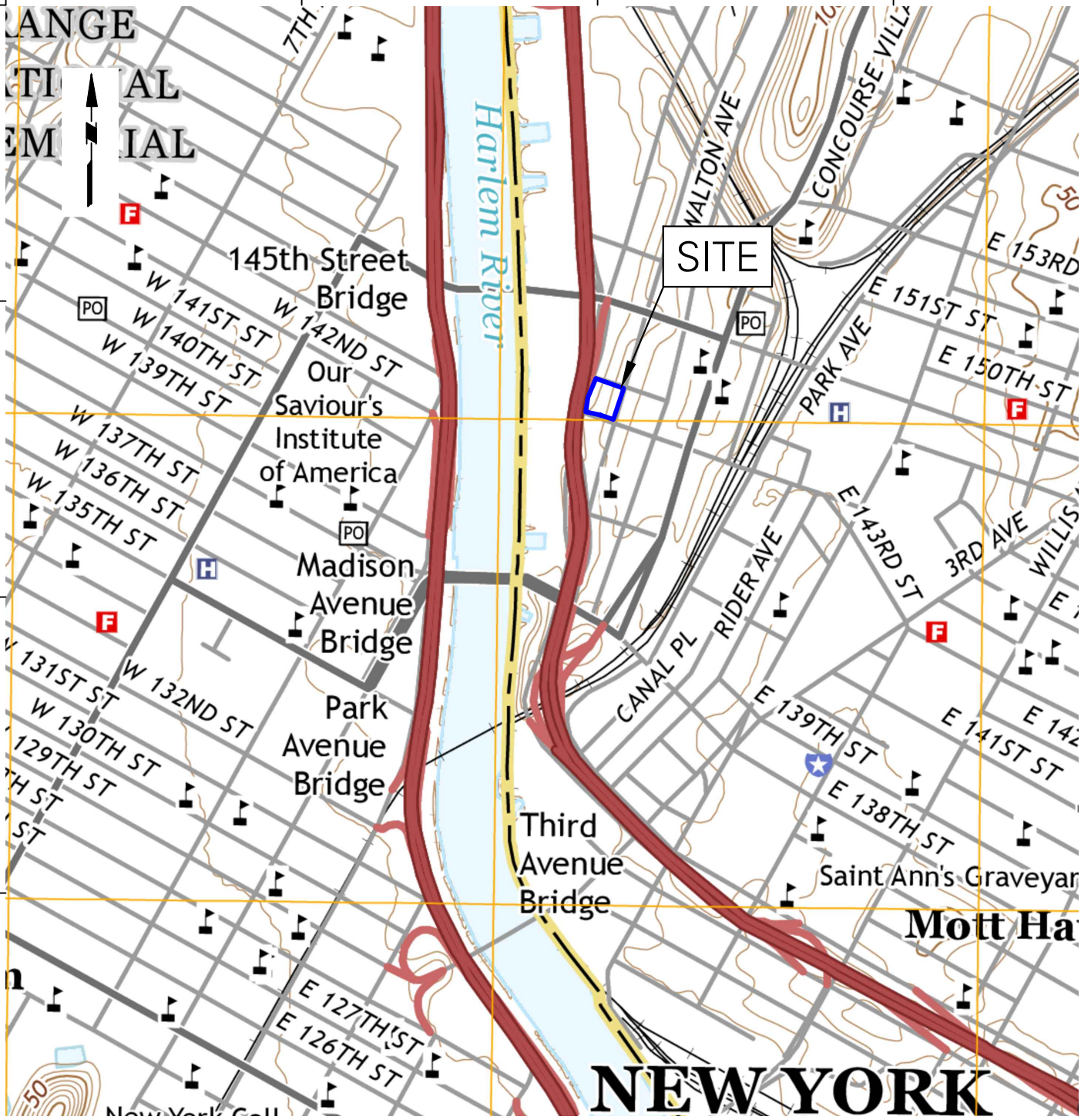
Engineering Fee Assumptions:

B-3 - The assumed duration of the community air monitoring program (CAMP) is six months to accommodate the estimated remediation timeline. CAMP fees include full-time equipment rental to facilitate perimeter dust and VOC monitorin

B-6 - The fee assumes collection of 55 post-excavation confirmation soil samples including quality assurance/quality control samples. Sample analysis will be for Part 375 VOCs, SVOCs, PCBs, pesticides, cyanide, metals (including hexavale and trivalent chromium), and PFAS. The fee includes subcontracted laboratory analysis by a NYSDOH ELAP-certified laboratory and ASP Category B deliverables.

B-8 - The assumed duration of operation and monitoring of long-term institutional controls/engineering controls is 10 years. Fee includes annual reporting fees for annual periodic review reports.

FIGURES



APPROXIMATE SITE BOUNDARY

NOTE: BASE MAP IS REFERENCED FROM THE UNITED STATES GEOLOGICAL SURVEY (USGS) 7.5 MINUTE SERIES CENTRAL PARK QUADRANGLE MAP, DATED 2016

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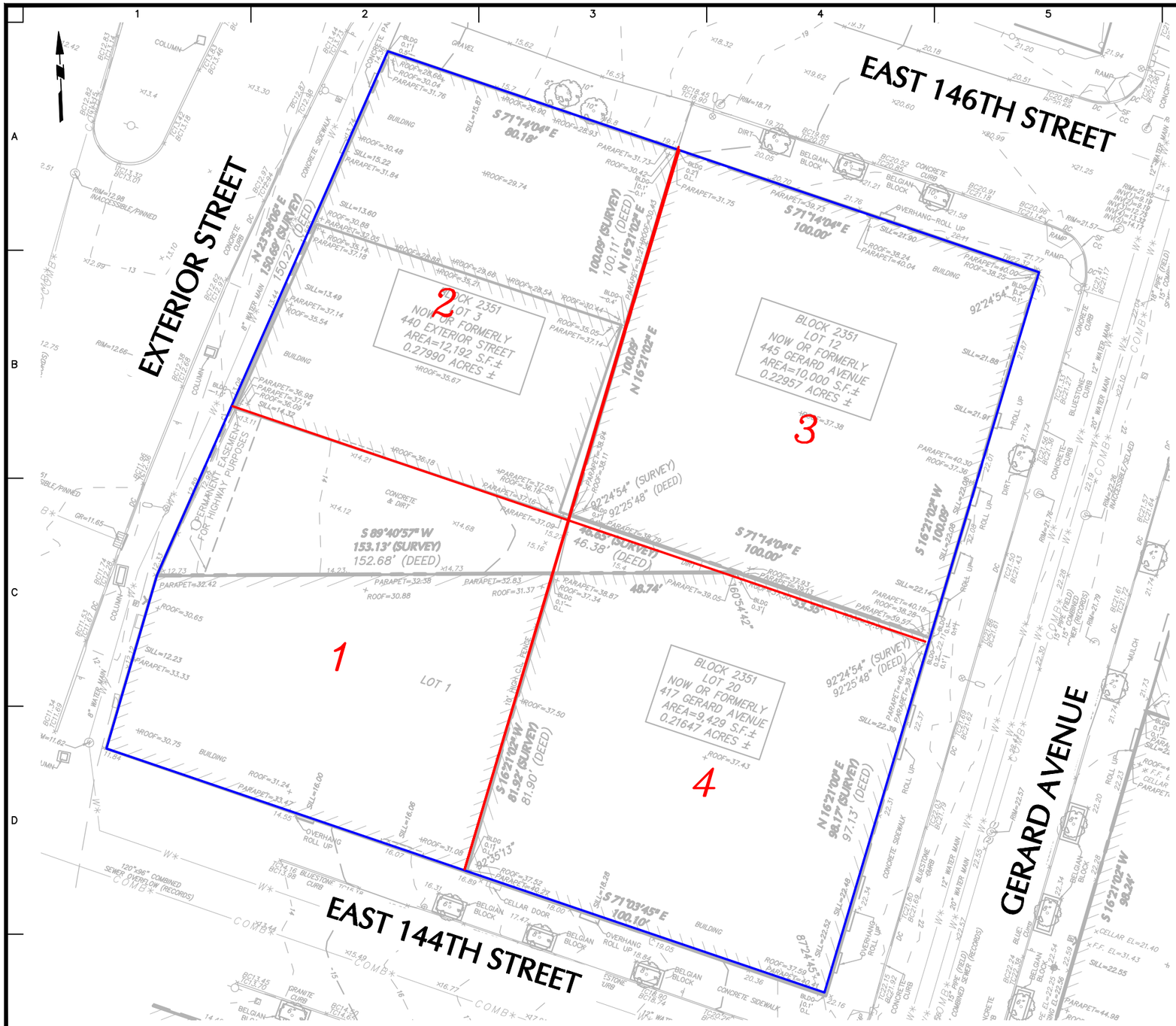
Project	Figure Title	Project No.	Figure No.
GERARD AVENUE AND EAST 146TH STREET BLOCK No. 2351, LOT Nos. 1, 3, 12, & 20 BRONX NEW YORK	SITE LOCATION MAP	170487001 Date 02/19/2019 Drawn By VZ Checked By JL	1

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 1 - Site Location Map.dwg Date: 7/29/2019 Time: 16:03 User: kracanelli Style Table: Langan.stb Layout: ANSIA-BP



LEGEND:

- SITE BOUNDARY
- WORK AREA GRIDS

NOTES:

1. THE BASE MAP IS REFERENCED FROM THE ALTA/NSPS LAND TITLE SURVEY PREPARED BY LANGAN DATED APRIL 11,2019.

30 0 15 30

SCALE IN FEET

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Project	GERARD AVENUE AND EAST 146TH STREET BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20 BRONX NEW YORK
Figure Title	SITE LAYOUT PLAN
Project No.	170487001
Date	5/23/2019
Drawn By	RB
Checked By	JL
Figure No.	2

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 2 - Site Layout Plan.dwg Date: 2/14/2020 Time: 12:46 User: jgolding Style Table: Langan.stb Layout: ANSIB-BL

Sample ID Sample Date Depth Range (feet bgs)	RB01_0-2 12/27/2018 0-2	RB01_9-11 12/27/2018 9-11	RB01_14-15 12/27/2018 14-15	RB01_25-27 12/27/2018 25-27
VOCs (mg/kg)				
Acetone	NE	ND	2.2	0.07
Benzene	NE	NE	0.18	ND
Methyl Ethyl Ketone (2-Butanone)	ND	ND	0.35 J	NE
SVOCs (mg/kg)				
Benzo(a)Anthracene	1.8	3.7	10	NE
Benzo(a)Pyrene	1.8	4.7	13	NE
Benzo(b)Fluoranthene	2.6	3.8	11	NE
Benzo(k)Fluoranthene	0.85	1.1	2.2	ND
Chrysene	2.3	3.7	12	NE
Dibenz(a,h)Anthracene	0.39	0.68	1.2	ND
Indeno(1,2,3-c,d)Pyrene	1.6	2.6	4.2	NE
Pesticides (mg/kg)	NE	ND	ND	NE
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND	ND
Inorganics (mg/kg)				
Arsenic	43.7	NE	NE	NE
Barium	591	NE	NE	NE
Cadmium	3.34	NE	NE	NE
Chromium, Trivalent	52	NE	NE	NE
Copper	275 J	88.4 J	NE	NE
Lead	619 J	134 J	NE	NE
Mercury	0.536	0.262	NE	NE
Zinc	1,080 J	216 J	NE	NE

Sample ID Sample Date Depth Range (feet bgs)	RB03_0-2 12/26/2018 0-2	RB03_2-3 12/26/2018 2-3	RB03_10-12 12/26/2018 10-12	RB03_17-18 12/26/2018 17-18
VOCs (mg/kg)				
Benzene	NE	NE	NE	0.18
SVOCs (mg/kg)				
Benzo(a)Anthracene	NE	NE	8.6	3.5
Benzo(a)Pyrene	1.4	NE	9	4.7
Benzo(b)Fluoranthene	1.7	NE	6.4	4
Benzo(k)Fluoranthene	NE	ND	1.3	1.1
Chrysene	1.1	NE	8	3.2
Dibenz(a,h)Anthracene	NE	ND	0.78 J	NE
Indeno(1,2,3-c,d)Pyrene	1.3 J	NE	3.4	3
Pesticides (mg/kg)	NE	ND	ND	ND
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND	ND
Inorganics (mg/kg)				
Arsenic	17.2	NE	NE	NE
Cadmium	7.4	ND	ND	NE
Copper	270	150	126	NE
Lead	621	108	NE	97.1
Mercury	1.32	1.83	0.226	0.716
Nickel	NE	NE	NE	31
Silver	35.7	9.66	NE	ND
Zinc	3,040	277	430	NE

Sample ID Sample Date Depth Range (feet bgs)	RB02_0-2 12/26/2018 0-2	RB02_7-9 12/26/2018 7-9	RB02_10-12 12/26/2018 10-12	RB02_13-15 12/26/2018 13-15
VOCs (mg/kg)	ND	NE	NE	NE
SVOCs (mg/kg)				
Benzo(a)Anthracene	NE	NE	2.4	1.9
Benzo(a)Pyrene	NE	3.1	2.5	1.9
Benzo(b)Fluoranthene	NE	2.7	2.8	2.3
Benzo(k)Fluoranthene	NE	NE	1 J	NE
Chrysene	NE	NE	2.1	1.6
Dibenz(a,h)Anthracene	NE	0.54	0.34 J	NE
Indeno(1,2,3-c,d)Pyrene	NE	2.6	1.6	1.3
Pesticides (mg/kg)	ND	ND	NE	ND
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	ND	ND	NE	ND
Inorganics (mg/kg)				
Lead	80.8	95.4	198	388
Mercury	NE	ND	0.768	0.476

Sample ID Sample Date Depth Range (feet bgs)	RB10_0-2 1/8/2019 0-2	RB10_18-20 1/8/2019 18-20	RB10_33-35 1/8/2019 33-35
VOCs (mg/kg)			
Acetone	ND	9.3	ND
Benzene	ND	9.5	ND
Ethylbenzene	ND	2.6	ND
n-Propylbenzene	ND	6.7	ND
Toluene	ND	8.5	ND
Total Xylenes	ND	7.6	ND
SVOCs (mg/kg)			
3 & 4 Methylphenol (m&p Cresol)	ND	0.38 J	ND
Benzo(a)Anthracene	2.5	12	ND
Benzo(a)Pyrene	2	11	ND
Benzo(b)Fluoranthene	2.8	15 J	ND
Benzo(k)Fluoranthene	0.82	4.5	ND
Chrysene	2.2	9.6	ND
Dibenz(a,h)Anthracene	NE	1.7	ND
Indeno(1,2,3-c,d)Pyrene	1.3	8.2	ND
Pesticides (mg/kg)	NE	ND	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)			
Arsenic	NE	17.2	NE
Copper	NE	63.2	NE
Lead	71.6	96.8	NE
Selenium	NE	12.5	ND
Zinc	NE	130	NE

LEGEND:

SITE BOUNDARY

RB32 SOIL BORING LOCATION

RB30/RMW30 SOIL BORING/MONITORING WELL LOCATION

SB03 APPROXIMATE SI SOIL BORING LOCATION (LANGAN, SEPTEMBER 2017)

SB01/MW01 APPROXIMATE SI SOIL BORING/MONITORING WELL LOCATION (LANGAN, SEPTEMBER 2017)

(0-2) SOIL SAMPLE RESULTS WITH HAZARDOUS LEAD (DEPTH INTERVAL)

(13-15) SOIL SAMPLE WITH FIELD EVIDENCE OF PETROLEUM IMPACTS (DEPTH INTERVAL)

(0-2+) SOIL SAMPLE RESULTS WITH PGW SCO EXCEEDANCE (DEPTH INTERVAL)

(19-28) (0-21+) SOIL SAMPLE WITH FIELD EVIDENCE OF PETROLEUM IMPACTS (DEPTH INTERNVAL) AND RESULTS WITH PGW SCO EXCEEDANCE (DEPTH INTERVAL)

NO SOIL SAMPLES WITH WITH FIELD EVIDENCE OF PETROLEUM IMPACTS OR RESULTS WITH PGW SCO EXCEEDANCE

Sample ID Sample Date Depth Range (feet bgs)	RB04_0-2 12/21/2018 0-2	RB04_8-10 12/21/2018 8-10	SODUP01_122118 12/21/2018 8-10	RB04_13-15 12/21/2018 13-15	RB04_18-20 12/21/2018 18-20
VOCs (mg/kg)					
Acetone	ND	ND	ND	NE	0.052
SVOCs (mg/kg)					
Benzo(a)Anthracene	1.6	NE	NE	1.8	2.4
Benzo(a)Pyrene	1.6	ND	ND	1.7	2.3
Benzo(b)Fluoranthene	2.2	NE	NE	2.1	2.7
Benzo(k)Fluoranthene	NE	ND	ND	NE	0.9
Chrysene	1.6	NE	NE	1.5	2
Indeno(1,2,3-c,d)Pyrene	1.1	ND	ND	0.93	1.4
Pesticides (mg/kg)					
4,4'-DDE	0.0446	ND	ND	ND	ND
4,4'-DDT	0.174	ND	ND	ND	ND
Herbicides (mg/kg)	ND	ND	ND	ND	ND
PCBs (mg/kg)	NE	ND	ND	ND	ND
Inorganics (mg/kg)					
Lead	294	72 J	NE	NE	NE
Mercury	0.506	0.639 J	0.277 J	0.553	0.242
Zinc	476	129 J	NE	NE	NE

Sample ID Sample Date Depth Range (feet bgs)	RB12_0-2 12/26/2018 0-2	RB12_8-9 12/26/2018 8-9	RB12_9-10 12/26/2018 9-10	RB12_10-12 12/26/2018 10-12
VOCs (mg/kg)				
1,2,4-Trimethylbenzene	NE	11	NE	NE
Total Xylenes	0.82	ND	NE	ND
SVOCs (mg/kg)				
Benzo(a)Anthracene	20	12	2	3.5
Benzo(a)Pyrene	19	12	2.6	3.6
Benzo(b)Fluoranthene	24	13	3.1	4
Benzo(k)Fluoranthene	8.2	4.7	1	1.4
Chrysene	18	11	1.8	3.9
Dibenz(a,h)Anthracene	2.8	2	0.38	0.57
Indeno(1,2,3-c,d)Pyrene	12	10	2	2.1
Pesticides (mg/kg)				
Dieldrin	ND	0.0169 J	ND	ND
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	ND	NE	ND	ND
Inorganics (mg/kg)				
Copper	56	NE	NE	52.4
Lead	162	NE	280	126
Mercury	0.446	NE	0.22	0.725

Sample ID Sample Date Depth Range (feet bgs)	RB11_0-2 1/2/2019 0-2	RB11_19-21 1/2/2019 19-21	RB11_28-30 1/2/2019 28-30
VOCs (mg/kg)			
n-Propylbenzene	NE	9.1	NE
SVOCs (mg/kg)	NE	NE	NE
Pesticides (mg/kg)	NE	ND	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	NE	ND	ND
Inorganics (mg/kg)			
Copper	422	NE	NE
Lead	162	NE	NE
Mercury	0.235	ND	ND
Zinc	130	NE	NE

Sample ID Sample Date Depth Range (feet bgs)	RB09_0-2 1/2/2019 0-2	RB09_19-21 1/2/2019 19-21	SODUP03_010219 1/2/2019 19-21	RB09_28-30 1/2/2019 28-30
VOCs (mg/kg)				
Benzene	ND	1.1 J	2.5 J	NE
Ethylbenzene	ND	NE	1.6	NE
n-Butylbenzene	ND	NE	14 J	NE
n-Propylbenzene	ND	21 J	44 J	NE
Total Xylenes	ND	0.5 J	1.3 J	ND
SVOCs (mg/kg)				
Benzo(a)Anthracene	2.7	NE	NE	ND
Benzo(a)Pyrene	2.4	NE	NE	ND
Benzo(b)Fluoranthene	3	NE	NE	ND
Benzo(k)Fluoranthene	0.99	NE	NE	ND
Chrysene	2.5	NE	NE	ND
Dibenz(a,h)Anthracene	0.38	ND	NE	ND
Indeno(1,2,3-c,d)Pyrene	1.5	NE	NE	ND
Naphthalene	NE	NE	21 J	ND
Pesticides (mg/kg)	ND	ND	ND	ND
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND	ND
Inorganics (mg/kg)				
Copper	68.2	NE	NE	NE
Lead	569	NE	NE	NE
Mercury	0.242	ND	ND	ND
Zinc	206	NE	NE	NE

Sample ID Sample Date Depth Range (feet bgs)	RB05_0-2 12/21/2018 0-2	RB05_8-10 12/21/2018 8-10	RB05_13-15 12/21/2018 13-15	RB05_19-21 12/21/2018 19-21
VOCs (mg/kg)	NE	NE	NE	NE
SVOCs (mg/kg)				
Benzo(a)Anthracene	1.4	NE	NE	1.1
Benzo(a)Pyrene	1.7	NE	NE	1.1
Benzo(b)Fluoranthene	2.3	NE	NE	1.2
Chrysene	1.5	NE	NE	NE
Indeno(1,2,3-c,d)Pyrene	1.3	NE	NE	0.65
Pesticides (mg/kg)				
4,4'-DDE	0.0785	ND	ND	ND
4,4'-DDT	0.265	ND	ND	ND
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	NE	ND	ND	ND
Inorganics (mg/kg)				
Barium	647	NE	NE	NE
Chromium, Trivalent	NE	35	NE	NE
Copper	73.5	188	NE	227
Lead	976	79.4	191	268
Mercury	0.514	0.688	1.11	1.12
Nickel	NE	30.1	NE	NE
Zinc	731	208	NE	130

Sample ID Sample Date Depth Range (feet bgs)	RB13_0-2 1/7/2019 0-2	RB13_18-20 1/7/2019 18-20	RB13_22-24 1/7/2019 22-24	RB13_33-35 1/7/2019 33-35
VOCs (mg/kg)				
1,2,4-Trimethylbenzene	ND	110	NE	ND
1,3,5-Trimethylbenzene	NE	38	NE	NE
Benzene	NE	1.7	1.4	NE
Ethylbenzene	NE	37	9.7	NE
Naphthalene	ND	NE	25	NE
n-Propylbenzene	ND	18	30	NE
Toluene	NE	1.6	NE	ND
Total Xylenes	NE	120	5.2	ND
SVOCs (mg/kg)				
Naphthalene	NE	NE	22	ND
Pesticides (mg/kg)	ND	ND	ND	ND
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND	ND
Inorganics (mg/kg)				
Lead	76.2	NE	NE	NE
Mercury	0.468	NE	ND	ND
Zinc	120	NE	NE	NE

Sample ID Sample Date Depth Range (feet bgs)	RB14_0-2 1/7/2019 0-2	RB14_18-20 1/7/2019 18-20	RB14_23-25 1/7/2019 23-25	SODUP04_010719 1/7/2019 23-25
VOCs (mg/kg)				
1,3,5-Trimethylbenzene (Mesitylene)	ND	NE	23 J	NE
Ethylbenzene	ND	NE	2.3 J	NE
n-Butylbenzene	ND	NE	17 J	NE
n-Propylbenzene	ND	7.6	33 J	13 J
Total Xylenes	ND	ND	0.42 J	ND
SVOCs (mg/kg)				
Indeno(1,2,3-c,d)Pyrene	0.54	ND	ND	ND
Pesticides (mg/kg)	ND	ND	ND	ND
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND	ND
Inorganics (mg/kg)				
Lead	169	NE	NE	NE
Mercury	0.186	ND	ND	ND
Zinc	119	NE	NE	NE

Sample ID Sample Date Depth Range (feet bgs)	RB06_0-2 12/21/2018 0-2	RB06_8-10 12/21/2018 8-10	RB06_10-12 12/21/2018 10-12
VOCs (mg/kg)	NE	NE	NE
SVOCs (mg/kg)			
Benzo(a)Anthracene	2.4	3.3	ND
Benzo(a)Pyrene	2.6	3.5	ND
Benzo(b)Fluoranthene	3.8	5	ND
Benzo(k)Fluoranthene	1.1	1.3	ND
Chrysene	2.4	3.2	ND
Dibenz(a,h)Anthracene	0.4	0.63	ND
Indeno(1,2,3-c,d)Pyrene	2	2.9	ND
Pesticides (mg/kg)			
4,4'-DDE	0.101	0.0341	ND
4,4'-DDT	0.259	0.0978	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	NE	NE	ND
Inorganics (mg/kg)			
Barium	826	NE	NE
Lead	1,120	539	NE
Mercury	0.417	1.12	ND
Zinc	1,190	114	NE

Sample ID Sample Date Depth Range (feet bgs)	RB15_0-2 1/8/2019 0-2	RB15_18-20 1/8/2019 18-20	RB15_23-25 1/8/2019 23-25	SODUP05_010819 1/8/2019 23-25
VOCs (mg/kg)				
Acetone	ND	0.051	ND	ND
Benzene	0.13	NE	0.61 J	0.28 J
Toluene	1.9	ND	ND	ND
SVOCs (mg/kg)				
Benzo(b)Fluoranthene	1.1	NE	ND	ND
Indeno(1,2,3-c,d)Pyrene	0.59	NE	ND	ND
Pesticides (mg/kg)	NE	ND	ND	NE
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)				
Inorganics (mg/kg)	ND	ND	ND	ND
Lead	244	69.4	NE	NE
Mercury	NE	0.276	ND	ND

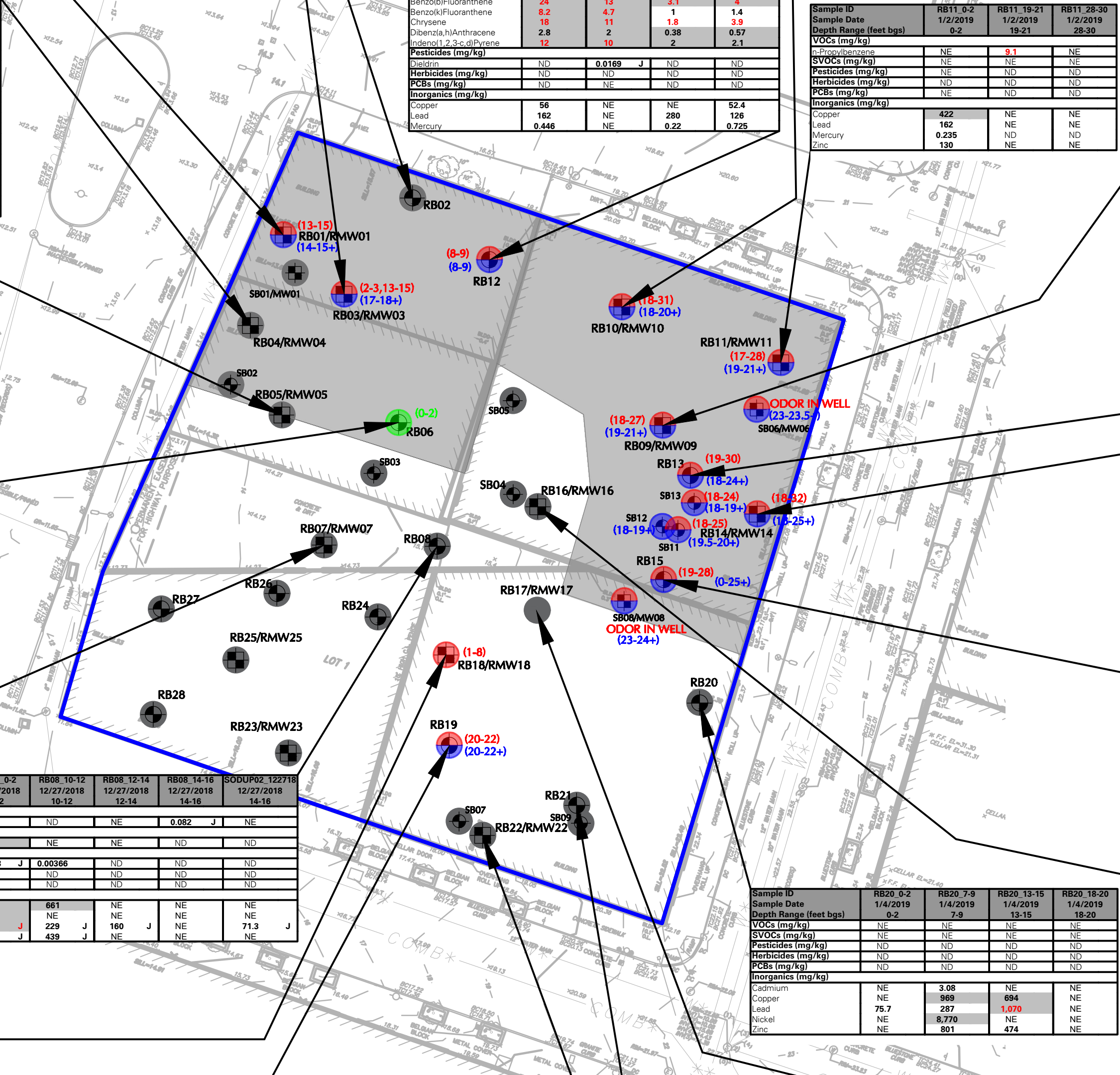
Sample ID Sample Date Depth Range (feet bgs)	RB07_0-2 12/20/2018 0-2	RB07_8-10 12/20/2018 8-10	RB07_10-12 12/20/2018 10-12
VOCs (mg/kg)	ND	NE	NE
SVOCs (mg/kg)			
Benzo(b)Fluoranthene	1.1	NE	NE
Indeno(1,2,3-c,d)Pyrene	0.71	0.53	NE
Pesticides (mg/kg)			
4,4'-DDE	0.0129	0.00667	NE
4,4'-DDT	0.0269	0.0166	0.00426 J
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	NE	NE	ND
Inorganics (mg/kg)			
Barium	468 J	456 J	NE
Chromium, Hexavalent	1.54	ND	ND
Copper	NE	NE	85.3
Lead	164 J	94 J	282 J
Nickel	NE	37	NE
Selenium	NE	ND	10.9
Zinc	221 J	293	321

Sample ID Sample Date Depth Range (feet bgs)	RB08_0-2 12/27/2018 0-2	RB08_10-12 12/27/2018 10-12	RB08_12-14 12/27/2018 12-14	RB08_14-16 12/27/2018 14-16	SODUP02_122718 12/27/2018 14-16
VOCs (mg/kg)					
Acetone	ND	ND	NE	0.082 J	NE
SVOCs (mg/kg)					
Indeno(1,2,3-c,d)Pyrene	0.58	NE	NE	ND	ND
Pesticides (mg/kg)					
4,4'-DDT	0.0133 J	0.00366	ND	ND	ND
Herbicides (mg/kg)	ND	ND	ND	ND	ND
PCBs (mg/kg)	NE	ND	ND	ND	ND
Inorganics (mg/kg)					
Barium	1,460	661	NE	NE	NE
Cadmium	5.19	NE	NE	NE	NE
Lead	753 J	229 J	160 J	NE	71.3 J
Zinc	2,990 J	439 J	NE	NE	NE

Sample ID Sample Date Depth Range (feet bgs)	RB20_0-2 1/4/2019 0-2	RB20_7-9 1/4/2019 7-9	RB20_13-15 1/4/2019 13-15	RB20_18-20 1/4/2019 18-20
VOCs (mg/kg)	NE	NE	NE	NE
SVOCs (mg/kg)	NE	NE	NE	NE
Pesticides (mg/kg)	ND	ND	ND	ND
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND	ND
Inorganics (mg/kg)				
Cadmium	NE	3.08	NE	NE
Copper	NE	969	694	NE
Lead	75.7	287	1,070	NE
Nickel	NE	8,770	NE	NE
Zinc	NE	801	474	NE

Sample ID Sample Date Depth Range (feet bgs)	RB16_0-2 1/8/2019 0-2	RB16_13-15 1/8/2019 13-15	RB16_18-20 1/8/2019 18-20
VOCs (mg/kg)	NE	NE	ND
SVOCs (mg/kg)			
Benzo(a)Anthracene	NE	1.3	NE
Benzo(a)Pyrene	NE	1.3	NE
Benzo(b)Fluoranthene	NE	1.6	NE
Chrysene	NE	1.2	NE
Indeno(1,2,3-c,d)Pyrene	NE	0.87	NE
Pesticides (mg/kg)			
4,4'-DDD	ND	0.00669	ND
4,4'-DDT	ND	0.00553 IP	ND
Endrin	ND	0.0252 P	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)			
Copper	NE	77.7	NE
Lead	288	NE	351
Mercury	0.638	0.46	1.45

Analyte	NYSDEC Part 375 Unrestricted Use SCOs	NYSDEC Part 375 Restricted Use - Restricted Residential SCOs	NYSDEC Part 375 Protection of Groundwater SCOs
VOCs (mg/kg)			
1,2,4-Trimethylbenzene	3.6	52	3.6
1,3,5-Trimethylbenzene (Mesitylene)	8.4	52	12
Acetone	0.05	100	~
Benzene	0.06	4.8	0.06
Ethylbenzene	1	41	1
Methyl Ethyl Ketone (2-Butanone)	0.12	100	~
n-Butylbenzene	12	100	12
n-Propylbenzene	3.9	100	3.9
Toluene	0.7	100	0.7
Total Xylenes	0.26	100	1.6
SVOCs (mg/kg)			
3 & 4 Methylphenol (m&p Cresol)	0.33	100	~
Benzo(a)Anthracene	1	1	1
Benzo(a)Pyrene	1	1	22
Benzo(b)Fluoranthene	1	1	1.7
Benzo(k)Fluoranthene	0.8	3.9	1.7
Chrysene	1	3.9	1
Dibenz(a,h)Anthracene	0.33	0.33	~
Indeno(1,2,3-c,d)Pyrene	0.5	0.5	8.2
Naphthalene	12	100	12
Pesticides (mg/kg)			
4,4'-DDD	0.0033	13	~
4,4'-DDE	0.0033	8.9	~
4,4'-DDT	0.0033	7.9	~
Dieldrin	0.005	0.2	~
Endrin	0.014	11	~
Inorganics (mg/kg)			
Arsenic	13	16	~
Barium	350	400	~
Cadmium	2.5	4.3	~
Chromium, Hexavalent	1	110	~
Chromium, Trivalent	30	180	~
Copper	50	270	~
Lead	63	400	~
Mercury	0.18	0.81	~
Nickel	30	310	~
Selenium	3.9	180	~
Silver	2	180	~
Zinc	109	10,000	~



60 0 20 40 60

SCALE IN FEET

Sample ID Sample Date Depth Range (feet bgs)	RB18_0-2 1/4/2019 0-2	RB18_6-8 1/4/2019 6-8	RB18_15-17 1/4/2019 15-17	RB18_18-20 1/4/2019 18-20
VOCs (mg/kg)	NE	NE	NE	NE
SVOCs (mg/kg)				
Benzo(a)Anthracene	NE	2.8	NE	ND
Benzo(a)Pyrene	NE	2.4	ND	ND
Benzo(b)Fluoranthene	1.1	4.8	NE	ND
Benzo(k)Fluoranthene	NE	1.3	ND	ND
Chrysene	NE	3.3	NE	ND
Dibenz(a,h)Anthracene	NE	0.5 J	ND	ND
Indeno(1,2,3-c,d)Pyrene	0.76 J	2.6	ND	ND
Pesticides (mg/kg)	NE	ND	ND	ND
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND	ND
Inorganics (mg/kg)				
Copper	NE	55.9	67.2	69
Lead	152	85.8	NE	NE
Mercury	0.317	0.623	NE	NE
Zinc	127	NE	NE	NE

Sample ID Sample Date Depth Range (feet bgs)	RB19_0-2 1/3/2019 0-2	RB19_20-22 1/3/2019 20-22	RB19_24-25 1/3/2019 24-25
VOCs (mg/kg)			
Total Xylenes	ND	0.31 J	ND
SVOCs (mg/kg)			
3 & 4 Methylphenol (m&p Cresol)	ND	0.37 J	NE
Benzo(a)Anthracene	1.2	NE	NE
Benzo(a)Pyrene	1.3	NE	NE
Benzo(b)Fluoranthene	1.7	NE	NE
Chrysene	1.2	NE	NE
Indeno(1,2,3-c,d)Pyrene	1.2	NE	NE
Pesticides (mg/kg)	ND	ND	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	ND	ND	NE
Inorganics (mg/kg)			
Arsenic	NE	17 J	17.8 J
Barium	1,210	NE	NE
Chromium, Trivalent	NE	40	37
Copper	52.1	78.2	96.5
Lead	366	203	252
Mercury	2.32 J	4.38 J	3.75 J
Zinc	1,200	177	226

Sample ID Sample Date Depth Range (feet bgs)	RB22_0-2 1/3/2019 0-2	RB22_3-5 1/3/2019 3-5	RB22_20-22 1/4/2019 20-22
VOCs (mg/kg)	NE	NE	NE
SVOCs (mg/kg)			
Benzo(a)Anthracene	1.1	NE	NE
Benzo(a)Pyrene	1.1	NE	NE
Benzo(b)Fluoranthene	1.4	NE	NE
Chrysene	1.1	NE	NE
Indeno(1,2,3-c,d)Pyrene	0.75	NE	NE
Pesticides (mg/kg)	ND	NE	ND
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)			
Copper	NE	81.5	NE
Lead	425	77.4	492
Mercury	0.318 J	0.2 J	5.03
Zinc	171	132	NE

Sample ID Sample Date Depth Range (feet bgs)	RB21_0-2 1/3/2019 0-2	RB21_2-4 1/3/2019 2-4	RB21_18-20 1/3/2019 18-20
VOCs (mg/kg)	NE	ND	NE
SVOCs (mg/kg)			
Benzo(a)Anthracene	5.9	NE	NE
Benzo(a)Pyrene	5.1	NE	NE
Benzo(b)Fluoranthene	6.3	NE	NE
Benzo(k)Fluoranthene	2.3	NE	NE
Chrysene	6	NE	NE
Dibenz(a,h)Anthracene	0.82	ND	NE
Indeno(1,2,3-c,d)Pyrene	3.5	NE	NE
Pesticides (mg/kg)	NE	ND	NE
Herbicides (mg/kg)	ND	ND	ND
PCBs (mg/kg)	ND	ND	ND
Inorganics (mg/kg)			
Copper	NE	191	54
Lead	2,940	304	NE
Mercury	0.881 J	0.52 J	ND
Zinc	874	212	NE

Sample ID Sample Date Depth Range (feet bgs)	RB17_0-2 1/4/2019 0-2	RB17_4-6 1/4/2019 4-6	RB17_8-10 1/4/2019 8-10	RB17_18-20 1/4/2019 18-20
VOCs (mg/kg)	NE	NE	NE	NE
SVOCs (mg/kg)				
Benzo(a)Anthracene	NE	1.3	NE	ND
Benzo(a)Pyrene	NE	1.7	NE	ND
Benzo(b)Fluoranthene	NE	2.6	1.3	ND
Chrysene	NE	1.3	NE	ND
Dibenz(a,h)Anthracene	NE	0.38	NE	ND
Indeno(1,2,3-c,d)Pyrene	NE	1.5	0.79	ND
Pesticides (mg/kg)	ND	ND	ND	ND
Herbicides (mg/kg)	ND	ND	ND	ND
PCBs (mg/kg)	NE	NE	ND	ND
Inorganics (mg/kg)				
Cadmium	3.17 J	NE	NE	NE
Copper	271 J	NE	265	NE
Lead	905	444	379	NE
Mercury	0.639	5.62	0.2	ND
Zinc	1,170	395	176	NE

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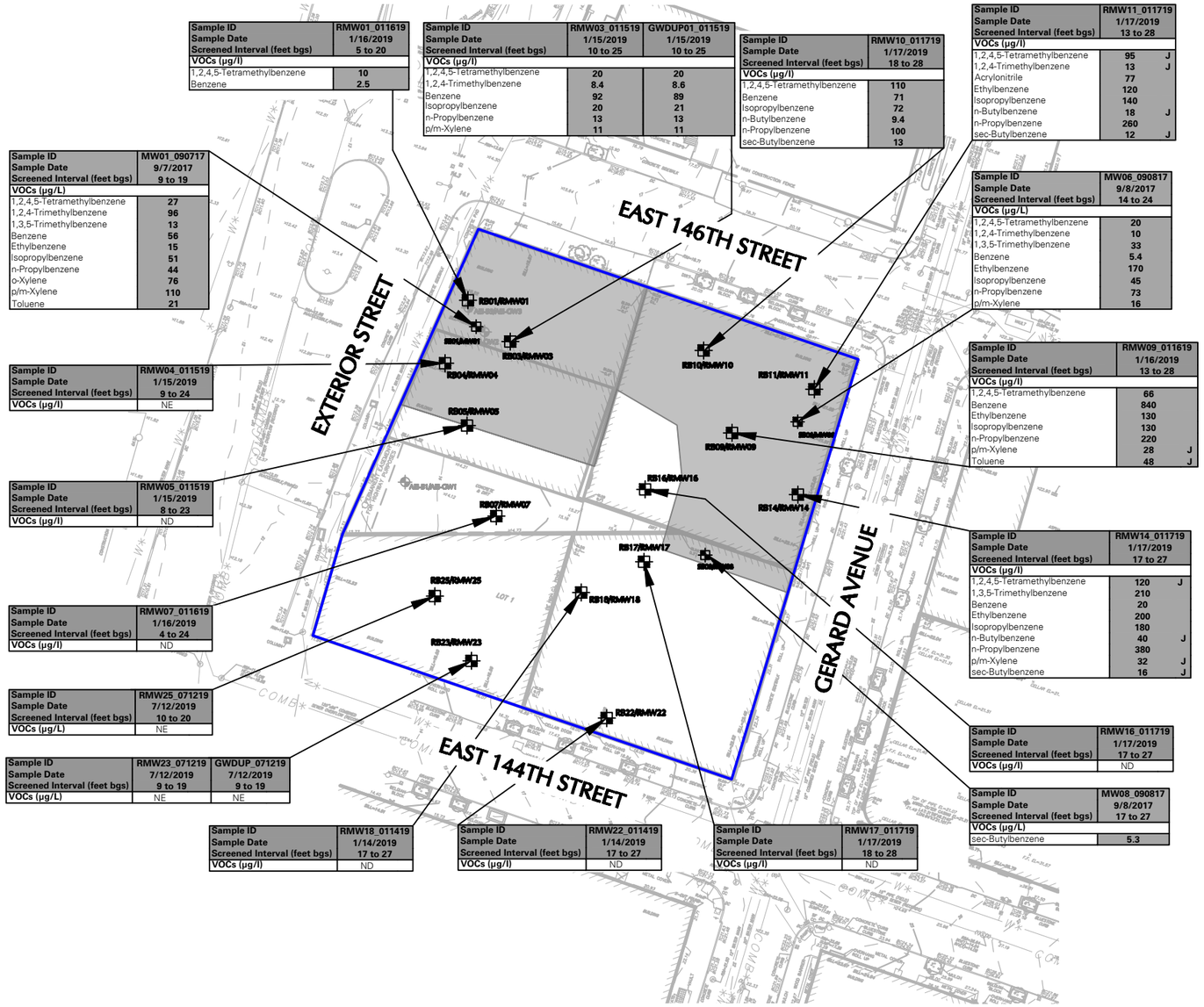
Project
GERARD AVENUE AND EAST 146TH STREET
BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20
BRONX NEW YORK

Figure Title
SOIL SAMPLE ANALYTICAL RESULTS MAP

Project No. 170487001
Date 2/18/2020
Drawn By JG
Checked By JL

Figure No. 3

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 3 - Soil Sample Analtyical Results Map VOC.dwg Date: 4/20/2020 Time: 14:40 User: jgolding Style Table: Langan.stb Layout: ANSIB-BL



Sample ID	RMW01_011619
Sample Date	1/16/2019
Screened Interval (feet bgs)	5 to 20
VOCs (µg/l)	
1,2,4,5-Tetramethylbenzene	10
Benzene	2.5

Sample ID	RMW03_011519	GWDUP01_011519
Sample Date	1/15/2019	1/15/2019
Screened Interval (feet bgs)	10 to 25	10 to 25
VOCs (µg/l)		
1,2,4,5-Tetramethylbenzene	20	20
1,2,4-Trimethylbenzene	8.4	8.6
Benzene	92	89
Isopropylbenzene	20	21
n-Propylbenzene	13	13
p/m-Xylene	11	11

Sample ID	RMW10_011719
Sample Date	1/17/2019
Screened Interval (feet bgs)	18 to 28
VOCs (µg/l)	
1,2,4,5-Tetramethylbenzene	110
Benzene	71
Isopropylbenzene	72
n-Butylbenzene	9.4
n-Propylbenzene	100
sec-Butylbenzene	13

Sample ID	RMW11_011719	
Sample Date	1/17/2019	
Screened Interval (feet bgs)	13 to 28	
VOCs (µg/l)		
1,2,4,5-Tetramethylbenzene	95	J
1,2,4-Trimethylbenzene	13	J
Acrylonitrile	77	
Ethylbenzene	120	
Isopropylbenzene	140	
n-Butylbenzene	18	J
n-Propylbenzene	260	
sec-Butylbenzene	12	J

Sample ID	MW01_090717
Sample Date	9/7/2017
Screened Interval (feet bgs)	9 to 19
VOCs (µg/L)	
1,2,4,5-Tetramethylbenzene	27
1,2,4-Trimethylbenzene	96
1,3,5-Trimethylbenzene	13
Benzene	56
Ethylbenzene	15
Isopropylbenzene	51
n-Propylbenzene	44
o-Xylene	76
p/m-Xylene	110
Toluene	21

Sample ID	MW06_090817
Sample Date	9/8/2017
Screened Interval (feet bgs)	14 to 24
VOCs (µg/L)	
1,2,4,5-Tetramethylbenzene	20
1,2,4-Trimethylbenzene	10
1,3,5-Trimethylbenzene	33
Benzene	5.4
Ethylbenzene	170
Isopropylbenzene	45
n-Propylbenzene	73
p/m-Xylene	16

Sample ID	RMW04_011519
Sample Date	1/15/2019
Screened Interval (feet bgs)	9 to 24
VOCs (µg/l)	NE

Sample ID	RMW09_011619
Sample Date	1/16/2019
Screened Interval (feet bgs)	13 to 28
VOCs (µg/l)	
1,2,4,5-Tetramethylbenzene	66
Benzene	840
Ethylbenzene	130
Isopropylbenzene	130
n-Propylbenzene	220
p/m-Xylene	28 J
Toluene	48 J

Sample ID	RMW05_011519
Sample Date	1/15/2019
Screened Interval (feet bgs)	8 to 23
VOCs (µg/l)	ND

Sample ID	RMW14_011719	
Sample Date	1/17/2019	
Screened Interval (feet bgs)	17 to 27	
VOCs (µg/l)		
1,2,4,5-Tetramethylbenzene	120	J
1,3,5-Trimethylbenzene	210	
Benzene	20	
Ethylbenzene	200	
Isopropylbenzene	180	
n-Butylbenzene	40	J
n-Propylbenzene	380	
p/m-Xylene	32	J
sec-Butylbenzene	16	J

Sample ID	RMW07_011619
Sample Date	1/16/2019
Screened Interval (feet bgs)	4 to 24
VOCs (µg/l)	ND

Sample ID	RMW25_071219
Sample Date	7/12/2019
Screened Interval (feet bgs)	10 to 20
VOCs (µg/L)	NE

Sample ID	RMW16_011719
Sample Date	1/17/2019
Screened Interval (feet bgs)	17 to 27
VOCs (µg/l)	ND

Sample ID	RMW23_071219	GWDUP_071219
Sample Date	7/12/2019	7/12/2019
Screened Interval (feet bgs)	9 to 19	9 to 19
VOCs (µg/L)	NE	NE

Sample ID	MW08_090817
Sample Date	9/8/2017
Screened Interval (feet bgs)	17 to 27
VOCs (µg/L)	
sec-Butylbenzene	5.3

Sample ID	RMW18_011419
Sample Date	1/14/2019
Screened Interval (feet bgs)	17 to 27
VOCs (µg/l)	ND

Sample ID	RMW22_011419
Sample Date	1/14/2019
Screened Interval (feet bgs)	17 to 27
VOCs (µg/l)	ND

Sample ID	RMW17_011719
Sample Date	1/17/2019
Screened Interval (feet bgs)	18 to 28
VOCs (µg/l)	ND

LEGEND:

- SITE BOUNDARY
- RB30/RMW30 — SOIL BORING AND MONITORING WELL LOCATION
- SB01/MW01 — APPROXIMATE SI SOIL BORING/MONITORING WELL LOCATION (LANGAN, SEPTEMBER 2017)
- AEI-B2/AEI-GW2 — APPROXIMATE PHASE II ESI SOIL BORING/MONITORING WELL LOCATION (AEI, OCTOBER 2015)
- APPROXIMATE EXTENT OF PETROLEUM PLUME

NOTES:

1. THE BASE MAP IS REFERENCED FROM THE SURVEY PREPARED BY LANGAN DATED OCTOBER 10, 2017.
2. MONITORING WELLS WERE SURVEYED BY LANGAN ON JANUARY 24, 2019.
3. GROUNDWATER SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TECHNICAL AND OPERATIONAL GUIDANCE SERIES (TOGS) 1.1.1 AMBIENT WATER QUALITY STANDARDS (AWQS) AND GUIDANCE VALUES FOR DRINKING WATER (CLASS GA)(COLLECTIVELY REFERRED TO AS THE STANDARDS AND GUIDANCE VALUES [SGVs]).
4. REGULATORY CRITERIA DO NOT EXIST FOR PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) AND 1,4-DIOXANE IN NEW YORK STATE. PFAS ARE COMPARED TO THE USEPA HEALTH ADVISORY LEVEL.
5. RESULTS EXCEEDING SGVs AND/OR THE USEPA HEALTH ADVISORY LEVEL ARE SHADED AND BOLDED.
6. ONLY RESULTS WITH DETECTED CONCENTRATIONS ABOVE SGVs AND/OR THE USEPA HEALTH ADVISORY LEVEL ARE SHOWN.
7. ONLY VALIDATED ANALYTICAL DATA ARE SHOWN.
8. SI = SUBSURFACE INVESTIGATION
9. ESI = ENVIRONMENTAL SITE INVESTIGATION
10. µg/L = MICROGRAMS PER LITER
11. VOCs = VOLATILE ORGANIC COMPOUNDS
12. NE = NO EXCEEDANCES
13. ND = NOT DETECTED
14. NA = NOT ANALYZED
15. J = THE ANALYTE WAS DETECTED ABOVE THE METHOD DETECTION LIMIT (MDL)
16. USEPA - UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Analyte	SGVs
VOCs (µg/l)	
1,2,4,5-Tetramethylbenzene	5
1,2,4-Trimethylbenzene	5
1,3,5-Trimethylbenzene	5
Acrylonitrile	5
Benzene	1
Ethylbenzene	5
Isopropylbenzene	5
n-Butylbenzene	5
n-Propylbenzene	5
p/m-Xylene	5
sec-Butylbenzene	5
Toluene	5

30 0 15 30
SCALE: 1 INCH = 30 FEET

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Project: GERARD AVENUE AND EAST 146TH STREET
BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20
BRONX NEW YORK

Figure Title: GROUNDWATER SAMPLE ANALYTICAL RESULTS MAP - VOCs

Project No. 170487001
Date 02/18/2020
Drawn By JG
Checked By JL

Figure No. 4A

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 4A - Groundwater Sample Analtyical Results Map (VOCs)(no tags for prev consultant).dwg Date: 2/20/2020 Time: 09:11 User: jgolding Style Table: Langan.stb Layout: VOCs

Sample ID	RMW01_011619
Sample Date	1/16/2019
Screened Interval (feet bgs)	5 to 20
SVOCs (µg/l)	
Acenaphthene	32
Benzo(a)anthracene	0.3
Benzo(a)pyrene	0.14
Benzo(b)fluoranthene	0.14
Benzo(k)fluoranthene	0.06 J
Chrysene	0.31
Indeno(1,2,3-cd)pyrene	0.08 J
Pesticides (µg/l)	ND
Herbicides (µg/l)	ND
PCBs (µg/l)	ND
Inorganics (µg/l)	
Iron	1,560
Iron (dissolved)	1,040
Magnesium	62,400
Magnesium (dissolved)	60,400
Manganese	570.4
Manganese (dissolved)	540.4
Sodium	523,000
Sodium (dissolved)	517,000
PFAS (ng/l)	NA

Sample ID	RMW03_011519	GWDUP01_011519
Sample Date	1/15/2019	1/15/2019
Screened Interval (feet bgs)	10 to 25	10 to 25
SVOCs (µg/l)		
Acenaphthene	33	32
Benzo(a)anthracene	0.22	0.14
Benzo(a)pyrene	0.2 J	0.09 J
Benzo(b)fluoranthene	0.16	0.08 J
Benzo(k)fluoranthene	0.05 J	0.03 J
Chrysene	0.19	0.12
Indeno(1,2,3-cd)pyrene	0.08 J	0.05 J
Naphthalene	30	28
Pesticides (µg/l)	ND	ND
Herbicides (µg/l)	ND	ND
PCBs (µg/l)	ND	ND
Inorganics (µg/l)		
Iron	984	919
Iron (dissolved)	439	418
Magnesium	59,100	57,100
Magnesium (dissolved)	57,600	58,000
Manganese	950.9	935.4
Manganese (dissolved)	955.1	965.4
Sodium	377,000	369,000
PFAS (ng/l) (dived)	370,000	371,000

Sample ID	RMW16_011719
Sample Date	1/17/2019
Screened Interval (feet bgs)	18 to 28
SVOCs (µg/l)	
Benzo(a)anthracene	0.05 J
Benzo(a)pyrene	0.03 J
Benzo(b)fluoranthene	0.04 J
Benzo(k)fluoranthene	0.02 J
Chrysene	0.06 J
Indeno(1,2,3-cd)pyrene	0.02 J
Phenol	1.2 J
Pesticides (µg/l)	ND
Herbicides (µg/l)	ND
PCBs (µg/l)	ND
Inorganics (µg/l)	
Iron	8,530
Iron (dissolved)	8,000
Lead	28.11
Sodium	47,100
Sodium (dissolved)	50,100
PFAS (ng/l)	
Perfluorobutanoic acid	7.08
Perfluoroheptanoic acid	1.76 J
Perfluorohexanoic Acid	2.16
Perfluorooctanesulfonic acid	4.19
Perfluorooctanoic Acid	1.76

Sample ID	RMW16_011719
Sample Date	1/17/2019
Screened Interval (feet bgs)	17 to 27
SVOCs (µg/l)	
Benzo(a)anthracene	0.04 J
Benzo(a)pyrene	0.06 J
Benzo(b)fluoranthene	0.07 J
Benzo(k)fluoranthene	0.03 J
Chrysene	0.06 J
Indeno(1,2,3-cd)pyrene	0.04 J
Pesticides (µg/l)	NE
Herbicides (µg/l)	ND
PCBs (µg/l)	ND
Inorganics (µg/l)	
Iron	4,100
Iron (dissolved)	1,150
Lead	54.01
Magnesium	57,200
Magnesium (dissolved)	57,200
Manganese	396.8
Manganese (dissolved)	354
Sodium	76,600
Sodium (dissolved)	76,500
PFAS (ng/l)	NA

Sample ID	RMW11_011719
Sample Date	1/17/2019
Screened Interval (feet bgs)	13 to 28
SVOCs (µg/l)	
Naphthalene	360
Pesticides (µg/l)	ND
Herbicides (µg/l)	ND
PCBs (µg/l)	ND
Inorganics (µg/l)	
Iron	3,700
Iron (dissolved)	2,950
Manganese	641.8
Manganese (dissolved)	639.3
Sodium	26,900
Sodium (dissolved)	28,000

Sample ID	MW01_090717
Sample Date	9/7/2017
Screened Interval (feet bgs)	9 to 19
SVOCs (µg/l)	
Acenaphthene	36
Benzo(a)anthracene	1.6
Benzo(a)pyrene	1.5
Benzo(b)fluoranthene	1.4
Benzo(k)fluoranthene	0.43
Chrysene	1.6
Indeno(1,2,3-cd)pyrene	0.82
PCBs (µg/l)	NA
Inorganics (µg/l)	
Arsenic	54.38
Beryllium	3.92
Cadmium	7.3
Chromium	506.6
Iron	102,000
Lead	2,520
Magnesium	59,100
Magnesium (dissolved)	43,400
Manganese	3,211
Mercury	2.4
Nickel	264.5
Selenium	28.7
Sodium	310,000
Sodium (dissolved)	285,000
Thallium	0.56
Zinc	2,128
PFAS (ng/l)	NA

Sample ID	MW08_090817
Sample Date	9/8/2017
Screened Interval (feet bgs)	14 to 24
SVOCs (µg/l)	
Benzo(a)anthracene	0.02 J
Benzo(b)fluoranthene	0.02 J
PCBs (µg/l)	ND
Inorganics (µg/l)	
Chromium	491.7
Iron	49,400
Lead	57.87
Magnesium	79,600
Magnesium (dissolved)	80,400
Manganese	5,174
Manganese (dissolved)	4,422
Nickel	234
Sodium	300,000
Sodium (dissolved)	282,000
PFAS (ng/l)	NA

Sample ID	RMW09_011619
Sample Date	1/16/2019
Screened Interval (feet bgs)	13 to 28
SVOCs (µg/l)	
Benzo(a)anthracene	0.1 J
Benzo(a)pyrene	0.05 J
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.04 J
Chrysene	0.1
Indeno(1,2,3-cd)pyrene	0.04 J
Naphthalene	370
Phenol	9.5
Pesticides (µg/l)	ND
Herbicides (µg/l)	ND
PCBs (µg/l)	ND
Inorganics (µg/l)	
Iron	32,000
Iron (dissolved)	31,800
Magnesium	43,100
Magnesium (dissolved)	42,800
Manganese	2,410
Manganese (dissolved)	2,390
Sodium	77,900
Sodium (dissolved)	79,800

Sample ID	RMW04_011519
Sample Date	1/15/2019
Screened Interval (feet bgs)	9 to 24
SVOCs (µg/l)	
Benzo(a)anthracene	0.18
Benzo(a)pyrene	0.18
Benzo(b)fluoranthene	0.21
Benzo(k)fluoranthene	0.07 J
Chrysene	0.15
Indeno(1,2,3-cd)pyrene	0.11
Pentachlorophenol	9.2
Pesticides (µg/l)	ND
Herbicides (µg/l)	ND
PCBs (µg/l)	ND
Inorganics (µg/l)	
Iron	8,990
Iron (dissolved)	5,870
Lead	38
Magnesium	52,700
Magnesium (dissolved)	49,600
Manganese	1,036
Manganese (dissolved)	977.6
Sodium	189,000
Sodium (dissolved)	181,000
PFAS (ng/l)	NA

Sample ID	RMW14_011719
Sample Date	1/17/2019
Screened Interval (feet bgs)	17 to 27
SVOCs (µg/l)	
Benzo(a)anthracene	0.28
Benzo(a)pyrene	0.28
Benzo(b)fluoranthene	0.33
Benzo(k)fluoranthene	0.13
Chrysene	0.28
Indeno(1,2,3-cd)pyrene	0.2
Naphthalene	280
Pesticides (µg/l)	ND
PFAS (ng/l) pg/l	ND
PCBs (µg/l)	ND
Inorganics (µg/l)	
Iron	14,100
Iron (dissolved)	10,900
Manganese	1,003
Manganese (dissolved)	949.9
Sodium	67,000
Sodium (dissolved)	69,700
PFAS (µg/l)	NA

Sample ID	MW08_090817
Sample Date	9/8/2017
Screened Interval (feet bgs)	17 to 27
SVOCs (µg/L)	
Benzo(a)anthracene	0.13
Benzo(a)pyrene	0.11
Benzo(b)fluoranthene	0.18
Benzo(k)fluoranthene	0.07 J
Chrysene	0.12
Indeno(1,2,3-cd)pyrene	0.06 J
PCBs (µg/L)	ND
Inorganics (µg/L)	
Iron	922

Sample ID	RMW25_071219
Sample Date	7/12/2019
Screened Interval (feet bgs)	10 to 20
SVOCs (µg/L)	NE
Pesticides (µg/L)	ND
Herbicides (µg/L)	ND
PCBs (µg/L)	ND
Inorganics (µg/L)	
Iron	10,600
Iron (Dissolved)	6,950
Lead	136
Manganese	1,444
Manganese (Dissolved)	1,270
Sodium	70,700
Sodium (Dissolved)	73,000
PFAS (ng/L)	
Perfluorobutanesulfonic Acid	0.969 J
Perfluorobutanoic Acid	4.8
Perfluoroheptanoic acid	2.56
Perfluorohexanoic Acid	10.2
Perfluorononanoic Acid	0.824 J
Perfluorooctanesulfonic acid	3.71
Perfluorooctanoic Acid	5.51
Perfluoropentanoic Acid	11.9

Sample ID	RMW23_071219	GWDUP_071219
Sample Date	7/12/2019	7/12/2019
Screened Interval (feet bgs)	9 to 19	9 to 19
SVOCs (µg/L)	NE	NE
Pesticides (µg/L)	ND	ND
Herbicides (µg/L)	ND	ND
PCBs (µg/L)	ND	ND
Inorganics (µg/L)		
Iron	1,200	1,200
Manganese	728	656
Manganese (Dissolved)	1,403	1,348
Sodium	1,324	1,288
Sodium (Dissolved)	75,100	70,400
PFAS (ng/L)	70,700	66,600
N-ethyl perfluorooctane-sulfonamidoacetic acid	1.7 J	ND
Perfluorobutanesulfonic Acid	0.773 J	1.12 J
Perfluorobutanoic Acid	2.42	10.6
Perfluoroheptanoic acid	0.982 J	2.62
Perfluorohexanoic Acid	1.53 J	6.12
Perfluorononanoic Acid	0.68 J	1.68 J
Perfluorooctanesulfonic acid	5.47 J	9.03
Perfluorooctanoic Acid	3.02	6.44
Perfluoropentanoic Acid	2.34	7.74

Sample ID	RMW07_011619
Sample Date	1/16/2019
Screened Interval (feet bgs)	4 to 24
SVOCs (µg/l)	
Benzo(a)anthracene	0.04 J
Benzo(a)pyrene	0.04 J
Benzo(b)fluoranthene	0.06 J
Benzo(k)fluoranthene	0.03 J
Chrysene	0.05 J
Indeno(1,2,3-cd)pyrene	0.04 J
Pesticides (µg/l)	ND
Herbicides (µg/l)	ND
PCBs (µg/l)	ND
Inorganics (µg/l)	
Iron	856
Lead	30.03
Magnesium	35,800
Sodium	39,800
Sodium (dissolved)	39,000
PFAS (ng/l)	
Perfluorobutanesulfonic Acid	3.49
Perfluorobutanoic acid	4.73
Perfluoroheptanoic acid	1.42 J
Perfluorohexanesulfonic Acid	0.782 J
Perfluorohexanoic Acid	1.66 J
Perfluorononanoic Acid	0.6 J
Perfluorooctanesulfonic acid	7.55
Perfluorooctanoic Acid	10.6
Perfluoropentanoic Acid	1.73 J

Sample ID	RMW22_011419
Sample Date	1/14/2019
Screened Interval (feet bgs)	17 to 27
SVOCs (µg/l)	
Benzo(a)anthracene	0.08 J
Benzo(a)pyrene	0.19
Benzo(b)fluoranthene	0.27
Benzo(k)fluoranthene	0.11
Chrysene	0.06 J
Indeno(1,2,3-cd)pyrene	0.31
Pesticides (µg/l)	ND
Herbicides (µg/l)	ND
PCBs (µg/l)	ND
Inorganics (µg/l)	
Iron	4770
Iron (dissolved)	1750
Lead	239.4
Manganese	1111
Manganese (dissolved)	1015
Sodium	45500
Sodium (dissolved)	44000
PFAS (pg/l)	NE

Sample ID	RMW18_011419
Sample Date	1/14/2019
Screened Interval (feet bgs)	17 to 27
SVOCs (µg/l)	
Benzo(a)anthracene	0.05 J
Benzo(a)pyrene	0.02 J
Benzo(b)fluoranthene	0.03 J
Benzo(k)fluoranthene	0.01 J
Chrysene	0.03 J
Indeno(1,2,3-cd)pyrene	0.02 J
Pesticides (µg/l)	ND
Herbicides (µg/l)	ND
PCBs (µg/l)	ND
Inorganics (µg/l)	
Iron	36,400
Iron (dissolved)	5,450
Lead	226.8
Magnesium	43,200
Magnesium (dissolved)	36,900
Manganese	2,553
Manganese (dissolved)	1,982
Sodium	67,600
Sodium (dissolved)	73,500
PFAS (pg/l)	NA

Sample ID	RMW17_011719
Sample Date	1/17/2019
Screened Interval (feet bgs)	18 to 28
SVOCs (µg/l)	
Benzo(a)anthracene	0.17
Benzo(a)pyrene	0.14
Benzo(b)fluoranthene	0.14
Benzo(k)fluoranthene	0.05 J
Chrysene	0.18
Indeno(1,2,3-cd)pyrene	0.06 J
Phenol	1.8 J
Pesticides (µg/l)	NE
Herbicides (µg/l)	ND
PCBs (µg/l)	ND
Inorganics (µg/l)	
Iron	1,920
Iron (dissolved)	558
Magnesium	62,200
Magnesium (dissolved)	60,900
Sodium	60,000
Sodium (dissolved)	57,200
PFAS (ng/l)	NA

Analyte	SGVs
SVOCs (µg/l)	
Acenaphthene	20
Benzo(a)anthracene	0.002
Benzo(a)pyrene	0
Benzo(b)fluoranthene	0.002
Benzo(k)fluoranthene	0.002
Chrysene	0.002
Indeno(1,2,3-cd)pyrene	0.002
Naphthalene	10
Pentachlorophenol	1
Phenol	1
Inorganics (µg/l)	
Arsenic	25
Beryllium	3
Cadmium	5
Chromium	50
Iron	300
Lead	25
Magnesium	35000
Manganese	300
Mercury	0.7
Nickel	100
Selenium	10
Sodium	20000
Thallium	0.5
Zinc	2000
PFAS (pg/l)	
PFOS + PFOA	0.07

LEGEND:

- SITE BOUNDARY
- RB30/RMW30 — RI SOIL BORING AND MONITORING WELL LOCATION
- SB01/MW01 — APPROXIMATE SI SOIL BORING/MONITORING WELL LOCATION (LANGAN, SEPTEMBER 2017)
- AEI-B2/AEI-GW2 — APPROXIMATE PHASE II ESI SOIL BORING/MONITORING WELL LOCATION (AEI, OCTOBER 2015)
- APPROXIMATE EXTENT OF PETROLEUM PLUME

NOTES:

1. THE BASE MAP IS REFERENCED FROM THE SURVEY PREPARED BY LANGAN DATED OCTOBER 10, 2017.
2. MONITORING WELLS WERE SURVEYED BY LANGAN ON JANUARY 24, 2019.
3. GROUNDWATER SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TECHNICAL AND OPERATIONAL GUIDANCE SERIES (TOGS) 1.1.1 AMBIENT WATER QUALITY STANDARDS (AWQS) AND GUIDANCE VALUES FOR DRINKING WATER (CLASS GA)(COLLECTIVELY REFERRED TO AS THE STANDARDS AND GUIDANCE VALUES [SGVs]).
4. REGULATORY CRITERIA DO NOT EXIST FOR PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) AND 1,4-DIOXANE IN NEW YORK STATE. PFAS ARE COMPARED TO THE USEPA HEALTH ADVISORY LEVEL.
5. RESULTS EXCEEDING SGVs AND/OR THE USEPA HEALTH ADVISORY LEVEL ARE SHADED AND BOLDED.
6. ONLY VALIDATED ANALYTICAL DATA ARE SHOWN.
7. SI = SUBSURFACE INVESTIGATION
8. ESI = ENVIRONMENTAL SITE INVESTIGATION
9. µg/L = MICROGRAMS PER LITER
10. VOCs = VOLATILE ORGANIC COMPOUNDS
11. NE = NO EXCEEDANCES
12. ND = NOT DETECTED
13. NA = NOT ANALYZED
14. J = THE ANALYTE WAS DETECTED ABOVE THE METHOD DETECTION LIMIT (MDL)
15. USEPA - UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

60 0 30 60

SCALE: 1 INCH = 60 FEET

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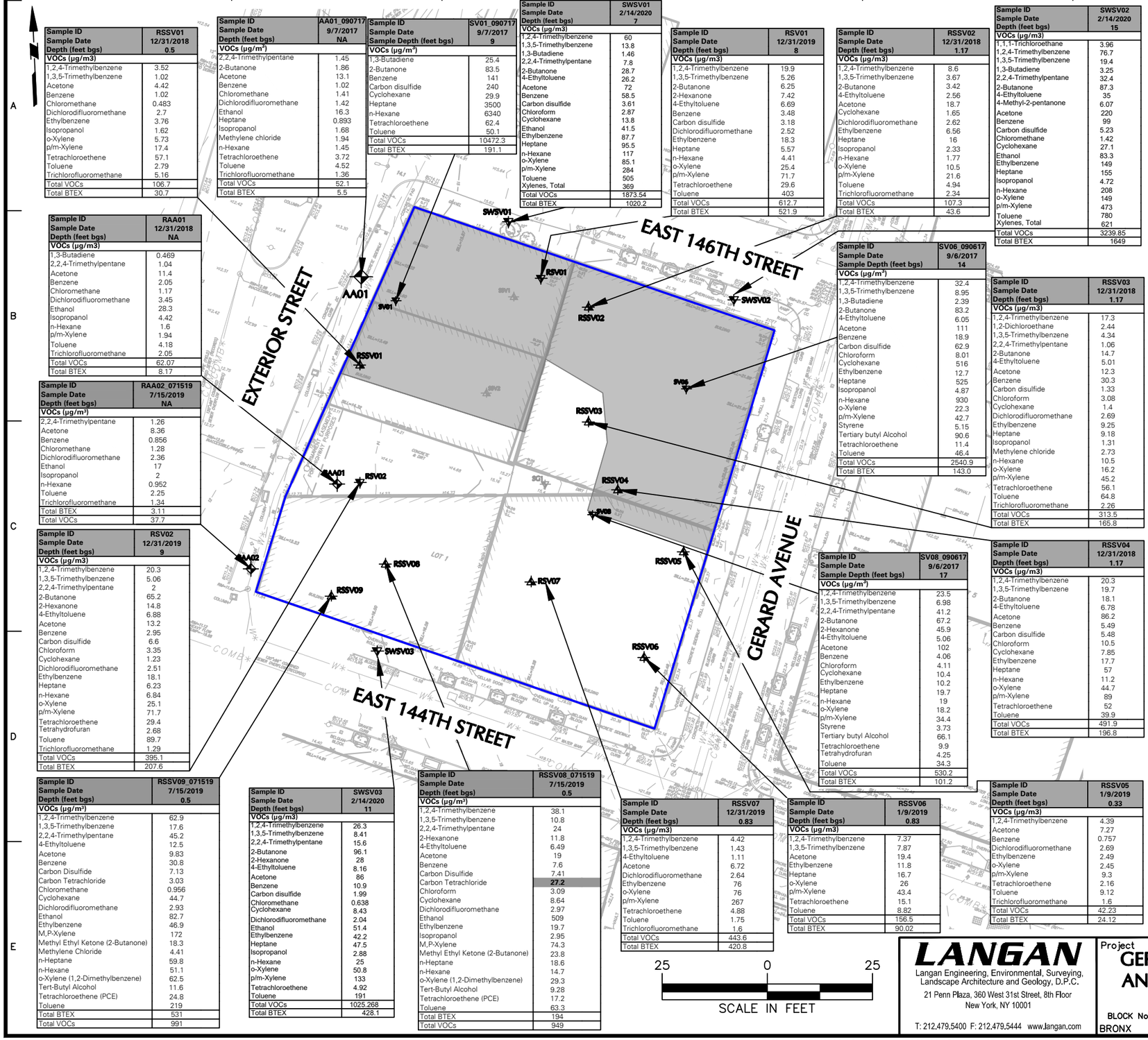
Project: GERARD AVENUE AND EAST 146TH STREET
BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20
BRONX NEW YORK

Figure Title: GROUNDWATER SAMPLE ANALYTICAL RESULTS MAP - SVOCs, PCBs, PESTICIDES, HERBICIDES, INORGANICS, & PFAS

Project No. 170487001
Date 02/18/2020
Drawn By JG
Checked By JL

Figure No. 4B

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 4B - Groundwater Sample Analtyical Results Map (other compounds)(no tags for prev consultant)_recover.dwg Date: 4/20/2020 Time: 18:35 User: jgolding Style Table: Langan.stb Layout: ANSID-BL



Sample ID Sample Date Depth (feet bgs)	RSSV01 12/31/2018 0.5
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	3.52
1,3,5-Trimethylbenzene	1.02
Acetone	4.42
Benzene	1.02
Chloromethane	0.483
Dichlorodifluoromethane	2.7
Ethylbenzene	3.76
Isopropanol	1.62
o-Xylene	5.73
p/m-Xylene	17.4
Tetrachloroethene	57.1
Toluene	2.79
Trichlorofluoromethane	5.16
Total VOCs	106.7
Total BTEX	30.7

Sample ID Sample Date Depth (feet bgs)	AA01_090717 9/7/2017 NA
VOCs (µg/m³)	
2,2,4-Trimethylpentane	1.45
2-Butanone	1.86
Acetone	13.1
Benzene	1.02
Chloromethane	1.41
Dichlorodifluoromethane	1.42
Ethanol	16.3
Heptane	0.893
Isopropanol	1.68
Methylene chloride	1.94
n-Hexane	1.45
Tetrachloroethene	3.72
Toluene	4.52
Trichlorofluoromethane	1.36
Total VOCs	52.1
Total BTEX	5.5

Sample ID Sample Date Sample Depth (feet bgs)	SV01_090717 9/7/2017 9
VOCs (µg/m³)	
1,3-Butadiene	25.4
2-Butanone	83.5
Benzene	141
Carbon disulfide	240
Cyclohexane	29.9
Heptane	3500
n-Hexane	6340
Tetrachloroethene	62.4
Toluene	50.1
Total VOCs	10472.3
Total BTEX	191.1

Sample ID Sample Date Depth (feet bgs)	SWSV01 2/14/2020 7
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	60
1,3,5-Trimethylbenzene	13.8
1,3-Butadiene	1.46
2,2,4-Trimethylpentane	7.8
2-Butanone	28.7
4-Ethyltoluene	26.2
Acetone	72
Benzene	58.5
Carbon disulfide	3.61
Chloroform	2.87
Cyclohexane	13.8
Ethanol	41.5
Ethylbenzene	87.7
Heptane	95.5
n-Hexane	117
o-Xylene	85.1
p/m-Xylene	284
Toluene	505
Xylenes, Total	369
Total VOCs	1873.54
Total BTEX	1020.2

Sample ID Sample Date Depth (feet bgs)	RSV01 12/31/2019 8
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	19.9
1,3,5-Trimethylbenzene	5.26
2-Butanone	6.25
2-Hexanone	7.42
4-Ethyltoluene	6.69
Benzene	3.48
Carbon disulfide	3.18
Dichlorodifluoromethane	2.52
Ethylbenzene	18.3
Heptane	5.57
n-Hexane	4.41
o-Xylene	25.4
p/m-Xylene	71.7
Tetrachloroethene	29.6
Toluene	403
Total VOCs	612.7
Total BTEX	521.9

Sample ID Sample Date Depth (feet bgs)	RSSV02 12/31/2018 1.17
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	8.6
1,3,5-Trimethylbenzene	3.67
2-Butanone	3.42
4-Ethyltoluene	2.56
Acetone	18.7
Cyclohexane	1.65
Dichlorodifluoromethane	2.62
Ethylbenzene	6.56
Heptane	16
Isopropanol	2.33
n-Hexane	1.77
o-Xylene	10.5
p/m-Xylene	21.6
Toluene	4.94
Trichlorofluoromethane	2.34
Total VOCs	107.3
Total BTEX	43.6

Sample ID Sample Date Depth (feet bgs)	SWSV02 2/14/2020 15
VOCs (µg/m3)	
1,1,1-Trichloroethane	3.96
1,2,4-Trimethylbenzene	76.7
1,3,5-Trimethylbenzene	19.4
1,3-Butadiene	3.25
2,2,4-Trimethylpentane	32.4
2-Butanone	87.3
4-Ethyltoluene	35
4-Methyl-2-pentanone	6.07
Acetone	220
Benzene	99
Carbon disulfide	5.23
Chloromethane	1.42
Cyclohexane	27.1
Ethanol	83.3
Ethylbenzene	149
Heptane	155
Isopropanol	4.72
n-Hexane	208
o-Xylene	149
p/m-Xylene	473
Toluene	780
Xylenes, Total	621
Total VOCs	3239.85
Total BTEX	1649

Sample ID Sample Date Depth (feet bgs)	RAA01 12/31/2018 NA
VOCs (µg/m3)	
1,3-Butadiene	0.469
2,2,4-Trimethylpentane	1.04
Acetone	11.4
Benzene	2.05
Chloromethane	1.17
Dichlorodifluoromethane	3.45
Ethanol	28.3
Isopropanol	4.42
n-Hexane	1.6
p/m-Xylene	1.94
Toluene	4.18
Trichlorofluoromethane	2.05
Total VOCs	62.07
Total BTEX	8.17

Sample ID Sample Date Depth (feet bgs)	SV06_090617 9/6/2017 14
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	32.4
1,3,5-Trimethylbenzene	8.95
1,3-Butadiene	2.39
2-Butanone	83.2
4-Ethyltoluene	6.05
Acetone	111
Benzene	18.9
Carbon disulfide	62.9
Chloroform	8.01
Cyclohexane	516
Ethylbenzene	12.7
Heptane	525
Isopropanol	4.87
n-Hexane	930
o-Xylene	22.3
p/m-Xylene	42.7
Styrene	5.15
Tertiary butyl Alcohol	90.6
Tetrachloroethene	11.4
Toluene	46.4
Total VOCs	2540.9
Total BTEX	143.0

Sample ID Sample Date Depth (feet bgs)	RSSV03 12/31/2018 1.17
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	17.3
1,2-Dichloroethane	2.44
1,3,5-Trimethylbenzene	4.34
2,2,4-Trimethylpentane	1.06
2-Butanone	14.7
4-Ethyltoluene	5.01
Acetone	12.3
Benzene	30.3
Carbon disulfide	1.33
Chloroform	3.08
Cyclohexane	1.4
Dichlorodifluoromethane	2.69
Ethylbenzene	9.25
Heptane	9.18
Isopropanol	1.31
Methylene chloride	2.73
n-Hexane	10.5
o-Xylene	16.2
p/m-Xylene	45.2
Tetrachloroethene	56.1
Toluene	64.8
Trichlorofluoromethane	2.26
Total VOCs	313.5
Total BTEX	165.8

Sample ID Sample Date Depth (feet bgs)	RAA02_071519 7/15/2019 NA
VOCs (µg/m³)	
2,2,4-Trimethylpentane	1.26
Acetone	8.36
Benzene	0.856
Chloromethane	1.28
Dichlorodifluoromethane	2.36
Ethanol	17
Isopropanol	2
n-Hexane	0.952
Toluene	2.25
Trichlorofluoromethane	1.34
Total BTEX	3.11
Total VOCs	37.7

Sample ID Sample Date Depth (feet bgs)	SV08_090617 9/6/2017 17
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	23.5
1,3,5-Trimethylbenzene	6.98
2,2,4-Trimethylpentane	41.2
2-Butanone	67.2
2-Hexanone	45.9
4-Ethyltoluene	5.06
Acetone	102
Benzene	4.06
Chloroform	4.11
Cyclohexane	10.4
Ethylbenzene	10.2
Heptane	19.7
n-Hexane	19
o-Xylene	18.2
p/m-Xylene	34.4
Styrene	3.73
Tertiary butyl Alcohol	66.1
Tetrachloroethene	9.9
Tetrahydrofuran	4.25
Toluene	34.3
Total VOCs	530.2
Total BTEX	101.2

Sample ID Sample Date Depth (feet bgs)	RSSV04 12/31/2018 1.17
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	20.3
1,3,5-Trimethylbenzene	19.7
2-Butanone	18.1
4-Ethyltoluene	6.78
Acetone	86.2
Benzene	5.49
Carbon disulfide	5.48
Chloroform	10.5
Cyclohexane	7.85
Ethylbenzene	17.7
Heptane	57
n-Hexane	11.2
o-Xylene	44.7
p/m-Xylene	89
Tetrachloroethene	52
Toluene	39.9
Total VOCs	491.9
Total BTEX	196.8

Sample ID Sample Date Depth (feet bgs)	RSSV09_071519 7/15/2019 0.5
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	62.9
1,3,5-Trimethylbenzene	17.6
2,2,4-Trimethylpentane	45.2
4-Ethyltoluene	12.5
Acetone	9.83
Benzene	30.8
Carbon Disulfide	7.13
Carbon Tetrachloride	3.03
Chloromethane	0.956
Cyclohexane	44.7
Dichlorodifluoromethane	2.93
Ethanol	82.7
Ethylbenzene	46.9
M,P-Xylene	172
Methyl Ethyl Ketone (2-Butanone)	18.3
Methylene Chloride	4.41
n-Heptane	59.8
n-Hexane	51.1
o-Xylene (1,2-Dimethylbenzene)	62.5
Tert-Butyl Alcohol	11.6
Tetrachloroethene (PCE)	24.8
Toluene	219
Total BTEX	531
Total VOCs	991

Sample ID Sample Date Depth (feet bgs)	RSV02 12/31/2019 9
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	20.3
1,3,5-Trimethylbenzene	5.06
2,2,4-Trimethylpentane	2
2-Butanone	65.2
2-Hexanone	14.8
4-Ethyltoluene	6.88
Acetone	13.2
Benzene	2.95
Carbon disulfide	6.6
Chloroform	3.35
Cyclohexane	1.23
Dichlorodifluoromethane	2.51
Ethylbenzene	18.1
Heptane	6.23
n-Hexane	6.84
o-Xylene	25.1
p/m-Xylene	71.7
Tetrachloroethene	29.4
Tetrahydrofuran	2.68
Toluene	89.7
Trichlorofluoromethane	1.29
Total VOCs	395.1
Total BTEX	207.6

Sample ID Sample Date Depth (feet bgs)	SWSV03 2/14/2020 11
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	26.3
1,3,5-Trimethylbenzene	8.41
2,2,4-Trimethylpentane	15.6
2-Butanone	96.1
2-Hexanone	28
4-Ethyltoluene	8.16
Acetone	86
Benzene	10.9
Carbon disulfide	1.99
Chloromethane	0.638
Cyclohexane	8.43
Dichlorodifluoromethane	2.04
Ethanol	51.4
Ethylbenzene	42.2
Heptane	47.5
Isopropanol	2.88
n-Hexane	25
o-Xylene	50.8
p/m-Xylene	133
Tetrachloroethene	4.92
Toluene	191
Total VOCs	1025.268
Total BTEX	428.1

Sample ID Sample Date Depth (feet bgs)	RSSV08_071519 7/15/2019 0.5
VOCs (µg/m³)	
1,2,4-Trimethylbenzene	38.1
1,3,5-Trimethylbenzene	10.8
2,2,4-Trimethylpentane	24
2-Hexanone	11.8
4-Ethyltoluene	6.49
Acetone	19
Benzene	7.6
Carbon Disulfide	7.41
Carbon Tetrachloride	27.2
Chloroform	3.09
Cyclohexane	8.64
Dichlorodifluoromethane	2.97
Ethanol	509
Ethylbenzene	19.7
Isopropanol	2.95
M,P-Xylene	74.3
Methyl Ethyl Ketone (2-Butanone)	23.8
n-Heptane	18.6
n-Hexane	14.7
o-Xylene (1,2-Dimethylbenzene)	29.3
Tert-Butyl Alcohol	9.28
Tetrachloroethene (PCE)	17.2
Toluene	63.3
Total BTEX	194
Total VOCs	949

Sample ID Sample Date Depth (feet bgs)	RSSV07 12/31/2019 0.83
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	4.42
1,3,5-Trimethylbenzene	1.43
4-Ethyltoluene	1.11
Acetone	6.72
Dichlorodifluoromethane	2.64
Ethylbenzene	76
o-Xylene	76
p/m-Xylene	267
Tetrachloroethene	4.88
Toluene	1.75
Trichlorofluoromethane	1.6
Total VOCs	443.6
Total BTEX	420.8

Sample ID Sample Date Depth (feet bgs)	RSSV06 1/9/2019 0.83
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	7.37
1,3,5-Trimethylbenzene	7.87
Acetone	19.4
Ethylbenzene	11.8
Heptane	16.7
o-Xylene	26
p/m-Xylene	43.4
Tetrachloroethene	15.1
Toluene	8.82
Total VOCs	156.5
Total BTEX	90.02

Sample ID Sample Date Depth (feet bgs)	RSSV05 1/9/2019 0.33
VOCs (µg/m3)	
1,2,4-Trimethylbenzene	4.39
Acetone	7.27
Benzene	0.757
Dichlorodifluoromethane	2.69
Ethylbenzene	2.49
o-Xylene	2.45
p/m-Xylene	9.3
Tetrachloroethene	2.16
Toluene	9.12
Trichlorofluoromethane	1.6
Total VOCs	42.23
Total BTEX	24.12

25 0 25

SCALE IN FEET

LEGEND:

- SITE BOUNDARY
- RSV01 — SOIL VAPOR SAMPLE LOCATION
- RSSV07 — SUBSLAB SOIL VAPOR SAMPLE LOCATION
- RAA01 — AMBIENT AIR SAMPLE LOCATION
- AA01 — APPROXIMATE SI AMBIENT AIR SAMPLE LOCATION (LANGAN, SEPTEMBER 2017)
- SV06 — APPROXIMATE SI SOIL VAPOR SAMPLE LOCATION (LANGAN, SEPTEMBER 2017)
- SSV2 — APPROXIMATE PHASE II ESI SUB-SLAB SOIL VAPOR SAMPLE LOCATION (AEI, OCTOBER 2015)
- SG1 — APPROXIMATE PHASE II ESI SOIL VAPOR SAMPLE LOCATION (AEI, OCTOBER 2015)
- EXTENT OF PETROLEUM PLUME

NOTES:

1. THE BASE MAP IS REFERENCED FROM THE SURVEY PREPARED BY LANGAN DATED OCTOBER 10, 2017.
2. AMBIENT AIR AND SOIL VAPOR SAMPLE ANALYTICAL RESULTS ARE COMPARED TO NEW YORK STATE DEPARTMENT OF HEALTH (NYSDOH) AIR GUIDELINE VALUES (AGVs).
3. RESULTS EXCEEDING THE NYSDOH AGVs ARE SHADED AND BOLD.
4. ONLY RESULTS WITH DETECTED CONCENTRATIONS ARE SHOWN.
5. ONLY VALIDATED ANALYTICAL DATA ARE SHOWN.
6. SI = SUBSURFACE INVESTIGATION
7. ESI = ENVIRONMENTAL SITE INVESTIGATION
8. NA = NOT APPLICABLE
9. µg/m^3 = MICROGRAMS PER CUBIC METER
10. BGS = BELOW GRADE SURFACE
11. VOCs = VOLATILE ORGANIC COMPOUNDS
12. BTEX = BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES.
13. SUB-SLAB SOIL VAPOR SAMPLES WERE COLLECTED FROM 2" BENEATH THE BOTTOM OF THE BUILDING SLABS.
14. THE AMBIENT AIR SAMPLE WAS COLLECTED APPROXIMATELY 5 FEET ABOVE THE GROUND.

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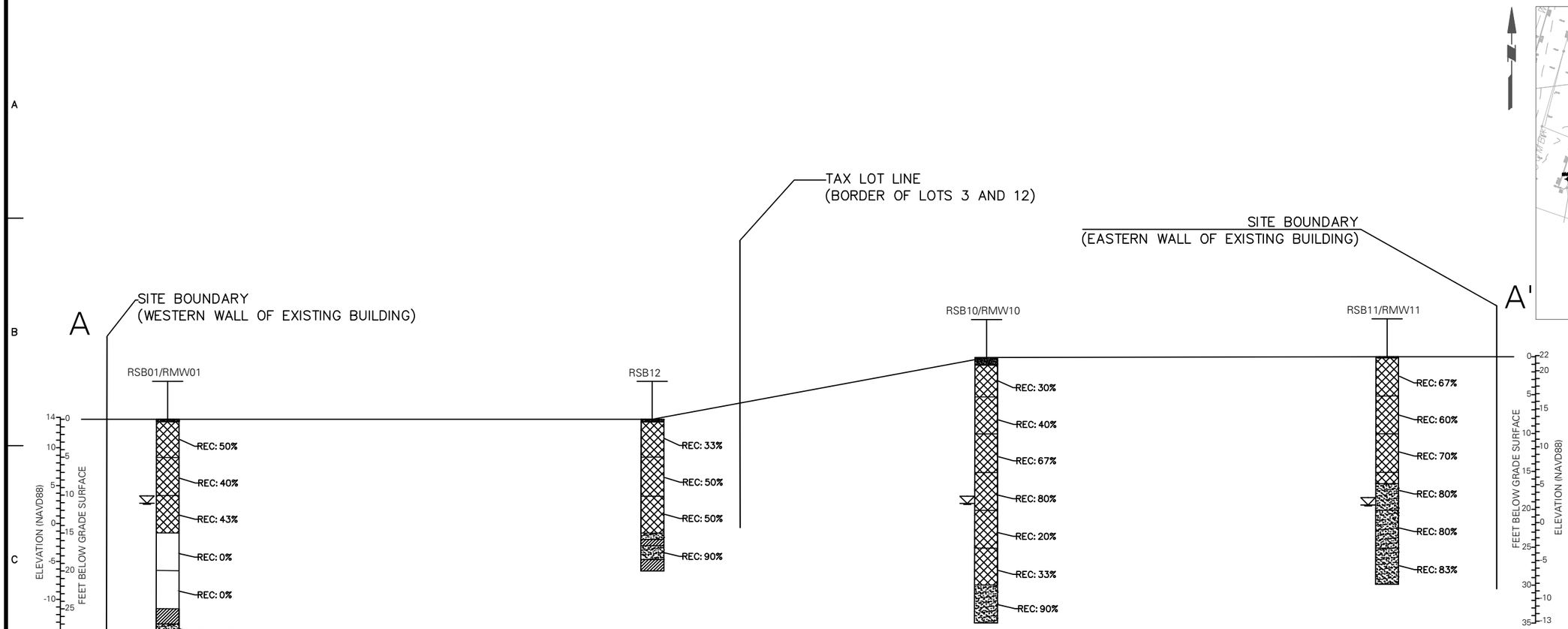
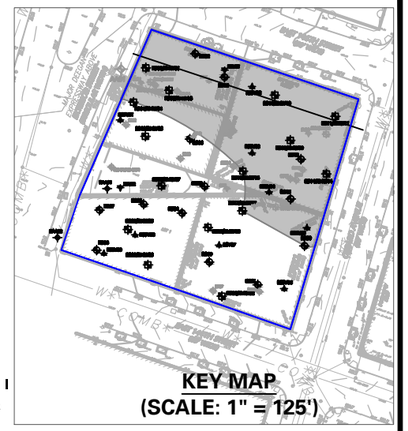
Project
GERARD AVENUE AND EAST 146TH STREET
BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20
BRONX NEW YORK

Figure Title
SOIL VAPOR SAMPLE ANALYTICAL RESULTS MAP

Project No.	Figure No.
170487001	5
Date: 02/18/2020	
Drawn By: JG	
Checked By: JL	

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 5 - Soil Vapor Sample Analtyical Results Map (no tags for prev consultant).dwg Date: 4/17/2020 Time: 15:46 User: jgolding Style Table: Langan.stb
Layout: ANSIB-BL





LEGEND:

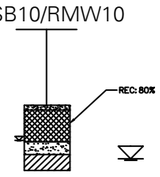
- APPROXIMATE SITE BOUNDARY
- RB08 — SOIL BORING LOCATION
- RB11/RMW11 — SOIL BORING/MONITORING WELL LOCATION
- CONCRETE
- HISTORIC FILL MATERIAL
- SAND
- SILT
- CLAY
- NO RECOVERY

SUBSURFACE PROFILE A–A' (SCALE: 1"=15')

15 0 7.5 15

SCALE IN FEET

BORING KEY DIAGRAM AND NOTES



- RSB10/RMW10 — BORING/MONITORING WELL NUMBER
- REC: 80% — LENGTH OF SOIL RECOVERY/LENGTH OF MACROCORE SLEEVE
- GROUNDWATER INTERFACE

NOTES

1. THE BASE MAP IS REFERENCED FROM THE SURVEY PREPARED BY LANGAN DATED OCTOBER 10, 2017.
2. THIS PROFILE REPRESENTS A GENERALIZED SOIL CROSS SECTION INTERPRETED FROM WIDELY SPACED BORINGS. SOIL AND GROUNDWATER MAY VARY IN TYPE, LOCATION, ELEVATION, AND ENVIRONMENTAL AND ENGINEERING PROPERTIES BETWEEN POINTS OF EXPLORATION. VARIATIONS IN SUBSURFACE CONDITIONS SHOULD BE EXPECTED BETWEEN BORINGS.
3. SUBSURFACE STRATIGRAPHY INTERPRETED FROM RECOVERED SOIL SAMPLES. REFER TO BORING LOGS (APPENDIX D) FOR ADDITIONAL INFORMATION.
4. MACROCORE SLEEVES WERE 5 FEET LONG
5. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

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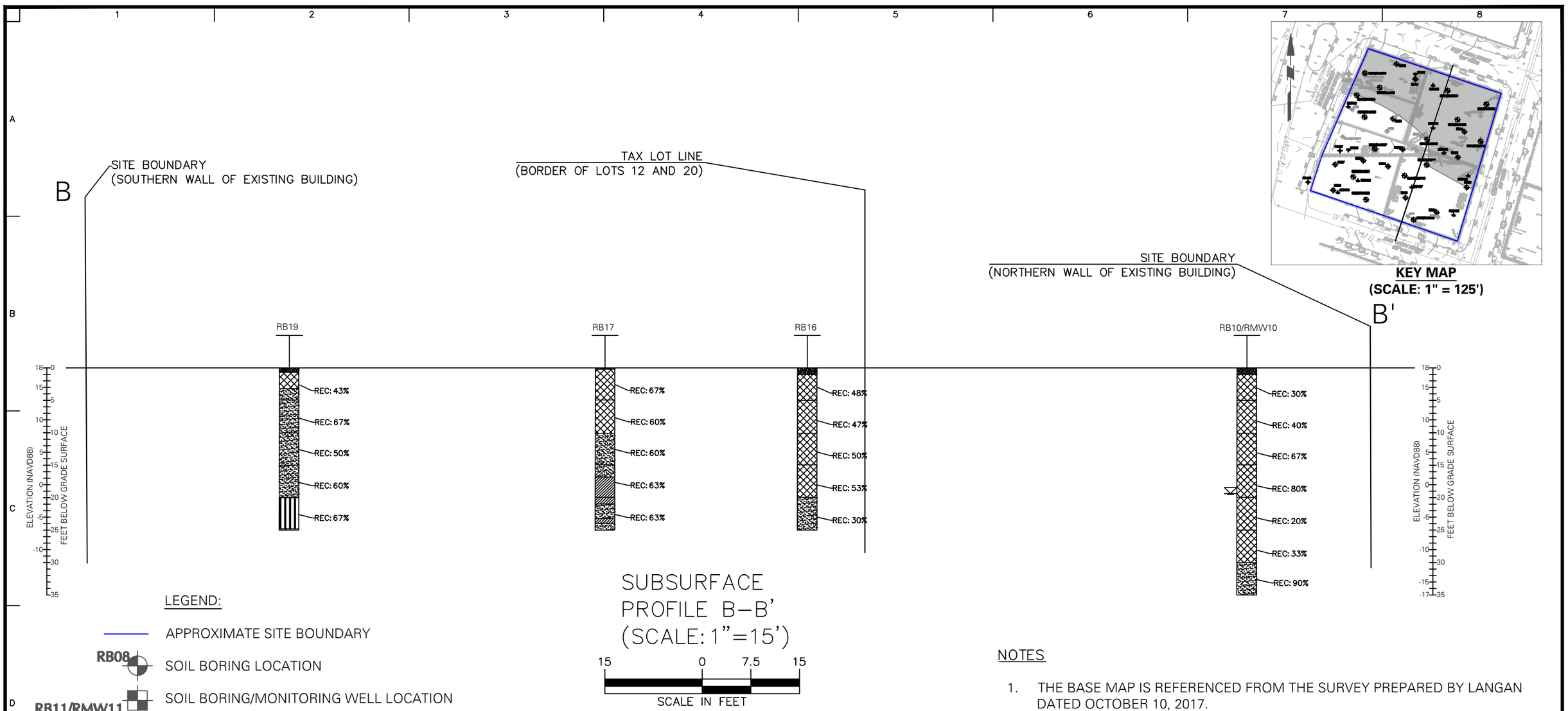
Project	GERARD AVENUE AND EAST 146TH STREET BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20 BRONX NEW YORK
Figure Title	SUBSURFACE PROFILE A-A'
Project No.	170487001
Date	2/15/2019
Drawn By	TG
Checked By	JL
Figure No.	6A

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RIR\Figure 9A 9B.dwg Date: 1/20/2020 Time: 12:14 User: jgolding Style Table: Langan.stb Layout: A-A' Cross



KEY MAP
(SCALE: 1" = 125')

SUBSURFACE PROFILE B–B'
(SCALE: 1"=15')

15 0 7.5 15
SCALE IN FEET

LEGEND:

- APPROXIMATE SITE BOUNDARY
- RB08 — SOIL BORING LOCATION
- RB11/RMW11 — SOIL BORING/MONITORING WELL LOCATION
- CONCRETE
- HISTORIC FILL MATERIAL
- SAND
- SILT
- CLAY

BORING KEY DIAGRAM AND NOTES

RSB10/RMW10 — BORING/MONITORING WELL NUMBER

REC: 80% — LENGTH OF SOIL RECOVERY/LENGTH OF MACROCORE SLEEVE

GROUNDWATER INTERFACE

NOTES

1. THE BASE MAP IS REFERENCED FROM THE SURVEY PREPARED BY LANGAN DATED OCTOBER 10, 2017.
2. THIS PROFILE REPRESENTS A GENERALIZED SOIL CROSS SECTION INTERPRETED FROM WIDELY SPACED BORINGS. SOIL AND GROUNDWATER MAY VARY IN TYPE, LOCATION, ELEVATION, AND ENVIRONMENTAL AND ENGINEERING PROPERTIES BETWEEN POINTS OF EXPLORATION. VARIATIONS IN SUBSURFACE CONDITIONS SHOULD BE EXPECTED BETWEEN BORINGS.
3. SUBSURFACE STRATIGRAPHY INTERPRETED FROM RECOVERED SOIL SAMPLES. REFER TO BORING LOGS (APPENDIX D) FOR ADDITIONAL INFORMATION.
4. MACROCORE SLEEVES WERE 5 FEET LONG
5. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

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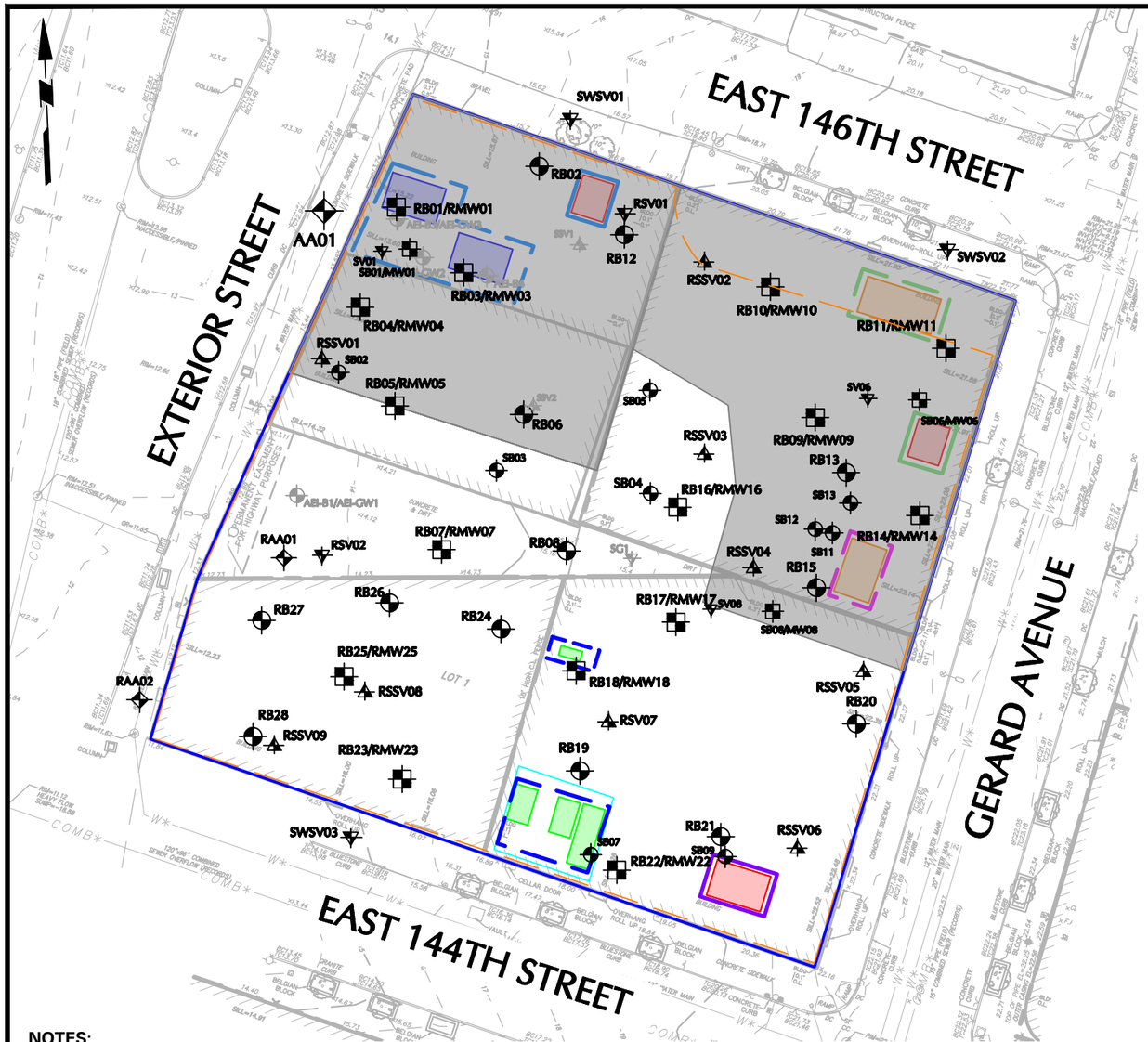
Project	GERARD AVENUE AND EAST 146TH STREET BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20 BRONX NEW YORK
Figure Title	SUBSURFACE PROFILE B-B'
Project No.	170487001
Date	2/15/2019
Drawn By	TG
Checked By	JL
Figure No.	6B

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RIR\Figure 9A 9B.dwg Date: 1/20/2020 Time: 12:15 User: jgolding Style Table: Langan.stb Layout: B-B' Cross



NOTES:

1. THE BASE MAP IS REFERENCED FROM THE ALTA/NSPS LAND TITLE SURVEY PREPARED BY LANGAN DATED APRIL 11,2019.
2. LANGAN CONDUCTED THE LIMITED SUBSURFACE INVESTIGATION (LSI) IN SEPTEMBER 2017 AND THE RI BETWEEN DECEMBER 20, 2018 AND JANUARY 17, 2019.
3. LANGAN LSI BORINGS AND SAMPLE LOCATIONS ARE BASED ON FIELD MEASUREMENTS.
4. AEI PHASE II ESI BORINGS AND SAMPLE LOCATIONS ARE REFERENCED FROM THE OCTOBER 2015 SUBSURFACE INVESTIGATION REPORT.
5. RI SAMPLE LOCATIONS ARE BASED ON FIELD MEASUREMENTS.
6. ESI = ENVIRONMENTAL SITE INVESTIGATION
7. SI = SUBSURFACE INVESTIGATION
8. RI = REMEDIAL INVESTIGATION
9. AST = ABOVEGROUND STORAGE TANK
10. UST = UNDERGROUND STORAGE TANK
11. INFERRED PETROLEUM PLUME IS BASED ON SOIL AND GROUNDWATER ANALYTICAL DATA AND FIELD OBSERVATIONS.
12. PCE = TETRACHLOROETHENE

LEGEND:

- SITE BOUNDARY
- APPROXIMATE CELLAR EXTENTS
- SB03 — APPROXIMATE SI SOIL BORING LOCATION (LANGAN, SEPTEMBER 2017)
- SB01/MW01 — APPROXIMATE SI SOIL BORING/MONITORING WELL LOCATION (LANGAN, SEPTEMBER 2017)
- AEI-B2/AEI-GW2 — APPROXIMATE PHASE II ESI SOIL BORING/MONITORING WELL LOCATION (AEI, OCTOBER 2015)
- AA01 — APPROXIMATE SI AMBIENT AIR SAMPLE LOCATION (LANGAN, SEPTEMBER 2017)
- SV06 — APPROXIMATE SI SOIL VAPOR SAMPLE LOCATION (LANGAN, SEPTEMBER 2017)
- SSV2 — APPROXIMATE PHASE II ESI SUB-SLAB SOIL VAPOR SAMPLE LOCATION (AEI, OCTOBER 2015)
- SG1 — APPROXIMATE PHASE II ESI SOIL VAPOR SAMPLE LOCATION (AEI, OCTOBER 2015)
- RB32 — APPROXIMATE RI SOIL BORING LOCATION
- RB30/RMW30 — APPROXIMATE RI SOIL BORING/MONITORING WELL LOCATION
- RSV01 — APPROXIMATE RI SOIL VAPOR SAMPLE LOCATION
- RSSV07 — APPROXIMATE RI SUB-SLAB VAPOR SAMPLE LOCATION
- RAA01 — APPROXIMATE RI AMBIENT AIR SAMPLE LOCATION
- APPROXIMATE EXTENT OF PETROLEUM PLUME
- APPROXIMATE LOCATION OF USTs IDENTIFIED DURING THE SEPTEMBER 2017 GEOPHYSICAL SURVEY
- APPROXIMATE LOCATION OF OIL WATER SEPARATOR IDENTIFIED DURING THE SEPTEMBER 2017 GEOPHYSICAL SURVEY
- APPROXIMATE LOCATION OF GASOLINE TANKS IDENTIFIED IN THE REVIEW OF THE SANBORN FIRE INSURANCE MAPS
- APPROXIMATE LOCATION OF ASTs

AREAS OF CONCERN (AOCs):

- AOC 1: LOT 3 GASOLINE TANKS
- AOC 2: LOT 3 OIL-WATER SEPARATOR
- AOC 3: LOT 12 GASOLINE TANKS IN NORTHEAST CORNER
- AOC 4: LOT 12 OIL-WATER SEPARATOR
- AOC 5: LOT 12 GASOLINE TANK AND ASSOCIATED SPILL IN SOUTHEAST CORNER
- AOC 6: LOT 20 OIL-WATER SEPARATOR
- AOC 7: LOT 20 ASTs
- AOC 8: HISTORIC FILL
- AOC 9: PCE IMPACTS TO SOIL VAPOR FROM AN OFF-SITE SOURCE

40 0 10 25 40
SCALE IN FEET

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Project: GERARD AVENUE AND EAST 146TH STREET
BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20
BRONX NEW YORK

Figure Title: AREAS OF CONCERN AND SAMPLE LOCATION PLAN

Project No.	170487001
Date	2/18/2020
Drawn By	JG
Checked By	JL
Figure No.	7

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 7 - AOC and Sample Location Plan.dwg Date: 4/17/2020 Time: 15:35 User: jgolding Style Table: Langan.stb Layout: ANSIB-BL

LEGEND:

- SITE BOUNDARY
- TAX LOT 1 TRACK 1 EXCAVATION AREA
- TAX LOT 3 TRACK 1 EXCAVATION AREA
- TAX LOT 12 TRACK 1 EXCAVATION AREA
- TAX LOT 20 TRACK 1 EXCAVATION AREA

NOTES:

1. THE BASE MAP IS REFERENCED FROM THE ALTA/NSPS LAND TITLE SURVEY PREPARED BY LANGAN DATED APRIL 11,2019.
2. ELEVATIONS (EL) ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
3. BGS = BELOW GRADE SURFACE

30 0 15 30
SCALE IN FEET

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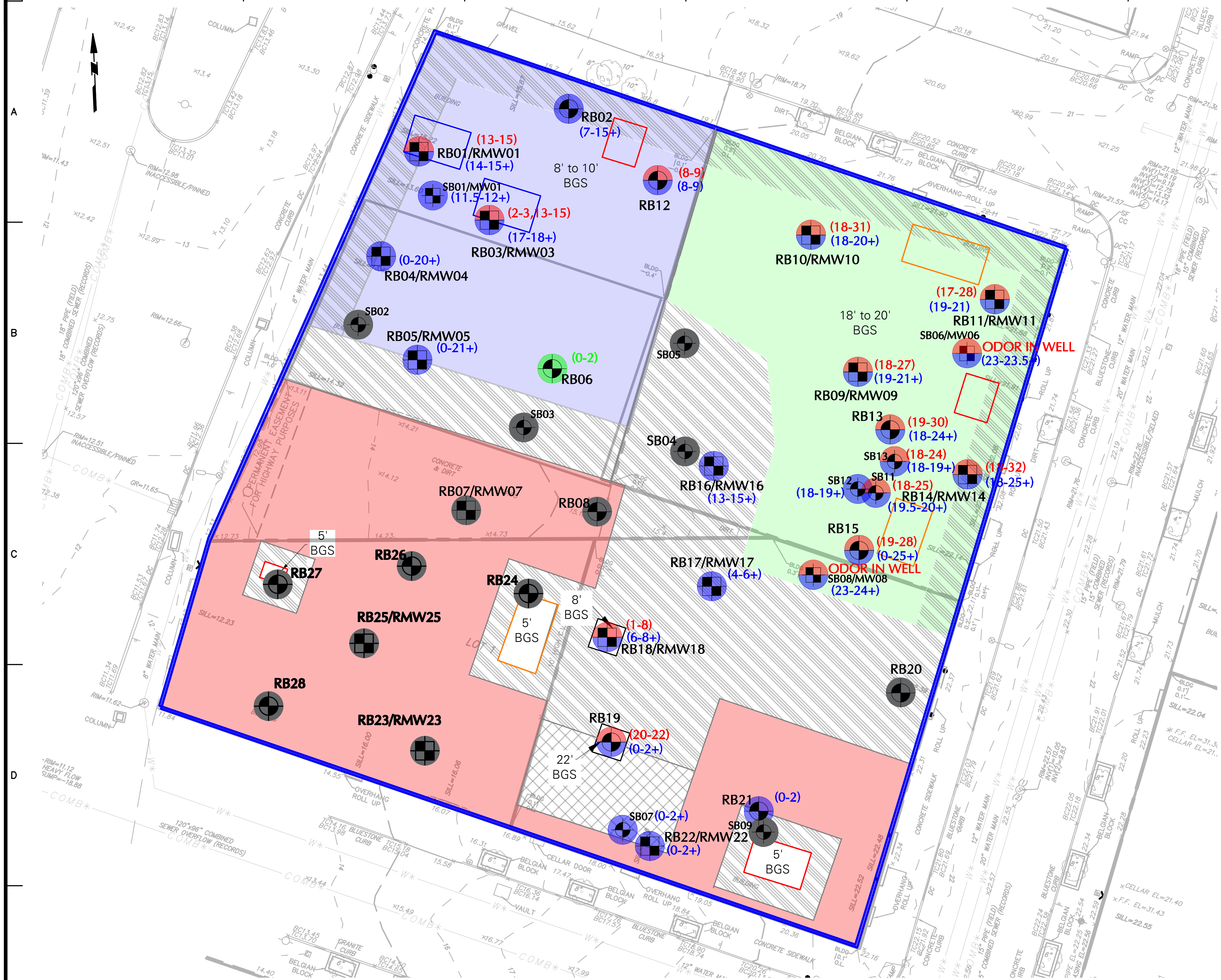
Project	GERARD AVENUE AND EAST 146TH STREET BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20 BRONX NEW YORK
Figure Title	ALTERNATIVE I - TRACK 1 CLEANUP
Project No.	170487001
Date	02/14/2020
Drawn By	JG
Checked By	JL
Figure No.	8

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 8 - Alternative I - Track 1 Cleanup.dwg Date: 2/14/2020 Time: 16:06 User: jgolding Style Table: Langan.stb Layout: ANSIB-BL



30 0 15 30

SCALE: 1 INCH = 30 FEET

LEGEND:

- SITE BOUNDARY
- RB32 — SOIL BORING LOCATION
- RB30/RMW30 — SOIL BORING/MONITORING WELL LOCATION
- (0-2) — SOIL SAMPLE RESULTS WITH HAZARDOUS LEAD (DEPTH INTERVAL)
- (13-15) — SOIL SAMPLE WITH FIELD EVIDENCE OF PETROLEUM IMPACTS (DEPTH INTERVAL)
- (0-2+) — SOIL SAMPLE RESULTS WITH PGW SCO EXCEEDANCE (DEPTH INTERVAL)
- (19-28) (0-21+) — SOIL SAMPLE WITH FIELD EVIDENCE OF PETROLEUM IMPACTS (DEPTH INTERNVAL) AND RESULTS WITH PGW SCO EXCEEDANCE (DEPTH INTERVAL)
- NO SOIL SAMPLES WITH WITH FIELD EVIDENCE OF PETROLEUM IMPACTS OR RESULTS WITH PGW SCO EXCEEDANCE
- APPROXIMATE LOCATION OF UNDERGROUND STORAGE TANKS IDENTIFIED DURING THE SEPTEMBER 2017 OR JULY 2019 GEOPHYSICAL SURVEYS
- APPROXIMATE LOCATION OF OIL WATER SEPARATOR IDENTIFIED DURING THE SEPTEMBER 2017 OR JULY 2019 GEOPHYSICAL SURVEYS
- APPROXIMATE LOCATION OF GASOLINE TANKS IDENTIFIED IN THE REVIEW OF THE SANBORN FIRE INSURANCE MAPS
- APPROXIMATE EXTENT OF EXCAVATION TO 8 TO 10 FEET BGS TO REMOVE CONTAMINANT SOURCE AREAS
- APPROXIMATE EXTENT OF EXCAVATION TO 18 TO 20 FEET BGS TO REMOVE CONTAMINANT SOURCE AREAS
- APPROXIMATE EXTENT OF EXCAVATION TO 2 FEET BGS
- APPROXIMATE EXTENT OF 2:1 SLOPED EXCAVATION
- APPROXIMATE EXTENT OF 1:1 SLOPED EXCAVATION

NOTES:

1. THE BASE MAP IS REFERENCED FROM THE SURVEY PREPARED BY LANGAN DATED OCTOBER 10, 2017
2. PGW SCOs = TITLE 6 NEW YORK CODES, RULES AND REGULATIONS (6 NYCRR) PART 375 PROTECTION OF GROUNDWATER SOIL CLEANUP OBJECTIVES
3. DEPTH INTERVALS ARE IN FEET BELOW GRADE SURFACE (BGS)
4. EVIDENCE OF PETROLEUM IMPACTS INCLUDE ODOR, STAINING, AND ELEVATED PHOTOIONIZATION DETECTOR (PID) READINGS ABOVE BACKGROUND
5. PGW SCOs WERE ONLY APPLIED TO ANALYTES THAT ALSO EXCEEDED GROUNDWATER REGULATORY STANDARDS IN GROUNDWATER SAMPLES COLLECTED FROM THE SITE. THE PGW SCOS ARE APPLICABLE ONLY TO THOSE CONSTITUENTS THAT ARE IN AREAS WHICH COULD BE A SOURCE OF GROUNDWATER CONTAMINATION
6. EXCAVATION DEPTHS ARE HATCHED OR LABELED AS SHOWN
7. PGW SCO EXCEEDANCES IDENTIFIED ON THE FIGURE AT RB16 AND RB17 ARE PLANNED FOR REMOVAL WITH EXCAVATION OF THE SLOPE

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Project	Figure Title	Project No.	Figure No.
GERARD AVENUE AND EAST 146TH STREET BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20 BRONX NEW YORK	ALTERNATIVE II - TRACK 4 CLEANUP	170487001 Date 02/14/2020 Drawn By JG Checked By JL	9

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 9 - Track 4 Plan (2).dwg Date: 5/29/2020 Time: 11:29 User: jgolding Style Table: Langan.stb Layout: ANSIB-BL

LEGEND:

- SITE BOUNDARY
- EP32 — PROPOSED ENDPOINT DOCUMENTATION SAMPLE LOCATION

NOTES:

1. THE BASE MAP IS REFERENCED FROM THE ALTA/NSPS LAND TITLE SURVEY PREPARED BY LANGAN DATED APRIL 11,2019.
2. ENDPOINT SAMPLE LOCATIONS ARE APPROXIMATE AND SUBJECT TO CHANGE BASED ON FIELD CONDITIONS.

30 0 15 30
SCALE

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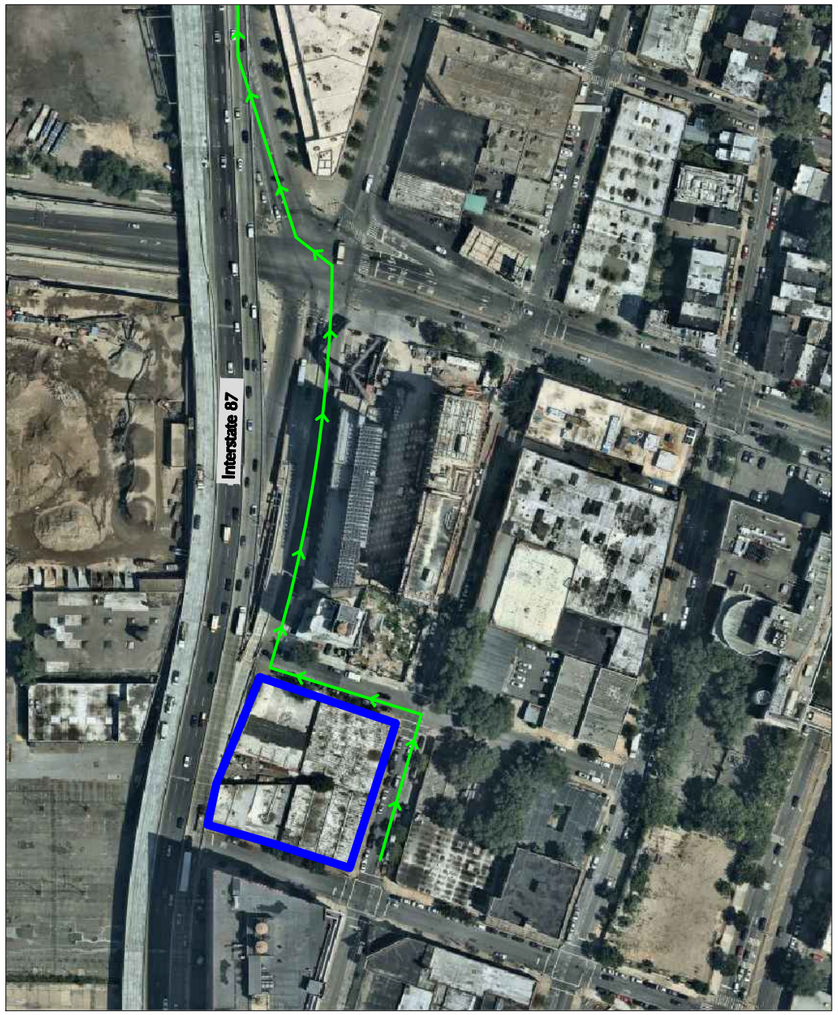
Project
GERARD AVENUE AND EAST 146TH STREET
BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20
BRONX NEW YORK

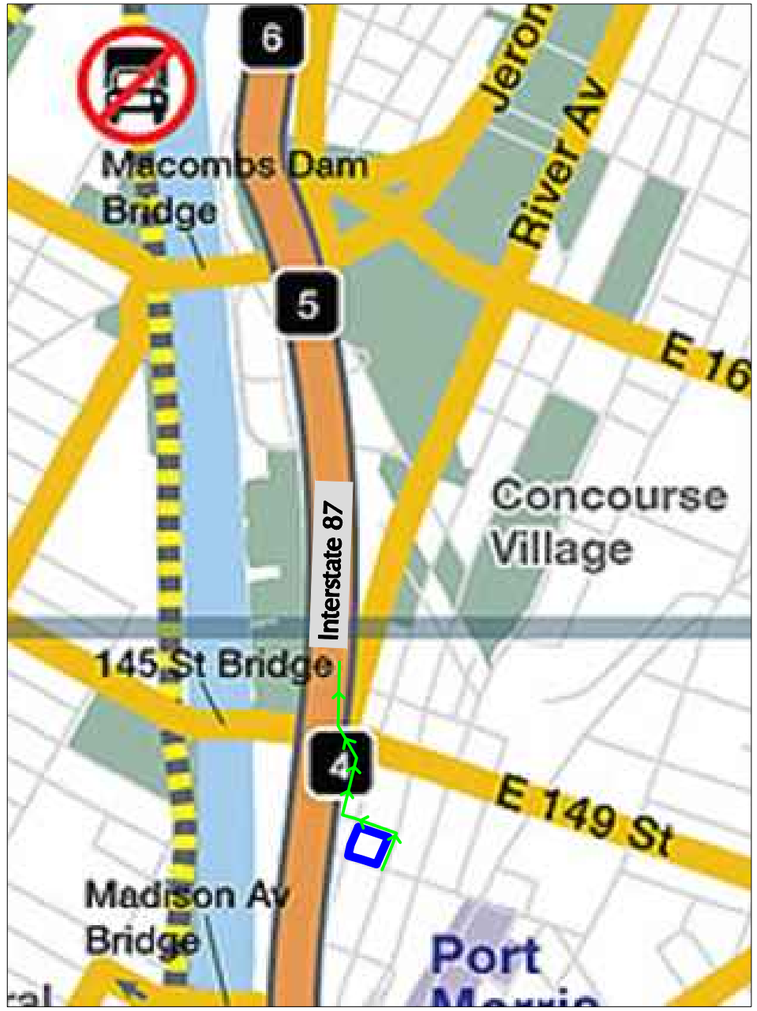
Figure Title
PROPOSED ENDPOINT DOCUMENTATION SAMPLE LOCATION PLAN

Project No.	170487001
Date	3/27/2019
Drawn By	TG
Checked By	JL

Figure No. 10

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 10 - Proposed Confirmation Endpoint Sample Location Map.dwg Date: 8/7/2019 Time: 18:35 User: vzuluaga Style Table: Langan.stb Layout: ANSIB-BL





LEGEND:

- APPROXIMATE SITE BOUNDARY
- PROPOSED TRUCK ROUTE
- LOCAL TRUCK ROUTE
- THROUGH TRUCK ROUTE ON EXPRESSWAY
- 29A HIGHWAY EXIT
- COMMERCIAL VEHICLES PROHIBITED

NOTES:

1. TRUCK ROUTE MAP AND LEGEND ADAPTED FROM THE NEW YORK CITY DEPARTMENT OF TRANSPORTATION (NYCDOT) 2015 NEW YORK CITY TRUCK ROUTE MAP.
2. AERIAL MAP FROM NEARMAP.COM, IMAGE DATED JULY 31, 2017
3. SITE ACCESS GATE LOCATION MAY CHANGE BASED ON CONSTRUCTION LOGISTICS.
4. FIGURE IS NOT TO SCALE.

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Project
GERARD AVENUE AND EAST 146TH STREET
BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20
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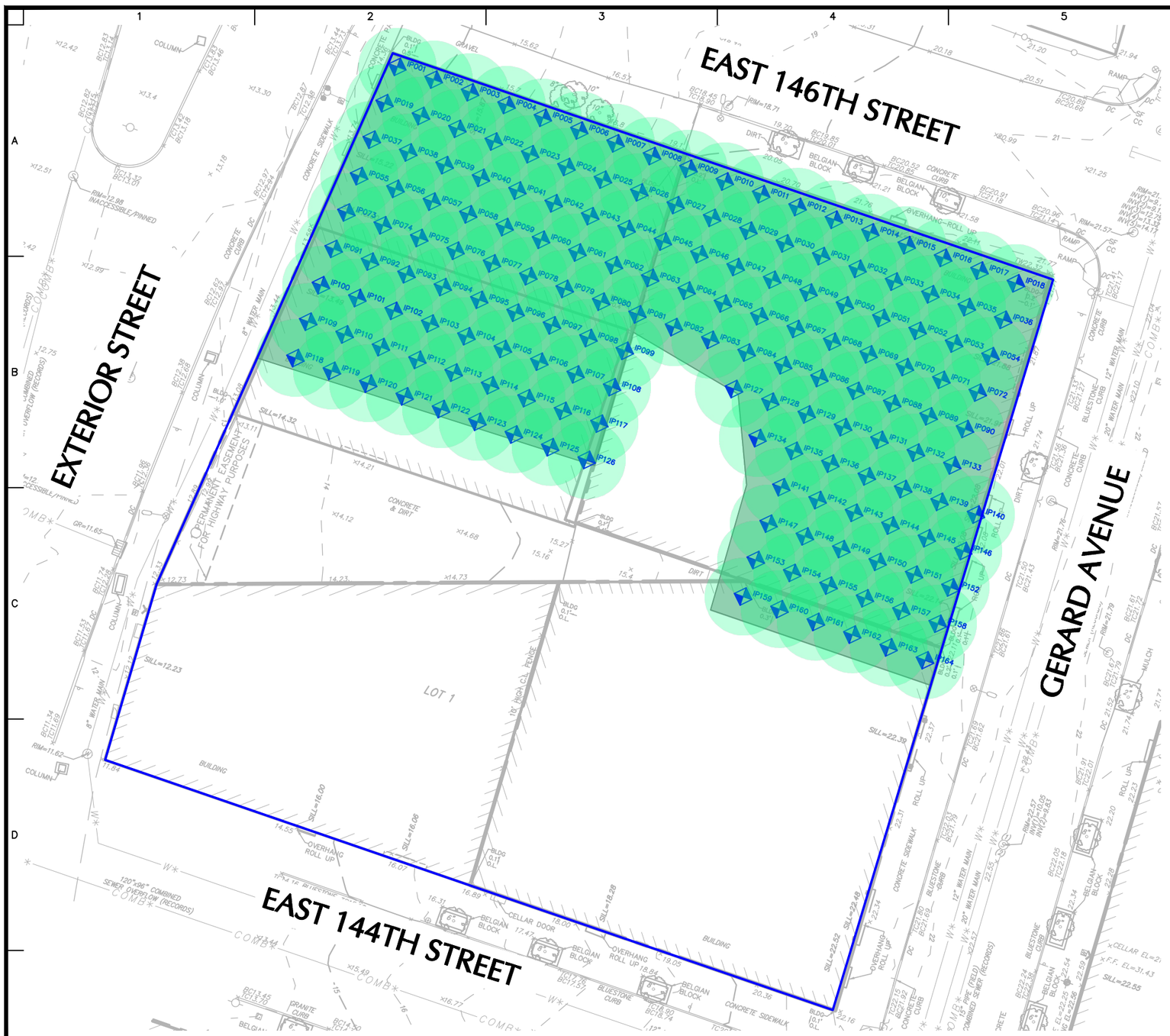
Figure Title
TRUCK ROUTE MAP

Project No. 170487001
Date 3/27/2019
Drawn By TG
Checked By JL

Figure No. 11

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 11 - Truck Route Map.dwg Date: 8/7/2019 Time: 18:40 User: vzuluaga Style Table: Langan.stb Layout: ANSIB-BL



LEGEND:

- APPROXIMATE SITE BOUNDARY
- IP001 PROPOSED INJECTION POINT LOCATION
- APPROXIMATE RADIUS OF INFLUENCE FOR PERSULFOX AND ORC ADVANCED
- APPROXIMATE EXTENT OF PETROLEUM PLUME

NOTES:

1. THE BASE MAP IS REFERENCED FROM THE SURVEY PREPARED BY LANGAN DATED OCTOBER 10, 2017.
2. RADIUS OF INFLUENCE CALCULATIONS WERE DETERMINED IN CONSULTATION WITH REMEDIAL CHEMICAL MANUFACTURERS BASED ON SUBSURFACE CONDITIONS AND CONTAMINANT CONCENTRATIONS ENCOUNTERED DURING THE REMEDIAL INVESTIGATION CONDUCTED BY LANGAN BETWEEN DECEMBER 20, 2018 AND JANUARY 17, 2019
3. ALL INJECTION LOCATIONS ARE APPROXIMATE.

30 0 15 30
SCALE IN FEET

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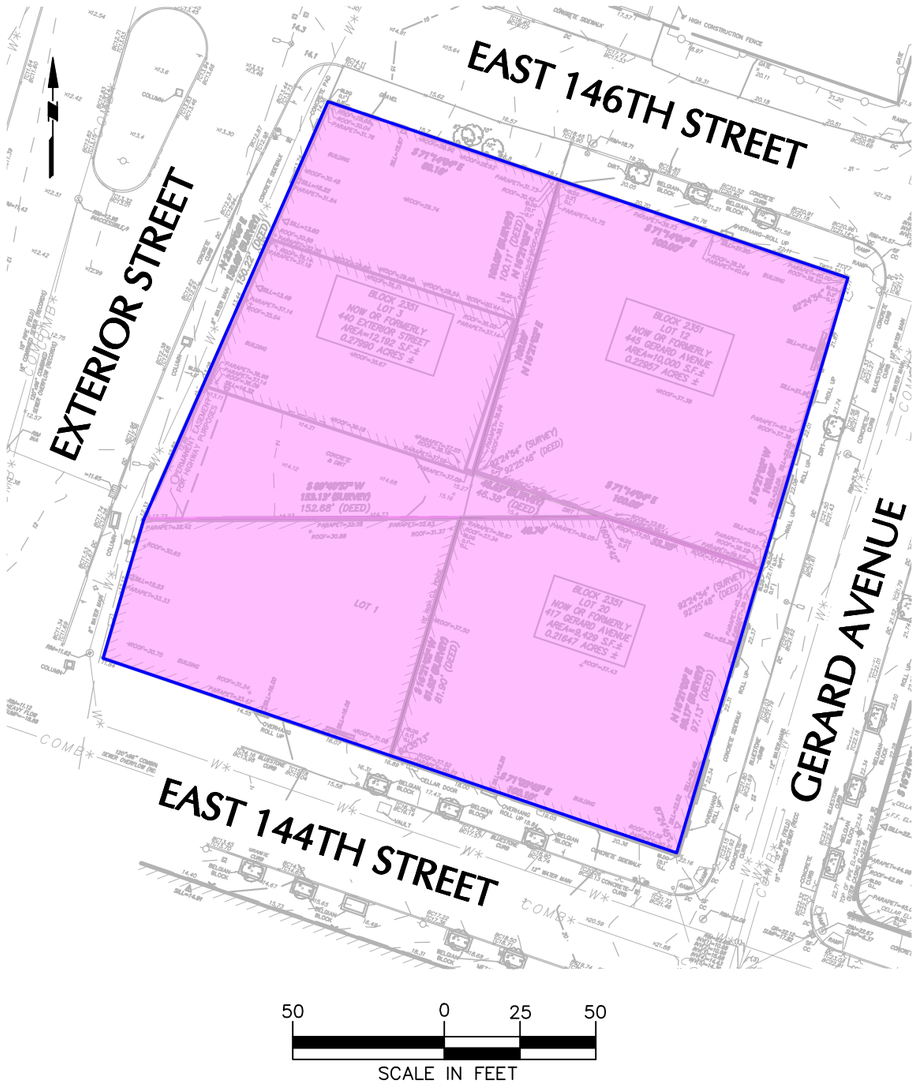
Project
GERARD AVENUE AND EAST 146TH STREET
BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20
BRONX NEW YORK

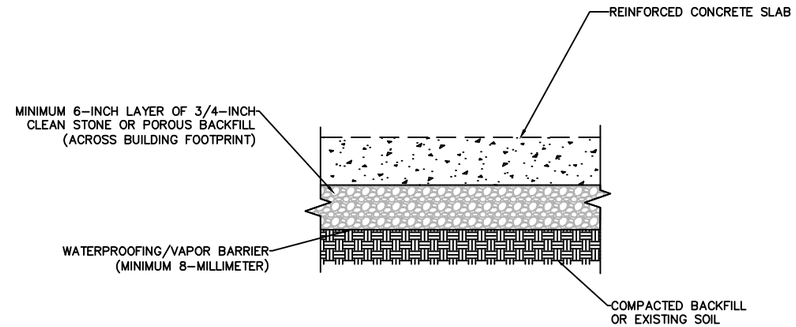
Figure Title
TREATMENT AREA LOCATION PLAN

Project No.	170487001
Date	02/25/20
Drawn By	JG
Checked By	JL

Figure No. 12

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 12 - Treatment Area Location Plan.dwg Date: 2/25/2020 Time: 12:04 User: jgolding Style Table: Langan.stb Layout: ANSIB-BL





TYPICAL SECTION THROUGH BUILDING SLAB WITH VAPOR BARRIER MEMBRANE

NOT TO SCALE

LEGEND:

SITE BOUNDARY

COMPOSITE COVER AREA

NOTES:

1. THE BASE MAP IS REFERENCED FROM THE ALTA/NSPS LAND TITLE SURVEY PREPARED BY LANGAN DATED APRIL 11,2019.
2. ELEVATIONS (EL) ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
3. BGS = BELOW GRADE SURFACE

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Project
GERARD AVENUE AND EAST 146TH STREET
BLOCK No. 2351 LOT Nos. 1, 3, 12, & 20
BRONX NEW YORK

Figure Title
SITE COVER PLAN

Project No.	Figure No.
170487001	13
Date: 02/14/2020	
Drawn By: JG	
Checked By: JL	

Filename: \\langan.com\data\NYC\data0\170487001\Cadd Data - 170487001\SheetFiles\Environmental\RAWP\Figure 13 - Composite Cover Plan and Details.dwg Date: 2/25/2020 Time: 12:44 User: jgolding Style Table: Langan.stb Layout: ANSIB-BL