2023 PERIODIC REVIEW REPORT

for

Standard Motor Products, Inc.
Long Island City, New York
NYSDEC BCP Site No. 241016

Prepared For:

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37-18 Northern Boulevard
Long Island City, Queens County, New York

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ACRONYMS

AS	air sparging
AWS	air/water separator
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CDM Smith	CDM Smith, Inc.
COC	certificate of completion
cfm	cubic feet per minute
CVOC	chlorinated volatile organic compound
DCA	dichloroethane
DCE	dichloroethene
DER	NYSDEC Division of Environmental Remediation
EC	Engineering Control
ELAP	Environmental Laboratory Approval Program
EDD	Electronic Data Deliverable
FSP	Field Sampling Plan
GAC	granulated activated carbon
GZA	Goldberg-Zoino Associates of New York P.C. - d/b/a GZA GeoEnvironmental of New York
IC	Institutional Control
IRM	interim remedial measure
IWC	inches water column
LPGAC	liquid-phase granular activated carbon
MS/MSD	matrix spike/matrix spike duplicate
LTM	Long Term Monitoring
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health

ACRONYMS (CONTINUED)

O&M	operations and maintenance
OM&M	operations, maintenance, and monitoring
PCE	tetrachloroethene
PDB	passive diffusion bag
PID	photoionization detector
PLC	programmable logic controller
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RI	remedial investigation
ROD	record of decision
ROI	radius of influence
RSR	Rebound Study Report
SMP	Standard Motor Products, Inc.
SSDS	sub-slab depressurization system
SVE	soil vapor extraction
TCA	trichloroethene
TCE	trichloroethene
µg/L	micrograms per liter
µg/m3	micrograms per meters cubed
USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VOC	volatile organic compound
VPGAC	vapor-phase granular activated carbon

1.0 INTRODUCTION

On behalf of Standard Motor Products, Inc. (SMP), Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) prepared the 2023 Periodic Review Report (PRR) for the property located at 37-18 Northern Boulevard in Long Island City, New York (herein referred to as the "Site"). This 2023 PRR has been developed in accordance with the Order on Consent and Administrative Settlement (Index No. R2-0637-04-10) between the New York State Department of Environmental Conservation (NYSDEC) and SMP, which was executed on March 12, 2010. The Order on Consent stipulated requirements for the development of a PRR for the Site. This PRR was also prepared in general accordance with the New York State Environmental Conservation Law, and New York State guidance entitled *DER-10 Technical Guidance for Site Investigation and Remediation*, dated May 3, 2010 (NYSDEC 2010), effective in June 2010 and revised in April 2019.

The vapor concentrations identified during the remedial investigation (RI) under the building slab were compared to New York State Department of Health (NYSDOH) Decision Matrix, based upon the evaluation an Interim Remedial Measure (IRM) was implemented in 2009 at the Site. The IRM consists of a sub-slab depressurization system (SSDS), which was completed in September of 2009, with continuous operation initiated on December 7, 2009. The system is currently operating as specified in the Final Interim Remedial Measure Work Plan (CDM 2009b). In March 2009, the NYSDEC issued a Record of Decision (ROD) selecting the continuation of the operation, maintenance, and monitoring of the IRM (NYSDEC 2009) as a component of the remedy for the Site. This measure was supplemented with a second remedial component consisting of the installation of an Air Sparging/Soil Vapor Extraction (AS/SVE) system designed to treat the contaminated groundwater and capture the associated contaminant vapors from groundwater sparging.

The AS/SVE system installation was completed in August 2013, with continuous operation initiated on August 23, 2013, until October 28, 2020. At that time, in accordance with the NYSDEC-approved July 14, 2020 AS/SVE Evaluation Study Workplan, Goldberg-Zoino Associates of New York P.C. d/b/a GZA GeoEnvironmental of New York (GZA) shut down the AS/SVE system to assess rebound in the groundwater concentrations. In November 2020, GZA collected baseline groundwater and soil vapor samples from the treatment area to establish initial site conditions. Groundwater sampling results for the eight quarters spanning November 2020 through November 2022 were summarized in the 2022 PRR and Rebound Study Report (RSR), which was approved by NYSDEC on November 13, 2024.

As approval for the 2022 PRR and RSR remained pending, quarterly sampling events continued from November 2022 through November 2024 to ensure ongoing monitoring and data collection

during the interim period. The sampling and monitoring were conducted in accordance with the 2020 AS/SVE Evaluation Study Workplan.

The purpose of this 2023 PRR is to document the performance of the SSDS and rebound of contaminants in groundwater and soil vapor from January 1, 2023 through December 31, 2023. This PRR summarizes the analytical results and findings from the groundwater and soil vapor sampling events conducted in February, May, August, and November 2023.

1.1 Site Background and Remedial Summary

The SMP property is located in the northwestern section of Queens County, New York; has a street address of 37-18 Northern Boulevard in Long Island City, New York (**Figures 1-1 and 1-2**); was owned and operated by SMP until March 2008; is located in an urban and industrial area; is rectangular in shape; occupies approximately one acre of land; and contains a large, six-story, industrial building with approximately 42,000 square feet per floor. The building occupies most of the property and houses commercial tenants on all six floors as well as in the basement. A narrow strip of land on the south side of the property contains a concrete loading dock and access for service and emergency vehicles. A fence separates the south yard area from a rail yard, located further south of the Site. The Site layout is shown in **Figure 1-3**.

According to historical Sanborn fire insurance rate maps, the subject building was constructed between 1919 and 1925, and has been utilized for industrial and manufacturing purposes since it was built. Starting in the mid-1900s, SMP has occupied the on-Site building. Until March 2008, SMP produced automobile parts and components in the basement of the Long Island City facility. The manufacturing operations included metal fabrication and machining, plastic injection molding, and assembly.

Previous Site investigation activities were performed in four stages, Phases I through IV. These investigation phases evaluated soil, groundwater, indoor air, sub-slab vapor, and soil gas. Results from the investigations identified chlorinated volatile organic compound (CVOC) contamination in the groundwater and soil vapor beneath the Site. Benzene, toluene, ethylbenzene, and xylene (BTEX) contamination were also identified in the upgradient groundwater. The BTEX contamination is not related to operations at the Site and is likely part of a plume originating from the gasoline service station immediately to the east of the Site (NYSDEC Spill #95-00846). The location of Site groundwater contamination in excess of remedial objectives in 2010 is depicted in **Figure 1-4**, which identified groundwater volatile organic compound (VOC) exceedances found in direct push samples collected during the Remedial Investigation (RI) Phase IV sampling event. The general groundwater flow direction in 2010 and 2023 are depicted on **Figures 1-5** and **1-6**, respectively. **Figure 1-5** also depicts groundwater contaminant concentrations from monitoring performed in 2010. The groundwater flow direction identified during the RI Phase- IV sampling event and in 2023 are consistent with regional groundwater flow to the west. The location of soil

vapor contamination on-Site in 2010 is depicted in **Figure 1-7**, which identifies soil vapor VOC concentrations in soil gas, sub-slab, and indoor air sampled during the RI Phase IV sampling event.

Detailed descriptions of the Site history and previous investigations are included in the RI Report for SMP, Final Comprehensive Remedial Investigation Report, Standard Motor Products, Inc. Site (Site No. 2-41-016), dated February 6, 2009 (CDM 2009a).

1.2 Remedial Program

An IRM was implemented to mitigate vapor concentrations detected under the basement floor slab which triggered the NYSDOH criteria set in the Decision Matrix for indoor air. The IRM consists of the installation and operation of an SSDS to create a negative pressure differential across the building slab. Vapors migrate toward the low-pressure areas created by SSDS operation and therefore eliminate vapor intrusion pathways. Construction of the SSDS was completed in September of 2009, and continuous operation was initiated on December 7, 2009. The system is currently operating as specified in the Final Interim Remedial Measure Work Plan (CDM 2009b).

In March 2009, the NYSDEC issued a ROD providing for the continued operation, maintenance, and monitoring of the IRM. The remedial goals as specified in the March 2009 ROD are to eliminate or reduce to the extent practicable:

- Exposures of persons at or around the Site to CVOCs in groundwater, soil vapor, and indoor air; and,
- The release of contaminants from groundwater into indoor air through sub-slab vapor intrusion.

Further, the remediation goals for the Site include attaining ambient groundwater quality standards to the extent practicable.The Site was remediated in accordance with the NYSDEC-approved Interim Remedial Measure Work Plan dated February 6, 2009, and the Final Design Report dated October 12, 2011.

The following is a summary of the Remedial Actions performed at the Site:

1. Implemented a remedial design program to provide the details necessary for the construction, operation, maintenance, and monitoring (OM&M) of the remedial program.
2. Implemented OM&M of the on-Site IRM which consists of a SSDS to control vapor intrusion into the on-Site building.
3. Installed an AS/SVE system. The AS system treats the contaminated groundwater in situ, and the SVE system captures and removes the contaminated soil vapor thereby preventing on- and off-site migration.

4. Imposition of an institutional control (IC) in the form of an environmental easement that requires: (a) limiting the use and development of the property to commercial use, which will also permit industrial use; (b) compliance with the approved Site management plan; (c) restricting the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDOH; and (d) completing and submitting to the NYSDEC a periodic certification of institutional and engineering controls.
5. Developed a Site management plan that includes the following institutional and engineering controls: (a) periodic groundwater sampling and analysis as part of the long-term monitoring of the remedial action; (b) identification of any use restrictions on the Site; (c) fencing to control Site access; and (d) provisions for the continued proper operations and maintenance (O&M) of the SSDS and AS/SVE systems.
6. A periodic certification of institutional and engineering controls prepared and submitted by a professional engineer or such other expert acceptable to the NYSDEC. The submittal: (a) contains certification that the ICs and engineering controls put in place are either unchanged from the previous certification or are compliant with the NYSDEC-approved modifications; (b) allows the NYSDEC to access the Site; and (c) states that nothing has occurred that will impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the Site management plan unless otherwise approved by the NYSDEC.
7. In accordance with the NYSDEC-approved July 14, 2020 AS/SVE Study Workplan, the AS/SVE system was shut down for rebound testing in October 2020. Baseline groundwater and soil vapor samples were collected in November 2020 followed by quarterly sampling collected in February, May, August, and November of 2021 2022, 2023 and 2024. The results from quarterly sampling are compared to the baseline samples collected in November 2020 to assess potential rebound contamination in groundwater.
8. Monthly OM&M system readings were collected during 2021, 2022, and 2023.

Prior to the AS/SVE system shutdown for rebound testing, a long-term monitoring program was instituted to monitor efficacy of the AS/SVE treatment at the Site. The long-term monitoring program consisted of quarterly sampling and analysis of the groundwater to determine the efficacy of the remedy in terms of reduction in the contaminant concentrations and mass. The influent to the SVE system was also sampled to estimate the quantity of contaminant being captured and to confirm that the treatment system continues to be effective. Detailed descriptions of the long-term monitoring scope are presented in the Site Management Plan submitted to NYSDEC on January 25, 2016, updated on July 18, 2016, February 15, 2017, and subsequently updated on November 3, 2020.

The long-term monitoring of the AS/SVE treatment system has been discontinued and rebound testing commenced in October 2020. In November 2020, baseline groundwater and vapor samples were collected. As part of the rebound testing, groundwater and soil vapor samples were collected in 2021 and 2022 on a quarterly basis to assess potential rebound of contamination. Pending approval of the 2022 PRR and RSR, GZA continued with quarterly groundwater and soil vapor sampling during 2023 and 2024. Site-related CVOCs throughout the 2021, 2022 rebound testing periods and the 2023 additional testing period are presented in **Appendix A.** On November 13, 2024, the NYSDEC and NYSDOH approved the 2022 PRR and RSR dated October 4, 2024. A copy of the approval letter is included in **Appendix B**.

1.3 Objectives of the Periodic Review

The periodic review and rebound study process is used for determining if a remedy continues to be properly managed, as set forth in the Site Management Plan. The objectives of the periodic review and rebound study for sites in the State Superfund Program are as follows:

- Evaluate if the remedy actions need to continue operation, are performing properly and effectively, and are protective of public health and the environment;
- Evaluate compliance with the decision document(s) and the Site Management Plan;
- Evaluate the treatment units, and recommend repairs or changes, if necessary;
- Certify, if appropriate, that the intent of ICs continues to be met, and that engineering controls (EC) remain in place, are effective and protective of public health and the environment; and,
- Evaluate costs.

2.0 EVALUATION OF REMEDY PERFORMANCE, EFFECTIVENESS, AND PROTECTIVENESS

Subject to the approval of the 2022 PRR and RSR, GZA proceeded with quarterly groundwater and soil vapor sampling throughout the 2023 and 2024 reporting periods. This section presents a comprehensive summary of the data evaluation and the performance assessment of the remedy components, including the ongoing AS/SVE rebound study.

2.1 Summary of Remedy Components

The following sub-sections provide a summary of remedy components that were used to monitor SSDS at the Site. The layout of extraction sumps and vacuum readings is depicted in **Figure 2-1**.

2.1.1 Sub-Slab Extraction Sumps

Extraction sumps were installed to create vacuum influence beneath the slab of the entire building based on a 60-foot radius of influence (ROI). A total of nine (9) extraction sumps were installed and identified as ES-01 through ES-09.

2.1.2 Vapor Extraction and Treatment System

The SSDS is connected to a single vapor inlet header. The inlet header is connected to two inline blowers located within an intermodal shipping container. Two Roots URAI 711 rotary-lobe blowers were installed to extract the air from the nine extraction sumps. A Calgon HFVS2000 vapor-phase granular activated carbon (VPGAC) adsorber was installed to remove VOCs from the blower effluent prior to atmospheric discharge. A Gasho GX-120 air/water separator (AWS) was installed inline prior to the blowers to remove entrained moisture in the extracted vapor stream. A Carbonair PC1 liquid-phase granular activated carbon (LPGAC) adsorber was installed to remove VOCs from the effluent water accumulated in the AWS prior to surface discharge to the south yard.

2.1.3 Soil Gas Monitoring Points

On October 28 and 29, 2020, GZA installed eight (8) soil vapor gas sample points (SG-1 through SG-8) in the treatment area to evaluate soil vapor conditions during the rebound testing period. The construction of these points is similar to the existing vadose zone monitoring points. Each soil vapor sample point consists of ¼" stainless steel tube, which is secured using ferrules, nut and female adapter; and extends a minimum of 6-inches into the vadose zone.

2.1.3.1 Soil Gas Sampling

The soil gas samples were collected from SG-1 through SG-8 using 6-liter summa canisters with a flow rate not to exceed 0.2 L/min and were analyzed for VOCs by TO-15 method as per the October 2006 "Guidance for Evaluating Soil Vapor Intrusion in the State of New York". The samples were collected with an average flow rate of 0.047 L/min for an average sampling duration of 2 hours and 7 minutes in 2023 (**Appendix C**). In order to collect a representative sample, the flow controller was set at a lower flow rate. The soil gas from the treatment was screened for VOCs using a photoionization detector (PID), the findings are tabulated in **Table 2-2 and depicted on Figure 2-2**.

2.1.4 Groundwater Monitoring Wells

Seven (7) monitoring wells, listed on Table 2-1, are sampled on a quarterly basis using the United States Environmental Protection low flow sampling procedures. Monitoring well locations are shown on **Figure 1-3**.

2.1.4.1 Monitoring Well Sampling

Groundwater samples are collected on a quarterly basis and analyzed by a NYSDOH-approved ELAP certified laboratory and analyzed for VOCs by EPA method 8260C and 1,4 dioxane by EPA method 8270D SIM. VOC concentrations in groundwater are compared against NYSDEC Guidance Values for Class GA Groundwater. An NYSDEC ASP Category B data deliverable and EDD confirmation is provided for these analyses in **Attachment A**. Sampling sheets are provided in **Appendix C**.

Table 2-1 – Monitoring Well Construction Details

Well #	Installation Date	Screen Interval (feet bgs)
MW-10	07/07/2003	2.5-17.5
MW-11S	07/07/2003	4.2-19.2
MW-16	01/14/2008	5-20
MW-17	04/25/2013	6.5-13.5
MW-18	04/24/2013	6.5-16.5
MW-19	04/23/2013	6.4-13.4
MW-20	04/23/2013	3.5-13.5

2.2 Quality Assurance / Quality Control

Quality Assurance / Quality Control (QA/QC) requirements for aqueous and air samples are described in Quality Assurance Project Plan and Field Sampling Plan (QAPP/FSP) provided as Appendix D to the Site Management Plan (CDM Smith 2016). The QAPP was updated to include the sampling procedures for 1,4 Dioxane and per- and poly-fluoroalkyl substances (PFAS). The updated QAPP was submitted to NYSDEC on November 13, 2019. In 2016, 2017, 2019, and 2020, a full suite of quality assurance/quality control (QA/QC) samples were collected as part of monitoring activities. Sample holding times are in accordance with the NYSDEC ASP requirements.

2.3 Summary of Operation and Maintenance of SSDS

The SSDS Operation and Maintenance (O&M) Manual was prepared by Intex Environmental Group (Intex) for CDM Smith. The manual is included in the Site Management Plan submitted to NYSDEC on January 25, 2016. The treatment system was operated and maintained by GZA until

August 2024. Since September 2024, Langan has taken over the operation and maintenance responsibilities. The treatment system is currently operated and maintained by Langan. The following summarizes the O&M procedures performed by GZA during the review period from January 1, through December 31, 2023:

- The programmable logic controller (PLC) generated a daily report of operational parameters including run status, vapor flow rate, vapor totalizer reading, and applied vacuum and discharge pressure readings.
- O&M of the system is performed on a monthly basis.
- Site-wide inspections are performed on a regular schedule at a minimum of once per year.

The treatment system ran during the reporting period with minimal downtime. Two rotary lobe blowers are installed in parallel for operational flexibility and backup use in case a blower failure occurs. Currently, only one blower is necessary to depressurize the slab beneath the building. No operational issues with the extraction system were encountered / experienced during the 2023 reporting periods. During 2023, the annual average treatment system flow rates ranged between 852 and 891 cubic feet per minute (cfm).

The treatment system is inspected and maintained on a monthly basis. During routine O&M, system performance readings are recorded, and equipment is inspected for noise, vibration, temperature and leaks. Blower oil is changed, motors are greased, and V-belts are checked and adjusted if necessary. System filters are replaced as necessary, or at a minimum of once per year. Annually, the blower and its components are inspected for proper functionality. SSDS O&M checklists recorded on a monthly basis for this reporting period are provided as **Appendix D**. The layout of monitoring points is depicted in **Figure 2-1**.

Annual operating cost including O&M, monitoring, reporting, and electrical usage was approximately $161,500, 2023 reporting periods.

2.3.1 Sub-Slab Depressurization Influence

Monitoring of SSDS influence is performed by monitoring pressure differential across sub-slab monitoring points and the vacuum in extraction sumps. Monitoring was performed on a quarterly basis in 2023. Refer to **Appendix E** for the datasheets.

2.4 Summary or Rebound Study and Evaluation

Prior to the AS/SVE system shutdown for the rebound study, Site-related CVOCs in groundwater were found consistent with previous observations. The performance monitoring at the Site suggests that the AS/SVE system, when operating, has reduced concentration levels of contaminants of concern. As such, an AS/SVE Study Workplan was developed and an updated version was submitted to NYSDEC on July 14, 2020, to establish a stepwise process to evaluate

if a transition from active groundwater treatment to a passive monitored natural attenuation (MNA) approach can be achieved. The AS/SVE Study Workplan was approved by the NYSDEC on September 29, 2020.

On October 28, 2020, the AS/SVE system was discontinued in accordance with the July 14, 2020, AS/SVE system Evaluation Study, and the rebound testing commenced to evaluate if concentrations of the COCs in the groundwater source area have been reduced sufficiently to no longer pose a threat to the environment. Subsequent baseline groundwater and soil vapor sampling was conducted in November 2020. Quarterly monitoring was conducted in February, May, August, and November of both 2021, and 2022 and the findings were summarized in the 2022 PRR/RSR.

2.4.1 Summary of Rebound Study

GZA collected groundwater and soil vapor samples on a quarterly basis for a total of four quarters in 2021 to assess rebound of contamination. Since there was no significant rebound in concentration after four quarters of groundwater monitoring data, the AS/SVE system remained off for four more quarters of groundwater and soil vapor sampling in 2022. There was no significant rebound found in the groundwater concentrations after a total of eight quarters of groundwater sampling; therefore, GZA recommend shutting down the AS/SVE permanently. The findings and recommendation from the rebound study from November 2020 through November 2022 were summarized in 2022 PRR/RSR, which was approved on November 13, 2024.

Since the approval of the 2022 PRR/RSR was pending the operations and maintenance, and quarterly sampling continued through November 2024 in accordance with the approved July 14, 2020 AS/SVE Rebound Study Workplan. A detailed evaluation of groundwater contamination trends is included in the subsequent sections of this 2023 PRR.

The following table summarizes the monitoring activities performed during the reporting period of this PRR and RSR:

Table 2-3: Monitoring Activities

Monitoring Program	Sample Locations	Frequency	Compliance Dates	Analysis
Groundwater	See Table 2-1 for list of Monitoring Wells	Quarterly	2/11/21; 5/18/21; 8/9/21; 11/9/21; 2/16/22; 5/19/22; 8/9/22; 11/28/22; 12/23/22; 2/6/2023; 5/16/2023;	VOCs (EPA 8260C); 1,4-dioxane (8270D SIM); anions—chloride, sulfate, and nitrate (300.0); sulfide (SM4500 S or F); TOC (9060); gases—methane, ethane, and ethene

Monitoring Program	Sample Locations	Frequency	Compliance Dates	Analysis
			8/22/2023; 11/13/2023	(RFK175); and total dissolved metals—arsenic, iron, and manganese (6010D)
Soil Vapor Samples	SG-1 through SG-8	Quarterly	2/12/21; 5/19/21; 8/9/21; 11/9/21; 2/16/22; 5/19/22; 8/9/22; 11/28/22; 2/7/2023; 5/17/2023; 8/22/2023; 11/14/2023	EPA TO-15
Sub-Slab Depressurization Influence	SB-01 through SB-07, SB-09, SB-10, SB-12, SB-13, SB-15, SB-22, SB-23, SB-24	Quarterly	2/11/21; 3/18/21; 5/18/21; 8/9/21; 11/9/21; 2/16/22; 5/19/22; 8/9/22; 11/28/22; 2/6/2023; 5/17/2023; 8/22/2023; 11/14/2023	Field differential pressure readings
Sub-Slab Extraction Sumps	ES1 through ES9	Quarterly	2/11/21; 3/18/21; 5/18/21; 8/9/21; 11/9/21; 2/16/22; 5/19/22; 8/9/22; 11/28/22; 2/6/2023; 5/17/2023; 8/22/2023; 11/14/2023	Field PID and differential pressure readings
SVE Vadose Zone Influence	SV1 through SV6	Quarterly	3/16/2020; 4/10/2020; 5/12/2020; 9/8/2020; 9/23/2020; 10/28/2020; 10/29/2020; 11/24/2020; 11/25/2020	Field PID and differential pressure readings

2.5 Confirmation Standards

Sub-slab Vacuum

Currently, 12 monitoring points are being measured (SB-01, SB-03, SB-04, SB-05, SB-06, SB-09, SB-10, SB-12, SB-13, SB-15, SB-22, and SB-25) for sub-slab vacuum performance. These 12 monitoring points are suitable to assess the sub-slab vapor pressure and confirm the readings. In 2023, monitoring of the SSDS operations was performed on a quarterly basis. The vacuum readings at the sub-slab monitoring points are evaluated to determine if the SSDS continues to be effective in providing negative pressure across the building slab by achieving a minimum pressure differential of 0.003 inches of water column (IWC) at the 12 monitoring points located across the building slab. SSDS log sheets are provided as **Appendix D**. Refer to **Figure 2-3** for the vacuum readings.

Field PID Readings at Extraction Sumps Underneath the Slab

Field PID readings were collected on a quarterly basis at each of the nine SSDS extraction sumps to determine estimated VOC concentrations. The PID readings collected during this monitoring period indicated no elevated VOC readings; the results are provided in **Appendix E**.

2.5.1 Soil Vapor Analytical Results

Soil gas in the treatment area were screened with PID (**Table 2-2 & Figure 2-2**) and sampled on February 7, May 17, August 22, and November 14, 2023 from the eight sampling points (SG-1 through SG-8). Samples were submitted to a NYSDOH approved ELAP certified laboratory and analyzed by EPA method TO-15 for VOCs. A summary of analytical results is provided in **Table 2-4** and **Figure 2-4**.

CVOC contamination related to the Site includes PCE, 1,1,1-TCA, TCE, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, chloroethane, and VC. Historically, Site-related CVOCs were detected in all influent samples collected from the SSDS and SVE system prior to shutting down the AS/SVE system for the rebound testing.

2023 Additional Testing Period

In February 2023, the following Site-related CVOCs were detected in soil vapor air samples:

- PCE at SG-1 (1.95 µg/m^3), SG-2 (13 µg/m^3), SG-4 (51 µg/m^3), SG-5 (315 µg/m^3), SG-6 (24.1 µg/m^3), SG-6 duplicate (27.7 µg/m^3), SG-7 (11.1 µg/m^3), and SG-8 (49.2 µg/m^3)

- 1,1,1-TCA at SG-1 (6.98 µg/m^3), SG-2 (43.2 µg/m^3), SG-3 (2.84 µg/m^3), SG-4 (14,200 µg/m^3), SG-5 (81,800 µg/m^3), SG-6 (1,360 µg/m^3), SG-6 duplicate (1,410 µg/m^3), SG-7 (74.2 µg/m^3), and SG-8 (1,160 µg/m^3)
- 1,1-DCA at SG-1 (1.72 µg/m^3), SG-2 (24 µg/m^3), SG-3 (1.6 µg/m^3), SG-4 (1,540 µg/m^3), SG-5 (56,300 µg/m^3), SG-6 (619 µg/m^3), SG-6 duplicate (639 µg/m^3), SG-7 (28.3 µg/m^3), and SG-8 (429 µg/m^3)
- 1,1-DCE at SG-5 (299 µg/m^3), SG-6 duplicate (5.31 µg/m^3), and SG-8 (5.95 µg/m^3)
- *cis*-1,2-DCE at SG-1 (1.43 µg/m^3), SG-2 (38.2 µg/m^3), SG-4 (112 µg/m^3), SG-5 (12,500 µg/m^3), SG-6 (547 µg/m^3), SG-6 duplicate (579 µg/m^3), SG-7 (11µg/m^3), and SG-8 (167 µg/m^3)
- Chloroethane at SG-2 (0.932 µg/m^3), SG-4 (42.7 µg/m^3), SG-5 (3,510 µg/m^3), SG-6 (19.6 µg/m^3), and SG-6 duplicate (19.2µg/m^3)
- TCE at SG-1 (23.8 µg/m^3), SG-2 (383 µg/m^3), SG-3 (12.3 µg/m^3), SG-4 (406 µg/m^3), SG-5 (12,300 µg/m^3), SG-6 (2,990 µg/m^3), SG-6 duplicate (2860 µg/m^3), SG-7 (283 µg/m^3), and SG-8 (167 µg/m^3)
- VC at SG-2 (0.565 µg/m^3), SG-5 (3,760 µg/m^3), and SG-8 (161 µg/m^3)

In May 2023, the following Site-related CVOCs were detected in soil vapor air samples:

- PCE at SG-1 (19.8 µg/m^3), SG-2 (54 µg/m^3), SG-5 duplicate (27.7 µg/m^3), SG-6 (78.7 µg/m^3), SG-7 (11.1 µg/m^3), and SG-8 (49.2 µg/m^3)
- 1,1,1-TCA at SG-1 (29.3 µg/m^3), SG-2 (202 µg/m^3), SG-3 (3.64 µg/m^3), SG-4 (13,400 µg/m^3), SG-5 (70,400 µg/m^3), SG-5 duplicate (µg/m^3), SG-6 (2,420 µg/m^3), SG-7 (517 µg/m^3), and SG-8 (3,440 µg/m^3)
- 1,1-DCA at SG-1 (8.78 µg/m^3), SG-2 (129 µg/m^3), SG-3 (2.32 µg/m^3), SG-4 (4,490 µg/m^3), SG-5 (80,100 µg/m^3), SG-5 duplicate (µg/m^3), SG-6 (1,660 µg/m^3), SG-7 (204 µg/m^3), and SG-8 (4,570 µg/m^3)
- 1,1-DCE at SG-8 (50 µg/m^3)
- *cis*-1,2-DCE at SG-1 (3.7 µg/m^3), SG-2 (183 µg/m^3), SG-3 (1.36 µg/m^3), SG-4 (535 µg/m^3), SG-5 (21,900 µg/m^3), SG-5 duplicate (579 µg/m^3), SG-6 (1,880 µg/m^3), SG-7 (73.7 µg/m^3), and SG-8 (952 µg/m^3)
- Chloroethane at SG-1 (0.776 µg/m^3), SG-2 (12.7 µg/m^3), SG-3 (0.961 µg/m^3), SG-4 (215 µg/m^3), SG-5 (3,510 µg/m^3), SG-5 duplicate (19.2µg/m^3), and SG-6 (57 µg/m^3)
- TCE at SG-1 (64 µg/m^3), SG-2 (2,140 µg/m^3), SG-3 (30.5 µg/m^3), SG-4 (865 µg/m^3), SG-5 (21,700 µg/m^3), SG-5 duplicate (2860 µg/m^3), SG-6 (10,600 µg/m^3), SG-7 (2,220 µg/m^3), and SG-8 (12,500 µg/m^3)
- VC at SG-1 (0.989 µg/m^3), SG-5 (2,510 µg/m^3), and SG-8 (450 µg/m^3

In August 2023, the following Site-related CVOCs were detected in soil vapor air samples:

- PCE at SG-2 (54 µg/m^3), SG-3 (14.9 µg/m^3), SG-4 (53.4 µg/m^3), SG-5 (111 µg/m^3), SG-6 (4.28 µg/m^3), SG-7 (2.31 µg/m^3), SG-8 (285 µg/m^3), and SG-8 duplicate (27.7 µg/m^3)
- 1,1,1-TCA at SG-1 (4.39 µg/m^3), SG-2 (1.37 µg/m^3), SG-3 (109 µg/m^3), SG-4 (1,190 µg/m^3), SG-5 (12,300 µg/m^3), SG-6 (15.8 µg/m^3), SG-7 (8.84 µg/m^3), SG-8 (3,440 µg/m^3), and SG-8 duplicate (µg/m^3)
- 1,1-DCA at SG-1 (1.34 µg/m^3), SG-3 (43.7 µg/m^3), SG-4 (911 µg/m^3), SG-5 (3,580 µg/m^3), SG-6 (6.64 µg/m^3), SG-7 (3.93 µg/m^3), SG-8 (2,440 µg/m^3), and SG-8 duplicate (µg/m^3)
- 1,1-DCE at SG-3 (1.29 µg/m^3), SG-4 (2.64 µg/m^3), and SG-8 (160 µg/m^3)
- *cis*-1,2-DCE at SG-3 (16.8 µg/m^3), SG-4 (218 µg/m^3), SG-5 (500 µg/m^3), SG-6 (7.1 µg/m^3), SG-7 (2.34 µg/m^3), SG-8 (1,700 µg/m^3), and SG-8 duplicate (579 µg/m^3)
- Chloroethane at SG-1 (0.871 µg/m^3), SG-2 (1.69 µg/m^3), SG-3 (2.88 µg/m^3), SG-4 (158 µg/m^3), and SG-5 (71 µg/m^3)
- TCE at SG-1 (37.9 µg/m^3), SG-2 (9.46 µg/m^3), SG-3 (4.3 µg/m^3), SG-4 (298 µg/m^3), SG-5 (688 µg/m^3), SG-6 (114 µg/m^3), SG-7 (35.4 µg/m^3), SG-8 (69,300 µg/m^3), and SG-8 duplicate (2860 µg/m^3)
- VC at SG-3 (0.624 µg/m^3), and SG-4 (18.2 µg/m^3)

In November 2023, the following Site-related CVOCs were detected in soil vapor air samples:

- PCE at SG-3 (3.47 µg/m^3), SG-4 (2.6 µg/m^3), SG-7 (1.36 µg/m^3), and SG-8 duplicate (15.3 µg/m^3)
- 1,1,1-TCA at SG-3 (17.8 µg/m^3), SG-4 (225 µg/m^3), SG-5 (1,390 µg/m^3), SG-7 (4.29 µg/m^3), SG-8 (1,090 µg/m^3), and SG-8 duplicate (1060 µg/m^3)
- 1,1-DCA at SG-3 (12.7 µg/m^3), SG-4 (166 µg/m^3), SG-5 (275 µg/m^3), SG-6 (6.64 µg/m^3), SG-7 (2.31 µg/m^3), and SG-8 (222 µg/m^3), and SG-8 duplicate (19.7 µg/m^3)
- 1,1-DCE at SG-4 (0.793 µg/m^3), SG-8 (21.6 µg/m^3), and SG-8 duplicate (19.7 µg/m^3),
- *cis*-1,2-DCE at SG-3 (6.07 µg/m^3), SG-4 (35.2 µg/m^3), SG-5 (20.1 µg/m^3), SG-7 (1.78 µg/m^3), SG-8 (121 µg/m^3), and SG-8 duplicate (126 µg/m^3)
- Chloroethane at SG-3 (0.575 µg/m^3), and SG-4 (81.8 µg/m^3)
- TCE at SG-3 (3.47 µg/m^3), SG-4 (2.6 µg/m^3), SG-7 (1.36 µg/m^3), SG-8 (4,690 µg/m^3), and SG-8 duplicate (4,260 µg/m^3)
- VC at SG-4 (37.3 µg/m^3)

2.5.2 Evaluation of Soil Gas Analytical Results

The soil gas results are presented in **Table 2-4** and the Site-related CVOCs, including PCE, 1,1,1-TCA, TCE, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, chloroethane, and VC were detected, which is consistent with the previous results. During the warmer months, an increased concentration of contaminants was observed across the board. This is likely due to the differential pressure

between the atmosphere and the subsurface, where the pressure in the subsurface is higher than that in the atmosphere. **Appendix F** includes the statistical calculations using Mann-Kendall analysis along with the concentration trendlines over this period at the soil gas sampling locations (SG-1 through SG-8). The trends from the Mann-Kendall analysis for soil vapor samples are summarized in **Table 2-5** below. Where a sample result was identified as non-detect by laboratory analysis, the reporting limit corresponding to the contaminant and sample was used in the Mann-Kendall analysis to assess for any trend. Plots were developed to confirm these trends and depict changes in concentration of the Site-related CVOCs throughout the 2021, 2022 rebound testing periods and the 2023 additional testing period are presented in **Appendix A**.

Table 2.5 Mann-Kendall Analysis Trend Summary for Soil Vapor Results

Contaminant	Mann-Kendall Analysis Trend							
	SG-1	SG-2	SG-3	SG-4	SG-5	SG-6	SG-7	SG-8
PCE	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend
TCE	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend
1,1-DCE	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend
1,1,1-TCA	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend
1,1-DCA	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend
***cis*-1,2-DCE**	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend
Chloroethane	No Trend	No Trend	No Trend	Probably Increasing	No Trend	No Trend	No Trend	No Trend
Vinyl Chloride	Stable	Probably Decreasing	Stable	No Trend	No Trend	Decreasing	Decreasing	No Trend
Total VOCs	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend

The results of this statistical analysis and our evaluation of the plots indicate that the concentration of CVOCs have reached asymptotic levels. The Mann-Kendall analysis of soil vapor concentrations for the site-related CVOCs at SG-1 through SG-8 indicates either a stable or decreasing trend, with the exception of SG-4, where chloroethane concentrations are likely increasing. Mann-Kendall analysis was also conducted on total VOCs for sample locations SG-1 through SG-8, where a stable, no trend was observed. Refer to **Appendix F** for a detailed summary of the Mann-Kendall analysis and associated trends. The trend graph shows that concentrations initially exceeded baseline levels; however, recent sampling results indicate a downward trend, with concentrations gradually approaching the original levels observed during baseline monitoring.

2.5.3 Groundwater Sampling and Analytical Results

Seven groundwater monitoring wells were sampled on February 6, May 16, August 22, and November 13, 2023. Analytical results for each sampling event are presented in **Table 2-6** and presented on **Figure 2-5A** for the Site-related CVOC results and **Figure 2-5B** for BTEX results.

2023 Additional Testing Period

The following contaminants were detected at concentrations exceeding NYSDEC Class GA Groundwater Standards in February 2023:

MW-10:

- Benzene: 3.5 µg/L
- Cyclohexane: 150 µg/L
- Ethylbenzene: 22 µg/L
- Isopropylbenzene: 47 µg/L
- m/p-Xylenes: 30 µg/L
- Methylcyclohexane: 30 µg/L
- Toluene: 9.7 µg/L

MW-11S:

- 1,4-Dioxane: 0.686 µg/L

MW-16

- 1,4-Dioxane: 0.762 µg/L
- cis-1,2-DCE: 17 µg/L
- VC: 58 µg/L

MW-18:

- 1,4-Dioxane: 0.362 µg/L

MW-19:

- 1,4-Dioxane: 0.573 µg/L

MW-20:

- 1,4-Dioxane: 0.385 µg/L

The following contaminants were detected at concentrations exceeding NYSDEC Class GA Groundwater Standards in May 2023:

MW-10:

- Benzene: 5.2 µg/L
- Isopropylbenzene: 31 µg/L

- m/p-Xylenes: 20 µg/L
- Toluene: 10 µg/L

MW-11S:

- 1,4-Dioxane: 0.588 µg/L

MW-16:

- 1,4-Dioxane: 0.613 µg/L
- cis-1,2-DCE: 14 µg/L
- VC: 70 µg/L

MW-17

- 1,4-Dioxane: 0.38 µg/L

MW-20

- 1,4-Dioxane: 0.386 µg/L

The following contaminants were detected at concentrations exceeding NYSDEC Class GA Groundwater Standards in August 2023:

MW-10:

- 2-Butanone: 150 µg/L
- Acetone: 160 µg/L
- Benzene: 3.9 µg/L
- Ethylbenzene: 8 µg/L
- Isopropylbenzene: 56 µg/L
- m/p-Xylenes: 16 µg/L
- o-Xylene: 5 µg/L
- Toluene: 11 µg/L

MW-11S:

- 1,4-Dioxane: 0.455 µg/L
- TCE: 5.6 µg/L

MW-16:

- cis-1,2-DCE: 21 µg/L
- VC: 63 µg/L

MW-17:

- 1,4-Dioxane: 0.462 µg/L

MW-18:

- 1,4-Dioxane: 0.46 µg/L

MW-19:

- 1,4-Dioxane: 0.448 µg/L

MW-20:

- 1,4-Dioxane: 0.467 µg/L

The following contaminants were detected at concentrations exceeding NYSDEC Class GA Groundwater Standards in November 2023:

MW-10:
- Benzene: 2.5 µg/L
- Isopropylbenzene: 35 µg/L
- m/p-Xylenes: 7.6 µg/L
- Toluene: 6.1 µg/L

MW-16:
- 1,4-Dioxane: 0.572 µg/L
- cis-1,2-DCE: 20 µg/L
- VC: 66 µg/L

MW-17:
- VC: 5.2 µg/L

MW-20:
- 1,4-Dioxane: 0.469 µg/L

2.6 Evaluation of Analytical Results

The following contaminants were detected at concentrations exceeding NYSDEC Class GA Groundwater Standards during the 2023 additional testing period:

- MW-10: petroleum-based products, including:
  - Acetone (August 2023 sampling event);
  - Benzene (February, May, August, and November 2023 sampling events);
  - Cyclohexane (February 2023 sampling event);
  - Toluene (February, May, August, and November 2023 sampling events);
  - Ethylbenzene (February and August 2023 sampling event);
  - Xylenes (February, May, August, and November 2023 sampling events);
  - Isopropylbenzene (February, May, August, and November 2023 sampling events);
  - Methylcyclohexane (February 2023 sampling event); and,
  - 2-Butanone (August 2023 sampling event).
- MW-11S: 1,4-dioxane during the February, May, and August 2023 sampling events and TCE during the August 2023 sampling event.

- MW-16: 1,4-dioxane during the February, May, and November 2023 sampling events; and, cis-1,2-DCE and VC during the February, May, August, and November 2023 sampling events.
- MW-17: 1,4-dioxane during the May and August 2023 sampling events; and, VC during the November 2023 sampling event.
- MW-18: 1,4-dioxane during the February and August 2023 sampling events.
- MW-19: 1,4-dioxane during the February and August 2023 sampling events.
- MW-20: 1,4-dioxane during the February, May, August, and November 2023 sampling event.

MW-10 results indicate contamination of non-site-related gasoline products, specifically BTEX compounds, and is consistent with the historical findings. MW-10 is upgradient from the source area and is impacted by the nearby gas station plume and surface runoff from the nearby roadway drainage pipe.

MW-11S results indicate the presence of TCE marginally above the standard in December 2022 (sampled as part of the November 2022 sampling event) and August 2023. These results are inconsistent with historical groundwater sampling results for TCE at this location, where the only other recorded instances of TCE above the standard at MW-11S occurred in July 2013 and March 2014. Because these two exceedances of TCE at MW-11S appear to be isolated incidents unrelated to the shutdown of the AS/SVE system, and are only marginally above the standard, these detections of TCE above NYSDEC Class GA Groundwater Standards at MW-11S seem to be outliers, and do not warrant further action.

Analytical results for the baseline groundwater sampling event in 2020 and the rebound testing periods during 2021, 2022 and 2023, plus past events since 2013 are provided in **Table 2-6**. Results for sample concentrations greater than the interim-remedial measures (IRM) treatment criteria of 20 times their groundwater standard is highlighted in the table along with exceedances of the groundwater standard itself. A statistical evaluation of the recent and historical groundwater results was conducted using Mann-Kendall test to establish a trend for the Site-related CVOCs, including PCE, 1,1,1-TCA, TCE, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, chloroethane, and VC. Plots were developed to confirm these trends and depict changes in concentration of the Site-related CVOCs from baseline in 2020 throughout the 2021, 2022 rebound testing period and 2023. The trends from the Mann-Kendall analysis for groundwater samples are summarized in **Table 2-7** below and the detailed analysis is provided as **Appendix G**. Wherever a sample result was non-detect by the laboratory, "0" was used in the Mann-Kendall analysis to establish a trend because over the years the reporting limits have changed and are not consistent.

The following contaminants were detected at concentrations exceeding NYSDEC Class GA Groundwater:

Table 2.4.7 Mann-Kendall Analysis Trend Summary for Groundwater Results

Contaminant	Mann-Kendall Analysis Trend						
	MW-10	**MW-11S**	**MW-16**	**MW-17**	**MW-18**	**MW-19**	**MW-20**
PCE	Decreasing	Decreasing	Decreasing	No Trend	No Trend	No Trend	No Trend
TCE	Decreasing	No Trend	Decreasing	Decreasing	Decreasing	Decreasing	Decreasing
1,1-DCE	No Trend	No Trend	Probably Decreasing	No Trend	No Trend	No Trend	No Trend
1,1,1-TCA	Probably Decreasing	No Trend	No Trend	No Trend	No Trend	No Trend	No Trend
1,1-DCA	Probably Decreasing	Decreasing	Decreasing	No Trend	No Trend	No Trend	No Trend
***cis*-1,2-DCE**	Decreasing	Decreasing	Stable	No Trend	Stable	No Trend	No Trend
Chloroethane	Decreasing	Decreasing	No Trend	No Trend	No Trend	No Trend	No Trend
Vinyl Chloride	Decreasing	Decreasing	Increasing	Decreasing	Decreasing	Probably Decreasing	Decreasing

The plots and statistical analysis show that the CVOCs have reached asymptotic levels in the wells within the AS/SVE treatment area. The MW-16 downgradient well is not located in the footprint of the AS/SVE treatment area and indicated an increasing trend of VC when comparing the rebound testing results to the historical data from 2008, which was to be expected considering VC is a daughter product from the source area. To further evaluate the increasing trend of VC at MW-16, the CVOC concentrations of the Site-related CVOCs at MW-16 were converted into their respective mole fractions and plotted over time (**Appendix H**). This plot shows that although the amount of VC is currently increasing at MW-16, it is behaving directly inverse to the amount of cis-1,2-DCE at MW-16, which is consistent with data trends observed at remedial sites involving treatment of chlorinated constituents at remedial sites. Consistent with these data trends, it is anticipated that the levels of cis-1,2-DCE will continue to drop until it reaches degradation at MW-16, causing the amount of VC to concurrently increase at the same rate. This may occur until the degradative cycle of cis-1,2-DCE is complete, at which point the VC will begin to degrade naturally. Thus, it is concluded that the increasing trend of VC in MW-16 shown by the Mann-Kendall analysis indicates a positive overall trend as opposed to worsening contaminant conditions.

It should be noted that 1,4-dioxane has been detected in the seven monitoring wells ranging from ND to 0.945 µg/L during the 2021 and 2022 rebound testing periods and ranging from ND to 0.762 µg/L during the 2023 additional sampling period. The results are consistent with historical and 2020 baseline results.

Recognizing there are some temporal variations, generally depleted levels of dissolved oxygen (DO), negative oxygen redox potential (ORP) readings, and the presence of sulfate, sulfide, and methane was observed in groundwater at MW-10 which indicates anaerobic degradation of organic contaminants is active at this well location. At MW-16 and MW-17, low levels of DO, ORP, sulfate, and methane was detected in the groundwater; nitrates were not detected in the groundwater at MW-16. This indicates anaerobic conditions; once the primary terminal electron acceptor (TEA) DO is depleted then it would switch to sulfate as the secondary TEA, which will generate sulfide upon degradation of CVOCs. The analytical results indicate anaerobic conditions prevail where CVOCs are detected, which would help with the continued degradation of contaminants.

Additionally, analytical results for the other four wells (MW-11S, MW-18, MW-19, and MW-20) did not reveal Site-related contaminants above their remedy evaluation criteria with the exception of the isolated incidents of TCE detection in MW-11S. Other electron donors or acceptors are not prevalent in the groundwater at the remaining monitoring wells. The DO and ORP levels at these wells indicate anaerobic biodegradation, which is supportive of continued degradation of CVOCs. The analytical results for wells MW-11S, MW-18, MW-19, and MW-20 indicate that contaminant concentrations have stabilized and reached asymptotic levels.

Elevated chloride levels were detected in the groundwater samples from all the wells. This increased concentration of chloride may be attributed to human activities, such as road salting, or to natural processes like the weathering of rocks. Additionally, chloride is also an indicator of biodegradation of chlorinated hydrocarbons. Chloride concentrations are higher in downgradient wells than in upgradient well MW-10, which indicates that degradation is occurring in the downgradient well.

2.7 Engineering/Institutional Control Plan

A Site Management Plan (SMP) was originally submitted on January 2016, which includes an Engineering Control (EC)/Institutional Control (IC) Plan. The plan was updated on July 18, 2016, February 15, 2017, and subsequently updated on November 3, 2020. The EC/IC Plan includes an environmental easement that is currently being developed and will be evaluated in the PRR for the next reporting period. A series of ICs is required by the ROD to: (1) implement, maintain and monitor EC systems; (2) prevent future exposure to residual contamination by controlling disturbances of the subsurface contamination; and (3) limit the use and development of the Site to commercial uses only.

Adherence to these ICs on the Site will be required by the Environmental Easement and will be implemented under the Site Management Plan. The ICs put in place have met the following objectives:

- Complied with the Environmental Easement, currently in NYSDEC review;
- All ECs were operated and maintained as specified in the Site Management Plan;
- All ECs were inspected at a frequency and in a manner defined in the Site Management Plan;
- Groundwater, soil vapor, process vapor, and process water monitoring were performed; and,
- Data and information pertinent to Site Management of the Controlled Property was reported at the frequency and in a manner defined in the Site Management Plan.

ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement.

The Site has a series of ICs in the form of Site restrictions. Adherence to these ICs is required by the Environmental Easement. Site restrictions that apply to the Controlled Property are:

- The property may only be used for commercial use (also permitting industrial use) provided that the long-term Engineering and Institutional Controls included in the Site Management Plan are employed;
- The property may not be used for a higher level of use, such as restricted residential use without additional remediation and amendment of the Environmental Easement, as approved by the NYSDEC;
- All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the Site Management Plan;
- Use of groundwater is restricted, as a source of potable or process water and is not permitted without necessary water quality treatment as determined by the NYSDOH;
- The potential for vapor intrusion must be evaluated for any buildings developed in the area noted on **Figure 2-1**, and any potential impacts that are identified must be monitored or mitigated;
- Vegetable gardens and farming on the property grounds are prohibited;
- The Remedial Party will 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 Site Management Plan. 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 and will be made by an expert that the NYSDEC finds acceptable.

In August 2019, Metro Transit Authority (MTA) commenced the construction activities to install new railway lines adjacent to the treatment area. During the active construction, the treatment area was used as a support area and was temporarily occupied by MTA equipment and storage containers. During this construction, the asphaltic cover at the treatment area was damaged by MTA contractors. GZA coordinated with NYSDEC and MTA to remove all the construction equipment and clear the treatment area. All the equipment and storage containers were moved out of the treatment area by the end of December 2019 and MTA restored the asphaltic cover where it was damaged in 2020. A high security fence was installed, sometime between August 2020 and August 2021, separating the treatment area from the active railway lines. No other incidents involving impacts to the treatment area have occurred.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

The following observations regarding system performance were made by GZA for the rebound testing period from January 1, 2023, through December 31, 2023.

3.1.1 Operation and Maintenance Conclusions

The SSDS is operating as designed and is eliminating the vapor intrusion pathway into the on-Site building. In accordance with New York State guidance, the SSDS successfully achieved a differential vacuum pressure of greater than or equal to 0.003 inches of water across the monitoring points except for SB-09 and SB-15, likely due to damaged monitoring points. Those monitoring points which did not receive sufficient vacuum in 2023, or those which were not consistently accessible, were reinstalled in February 2024 at a minimal offset from their original locations and subsequently showed sufficient vacuum readings. The details of this evaluation are included in the March 2024 Consent Order Monthly Progress Report and will be included in the 2024 PRR. Minimal downtime has been encountered from the onset of continuous operations through the timeframe of this periodic review.

3.1.2 Monitoring Conclusions

The soil vapor analytical results from the 2023 testing are discussed below:

- The following Site-related CVOCs were detected in the soil gas samples: PCE, 1,1,1-TCA, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, chloroethane, VC, and TCE.

  - There was an anomalous increase in soil gas concentrations observed at the soil gas monitoring points (SG-1 through SG-8) during the May 2023 sampling event, however concentrations generally returned to within historical ranges during the August and November 2023 sampling events.

  - The Mann-Kendall analysis (**Appendix E**) indicates that asymptotic soil vapor levels of CVOCs have been reached.

- Low levels of TCE, VC, and/or cis-1,2-DCE were detected above the groundwater remedy performance criteria in MW-11S, MW-16, and MW-17.

  - The TCE exceedances detected in MW-11S was reported during the final sampling event in the 2022 rebound testing period and in the August 2023 sampling event were marginally above the standard of 5 µg/L. These results are inconsistent with the historical groundwater sampling data for TCE at this location. Furthermore, subsequent sampling events showed that TCE levels dropped below the established performance criteria. The exceedences therefore appear to be isolated incidences not indicative of the overall TCE trends or findings in MW-11S. The Mann-Kendall analysis likewise indicates there is no trend for TCE in MW-11S, which further confirms these incidences, only marginally above the standard, as being non-representative of rebound.

  - VC was detected at a maximum concentration of 70 µg/L (May 2023) in MW-16 which is above its groundwater remedy performance criteria (2 µg/L).

  - cis-1,2-DCE was detected at a maximum concentration of 21 (August 2023) in MW-16, which is above its groundwater remedy performance criteria (5 µg/L).

- No other CVOCs were detected in the upgradient, source, side-gradient, and downgradient wells.

- The Mann-Kendall analysis (**Appendix E**) of on-Site contaminants in MW-10, MW-11s, and MW-17 through MW-20 indicate that there is no increasing trend of CVOCs and that asymptotic CVOC groundwater contaminant levels have been reached.

- The Mann-Kendall analysis of historical groundwater data from 2008 through the 2023 testing period indicates an increase in concentration of VC in MW-16, which is located downgradient from the source area. The mole fraction analysis of the Site-related CVOCs

at MW-16 reveals that although the amount of VC is currently increasing at MW-16, it is behaving directly inverse to the amount of cis-1,2-DCE at MW-16 (**Appendix H**). The presence of daughter products in MW-16 is an indication of the degradation of PCE and TCE and is consistent with previous observations. The presence of cis-1,2-DCE and VC has been detected since the beginning of the AS/SVE system operation in 2013, and the results are likewise consistent with the historical trend.

- An evaluation of MNA compounds and other chemical parameters of water quality (e.g., DO and ORP) indicate favorable anaerobic degradation conditions in wells with CVOCs. Upon complete degradation of the parent compound(s) remaining in monitoring wells at the Site, the daughter product(s) will degrade further as DO levels increase in the groundwater with the introduction of fresh water in the aquifer, thus creating oxidizing conditions.

- Based on the groundwater results and statistical evaluation, it has been determined that there has been no rebound in contamination levels following the shutdown of the AS/SVE system. The findings from the rebound study were detailed in the 2022 PRR/RSR, which received approval from NYSDEC on November 13, 2024. Consequently, the AS/SVE system will remain permanently offline.

3.2 Recommendations

The analytical results indicate that contaminant levels within the treatment area have stabilized and reached asymptotic levels. Following the recent approval of the 2022 PRR/RSR, the AS/SVE system will be permanently shut down.

This section outlines recommendations for decommissioning the AS/SVE system, transitioning to long-term monitoring, and evaluating alternative treatment technologies to address elevated contaminant levels at well MW-16. The detailed steps for implementing these recommendations are provided below:

- The SSDS operations will continue to effectively depressurize the slab within the building. Langan will continue monitoring the SSDS on a monthly basis.
- Langan proposes to mothball the AS/SVE system as explained below:
    - Disconnect the blower from the SVE lines.
    - Abandon the SVE lines-in-place to avoid disturbing the existing cap.
    - Remove the sparge equipment from the AS wells.
    - Retain the air sparge wells for potential future use.

- A Long Term Monitoring (LTM) program which comprises of periodic sampling will be instituted as described below:
    - Groundwater samples will be collected twice a year from seven monitoring wells (MW-10, MW-11S, MW-16 through MW-20).
    - Groundwater samples will be collected using permeable diffusion bags (PDB) and geochemical parameters will be recorded during sampling.
    - Groundwater samples will be analyzed for the following parameters:
        - VOCs by EPA Method 8260C; and
        - MNA parameters including: anions (chloride, sulfate, and nitrate via method 300.0), sulfide (method SM4500 S or F), TOC (method 9060), gases (methane, ethane, and ethene via method RFK175), total metals (As, Fe, and Mn via method 6010D) and dissolved metals (As, Fe, and Mn via method 6010D)
    - If the groundwater results remain consistent for the next two years, then the sampling frequency will be reduced to one year.
    - As directed by NYSDEC, LANGAN will sample all seven wells (MW-10, MW-11S, MW-16 through MW-20) annually and analyze the samples for PFOA and PFAS using EPA method 1633.
    - Soil Gas Samples will be collected twice a year from all eight (8) soil vapor gas sample points (SG-1 through SG-8) in the treatment area to evaluate soil vapor conditions. The soil gas samples will be analyzed for TO-15.
- After receiving approval on the reduced sampling frequency from the NYSDEC/DOH, the Site Management Plan (SMP) will be updated to implement a LTM at the Site.
- The vinyl chloride levels in well MW-16 are showing an increasing trend. As noted in previous sections, we believe this rise is primarily due to the ongoing degradation of CVOCs in the groundwater. However, in accordance with NYSDEC's request, Langan is evaluating a possible targeted strategy to effectively manage/mitigate these elevated concentrations. Langan targets to submit the potential strategy for NYSDECs approval end of Q1, 2025.

4.0 REFERENCES

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5.0 CERTIFICATION OF IC/ECS

I, Gerald Nicholls P.E., of Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C., am certifying as the Remedial Party's Designated Site Representative: I have been authorized and designated by all site owners/remedial parties to sign this certification for the site and certify that the following statements are true:

a) The institutional control and/or engineering control employed at the site is unchanged from the date the control was put in place, or last approved by DER;
b) Nothing has occurred that would impair the ability of such control to protect public health and the environment,
c) I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

New York State Professional Engineer #	Date	Signature
	12/30/2024	