ISLIP
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AGENCY

Blydenburgh Road Landfill Complex
Town of Islip, New York

Soil Vapor Investigation Work Plan

May 2013

Prepared by:

DVIRKA AND BARTILUCCI CONSULTING ENGINEERS
A DIVISION OF D&B ENGINEERS AND ARCHITECTS, P.C.

SOIL VAPOR INVESTIGATION WORK PLAN

TOWN OF ISLIP

BLYDENBURGH ROAD LANDFILL COMPLEX

HAUPPAUGE, NEW YORK

Prepared for:

TOWN OF ISLIP

ISLIP RESOURCE RECOVERY AGENCY

ISLIP, NEW YORK

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WOODBURY, NEW YORK

MAY 2013

SOIL VAPOR INVESTIGATION WORK PLAN
BLYDENBURGH ROAD LANDFILL COMPLEX
HAUPPAUGE, NEW YORK

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1.0 INTRODUCTION

1.1 Project Background

As set forth in the New York State Department of Environmental Conservation (NYSDEC) letter dated January 23, 2013, the Islip Resource Recovery Agency (IRRA) is required to conduct a Soil Vapor Investigation at the Blydenburgh Road Landfill Complex, located in Hauppauge, New York (see ***Figure 1-1***). On behalf of IRRA, Dvirka and Bartilucci Consulting Engineers (D&B) has prepared this Soil Vapor Investigation Work Plan pursuant to the NYSDEC letter. The work plan provides a detailed description of the approach and scope of work for completing the investigation, and is consistent with the methods and procedures outlined in the New York State Department of Health (NYSDOH) document entitled, "Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006.

In addition, the scope of work presented herein takes into consideration the recommendations provided in the NYSDOH document entitled, "Letter Health Consultation, Blydenburgh Road Landfill Site, Town of Islip, Suffolk County, New York," dated June 5, 2012. This document was prepared by the NYSDOH with assistance from the United States Agency for Toxic Substances and Disease Registry (ATSDR).

As detailed in the above document, the NYSDOH/ATSDR have concluded that there are no known complete exposure pathways with regard to site-related contaminants. However, they qualify this conclusion by stating that there is insufficient data to determine that the off-site migration of landfill gases does not represent a potential health concern. Therefore, the NYSDOH/ATSDR have recommended the implementation of a soil vapor investigation in addition to operating the landfill gas collection systems on a full-time "24/7" basis. The basic elements of the soil vapor investigation (SVI) recommendations are as follows:

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SITE LOCATION MAP

Source: Googlearth.com
Scale: Not to Scale

FIGURE 1-1

- Install and sample permanent soil vapor monitoring probes in off-site areas where methane has been detected in landfill gas monitoring wells at "percent levels" sporadically since the Fall of 2008; specifically, in landfill gas monitoring wells MW-13, MW-23, MW-53 and MW-54; and

- Collect samples for VOC analysis from the landfill gas collection discharge points that are not being "flared."

Please note that the current Site Plan, as well as the location of existing landfill gas monitoring and extraction wells is provided on ***Figure 1-2***. The figure includes the location of the landfill gas monitoring wells cited above.

1.2 Site Description and History

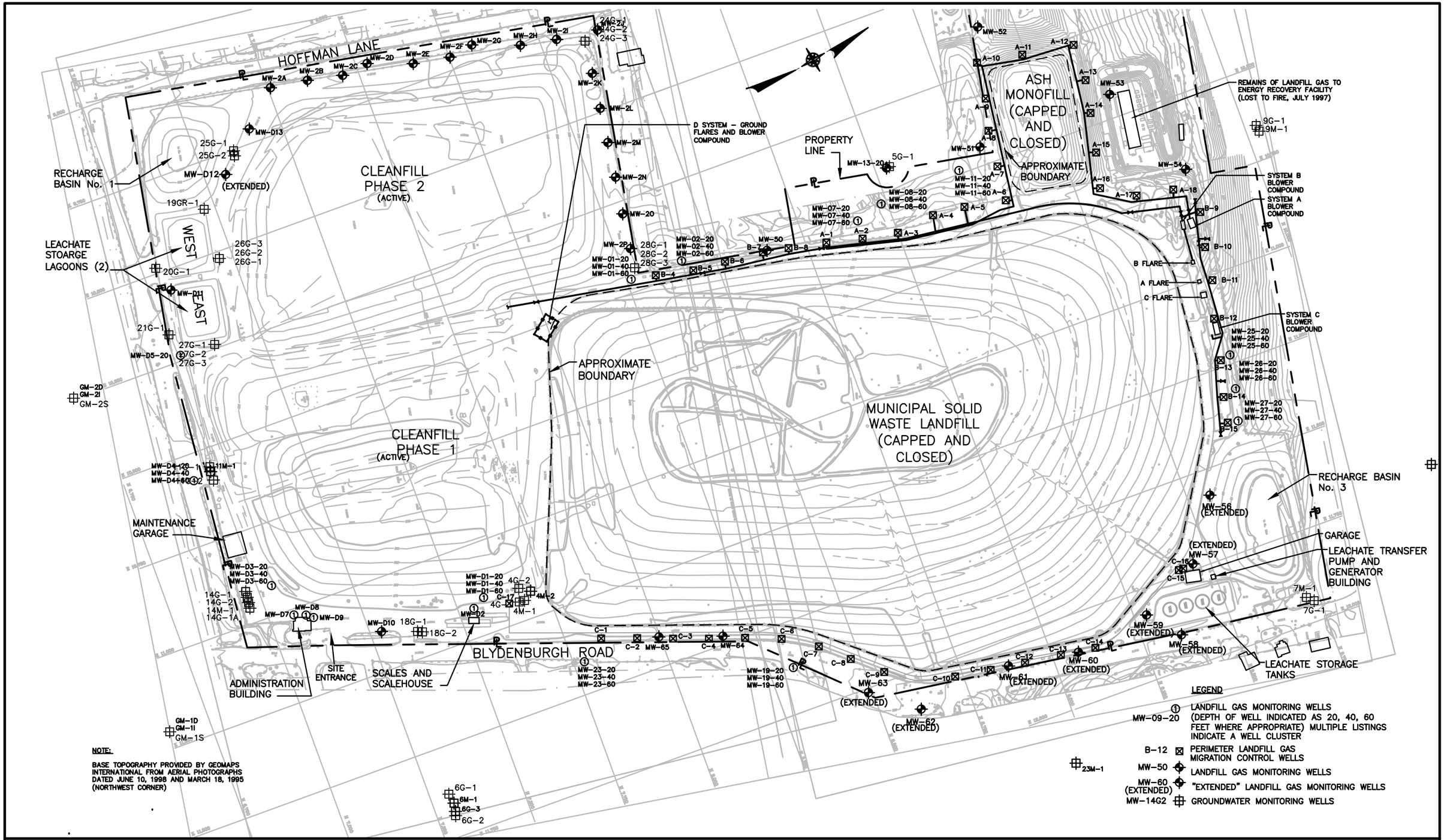
Site Description and Surrounding Area

The Site (also known as the Islip Municipal Sanitary Landfill) is located on a 109-acre parcel in Hauppauge, Town of Islip, Suffolk County, New York (see ***Figure 1-1***). The landfill complex consists of:

- An approximate, 52-acre, capped and closed Municipal Solid Waste (MSW) landfill;
- An approximate 2-acre capped and closed ash monofill; and
- An approximate 30-acre, lined operational clean fill landfill.

The Site also includes buffer zones, a leachate collection system, leachate storage tanks, surface water management, a landfill gas collection system, an office and maintenance buildings, roadways and a groundwater treatment system. Please refer to ***Figure 1-2*** for the Site Plan.

The Site is still an active site and a portion of the landfill complex is used as a clean fill disposal site, as noted above. The Town of Islip does not currently have any future plans for alternative uses for the Site. Presently, activities at the Site include ongoing maintenance of the landfill cover/cap and operation of the groundwater treatment facility, the gas control system and the leachate collection system.



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SITE PLAN AND EXISTING LANDFILL GAS MONITORING AND EXTRACTION WELL LOCATIONS

SCALE: 1"=250'

FIGURE 1-2

F:\3374\3374-FIG 1-1.dwg, Layout1, 5/15/2013 10:36:58 AM, lpeppe

The Site is bordered to the east by Blydenburgh Road; to the south by an electric transmission line and right-of-way, and 200 feet beyond the right-of-way is Motor Parkway; to the west by Hoffman Lane and Woods Edge Court; and to the north by the former Whiporwil School and the Town House Village North Apartments.

The landfill property and most of the surrounding areas immediately adjacent to the landfill are residentially zoned. The closest residence to the Site is on Blydenburgh Road, approximately 80 feet from the east of the landfill property boundary. The nearest residence to the western boundary of the landfill property is on Woods Edge Court, which is approximately 150 feet from the landfill. Light industry is located southeast of the landfill on Motor Parkway, east of Blydenburgh Road. A hotel (which operates its own waste water treatment facility) and a golf course are located to the east of the landfill.

Site History

The Town of Islip began landfilling operations at the Site in 1963. Municipal solid waste was accepted at the Site until December 18, 1990, when landfilling of municipal waste was ceased in accordance with the requirements of the Long Island Landfill Law. Municipal waste was landfilled on approximately 55.4 acres of the MSW Landfill. In addition, a small portion of the MSW Landfill was also utilized as a combustible ash monofill and ash processing area.

The property is listed as an inactive hazardous waste disposal site in the Registry of Inactive Hazardous Waste Disposal Sites in the State of New York (NYSDEC Site No. 152002). In 1978, drums of dry cleaning waste containing trichloroethylene (TCE) were reportedly buried at the landfill. An active landfill gas collection system was installed in 1983 to control migration of landfill gas beyond the Site boundary and within on-site structures. In August 1987, the Town of Islip and the New York State Department of Environmental Conservation (NYSDEC) entered into an Order on Consent to develop and implement a Remedial Investigation (RI) and a Feasibility Study (FS). In March 1989, the Site was included on the Federal National Priorities List under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

In December 1990, the Town of Islip and the NYSDEC entered into a Consent Order to perform remedial activities at the Site. The RI and FS for the Site were completed in June 1992. The Record of Decision (ROD) was issued September 30, 1992, stating the components of the selected remedy.

The three major components of the selected remedy are as follows:

1. Capping and closure of the MSW landfill in accordance with 6 NYCRR Part 360 Solid Waste Management Facilities;

2. Construction of a groundwater extraction and treatment system; and

3. Implementation of institutional controls including deed restrictions for the Site and restrictions on the use or installation of wells within the groundwater contaminant plume.

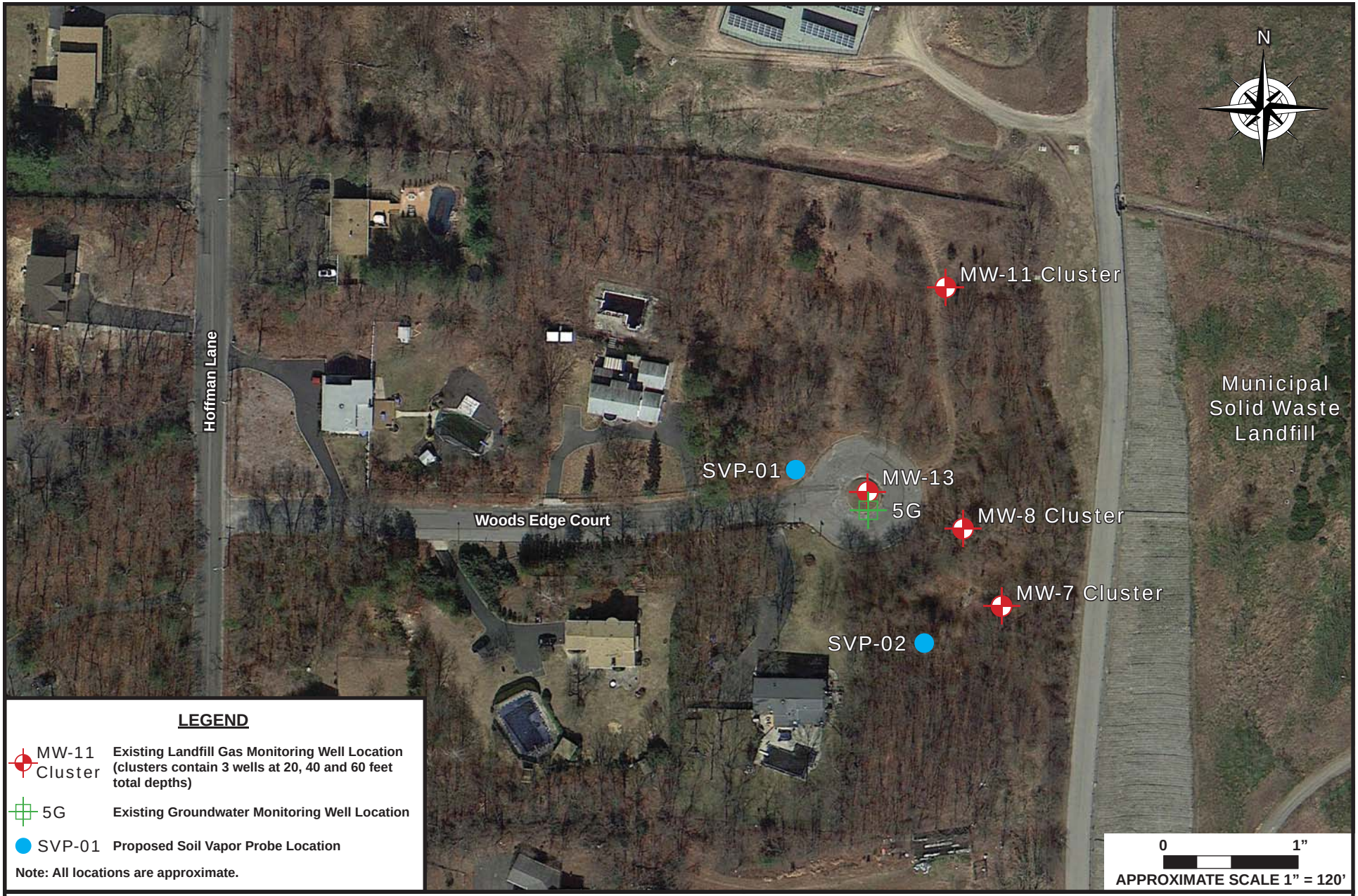
2.0 SCOPE OF WORK

2.1 Sampling Summary and Rationale

Given currently available soil vapor and landfill gas data, and the fact that NYSDOH/ATSDR have concluded that there are no known complete exposure pathways to site-related contaminants, IRRA and D&B propose to undertake the SVI in a phased approach. The initial phase of the SVI will include the installation and one round of sampling of permanent soil vapor monitoring probes for VOC analysis, as well as the sampling of landfill gas discharge points. The proposed locations for the soil vapor monitoring probes are off-site in the areas of concern, namely where methane has been detected in landfill gas monitoring wells MW-13, MW-23, MW-53 and MW-54. The proposed location of each soil vapor monitoring probe is depicted on ***Figure 2-1***, ***Figure 2-2*** and ***Figure 2-3*** for off-site areas to the west, northwest and east of the landfill, respectively. Additionally, ***Table 2-1*** provides a summary of the sample location rationale, estimated sample depths and sample analysis. The soil vapor and landfill discharge sampling will be conducted as described below Sections 2.2 and 2.3 of this work plan, respectively, and consistent with the methods and procedures outlined in the October 2006 NYSDOH soil vapor guidance document.

The objective of the initial phase of sampling will determine if the migration or discharge of VOCs from landfill gas is a concern, and if additional sampling or mitigative measures are required. Based on the initial round of soil vapor sample results, a decision will be made by IRRA and D&B, in consultation with NYSDEC/NYSDOH, as to the need for implementing mitigative measures such as operating all landfill gas control systems on a continuous basis. This decision will be based on a comparison of the soil vapor data to appropriate NYSDEC/NYSDOH guidance values, as well as to the landfill gas discharge sampling data.

If such a mitigative measure is implemented, a second round of soil vapor samples would be collected as part of the SVI after the systems have been operating for at least 3 weeks. As described in Section 2.5, the results of all phases of soil vapor sampling and the landfill gas



SOURCE: GOOGLEARTH.COM

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PROPOSED WESTERN SOIL VAPOR SAMPLE LOCATIONS

FIGURE 2-1

3374-01 - Proposed Soil Vapor Sample Locations (Figs 2-1 - 2-3).indd (05/15/13 - 10:23 AM)

SOURCE: GOOGLEARTH.COM

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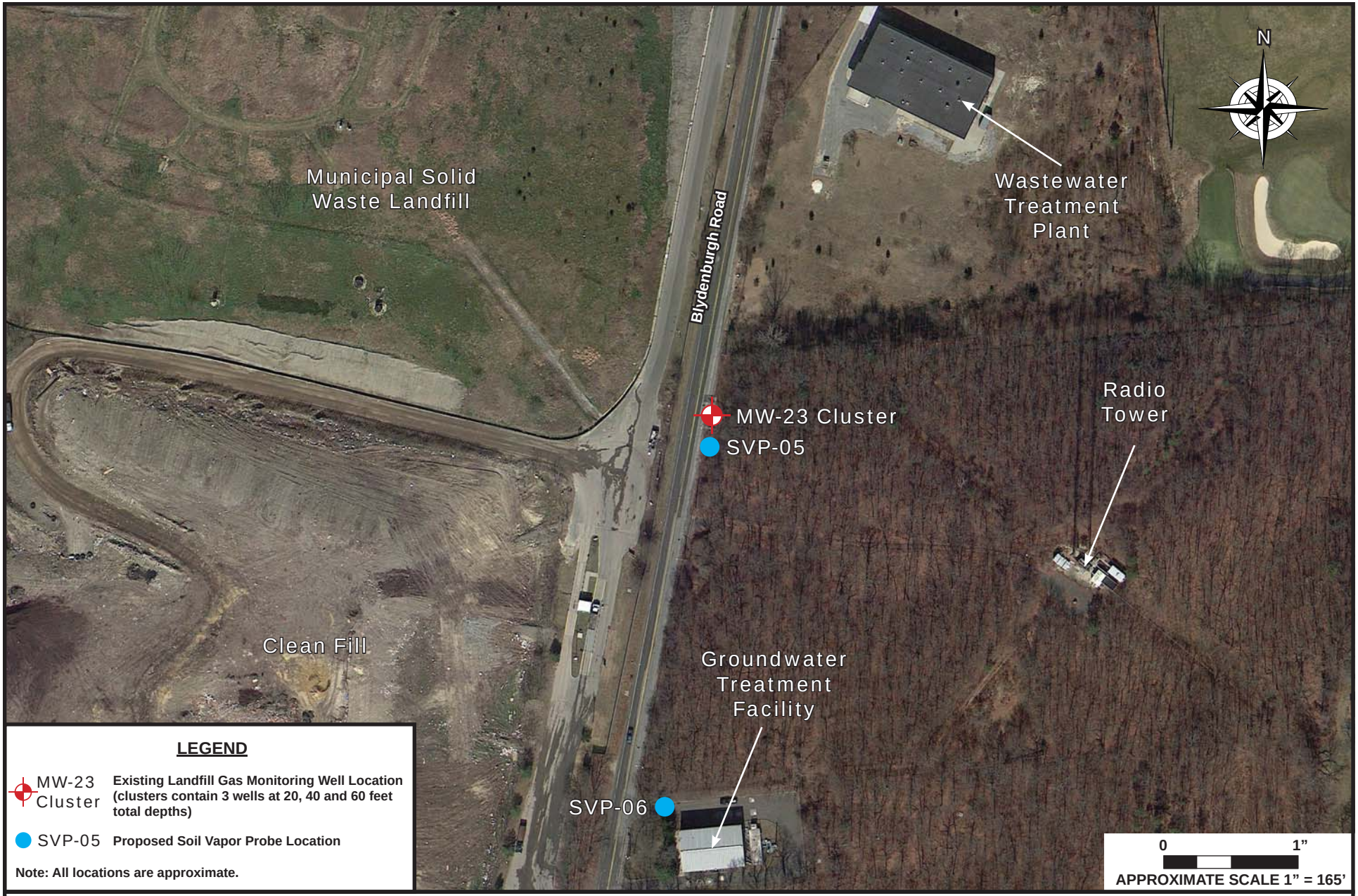
PROPOSED NORTHWESTERN SOIL VAPOR SAMPLE LOCATIONS (FORMER WHIPORWIL SCHOOL)

FIGURE 2-2



SOURCE: GOOGLEARTH.COM

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PROPOSED EASTERN SOIL VAPOR SAMPLE LOCATIONS

FIGURE 2-3

3374-01 - Proposed Soil Vapor Sample Locations (Figs 2-1 - 2-3).indd (05/15/13 - 10:23 AM)

TABLE 2-1

Town of Islip
Blydenburgh Road Landfill Complex
Soil Vapor Investigation

PROPOSED SAMPLING SUMMARY AND RATIONALE

Program Element	Sample Point ID	Sample Media	Estimated Maximum Depth Below Grade (feet)	No. of Samples Selected for Analysis [1]	Sampling Equipment	Sample Analysis [2]	Sample Point Objectives/Comments
Soil Vapor Monitoring Probes	SVP-01	Soil Vapor	10	1	6-Liter Summa Canister	VOCs, Methane	Determine the presence and composition of landfill gas in the vicinity of off-site gas monitoring well MW-13, between the landfill and residential homes to the west.
	SVP-02	Soil Vapor	10	1	6-Liter Summa Canister	VOCs, Methane	Determine the presence and composition of landfill gas in the vicinity of off-site gas monitoring well MW-13, between the landfill and residential homes to the west.
	SVP-03	Soil Vapor	10	1	6-Liter Summa Canister	VOCs, Methane	Determine the presence and composition of landfill gas between on-site gas monitoring wells MW-53 and MW-54, and the former Whiporwil School to the northwest.
	SVP-04	Soil Vapor	10	1	6-Liter Summa Canister	VOCs, Methane	Determine the presence and composition of landfill gas between on-site gas monitoring wells MW-53 and MW-54, and the former Whiporwil School to the northwest.
	SVP-05	Soil Vapor	10	1	6-Liter Summa Canister	VOCs, Methane	Determine the presence and composition of landfill gas in the vicinity of off-site gas monitoring well cluster MW-23.
	SVP-06	Soil Vapor	10	1	6-Liter Summa Canister	VOCs, Methane	Determine the presence and composition of landfill gas south of off-site gas monitoring well cluster MW-23, between the landfill and the Groundwater Treatment Facility on Blydenburgh Road.
Landfill Gas Discharge Sampling	B Blower	Landfill Gas	--	1	6-Liter Summa Canister	VOCs, Methane	Determine the composition of landfill gas currently being vented.
	C Blower	Landfill Gas	--	1	6-Liter Summa Canister	VOCs, Methane	Determine the composition of landfill gas currently being vented.

Notes:

[1] A second phase of soil vapor sampling from the soil vapor monitoring probes may be collected based on results from the initial phase of sampling.

[2] The VOC analysis will be by EPA Method TO-15, and the methane analysis by USEPA Method 3-C.

discharge sampling will be presented and discussed in a Soil Vapor Investigation Report. Based on the SVI results, the report will include an assessment as to the need for indoor air testing and, if so, which structures should be tested.

2.2 Subsurface Soil Vapor Sampling

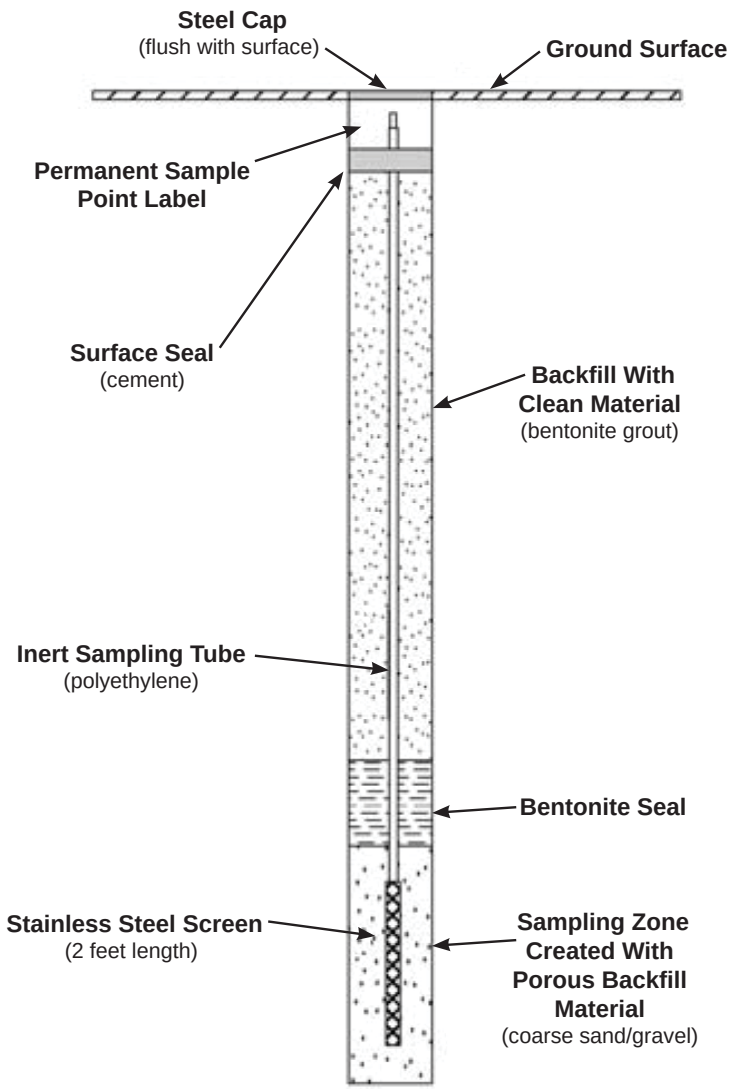
Subsurface soil vapor probes will be advanced using direct-push technology (i.e., Geoprobe). As detailed in ***Table 2-1***, a total of six permanent soil vapor monitoring probes (SVP-01 through SVP-06) will be installed at off-site locations, including:

- SVP-01 and 02 in the vicinity of landfill gas monitoring well MW-13, and between the landfill and residential homes to the west (refer to ***Figure 2-1***);
- SVP-03 and 04 north of landfill gas monitoring wells MW-53 and MW-54, and between the landfill and the former Whiporwill School to the northwest (refer to ***Figure 2-2***); and
- SVP-05 and 06 adjacent and south of landfill gas monitoring well cluster MW-23, respectively (refer to ***Figure 2-3***). SVP-06 will be completed between the landfill and the Groundwater Treatment Facility on Blydenburgh Road.

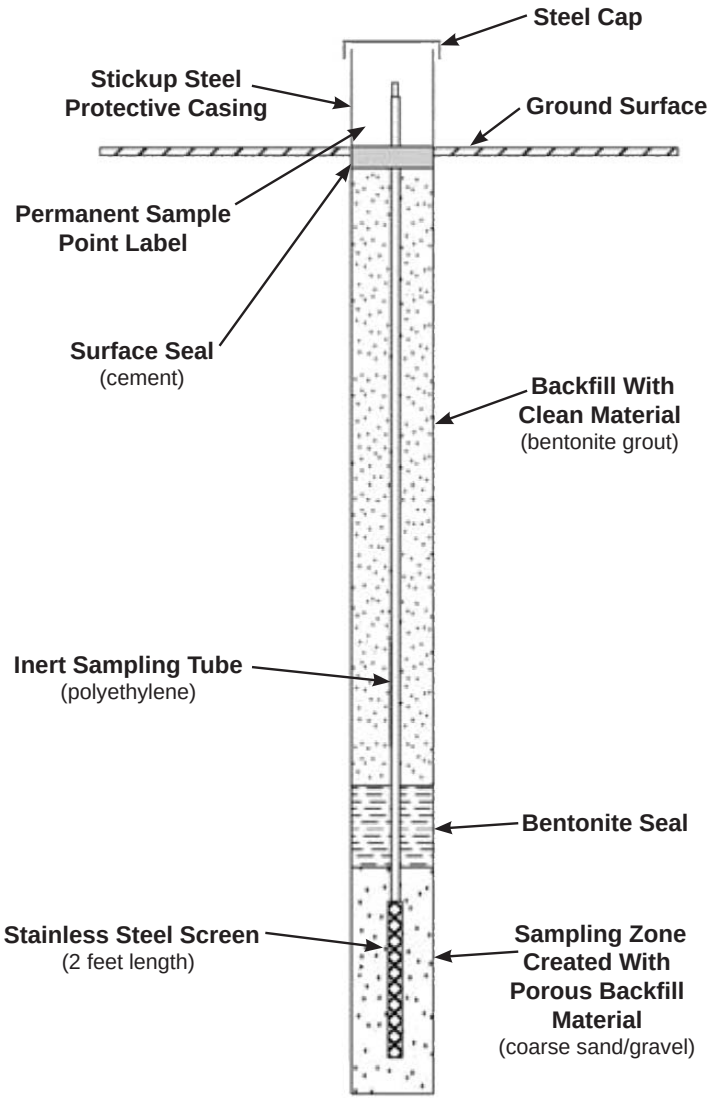
Each soil vapor monitoring probe will be completed at an elevation comparable to the nearest potential receptor. Note that the drilling contractor will arrange for underground utilities to be marked in the field prior to starting work. Consistent with the One-Call (also called Dig Safe New York) criteria, a request will be made at least 72 hours prior to initiating fieldwork.

A schematic of the planned construction of each permanent soil vapor monitoring probe is provided as ***Figure 2-4***. Each soil vapor monitoring point will be constructed of a stainless steel screen and polyethylene tubing serving as the "riser." The screens will be 2 feet in length and will be constructed of double-woven stainless steel wire. Each screen will be installed at 8 to 10 feet below grade in order to intercept VOCs that could potentially infiltrate a typical basement area of a residential home. The bottom of the probes will have a "PRT" style thread, the same fitting style used with PRT soil sampling tools. The top connection to the tubing will be a vapor-tight stainless steel "swage lock" or clamp fitting to prevent the escape of any vapors during sample collection. A suitable gravel pack will be placed around the screened portion of the soil vapor monitoring probe.

Permanent Soil Vapor Probe (Flush)



Permanent Soil Vapor Probe (Stickup)



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SOURCE: ADAPTED FROM FINAL NYSDOH CEH BEEI SOIL VAPOR INTRUSION GUIDANCE (OCTOBER 2006), PAGE 20

SCHEMATIC OF SOIL VAPOR MONITORING PROBE

FIGURE 2-4

3374-01 - Soil Vapor Mon Probe Schematic (Fig2-4).indd (05/10/13 - 4:06 PM)

Bentonite pellets will be placed above the gravel pack and hydrated to form a seal and a high-solids content bentonite grout will be used from the top of the bentonite to a depth of 1 foot below ground surface. Steel flush-mount or stick-up protective casings will be placed around the soil vapor probes following installation of the probes, depending on the location of each probe. At a minimum, a stick-up casing will be used at soil vapor probe SVP-02 in order for the probe to be easier to locate in this wooded area.

All soil vapor samples will be collected from the permanent probes at least 24 hours after installation utilizing laboratory certified clean 6-liter SUMMA® canisters fitted with laboratory calibrated low-flow regulators. The cycle time of the canisters will not exceed 30 days. The cycle time is defined as the time from shipment from the laboratory, through the return shipping and analysis at the laboratory.

Prior to connecting the canister to the soil vapor probe tube, the tube will be purged of 1 to 3 volumes using a vacuum pump at a flow rate not exceeding 0.2 liters per minute. During the purging, D&B will record oxygen, methane, hydrogen sulfide and carbon dioxide utilizing a Landtec GEM 2000 gas analyzer. In addition, total VOCs will be measured utilizing a photoionization detector (PID).

After purging, each SUMMA® canister will be filled over a 1-hour period at a flow rate not exceeding 0.2 liters per minute. The connection to the sampling canister will be made through the use of 1/8-inch internal diameter disposable tubing with swage lock or clamped fittings. A tubing pinch valve will be utilized to seal the end of the tube while the connection to the canister is made and to reseal the tubing after sampling is completed. Any canister with less than 25 inches of mercury (in. Hg) of vacuum showing on the vacuum gauge prior to sampling will not be used. The canister and control valve assembly will be kept out of direct sunlight during sampling by using a cloth or plastic drape or an enclosure. This is to prevent heating of the flow controller.

As discussed earlier, the initial phase of the SVI will include one round of sampling from the soil vapor probes. After receiving the results of the first round, a decision will be made as to the need for the IRRA to undertake mitigative measures and collect a second round of samples.

2.3 Landfill Gas Discharge Sampling

Landfill gas samples will be collected from the three landfill blower systems (A, B and C), which vent the landfill gas collected by the perimeter landfill gas migration control wells. The location of the blower systems and gas migration control wells are depicted on ***Figure 1-2***. The A-blower system is currently inactive. The B-blower is active and receives landfill gas collected by the entire A-series of gas migration control wells (A-1 through A-18) and some of the B-series (B-4 to B-8). The C-blower is also active and receives landfill gas collected by the entire C-series of gas migration control wells (C-1 to C-17) and some of the B-series (B-9 to B-15). According to site personnel, the B blower is currently operational on weekdays during work hours, and the C blower is in continuous operation except for 3 nights a week.

The two active blowers will be sampled (B and C) in order to determine the composition of the landfill gas that is currently being vented. The samples will be collected utilizing laboratory certified clean 6-liter SUMMA® canisters fitted with laboratory calibrated low-flow regulators. The cycle time of the canisters will not exceed 30 days. The cycle time is defined as the time from shipment from the laboratory, through the return shipping and analysis at the laboratory.

Landfill personnel have previously installed a sample port downstream of each blower that is under positive pressure. Each sample will be collected by connecting a SUMMA® canister control valve assembly with polyethylene tubing to the sampling port of each blower that is utilized in the monthly landfill gas monitoring. Prior to sampling, D&B will record oxygen, methane, hydrogen sulfide and carbon dioxide at each blower sampling port utilizing a Landtec GEM 2000 gas analyzer. In addition, total VOCs will be measured utilizing a photoionization detector (PID). After collection of these parameters, each SUMMA® canister will be filled over a 1-hour period at a flow rate not exceeding 0.2 liters per minute. Any canister with less than 25 inches of mercury (in. Hg) of vacuum showing on the vacuum gauge prior to sampling will not be used. The canister and control valve assembly will be kept out of direct sunlight during

sampling by using a cloth or plastic drape or an enclosure. This is to prevent heating of the flow controller.

As described earlier, the results of this sampling and the soil vapor sampling described in Section 2.2 will be utilized to determine if continuous operation of the landfill gas control systems is necessary.

2.4 Analysis and Data Validation

Upon completion of the sample collection, all SUMMA® canisters will be properly labeled and shipped under Chain of Custody to the contract laboratory. The samples will be analyzed for VOCs by EPA Method TO-15 and for methane by USEPA Method 3-C.

The samples will be analyzed by ConTest Laboratory, a certified NYSDOH Environmental Laboratory Approval Program (ELAP) laboratory. All analyses will be conducted utilizing NYSDEC 7/05 Analytical Services Protocol (ASP) methods, or latest version. A NYSDEC ASP Category B data package will be provided for all analyses. Samples will be shipped daily to ensure that they are received at the laboratory no later than 48 hours after collection.

Data validation will be performed by a NYSDEC-approved data validator in order to verify and document acceptable quality of the analytical data. The analytical and validation processes will be conducted in conformance with the NYSDEC 7/05 ASP (or latest version) and ensure that all analytical requirements specified in the work plan have been met. Each data package will be checked for completeness and technical adequacy of the data. At the completion of the data validation, a Data Usability Summary Report (DUSR) section will be prepared and included in the Soil Vapor Investigation Report described under Section 2.5.

2.5 Soil Vapor Investigation Report

A Soil Vapor Investigation Report will be developed by D&B outlining the completed fieldwork and the results of all phases of soil vapor sampling and the landfill gas discharge

sampling. The report will include a DUSR and a summary of the validated chemical data in tabular form, including a comparison of this data to appropriate NYSDEC/NYSDOH guidance values. The report will include conclusions and recommendations. Based on the SVI results, the report will include an assessment as to the need for indoor air testing and, if so, which structures should be tested.

IRRA will submit the draft report to the NYSDEC and NYSDOH for review. IRRA and D&B will address one round of comments from the NYSDEC/NYSDOH concerning the draft report and revise the draft report for final approval by the Departments.

2.6 Project Organization and Schedule

The SVI will be completed by D&B on behalf of IRRA. An approximate schedule to complete the SVI is provided as follows:

- Once the final work plan is approved by NYSDEC/NYSDOH, D&B will mobilize to the field to begin the SVI within 2 weeks.
- The installation of the permanent soil vapor probes under Task 2 will take 2 days to complete and the first round soil vapor samples would be collected about 1 week after installation and take 1 day to complete. The sampling of the blower systems (A, B and C) will take 1 day to complete. If a second round of soil vapor samples is to be collected, it would likely take place approximately 9 weeks from the first round to allow for:
  - A 4-week sample turnaround on the first round sample data;
  - Two weeks to review the first round data and determine if an additional sample round should be collected; and to allow for
  - The gas collection systems to operate continuously for 3 weeks before collecting the second round.

  Therefore, if one round of soil vapor samples is required, all field work will be completed within 4 weeks of Work Plan approval. If two rounds of samples are required, it will be 13 weeks from approval.
- The draft SVI Report will be completed and provided to NYSDEC/NYSDOH within 4 weeks of receiving all laboratory data;

3.0 SITE-SPECIFIC QUALITY ASSURANCE/QUALITY CONTROL PLAN

Extreme care should be taken during all aspects of sample collection to ensure that high quality data are obtained. The laboratory will use only certified clean sample collection devices. The sampling team members will avoid actions which cause sample interference such as pumping gasoline prior to testing or using permanent marking pens in the field. Once samples are collected, they will be stored according to the method protocol and delivered to the analytical laboratory as soon as possible. Samples should not exceed recommended holding times prior to being processed by the laboratory.

3.1 Analytical Parameters

Samples will be shipped via standard COC protocols to the contract laboratory for analyses of VOCs and methane. Both the subsurface soil vapor samples and landfill gas discharge samples will be analyzed for VOCs by United States Environmental Protection Agency (USEPA) Method TO-15 using low level detection limits, and methane by USEPA Method 3-C. The laboratory will achieve minimum detection limits of one microgram per cubic meter (ug/m^3) for all compounds.

All air sample analyses will be performed by ConTest Laboratory, who is certified for the analysis under the NYSDOH Environmental Laboratory Approval Program (ELAP), and in accordance with NYSDEC 7/05 Analytical Services Protocol (ASP) methods, or latest version. Category B deliverables will be furnished by the laboratory. Samples will be shipped daily to ensure that they are received at the laboratory no later than 48 hours after collection, and analyses will be performed so that the holding time limits of the analytical methods will not be exceeded. The analysis of QA/QC samples will be performed for the same compounds as the environmental samples using the same USEPA methods.

3.2 Duplicates

Field duplicate samples will not be collected during this sampling event.

3.3 Decontamination Procedures

All subsurface tools and equipment used during the advancement and installation of any soil vapor sample probe will be cleaned prior to their introduction or reintroduction into any given point. The cleaning method will involve a water wash, followed by an Alconox solution wash and a final distilled water rinse. If oily residues are present, a pesticide grade methanol rinse will be added to remove any oily residue prior to the final distilled water rinse. These specifications will be followed in order to reduce the potential for cross contamination of any samples and to ensure that the integrity of each soil vapor sampling point is maintained.

3.4 Data Usability Summary Report

A Data Usability Summary Report (DUSR) will be prepared as part of the data validation process, and included in the Soil Vapor Investigation Report. The DUSR is prepared by reviewing and evaluating the analytical data. The parameters to be evaluated in reference to compliance with analytical method protocols include all COC forms, holding times, raw data (instrument print out data and chromatograms), calibrations, blanks, spikes, controls, surrogate recoveries, duplicates and sample data. Field sampling notes will also be reviewed and any quality control problems will be evaluated as to their effect on the usability of the sample data.

The DUSR will describe the samples and analysis parameters reviewed. Data deficiencies, analytical protocol deviations and quality control problems will be described, and their effect on the data discussed. Re-sampling and reanalysis recommendations will be made, if necessary. Data qualifications will be documented for each sample analyte following the NYSDEC 7/05 ASP guidelines, or latest version.