

CHAPTER CONTENTS

Section	Page
13.1 Wooded Wetland Monitoring	13.1-1
13.2 Landfill Soils Gas Monitoring	13.2-1

Intentionally Left Blank

CURRENT LANDFILL – WOODED WETLAND MONITORING

DQO START DATE	January 1, 2004
REVISION NUMBER/DATE	Rev. 5, December 4, 2013
IMPLEMENTATION DATE	January 1, 2014
POINT OF CONTACT	William Dorsch (631) 344-7504 Robert Howe (631) 344-5588

SUMMARY OF PROPOSED CHANGES

There are no proposed changes for calendar year (CY) 2014.

DESCRIPTION AND TECHNICAL BASIS

A wooded wetland is located east of the Current Landfill. Before the landfill was capped, landfill leachate was observed in this area; since the capping of the landfill in 1995, leachate has not been observed. Monitoring is performed to demonstrate the effectiveness of the landfill capping and to assess potential risks to the local tiger salamander population. Additional information regarding cap construction may be obtained from the construction certification report for the Current Landfill (CDM Federal, 1996).

This monitoring program is based on the Operable Unit (OU) I Wooded Wetlands Supplemental Sampling and Analysis Plans. These plans were prepared as an addendum to the Sampling and Analysis Plan for the Remedial Investigation/Feasibility Study for Operable Unit I (SAIC, 1993). Samples of sediment and surface water are collected from seven locations for metals analysis on an annual basis. A map showing the sample locations is shown in Figure 1.

Ten years of data from both surface water and sediment sampling within the wooded wetlands indicate a stable pattern in the concentration of metals. Because of this stability, in September 2009, BNL recommended and the regulators concurred that sampling of both surface waters and sediments within the wooded wetland complex be reduced to once every 2 years.

DRIVERS FOR MONITORING BEING CONDUCTED UNDER THIS CHANGE

- Compliance
- Support Compliance
- Surveillance
- Restoration

DATA QUALITY OBJECTIVE ANALYSIS

Step 1: State the Problem

Solid waste disposed in the Current Landfill (which was in operation 1967-1990) came in repeated contact with rainwater that led to the generation of landfill leachate. This leachate migrated from the landfill into the groundwater and into the neighboring wooded wetland area. The landfill was capped in 1995 and, since that time, leachate has not been observed in this area. Monitoring is necessary to demonstrate that environmental impacts are being controlled and mitigated by the landfill cap. Specifically, it needs to be determined whether the wooded wetlands could still be receiving leachate and evaluate the potential risk to the local tiger salamander population.

Step 2: Identify the Decision

Is the landfill cap effective at protecting the wooded wetlands (including the local tiger salamander population) and are additional controls required?

Step 3: Identify Inputs to the Decision

- Wooded wetlands surface water and sediment quality
- The primary contaminants of concern are metals: copper, lead, manganese, mercury, and zinc

Step 4: Define the Study Boundaries

The north and south pond areas of the wooded wetland define the study boundaries.

Step 5: Develop the Decision Rules

Is the landfill cap effective at protecting the wooded wetlands (including the local tiger salamander population) and are additional controls required?

Decision Rules

If the annual average metal (metals of concern) concentrations in sediment and/or surface water show a significant increasing trend relative to 1999 benchmark concentrations, or if concentrations exceed maximum concentrations detected in the 1999 benchmark study, **then** perform an evaluation to determine whether additional landfill controls are necessary. **If not, then** continue the routine wooded wetland monitoring program.

Step 6: Specify Acceptable Error Tolerances

There is no acute risk to human health and the environment. Ecological risk assessment is an inexact science; hence, defining acceptable error tolerances is difficult and not possible in a meaningful way.

Step 7: Optimize the Design

Performed under the purview of Inter Agency Agreement (IAG) review:

Ten years of data from both surface water and sediment sampling within the wooded wetlands indicate a stable pattern in the concentration of metals. Because of this stability, in September 2009, BNL recommended and the regulators concurred that sampling of both surface waters and sediments within the wooded wetland complex be reduced to once every 2 years.

ANNUAL COST IMPACT DUE TO PROPOSED CHANGE

There is no cost change for CY 2014.

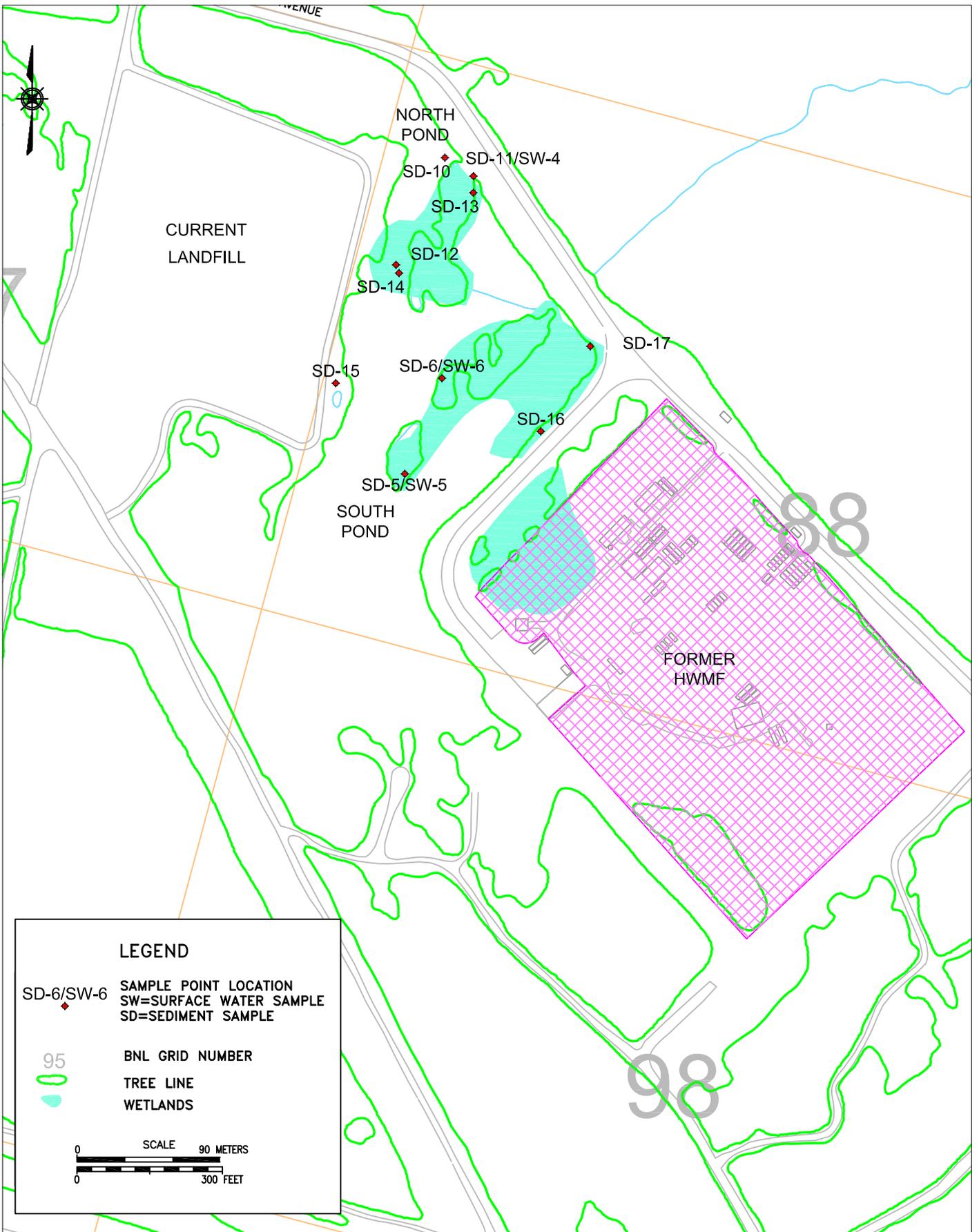
TOTAL COST FOR MONITORING PROGRAM

Approximately \$22,000/year

See Appendix B for the monitoring program for this DQO.

Intentionally Left Blank

R:\Gw_projects\EMPT3\Ch13_1-1.dwg



LEGEND

SD-6/SW-6 SAMPLE POINT LOCATION
 SW=SURFACE WATER SAMPLE
 SD=SEDIMENT SAMPLE

95 BNL GRID NUMBER

TREE LINE

WETLANDS

0 90 METERS
 0 300 FEET

BROOKHAVEN
 NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION
 DIVISION

TITLE: **WOODED WETLANDS
 SEDIMENT AND SURFACE WATER
 SAMPLING LOCATIONS 2012**

CURRENT AND FORMER LANDFILL AREAS

DWN: KCK	VT:HZ.: -	DATE: 12/18/12	PROJECT NO.: 07926
CHKD: JEB	APPD: WRD	REV.: -	NOTES: -
FIGURE NO.:			1

LANDFILL SOILS GAS MONITORING

DQO START DATE	January 1, 2003
REVISION NUMBER/DATE	Rev. 6, December 4, 2013
IMPLEMENTATION DATE	January 1, 2014
POINT OF CONTACT	William Dorsch (631) 344-5186 Robert Howe (631) 344-5588

SUMMARY OF PROPOSED CHANGES

There are no proposed changes for calendar year (CY) 2014.

DESCRIPTION AND TECHNICAL BASIS

The Former Landfill (Former Landfill, Interim Landfill, and Slit Trench) and the Current Landfill require post-closure monitoring in accordance with the requirements of 6 NYCRR part 360, solid waste management facilities, and the Operable Unit (OU) I Record of Decision (ROD). The monitoring period shall be a minimum of 30 years following landfill closure.

The Current Landfill was capped in 1995. Additional information regarding cap construction may be obtained from the construction certification report for the Current Landfill (CDM Federal, 1996). The Former Landfill and nearby Slit Trench were capped in November 1996 and the Interim Landfill was capped in October 1997. Additional information regarding cap construction may be obtained from the construction certification report for the Former Landfill (CDM Federal, 1997) and the Interim Landfill (PW Grosser, 1997).

Monitoring covered by this data quality objective (DQO) will be soil gas monitoring of methane and hydrogen sulfide concentrations around each landfill. Soil gas monitoring data are evaluated for the potential for hazardous concentrations of gas near the landfill areas and the potential for off-site migration. Monitoring is conducted in accordance with the Final Operations and Maintenance Manual for the Current Landfill (CDM, 1996) and the Final Operations and Maintenance Manual for the Former Landfill Area (CDM, 1996). Both landfill areas contain passive venting for the controlled release of landfill gasses.

In accordance with NYCRR Part 360-2.17(f), decomposition gases generated within a landfill must be controlled to avoid hazards to health, safety, and property. Measures to control decomposition gases must be undertaken when the concentration of methane or other explosive gases exceeds 25 percent of the Lower Explosive Limit (LEL) for gases in facility structures on or off site or 100 percent of the LEL for gases at or beyond the site boundary. Notification to the New York State Department of Environmental Conservation (NYSDEC) shall be made within 7 days of an observed exceedance.

Each of BNL's landfills has soil gas monitoring networks. Since the landfills were capped, BNL has been routinely monitoring for LEL, methane, and hydrogen sulfide using a Landtec GA-90. The Current Landfill has a total of 58 sampling points for monitoring soil gas positioned along

the perimeter of the landfill. The sampling points include 12 soil gas well clusters consisting of 3 sampling intervals per cluster and 11 soil gas well couplets consisting of 2 sampling intervals per couplet. Locations of each soil gas monitoring well are shown in Figure 1.

The Former Landfill has a total of 24 sampling points for soil gas monitoring, also positioned along the perimeter of the landfill. These sampling points include 6 well couplets consisting of 2 sampling points per couplet. Locations of each soil gas monitoring well are shown in Figure 2.

DRIVERS FOR MONITORING BEING CONDUCTED UNDER THIS CHANGE

- Compliance
- Support Compliance
- Surveillance
- Restoration

DATA QUALITY OBJECTIVE ANALYSIS

Step 1: State the Problem

Material disposed of in the landfills decomposes, generating gases that may migrate to areas outside the landfill boundaries. These gases may be explosive at certain concentrations and may cause harm to personnel and/or property.

Step 2: Identify the Decision

Is the as-built passive venting landfill gas collection system adequate to control soil gas levels near the landfills to safe levels and prevent the off-site migration of gases at hazardous levels?

Step 3: Identify Inputs to the Decision

Soil gas monitoring data should be evaluated for the potential for hazardous conditions on site and the potential for off-site migration at the following frequency:

- Current landfill – Quarterly
- Former landfill – Semi-annually

Since there have been little to no detections of methane during monitoring at the Former Landfill Area over the past nine years, in September 2009, BNL recommended and the regulators concurred that the soil gas monitoring frequency be reduced from quarterly to semiannual.

Step 4: Define the Study Boundaries

Landfill perimeter gas monitoring network.

Step 5: Develop the Decision Rules

Is the as-built passive venting landfill gas collection system adequate to control soil gas levels near the landfills to safe levels and prevent the off-site migration of gases at hazardous levels? Does the BNL Environmental Incident Procedure need to be deployed? Does NYSDEC need to be notified?

Decision Rule

If the soil gas levels in the soil gas monitoring wells are <25 percent of the LEL for gases in facility structures on or off site or <100 percent of the LEL for gases at or beyond the landfill site boundary, **then** deployment of the BNL Environmental Incident Procedure and notification to NYSDEC is not required.

If the soil gas levels in soil gas monitoring wells are >25 percent of the LEL for gases in facility structures on or off site or > or equal to 100 percent of the LEL for gases at or beyond the landfill site boundary, **then** perform an evaluation to determine whether additional landfill controls are necessary and notify NYSDEC within 7 days, as required.

Step 6: Specify Acceptable Error Tolerances

Design is per NYCRR Part 360 requirements.

Step 7: Optimize the Design

Design is per NYCRR Part 360 requirements. Since there have been little to no detections of methane during monitoring at the Former Landfill Area over the past 9 years, in September 2009, BNL recommended and the regulators concurred that the soil gas monitoring frequency be reduced from quarterly to semiannual.

ANNUAL COST IMPACT DUE TO PROPOSED CHANGE

There is no cost change for CY 2014

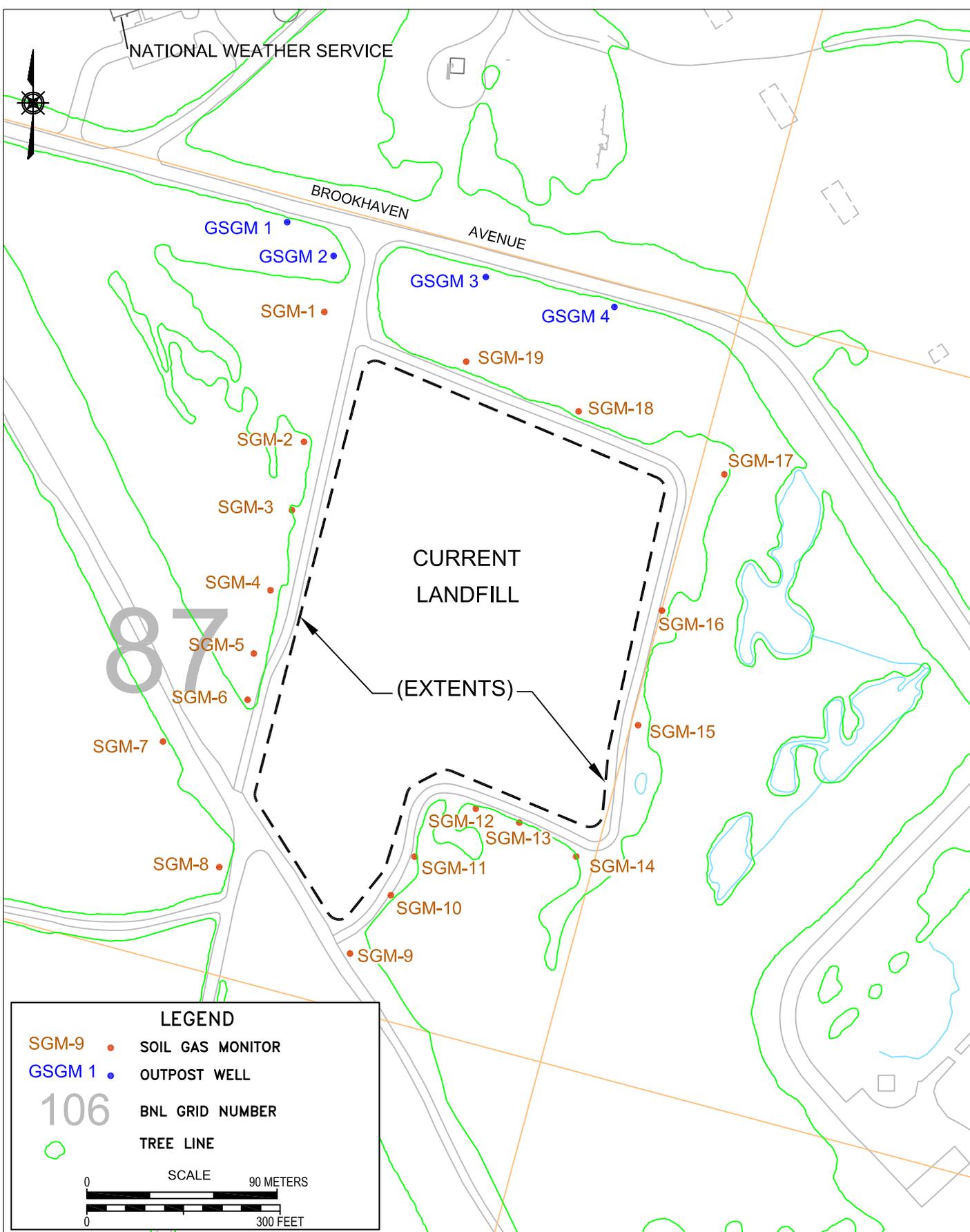
TOTAL COST FOR MONITORING PROGRAM

Approximately \$5,000/yr.

See Appendix B for the monitoring program for this DQO.

Intentionally Left Blank

R:\Gw_projects\EMP13\Ch13_2-1.dwg



LEGEND

- SGM-9 ● SOIL GAS MONITOR
- GSGM 1 ● OUTPOST WELL
- 106 BNL GRID NUMBER
- TREE LINE

SCALE
0 90 METERS
0 300 FEET

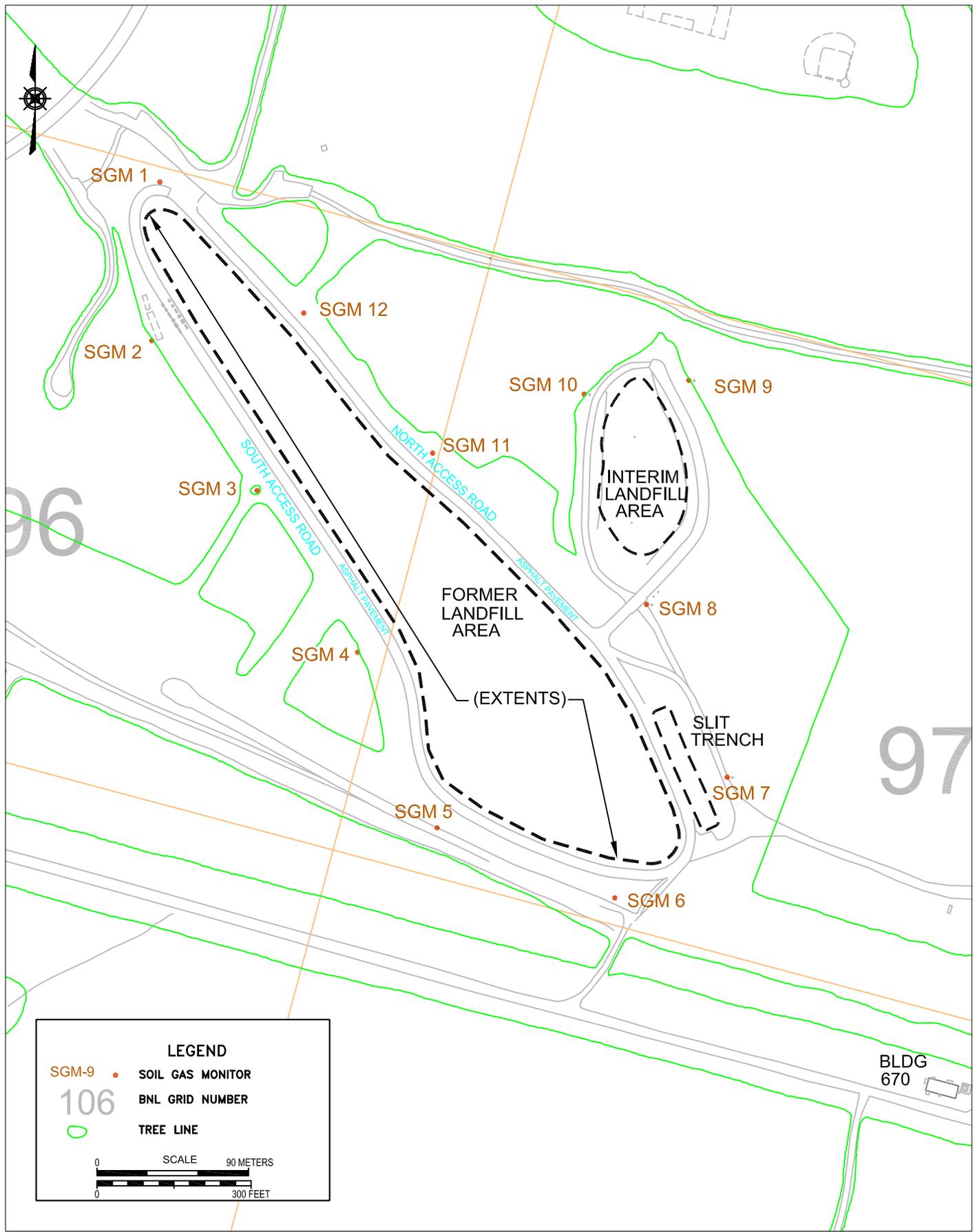


TITLE:

**CURRENT LANDFILL
SOIL GAS MONITOR LOCATION MAP**
2013 ENVIRONMENTAL MONITORING PLAN
CURRENT AND FORMER LANDFILL AREAS

DWN: AJZ	VT:HZ.: -	DATE: 12/18/12	PROJECT NO.: -
CHKD: JEB	APPD: RFH	REV.: -	NOTES: -
FIGURE NO.:		2-1	

R:\Gw_projects\EMP13\Ch13_2-2.dwg



LEGEND

- SGM-9 • SOIL GAS MONITOR
- 106 BNL GRID NUMBER
- TREE LINE

SCALE

0 90 METERS

0 300 FEET



TITLE: **FORMER LANDFILL
SOIL GAS MONITOR LOCATION MAP
2013 ENVIRONMENTAL MONITORING PLAN
CURRENT AND FORMER LANDFILL AREAS**

DWN: AJZ	VT:HZ.: -	DATE: 12/18/12	PROJECT NO.: -
CHKD: JEB	APPD: RFH	REV.: -	NOTES: -

FIGURE NO.: **2-2**