BRIDGE CLEANERS
QUEENS COUNTY
LONG ISLAND CITY, NEW YORK

SITE MANAGEMENT PLAN

NYSDEC Site Number: 241127

Prepared for:

39-26 Property, LLC

39-26 30th Street

Long Island City, New York

Prepared by:

Carson Voci Engineering and Geology, D.P.C. *an affiliate of Terraphase Engineering Inc.*

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NOVEMBER 2021

Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date
1	12/31/2025	Post Site Redevelopment Revision	

CERTIFICATION STATEMENT

I, Nicholas Krasnecky, certify that I am currently a NYS registered professional engineer and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and Green Remediation (DER-31).

Nicholas Krasnecky, P.E.
NYS PE License No. 100006

TABLE OF CONTENTS

List of Tables

List of Figures

List of Appendices

List of Acronyms

Alenat	Alenat Properties, LLC
AS	Air Sparge
AWQS	Ambient Water Quality Standard
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
Bgs	Below grade surface
CAMP	Community Air Monitoring Plan
Carson Voci	Carson Voci Engineering and Geology, D.P.C.
CCR	Construction Completion Report
CFM	Cubic feet per minute
CFR	Code of Federal Regulation
CMWP	Corrective Measures Work Plan
COC	Certificate of Completion
CVOCs	chlorinated volatile organic compounds
CP	Commissioner Policy
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
EC	Engineering Control
ECL	Environmental Conservation Law
EECC	Environmental Engineering Compliance Control, D.P.C.
EPA	Environmental Protection Agency
EWP	Excavation Work Plan
HASP	Health and Safety Plan
IA	Indoor Air
IC	Institutional Control
inWC	Inches of water column
Integral	Integral Engineering, P.C.
IRM	Interim Remedial Measures
Lb/day	pounds per day
Mg/kg	milligram per kilogram
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules and Regulations
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
PCE	Tetrachloroethylene
P.E.	Professional Engineer
PID	Photoionization Detector
PRR	Periodic Review Report
Psi	Pounds per square inch
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan

RESR	Restricted Residential Use Criteria
RIR	Remedial Investigation Report
ROD	Record of Decision
RP	Remedial Party
RSO	Remedial System Optimization
SCO	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SOP	Standard Operating Procedures
SP	Soil vapor point
SSV	Sub-slab vapor
SVE	Soil Vapor Extraction
TCE	Trichloroethylene
TechSolutions	TechSolutions Engineering, P.C.
ug/m^3	micrograms per cubic meter
UNRES	Restricted Residential Use Criteria
USEPA	United States Environmental Protection Agency
VCP	Voluntary Cleanup Program
VM	Vacuum monitoring
VOC	Volatile Organic Compound
Zhong Chuang	Zhong Chuang Properties, LLC

EXECUTIVE SUMMARY

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan:

Site Identification: Bridge Cleaners
39-26 30th Street, Long Island City, NY
NYSDEC Site # 241127

Institutional Controls:	1. The property may be used for restricted residential use.
	2. The Site currently has an environmental easement in place, with the most recent version dated March 4, 2019, with an amendment dated April 3, 2023. This environmental easement outlines the following control elements utilized as ICs/ECs at the Site: • Groundwater Use Restriction • Cover System • Monitoring Plan • Site Management Plan (SMP) • O&M Plan • IC/EC Plan
	3. All ECs must be inspected at a frequency and in a manner defined in the SMP.

Engineering Controls:	1. Cover (or Cap)
Inspections:	Frequency
1. Site-wide inspection	Annually (and after severe conditions)
Maintenance:	
1. Repair of cover system	As needed
Monitoring:	
1. Groundwater sampling at GW-1R, GW-2R, GW-3R, GW-5R, and GW-6	Quarterly through the first quarter of 2026, then annually thereafter (every 5th quarter)
Reporting:	
1. Annual Inspection Report	Annually
2. Periodic Review Report	Annually

Further descriptions of the above requirements are provided in detail in the latter sections of this Site Management Plan.

1.0 INTRODUCTION

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the Bridge Cleaners Site, which is owned by 39-26 Property, LLC and currently operates as The Fifty LIC, an 11-story mixed-use residential building located at 39-26 30th Street, Long Island City, Queens, New York (hereinafter referred to as the "Site"). See Figures 1 and 2. The Site is currently in the New York State (NYS) Inactive Hazardous Waste Disposal Site (Superfund) Remedial Program Site No. 241127 which is administered by New York State Department of Environmental Conservation (NYSDEC). This SMP has been developed pursuant to an Order on Consent (CO2-2017-0509-174) with the New York State Department of Environmental Conservation (NYSDEC). NYSDEC is currently responding to any known off-site impacts in Operable Unit 2 (OU-2)

Carson Voci Engineering and Geology, D.P.C. (Carson Voci), an affiliate of Terraphase Engineering, Inc., has prepared this SMP on behalf of 39-26 Property, LLC (Owner) having been recorded on the Deed with Zhong Chuang Properties, LLC (Zhong Chuang) in December 2020. Zhong Chuang purchased the property from Alenat Properties, LLC (Alenat) in March 2012. In May 2013, Zhong Chuang entered into a Brownfield Cleanup Agreement (BCA) with the NYSDEC as a Volunteer to investigate and remediate the Site. On December 1, 2016, the BCA was terminated. On August 16, 2018, Alenat and Zhong Chuang executed an Order on Consent (Administrative Settlement # CO2-20170509-174) with NYSDEC.

An Interim Remedial Design Document written by Integral Engineering, P.C. (Integral), was approved by the NYSDEC on March 29, 2016. The air sparge (AS)/soil vapor extraction (SVE) remedial system was installed and began operation in March 2018. Following the installation and operation of the system, Integral issued Draft Construction Completion Report (CCR) dated December 2018, and a Memorandum *Successful Former Bridge Cleaners AS/SVE System Performance* dated July 19, 2019, detailing the system installation and operations. Correspondence between the NYSDEC and Integral resulted in the issuance of a *Dispute Resolution Decision*, dated November 4, 2019, which stipulates

modifications to the system were necessary to address continued groundwater contamination. Subsequently, Alenat retained Sustainable Development, Inc. (SDI) to provide project management of the system modification, and TechSolutions Engineering, P.C. (TechSolutions) to prepare the Supplemental Interim Remedial Measures Work Plan (IRM WP), dated July 2020. The Supplemental IRM WP was prepared in response to the New York State Department of Environmental Conservation (NYSDEC) email communication from Ms. Ruth Curley, *Subject: 241127 – Bridge Cleaners 2020 Activities, dated January 8, 2020*. Environmental Engineering Compliance Control, D.P.C. (EECC) oversaw the implementation of the Supplemental IRM WP and subsequently prepared a Construction Completion Report (CCR), dated August 2021.

The Record of Decision (ROD) (NYSDEC Division of Environmental Remediation 2022) required continued operation of the AS/SVE system and continued site monitoring of Institutional Controls (ICs) and Engineering Controls (ECs) at the Site in accordance with the SMP.

A Change of Use Work Plan (EECC 2021) was prepared for the demolition of the existing one-story structure and relocation of the AS/SVE system to facilitate redevelopment of the Site by the Owner. The AS/SVE system was shut down on December 8, 2021, to enable roof and interior demolition activities. Subsequent post-shut down sampling was conducted in January 2022, and the results were presented in the AS/SVE Remedial Progress Sampling Report (EECC 2022) submitted to the NYSDEC. The AS/SVE system was disconnected and removed in March 2022 in accordance with the Change of Use Work Plan. The Site environmental easement was amended as of April 3, 2023, to include Restricted Residential Use as described in 6 NYCRR § 375-1.8(g)(2)(ii) to the allowed property uses.

The Site was redeveloped to an 11-story residential building with a parking garage on the ground floor, which was completed in 2025. Subsurface redevelopment excavation activities were conducted in accordance with the Redevelopment Excavation Work Plan (EECC 2022) and completed in March 2023. The final completed component of the Redevelopment Excavation Work Plan was the reinstallation and development of the

groundwater monitoring well network at the Site to facilitate groundwater monitoring in accordance with the SMP. Implementation of the Redevelopment Excavation Work Plan is documented in the Construction Completion Report – Redevelopment Excavation (Carson Voci 2024).

As detailed in the Corrective Measures Report (Carson Voci 2025), following the April 2023 groundwater monitoring event which indicated a significant increase of tetrachloroethylene (PCE) and trichloroethylene (TCE) concentrations in GW-2R, corrective measures at the Site were conducted in accordance with the Corrective Measures Work Plan (CMWP; Carson Voci 2024). The corrective measures consisted of an in-situ chemical reduction and enhanced reductive dechlorination injection via direct-push technology application. The remedial injections implemented were proven effective at addressing the rebound of PCE concentrations at monitoring wells GW-2R and GW-5R through the 6-month post-injection monitoring and indicate the presence of conditions that continue to address potential additional rebound.

A figure showing the site location is provided as Figure 1 and the site boundaries and tax parcels are provided in Figure 2. The boundaries of the site are more fully described in the metes and bounds site description that is part of the Environmental Easement provided in Appendix 2.

After completion of the remedial work, some contamination may remain at this site, which is hereafter referred to as “remaining contamination”. ICs and ECs, including a cover/cap system have been incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC and recorded with the Queens County Clerk requires compliance with this SMP, and all ECs and ICs placed on the site.

This SMP was prepared to manage remaining contamination at the site until the Environmental Easement is extinguished in accordance with ECL Article 71, Title 36. This plan has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor’s successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion (COC);

- Failure to comply with this SMP is also a violation of Environmental Conservation Law, 6NYCRR Part 375 and the Order on Consent (Index # CO2-20170509-174; Site #241127) for the site, and thereby subject to applicable penalties.

All reports associated with the site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the site is provided in Table 1.3 and as Appendix 1 of this SMP.

This SMP was prepared in accordance with the requirements of the NYSDEC's DER- 10 ("Technical Guidance for Site Investigation and Remediation"), dated May 3, 2010, and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the site.

1.2 Revisions and Alterations

Revisions and alterations to this plan will be proposed in writing to the NYSDEC's project manager. The NYSDEC can also make changes to the SMP or request revisions from the remedial party. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shutdown of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the site conditions. All approved alterations must conform with Article 145 Section 7209 of the Education Law regarding the application of professional seals and alterations. For example, any changes to as-built drawings must be stamped by a New York State Professional Engineer. In accordance with the Environmental Easement for the site, the NYSDEC project manager will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.3 Notifications

Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

1. 60-day advance notice of any proposed changes in site use that are required under the terms of the Order on Consent dated August 6, 2018, 6NYCRR Part 375 and/or Environmental Conservation Law.

2. 7-day advance notice of any field activity associated with the remedial program.

3. 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan. If the ground-intrusive activity qualifies as a change of use as defined in 6 NYCRR Part 375, the above mentioned 60-day advance notice is also required.

4. Notice within 48-hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.

5. Notice within 48 hours of any non-routine maintenance activities.

6. Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

7. Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the site or the responsibility for implementing this SMP will include the following notifications:

8. At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the Order on Consent dated August 6, 2018, and all approved work plans and reports, including this SMP.

9. Within 15 days after the transfer of all or part of the site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC.

Table 1.3 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix 1.

Table 1.3: Notifications*

Name	Contact Information	Required Notification
Brittany Taranto, NYSDEC Project Manager	P: (518)-402-9791 E: brittany.taranto@dec.ny.gov	All Notifications
Douglas MacNeal, P.E., NYSDEC Supervisor	P: (518)-402-9662 E: douglas.macneal@dec.ny.gov	All Notifications
Kelly Lewandowski, NYSDEC Site Control	P: (518)-402-9569 E: Kelly.lewandowski@dec.ny.gov	Notifications 1 and 8
Johnathan Robinson, NYSDOH Project Manager	P: (518)-402-7881 E:johnathan.robinson@health.ny.gov	Notifications 4, 6, and 7

* Note: Notifications are subject to change and will be updated as necessary.
** Note: Numbers in this column reference the numbered bullets in the notification list in this section.

2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The site is located at 39-26 30th Street, Long Island City, Queens County, New York and is identified as Block 399 and Lot 31 on the New York City Department of Finance Tax Map (see Figure 2). The site is an approximately 0.17-acre area and is bounded by residential units to the north and west, a multi-story residential structure to the south, and 30th Street to the east (see Figure 2). The boundaries of the site are more fully described in Appendix 2–Environmental Easement. The owner and operator of the site parcel at the time of issuance of this SMP is 39-26 Property, LLC.

2.2 Physical Setting

2.2.1 Land Use

The Site consists of the following: an 11-story residential building with a parking garage on the ground floor. The Site is zoned as restricted residential and is currently operating as a residential apartment building.

The properties adjoining the Site, and in the neighborhood surrounding the Site, primarily include commercial and residential properties, restaurants, hotels, and convenience stores/bodegas. Adjacent buildings to the north and west appear to contain residential units. To the south is a newly constructed multi-story residential building. To the east is 30th Street.

2.2.2 Geology

Soils at the site generally consist of brown fine to medium grained sand with some silt. According to the June 2014 Remedial Investigation Report (RIR) prepared by TechSolutions[1], geology in the vicinity of the Site is characterized as:

At the regional level, the subsurface geological units of Queens County consist of sequences of unconsolidated sediments of Late Cretaceous and Pleistocene pre-Sangamon and Sangamon ages. The unconsolidated sediments are underlain by crystalline bedrock of Precambrian age and overlain mostly by glacial upper Pleistocene deposits of Wisconian age but also to a lesser extent by Holocene deposits (Soren, USGS, 1978). From grade to bedrock, the primary geologic units in the region are artificial fill / surficial deposits, upper Pleistocene deposits, Gardiners Clay (where present), Jameco Gravel (not be present in the vicinity of the Site), Monmouth Group and Magothy Formation, and the Raritan Formation.

Natural surficial glacial deposits in Queens County consist mostly of ground moraine in the northern part of Queens County near the Site and outwash in the southern portions of the county. However, artificial fill has been used in many places to extend and reinforce shorelines and to fill swampy areas in preparation for development. The surficial deposits are underlain by the upper Pleistocene deposits which range in thickness from 0 to 300 feet and are primarily composed of glacial drift material such as till, lacustrine deposits and outwash sand and gravel (Soren, USGS, 1978). Regionally, the upper Pleistocene deposits are unconformably underlain by the Gardiners Clay which is located in primarily the central and southern parts of Queens County. The Gardiners Clay consists of mostly grayish green and less commonly dark gray clay intercalated with sand and gravelly beds. The thickness

[1] This RIR was rejected by the NYSDEC in a letter dated September 10, 2014, though it has been referenced in this SMP.

of the Gardiners Clay varies widely and is absent in some sections of Queens County (i.e., Glendale, Woodhaven, Ozone Park areas) but generally ranges to a maximum of 150 feet thick. Importantly, the Gardiners Clay serves to confine water in the underlying Jameco Gravel regionally where present and Magothy-Matawan Formation (Soren, USGS, 1978) in much of the region.

The Jameco Gravel is believed to have been deposited by streams in Queens County and unconformable underlies the Gardiners Clay where present. The Jameco deposits are mostly coarse sand and granule to cobble gravel with boulders having been reported by some drillers. The thickness of the Jameco Gravel ranges from 0 to 250 feet regionally; however, it is generally absent in the vicinity of the Site which is located north of the most-widely accepted extent of the Jameco Gravel.

Underlying the Jameco Gravel (where present) is the Monmouth Group and the Magothy- Matawan Formation which ranges from 0 to 450 feet thick in Queens County. Magothy- Matawan strata may be missing in northern and northwestern Queens County and is typically present between 0 and 200 feet in thickness near the Site. The Raritan Formation underlies the Magothy-Matawan formation where present and consists of a clay and sand member. Bedrock is typically not encountered to a depth of between 100 and 200 feet in the vicinity of the Site (TechSolutions 2014).

Soils underlying the Subject Property cover to the top of the water table (approximately 20 feet below ground surface [bgs]) are generally a mixture of light to medium brown sands with some gravel and silty sands, with clays only noted sporadically (TechSolutions 2014). A geologic cross section is shown in Figure 3. Site specific boring logs are provided in Appendix 4.

2.2.3 Hydrogeology

Groundwater has been encountered between 18 and 20 feet below ground surface (bgs). The groundwater flow direction is in the southwesterly direction. A groundwater contour map is shown in Figure 4. Groundwater elevation data is provided in Table 2.2.3 below. Groundwater monitoring well construction logs are provided in Appendix 4.

Table 2.2.3 Groundwater Elevation Measurements

Monitoring Well	Well Construction Details				Elevations (feet AMSL)		Dec. 17, 2024		Mar. 4, 2025	
	Total Depth (feet)	Screened Interval (feet)			Inner Casing	Ground Surface	Depth to Water (feet bgs)	Groundwater Elev. (feet AMSL)	Depth to Water (feet bgs)	Groundwater Elev. (feet AMSL)
GW-1R	29.40	16.67	-	1.67	31.07	31.24	21.08	9.99	21.18	9.89
GW-2R	29.03	16.66	-	1.66	30.69	30.98	20.73	9.96	20.76	9.93
GW-3R	30.12	15.76	-	0.76	30.88	31.18	20.87	10.01	20.93	9.95
GW-5R	30.07	14.88	-	-0.12	29.95	30.40	19.93	10.02	20.04	9.91
GW-6	28.66	16.89	-	1.89	30.55	30.79	20.51	10.04	20.51	10.04

Monitoring Well	June 26, 2025		September 29, 2025	
	Depth to Water (feet bgs)	Groundwater Elev. (feet AMSL)	Depth to Water (feet bgs)	Groundwater Elev. (feet AMSL)
GW-1R	21.3	9.77	21.54	9.53
GW-2R	20.9	9.79	21.2	9.49
GW-3R	21.04	9.84	21.29	9.59
GW-5R	20.18	9.77	20.43	9.52
GW-6	20.7	9.85	20.94	9.61

Notes:
bgs = below ground surface
AMSL = Above Mean Sea Level

According to the RIR, the regional aquifer system in the general vicinity of the Site includes the following system from shallow to deep: the upper glacial aquifer which is underlain by the Magothy Aquifer. The Raritan clay unit then separates the Magothy Aquifer from the underlying Lloyd Aquifer which overlies bedrock (TechSolutions, 2014).

2.3 Investigation and Remedial History

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8.0 - References.

The Site was previously occupied by a commercial laundry and dry cleaner, Bridge Cleaners, between 1997 until about 2011. Remedial investigations (RIs) were performed at the Site between September 2011 and February 2014 and a Remedial Investigation Report (RIR) was prepared by TechSolutions in 2014 summarizing the results of the investigations. The results of the RIs indicated the presence of dry-cleaning related compounds PCE and TCE in groundwater, soil, and soil vapor samples collected within, and nearby, the Site.

Groundwater concentrations of PCE and TCE ranged from 10 – 340 micrograms per liter (µg/L) and 0.59 – 14 µg/L respectively. More specifically, PCE concentrations in groundwater below the site ranged from 44 to 340 ug/L, exceeding the NYSDEC GA

Groundwater Quality Standards of 5 ug/L, and were a potential source of soil vapor PCE concentrations.

Soil vapor PCE concentrations ranged from 21,400 – 668,000 micrograms per cubic meter of air (µg/m^3), and TCE concentrations ranged from 53.1 – 3,750 µg/m^3. These values exceeded the New York State Department of Health (NYSDOH) decision matrix concentrations that indicate mitigation is recommended to minimize current or potential exposures associated with soil vapor intrusion (NYSDOH 2017).

PCE and TCE were identified in soil samples collected from 2011-2014 at the Site but did not exceed NYSDEC Unrestricted Soil Cleanup Objectives (SCOs). An additional soil investigation conducted by Integral in December 2014 identified concentrations of PCE above the Unrestricted SCO, but below the Industrial SCO, in four soil samples collected from beneath the northern corner of the building. Pursuant to a NYSDEC-approved Remedial Investigation Proposal dated November 11, 2014, a total of five soil samples, inclusive of one duplicate, were collected for VOC analysis during the installation of two soil borings (SB-6 and SB-7). PCE was the only analyte detected and was identified above the Unrestricted SCO and the Protection of Groundwater SCO, both 1.3 mg/kg, but below the Industrial SCO of 300 mg/kg. The maximum observed concentration of PCE was 9.6 mg/kg, collected from soils 0 – 4 feet below ground surface. Integral's Data Evaluation Report, dated July 1, 2015, presented the results from this investigation. Further supplemental investigation work was limited due to access issues resulting from the large amounts of material stored in the building.

Subsequent to the completion of site investigation activities, a pilot test was completed in November 2015 to evaluate the efficacy of an AS/SVE system and to identify parameters for a remediation system. Based on the results of the pilot test, Integral prepared and submitted an Interim Remedial Design Document (Design Document), dated March 29, 2016. The Design Document consisted of an AS/SVE system to remediate soil, groundwater, and soil vapor impacts, and to mitigate vapor intrusion in the onsite building. It was approved by NYSDEC in May 2016, the AS/SVE system was subsequently installed in January 2018 and began continuous operation in March 2018. In accordance with the Consent Order dated August 2018, Integral submitted a draft CCR in September 2018 to

document the installation and start-up of the AS/SVE remediation system. Upon review, NYSDEC requested monitoring data to show the effectiveness of the installed AS/SVE remediation system. Monitoring data collected in November 2018 and May 2019 indicated the AS/SVE system had reduced groundwater PCE concentrations in four of the five groundwater monitoring wells, with the exception being GW-2. NYSDEC then requested modifications to the AS/SVE system to address GW-2. The parties went to Dispute Resolution, which resulted in the determination in November 2019 that system modifications were necessary.

On January 8, 2020, NYSDEC requested preparation of a Supplemental IRM Work Plan (WP) to address the dispute resolution decision. TechSolutions, prepared the Supplemental IRM WP, approved by NYSDEC on July 23, 2020. The Supplemental IRM WP detailed the addition of two air sparge points onto the existing AS/SVE system, which was completed and began operation in September 2020. Environmental Engineering Compliance Control, D.P.C. (EECC) oversaw the implementation of the Supplemental IRM WP and subsequently prepared a CCR, dated August 2021.

The ROD required continued operation of the AS/SVE system and continued site monitoring as ECs at the Site in accordance with the SMP.

A Change of Use Work Plan (EECC 2021) was prepared for the demolition of the existing one-story structure and relocation of the AS/SVE system to facilitate redevelopment of the Site by the Owner. The AS/SVE system was shut down on December 8, 2021, to enable roof and interior demolition activities. Subsequent post-shut down sampling was conducted in January 2022, and the results were presented in the AS/SVE Remedial Progress Sampling Report (EECC 2022) submitted to the NYSDEC. Soil vapor results indicated remaining concentrations of chlorinated volatile organic compounds (CVOCs) including tetrachloroethene (PCE), which was detected at concentrations ranging from 23.3 micrograms per cubic meter (ug/m^3) to 685 ug/m^3, and trichloroethene (TCE), which was detected at concentrations ranging from non-detect to 10.7 ug/m^3. The AS/SVE Remedial Progress Sampling Report determined that concentration trends showed a significant decrease in PCE, TCE, and daughter products from the analytical results

presented in the 2014 Remedial Investigation Report (TechSolutions, P.C.). The AS/SVE system was disconnected and removed in March 2022 in accordance with the Change of Use Work Plan.

A limited soil investigation was conducted prior to the proposed redevelopment activities in accordance with the 2022 Limited Soil Investigation Work Plan (EECC 2022). Nine soil borings were advanced at the Site to further delineate onsite soils in accordance with the ROD and collect samples for waste characterization and a contained-in determination of the soils to be excavated for redevelopment. All VOC concentrations in the delineation soil samples collected were below 6 NYCRR 375 Restricted Residential Use Criteria (RESR). The analytical results of the waste characterization sampling were submitted as part of a "Contained-In" Determination request to the Bureau of Hazardous Waste and Radiation Management and approved for management as non-hazardous soil in accordance with all applicable regulations. The Site environmental easement was amended as of April 3, 2023, to include Restricted Residential Use as described in 6 NYCRR § 375-1.8(g)(2)(ii) to the allowed property uses.

The Site was redeveloped to an 11-story residential building with a parking garage on the ground floor, which was completed in 2025. Subsurface redevelopment excavation activities were conducted in accordance with the Redevelopment Excavation Work Plan (EECC 2022) and completed in March 2023. During excavation activities, nine post-excavation soil samples were collected from the base of the excavation. Analytical results indicated no exceedances of 6 NYCRR 375 Unrestricted Use (UNRES). The final completed component of the Redevelopment Excavation Work Plan was the reinstallation and development of the groundwater monitoring well network at the Site to facilitate groundwater monitoring in accordance with the SMP. Implementation of the Redevelopment Excavation Work Plan is documented in the Construction Completion Report – Redevelopment Excavation (Carson Voci 2024).

As detailed in the Corrective Measures Report (Carson Voci 2025), following the April 2023 groundwater monitoring event which indicated a significant increase of PCE and TCE concentrations in GW-2R, corrective measures at the Site were conducted in

accordance with the NYSDEC-approved CMWP. The corrective measures consisted of an in-situ chemical reduction and enhanced reductive dechlorination injection via direct-push technology application. The remedial injections implemented were proven effective at addressing the rebound of PCE concentrations at monitoring wells GW-2R and GW-5R through the 6-month post-injection monitoring and indicate the presence of conditions that continue to address potential additional rebound.

2.4 Remedial Action Objectives

The primary objective of the remedy is to protect human health by addressing source material under the slab, treating the impacted groundwater, mitigating the risk of sub-slab soil vapor intrusion into the Site building, and preventing off-site migration of soil vapor. The results of previous Site investigations have shown elevated PCE and TCE concentrations in groundwater and soil vapor samples. Following redevelopment activities, post-excavation soil sampling results reported TCE and PCE in soil below the Unrestricted SCOs.

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

2.5 Remaining Contamination

Contaminated soil, soil vapor, and groundwater may remain at the Site. As presented in the above sections, the primary objective of the remedy is to address source material under the slab, treat the contaminated groundwater, mitigate on-site soil vapor intrusion, and prevent off-site migration of soil vapor. A summary of the remaining contamination in each media is presented in the following sections.

2.5.1 Groundwater

PCE and associated daughter products remain in the Site groundwater slightly above the corresponding Ambient Water Quality Standards (AWQS) following the remedial injection, as displayed in Table 2.5.1 and Figure 5. PCE was detected at concentrations ranging from low-levels to 21 ug/L, and the concentrations of PCE daughter products at MW-2R indicate continued reductive dechlorination (i.e., from cis-1,2-dichloroethene to vinyl chloride and to non-toxic end products, ethene and ethane) and the continued effectiveness of the remedial injection.

Table 2.5.1 Remaining Groundwater Analytical Results

SAMPLE ID:		GW-1R														GW-2R											
LAB ID:		L2474700-05				L2512370-03				L2540557-01				L2561445-04			L2474700-02				L2512370-05				L2540557-02				L2561445-05		
COLLECTION DATE:		12/17/2024				3/4/2025				6/26/2025				9/29/2025			12/17/2024				3/4/2025				6/26/2025				9/29/2025		
SAMPLER:		Carson Voci				Carson Voci				Carson Voci				Carson Voci			Carson Voci				Carson Voci				Carson Voci				Carson Voci		
SAMPLE MATRIX:		Water				Water				Water				Water			WATER				WATER				WATER				WATER		
VOLATILE ORGANICS BY GC/MS																															
ANALYTE	NY-AWQS																														
	ug/L	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL
Chloroform	7	ND		2.5	0.7	ND		2.5	0.7	0.97	J	2.5	0.7	1.2	J	2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7
Tetrachloroethene	5	15		0.5	0.18	21		0.5	0.18	18		0.5	0.18	15		0.5	0.18	ND		0.5	0.18	0.34	J	0.5	0.18	0.24	J	0.5	0.18	ND		0.5	0.18
Vinyl chloride	2	ND		1	0.07	ND		1	0.07	ND		1	0.07	ND		1	0.07	1.3		1	0.07	9.3		1	0.07	2.8		1	0.07	1.3		1	0.07
trans-1,2-Dichloroethene	5	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7
Trichloroethene	5	0.57		0.5	0.18	0.7		0.5	0.18	0.62		0.5	0.18	0.65		0.5	0.18	ND		0.5	0.18	ND		0.5	0.18	ND		0.5	0.18	ND		0.5	0.18
cis-1,2-Dichloroethene	5	ND		2.5	0.7	1.3	J	2.5	0.7	0.95	J	2.5	0.7	1.1	J	2.5	0.7	66		2.5	0.7	47		2.5	0.7	18		2.5	0.7	7.5		2.5	0.7
1,2-Dichloroethene, Total	--	ND		2.5	0.7	1.3	J	2.5	0.7	0.95	J	2.5	0.7	1.1	J	2.5	0.7	66		2.5	0.7	47		2.5	0.7	18		2.5	0.7	7.5		2.5	0.7

SAMPLE ID:		GW-3R												GW-5R											
LAB ID:		L2474700-04				L2512370-04				L2561445-03				L2474700-06				L2512370-02				L2540557-04				L2561445-01			
COLLECTION DATE:		12/17/2024				3/4/2025				9/29/2025				12/17/2024				45720				45834				45929			
SAMPLER:		Carson Voci				Carson Voci				Carson Voci				Carson Voci				Carson Voci				Carson Voci				Carson Voci			
SAMPLE MATRIX:		WATER				WATER				WATER				Water				WATER				Water				WATER			
VOLATILE ORGANICS BY GC/MS																													
ANALYTE	NY-AWQS																												
	ug/L	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL
Chloroform	7	ND		2.5	0.7	1	J	2.5	0.7	0.94	J	2.5	0.7	0.95	J	2.5	0.7	1.3	J	2.5	0.7	1.2	J	2.5	0.7	1.3	J	2.5	0.7
Tetrachloroethene	5	11		0.5	0.18	18		0.5	0.18	12		0.5	0.18	14		0.5	0.18	11		0.5	0.18	8.3		0.5	0.18	8.6		0.5	0.18
Vinyl chloride	2	ND		1	0.07	ND		1	0.07	ND		1	0.07	ND		1	0.07	ND		1	0.07	ND		1	0.07	ND		1	0.07
trans-1,2-Dichloroethene	5	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		0.5	0.7	ND		0.5	0.7	ND		0.5	0.7
Trichloroethene	5	0.56		0.5	0.18	0.86		0.5	0.18	0.66		0.5	0.18	0.4	J	0.5	0.18	0.43	J	0.5	0.18	0.31	J	0.5	0.18	0.34	J	0.5	0.18
cis-1,2-Dichloroethene	5	1.6	J	2.5	0.7	3		2.5	0.7	2	J	2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7
1,2-Dichloroethene, Total	--	1.6	J	2.5	0.7	3		2.5	0.7	2	J	2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7

SAMPLE ID:		GW-6											
LAB ID:		L2474700-01				L2512370-1				L2540557-05				L2561445-02			
COLLECTION DATE:		12/17/2024				3/4/2025				6/26/2025				9/29/2025			
SAMPLER:		Carson Voci				Carson Voci				Carson Voci				Carson Voci			
SAMPLE MATRIX:		Water				WATER				Water				WATER			
VOLATILE ORGANICS BY GC/MS																	
ANALYTE	NY-AWQS																
	ug/L	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL	Conc	Q	RL	MDL
Chloroform	7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7
Tetrachloroethene	5	7.6		0.5	0.18	9.6		0.5	0.18	10		0.5	0.18	8.8		0.5	0.18
Vinyl chloride	2	ND		1	0.07	ND		1	0.07	ND		1	0.07	ND		1	0.07
trans-1,2-Dichloroethene	5	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7
Trichloroethene	5	0.4	J	0.5	0.18	0.41	J	0.5	0.18	0.4	J	0.5	0.18	0.49	J	0.5	0.18
cis-1,2-Dichloroethene	5	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7
1,2-Dichloroethene, Total	--	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7	ND		2.5	0.7

Notes
Table only includes contaminants of potential concern
NY-AWQS: NY - New York TOGS 1.1.1 Ambient
ug/l = Micrograms per liter
Conc = concentration in ug/L
Q = qualifier
RL = Reporting Limit
MDL = Method Detection Limit
ND = Non-detect
J = Estimated value
-- = Not sampled
Bold Highlighted = Exceeds AWQS
Bold Grey = Detection below AWQS

2.5.2 Soil

There is no known remaining soil contamination above unrestricted use criteria as documented by the limited soil investigation and post excavation sample results from soils not removed from the Site, displayed in Table 2.5.2 and Figure 6. It is anticipated that the soil vapor extraction remedial activities, coupled with comprehensive delineation have remediated and/or investigated all onsite soils, yet the potential for residual contamination below the cover system remains.

Table 2.5.2 Remaining Soil Analytical Results

LOCATION			SB-9	SB-10		SB-12		SB-15	SB-16	PX-NE
SAMPLING DATE			4/5/2022	4/5/2022		4/5/2022		4/5/2022	4/5/2022	2/2/2023
SAMPLING DEPTH (FT BELOW GRADE)			7-7.5	7-7.5	15-15.5	7-8	15-15.5	12-13	7-7.5	5.0-5.5
Volatiles BY 8260D (mg/kg)										
ANALYTE	NY-UNRES	NY-RESR	Results							
Tetrachloroethene	1.3	5.5	ND	0.0008 J	0.00092 J	0.00077 J	ND	ND	ND	0.011 U
Trichloroethene	0.47	10	ND	ND	ND	ND	ND	ND	ND	0.00067 U
1,2-Dichloroethene, Total	NA	NA	ND	ND	ND	ND	ND	ND	ND	0.0013 U
Vinyl chloride	0.02	0.21	ND	ND	ND	ND	ND	ND	ND	0.0013 U

LOCATION			PX-SE	PX-S	PX-SW	PX-E	PX-N	PX-C	PX-NW	PX-W
SAMPLING DATE			2/8/2023	2/8/2023	2/8/2023	2/15/2023	3/14/2023	3/14/2023	3/15/2023	3/15/2023
SAMPLING DEPTH (FT BELOW GRADE)			12.0-12.5	12.0-12.5	12.0-12.5	5.0-5.5	5.0-5.5	5.0-5.5	5.0-5.5	5.0-5.5
Volatiles BY 8260D (mg/kg)										
ANALYTE	NY-UNRES	NY-RESR	Results							
Tetrachloroethene	1.3	5.5	0.00072 U	0.0012 U	0.00068 U	0.00093	0.0012	0.0028	0.0078	0.021
Trichloroethene	0.47	10	0.00072 U	0.0012 U	0.00068 U	0.00078 U	0.0005 U	0.0005 U	0.00068 U	0.00053 U
1,2-Dichloroethene, Total	NA	NA	0.0014 U	0.0024 U	0.0014 U	0.0016 U	0.001 U	0.00099 U	0.0014 U	0.001 U
Vinyl chloride	0.02	0.21	0.0014 U	0.0024 U	0.0014 U	0.0016 U	0.001 U	0.00099 U	0.0014 U	0.001 U

Notes
All results reported in milligrams per kilogram (mg/kg)
NY-UNRES: 6 NYCRR 375 Unrestricted Use Criteria
NY-RESR: 6 NYCRR 375 Restricted Residential Use Criteria
J = Estimated Value
U = Non-Detect at the associated numerical value (reporting limit)

2.5.3 Soil Vapor

Upon discontinuation of the AS/SVE system and prior to the demolition of the former slab and redevelopment excavation, low levels of CVOCs in soil vapor remained, as summarized in Table 2.5.3 and Figure 7. The soil vapor sampling results exhibited a significant reduction in concentration of CVOCs, of up to 3 orders of magnitude, indicating the AS/SVE was effective at an overall reduction of contaminant mass in the subsurface leading to elevated soil vapor concentrations.

Table 2.5.3 Post-System Shutdown Soil Vapor Analytical Results (Collected prior to redevelopment excavation and installation of new cover system)

SAMPLE ID:	SP-1		SP-2		SP-3		SP-4		SP-5		SP-7		SP-8	
COLLECTION DATE:	1/11/2022		1/11/2022		1/11/2022		1/11/2022		1/11/2022		1/11/2022		1/11/2022	
SAMPLE MATRIX:	SOIL VAPOR		SOIL VAPOR		SOIL VAPOR		SOIL VAPOR		SOIL VAPOR		SOIL VAPOR		SOIL VAPOR	
VOLATILE ORGANICS IN AIR	Conc	RL	Conc	RL	Conc	RL	Conc	RL	Conc	RL	Conc	RL	Conc	RL
cis-1,2-Dichloroethene	ND	0.08	ND	0.08	ND	0.08	ND	0.08	ND	0.9	ND	0.79	1.08	0.79
Trichloroethene	3.13	1.07	3.56	1.07	ND	1.07	3.03	1.22	8.81	1.07	10.7	1.07	7.9	1.58
Tetrachloroethene	23.3	1.36	79.3	1.36	71.9	1.36	412	1.54	41.6	1.36	186	1.36	685	1.99
Vinyl chloride	ND	0.51	ND	0.51	ND	0.51	ND	0.58	ND	0.51	ND	0.51	ND	0.75
trans-1,2-Dichloroethene	ND	0.79	ND	0.79	ND	0.79	ND	0.79	1.98	0.9	1.61	0.79	1.7	0.79
Isopropanol	2.12	1.23	1.99	1.23	1.84	1.23	1.89	1.23	ND	1.4	ND	1.23	ND	1.23

Notes:
All results reported in micrograms per cubic meter (ug/m^3)
Conc: Concentration
RL: Reporting Limit
ND - Non Detect at the corresponding RL

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Since remaining contamination exists at the site, Institutional Controls (ICs) and Engineering Controls (ECs) are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all IC/ECs at the site. The IC/EC Plan is one component of the SMP and is subject to revision by the NYSDEC project manager.

This plan provides:

- A description of all IC/ECs on the site;
- The basic implementation and intended role of each IC/EC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the Excavation Work Plan (EWP) (as provided in Appendix 3) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the site; and
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the site remedy, as determined by the NYSDEC.

3.2 Institutional Controls

A series of ICs is required by the Environmental Easement to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination; and, (3) limit the use and development of the site to restricted residential, commercial, and industrial uses only. Adherence to these ICs on the site is required by the Environmental Easement and will be implemented under this SMP. ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are shown on Figure 2.

The property may be used for:

- The property may be used for: Restricted Residential use as described in 6 NYCRR Part 375-1.8(g)(2)(ii), commercial use as described in 6 NYCRR Part 375-1.8(g)(2)(iii), and for Industrial use as described in 6 NYCRR Part 375-l.8(g)(2)(iv).

- All ECs must be operated and maintained as specified in this SMP;

- All ECs must be inspected at a frequency and in a manner defined in the SMP.

- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health and Mental Hygiene to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.

- Groundwater and other environmental or public health monitoring must be performed as defined in this SMP;

- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP;

- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP;

- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP;

- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP;

- Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement;

- The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries noted on Figure 2, and any potential impacts that are identified must be monitored or mitigated; and;

- Vegetable gardens and farming on the site are prohibited.

3.3 Engineering Controls

3.3.1 Cover (or Cap)

Exposure to remaining contamination at the site is prevented by a cover system placed over the site. This cover system is comprised of a minimum of 6 inches of concrete building slab, up to 18 inches of clean soil, and a minimum 24-inch thick concrete mat foundation. Figure 8 presents the location of the cover system and applicable demarcation layers. The Excavation Work Plan (EWP) provided in Appendix 3 outlines the procedures required to be implemented in the event the cover system is breached, penetrated, or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection of this cover are provided in the Monitoring and Sampling Plan included in Section 4.0 of this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and associated Community Air Monitoring Plan (CAMP) prepared for the site and provided in Appendix 5 and 6, respectively. Any breach of the site's cover system shall be overseen by a Professional Engineer (PE) who is licensed and registered in New York State or a qualified person who directly reports to a PE who is licensed and registered in New York State.

3.3.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10. Unless waived by the NYSDEC, confirmation samples of applicable environmental media are required before terminating any remedial actions at the site. Confirmation samples require Category B deliverables and a Data Usability Summary Report (DUSR).

As discussed below, the NYSDEC may approve termination of a groundwater monitoring program. When a remedial party receives this approval, the remedial party will decommission all site-related monitoring, injection and recovery wells as per the NYSDEC CP-43 policy.

The remedial party will also conduct any needed site restoration activities, such as concrete slab patching.

3.3.2.1 Cover (or Cap)

The composite cover system is a permanent control, and the quality and integrity of this system will be inspected at defined, regular intervals in accordance with this SMP in perpetuity. If the inspection indicates that the site cover is damaged or compromised, actions to repair the cover will be conducted with consultation and approval from NYSDEC and NYSDOH.

3.3.2.2 Monitoring Wells associated with Monitored Natural Attenuation

Groundwater monitoring activities to assess natural attenuation will continue, as determined by the NYSDEC project manager in consultation with NYSDOH project manager, until residual groundwater concentrations are found to be consistently below ambient water quality standards, the site SCGs, or have become asymptotic at an acceptable level over an extended period. In the event that monitoring data indicates that monitoring for natural attenuation may no longer be required, a proposal to discontinue the monitoring will be submitted by the remedial party. Monitoring will continue until permission to discontinue is granted in writing by the NYSDEC project manager. If groundwater contaminant levels become asymptotic at a level that is not acceptable to the NYSDEC, additional source removal, treatment and/or control measures will be evaluated.

4.0 MONITORING AND SAMPLING PLAN

4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with the approval of the NYSDEC.

This Monitoring and Sampling Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (e.g., groundwater);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance (SCGs), particularly groundwater standards; and

- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment.

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol and frequency;
- Information on all designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7.0 of this SMP.

4.2 Site – wide Inspection

Site-wide inspections will be performed at a minimum of once per year. These periodic inspections must be conducted when the ground surface is visible (i.e. no snow cover). Site-wide inspections will be performed by a qualified environmental professional as defined in 6 NYCRR Part 375, a Professional Engineer (PE) who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State. Modification to the frequency or duration of the inspections will require approval from the NYSDEC project manager. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. During these inspections, an inspection form will be completed as provided in Appendix 7 – Site Management Forms. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General site conditions at the time of the inspection;

- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that site records are up to date.

Inspections of all remedial components installed at the site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria; and
- If site records are complete and up to date.

Reporting requirements are outlined in Section 7.0 of this plan.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the site, verbal notice to the NYSDEC project manager must be given by noon of the following day. In addition, an inspection of the site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the site by a qualified environmental professional, as defined in 6 NYCCR Part 375. Written confirmation must be provided to the NYSDEC project manager within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public. The remedial party will submit follow-up status reports to the NYSDEC within 45 days of the event on actions taken to respond to any emergency event requiring ongoing responsive action, describing and documenting actions taken to restore the effectiveness of the ECs.

4.3 Treatment System Monitoring and Sampling

4.3.1 Remedial System Monitoring

Monitoring of the cover system will be performed on a routine basis, as identified in Table 4.3.1 Remedial System Monitoring Requirements and Schedule (see below). The monitoring of remedial systems must be conducted by a qualified environmental professional as defined in 6 NYCRR Part 375, a Professional Engineer (PE) who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager. A visual inspection of the complete system will be conducted during each monitoring event. Unscheduled inspections and/or sampling may take place when a suspected failure of the cover system has been reported or an emergency occurs that is deemed likely to affect the operation of the system. Cover system components to be monitored include, but are not limited to, the components included in Table 4.3.1 below.

Table 4.3.1 – Remedial System Monitoring Requirements and Schedule

Remedial System Components	Monitoring Parameters	Performance Criteria (As Designed)	Typical Operating Point / Range	Monitoring Schedule
Site Cover System	Visual Inspection	Not Applicable	Not Applicable	Annually
Site-Wide Inspection	See Section 4.2	Not Applicable	Not Applicable	Annually

A complete list of components to be inspected is provided in the Inspection Checklist, provided in Appendix 7 - Site Management Forms.

4.3.1.1 General Cover Inspection

An inspection of the cover component will be performed at a minimum of once annually and will include:

- The location and size of new cracks or protrusions through the slab, if any;
- The condition of previously sealed void spaces in concrete; and
- Any modifications or adjustments made to the cover from the previous inspection

Monitoring event findings will be documented within a Site Management Form (Appendix 7).

4.4 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from the groundwater on a routine basis. Sampling locations, required analytical parameters, and schedule are provided in Table 4.4 – Media Sampling Requirements and Schedule below. Modification to the frequency or sampling requirements will require approval from the NYSDEC project manager.

Table 4.4 –Media Sampling Requirements and Schedule

Sampling Location	**Analytical Parameters:** VOCs (EPA Method 8260C)	**Schedule**
GW-1R, GW-2R, GW-3R, GW-5R, and GW-6	X	Quarterly through the first quarter of 2026, then annually thereafter (every 5th quarter)

Detailed sample collection and analytical procedures and protocols are provided in Appendix 8 – Quality Assurance Project Plan and Appendix 9 – Field Activities Plan.

4.4.1 Groundwater Sampling

Groundwater monitoring will be performed quarterly through the first quarter of 2026 to continue to assess the performance of the Corrective Measures and then annually (every 5 quarters) thereafter to account for seasonal fluctuations to assess the performance of the remedy. Modification to the frequency or sampling requirements will require approval from the NYSDEC.

Monitoring well construction details are provided in Table 4.4.1 below. Monitoring well construction logs are included in Appendix 4 and locations are provided in Figure 4.

Groundwater analytical samples are to be collected from groundwater wells GW-1R, GW-2R, GW-3R, GW-5R, and GW-6 utilizing low-flow sampling techniques as detailed in the USEPA Standard Operating Procedure[2] (SOP) with dedicated Teflon™-lined tubing for each well. For quality assurance/quality control (QA/QC) purposes, a field blank, trip blank, and blind duplicate will be collected and analyzed for VOCs using EPA

[2] The low flow sampling techniques used during the sample collection can be accessed at: https://www.epa.gov/quality/low-stress-low-flow-purging-and-sampling-procedure-collection-groundwater-samples-monitoring

Method 8260C. The samples will be analyzed by a New York State-accredited laboratory and results will be issued as Category B deliverables. Groundwater data will be independently validated by a third-party data validator in accordance with the DER-10 guidance. Electronic data deliverables (EDDs) will be submitted to NYSDEC in the EQuIS™ database.[3]

Table 4.4.1 – Monitoring Well Construction Details

Monitoring Well ID	Coordinates (longitude/ latitude)	Well Diameter (inches)	Elevation (above mean sea level)			
			Casing	Surface	Screen Top	Screen Bottom
GW-1R	40.752573° N, 73.934736° W	2	31.07	31.24	16.67	1.67
GW-2R	40.752471 ° N, 73.934647° W	2	30.69	30.98	16.66	1.66
GW-3R	40.752622° N, 73.934634° W	2	30.88	31.18	15.76	0.76
GW-5R	40.752469° N, 73.934557° W	2	29.95	30.40	14.88	-0.12
GW-6	40.752534° N, 73.934557° W	2	30.55	30.79	16.89	1.89

Monitoring well construction logs are included in Appendix 4 of this document.

If biofouling or silt accumulation occurs in the on-site and/or off-site monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced if an event renders the wells unusable. Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent Periodic Review Report. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC. Well abandonment will be performed in accordance with NYSDEC's guidance entitled "CP-43: Groundwater Monitoring Well Decommissioning Procedures."

[3] Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html.

Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC.

The sampling frequency may only be modified with the approval of the NYSDEC project manager. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC project manager.

Deliverables for the groundwater monitoring program are specified in Section 7.0 – Reporting Requirements.

4.4.2 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in Appendix 7 – Site Management Forms. Other observations (e.g., groundwater monitoring well integrity, etc.) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the site-specific Field Activities Plan provided as Appendix 9 of this document.

5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

The site remedy does not rely on any mechanical systems, such as groundwater treatment systems, sub-slab depressurization systems or air sparge/soil vapor extraction systems to protect public health and the environment. Therefore, the operation and maintenance of such components is not included in this SMP.

6.0 PERIODIC ASSESSMENTS/EVALUATIONS

6.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated remedial systems. Vulnerability assessments provide information so that the site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

This section provides a current vulnerability assessment that evaluates the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding. This section also identifies vulnerability assessment updates that will be conducted for the site in Periodic Review Reports.

A vulnerability assessment has been performed at the site at the time of this SMP preparation. The assessment will be completed during the PRR composition.

This section provides a summary of vulnerability assessments that will be conducted for the site during periodic assessments, and briefly summarizes the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding.

- Flood Plain: The site is not located in a flood plain.
- Sea Level Rise: The site is not located in an area that will be impacted by sea level rise according to the National Oceanic and Atmospheric Administration's Sea Level Rise Map Viewer[4].
- Site Drainage and Storm Water Management: The site is located in a highly urbanized area where stormwater is collected in storm drains located on the street and is then processed by the municipality. Stormwater infiltration and

[4] https://www.climate.gov/maps-data/dataset/sea-level-rise-map-viewer

permeability as the site is negligible as the concrete cover on site extends to the property boundaries.

- Erosion: Erosion is not a concern on site due to the concrete cover which contains soils underneath.
- High Wind: The site does not have any engineering controls which are vulnerable to damage from high wind, as the concrete cover is at ground level along the ground surface.
- Drought: The site is located in a highly urbanized area where drought is not a concern. In addition, neither the site nor the concrete cover would be damaged by drought.
- Electricity: The engineering control located on-site (i.e. the concrete cover) does not have electrical components and therefore is not susceptible to power loss and/or dips/surges in voltage during severe weather events, including lightning strikes.
- Spill/Contaminant Release: The concrete cover does not have chemical components capable of or vulnerable to release.
- Wildfires: The site is located in a highly urbanized area where wildfires do not occur due to the lack of vegetation.

6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation requires that green remediation concepts and techniques be considered during all stages of the remedial program including site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section of the SMP provides a summary of green remediation evaluations to be completed for the site during site management and reported in Periodic Review Reports (PRRs).

Efforts will be made to limit the amount of waste generated on-site during the periodic sampling procedures. The groundwater sampling purge water will be minimized to the best of the sampler's ability. Purge water will be stored in 55-gallon drums for off-site disposal in accordance with local, state, and federal regulations. The timing of the drum

disposal will be adjusted to minimize the quantity of trips needed from the site to the disposal facility, i.e., when the drums are full.

Emissions from field vehicles will be minimized by completing all O&M activities and requisite sampling activities during the same mobilization, if possible.

Decontamination procedures for field equipment is the only activity requiring water on-site. Efforts will be made to limit the amount of water used for decontamination of field equipment.

Methods proposed to reduce energy consumption, resource usage, waste generation, water usage, etc. will be included in the PRR.

An environmental footprint analysis was conducted utilizing the Spreadsheets for Environmental Footprint Analysis (SEFA) developed by the United States Environmental Protection Agency, based on the annual SMP activities to be conducted at the Site, with consideration of the green and sustainable best management practice detailed above. The summary of the environmental footprint analysis is provided in Appendix 9.

6.2.1 Timing of Green Remediation Evaluations

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the Project Manager feels appropriate (e.g. during significant maintenance events or in conjunction with storm recovery activities).

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities after approval from the DER project manager . Reporting of these modifications will be presented in the PRR.

6.2.2. Remedial Systems

Remedial systems are not currently present at the Site.

6.2.3 Building Operations

Structures including buildings and sheds will be operated and maintained to provide for the most efficient operation of the remedy, while minimizing energy, waste generation and water consumption.

6.2.4 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site and use of consumables in relation to visiting the Site in order to conduct system checks and or collect samples and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources.

6.2.5 Metrics and Reporting

As discussed in Section 7.0 and as shown in Appendix 7 – Site Management Forms, information on energy usage, solid waste generation, transportation and shipping, water usage and land use and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during site management and to identify corresponding benefits. A set of metrics has been developed and will be evaluated over time to ensure that green remediation actions are achieving the desired results.

6.3 Remedial System Optimization

A Remedial Site Optimization (RSO) study will be conducted any time that the NYSDEC or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;

- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and information and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

The RSO study will focus on overall site cleanup strategy, process optimization and management with the intent of identifying impediments to cleanup and improvements to site operations to increase efficiency, cost effectiveness and remedial time frames. Green remediation technology and principles are to be considered when performing the RSO.

7.0. REPORTING REQUIREMENTS

7.1 Site Management Reports

All site management inspection, maintenance and monitoring events will be recorded on the appropriate site management forms provided in Appendix 7. These forms are subject to NYSDEC revision. All site management inspection, maintenance, and monitoring events will be conducted by a qualified environmental professional as defined in 6 NYCRR Part 375, a Professional Engineer (PE) who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the site during the reporting period will be provided in electronic format to the NYSDEC in accordance with the requirements of Table 7.1 and summarized in the Periodic Review Report.

Table 7.1: Schedule of Interim Monitoring/Inspection Reports

Task/Report (pursuant to Table 4.3.1)	**Reporting/Documentation Frequency***
Soil Vapor Intrusion Evaluation *(Pursuant to the ROD and in accordance with a NYSDEC-approved work plan submitted under separate cover.)*	One-Time (2025-2026 Heating Season) – *Reported under separate cover and within PRR documenting the reporting period.*
Site-Wide Inspection *(Includes slab inspection for SVI preferential pathways)*	Annually
Periodic Review Report (PRR)	Annually, or as otherwise determined by the Department

* The frequency of events will be conducted as specified until otherwise approved by the NYSDEC.

All interim monitoring/inspection reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;

- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Type of samples collected (e.g., sub-slab vapor, indoor air, outdoor air);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting maintenance activities;
- Description of maintenance activities performed;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and
- Other documentation such as copies of invoices for maintenance work, receipts for replacement equipment, etc., (attached to the checklist/form).

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;

- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and
- Other documentation such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuISTM database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html.

7.2 Periodic Review Report

A Periodic Review Report (PRR) will be submitted to the Department beginning sixteen (16) months after the satisfactory completion letter or equivalent is issued. After submittal of the initial Periodic Review Report, the next PRR shall be submitted annually to the NYSDEC project manager or at another frequency as may be required by the NYSDEC project manager. In the event that the site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the site described in Appendix 2 - Environmental Easement. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the site.
- Results of the required annual site inspections and severe condition inspections, if applicable.
- Description of any change of use, import of materials, or excavation that occurred during the certifying period.
- All applicable site management forms and other records generated for the site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- Identification of any wastes generated during the reporting period, along with waste characterization data, manifests, and disposal documentation.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.

- Data summary tables and graphical representations of contaminants of concern by media (groundwater, soil vapor, etc.), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These will include a presentation of past data as part of an evaluation of contaminant concentration trends, including but not limited to:

  - Trend monitoring graphs that present groundwater contaminant levels from before the start of the remedy implementation to the most current sampling data;
  - A current plume map for sites with remaining groundwater contamination; and
  - A groundwater elevation contour map for each gauging event.

- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.

- A site evaluation, which includes the following:

  - The compliance of the remedy with the requirements of the site-specific Remedial Action Work Plan (RAWP), ROD or Decision Document;

  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;

  - Any new conclusions or observations regarding site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;

  - Recommendations regarding any necessary changes to the remedy and/or Monitoring and Sampling Plan; and

  - An update to the climate change vulnerability assessment if site or external conditions have changed since the previous assessment, and recommendations to address vulnerabilities.

  - A summary of the Green Remediation evaluation, including a quantitative and qualitative overview of a site's environmental impacts and recommendations to improve the remedy's environmental footprint. The PRR will include the completed Summary of Green Remediation Metrics form provided in Appendix 10.

  - An evaluation of trends in contaminant levels in the affected media to determine if the remedy continues to be effective in achieving remedial goals as specified by the RAWP, ROD or Decision Document; and

  - The overall performance and effectiveness of the remedy.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, the Professional Engineer licensed to practice and registered in New York State will prepare, and include in the Periodic Review Report, the following certification as per the requirements of NYSDEC DER-10:

"*For each institutional or engineering control identified for the site, I certify that all of the following statements are true:*

- *The inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- *If a financial assurance mechanism is required under the oversight document for the site, the mechanism remains valid and sufficient for the intended purpose under the document;*
- *Use of the site is compliant with the environmental easement;*
- *The engineering control systems are performing as designed and are effective;*
- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program and generally accepted engineering practices; and*
- *The information presented in this report is accurate and complete.*

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. I, [name] , of [business address], am certifying as [Owner/Remedial Party or Owner's/Remedial Party's Designated Site Representative] for the site."

The signed certification will be included in the Periodic Review Report.

The Periodic Review Report will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the site is located and the NYSDOH Bureau of Environmental Exposure Investigation. The Periodic Review Report may need to be submitted in hard-copy format, as requested by the NYSDEC project manager.

7.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control or failure to conduct site management activities, a Corrective Measures Work Plan will be submitted to the NYSDEC project manager for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC project manager.

7.4 Remedial System Optimization Report

If an RSO is to be performed (see Section 6.3), upon completion of an RSO, an RSO report must be submitted to the NYSDEC project manager for approval. The RSO report will document the research/ investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual site model and present recommendations. RSO recommendations are to be implemented upon approval from the NYSDEC. Additional work plans, design documents, HASPs etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC project manager and the NYSDOH project manager.

8.0 REFERENCES

Carson Voci Engineering and Geology, D.P.C. 2025. Corrective Measures Report. May 21, 2025.

Carson Voci Engineering and Geology, D.P.C. 2024. Corrective Measures Work Plan. January 30, 2024.

Carson Voci Engineering and Geology, D.P.C. 2024. Construction Completion Report – Redevelopment Excavation. January 19, 2024.

Environmental Engineering Compliance Control, D.P.C. 2022. Redevelopment Excavation Work Plan. May 2, 2022.

Environmental Engineering Compliance Control, D.P.C. 2022. Limited Soil Investigation Work Plan. March 24, 2022.

Environmental Engineering Compliance Control, D.P.C. 2022. AS/SVE Remedial Progress Sampling Report. March 15, 2022.

Environmental Engineering Compliance Control, D.P.C. 2021. Change of Use Work Plan. December 20, 2021.

Environmental Engineering Compliance Control, D.P.C. 2021. Construction Completion Report for Bridge Cleaners. August 31, 2021.

Integral Engineering, P.C. 2015. Data Evaluation Report. Former Bridge Cleaners. July 1, 2015.

Integral Engineering, P.C. 2016. Interim Remedial Measure Design Document. Former Bridge Cleaners, 39-26 30th St, Long Island City, NY. BCP Site No. C241127. March 29, 2016.

Integral Engineering, P.C. 2018. Draft Construction Completion Report. Former Bridge Cleaners. December 2018.

Integral Engineering, P.C. 2019. *Successful Former Bridge Cleaners AS/SVE System Performance* Memorandum. July 19, 2019.

6NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

NYSDEC, 2022. *Record of Decision*. March 27, 2022.

NYSDEC DER-10 – "Technical Guidance for Site Investigation and Remediation".

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum, June 2004 addendum).

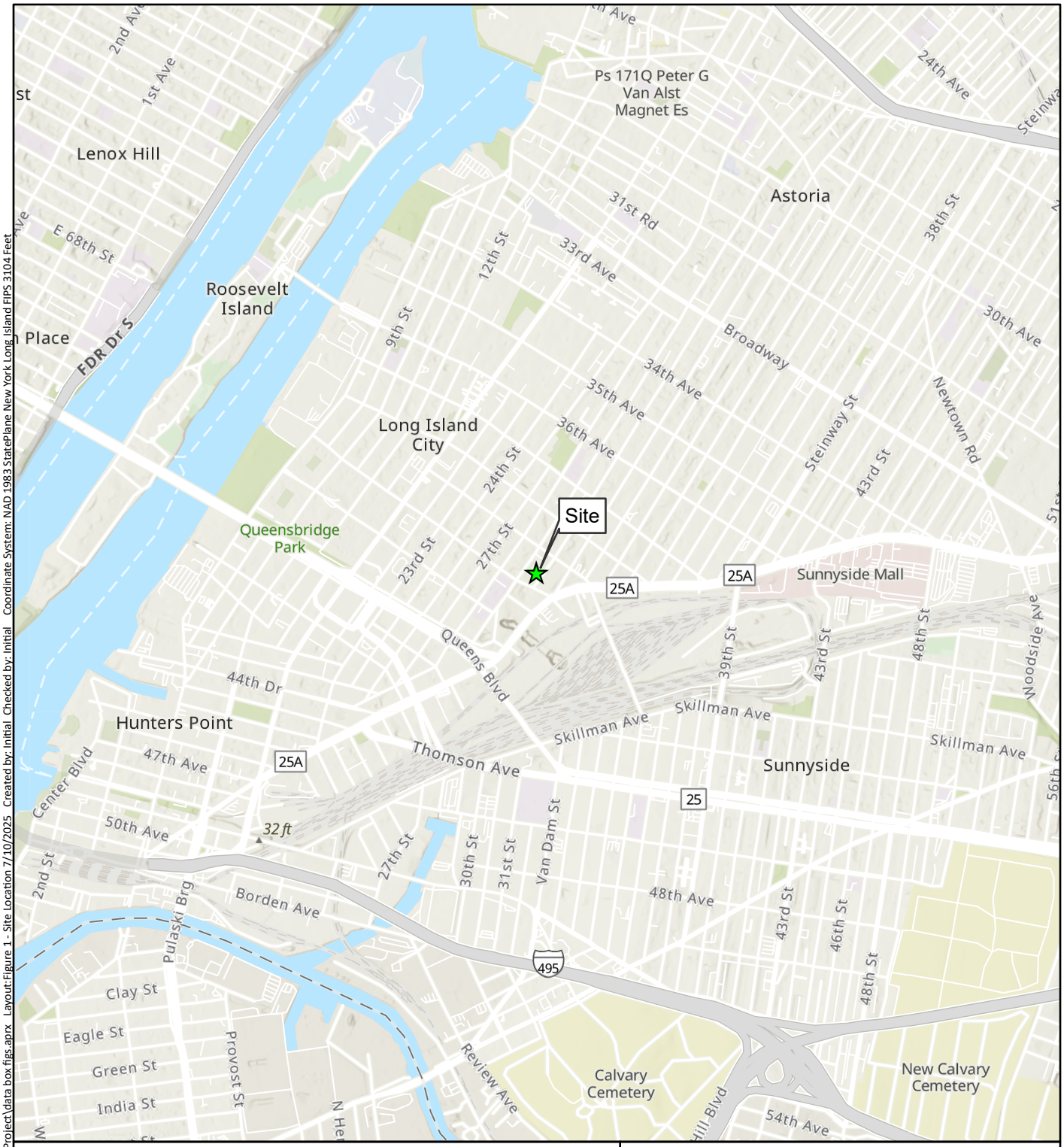
Soren, Julian. 1978. Subsurface geology and paleogeography of Queens County, Long Island, New York. U.S. Geological Survey. February 1978.

TechSolutions Engineering, P.C. 2013. Remedial Investigation Work Plan. Former Bridge Cleaners Site. October 2013.

TechSolutions Engineering, P.C. 2014. Remedial Investigation Report. Former Bridge Cleaners. June 2014.

TechSolutions Engineering, P.C. 2020. Supplemental Interim Remedial Measure Work Plan for Bridge Cleaners. July 2020.

FIGURES



0 1,000 2,000 3,000 4,000 Feet

1 inch = 2,000 feet

N

Legend

Site Location

Base Map: ESRI World Topographic Map

SAFETY FIRST

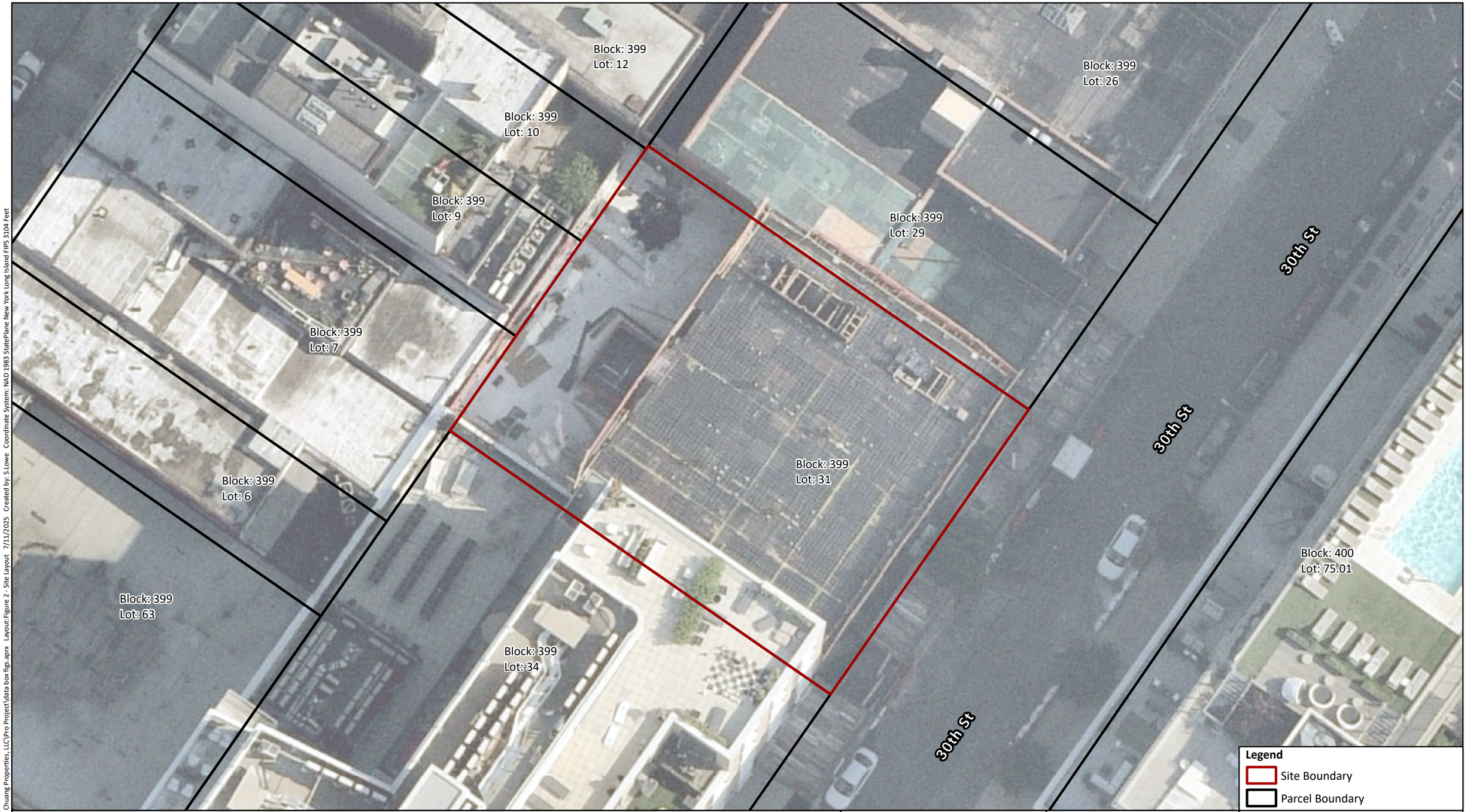
terraphase engineering

CLIENT:	39-26 Property, LLC
PROJECT:	Bridge Cleaners, NYSDEC Site No. 241127 39-26 30th Street., Long Island City, NY
PROJECT NUMBER:	CV03.001.003

Site Location

FIGURE 1

File: N:\GIS\Prj\CV01.001 Zhong Chuang Properties, LLC\Pro Project\data box figs.aprx Layout:Figure 1 - Site Location 7/10/2025 Created by: Initial Checked by: Initial Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet



Aerial Imagery Source: Nearmap (May 28, 2023)

0 10 20 30 40 Feet

1 inch = 20 feet

N

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terraphase engineering

CLIENT:	39-26 Property, LLC
PROJECT:	Bridge Cleaners, NYSDEC Site No. 241127 39-26 30th Street., Long Island City, NY
PROJECT NUMBER:	CV03.001.003

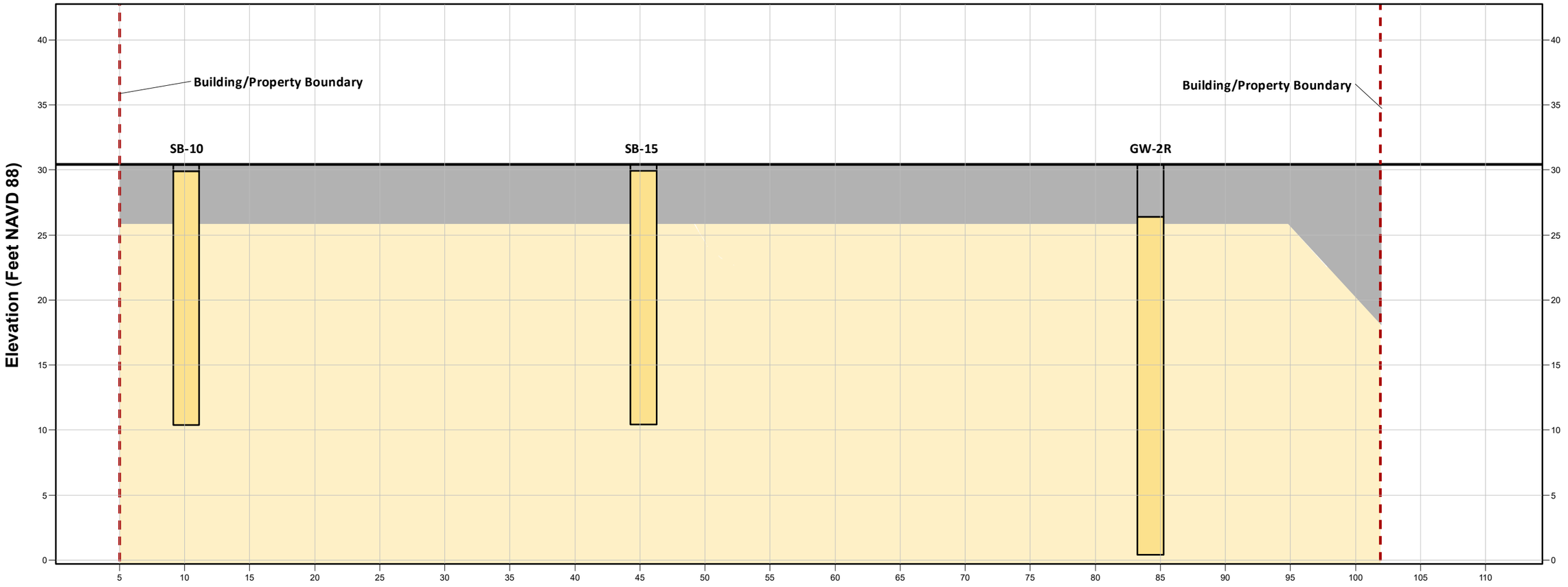
Site Layout

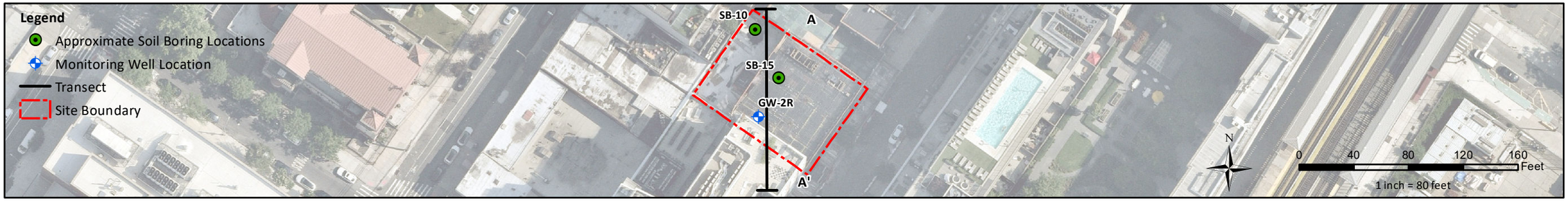
FIGURE 2

File: N:\GIS\Pr\[CV01.001_Zhong Chuang Properties, LLC\Pro Project\data box figs.aprx Layout:Figure 2 - Site Layout 7/11/2025 Created by: S.Lowe Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet

North
A

South
A'





Legend

Lithology

- Concrete/Cover System
- Light Brown Fine Sand
- Top of Slab on Grade

0 4 8 12 16 Feet

1 inch = 8 feet

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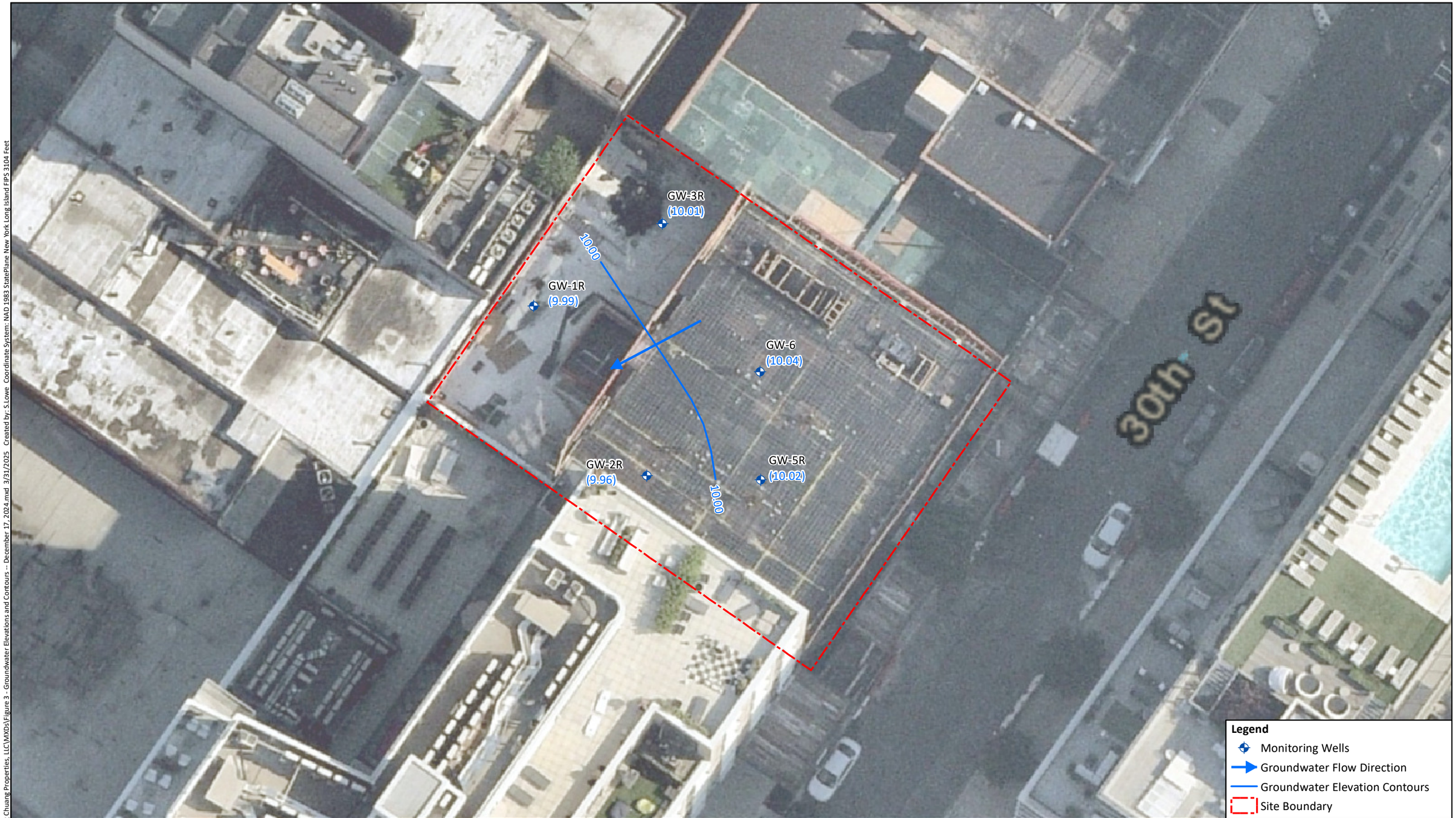
CLIENT:	39-26 Property, LLC
PROJECT:	Bridge Cleaners, NYSDEC Site No. 241127 39-26 30th Street., Long Island City, NY
PROJECT NUMBER:	CV01.001.003

Geologic Cross Section

FIGURE 3

File: N:\GIS\Prj\CV01.001_Zhong Chuang Properties, LLC\CrossviewMXDs\Figure X - Cross Section A-A'.mxd 7/14/2025 Created by: S.Lowe Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet



Legend
- Monitoring Wells
- Groundwater Flow Direction
- Groundwater Elevation Contours
- Site Boundary

Notes:
- Aerial Imagery Source: Nearmap (May 28, 2023)
- Elevations are in Feet Above Mean Sea Level
- Groundwater elevation data collected on December 17, 2024

0 10 20 30 40 Feet

1 inch = 20 feet

N

SAFETY FIRST

carsonVOCI
engineering and geology dpc
an affiliate of Terraphase Engineering Inc.

CLIENT: 39-26 Property, LLC

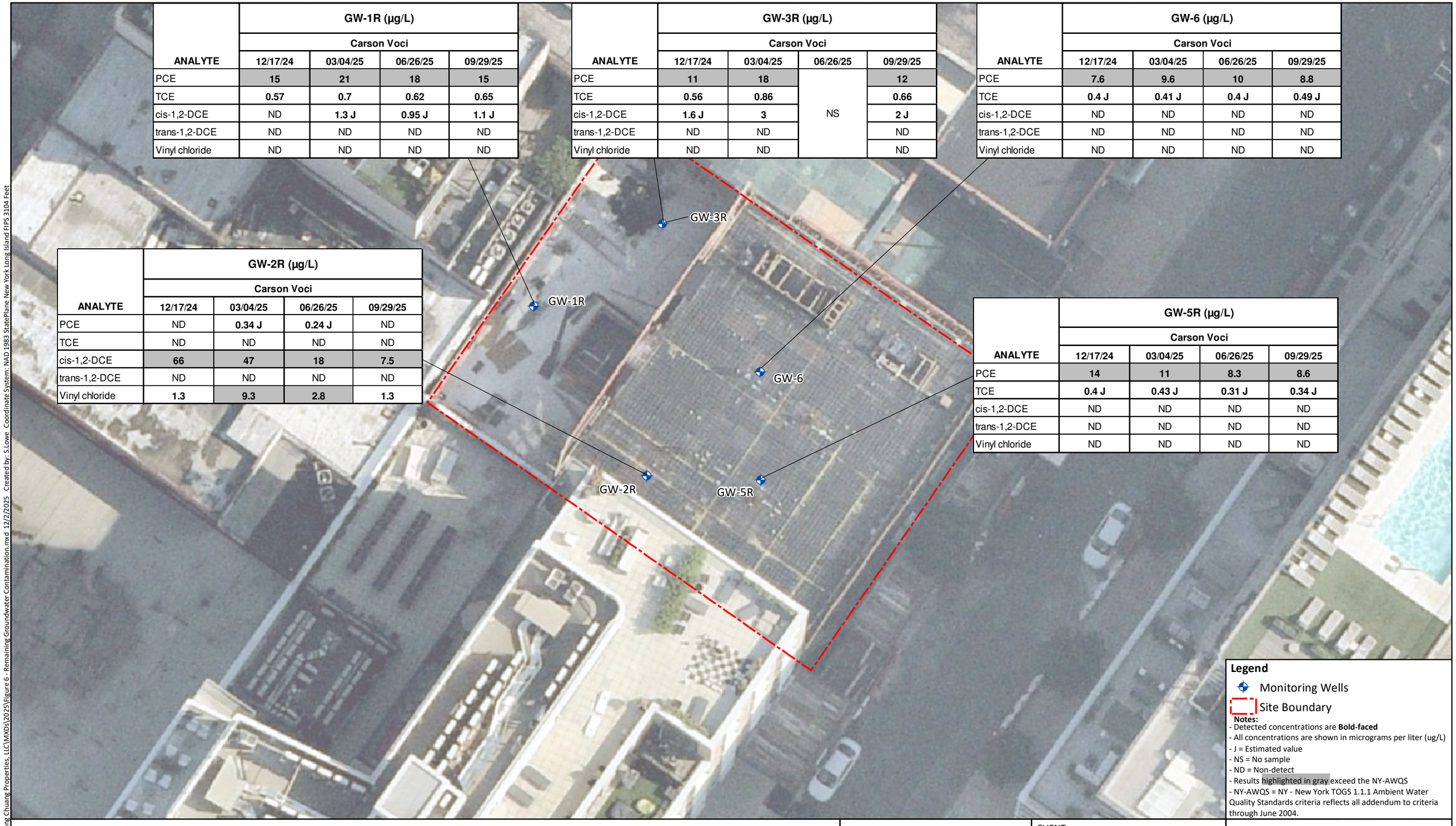
PROJECT: Bridge Cleaners, NYSDEC Site No. 241127, 39-26 30th Street., Long Island City, NY

PROJECT NUMBER: CV03.001.003

Groundwater Contour Map

FIGURE 4

File: N:\GIS\Prj\CV01.001_Zhong Chuang Properties, LLC\MXDs\Figure 3 - Groundwater Elevations and Contours -- December 17, 2024.mxd 3/31/2025 Created by: S.Lowe Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet



ANALYTE	GW-1R (µg/L)			
	Carson Voci			
	12/17/24	03/04/25	06/26/25	09/29/25
PCE	**15**	**21**	**18**	**15**
TCE	**0.57**	**0.7**	**0.62**	**0.65**
cis-1,2-DCE	ND	**1.3 J**	**0.95 J**	**1.1 J**
trans-1,2-DCE	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND

ANALYTE	GW-3R (µg/L)			
	Carson Voci			
	12/17/24	03/04/25	06/26/25	09/29/25
PCE	**11**	**18**	NS	**12**
TCE	**0.56**	**0.86**		**0.66**
cis-1,2-DCE	**1.6 J**	**3**		**2 J**
trans-1,2-DCE	ND	ND		ND
Vinyl chloride	ND	ND		ND

ANALYTE	GW-6 (µg/L)			
	Carson Voci			
	12/17/24	03/04/25	06/26/25	09/29/25
PCE	**7.6**	**9.6**	**10**	**8.8**
TCE	**0.4 J**	**0.41 J**	**0.4 J**	**0.49 J**
cis-1,2-DCE	ND	ND	ND	ND
trans-1,2-DCE	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND

ANALYTE	GW-2R (µg/L)			
	Carson Voci			
	12/17/24	03/04/25	06/26/25	09/29/25
PCE	ND	**0.34 J**	**0.24 J**	ND
TCE	ND	ND	ND	ND
cis-1,2-DCE	**66**	**47**	**18**	**7.5**
trans-1,2-DCE	ND	ND	ND	ND
Vinyl chloride	**1.3**	**9.3**	**2.8**	**1.3**

ANALYTE	GW-5R (µg/L)			
	Carson Voci			
	12/17/24	03/04/25	06/26/25	09/29/25
PCE	**14**	**11**	**8.3**	**8.6**
TCE	**0.4 J**	**0.43 J**	**0.31 J**	**0.34 J**
cis-1,2-DCE	ND	ND	ND	ND
trans-1,2-DCE	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND

Legend

Monitoring Wells

Site Boundary

Notes:
- Detected concentrations are **Bold-faced**
- All concentrations are shown in micrograms per liter (ug/L)
- J = Estimated value
- NS = No sample
- ND = Non-detect
- Results highlighted in gray exceed the NY-AWQS
- NY-AWQS = NY - New York TOGS 1.1.1 Ambient Water Quality Standards criteria reflects all addendum to criteria through June 2004.

Aerial Imagery Source: Nearmap (May 28, 2023)

0 10 20 30 40 Feet

1 inch = 20 feet

N

SAFETY FIRST

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engineering and geology dpc
an affiliate of Terraphase Engineering Inc.

CLIENT: 39-26 Property, LLC

PROJECT: Bridge Cleaners, NYSDEC Site No. 241127 39-26 30th Street., Long Island City, NY

PROJECT NUMBER: CV03.001.003

Remaining Groundwater Contamination

FIGURE 5

File: N:\GIS\Prj\CV01.001_Zhong Chuang Properties, LLC\MXDs\2025\Figure 6 - Remaining Groundwater Contamination.mxd 12/2/2025 Created by: S.Lowe Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet

SB-10		
Sampling Date	4/5/2022	
Sampling Depth (Ft Below Grade)	7-7.5	15-15.5
Tetrachloroethene	0.0008 J	0.00092 J
Trichloroethene	ND	ND
1,2-Dichloroethene, Total	ND	ND
Vinyl chloride	ND	ND

PX-NW	
Sampling Date	3/15/2023
Sampling Depth (Ft Below Grade)	5.0-5.5
Tetrachloroethene	0.0078
Trichloroethene	0.00068 U
1,2-Dichloroethene, Total	0.0014 U
Vinyl chloride	0.0014 U

PX-W	
Sampling Date	3/15/2023
Sampling Depth (Ft Below Grade)	5.0-5.5
Tetrachloroethene	0.021
Trichloroethene	0.00053 U
1,2-Dichloroethene, Total	0.001 U
Vinyl chloride	0.001 U

SB-9	
Sampling Date	4/5/2022
Sampling Depth (Ft Below Grade)	15.0-17.5
Tetrachloroethene	1.8
Trichloroethene	ND
1,2-Dichloroethene, Total	ND
Vinyl chloride	ND

PX-N	
Sampling Date	3/14/2023
Sampling Depth (Ft Below Grade)	5.0-5.5
Tetrachloroethene	0.0012
Trichloroethene	0.0005 U
1,2-Dichloroethene, Total	0.001 U
Vinyl chloride	0.001 U

SB-15	
Sampling Date	4/5/2022
Sampling Depth (Ft Below Grade)	12-13
Tetrachloroethene	ND
Trichloroethene	ND
1,2-Dichloroethene, Total	ND
Vinyl chloride	ND

PX-C	
Sampling Date	3/14/2023
Sampling Depth (Ft Below Grade)	5.0-5.5
Tetrachloroethene	0.0028
Trichloroethene	0.0005 U
1,2-Dichloroethene, Total	0.00099 U
Vinyl chloride	0.00099 U

SB-16	
Sampling Date	4/5/2022
Sampling Depth (Ft Below Grade)	7-7.5
Tetrachloroethene	ND
Trichloroethene	ND
1,2-Dichloroethene, Total	ND
Vinyl chloride	ND

PX-SW	
Sampling Date	2/8/2023
Sampling Depth (Ft Below Grade)	12.0-12.5
Tetrachloroethene	0.00068 U
Trichloroethene	0.00068 U
1,2-Dichloroethene, Total	0.0014 U
Vinyl chloride	0.0014 U

PX-E	
Sampling Date	2/15/2023
Sampling Depth (Ft Below Grade)	5.0-5.5
Tetrachloroethene	0.00093
Trichloroethene	0.00078 U
1,2-Dichloroethene, Total	0.0016 U
Vinyl chloride	0.0016 U

PX-NE	
Sampling Date	2/2/2023
Sampling Depth (Ft Below Grade)	5.0-5.5
Tetrachloroethene	0.011 U
Trichloroethene	0.00067 U
1,2-Dichloroethene, Total	0.0013 U
Vinyl chloride	0.0013 U

SB-12		
Sampling Date	4/5/2022	
Sampling Depth (Ft Below Grade)	7-8	15-15.5
Tetrachloroethene	0.00077 J	ND
Trichloroethene	ND	ND
1,2-Dichloroethene, Total	ND	ND
Vinyl chloride	ND	ND

PX-S	
Sampling Date	2/8/2023
Sampling Depth (Ft Below Grade)	12.0-12.5
Tetrachloroethene	0.0012 U
Trichloroethene	0.0012 U
1,2-Dichloroethene, Total	0.0024 U
Vinyl chloride	0.0024 U

PX-SE	
Sampling Date	2/8/2023
Sampling Depth (Ft Below Grade)	12.0-12.5
Tetrachloroethene	0.00072 U
Trichloroethene	0.00072 U
1,2-Dichloroethene, Total	0.0014 U
Vinyl chloride	0.0014 U

SB-07, SB-06, SB-10, PX-NW, B-3, SB-9, SB-13, PX-N, B-1, PX-W, SB-15, B-4, SB-16, SB-8, PX-C, PX-NE, SB-12, PX-SW, B-2, PX-E, B-5, SB-11, PX-S, SB-14, PX-SE

Legend

- Historic Soil Sample Location
- LSI Soil Sample Location
- Post-Excavation Soil Sample Location
- Site Boundary

Notes:

- All results reported in milligrams per kilogram (mg/kg)
- J = Estimated value
- ND = Non-detect
- U = Non-Detect at the associated numerical value (reporting limit)
- Results highlighted in gray exceed the NY-UNRES
- NY-UNRES = NY-UNRES: 6 NYCRR 375 Unrestricted Use Criteria

Aerial Imagery Source: Nearmap (May 28, 2023)

0 10 20 30 40 Feet

1 inch = 20 feet

N

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an affiliate of Terraphase Engineering Inc.

CLIENT: 39-26 Property LLC

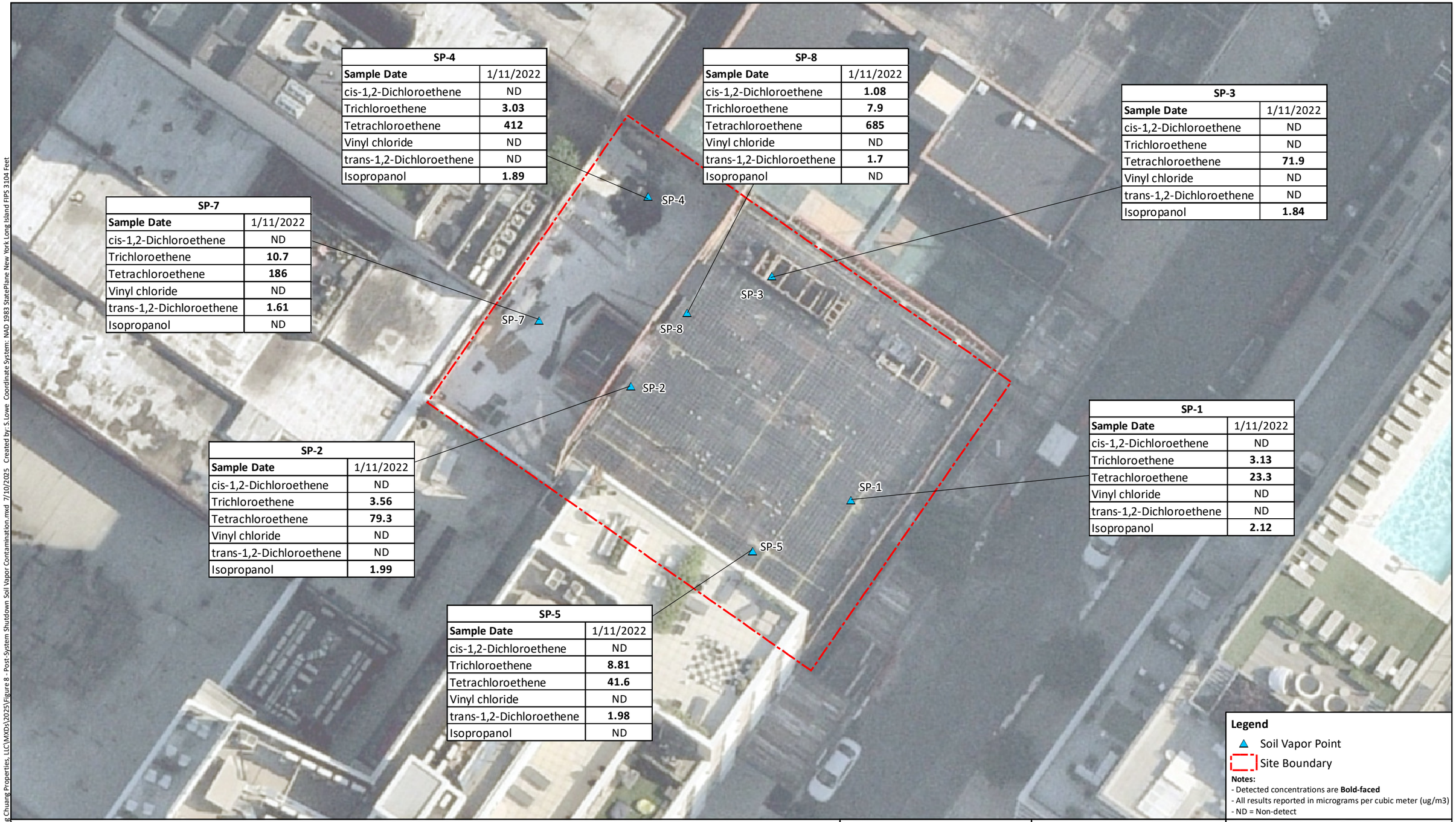
PROJECT: Bridge Cleaners, NYSDEC Site No. 241127 39-26 30th Street., Long Island City, NY

PROJECT NUMBER: CV03.001.003

Remaining Soil Contamination

FIGURE 6

File: N:\GIS\Pr\CV01.001_Zhong Chuang Properties, LLC\MXDs\2025\Figure 7 - Remaining Soil Contamination.mxd 7/10/2025 Created by: S.Lowe Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet



SP-4	
Sample Date	1/11/2022
cis-1,2-Dichloroethene	ND
Trichloroethene	**3.03**
Tetrachloroethene	**412**
Vinyl chloride	ND
trans-1,2-Dichloroethene	ND
Isopropanol	**1.89**

SP-8	
Sample Date	1/11/2022
cis-1,2-Dichloroethene	**1.08**
Trichloroethene	**7.9**
Tetrachloroethene	**685**
Vinyl chloride	ND
trans-1,2-Dichloroethene	**1.7**
Isopropanol	ND

SP-3	
Sample Date	1/11/2022
cis-1,2-Dichloroethene	ND
Trichloroethene	ND
Tetrachloroethene	**71.9**
Vinyl chloride	ND
trans-1,2-Dichloroethene	ND
Isopropanol	**1.84**

SP-7	
Sample Date	1/11/2022
cis-1,2-Dichloroethene	ND
Trichloroethene	**10.7**
Tetrachloroethene	**186**
Vinyl chloride	ND
trans-1,2-Dichloroethene	**1.61**
Isopropanol	ND

SP-2	
Sample Date	1/11/2022
cis-1,2-Dichloroethene	ND
Trichloroethene	**3.56**
Tetrachloroethene	**79.3**
Vinyl chloride	ND
trans-1,2-Dichloroethene	ND
Isopropanol	**1.99**

SP-1	
Sample Date	1/11/2022
cis-1,2-Dichloroethene	ND
Trichloroethene	**3.13**
Tetrachloroethene	**23.3**
Vinyl chloride	ND
trans-1,2-Dichloroethene	ND
Isopropanol	**2.12**

SP-5	
Sample Date	1/11/2022
cis-1,2-Dichloroethene	ND
Trichloroethene	**8.81**
Tetrachloroethene	**41.6**
Vinyl chloride	ND
trans-1,2-Dichloroethene	**1.98**
Isopropanol	ND

Legend

- Soil Vapor Point
- Site Boundary

Notes:
- Detected concentrations are **Bold-faced**
- All results reported in micrograms per cubic meter (ug/m3)
- ND = Non-detect

Aerial Imagery Source: Nearmap (May 28, 2023)

0 10 20 30 40 Feet

1 inch = 20 feet

N

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CLIENT: 39-26 Property, LLC

PROJECT: Bridge Cleaners, NYSDEC Site No. 241127, 39-26 30th Street., Long Island City, NY

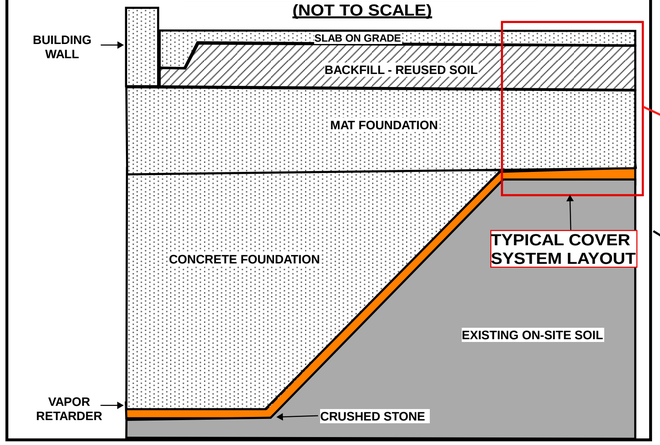
PROJECT NUMBER: CV03.001.003

Remaining Soil Vapor Contamination

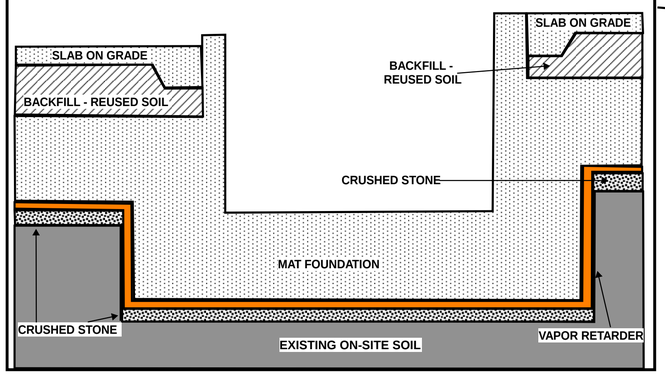
FIGURE 7

File: N:\GIS\Prj\CV01.001_Zhong Chuang Properties, LLC\MXDs\2025\Figure 8 - Post-System Shutdown Soil Vapor Contamination.mxd 7/10/2025 Created by: S.Lowe Coordinate System: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet

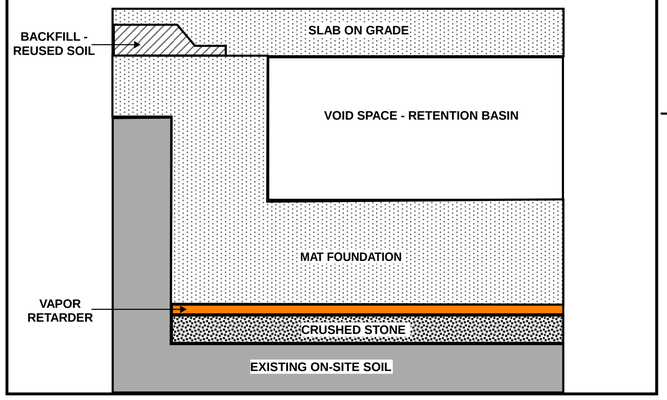
SIDE FOUNDATION WALL COVER SYSTEM (NOT TO SCALE)

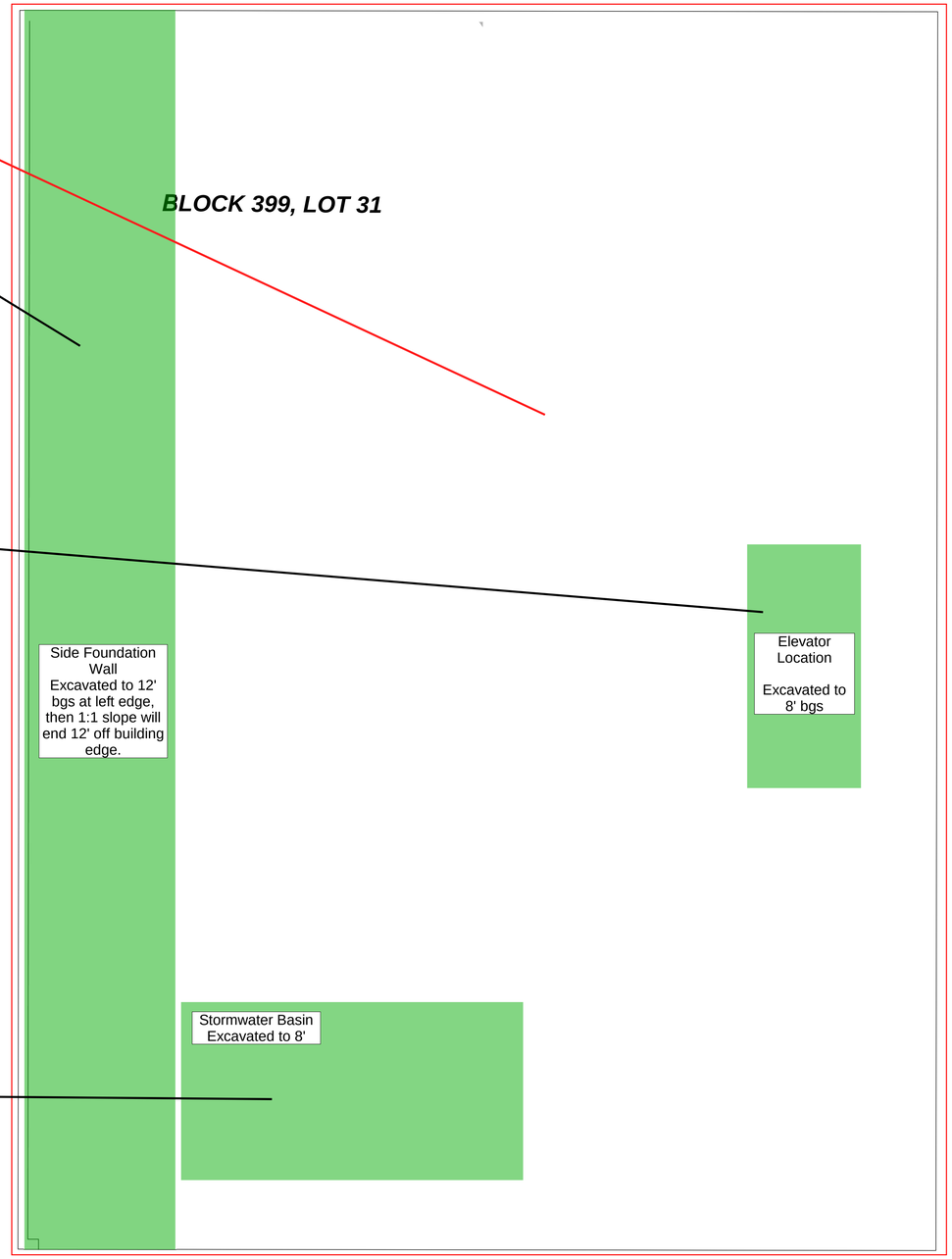


ELEVATOR LOCATION COVER SYSTEM (NOT TO SCALE)



STORMWATER BASIN COVER SYSTEM (NOT TO SCALE)





LEGEND

- EXTENT OF EXCAVATION / APPROXIMATE BUILDING FOOTPRINT
- CONCRETE COVER
- EXCAVATION AREAS DEEPER THAN 5 FT BELOW GRADE SURFACE

SOURCES:

1. BASEMAP: WELL ELEVATION SURVEY, BRIDGE CLEANERS, 39-26 30th STREET, LONG ISLAND CITY, NEW YORK, DONALD R. STEDGE, P.L.S., OCTOBER 30, 2015.

0 3 6 12 Feet

THIS SHEET PLOTS FULL SCALE AT 11X17 IN.

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39-26 Property, LLC

BRIDGE CLEANERS SITE
39-26 30th ST

LONG ISLAND CITY NEW YORK

DRN NC	DATE 5/23/2023
DES NK	DATE 5/23/2023
CHK NK	DATE 5/23/2023
SCALE AS NOTED	PROJECT NO. BRIDGE CLEANERS

ENGINEERING CONTROLS LOCATION - COVER SYSTEM

FIGURE

8

APPENDIX 1
SITE CONTACT LIST

Name	Role	Contact Information
39-26 Property LLC (Lillian Shi)	Property Owner Representative	P: (212)-967-1188 E: classiccutting11@yahoo.com
Brittany Taranto	NYSDEC Project Manager	P: (518)-402-9791 E: brittany.taranto@dec.ny.gov
Douglas MacNeal, P.E.	NYSDEC Supervisor	P: (518)-402-9662 E: douglas.macneal@dec.ny.gov
Kelly Lewandowski	NYSDEC Site Control	P: (518)-402-9569 E: kelly.lewandowski@dec.ny.gov
Johnathan Robinson	NYSDOH Project Manager	P: (518)-402-7881 E: johnathan.robinson@health.ny.gov
Nicholas Krasnecky, P.E.	Signatory Professional Engineer	P: (201)-552-0224 E: nicholas.krasnecky@terraphase.com

APPENDIX 2
ENVIRONMENTAL EASEMENT

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this 4th day of March, 2019, between Owner(s) Zhong Chuang Properties, LLC, having an office at 37-24 30th Street, Long Island City, New York 11101, County of Queens, State of New York (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 39-26 30th Street in the City of New York, County of Queens and State of New York, known and designated on the tax map of the New York City Department of Finance as tax map parcel number: Block 399 Lot 31, being the same as that property conveyed to Grantor by deed dated March 9, 2012 and recorded in the City Register of the City of New York as CRFN # 2012000122920. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 0.17 +/- acres, and is hereinafter more fully described in the Land Title Survey dated November 27, 2018 prepared by Gerald T. O'Buckley, P.L.S., which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Order on Consent Index Number: C●2–20170509-174, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health and Mental Hygiene to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential or Restricted Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i) and (ii), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation

Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by

Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:	Site Number: 241127 Office of General Counsel NYSDEC 625 Broadway Albany New York 12233-5500
With a copy to:	Site Control Section Division of Environmental Remediation NYSDEC 625 Broadway Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

11. Consistency with the SMP. To the extent there is any conflict or inconsistency between the terms of this Environmental Easement and the SMP, regarding matters specifically addressed by the SMP, the terms of the SMP will control.

Remainder of Page Intentionally Left Blank

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

Zhong Chuang Properties, LLC:

By: _____

Print Name: Steve Lin

Title: member Date: 01/25/19

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF New York)

On the 25th day of January, in the year 2019, before me, the undersigned, personally appeared Steve Lin, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

SAMMIE HUANG
Notary Public, State of New York
Qualified in New York County
No. 01HU6114472
Commission Expires 8/16/ 2020

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____
Michael J. Ryan, Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 4th day of March, in the year 2019, before me, the undersigned, personally appeared Michael J. Ryan, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County
Commission Expires August 22, 2020

SCHEDULE "A" PROPERTY DESCRIPTION

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND, WITH THE BUILDINGS AND IMPROVEMENTS THEREON ERECTED, SITUATE, LYING AND BEING IN THE BOROUGH AND COUNTY OF QUEENS, CITY AND STATE OF NEW Y●RK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE WESTERLY SIDE OF 30TH STREET, DISTANT 133.72 FEET (DEED) (133.73 FEET ●N TAX MAP) NORTHERLY FROM THE C●RNER FORMED BY THE INTERSECTION OF THE WESTERLY SIDE OF 30TH STREET WITH THE NORTHERLY SIDE OF 40TH AVENUE AS SAID STREET AND AVENUE ARE SHOWN AND LAID OUT ON THE FINAL T●POGRAPHICAL MAP OF THE CITY OF NEW YORK FOR THE BOROUGH OF QUEENS;

RUNNING THENCE WESTERLY AT RIGHT ANGLES TO THE WESTERLY SIDE OF 30TH STREET, 100.10 FEET;

THENCE NORTHERLY PARALLEL WITH THE WESTERLY SIDE OF 30TH STREET, 75.06 FEET;

THENCE EASTERLY AGAIN AT RIGHT ANGLES T● THE WESTERLY SIDE ●F 30TH STREET, 100.10 FEET TO THE WESTERLY SIDE OF 30TH STREET;

THENCE SOUTHERLY ALONG THE WESTERLY SIDE OF 30TH STREET, 75.06 FEET TO THE POINT OR PLACE OF BEGINNING.

CONTAINING APPROXIMATELY 0.17 ACRES MORE OR LESS.

FOR INFORMATION ONLY: SAID PREMISES BEING KNOWN AS 39-28 30TH STREET, LONG ISLAND CITY, NEW YORK 11101. BLOCK: 399 LOT: 31

AMENDMENT TO ENVIRONMENTAL EASEMENT

This Amendment to Environmental Easement is made as of this 3rd day of April 2023 between Owner(s) Zhong Chuang Properties, LLC, having an office at 37-24 30th Street, Long Island City, New York 11101, County of Queens, State of New York (the "Grantor"), and The People of the State of New York (the "Grantee"), acting through their Commissioner of the Department of Environmental Conservation ("NYSDEC" or the "Department") with its headquarters located at 625 Broadway, Albany, New York 12233.

RECITALS

1. Grantor is the owner of certain land known and designated on the tax map of the New York City Department of Finance, County of Queens and State of New York as tax map parcel number: Block 399 Lot 31, being the same as the property conveyed to Grantor by deed dated March 9, 2012 and recorded in the City Register of the City of New York as CRFN # 2012000122920.

2. The Department and Grantor entered into that certain Environmental Easement ("Easement Agreement") dated as of March 4, 2019.and recorded in the NYC Department of Finance Office of the City Register on March 4, 2019 as CRFN # 2019000081445. Capitalized terms used herein without definition have the meanings ascribed to them in the Environmental Easement Agreement.

3. Pursuant to Section 1, 2, 3, 4, and 5 of the Easement Agreement, Grantor granted the Department rights and interests that run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of the Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of certain maintenance, monitoring or operation requirements; and to ensure the potential restriction of future uses of the land that are inconsistent with the stated purpose.

4. This Amendment to Environmental Easement is filed solely in order to revise Section 2 A of the Easement Agreement, the use of the Controlled Property.

5. Pursuant to Section 8 of the Easement Agreement, the Department agrees to amend the Easement Agreement in the manner prescribed by Article 9 of the Real Property Law.

AMENDMENT OF ENVIRONMENTAL EASEMENT

A. The above recitals are hereby incorporated into this Amendment of Environmental Easement.

B. The Department and Grantor hereby agree Section 2 A of the Easement Agreement is hereby amended to read as follows:

A. (1) The Controlled Property may be used for:

Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii), Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

C. The Department and Grantor hereby agree Section B of the Easement Agreement is hereby amended to read as follows:

B. The Controlled Property shall not be used for Residential purposes as defined in 6 NYCRR 375-1.8(g)(2)(i) and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

D. All other terms of the March 4, 2019 Environmental Easement shall remain in effect.

E. This Amendment of Environmental Easement inures to and binds the parties hereto and their respective successors and assigns.

F. This Amendment of Environmental Easement shall be governed by and interpreted in accordance with the laws of the State of New York.

IN WITNESS WHEREOF, Grantor has caused this Amendment to Environmental Easement to be signed in its name.

Zhong Chuang Properties, LLC:

By: _____

Print Name: Qi HONG LIN

Title: President Date: 01/26/23

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF New York)

On the 26th day of January, in the year 2023, before me, the undersigned, personally appeared Qi Hong Lin, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

SAMMIE HUANG
Notary Public, State of New York
Qualified in New York County
No. 01HUG114472
Commission Expires 8/16/ 2024

THIS AMENDMENT OF THE ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: Andrew Guglielmi
Andrew Guglielmi, Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 3rd day of April, in the year 2023 before me, the undersigned, personally appeared Andrew Guglielmi, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Jennifer Andaloro
Notary Public - State of New York

JENNIFER ANDALORO
Notary Public, State of New York
No. 02AN6098246
Qualified in Albany County
Commission Expires January 14, 2024

APPENDIX 3
EXCAVATION WORK PLAN (EWP)

BRIDGE CLEANERS
QUEENS COUNTY
LONG ISLAND CITY, NEW YORK

Excavation Work Plan

NYSDEC Site Number: 241127

Prepared for:

39-26 Property, LLC

39-26 30th Street

Long Island City, New York

Prepared by:

Carson Voci Engineering and Geology, D.P.C.

an affiliate of Terraphase Engineering Inc.

1100 East Hector Street, Suite 400

Conshohocken, Pennsylvania 19428

December 2025

3-1 NOTIFICATION

This Excavation Work Plan (EWP) is part of an SMP; it may need to be updated along with the SMP once an overall site remedy is selected and implemented.

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the site owner or their representative will notify the NYSDEC. A full listing of site-related contact information is provided in Table 2-1 below.

Table 3-1 Site Contact Information

Name	Role	Contact Information
39-26 Property LLC (Steven Li)	Property Owner Representative	P: (203)-908-5112 E: sli@jlsgrp.com
Brittany Taranto	NYSDEC Project Manager	P: (518)-402-9791 E: brittany.taranto@dec.ny.gov
Douglas MacNeal, P.E.	NYSDEC Supervisor	P: (518)-402-9662 E: douglas.macneal@dec.ny.gov
Kelly Lewandowski	NYSDEC Site Control	P: (518)-402-9569 E: kelly.lewandowski@dec.ny.gov
Johnathan Robinson	NYSDOH Project Manager	P: (518)-402-7881 E: johnathan.robinson@health.ny.gov
Nicholas Krasnecky, P.E.	Signatory Professional Engineer	P: (201)-552-0224 E: nicholas.krasnecky@terraphase.com

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated and any work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;

- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;
- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in Appendix 3 of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

3-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed by a qualified environmental professional during all excavations into known or potentially contaminated material (remaining contamination). Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil.

3-3 SOIL STAGING METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be

promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC.

3-4 MATERIALS EXCAVATION AND LOAD-OUT

A qualified environmental professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this Plan.

The presence of utilities and easements on the site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the site.

Loaded vehicles leaving the site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-site, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the site until the activities performed under this section are complete Truck wash waters will be collected and disposed of off-site in an appropriate manner.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the site are clean of dirt and other materials derived from the site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

3-5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes are dependent on the disposal facility. A truck route to the nearest highway is included as an attachment. All trucks loaded with site materials will exit the vicinity of the site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project site.

Egress points for truck and equipment transport from the site will be kept clean of dirt and other materials during site remediation and development.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

3-6 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of material from this site is proposed for unregulated off-site disposal (i.e. clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e. hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C/D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

3-7 MATERIALS REUSE ON-SITE

The qualified environmental professional will ensure that procedures for materials reuse, as defined in DER-10 Section 5.4(e)(4), are followed and that unacceptable material does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the site will not be reused on-site.

3-8 FLUIDS MANAGEMENT

All liquids to be removed from the site, including but not limited to, excavation dewatering, decontamination waters and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during large-scale construction activities to surface waters (i.e. a local pond, stream or river) will be performed under a SPDES permit.

3-9 COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with the Order on Consent and Environmental Easement. The existing cover system is comprised of a minimum 6-inch thick concrete cover. A demarcation layer will be placed to provide a visual reference to the top of the remaining contamination zone, the zone that requires adherence to special conditions for disturbance of remaining potentially-contaminated soils defined in this SMP. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the remaining contamination. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP.

3-10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review. Any soils imported from off-site sources will be sampled in accordance with DER-10 Section 5.4(e).

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the site.

All imported soils will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for

this site, will not be imported onto the site without prior approval by NYSDEC. Solid waste will not be imported onto the site.

Trucks entering the site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

3-11 STORMWATER POLLUTION PREVENTION

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

3-12 EXCAVATION CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition. Areas in the vicinity of the tank will be investigated in accordance with DER-10 Section 3.9.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals; TCL volatiles and semi-volatiles, TCL pesticides and PCBs), unless the site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the Periodic Review Report.

3-13 COMMUNITY AIR MONITORING PLAN

A figure showing the location of air sampling stations based on generally prevailing wind conditions will be generated before the commencement of excavation. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

Exceedances of action levels listed in the CAMP will be reported to

NYSDEC and NYSDOH Project Managers. This CAMP is found in the SMP Appendix 5.

3-14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors on- and off- site. Specific odor control methods to be used on a routine basis will be defined in the workplan as required in Section 2-1. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the remedial party's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

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

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

3-15 DUST CONTROL PLAN

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

- Dust suppression will be achieved through the use of a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

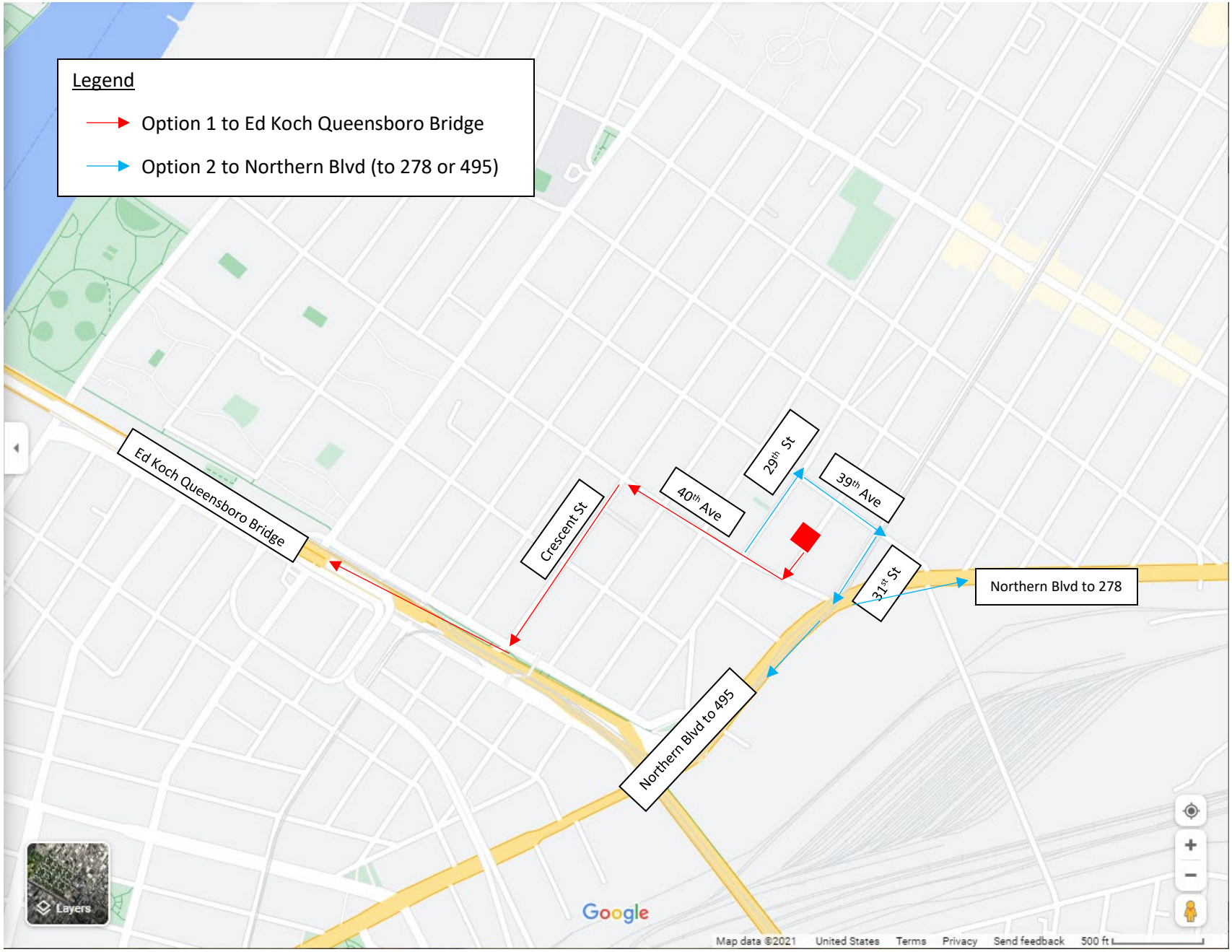
3-16 OTHER NUISANCES

A plan for rodent control will be developed and utilized by the contractor prior to and during site clearing and site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.

ATTACHMENT 1
TRUCK ROUTE

Excavation Work Plan
Bridge Cleaners Site # 241127
Attachment 1 – Truck Route



APPENDIX 4
BORING LOGS
& WELL CONSTRUCTION LOGS

PetroScience, Inc.

Boring Log No. B-1/GW-1

Location: Former Bridge Creques 39-26 30th Street, Long Island City, NY
Contractor: ETB
Licensed Driller:
Project No: 0951.4
Date Started: 1/13/13
Date Completed: 1/14/13
Inspector: BK

Method: GP | Spoon Size: 2 Inch | Depth to Water: 20' | Boring Depth: 25'

Sample Number	Sample Depth (feet)	Blows	Sample Description	OVM Result (PPM)	Depth (feet)
			0-0.5 Concrete		
			0.5-1.25 Cinders w/ some gravel		
9:10 B-1A	4.5-5.0			0	5
			1.25-7.0 Medium Light brown sand		
9:18 B-1B	9.5-10.0			0	10
			7.0-17.0' Fine light brown sand		
9:25 B-1C	14.5-15.0			0	15
			17.0-20.0' Fine brown sand	1	17
				18	18
				28	19
9:34 B-1D	19.5-20.0			40	20
			20.0-25.0' Medium brown sand	28	
				24	
			No odors	2	25
			GW @ 20.0'		
			well installed to a depth of 30' BGS on 1/14/14		
			15' screen		
			15' casing		

Well was installed as described in Section 3.5.2 of the RIWP dated September 2013 for the subject site.

PetroScience, Inc.

Boring Log No. B-2/GW-2

Location: Former Bridge Cleaners 39-26 30th Street, Long Island City, NY
Project No: 0951.H
Date Started: 1/13/14
Date Completed: 1/14/14
Contractor: ETB
Inspector: BH
Licensed Driller:
Method: GP
Spoon Size: 2 Inch
Depth to Water: 20
Boring Depth: 25

	Sample Number	Sample Depth (feet)	Blows	Sample Description	OVM Result (PPM)	Depth (feet)
				0-0.5 Concrete	1	
				0.5-1.0 Gravel	3.2	
12:33	B-2A	3.0-3.5		1.0-1.5 Cinders + some gravel	4.0	
					1.8	2'
					1.9	5'
					0	
					0	
12:41	B-2B	8.0-8.5		1.5-2.0 Dark brown silty loam w/some gravel	0	15'
					0	
					0	10'
					6.0	
					10	8'
12:50	B-2C	13.0-13.5		2.0-4.0 Reddish brown silty sand	12.0	
					6.8	
13:04	B-2D	14.5-15.0			2.2	15'
				4.0-4.5 light brown fine sand	14.0	38'
					16	
					1.7	
					18	
13:01	B-2E	19.5-20.0		4.5-8.0' Brown Medium Sand	22	20'
					43	
					44	
					44	
				8.0-20.0' Light Brown Fine Sand	47	48'
					31	25'
						28'
				20.0-25.0 Gray fine silty sand		
				GW @ 20		30'
				NO ODORS		
				well installed to a depth of 30' on 1/14/14		18'
				15' screen		
				15' casing		
						13'
						20'

well was installed as described in Section 3.5.2 of the RIWP dated September 2013 for the subject site.

PetroScience, Inc.

Boring Log No. B-3/GW-3

Location: Former Bridge Cleaners 39-26 30th Street, Long Island City, NY
Project No: 0951H
Date Started: 1/13/14
Date Completed: 1/14/14
Contractor: ETB
Inspector:
Licensed Driller:
Method: GP
Spoon Size: 2 Inch
Depth to Water: 18
Boring Depth: 25

Sample Number	Sample Depth (feet)	Blows	Sample Description	OVM Result (PPM)	Depth (feet)
			0-0.5 Concrete		
			0.5-1.0 silty sand w/gravel (dark brown)	32	2
15:05 B-3A	2.5-3.0			22	3
				6.1	4
			1.0-5.5 Brown medium sand	2.3	5
				10.2	
				11.4	
15:14 B-3B	8.0-8.5			12.2	9
				12.7	
			5.5-18.0 Light brown fine sand	12.9	10
				7.9	
				20.7	12
15:22 B-3C	13.0-13.5			25.5	VS
			18.0-25.0 Brown fine sand	17.0	
15:30 B-3D	14.5-15.0			12.0	15 SVO
				9.2	16
15:33 B-3E	17.5-18.0			53	
				38	18
				36	
			GW @ 18.0'	22	20
				2	
				0	
				0	
			No odors	0	24
					27
			Well installed to 30' BGS on 1/14/14		
					30
			15' screen		33
			15' Casing		
					36
					39

Well was installed as described in section 3.5.2 of the RIWP dated September 2013 for the site.

PetroScience, Inc.

Boring Log No. B4/GW4

Location: Former Bridge Cleaners 39.26 30th Street, Long Eikwood City, NV
Project No: 0951.11
Date Started: 1/13/14
Date Completed: 1/14/14
Contractor: ETI
Inspector:
Licensed Driller:
Method:
Spoon Size: 2 Inch
Depth to Water: 20'
Boring Depth: 25'

Sample Number	Sample Depth (feet)	Blows	Sample Description	OVM Result (PPM)	Depth (feet)
			0-0.5 Concrete	4.3	
				4.9	
11:32	B-4A	3.0-3.5	0.5-1.0 Cinders + some gravel	5.1	
				4.7	4
				3.8	5
			1.0-6.0' Medium Brown Sand	0.4	
				0.5	
11:37	B-4B	8.0-8.5		1.0	9
				0.5	
			6.0-16.0' Fine Light brown Sand	0.0	10
				4.2	
				16	15
			16.0-25.0 Fine brown Sand	22	
				24	
11:44	B-4C	13.5-14.0		14	15
				16	16
				42	
				48	
				50	
				53	20
11:52	B-4D	19.5-20.0		22	2
				3	
				0	
				0	25
				0	
			No odors		10
					30
			GW@ 20'		35
			Well installed to 30' BGS on 1/14/14		
					40
			15' screen		
			15' casing		
					45

Well was installed as described in section 3.5.2 of the RIWP dated September 2013 for the subject site.

PetroScience, Inc.

Boring Log No. B-5/GW-5

Location: Former Bridge Cleaners 39-26 30th Street, Long Island City, NY
Project No: 0951.11
Date Started: 1/13/14
Date Completed: 1/14/14
Contractor: ETB
Inspector: BK
Licensed Driller:
Method: GP
Spoon Size: 2 Inch
Depth to Water: 19.0
Boring Depth: 25

	Sample Number	Sample Depth (feet)	Blows	Sample Description	OVM Result (PPM)	Depth (feet)
				0-0.5 Concrete	14	
				0.5-1.0 Silty sand + gravel	16	
					24	3
					19	
13:50	B-5A	4.5-5.0			15	5
SVO 13:52	B-5B	5.75-6.25		1.0-1.5 Dark brown sand w/gravel	6.2	
					2.3	
					2.3	
				1.5-3.5 Brown silty sand	3.2	
13:56	B-5C	9.5-10.0			4.4	10
					3.0	
					9.8	
14:04	B-5D	13.0-13.5		3.5-6.0 Light Brown medium sand w some gravel	10	
					8.0	
					7.1	15
				6.0-9.5 Brown silty clay	7.0	
					13.1	
					9.8	
14:10	B-5E	18.5-19.0			12.3	
					24.9	20
				9.5- Light Brown fine sand	7.3	
					8.9	
					12.3	
					8.1	
						25
				GW@ 19.0		
				No odors		
						30
				well installed to a depth of 30' on 1/14/14		
				15' screen		
				15' casing		

well was installed as described in section 3.5.2 of the RIWP dated September 2013 for the subject site

LOG OF BOREHOLE

SB-06

PROJECT NUMBER: **PE075**
PROJECT NAME: **Bridge Cleaners**
LOCATION: **39-26 30th Street, LIC, NY**
GEOLOGIST: **SM/LW**
DATE BEGUN: **12/30/14** DATE COMPLETED: **12/30/14**
BORING START **9:00** BORING COMPLETE: **10:50**

TOTAL DEPTH: **20'**
GROUND SURFACE ELEVATION: **38'**

STATIC WATER LEVEL (BLS)	
Depth (ft)	Oberserved at ~18.5 ft bgs
Time	10:50
Date	12/30/2014

Sample ID	Time	Tag	% Recovery	Sheen	Depth (Feet)	PID (ppm)	Lithology USCS	DESCRIPTION	WELL INSTALLATION
			N/A		0–5	0.3		SP: Brown dark brown medium to fine SAND, some medium Gravel, trace fine Silt; poorly sorted; dry; loose; subrounded; uniform; no odor;	
			68		5–10	0		SM: Brown fine SAND, trace medium Gravel, trace Mica; well sorted; dry; soft; subrounded; uniform; no odor;	
					10–11	0		SP: Brown fine SAND, trace medium Gravel, trace Mica; well sorted; dry; soft; subrounded; uniform; no odor;	
SB-06 (11.5' - 12')					11–12	1			
			77		12–13			SP: Dark Brown fine to medium SAND; moderately sorted; damp; medium dense; uniform; no odor;	
					13–15	0		SP: Brown fine SAND, trace Mica; well sorted; damp; medium dense; uniform; no odor;	
					15–18	0		SM: Brown fine SAND, trace Mica, trace Silt; well sorted; damp; medium dense; uniform; no odor;	
SB-06 (17.5' - 18.5')			94						
					18–20	0.8		SM: Brown fine SAND, trace Mica, trace Silt; well sorted; wet; medium dense; thinly bedded; no odor;	

DRILLING CONTRACTOR: **AARCO**
DRILLING METHOD: **Hydraulic Hammer**
DRILLING EQUIPMENT: **Geoprobe 7720 DT**
SAMPLING EQUIPMENT: **57.5" Macro Core**
LATITUDE: **40°45'9.50"N**
LONGITUDE: **73°56'4.69"W**

NOTES: **SB-06 (11.5-12') - VOCs Analysis**
SB-06 (17.5-18.5') - VOCs Analysis

LOG OF BOREHOLE

SB-07

PROJECT NUMBER: **PE075**
PROJECT NAME: **Bridge Cleaners**
LOCATION: **39-26 30th Street, LIC, NY**
GEOLOGIST: **SM/LW**
DATE BEGUN: **12/30/14** DATE COMPLETED: **12/30/14**
BORING START **10:50** BORING COMPLETE: **11:30**

TOTAL DEPTH: **20'**
GROUND SURFACE ELEVATION: **38'**

STATIC WATER LEVEL (BLS)	
Depth (ft)	Oberserved at ~18.5 ft bgs
Time	11:30
Date	12/30/2014

Sample ID	Time	Tag	% Recovery	Sheen	Depth (Feet)	PID (ppm)	Lithology USCS	DESCRIPTION	WELL INSTALLATION
SB-07 (0-4') and Duplicate			N/A		0–4	0.2		SW: Brown fine to medium SAND, some Silt, some Gravel; moderately sorted; damp; loose; uniform; no odor;	
					4–5	0		SP: Brown fine SAND, trace medium Sand; well sorted; dry; soft; uniform; no odor;	
			63		5–6	0		SM: Dark Brown fine to medium SAND, trace Silt, trace medium Gravel; well sorted; damp; soft; subrounded; uniform; no odor;	
					6–10	0		SP: Brown fine to medium SAND; well sorted; dry; soft; uniform; no odor;	
			83		10–15	0.2		SP: Brown fine to medium SAND, trace medium Pebbles, trace Mica; moderately sorted; damp; medium dense; subrounded; uniform; no odor;	
SB-07 (15 - 17.5')			94		15–17	0		SP: Brown medium SAND, trace medium Pebbles, trace Mica; moderately sorted; damp; medium dense; subrounded; thinly bedded; no odor;	
					17–20	2		SP: Brown fine SAND, some Silt, trace Mica; well sorted; wet; medium dense; thinly bedded; no odor;	

DRILLING CONTRACTOR: **AARCO**
DRILLING METHOD: **Hydraulic Hammer**
DRILLING EQUIPMENT: **Geoprobe 7720 DT**
SAMPLING EQUIPMENT: **57.5" Macro Core**
LATITUDE: **40°45'9.54"N**
LONGITUDE: **73°56'4.82"W**

NOTES: **SB-07 (0-4') - VOCs Analysis**
Duplicate - SB-07 (0-4')
SB-07 (15-17.5') - VOCs Analysis

WELL LOG

Well ID: **GW-1R**

PROJECT NUMBER: N-Bridge Cleaners
PROJECT NAME: Bridge Cleaners
ADDRESS: 39-26 30th Street, Long Island City, NY
CLIIENT: 39-26 Properties, LLC

LOCATION:
COORDINATES N: E:
SURFACE ELEVATION:
DATUM:

DRILLER: Coastal Environmental Solutions, Inc.
INSPECTOR: Mike Huston

START DATE: 3/15/2023
FINISH DATE: 3/16/2023

DRILLING METHOD: Direct Push TOTAL DEPTH: 30 ft' below slab SAMPLER TYPE: N/A
RIG TYPE: 7822 DT TOP OF ROCK: N/A

WELL ID	DIAMETER (INCH)	MATERIAL TYPE
GW-1R	2.0"	PVC
SCREEN INTERVAL	SLOT	RISER
15 - 30	0.020	0 - 15
SAND PACK INT.	SAND TYPE	FINISH CASING TYPE
13 - 30, 5 - 12	# 1 Morie Sand	Flush Mount

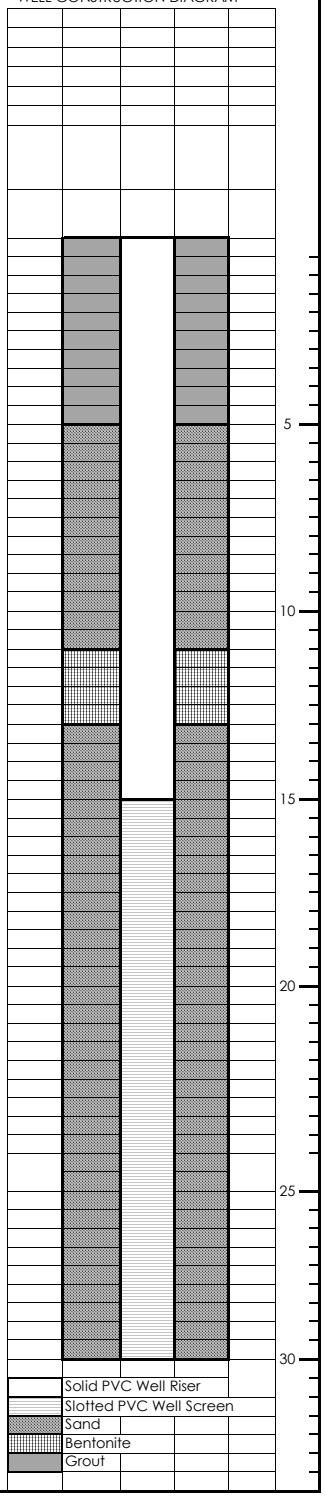
GROUND WATER DATA

DATE	TIME	DTW (ft.)	DTP (ft.)	
3/16/2023	720	20.64	--	
3/28/2023	930	20.45	--	

Notes

DEPTH (ft.)	PID (ppm)	SAMPLING INTERVAL	RECOVERY	USCS SYMBOL	FIELD CLASSIFICATION AND REMARKS
					Well Installed Via Direct Push - No soil observed

WELL CONSTRUCTION DIAGRAM



WELL LOG

Well ID: **GW-2R**

PROJECT NUMBER: N-Bridge Cleaners
PROJECT NAME: Bridge Cleaners
ADDRESS: 39-26 30th Street, Long Island City, NY
CLIIENT: 39-26 Properties, LLC

LOCATION:
COORDINATES N: E:
SURFACE ELEVATION:
DATUM:

DRILLER: Coastal Environmental Solutions, Inc.
INSPECTOR: Mike Huston

START DATE: 3/14/2023
FINISH DATE: 3/16/2023

DRILLING METHOD: Direct Push TOTAL DEPTH: 30 ft' below slab SAMPLER TYPE: N/A
RIG TYPE: 7822 DT TOP OF ROCK: N/A

WELL ID	DIAMETER (INCH)	MATERIAL TYPE
GW-2R	2.0"	PVC
SCREEN INTERVAL	SLOT	RISER
15 - 30	0.020	0 - 15
SAND PACK INT.	SAND TYPE	FINISH CASING TYPE
13 - 30, 5 - 12	# 1 Morie Sand	Flush Mount

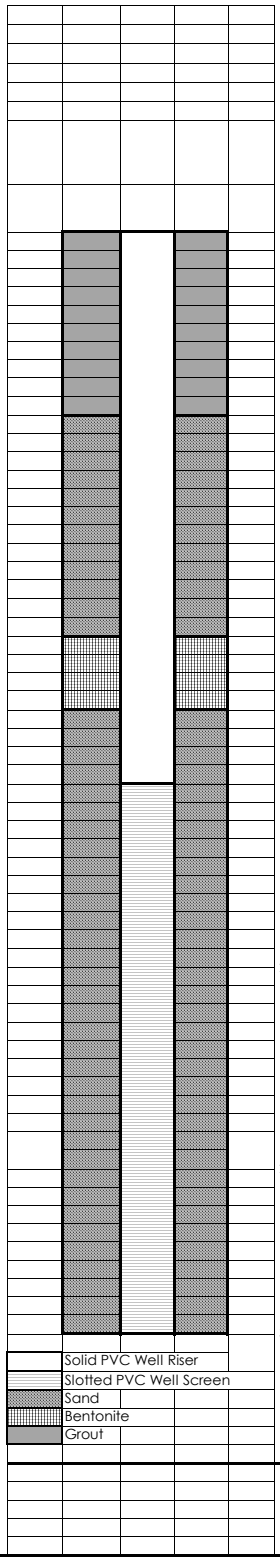
GROUND WATER DATA

DATE	TIME	DTW (ft.)	DTP (ft.)	
3/16/2023	725	20.30	--	
3/28/2023	935	20.38	--	

Notes

DEPTH (ft.)	PID (ppm)	SAMPLING INTERVAL	RECOVERY	USCS SYMBOL	FIELD CLASSIFICATION AND REMARKS
					Well Installed Via Direct Push - No soil observed
5					
10					
15					
20					
25					
30					

WELL CONSTRUCTION DIAGRAM



WELL LOG

Well ID: **GW-3R**

PROJECT NUMBER: N-Bridge Cleaners
PROJECT NAME: Bridge Cleaners
ADDRESS: 39-26 30th Street, Long Island City, NY
CLIIENT: 39-26 Properties, LLC

LOCATION:
COORDINATES N: E:
SURFACE ELEVATION:
DATUM:

DRILLER: Coastal Environmental Solutions, Inc.
INSPECTOR: Mike Huston

START DATE: 3/15/2023
FINISH DATE: 3/16/2023

DRILLING METHOD: Direct Push TOTAL DEPTH: 30 ft' below slab SAMPLER TYPE: N/A
RIG TYPE: 7822 DT TOP OF ROCK: N/A

WELL ID	DIAMETER (INCH)	MATERIAL TYPE
GW-3R	2.0"	PVC
SCREEN INTERVAL	SLOT	RISER
15 - 30	0.020	0 - 15
SAND PACK INT.	SAND TYPE	FINISH CASING TYPE
13 - 30, 5 - 12	# 1 Morie Sand	Flush Mount

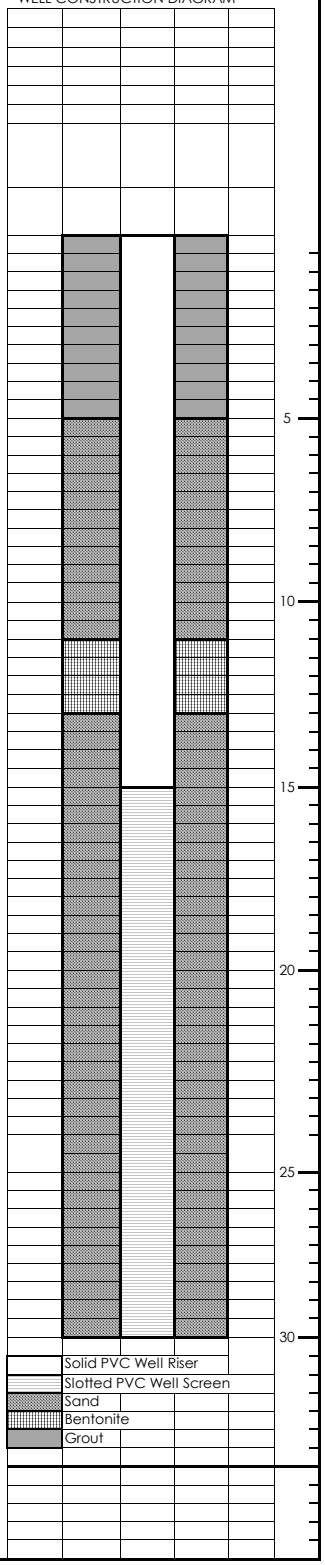
GROUND WATER DATA

DATE	TIME	DTW (ft.)	DTP (ft.)	
3/16/2023	730	20.40	--	
3/28/2023	940	20.42	--	

Notes

DEPTH (ft.)	PID (ppm)	SAMPLING INTERVAL	RECOVERY	USCS SYMBOL	FIELD CLASSIFICATION AND REMARKS
					Well Installed Via Direct Push - No soil observed

WELL CONSTRUCTION DIAGRAM



WELL LOG

Well ID: **GW-5R**

PROJECT NUMBER: N-Bridge Cleaners
PROJECT NAME: Bridge Cleaners
ADDRESS: 39-26 30th Street, Long Island City, NY
CLIIENT: 39-26 Properties, LLC

LOCATION:
COORDINATES N: E:
SURFACE ELEVATION:
DATUM:

DRILLER: Coastal Environmental Solutions, Inc.
INSPECTOR: Mike Huston

START DATE: 3/14/2023
FINISH DATE: 3/16/2023

DRILLING METHOD: Direct Push TOTAL DEPTH: 30 ft' below slab SAMPLER TYPE: N/A
RIG TYPE: 7822 DT TOP OF ROCK: N/A

WELL ID	DIAMETER (INCH)	MATERIAL TYPE
GW-5R	2.0"	PVC
SCREEN INTERVAL	SLOT	RISER
15 - 30	0.020	0 - 15
SAND PACK INT.	SAND TYPE	FINISH CASING TYPE
13 - 30, 5 - 12	# 1 Morie Sand	Flush Mount

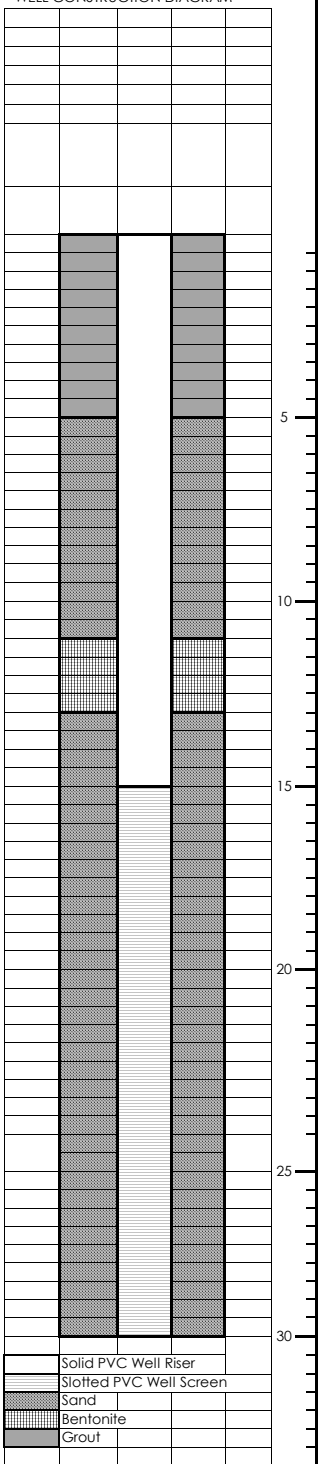
GROUND WATER DATA

DATE	TIME	DTW (ft.)	DTP (ft.)	
3/16/2023	735	19.59	--	
3/28/2023	945	20.42	--	

Notes

DEPTH (ft.)	PID (ppm)	SAMPLING INTERVAL	RECOVERY	USCS SYMBOL	FIELD CLASSIFICATION AND REMARKS
					Well Installed Via Direct Push - No soil observed

WELL CONSTRUCTION DIAGRAM



WELL LOG

Well ID: **GW-6**

PROJECT NUMBER: N-Bridge Cleaners
PROJECT NAME: Bridge Cleaners
ADDRESS: 39-26 30th Street, Long Island City, NY
CLIIENT: 39-26 Properties, LLC

LOCATION:
COORDINATES N: E:
SURFACE ELEVATION:
DATUM:

DRILLER: Coastal Environmental Solutions, Inc.
INSPECTOR: Mike Huston

START DATE: 3/14/2023
FINISH DATE: 3/16/2023

DRILLING METHOD: Direct Push TOTAL DEPTH: 30 ft' below slab SAMPLER TYPE: N/A
RIG TYPE: 7822 DT TOP OF ROCK: N/A

WELL ID	DIAMETER (INCH)	MATERIAL TYPE
GW-6	2.0"	PVC
SCREEN INTERVAL	SLOT	RISER
15 - 30	0.020	0 - 15
SAND PACK INT.	SAND TYPE	FINISH CASING TYPE
13 - 30, 5 - 12	# 1 Morie Sand	Flush Mount

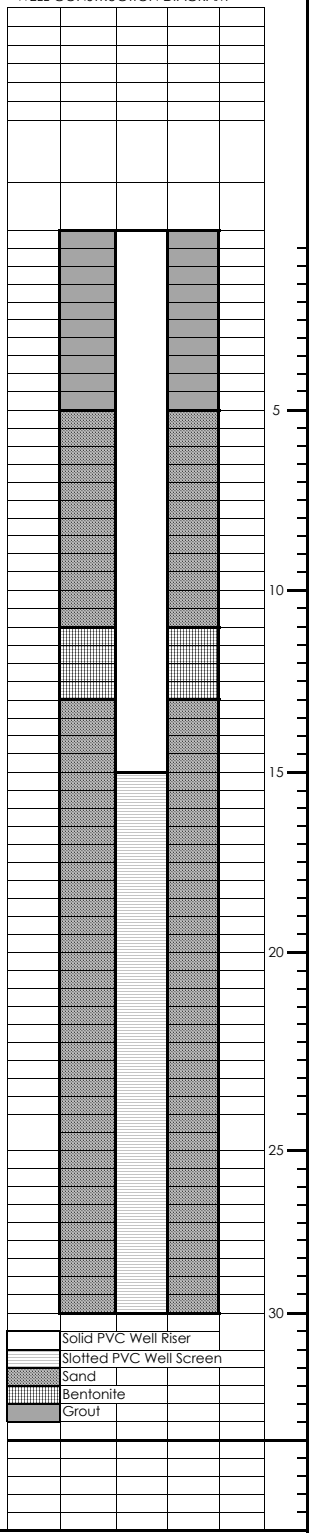
GROUND WATER DATA

DATE	TIME	DTW (ft.)	DTP (ft.)	
3/16/2023	740	20.10	--	
3/28/2023	950	20.22	--	

Notes

DEPTH (ft.)	PID (ppm)	SAMPLING INTERVAL	RECOVERY	USCS SYMBOL	FIELD CLASSIFICATION AND REMARKS
					Well Installed Via Direct Push - No soil observed
5					
10					
15					
20					
25					
30					

WELL CONSTRUCTION DIAGRAM



APPENDIX 5
HEALTH AND SAFETY PLAN (HASP)

This Level 2 HASP is intended to provide health and safety guidelines for project field work meeting the following criteria:

- **"Buddy System" in use (or communication plan implemented for "lone worker"**
- **Some likelihood of chemical and/or physical hazard exposure**
- **No supplied-air respirator use**

The Project Manager should review this Health and Safety Plan with all project personnel. A copy of the HASP must be kept in the field with the project team as well as maintained in project files.

<table>
<tr><td rowspan="6">Administrative Information

This document is valid for a maximum time period of one year after initial completion and must be re-evaluated by the project team at that time.

A minimum of two persons with appropriate training must be onsite or an appropriate communication plan must be implemented. A mix of employee and other personnel can satisfy this requirement.</td><td colspan="2">Site Name and Location
Bridge Cleaners; 39-26 30th Street, Long Island City, New York</td></tr>
<tr><td colspan="2">Client Contact and Phone
Steven Li – (203)-908-5112</td></tr>
<tr><td colspan="2">Project Name
Bridge Cleaners</td></tr>
<tr><td>Health & Safety Plan Date
January 28, 2020</td><td>Revision Number and Date
Revision 2 - June 9, 2025</td></tr>
<tr><td>Field Work Start Date
Spring 2020</td><td>Anticipated Field Work End Date
TBD</td></tr>
<tr><td>Project Manager (responsible for implementing the site health and safety program on this project)
Nick Krasnecky, PE</td><td>Site Safety Officer (SSO) (responsible for overall site health and safety performance on this project).

TBD</td></tr>
</table>

Project Background and Scope of Work

Include numbered list of tasks to be completed by personnel during this project, and a separate list of tasks to be completed by any subcontractors at the site.

JSAs are to be prepared for each task listed. Subcontractors are responsible for preparing JSAs for their activities.

Scope of Work: Conduct periodic groundwater sampling and monitoring requirements, and conduct cover inspections

Subcontractor Scope of Work:

Site/Project General Information

An asterisk (*) indicates that additional checklists or permits are required and must be completed and attached to this document.

A double asterisk (**) indicates that a Risk Review performed by a member of the Corporate Safety Committee must take place prior to beginning fieldwork on the project.

Site Type (check all applicable boxes)

☒ Active Facility	☐ Remote Facility	☐ Inactive Facility	☒ Residential
☐ Mine	☐ Railroad	☐ Industrial	☐ Secured
☐ Uncontrolled	☐ Agricultural	☐ Commercial	☐ Other (specify)

Main Site Hazards (check all applicable boxes)

☒ Slip/Trip/Fall	☐ Cold Stress	☐ Heat Stress	☐ Extreme Weather
☐ Biological	☒ Organic/Inorganic Chemicals	☐ High Noise	☐ Construction Traffic
☐ Vehicular Traffic	☒ Respirable Particles	☐ Excavations	☐ Buried/Overhead Utilities
☐ Non-Ionizing Radiation	☐ Security	☐ ASTs/USTs	☐ Manlift/Cherry Picker Use
☒ Work Over 6' High	☒ Hand/Portable Power Tools	☐ Oxygen Deficiency	☐ Construction
☐ Blasting Agents	☐ Confined Spaces	☐ Welding or Hot Work	☐ Chemical Mixing**
☒ Lockout/Tagout	☐ Forklift Use	☐ Sharps	
☐ Scaffold Use	☒ Portable Ladders	☐ Other (*specify*)	

Chemical Products to Use or Store Onsite

For each chemical product identified, an SDS must be attached to this HASP

☒ Alconox or Liquinox	☐ Calibration gas (Methane)	☐ Isopropyl Alcohol
☒ Hydrochloric acid (HCl)*	☒ Calibration gas (Isobutylene)	☐ Household bleach (NaOCl)*
☐ Nitric acid (HNO_3)*	☐ Calibration gas (Pentane)	☐ Sulfuric acid (H_2SO_4)*
☐ Sodium hydroxide (NaOH)*	☐ Calibration gas (4-gas mixture)	☐ Hexane
☐ Gasoline	☐ Methanol	☐ Other (specify)

***NOTE: Eyewash solution shall be readily available on ALL projects where corrosive materials are used or stored, including sample preservatives.**

Safe Work Practices

Place a checkmark by applicable SWPs and attach to this document

For hazards not covered by SWPs listed in this section, ensure the hazard is addressed in the JSA for that task. Otherwise, the JSA may reference the SWP for that hazard.

SWPs Applicable To This Project (check all applicable boxes)

☒ Hazard Communication	☒ Medical Services and First Aid	☐ Airborne Contaminants	☐ Heat Stress
☐ Cold Stress	☐ Natural Hazards	☒ Personal Protective Equipment	☐ Respiratory Protection
☐ Confined Space Entry	☐ Drum Handling	☐ Excavation	☐ Fall Protection and Prevention
☐ Forklift and Truck Operations	☒ Hand/Power Tool Use	☐ Heavy and Material Handling Equipment	☒ Ladder Safety
☐ Wet Utilities – Maintenance, Inspection, Repair	☒ **Other Task (specify)** **Lock Out/Tag Out**	☒ **Other Task (specify)** **Mechanical Equipment**	☒ **Other Task (specify)** **Pressurized Lines**
☐ **Other Task (specify)**	☐ **Other Task (specify)**	☐ **Other Task (specify)**	☐ **Other Task (specify)**

Levels of Protection Required for each Task

Signature of the SSO on page 1 of this document signifies certification of PPE Hazard Assessment

Task Description	Level			
	A	B	C	D
Periodic groundwater sampling & cover inspection	☐	☐	☐	☒
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐

Personal Protective Equipment	Equipment	Req	Rec	NA	Equipment	Req	Rec	NA
Req=Required Rec=Recommended An asterisk (*) indicates that employees must be a participant in the respiratory program, including, annual training and fit testing.	Steel Toe Boots	☒	☐	☐	Tyvek Suit	☐	☐	☒
	Safety Glasses Shields	☐	☒	☐	Outer Disposable Boots	☐	☐	☒
	Hi Vis Vest (Specify Class 2/3)	☐	☒	☐	Indirect Vented Goggles	☐	☐	☒
	Hi Vis Shirt	☐	☒	☐	Poly-Coated Tyvek	☐	☐	☒
	Hard Hat	☐	☐	☒	Dust Mask*	☐	☐	☒
	Fire Resistant Clothing (FRC)	☐	☐	☒	Full-Face Respirator*	☐	☐	☒
	Hearing Protection	☐	☐	☒	Half-Face Respirator*	☐	☐	☒
	Work Gloves – Type: Leather	☐	☒	☐	Inner Chemical Gloves	☐	☐	☒
	Outer Chemical Gloves	☒	☐	☐	Other (specify)	☐	☐	☐
Training and Medical Surveillance Req=Required Rec=Recommended	**Training**	**Req**	**Rec**	**NA**	**Medical Surveillance**	**Req**	**Rec**	**NA**
	40 Hour HAZWOPER	☒	☐	☐	Medical Clearance (fit for duty)	☒	☐	☐
	Current 8 Hour HAZWOPER	☒	☐	☐	Respirator Clearance	☐	☐	☒
	8 Hour HAZWOPER Supervisor	☐	☐	☒	Blood Lead and ZPP	☐	☐	☒
	24Hour HAZWOPER	☐	☐	☒	Other (specify)	☐	☐	☐
	Current CPR, First Aid, and BBP	☐	☒	☐	Other (specify)	☐	☐	☐
	10 Hour Construction	☐	☐	☒	Other (specify)	☐	☐	☐
	Other (specify)	☐	☐	☐	Other (specify)	☐	☐	☐
	Other (specify)	☐	☐	☐	Other (specify)	☐	☐	☐
	Other (specify)	☐	☐	☐	Other (specify)	☐	☐	☐
Safety Supplies Req=Required Rec=Recommended	**Supplies**	**Req**	**Rec**	**NA**	**Supplies**	**Req**	**Rec**	**NA**
	First Aid Kit	☒	☐	☐	Fire Extinguisher	☐	☒	☐
	Eyewash Solution	☒	☐	☐	Water/Sports Drink	☐	☒	☐
	Air Horn	☐	☐	☒	Oral Thermometer (heat monitoring)	☐	☐	☒
	Noise Meter (Dosimeter)	☐	☐	☒	Decontamination Supplies	☒	☐	☐

Work Zones **If exclusion zones are necessary because of chemical OR equipment hazards, describe the plan**	Exclusion Zone: 10-foot radius around equipment
	Contamination Reduction Zone: Area between the 10 and 15-foot radius around equipment
	Support Zone: Area between the 15 and 25-foot radius around equipment

Site Access/Control **How do we limit unauthorized entry to the site itself?**	Access Control Procedures: Close doors to the building, set up cones on sidewalk in front of the building as necessary to limit use of specific doors and/or garage doors.
DECON Procedures	Decontamination Procedures: Use Alconox solution to wash contaminated equipment

Communication Plan **In the event work must be completed alone by an employee or work is performed in a rural area with limited communication, this Communication Plan must be completed.**	The purpose of the communication plan is to provide a "What to Do" if the project manager/supervisor cannot contact field personnel. The field team and PM must coordinate a call in time daily. The check-in intervals will depend on the project setting and hazards. More importantly, if the field team does not check in, what is the requirement or actions of the PM.			
	Daily Check in Time	Responsible Person	Daily Check In Time	Responsible person
	12:00	Field Staff	Before leaving site	Field Staff
	Plan of Action (in the event of no communication): Site Safety Officer will call field staff on site.			

Chemicals of Concern

In the section to the right, check any chemicals present onsite in any media (air, soil water).

In the table below, list chemicals suspected or confirmed to be onsite, and provide requested information.

☐ Friable Asbestos	☐ Vinyl chloride	☐ Toluene
☐ RCRA Metals	☐ Inorganic Arsenic	☐ Ethylbenzene
☐ Lead	☐ Cadmium	☐ Xylene
☐ Benzene	☐ Formaldehyde	☐ Polyaromatic hydrocarbons (PAHs)
☒ Trichloroethylene (TCE)	☐ Fuel Oils	☐ Polychlorinated biphenyl (PCBs)
☒ Tetrachloroethylene (PCE)	☐ Methylene chloride	☐ Chromium (VI)
☐ Acetone	☐ Other	☐ Other
☐ Lithium	☐ Other	☐ Other
☐ Other	☐ Other	☐ Other
	☐ **No exposure to these**	

Materials Present or Suspected at Site	Highest Reported Concentration (specify units and sample medium)	Exposure Limit (specify ppm or mg/m³)	IDLH Level (specify ppm or mg/m³)	Primary Hazards of the Material (explosive, flammable, corrosive, toxic, volatile, radioactive, biohazard, oxidizer, or other)	Symptoms and Effects of Acute Exposure	Ionization Potential (eV)
Trichloroethylene (TCE)	GW: 4.1 ug/L	PEL = 100 ppm REL = 25 ppm TLV = 10 ppm Skin Hazard ☒	1000 ppm	Toxic, Volatile, Flammable	irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	9.45
Tetrachloroethylene (PCE)	GW: 210 ug/L	PEL = 100 ppm REL = TLV = 25 ppm Skin Hazard ☒	150 ppm	Toxic, Volatile	irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]	9.32
		PEL = REL = TLV = Skin Hazard ☒				
		PEL = REL = TLV = Skin Hazard ☐				

PEL = OSHA Permissible Exposure Limit
REL = NIOSH Recommended Exposure Limit
TLV = ACGIH Threshold Limit Value
IDLH = Immediately Dangerous to Life or Health

Monitoring Equipment: All monitoring equipment on site must be calibrated before and after each use and results recorded.				
Instrument (Check all required)	**Task**	**Instrument Reading**	**Action Guideline**	**Comments**
☐ Combustible gas indicator model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	0 to 10% LEL 10 to 25% LEL >25% LEL	Monitor; evacuate if confined space Potential explosion hazard Explosion hazard; interrupt task; evacuate site	
☐ Oxygen meter model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	>23.5% Oxygen 23.5 to 19.5% Oxygen <19.5% Oxygen	Potential fire hazard; evacuate site Oxygen level normal Oxygen deficiency; interrupt task; evacuate site	
☐ Radiation survey meter model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Normal background Two to three times background >Three times background	Proceed Notify SSO Radiological hazard; interrupt task; evacuate site	Annual exposure not to exceed 1,250 mrem per quarter Background reading must be taken in an area known to be free of radiation sources
☒ Photoionization detector model: ☐ 11.7 eV ☒ 10.6 eV ☐ 10.2 eV ☐ 9.8 eV ☐ _____ eV	☒ 1 ☒ 2 ☒ 3 ☐ 4 ☐ 5	Any response above background to 5 ppm above background 5 ppm above background 10 ppm above background	Level D is acceptable Level C (not anticipated) Discontinue work	Action levels must be determined based on the COCs and concentrations identified in the media sampled. If no COC conentrations are known, then use 5 ppm sustained within the breathing zone as your action level until the contaminants are identified.
☐ Flame ionization detector model:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Any response above background to ppm above background ppm above background above background	Level C is acceptable Level B is recommended Level B Level A	Action levels must be determined based on the COCs and concentrations identified in the media sampled. If no COC conentrations are known, then use 5 ppm sustained within the breathing zone as your action level until the contaminants are identified.
☐ Detector tube models:	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Specify:	Specify:	The action level for upgrading the level of protection is one-half of the contaminant's PEL. If the PEL is reached, evacuate the site and notify a safety specialist.
☐ Other (specify):	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	Specify:	Specify:	

Emergency Response Planning	
In the pre-work briefing and Daily Tailgate Safety meetings, all onsite employees will be trained in the provisions of emergency response planning, site communication systems, and site evacuation routes. **Signal a site emergency or medical emergency with three blasts of a loud horn (car horn, fog horn, or similar device).** **To complete this section, attach a hospital route map to the HASP.**	**All work-related incidents must be reported. For all medical emergencies, call 911 or the local emergency number. For non-emergency incidents, you must:** • Give appropriate first aid care to the injured or ill individual and secure the scene. • Immediately call **Axiom Medical at (877) 502-9466** (available 24 hours/7 days per week) if the injured person is an employee. • Notify the Project Manager and/or SSO after calling Axiom. • Enter the safety incident into the Incident Report and submit to the CHSO at within 24 hours. **In the event of an emergency that necessitates evacuation of the work task area or the site as a whole, the following procedures shall occur:** • The site supervisor or Project Manager will contact all nearby personnel using the onsite communications system to advise of the emergency. • Personnel will proceed along site roads to a safe distance upwind from the hazard source to a pre-determined assembly area. • Call 911 • Personnel will remain in that area until the site supervisor or Project Manager or other authorized individual provides further instruction. **In the event of a severe spill or leak, site personnel will follow the procedures listed below:** • **STOP WORK** • Evacuate the affected area and relocate personnel to an upwind, pre-determined assembly area. • Inform the site supervisor or Project Manager, an office, and a site representative immediately. • Locate the source of the spill or leak, and stop the source if it is safe to do so until appropriately trained personnel are onsite to do so. Begin containment and recovery of spilled or leaked materials. • Notify appropriate local, state, and federal agencies after obtaining client consent to do so. **In the event of severe weather, site personnel will follow the procedures listed below:** • Site work shall not be conducted during severe weather, including high winds and lightning. • In the event of severe weather, stop work, lower any equipment (drill rigs), and evacuate the affected area. • Monitor internet or other sources for sever weather alerts before resuming work. • In the event of lightning, outdoor work must be halted for a minimum of **30 minutes** from the last lightening observation.

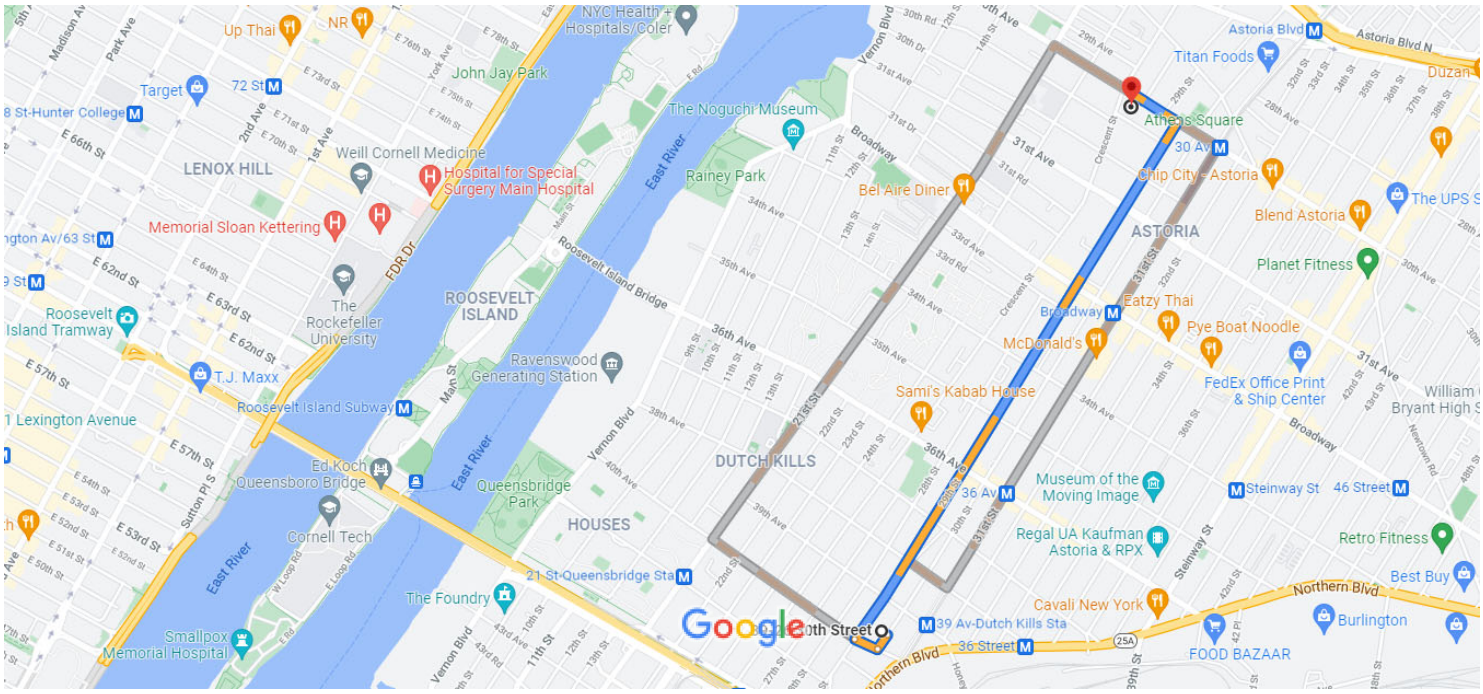
Emergency Contacts	Name	Location	Phone	Cell Phone
Hospital (attach map)	Mt Sinai Queens	25-10 30th Ave, Queens, NY	718-932-1000	
Police	NYCPD	4707 Pearson Pl, LIC, NY	718-361-1021	
Fire	FDNY Ladder 116	37-20 29th St, LIC, NY	911	
Project Manager	Nick Krasnecky	1 Emery Ave., Unit 2, Randolph, NJ	201-552-0224	
Field Manager (if not PM)				
Site Safety Officer (if not PM)	TBD			
Division H&S Contact				
Corporate H&S Contact	TBD			
Incident Intervention	Axiom	NA	877-502-9466	
Subcontractor Safety Contact	TBD	TBD	TBD	

Acknowledgement	***I have read, understood, and agree with the information set forth in this Health & Safety Plan, and will follow guidance in the plan and in the Corporate Health and Safety Manual. I understand the training and medical monitoring requirements for conducting activities covered by this HASP and have met these requirements.*** ***This plan has been prepared solely for the purpose of protecting the health and safety of employees. Subcontractors, visitors, and others at the site are required to follow provisions in this document at a minimum, but must refer to their organization's health and safety program for their protection.***		
Printed Name	Signature	Organization	Date

Approval Signatures

Signatures in this section indicate the signing employee will comply with and enforce this HASP, as well as procedures and guidelines established in the Corporate H&S Manual. Signatures in this section also indicate that any subcontractors performing work under contract agree to comply with this HASP.

Google Maps 39-26 30th Street, Queens, NY to Mount Sinai Queens Drive 1.4 miles, 9 min



Map data ©2021 Google 1000 ft

39-26 30th St

Long Island City, NY 11101

1. Head southwest on 30th St toward 40th Ave

190 ft

2. Turn right onto 40th Ave

266 ft

3. Turn right onto 29th St

1.3 mi

4. Turn left onto 30th Ave

Destination will be on the left

0.1 mi

Mount Sinai Queens

25-10 30th Ave, Queens, NY 11102

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

1 Identification of the substance/mixture and of the supplier

1.1 Product identifier

Trade Name: Alconox
Synonyms:
Product number: 1104-1, 1104, 1125, 1150, 1101, 1103, 1112-1, 1112

1.2 Application of the substance / the mixture : Cleaning material/Detergent

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer
Alconox, Inc.
30 Glenn Street
White Plains, NY 10603
1-914-948-4040

Supplier

Emergency telephone number:
ChemTel Inc
North America: 1-800-255-3924
International: 01-813-248-0585

2 Hazards identification

2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments.

Hazard-determining components of labeling:
Tetrasodium Pyrophosphate
Sodium tripolyphosphate
Sodium Alkylbenzene Sulfonate

2.2 Label elements:

Skin irritation, category 2.
Eye irritation, category 2A.

Hazard pictograms:

Signal word: Warning

Hazard statements:
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Additional information: None.

Hazard description

Hazards Not Otherwise Classified (HNOC): None

Information concerning particular hazards for humans and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients

3.1 Chemical characterization : None

3.2 Description : None

3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	12-28
CAS number: 68081-81-2	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	8-22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	2-16

3.4 Additional Information : None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.

Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.

Remove contact lens(es) if able to do so during rinsing.

Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.

Seek medical attention if irritation, discomfort, or vomiting persists.

4.2 Most important symptoms and effects, both acute and delayed

None

4.3 Indication of any immediate medical attention and special treatment needed:

No additional information.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents : None

5.2 Special hazards arising from the substance or mixture :

Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters

Protective equipment:

Wear protective eye wear, gloves and clothing.
Refer to Section 8.

5.4 Additional information :

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.
Avoid contact with skin, eyes and clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures :

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions :

Should not be released into the environment.
Prevent from reaching drains, sewer or waterway.

6.3 Methods and material for containment and cleaning up :

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections : None

7 Handling and storage

7.1 Precautions for safe handling :

Avoid breathing mist or vapor.
Do not eat, drink, smoke or use personal products when handling chemical substances.

7.2 Conditions for safe storage, including any incompatibilities :

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

8 Exposure controls/personal protection

8.1 Control parameters :

a) 7722-88-5, Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3

b) Dusts, non-specific OEL, Irish Code of Practice

(i) Total inhalable 10 mg/m3 (8hr)

(ii) Respirible 4mg/m3 (8hr)

(iii) Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3, (8hr)

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal use conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance or preparation. Protective gloves recommended to comply with EN 374. Take note of break through times, permeability, and special workplace conditions, such as mechanical strain, duration of contact, etc. Protective gloves should be replaced at the first sign of wear.

Eye protection:

Safety goggles or glasses, or appropriate eye protection. Recommended to comply with ANSI Z87.1 and/or EN 166.

General hygienic measures:

Wash hands before breaks and at the end of work.

Avoid contact with skin, eyes and clothing.

9 Physical and chemical properties

Appearance (physical state, color):	White and cream colored flakes - powder	**Explosion limit lower:** **Explosion limit upper:**	Not determined or not available. Not determined or not available.
Odor:	Not determined or not available.	**Vapor pressure at 20°C:**	Not determined or not available.
Odor threshold:	Not determined or not available.	**Vapor density:**	Not determined or not available.
pH-value:	9.5 (aqueous solution)	**Relative density:**	Not determined or not available.
Melting/Freezing point:	Not determined or not available.	**Solubilities:**	Not determined or not available.
Boiling point/Boiling range:	Not determined or not available.	**Partition coefficient (n-octanol/water):**	Not determined or not available.
Flash point (closed cup):	Not determined or not available.	**Auto/Self-ignition temperature:**	Not determined or not available.
Evaporation rate:	Not determined or not available.	**Decompositio n**	Not determined or not available.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Flammability (solid, gaseous):	Not determined or not available.	**Viscosity**:	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.
Density at 20°C:	Not determined or not available.		

10 Stability and reactivity

10.1 Reactivity : None

10.2 Chemical stability : None

10.3 Possibility hazardous reactions : None

10.4 Conditions to avoid : None

10.5 Incompatible materials : None

10.6 Hazardous decomposition products : None

11 Toxicological information

11.1 Information on toxicological effects :

Acute Toxicity:

Oral:

: LD50 > 5000 mg/kg oral rat - Product .

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Sodium Alkylbenzene Sulfonate: Causes skin irritation. .

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation .

Tetrasodium Pyrophosphate: Rabbit - Risk of serious damage to eyes .

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.
Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.4 mg/l, 48 hours. Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Tetrasodium Pyrophosphate: Fish, LC50 - other fish - 1,380 mg/l - 96 h.
Tetrasodium Pyrophosphate: Aquatic invertebrates, EC50 - Daphnia magna (Water flea) - 391 mg/l - 48 h.

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)

Relevant Information:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information

14.1 UN Number: ADR, ADN, DOT, IMDG, IATA	None
14.2 UN Proper shipping name: ADR, ADN, DOT, IMDG, IATA	None
14.3 Transport hazard classes: ADR, ADN, DOT, IMDG, IATA	**Class:** None **Label:** None **LTD.QTY:** None

US DOT

Limited Quantity Exception: None

Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Non Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Comments: None	**Comments:** None
14.4 Packing group: ADR, ADN, DOT, IMDG, IATA	None
14.5 Environmental hazards :	None
14.6 Special precautions for user:	None
Danger code (Kemler):	None
EMS number:	None
Segregation groups:	None
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.	
14.8 Transport/Additional information:	
Transport category:	None
Tunnel restriction code:	None
UN "Model Regulation":	None

15 Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.

North American

SARA

Section 313 (specific toxic chemical listings): None of the ingredients are listed.
Section 302 (extremely hazardous substances): None of the ingredients are listed.

CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

Inventory: All ingredients are listed.
Rules and Orders: Not applicable.

Proposition 65 (California):

Chemicals known to cause cancer: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.

Chemicals known to cause developmental toxicity: None of the ingredients are listed.

Canadian

Canadian Domestic Substances List (DSL):
All ingredients are listed.

EU

REACH Article 57 (SVHC): None of the ingredients are listed.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Germany MAK: Not classified.
EC 648/2004 – This is an industrial detergent. Contains >30% phosphate, 15-30% anionic surfactant, <5% EDTA salts
EC 551/2009 – This is not a laundry or dishwasher detergent
EC 907/2006 – Contains no enzymes, optical brighteners, perfumes, allergenic fragrances, or preservative agents

Asia Pacific

Australia

Australian Inventory of Chemical Substances (AICS): All ingredients are listed.

China

Inventory of Existing Chemical Substances in China (IECSC): All ingredients are listed.

Japan

Inventory of Existing and New Chemical Substances (ENCS): All ingredients are listed.

Korea

Existing Chemicals List (ECL): All ingredients are listed.

New Zealand

New Zealand Inventory of Chemicals (NZOIC): All ingredients are listed.

Philippines

Philippine Inventory of Chemicals and Chemical Substances (PICCS): All ingredients are listed.

Taiwan

Taiwan Chemical Substance Inventory (TSCI): All ingredients are listed.

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements:
H315 Causes skin irritation.
H319 Causes serious eye irritation.

NFPA: 1-0-0
HMIS: 1-0-0

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SAFETY DATA SHEET

Isobutylene

Section 1. Identification

GHS product identifier : Isobutylene

Chemical name : 2-methylpropene

Other means of identification : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

Product type : Gas.

Product use : Synthetic/Analytical chemistry.

Synonym : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

SDS # : 001031

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE GASES - Category 1
GASES UNDER PRESSURE - Liquefied gas

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Extremely flammable gas.
May form explosive mixtures with air.
Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position. Approach suspected leak area with caution.

Prevention : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response : Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

Storage : Protect from sunlight. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : 2-methylpropene

Other means of identification : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

Product code : 001031

CAS number/other identifiers

CAS number : 115-11-7

Ingredient name	%	CAS number
Isobutylene	100	115-11-7

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Use only non-sparking tools. Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Isobutylene	**ACGIH TLV (United States, 3/2017).** TWA: 250 ppm 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Section 8. Exposure controls/personal protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Compressed gas.]

Color : Colorless.

Odor : Characteristic.

Odor threshold : Not available.

pH : Not available.

Melting point : -140.7°C (-221.3°F)

Boiling point : -6.9°C (19.6°F)

Critical temperature : 144.75°C (292.6°F)

Flash point : Closed cup: -76.1°C (-105°F)

Evaporation rate : Not available.

Flammability (solid, gas) : Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and oxidizing materials.

Lower and upper explosive (flammable) limits : Lower: 1.8%
Upper: 9.6%

Vapor pressure : 24.3 (psig)

Vapor density : 1.94 (Air = 1)

Specific Volume (ft ^{3}/lb) : 6.6845

Gas Density (lb/ft ^{3}) : 0.1496 (25°C / 77 to °F)

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : 0.26 g/l

Partition coefficient: n-octanol/water : 2.34

Auto-ignition temperature : 465°C (869°F)

Decomposition temperature : Not available.

Viscosity : Not applicable.

Flow time (ISO 2431) : Not available.

Molecular weight : 56.12 g/mole

Aerosol product

Heat of combustion : -45029034 J/kg

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Incompatible materials : Oxidizers

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Isobutylene	LC50 Inhalation Vapor	Rat	550000 mg/m³	4 hours

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Section 11. Toxicological information

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Isobutylene	2.34	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1055	UN1055	UN1055	UN1055	UN1055
UN proper shipping name	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE
Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Additional information

DOT Classification : **Limited quantity** Yes.
Quantity limitation Passenger aircraft/rail: Forbidden. Cargo aircraft: 150 kg.
Special provisions 19, T50

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).
Explosive Limit and Limited Quantity Index 0.125
ERAP Index 3000
Passenger Carrying Ship Index Forbidden
Passenger Carrying Road or Rail Index Forbidden
Special provisions 29

IATA : **Quantity limitation** Passenger and Cargo Aircraft: Forbidden. Cargo Aircraft Only: 150 kg.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

Clean Air Act (CAA) 112 regulated flammable substances: Isobutylene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Europe : This material is listed or exempted.

Japan : **Japan inventory (ENCS)**: This material is listed or exempted.
Japan inventory (ISHL): Not determined.

Malaysia : Not determined.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Section 15. Regulatory information

Taiwan : This material is listed or exempted.

Thailand : Not determined.

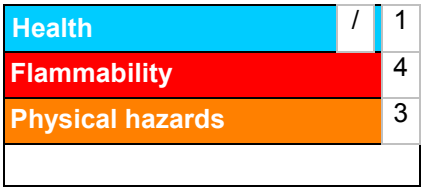
Turkey : Not determined.

United States : This material is listed or exempted.

Viet Nam : Not determined.

Section 16. Other information

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

National Fire Protection Association (U.S.A.)

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Liquefied gas	Expert judgment Expert judgment

History

Date of printing : 5/10/2018

Date of issue/Date of revision : 5/10/2018

Date of previous issue : 7/11/2016

Version : 0.02

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973

Section 16. Other information

as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

M34514 - ANSI - EN

HYDROCHLORIC ACID (HCl) (ALL GRADES)

SDS No.: M34514 **SDS Revision Date:** 21-Jan-2016

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Company Identification:	Occidental Chemical Corporation 5005 LBJ Freeway P.O. Box 809050 Dallas, TX 75380-9050 1-800-752-5151
24 Hour Emergency Telephone Number:	1-800-733-3665 or 1-972-404-3228 (USA); CANUTEC (Canada): 1-613-996-6666; CHEMTREC (within USA and Canada): 1-800-424-9300; CHEMTREC (outside USA and Canada): +1 703-527-3887; CHEMTREC Contract No: CCN16186
To Request an SDS:	MSDS@oxy.com or 1-972-404-3245
Customer Service:	1-800-752-5151 or 1-972-404-3700
Product Identifier:	**HYDROCHLORIC ACID (HCl) (ALL GRADES)**
Trade Name:	Hydrochloric Acid (HCl) aqueous all grades
Synonyms:	Muriatic Acid, HCl Solution, Aqueous hydrogen chloride
Product Use:	Process chemical, Metal cleaning, Water purification, Petroleum Industry
Uses Advised Against:	None identified

SECTION 2. HAZARDS IDENTIFICATION

HYDROCHLORIC ACID (HCl) (ALL GRADES)

SDS No.: M34514 **SDS Revision Date:** 21-Jan-2016

OSHA REGULATORY STATUS: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

****

EMERGENCY OVERVIEW:

Color: Colorless
Physical State: Liquid
Appearance: Clear
Odor: Irritating, Pungent, Sharp

Signal Word: **Danger**

MAJOR HEALTH HAZARDS: CORROSIVE. CAUSES SEVERE SKIN BURNS AND SERIOUS EYE DAMAGE. HARMFUL IF SWALLOWED. HARMFUL IF INHALED. CAUSES DAMAGE TO TEETH THROUGH PROLONGED OR REPEATED EXPOSURES.

PHYSICAL HAZARDS: Contact with metals may evolve flammable hydrogen gas. May spatter or generate heat when mixed with water.

PRECAUTIONARY STATEMENTS: Do not get in eyes, on skin, or on clothing. Wear gloves, protective clothing, eye, and face protection. Do not breathe mist, vapors, or spray. Use outdoors or in a well-ventilated area. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Keep separated from incompatible substances.

ADDITIONAL HAZARD INFORMATION: This material is corrosive. To treat contacted tissue, flush with water to dilute. There is no specific antidote.

****

GHS CLASSIFICATION:

GHS: CONTACT HAZARD - SKIN:	Category 1B - Causes severe skin burns and eye damage.
GHS: CONTACT HAZARD - EYE:	Category 1 - Causes serious eye damage
GHS: ACUTE TOXICITY - INHALATION:	Category 4 - Harmful if inhaled
GHS: ACUTE TOXICITY - ORAL:	Category 4 - Harmful if swallowed.
GHS: TARGET ORGAN TOXICITY (REPEATED EXPOSURE):	Category 1 - Causes damage to teeth through prolonged or repeated exposure
GHS: TARGET ORGAN TOXICITY (REPEATED EXPOSURE):	Category 1 - Causes damage to teeth through prolonged or repeated exposure
GHS: CARCINOGENICITY:	Not classified as a carcinogen per GHS criteria. This material is not classifiable as to its carcinogenicity to humans (Group 3 - IARC). ACGIH - A4 Carcinogen - Not classifiable as a human carcinogen.

HYDROCHLORIC ACID (HCl) (ALL GRADES)

UNKNOWN ACUTE TOXICITY: Not applicable. 100% of this product consists of ingredient(s) of known acute toxicity.

GHS SYMBOL: Corrosive, Health hazard, Exclamation mark

GHS SIGNAL WORD: **DANGER**

GHS HAZARD STATEMENTS:

GHS - Health Hazard Statement(s)
• Causes severe skin burns and eye damage
• Causes serious eye damage
• Harmful if swallowed
• Harmful if inhaled
• Causes damage to organs through prolonged or repeated exposure (teeth)

GHS - Precautionary Statement(s) - Prevention
• Wear protective gloves, protective clothing, eye, and face protection
• Do not breathe mist, vapors, or spray
• Wash thoroughly after handling
• Do not eat, drink or smoke when using this product
• Use only outdoors or in a well-ventilated area

GHS - Precautionary Statement(s) - Response
• IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
• IF ON SKIN (or hair): Remove/Take off Immediately all contaminated clothing. Rinse SKIN with water/shower
• IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
• Immediately call a POISON CENTER or doctor/physician
• Wash contaminated clothing before reuse
• IF INHALED: Remove person to fresh air and keep comfortable for breathing
• Call a POISON CENTER or doctor/physician if you feel unwell
• Specific treatment (see First Aid information on product label and/or Section 4 of the SDS)

GHS - Precautionary Statement(s) - Storage
• Store locked up

GHS - Precautionary Statement(s) - Disposal
• Dispose of contents and container in accordance with applicable local, regional, national, and/or international regulations

Hazards Not Otherwise Classified (HNOC)
None identified

See Section 11: TOXICOLOGICAL INFORMATION

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms: Muriatic Acid, HCl Solution, Aqueous hydrogen chloride

Contains Hydrochloric Acid [Hydrogen Chloride]

Component	Percent [%]	CAS Number
Water	63 - 91	7732-18-5
Hydrochloric Acid [Hydrogen Chloride]	9-36	7647-01-0

SECTION 4. FIRST AID MEASURES

INHALATION: If inhaled and adverse effects occur, remove victim to fresh air and keep at rest in a position comfortable for breathing. Evaluate ABC's (is Airway constricted, is Breathing occurring, and is blood Circulating) and treat symptomatically. IF exposed or concerned: Get medical advice/attention. If you feel unwell, GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT: If on skin or hair, immediately flush contaminated areas with water. Immediately remove all contaminated clothing, jewelry, and shoes. Rinse skin with large amounts of water. Thoroughly clean and dry contaminated clothing and shoes before reuse. The specific treatment is dilution with water. There is no antidote. If you feel unwell, IMMEDIATELY CONTACT A POISON CENTER, PHYSICIAN/DOCTOR, OR GET MEDICAL ATTENTION.

EYE CONTACT: Immediately rinse eyes cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Continued irrigation may be necessary to ensure neutral pH. Water or saline may be used. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION: If swallowed: Rinse mouth. Do NOT induce vomiting. Give large amounts of water. If vomiting occurs spontaneously, keep airway clear. Give more water when vomiting stops. Never give anything by mouth to an unconscious or convulsive person. GET MEDICAL ATTENTION IMMEDIATELY.

Most Important Symptoms/Effects (Acute and Delayed) Hydrochloric acid may be corrosive to the eyes, skin, and mucus membranes. It may be corrosive to any tissue it comes in contact with. Depending on the concentration, duration, and nature of the exposure, it can cause serious burns and extensive tissue destruction.

Acute Symptoms/Effects: Listed below.
Inhalation (Breathing): Respiratory System Effects: Inhalation of this material may cause: irritation of the respiratory tract with sore throat, coughing, shortness of breath, hoarseness, laryngeal spasms, upper respiratory tract edema, inflammation and ulceration, hemorrhage, chest pain, and pulmonary edema. Measurements of distress include increased respiration rate and decreased tidal volume, decreased forced expiratory volume, increased airway resistance, and reduced vital capacity. You may observe sudden circulatory collapse, glottis or esophageal edema and death.

Skin: Skin Corrosion: Concentrated hydrochloric acid is corrosive to tissue, possibly causing redness, irritation, burns, ulceration, scarring, and possible necrosis (tissue death). Severe burns have been fatal. Sudden circulatory collapse can occur with shock if large areas of skin have been burned.
Eye: Serious Eye Damage. Exposure to eyes may cause irritation and burns to the eye lids, conjunctivitis, corneal edema, and corneal burn.
Ingestion (Swallowing): Gastrointestinal System Effects: Acute ingestion of concentrated hydrochloric acid may cause nausea, vomiting, abdominal pain, diarrhea, gastrointestinal bleeding, perforation, necrosis, scarring, acidosis, and sudden circulatory collapse. May be fatal if swallowed.

Delayed Symptoms/Effects:
- Respiratory System Effects: Chronic occupational exposure to hydrochloric acid has been reported to cause chronic bronchitis
- Skin: Repeated and prolonged skin contact may cause a chronic dermatitis
- Eye: Blindness, resulting from corneal burns, damage/loss of internal contents of eye, and perforation of globe
- Gastrointestinal Effects: Chronic occupational exposure has been reported to cause gastritis
- Teeth: Prolonged exposure to low concentrations may also cause dental discoloration and erosion

Interaction with Other Chemicals Which Enhance Toxicity: None known.

Medical Conditions Aggravated by Exposure: May aggravate preexisting conditions such as: eye disorders that decrease tear production or have reduced integrity of the eye; skin disorders that compromise the integrity of the skin; and respiratory conditions including asthma and other breathing disorders.

Protection of First-Aiders: Protect yourself by avoiding contact with this material. Avoid contact with skin and eyes. Do not breathe dust, fume, gas, mist, vapors, or spray. Do not ingest. Use personal protective equipment. Refer to Section 8 for specific personal protective equipment recommendations.

Notes to Physician: Treat as a corrosive substance. Do not attempt to neutralize pH with sodium bicarbonate. Treat via dilution. Water or milk may be used. There is no antidote. Severe burns have been fatal. Treatment is supportive care. Follow normal parameters for airway, breathing, and circulation.

SECTION 5. FIRE-FIGHTING MEASURES

Fire Hazard: Not combustible, but if involved in a fire decomposes to produce irritants and toxic gases.

Extinguishing Media: Use media appropriate for surrounding fire.

Fire Fighting: Keep unnecessary people away, isolate hazard area and deny entry. Wear NIOSH approved positive-pressure self-contained breathing apparatus operated in pressure demand mode. Move container from fire area if it can be done without risk. Cool non-leaking containers with water. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

Component	Immediately Dangerous to Life/ Health (IDLH)
Hydrochloric Acid [Hydrogen Chloride] 7647-01-0	50 ppm IDLH

Hazardous Combustion Products: Hydrogen chloride, Chlorine, Hydrogen gas

Sensitivity to Mechanical Impact:	Not sensitive.
Sensitivity to Static Discharge:	Not sensitive.
Lower Flammability Level (air):	Not flammable
Upper Flammability Level (air):	Not flammable
Flash point:	Not flammable
Auto-ignition Temperature:	Not determined

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:
Remove all ignition sources. Keep unnecessary and unprotected persons away. Isolate hazard area and deny entry. Stop spill/leak if no risk involved. Consider evacuation of personnel located downwind if material is leaking. Do not get in eyes, on skin or on clothing. Do not breathe dust, fume, gas, mist, vapors, or spray. Do not ingest. Wear appropriate personal protective equipment recommended in Section 8, Exposure Controls / Personal Protection, of the SDS.

Methods and Materials for Containment and Cleaning Up:
Completely contain spilled materials with dikes, sandbags, etc. Shut off ventilation system if needed. Reuse or reprocess where possible. Neutralize with soda ash or dilute caustic soda. Collect with appropriate, noncombustible absorbent and place into suitable container. Liquid material may be removed with a properly rated vacuum truck.

Environmental Precautions:
Keep out of water supplies and sewers. This material is acidic and may lower the pH of the surface waters with low buffering capacity. Releases should be reported, if required, to appropriate agencies.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling:
Avoid breathing vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Wear personal protective equipment as described in Exposure Controls/Personal Protection (Section 8) of the MSDS. Use only equipment and hoses approved for this material. NEVER add water to this product. Always add product to large quantities of water. When mixing, slowly add to water to minimize heat generation and spattering. Water or caustic solutions should never be added directly to this product because of violent reaction and spattering.

Safe Storage Conditions:
Store and handle in accordance with all current regulations and standards. Store in rubber-lined steel, acid-resistant plastic or glass containers. Keep container tightly closed. Store in a cool, dry area. Store in a well-ventilated area. Keep away from heat, sparks and open flames. Keep separated from incompatible substances (see below or Section 10 of the Safety Data Sheet). Do not store in aluminum container or use aluminum fittings or transfer lines. Protect from physical damage. Dike and vent storage tanks.

Incompatibilities/ Materials to Avoid:
Alkalis, metals, oxidizing agents, Mercuric sulfate, Perchloric acid, Carbides of calcium, cesium, rubidium, Acetylides of cesium and rubidium, Phosphides of calcium and uranium, Lithium silicide

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Regulatory Exposure Limit(s): Listed below for the product components that have non-regulatory occupational exposure limits (OEL's).

Component	OSHA Final PEL TWA	OSHA Final PEL STEL	OSHA Final PELCeiling
Hydrochloric Acid [Hydrogen Chloride] 7647-01-0	-----	-----	5 ppm 7 mg/m^3

OEL: Occupational Exposure Limit; OSHA: United States Occupational Safety and Health Administration; PEL: Permissible Exposure Limit; TWA: Time Weighted Average; STEL: Short Term Exposure Limit

NON-REGULATORY EXPOSURE LIMIT(S): Listed below for the product components that have non-regulatory occupational exposure limits (OEL's).

Component	ACGIH TWA	ACGIH STEL	ACGIH Ceiling	OSHA TWA (Vacated)	OSHA STEL (Vacated)	OSHA Ceiling (Vacated)
Hydrochloric Acid [Hydrogen Chloride]	-----	-----	2 ppm	-----	-----	5 ppm 7 mg/m^3

- *The Non-Regulatory United States Occupational Safety and Health Administration (OSHA) limits, if shown, are the Vacated 1989 PEL's (vacated by 58 FR 35338, June 30, 1993).*

- The American Conference of Governmental Industrial Hygienists (ACGIH) is a voluntary organization of professional industrial hygiene personnel in government or educational institutions in the United States. The ACGIH develops and publishes recommended occupational exposure limits each year called Threshold Limit Values (TLVs) for hundreds of chemicals, physical agents, and biological exposure indices.

Component	OXY REL 8 hr TWA	OXY REL STEL	OXY REL Ceiling
Hydrochloric Acid [Hydrogen Chloride] 7647-01-0 (9-36)			2 ppm

ENGINEERING CONTROLS: Use closed systems when possible. Provide local exhaust ventilation where vapor or mist may be generated. Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Wear chemical safety goggles with a face-shield to protect against eye and skin contact when appropriate. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin and Body Protection: Wear chemical resistant clothing and rubber boots when potential for contact with the material exists. Always place pants legs over boots.

Hand Protection: Wear appropriate chemical resistant gloves. Consult a glove supplier for assistance in selecting an appropriate chemical resistant glove.

Protective Material Types:
- Nitrile
- Neoprene
- Butyl rubber
- Polyvinyl chloride (PVC)
- Responder®
- Trellchem® HPS
- Tychem®

Respiratory Protection: Where vapor or mist concentration exceeds or is likely to exceed applicable exposure limits, a NIOSH approved respirator with acid gas cartridges (appropriate for hydrogen chloride) is required. When an air-purifying respirator is not adequate, for exposures above the IDLH or for spills and/or emergencies of unknown concentrations, a NIOSH approved self-contained breathing apparatus or airline respirator with a full-face piece and with an auxiliary self contained escape pack is required. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

Component	Immediately Dangerous to Life/ Health (IDLH)
Hydrochloric Acid [Hydrogen Chloride] 7647-01-0	50 ppm IDLH

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Appearance:	Clear
Color:	Colorless
Odor:	Irritating, Pungent, Sharp
Odor Threshold [ppm]:	0.3 ppm (causes olfactory fatigue).
Molecular Weight:	36.46
Molecular Formula:	HCl
Boiling Point/Range:	140 - 221°F (60 - 105 °C)
Freezing Point/Range:	-29 to 5 °F (-34 to -15 °C).
Melting Point/Range:	Not applicable to liquids
Vapor Pressure:	14.6 - 80 mmHg @ 20 °C
Vapor Density (air=1):	1.3 @ 20 °C
Relative Density/Specific Gravity (water=1):	1.05 - 1.18
Density:	8.75 - 9.83 lbs/gal

Water Solubility:	100%
pH:	0.03647 wt% HCl solution (364 ppm) has a pH of 2
Volatility:	9 - 36% by volume
Evaporation Rate (ether=1):	< 1.00 (butyl acetate = 1)
Partition Coefficient (n-octanol/water):	No data available
Flash point:	Not flammable
Flammability (solid, gas):	Not flammable
Lower Flammability Level (air):	Not flammable
Upper Flammability Level (air):	Not flammable
Auto-ignition Temperature:	Not determined
Viscosity:	No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity: Hydrochloric acid reacts vigorously with alkalis and with many organic materials. Reacts with strong oxidizing materials causing the release of chlorine.

Chemical Stability: Stable at normal temperatures and pressures.

Possibility of Hazardous Reactions:
Avoid heat, flames, sparks and other sources of ignition. Mixing with water may cause splattering and release of large amounts of heat. Will react with some metals forming flammable hydrogen gas. Hydrogen chloride may react with cyanide, forming lethal concentrations of hydrocyanic acid. Avoid contact with incompatible materials.

Conditions to Avoid: (e.g., static discharge, shock, or vibration) -. None known.

Incompatibilities/ Materials to Avoid: Alkalis. metals. oxidizing agents. Mercuric sulfate. Perchloric acid. Carbides of calcium, cesium, rubidium. Acetylides of cesium and rubidium. Phosphides of calcium and uranium. Lithium silicide.

Hazardous Decomposition Products: chlorine, hydrogen chloride, hydrogen gas

Hazardous Polymerization: Will not occur.

SECTION 11. TOXICOLOGICAL INFORMATION

TOXICITY DATA:

PRODUCT TOXICITY DATA: Hydrochloric Acid (HCl) (All Grades)

LD50 Oral:	LD50 Dermal:	LC50 Inhalation:
700 mg/kg (Rat)	>5010 mg/kg (Rabbit)	3124 ppm (1 hr - Rat), converted to 1562 ppm (4 hr - Rat)

COMPONENT TOXICITY DATA:

HYDROCHLORIC ACID (HCl) (ALL GRADES)

Note: The component toxicity data is populated by the LOLI database and may differ from the product toxicity data given.

Component	LD50 Oral:	LD50 Dermal:	LC50 Inhalation:
Water 7732-18-5	90 mL/kg (Rat)	-----	-----
Hydrochloric Acid [Hydrogen Chloride] 7647-01-0	238 - 277 mg/kg (Rat)	5010 mg/kg (Rabbit)	1.68 mg/L (1 hr-Rat)

****

POTENTIAL HEALTH EFFECTS:

Eye contact: Causes serious eye damage. Eye exposure may cause irritation and burns to the eye lids, conjunctivitis, corneal edema, and corneal burn.

Skin contact: Can cause severe skin burns. Concentrated hydrochloric acid is corrosive to tissue, causing redness, irritation (possibly severe), burns, ulceration, scarring, and possible necrosis (tissue death).

Inhalation: Inhalation of this material may cause: irritation of the respiratory tract with sore throat, coughing, shortness of breath, hoarseness, laryngeal spasms, upper respiratory tract edema, inflammation and ulceration, hemorrhage, chest pain, and pulmonary edema.

Ingestion: Ingestion of concentrated hydrochloric acid can cause nausea, vomiting, abdominal pain, diarrhea, gastrointestinal bleeding, perforation, necrosis and scarring, acidosis, and sudden circulatory collapse. May be fatal if swallowed.

Chronic Effects: Repeated or prolonged skin exposure to dilute solutions may result in dermatitis. Photosensitization has been reported in chronic occupational skin exposures. Discoloration and erosion of the teeth may occur as a result of long term exposure. Chronic occupational inhalation exposure to hydrochloric acid has been reported to cause chronic bronchitis.

SIGNS AND SYMPTOMS OF EXPOSURE:
Listed below.

Inhalation (Breathing): Respiratory System Effects: Inhalation of this material may cause: irritation of the respiratory tract with sore throat, coughing, shortness of breath, hoarseness, laryngeal spasms, upper respiratory tract edema, inflammation and ulceration, hemorrhage, chest pain, and pulmonary edema. Measurements of distress include increased respiration rate and decreased tidal volume, decreased forced expiratory volume, increased airway resistance, and reduced vital capacity. You may observe sudden circulatory collapse, glottis or esophageal edema and death.
Skin: Skin Corrosion: Concentrated hydrochloric acid is corrosive to tissue, possibly causing redness, irritation, burns, ulceration, scarring, and possible necrosis (tissue death). Severe burns have been fatal. Sudden circulatory collapse can occur with shock if large areas of skin have been burned.
Eye: Serious Eye Damage. Exposure to eyes may cause irritation and burns to the eye lids, conjunctivitis, corneal edema, and corneal burn.

Ingestion (Swallowing): Gastrointestinal System Effects: Acute ingestion of concentrated hydrochloric acid may cause nausea, vomiting, abdominal pain, diarrhea, gastrointestinal bleeding, perforation, necrosis, scarring, acidosis, and sudden circulatory collapse. May be fatal if swallowed.

TOXICITY:
Hydrochloric acid is corrosive to skin, eyes, and mucus membranes and causes immediate, severe irritation and corrosion of exposed tissue. Prolonged exposures may cause discoloration and erosion of teeth, gastritis, photosensitization, and bronchitis. Ingestion may be fatal.

Interaction with Other Chemicals Which Enhance Toxicity: None known.

****

GHS HEALTH HAZARDS:

GHS: ACUTE TOXICITY - ORAL: Category 4 - Harmful if swallowed.

GHS: ACUTE TOXICITY - INHALATION: Category 4 - Harmful if inhaled.

GHS: CONTACT HAZARD - EYE: Category 1 - Causes serious eye damage

GHS: CONTACT HAZARD - SKIN: Category 1B - Causes severe skin burns and eye damage

Skin Absorbent / Dermal Route? No.

GHS: CARCINOGENICITY:
Not classified as a carcinogen per GHS criteria. This material is not classifiable as to its carcinogenicity to humans (Group 3 - IARC). ACGIH - A4 Carcinogen - Not classifiable as a human carcinogen.

Component	NTP:	IARC (GROUP 1):	IARC (GROUP 2):	OSHA:
Hydrochloric Acid [Hydrogen Chloride]	Not listed	Not listed	Not listed	Listed

SPECIFIC TARGET ORGAN TOXICITY (Repeated or Prolonged Exposure):
Category 1 - Teeth

SECTION 12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:

FATE AND TRANSPORT:

BIODEGRADATION: This material is inorganic and not subject to biodegradation

PERSISTENCE: This material is believed not to persist in the environment
This material is believed to exist in the disassociated state in the environment
If released to soil, hydrogen chloride will sink into the soil. The acid will dissolve some soil material (in particular, anything with a carbonate base) and will be somewhat neutralized. The remaining portion is thought to transport downward to the water table. If released to water, it dissociates almost completely and will be neutralized by natural alkalinity and carbon dioxide

BIOCONCENTRATION: This material is not expected to bioconcentrate in organisms.

ADDITIONAL ECOLOGICAL INFORMATION: This material has exhibited toxicity to terrestrial organisms. May decrease pH of waterways and adversely affect aquatic life. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product into sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your local or regional regulatory water boards and/or other appropriate regulatory offices.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste from material:
Reuse or reprocess, if possible. May be subject to disposal regulations. Dispose in accordance with all applicable regulations.

Container Management:
Dispose of container in accordance with applicable local, regional, national, and/or international regulations. Container rinsate must be disposed of in compliance with applicable regulations.

SECTION 14. TRANSPORT INFORMATION

IMPORTANT: The shipper/consignor/sender is responsible to ensure that the packaging, labeling, and markings are in compliance with the selected mode of transport

LAND TRANSPORT

U.S. DOT 49 CFR 172.101:

UN NUMBER:	UN1789
PROPER SHIPPING NAME:	Hydrochloric acid solution
HAZARD CLASS/ DIVISION:	8
PACKING GROUP:	II
LABELING REQUIREMENTS:	8
RQ (lbs):	RQ 5,000 Lbs. (Hydrochloric acid)

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

UN NUMBER: UN1789
SHIPPING NAME: Hydrochloric acid solution
CLASS OR DIVISION: 8
PACKING/RISK GROUP: II
LABELING REQUIREMENTS: 8

MARITIME TRANSPORT (IMO / IMDG) :

UN NUMBER: UN1789
PROPER SHIPPING NAME: Hydrochloric acid solution
HAZARD CLASS / DIVISION: 8
Packing Group: II
LABELING REQUIREMENTS: 8

SECTION 15. REGULATORY INFORMATION

U.S. REGULATIONS

OSHA REGULATORY STATUS:
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
If a release is reportable under CERCLA section 103, notify the state emergency response commission and local emergency planning committee. In addition, notify the National Response Center at (800) 424-8802 or (202) 426-2675.

Component	CERCLA Reportable Quantities:
Hydrochloric Acid [Hydrogen Chloride]	5000 lb (final RQ)

SARA EHS Chemical (40 CFR 355.30)
If a release is reportable under EPCRA, notify the state emergency response commission and local emergency planning committee. If the TPQ is met, facilities are subject to reporting requirements under EPCRA Sections 311 and 312.

Component	EPCRA RQs	Section 302 Threshold Planning Quantity (TPQs)
Hydrochloric Acid [Hydrogen Chloride]	5000 lb (EPCRA RQ)	500 lb TPQ

EPCRA SECTIONS 311/312 HAZARD CATEGORIES (40 CFR 370.10):
Acute Health Hazard, Reactive Hazard, Chronic Health Hazard, Extremely Hazardous

EPCRA SECTION 313 (40 CFR 372.65):
The following chemicals are listed in 40 CFR 372.65 and may be subject to Community Right-to Know Reporting requirements

Component	Status:
Hydrochloric Acid [Hydrogen Chloride]	1.0 %

DEPARTMENT OF HOMELAND SECURITY (DHS)- Chemical Facility Anti-Terrorism Standards (6 CFR 27):
.? is regulated under DHS as follows:

OSHA PROCESS SAFETY (PSM) (29 CFR 1910.119):
Not regulated

NATIONAL INVENTORY STATUS

Component	U.S. INVENTORY STATUS: Toxic Substance Control Act (TSCA):
Water 7732-18-5 (63 - 91)	Listed
Hydrochloric Acid [Hydrogen Chloride] 7647-01-0 (9-36)	Listed

TSCA 12(b): This product is not subject to export notification.

Canadian Chemical Inventory: All components of this product are listed on either the DSL or the NDSL.

STATE REGULATIONS

Component	California Proposition 65 Cancer WARNING:	California Proposition 65 CRT List - Male reproductive toxin:	California Proposition 65 CRT List - Female reproductive toxin:	Massachusetts Right to Know Hazardous Substance List	New Jersey Right to Know Hazardous Substance List	New Jersey Special Health Hazards Substance List
Hydrochloric Acid [Hydrogen Chloride] 7647-01-0	Not Listed	Not Listed	Not Listed	Listed	1012	corrosive

Component	New Jersey - Environmental Hazardous Substance List	Pennsylvania Right to Know Hazardous Substance List	Pennsylvania Right to Know Special Hazardous Substances	Pennsylvania Right to Know Environmental Hazard List	Rhode Island Right to Know Hazardous Substance List
Water 7732-18-5	Not Listed	Listed	Not Listed	Not Listed	Not Listed
Hydrochloric Acid [Hydrogen Chloride] 7647-01-0	Listed	Listed	Not Listed	Present	Listed

CANADIAN REGULATIONS
• This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations

Component	Water
WHMIS - Classifications of Substances: Uncontrolled product according to WHMIS classification criteria	
Component	Hydrochloric Acid [Hydrogen Chloride]

WHMIS - Classifications of Substances:
A,D1A,E
D1A,E
E
D1B,E

SECTION 16. OTHER INFORMATION

Prepared by: OxyChem Corporate HESS - Product Stewardship

Rev. Date: 21-Jan-2016

Disclaimer:
This information is intended solely for the use of individuals trained in the NFPA and/or HMIS systems.

HMIS: (SCALE 0-4) (Rated using National Paint & Coatings Association HMIS: Rating Instructions, 2nd Edition)

Health Rating: 3*	**Flammability Rating:** 0	**Reactivity Rating:** 0
Health Rating: 3	**Flammability:** 0	**Reactivity Rating:** 1

Reason for Revision:
• Emergency Overview was revised: SEE SECTION 2
• Changed the GHS classification: SEE SECTION 2
• Toxicological Information has been revised: SEE SECTION 11
• Regulatory Information Changes: SEE SECTION 15

IMPORTANT:
The information presented herein, while not guaranteed, was prepared by technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTY OR GUARANTY OF ANY OTHER KIND, EXPRESSED OR IMPLIED, IS MADE REGARDING PERFORMANCE, SAFETY, SUITABILITY, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling, storage, disposal and other factors that may involve other or additional legal, environmental, safety or performance considerations, and OxyChem assumes no liability whatsoever for the use of or reliance upon this information. While our technical personnel will be happy to respond to questions, safe handling and use of the product remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as, a recommendation to infringe any existing patents or to violate any Federal, State, local or foreign laws

OSHA Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Safety Data Sheet available to your employees

End of Safety Data Sheet

SAFETY DATA SHEET

Creation Date 10-Dec-2009 **Revision Date** 23-Jan-2018 **Revision Number** 5

1. Identification

Product Name **Tetrachloroethylene**

Cat No. : **AC445690000; ACR445690010; AC445690025; AC445691000**

CAS-No 127-18-4
Synonyms Perchloroethylene

Recommended Use Laboratory chemicals.
Uses advised against Not for food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Skin Sensitization	Category 1
Carcinogenicity	Category 1B
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements
Causes skin irritation
Causes serious eye irritation
May cause an allergic skin reaction
May cause drowsiness or dizziness
May cause cancer
May cause damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Contaminated work clothing should not be allowed out of the workplace
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation or rash occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Toxic to aquatic life with long lasting effects
WARNING. Cancer - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Tetrachloroethylene	127-18-4	>95

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

Inhalation Move to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

Ingestion Clean mouth with water and drink afterwards plenty of water.

Most important symptoms and effects	None reasonably foreseeable. May cause allergic skin reaction. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Containers may explode when heated.

Hazardous Combustion Products
Chlorine Hydrogen chloride gas Phosgene
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	0	N/A

6. Accidental release measures

Personal Precautions	Use personal protective equipment. Ensure adequate ventilation.
Environmental Precautions	Do not flush into surface water or sanitary sewer system.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling	Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Ensure adequate ventilation. Avoid ingestion and inhalation.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from sunlight.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Tetrachloroethylene	TWA: 25 ppm STEL: 100 ppm	(Vacated) TWA: 25 ppm (Vacated) TWA: 170 mg/m^3 Ceiling: 200 ppm TWA: 100 ppm	IDLH: 150 ppm	TWA: 100 ppm TWA: 670 mg/m^3 TWA: 200 ppm TWA: 1250 mg/m^3 STEL: 200 ppm STEL: 1340 mg/m^3

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Long sleeved clothing.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Characteristic, sweet
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-22 °C / -7.6 °F
Boiling Point/Range	120 - 122 °C / 248 - 251.6 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	6.0 (Ether = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	18 mbar @ 20 °C
Vapor Density	No information available
Density	1.619
Specific Gravity	1.625
Solubility	0.15 g/L water (20°C)
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	> 150°C
Viscosity	0.89 mPa s at 20 °C
Molecular Formula	C2 Cl4
Molecular Weight	165.83

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Exposure to moist air or water.

Incompatible Materials Strong acids, Strong oxidizing agents, Strong bases, Metals, Zinc, Amines, Aluminium

Hazardous Decomposition Products Chlorine, Hydrogen chloride gas, Phosgene

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Tetrachloroethylene	LD50 = 2629 mg/kg (Rat)	LD50 > 10000 mg/kg (Rat)	LC50 = 27.8 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Tetrachloroethylene	127-18-4	Group 2A	Reasonably Anticipated	A3	X	A3

IARC: (International Agency for Research on Cancer)

NTP: (National Toxicity Program)

ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans
NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)
A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
Mexico - Occupational Exposure Limits - Carcinogens
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)

STOT - repeated exposure Kidney Liver Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information

Component	EU - Endocrine Disrupters Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Tetrachloroethylene	Group II Chemical	Not applicable	Not applicable

Other Adverse Effects Tumorigenic effects have been reported in experimental animals.

12. Ecological information

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Tetrachloroethylene	EC50: > 500 mg/L, 96h (Pseudokirchneriella subcapitata)	LC50: 4.73 - 5.27 mg/L, 96h flow-through (Oncorhynchus mykiss) LC50: 11.0 - 15.0 mg/L, 96h static (Lepomis macrochirus) LC50: 8.6 - 13.5 mg/L, 96h static (Pimephales promelas) LC50: 12.4 - 14.4 mg/L, 96h flow-through (Pimephales promelas)	EC50 = 100 mg/L 24 h EC50 = 112 mg/L 24 h EC50 = 120.0 mg/L 30 min	EC50: 6.1 - 9.0 mg/L, 48h Static (Daphnia magna)

Persistence and Degradability Insoluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility . Is not likely mobile in the environment due its low water solubility. Will likely be mobile in the environment due to its volatility.

Component	log Pow
Tetrachloroethylene	2.53 - 2.88

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Tetrachloroethylene - 127-18-4	U210	-

14. Transport information

DOT

UN-No UN1897
Proper Shipping Name TETRACHLOROETHYLENE
Hazard Class 6.1
Packing Group III

TDG

UN-No UN1897

Proper Shipping Name TETRACHLOROETHYLENE
Hazard Class 6.1
Packing Group III

IATA
UN-No UN1897
Proper Shipping Name TETRACHLOROETHYLENE
Hazard Class 6.1
Packing Group III

IMDG/IMO
UN-No UN1897
Proper Shipping Name TETRACHLOROETHYLENE
Hazard Class 6.1
Subsidiary Hazard Class P
Packing Group III

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Tetrachloroethylene	X	X	-	204-825-9	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Tetrachloroethylene	127-18-4	>95	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Tetrachloroethylene	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Tetrachloroethylene	X		-

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Tetrachloroethylene	100 lb 1 lb	-

California Proposition 65 This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Tetrachloroethylene	127-18-4	Carcinogen	14 µg/day	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Tetrachloroethylene	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant Y
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 10-Dec-2009
Revision Date 23-Jan-2018
Print Date 23-Jan-2018
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Trichloroethylene

Airgas
an Air Liquide company

Section 1. Identification

GHS product identifier : Trichloroethylene

Chemical name : trichloroethylene

Other means of identification : trichloroethene; Ethene, 1,1,2-trichloro-; Ethene, trichloro-; Trichlorethylene; Ethylene, trichloro-

Product use : Synthetic/Analytical chemistry.

Synonym : trichloroethene; Ethene, 1,1,2-trichloro-; Ethene, trichloro-; Trichlorethylene; Ethylene, trichloro-

SDS # : 001206

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
GERM CELL MUTAGENICITY - Category 2
CARCINOGENICITY - Category 1
AQUATIC HAZARD (LONG-TERM) - Category 3

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Causes serious eye irritation.
Causes skin irritation.
May cause cancer.
Suspected of causing genetic defects.
Harmful to aquatic life with long lasting effects.

Precautionary statements

General : Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Avoid release to the environment. Wash hands thoroughly after handling.

Response : IF exposed or concerned: Get medical attention. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Storage : Store locked up.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Section 2. Hazards identification

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : trichloroethylene

Other means of identification : trichloroethene; Ethene, 1,1,2-trichloro-; Ethene, trichloro-; Trichlorethylene; Ethylene, trichloro-

CAS number/other identifiers

CAS number : 79-01-6

Product code : 001206

Ingredient name	%	CAS number
trichloroethylene	100	79-01-6

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

Skin contact : Causes skin irritation.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : No known significant effects or critical hazards.

Section 4. First aid measures

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:, pain or irritation, watering, redness

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:, irritation, redness

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds
carbonyl halides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Section 6. Accidental release measures

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Avoid release to the environment. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

trichloroethylene

ACGIH TLV (United States, 3/2016).
STEL: 25 ppm 15 minutes.
TWA: 10 ppm 8 hours.
OSHA PEL 1989 (United States, 3/1989).
STEL: 1080 mg/m³ 15 minutes.
STEL: 200 ppm 15 minutes.
TWA: 270 mg/m³ 8 hours.
TWA: 50 ppm 8 hours.
OSHA PEL Z2 (United States, 2/2013).
AMP: 300 ppm 5 minutes.
CEIL: 200 ppm
TWA: 100 ppm 8 hours.

Section 8. Exposure controls/personal protection

Appropriate engineering controls : If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid. [Watery liquid.]

Color : Colorless.

Molecular weight : 131.38 g/mole

Molecular formula : C2-H-Cl3

Boiling/condensation point : 86.7°C (188.1°F)

Melting/freezing point : -84.8°C (-120.6°F)

Critical temperature : Not available.

Odor : Characteristic.

Odor threshold : Not available.

pH : Not available.

Flash point : Not available.

Burning time : Not applicable.

Burning rate : Not applicable.

Evaporation rate : 6.39 (butyl acetate = 1)

Flammability (solid, gas) : Not available.

Section 9. Physical and chemical properties

Lower and upper explosive (flammable) limits : Lower: 8%
Upper: 10.5%

Vapor pressure : 9.9 kPa (74.256033302 mm Hg) [room temperature]

Vapor density : 4.5 (Air = 1)

Specific Volume (ft ^{3}/lb) : 0.6849

Gas Density (lb/ft ^{3}) : 1.46

Relative density : 1.5

Solubility : Not available.

Solubility in water : 1.1 g/l

Partition coefficient: n-octanol/water : 2.53

Auto-ignition temperature : 410°C (770°F)

Decomposition temperature : Not available.

SADT : Not available.

Viscosity : Dynamic (room temperature): 0.58 mPa·s (0.58 cP)

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
trichloroethylene	LC50 Inhalation Vapor LD50 Dermal LD50 Oral	Rat Rabbit Rat	140700 mg/m³ >20 g/kg 4920 mg/kg	1 hours - -

IDLH : 1000 ppm

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
trichloroethylene	Eyes - Moderate irritant Skin - Severe irritant	Rabbit Rabbit	- -	24 hours 20 milligrams 24 hours 2 milligrams	- -

Sensitization

Not available.

Section 11. Toxicological information

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
trichloroethylene	-	1	Reasonably anticipated to be a human carcinogen.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

Skin contact : Causes skin irritation.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:, pain or irritation, watering, redness

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:, irritation, redness

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : Suspected of causing genetic defects.

Section 11. Toxicological information

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
trichloroethylene	Acute EC50 95000 µg/l Marine water	Algae - Skeletonema costatum	96 hours
	Acute EC50 36.5 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours
	Acute LC50 20 mg/l Marine water	Crustaceans - Elminius modestus	48 hours
	Acute LC50 18 mg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 3100 µg/l Fresh water	Fish - Jordanella floridae - Juvenile (Fledgling, Hatchling, Weanling)	96 hours
	Chronic EC10 12.3 mg/l Fresh water	Algae - Chlamydomonas reinhardtii - Exponential growth phase	72 hours
	Chronic NOEC 10 mg/l Fresh water	Daphnia - Daphnia magna	21 days

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
trichloroethylene	2.53	17	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 13. Disposal considerations

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Trichloroethylene; Ethene, trichloro-	79-01-6	Listed	U228

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1710	UN1710	UN1710	UN1710	UN1710
UN proper shipping name	TRICHLOROETHYLENE	TRICHLOROETHYLENE	TRICHLOROETHYLENE	TRICHLOROETHYLENE	TRICHLOROETHYLENE
Transport hazard class(es)	6.1 	6.1 	6.1 	6.1 	6.1 
Packing group	III	III	III	III	III
Environment	No.	No.	No.	No.	No.
Additional information	**Reportable quantity** 100 lbs / 45.4 kg [8. 2147 gal / 31.096 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements. **Limited quantity** Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: 60 L **Cargo aircraft** Quantity limitation: 220 L **Special provisions** IB3, N36, T4, TP1, T1	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.26-2.36 (Class 6). **Explosive Limit and Limited Quantity Index** 5	-	-	**Passenger and Cargo Aircraft** Quantity limitation: 60 L **Cargo Aircraft Only** Quantity limitation: 220 L **Limited Quantities - Passenger Aircraft** Quantity limitation: 2 L

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 5(a)2 final significant new use rules**: trichloroethylene
TSCA 8(a) CDR Exempt/Partial exemption: Not determined
TSCA 12(b) one-time export: trichloroethylene
United States inventory (TSCA 8b): This material is listed or exempted.
Clean Water Act (CWA) 307: trichloroethylene
Clean Water Act (CWA) 311: trichloroethylene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Immediate (acute) health hazard
Delayed (chronic) health hazard

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
trichloroethylene	100	No.	No.	No.	Yes.	Yes.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	trichloroethylene	79-01-6	100
Supplier notification	trichloroethylene	79-01-6	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : This material is listed.

New York : This material is listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

Section 15. Regulatory information

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
trichloroethylene	Yes.	Yes.	14 µg/day (ingestion) 50 µg/day (inhalation)	No.

International regulations

International lists

National inventory

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Europe : This material is listed or exempted.

Japan : This material is listed or exempted.

Malaysia : This material is listed or exempted.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Taiwan : This material is listed or exempted.

Canada

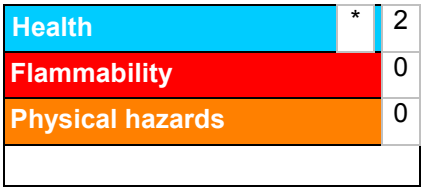
WHMIS (Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

CEPA Toxic substances: This material is listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Section 16. Other information

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
Skin Irrit. 2, H315	Expert judgment
Eye Irrit. 2A, H319	Expert judgment
Muta. 2, H341	Expert judgment
Carc. 1, H350	Expert judgment
Aquatic Chronic 3, H412	Expert judgment

History

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Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

APPENDIX 6
COMMUNITY AIR MONITORING PLAN (CAMP)

BRIDGE CLEANERS

QUEENS COUNTY

LONG ISLAND CITY, NEW YORK

Community Air Monitoring Program

NYSDEC Site No. 241127

Prepared for:

39-26 Property, LLC

39-26 30th Street

Long Island City, New York

Prepared by:

Carson Voci Engineering and Geology, D.P.C.

an affiliate of Terraphase Engineering Inc.

1100 East Hector Street, Suite 400

Conshohocken, Pennsylvania 19428

December 2025

Introduction

This Community Air Monitoring Plan (CAMP) has been prepared to describe air monitoring activities to be implemented during the Site Management Plan (SMP) proposed for 39-26 30th St, Long Island City, New York (the Site). This CAMP has been prepared in accordance with the New York State Department of Health (NYSDOH) Generic CAMP (Appendix 1A) of the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation (DER) guidance memorandum DER-10/Technical Guidance for Site Investigation and Remediation.

The CAMP is a companion document to the SMP. Further, the CAMP is a stand-alone companion document to the Site-specific health and safety plan (HASP). The Site-specific HASP provides details related to health and safety for on-site activities for on-site personnel and associated subcontractors, and the CAMP details air monitoring activities to protect the surrounding community.

Purpose

This CAMP will be implemented during any ground intrusive activities and disturbances to the cover system. The purpose of this CAMP is to provide a measure of protection for the off-site receptors and from potential airborne contaminant releases as a result of investigative and remedial work activities.

Volatile Organic Compound Air Monitoring

Periodic volatile organic compound (VOC) air monitoring will be conducted during sampling activities presented within the SMP. VOC air monitoring will be conducted using a RAE Systems MiniRAE 2000/3000 VOC instrument (or a similar photoionization detector device) to provide real-time recordable air monitoring data. In the event the cover is disturbed (excavation), VOC monitoring will be required.

Indoor concentrations will be measured before and after field activities commence to establish background conditions and monitor changes in VOC concentrations through the day.

VOC monitoring response and action levels are:

- If the ambient air concentration of total organic vapors of the indoor work area exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities may resume with continued monitoring.
- If the organic vapor level remains sustained above 5 ppm at the indoor work area, activities must cease and work will be re-evaluated.

Any ground intrusive work requires monitoring as outlined in the NYSDOH Generic CAMP (Page 1, Section 'Community Air Monitoring Plan').

Particulate Air Monitoring

As specified in the NYSDOH Generic CAMP, continuous monitoring is only required during ground-intrusive activities. Because no ground-intrusive field activities are proposed for O&M activities in the SMP, continuous particulate air monitoring will not be completed during on-site O&M procedures. Any ground intrusive work requires monitoring as outlined in the NYSDOH Generic CAMP (Page 1, Section 'Community Air Monitoring Plan').

Documentation and Calibration

The VOC air monitoring device shall be calibrated prior to daily field activities according to manufacturer's instructions and standard industrial hygiene practices. In addition, monitoring instruments will be checked for "drift" upon completion of daily field activities. Calibration measurements will be recorded on a field data record. Field measurements will be recorded and available for State (NYSDEC and NYSDOH) personnel to review. Upon completion of field activities, available monitored data recorded will be evaluated and summarized in reports as outlined below.

CAMP reports will be prepared and submitted to the NYSDEC and NYSDOH for review on a quarterly basis for routine inspection activities. In the event of ground intrusive work, CAMP reports will be submitted daily during field work.

If an exceedance occurs during work activities, the data will be provided to the NYSDEC and NYDOH via email as soon as possible on the same day. The email is to include a description of the exceedance, the cause of the exceedance, and corrective actions taken, if any. If the exceedance occurs after regular business hours, the NYSDEC and NYSDOH are to be notified as soon as possible the next business day.

Enclosure:

Appendix 1A: NYSDOH Generic CAMP

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

APPENDIX 7
SITE MANAGEMENT FORMS

Site Management Forms
Form 1: General Management, SVE Sampling
Bridge Cleaners Site # 241127
39-26 30th Street, Long Island City, Queens, NY

Date _____
Weather _____
Preparer's Name _____
Preparer's Affiliation/Title _____

General System Operation:

Inspection /Monitoring Type: Monthly Quarterly Annually Other
Is the AS/SVE ON upon arrival? Y / N
System Run-Time _____
SVE Vacuum (inches H2O)
RW-2: _____ RW-3: _____
AS Pressure (psi)
AS-1: _____ AS-2: _____ AS-3: _____
Are the AS timers on and functioning? (circle) Y / N
Are the AS timers set on the correct time/interval? (circle) Y / N N/A

	On (24:00)		Off (24:00)	
	Set	Actual	Set	Actual
AS-1				
AS-2				
AS-3				

Notes:

Roof Enclosure:

Blower Pre-Filter Vacuum (in H2O): _____ Temperature: _____
Blower Post-Filter Vacuum (in H2O): _____ Compressor Pressure (psi): _____
Blower Effluent Pressure (in H2O): _____

SVE Exhaust PID (ppm): _____
SVE Exhaust Sample collected at (time): _____
SVE Exhaust air flow rate: _____

Notes:

Cover System: Note additional cracks/penetrations, and the integrity of the cover

Site Management Forms
Form 5: Low Flow Groundwater Sampling Form
Bridge Cleaners Site # 241127
39-26 30th Street, Long Island City, Queens, NY

Low Flow Purge Sheet

Date: _____ Well ID: _____

Client: _____ Project: _____ Analyzer _____

PID (PPM): Well Diam (in): DOW (ft): DTW (ft):

		Temperature		pH		ORP		Specific Cond.		Turbidity		Dissolved Oxygen				DTW	Purge Rate
	Time	Deg C	Change %	S.U.	Change	mV	Change	ms/cm	Change %	NTU	Change	mg/L	Change %	Color	Clarity	ft BTOC	mL/min
0																	
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	

Start Time	
End Time	
Volume	
Pump Intake	
Sample Start	
Sample End	

Parameter	Change Allowance	OR
Temp	3%	
pH	0.1	
ORP	10	
Spec Cond	3%	
Turbidity	10%	<5 NTU
DO	10%	<0.5 mg/L

PID = Photoionization detector
PPM - parts per million
in = inches
ft = feet
DOW = depth of well
DTW = Depth to water
Deg C = Degrees Celcius
S.U. = Standard Units
ORP = Oxidation-Reduction Potential
mV = Millivolts
Specific Cond = Specific Conductivity
mS/cm = Milli Siemens per centimeter
NTU = Nephelometric Turbidity Units
mg/L = milligrams per Liter
BTOC = Below top of casing
mL/min = Milliliters per minute

Notes _____
_____
_____
_____
_____

APPENDIX 8
QUALITY ASSURANCE PROJECT PLAN
(QAPP)

BRIDGE CLEANERS
QUEENS COUNTY
LONG ISLAND CITY, NEW YORK

Quality Assurance Project Plan

NYSDEC Site No. 241127

Prepared for:
39-26 Property, LLC
39-26 30th Street
Long Island City, New York

Prepared by:
Carson Voci Engineering and Geology, D.P.C.
an affiliate of Terraphase Engineering Inc.
1100 East Hector Street, Suite 400
Conshohocken, Pennsylvania 19428

December 2025

Table of Contents

1.0 Introduction and Background

Carson Voci Engineering and Geology, D.P.C. (Carson Voci), an affiliate of Terraphase Engineering, Inc., has prepared this Quality Assurance Project Plan (QAPP) on behalf of 39-26 Property, LLC (Owner) for the property located at 39-26 30th Street, Queens, New York. The property is identified by the NYSDEC as Site No. 241127. 39-26 Property, LLC was recorded on the Deed with Zhong Chuang Properties, LLC (Zhong Chuang) in December 2020. Zhong Chuang purchased the property from Alenat in May 2012. The site is operated by The Fifty LIC as an 11-story mixed-use residential building.

The site historically operated as a commercial laundry and dry cleaner. Remedial investigations completed on site identified soil, groundwater, and soil vapor contamination containing chlorinated solvents above regulatory criteria. An air sparge (AS) and soil vapor extraction (SVE) system was installed to protect human health by addressing source material under the slab, treating the contaminated groundwater, mitigating the risk of sub-slab soil vapor intrusion into the Site building, and prevent off-site migration of soil vapor. The system initially began operation in January 2018. Monitoring data collected in November 2018 and May 2019 indicated the AS/SVE system had reduced groundwater PCE concentrations in four of the five groundwater monitoring wells, with the exception being GW-2. The parties went to Dispute Resolution, and in November 2019, a determination was made that system modifications were necessary. A Supplemental Interim Remedial Measure Work Plan (IRM WP) detailing the addition of two AS points was approved by New York State Department of Environmental Conservation (NYSDEC) in July 2020. The Supplemental IRM was implemented, and the system began continuous operation again in September 2020. This QAPP was prepared alongside the Interim Site Management Plan (SMP) for the continual operation and monitoring of the AS/SVE system.

Environmental Engineering Compliance Control, D.P.C. (EECC) oversaw the implementation of the Supplemental IRM WP and subsequently prepared a Construction Completion Report (CCR), dated August 2021.

The 2022 NYSDEC Record of Decision required continued operation of the AS/SVE system and continued site monitoring as ECs at the Site in accordance with the SMP.
A Change of Use Work Plan was prepared in 2021 for the demolition of the existing one-story structure and relocation of the AS/SVE system to facilitate redevelopment of the Site by the Owner. The AS/SVE system was shut down on December 8, 2021, to enable roof and interior demolition activities. Subsequent post-shut down sampling was conducted in January 2022, and the results were presented in the 2022 AS/SVE Remedial Progress Sampling Report submitted to the NYSDEC. The AS/SVE system was disconnected and removed in March 2022 in accordance with the Change of Use Work Plan. The Site environmental easement was amended as of April 3, 2023, to include Restricted Residential Use as described in 6 NYCRR § 375-1.8(g)(2)(ii) to the allowed property uses.

The Site was redeveloped to an 11-story residential building with a parking garage on the ground floor, which was completed in 2025. Subsurface redevelopment excavation activities were conducted in accordance with the 2022 Redevelopment Excavation Work Plan and completed in March 2023. The final completed component of the Redevelopment Excavation Work Plan was the reinstallation and development of the groundwater monitoring well network at the Site to facilitate groundwater monitoring in accordance with the SMP. Implementation of the Redevelopment Excavation Work Plan is documented in the 2024 NYSDEC-approved, Construction Completion Report – Redevelopment Excavation.

As detailed in the 2025 Corrective Measures Report, following the April 2023 groundwater monitoring event which indicated a significant increase of PCE and TCE concentrations in GW-2R, corrective measures at the Site were conducted in accordance with the NYSDEC-approved Corrective Measures Work Plan (CMWP). The corrective measures consisted of an in-situ chemical reduction (ISCR) and enhanced reductive dechlorination (ERD) injection via direct-push technology (DPT) application. The remedial injections implemented were proven effective at addressing the rebound of PCE concentrations at monitoring wells GW-2R and GW-5R through the 6-month post-injection monitoring and indicate the presence of conditions that continue to address potential additional rebound.

2.0 Project Definition

The overall objective of the remedy is to protect human health by addressing source material under the slab, treating the contaminated groundwater, mitigating the risk of sub-slab soil vapor intrusion into the Site building, and prevent off-site migration of soil vapor.

In general, the project will involve the following activities:

- Low-flow groundwater sampling on a quarterly basis through the first quarter of 2026, then every fifth quarter thereafter; and,
- Annual visual inspection of the site cover system.

The activities listed above are described in the SMP and will be conducted in accordance with applicable NYSDEC guidance and regulations.

This QAPP sets forth the quality assurance/quality control (QA/QC) procedures to be followed during the execution of the SMP, including procedures for sampling, chain of custody, laboratory analysis, data reduction and reporting, internal quality control, preventive maintenance, and corrective action. The purpose of the QAPP is to ensure the generation of valid data or, if the data are not valid, to identify the validity issues and determine appropriate corrective actions.

2.1 Project Team

The project team members are responsible for collecting and analyzing all site data. The project team will consist of the following persons:

LICENSED ENGINEER

Nicholas Krasnecky, PE
Senior Associate Engineer
Carson Voci Engineering and Geology, D.P.C
an affiliate of Terraphase Engineering Inc.
201-552-0224

PROJECT MANAGER

Al Nesheiwat
Managing Principal
Sustainable Development, Inc.
914-220-2404

QUALITY ASSURANCE CONTACT

Alex Strohl
Quality Assurance Coordinator
Terraphase Engineering, Inc.
215-297-3502

HEALTH AND SAFETY CONTACT

Daren Roth
Health and Safety Officer
Terraphase Engineering, Inc.
925-444-0555

LABORATORY CONTACTS

Nicole Galamb
Project Manager (Water and Soil Analytical)
Pace Analytical
201-428-2601

Chris Anderson
Project Manager (Air Analytical)
Pace Analytical
508-844-4122

Field staff will be supervised and directed by project team members. Changes to the project team, if any, will be annotated to this QAPP.

2.2 Data Collection

Carson Voci will collect data at the site. Any data from external sources will be evaluated by the Project Team for usability and will be considered usable if the data are (1) collected by a person with the education, training, experience, and certification or license (if required) for collecting the specific data and (2) consistent with collection and usability guidelines and protocols established by NYSDEC, New York State Department of Health (NYSDOH), and the industry, as well as this QAPP.

All data collection activities will comply, to the extent possible, with any existing guidance or regulatory requirements of NYSDEC and NYSDOH, including the requirements of the Division of Environmental Remediation *Technical Guidance for Site Investigation and Remediation, May 2010* (DER-10). This QAPP describes data collection procedures that will result in data that meets the Data Quality Index (DQI) requirements of Section 3.2, below. The DQI parameters establish the data usability requirements for this project. Necessary deviations from standard or established procedures will be documented and disclosed to the Project Team members, who will evaluate whether the data meets DQI usability requirements.

2.2.1 Analytical Requirements

The following target lists and laboratory methods will be used to analyze environmental samples from the site:

GROUNDWATER:	Target Compound List (TCL) VOCs (USEPA 8260)
SOIL GAS:	EPA TO-15
SOIL:	VOCs (EPA 8260C)

2.2.2 Data Completeness

Data completeness is the percentage of the collected data that are usable for making defensible conclusions. For investigational purposes, data completeness may be less than 100% if sufficient alternative data are available to achieve a reasonable level of scientific probability. For compliance purposes, the data completeness target should be 100%. Compliance data that are not usable for making defensible conclusions will either be re-collected or supplemented with alternative data that support comparably reliable conclusions. Data gaps will be addressed prior to completion of each phase of work.

2.2.3 Groundwater Sampling Procedure and Points of Compliance

Groundwater data will be collected to assess and characterize the quality of groundwater at the site. The performance objective is compliance with the New York TOGS 1.1.1 Ambient Water Quality Standards, Class GA.

Groundwater samples will be collected from GW-1R, GW-2R, GW-3R, GW-5R, and GW-6. The Sampling Personnel will collect groundwater samples from each well using low flow sampling techniques, as defined by the US EPA[1]. This process will begin by removing the well cap and measuring the organic vapor levels in the top of the well casing using a PID. This level will be recorded in the field notebook and appropriate health and safety precautions taken following the HASP. The low flow technique then entails first measuring and recording the static water level measurement, which will be compared to the well installation records for reference to well construction and screen depth. Next, 0.25-inch polyethylene tubing will be cut to length for purging. Groundwater purging involves using a low flow pump, such as a Monsoon, bladder, or peristaltic pump. While purging, water quality measurements will be recorded during every five-minute interval using a calibrated field meter to measure temperature, pH, specific conductivity, ORP, DO, and turbidity. Groundwater purging will continue until three consecutive

[1] The low flow sampling guidance can be accessed at: https://www.epa.gov/quality/low-stress-low-flow-purging-and-sampling-procedure-collection-groundwater-samples-monitoring

readings are observed to be within the following limits:

- Turbidity (+/- 10% for values >10 NTUs)
- DO (+/- 10% for values greater than 0.5 milligram per liter (mg/L). (If three dissolved oxygen values are < 0.5 mg/L, consider the values stabilized.)
- Specific conductivity (+/- 3%)
- Temperature (+/- 3%)
- pH (± 0.1 unit)
- ORP (± 10 millivolts)

If the parameters have not stabilized after one hour of water quality collection, it is at the discretion of the Sampling Personnel whether or not to collect a sample or to continue purging. If, after one hour, pH and conductivity have stabilized and the turbidity is still decreasing and approaching an acceptable level, additional purging should be considered to obtain the best sample possible, with respect to turbidity. The sample clarity and any other visual observations during sampling shall be described in the field log.

After purging, the groundwater samples will be collected by slowly filling the sample containers. For VOC samples, the preserved 40-ml vials will be filled until full, capped, and then inspected for air bubbles by inverting the sample container and inspecting the bottom of the vial, which will be facing upward. If an air bubble(s) is present, the sampler will remove the lid of the container and add water to the vial until it is full. The sampler will replace the lid and inspect the vial for bubbles again. This process will continue until there are no air bubbles in the sample vial. A minimum of three vials will be filled for each well.

3.0 Data Quality Objectives

Data Quality Objectives (DQOs) ensure that the data collected as part of the remedial action at the site are of sufficient quality to make project decisions. The intended use of the data, the procedures available for laboratory and field analyses, and the available resources to collect data all factor into DQOs. Once the DQOs have been established, analytical methods that are capable of supporting the DQOs are selected.

3.1 DQO Confidence Levels

The United States Environmental Protection Agency (USEPA) has defined certain analytical and confidence levels that support the DQOs and define the type of data that can be used for particular purposes. DQO level's range from 1 to 5 in increasing order of precision, difficulty, speed, and cost. This project will utilize the following DQO levels, as follows:

Level I. Level I data consist of various subjective assessments that are used to initially characterize site conditions. Level I data cannot accurately assess compositions or quantify materials but can provide general guidance for directing investigation and remedial activities in real time. Level I data can be used to reduce the volume of higher-level data needed that may be otherwise needed to guide investigations or remedial actions, and thereby accelerate the activities.

Level II. Level II data consist of field analyses that utilize portable analytical test kits and screening instruments. These assessments are semi-quantitative and rely on proper calibration and utilization of testing equipment through suitable calibration standards, reference materials, sample preparation equipment, and operator training.

Level III. Level III data consist of laboratory analyses conducted in a mobile or off-site laboratory that is not Contract Laboratory Program (CLP) certified. These data are reproducible and reliable due to quality assurance/quality control (QA/QC) procedures that govern the data generation and verification process but may not be able to attain the level of precision, accuracy or reproducibility that are needed to demonstrate environmental compliance pursuant to state requirements. This level of data is usable for all site purposes except regulatory compliance.

Level IV. Level IV data are characterized by QA/QC protocols and documentation of procedures that comply with CLP analytical service requirements. This level of data is usable for all site purposes except those specifically requiring Level V.

Level V. Level V data utilize non-standard methods or analyses that have been modified or developed for site-specific purposes. Method development or method modification may be required for specific constituents or detection limits.

Historic and Secondary Data. Historic and secondary data come from institutions, processes or people that were not under the control of the site investigator, or that were collected for purposes unrelated to site activities. These data can be used to assess the general expected limits of initial site conditions, potentially contributing conditions from off-site sources, and potential background conditions. Historic and secondary data should be confirmed with primary data if the accuracy and precision of the data are important to the evaluation.

Site data will be used to (1) monitor the progress of the remedial action, and (2) verify that post-remedial action environmental conditions have returned to compliance levels.

The following DQO confidence levels will be applicable to all media at the property:

- DQO level I is not expected to be needed at this site at this time, as delineation has been completed to the extent practicable.
- DQO levels II and III are acceptable for characterization sampling and the monitoring of site conditions during remediation.
- DQO level IV will be used for all compliance testing and may be used for any other monitoring purposes.
- DQO level V is not expected to be needed at this site.

3.2 Data Quality Index

The acceptance/performance criteria for laboratory analyses are assessed by evaluating the precision, accuracy, representativeness, completeness, and comparability of the laboratory

data. The definition of each of these terms is provided below.

- **Precision:** a measure of mutual agreement among individuals of the same property, usually under prescribed similar conditions. Precision is measured in terms of relative percent difference between two data sets from a similar source, or percent relative standard deviation from multiple data sets. Duplicate samples are used to evaluate this DQI. Precision will vary by sample media. Soil duplicate results may vary by 100% or more and still represent acceptable precision, whereas a split groundwater sample may exhibit unacceptable precision at a difference level of just 20%. To conservatively estimate overall risk, the higher measurement will generally be used to represent site conditions.
- **Accuracy** is the degree of difference between measured and calculated or true values. In laboratory conditions, accuracy is measured by the average percent recovery of standard control spikes. The acceptable level of accuracy for this project will be based on the acceptable percent recovery of laboratory control spikes for each method. The laboratory will evaluate this DQI for its own laboratory data.
- **Representativeness** expresses the degree to which data accurately and precisely represent a characteristic of a population, or parameter variations at a sampling point, or a process condition, or an environmental condition. To ensure that the samples collected at the site are representative of the site conditions, the number of samples collected, and the areas of collection, will conform to the sampling requirements of the NYSDEC and the NYSDOH. To ensure that samples delivered to the laboratory are representative of the site conditions rather than cross-contamination, quality assurance samples will be collected for laboratory analysis as described in Section 4.7, below. Representativeness will be evaluated by the Project Team.
- **Comparability** is the degree to which one set of data can be accurately compared to another set of data that were collected by a different means or analyzed by a different entity. The objectives of the analytical laboratory for comparability are to:
    1. Demonstrate traceability of standards to USEPA or NYSDEC-approved sources;
    2. Use standard methodology;
    3. Report results from similar matrices in standard units;
    4. Apply appropriate levels of quality control within the context of the laboratory QA program, (Level III, USEPA Data Objectives for Remedial Response Activities, 1987, or equivalent); and,
    5. Participate in inter-laboratory studies to document laboratory performance.
- **Completeness** is a measure of the amount of the data obtained from a measuring system compared to the amount that was expected to be obtained under normal

conditions. The goal and objective is 100% completeness. However, due to unforeseen field conditions, laboratory conditions, and analytical limitations (such as matrix interference or required dilution) which could result in data qualification or rejection, it may not be possible to achieve 100% completeness. For compliance purposes, the level of completeness will be 100%. If any data needed for compliance are rejected, additional data will be collected. For monitoring and site evaluation purposes, project completeness may be less than 100% if the available data enables the Project Team to make determinations within a reasonable degree of scientific probability. The Quality Assurance Coordinator will determine if re-sampling or re-analysis are required to meet the data quality objectives.

- **Sensitivity** is the lowest concentration (reporting limit) at which a specific analytical procedure can accurately quantify an analyte concentration. The analytical method used by a laboratory must ensure that the reporting limits are able to detect each analyte at or below its regulatory standard. However, due to sample conditions or laboratory operational limitations (i.e. matrix interference or required dilution), the actual reporting limit for each analyte may not always achieve the required sensitivity. Non-detectable concentrations of analytes that do not meet sensitivity requirements (established at the relevant state standard for the compound of concern) will be identified. Estimated or otherwise qualified data will be appropriately flagged.

4.0 Field Investigation Procedures

The field investigation procedures will conform to the requirements of the NYSDEC DER-10, US EPA Standard Operating Procedures (SOPs), NYSDOH *Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006 (SVI Guidance)*, and this QAPP. Any deviation from these procedures, and the reason for deviating, will be documented.

4.1 Communications and Emergency Contacts

All communications and field and monitoring activities will be recorded in a permanent field book as they occur. In the event of an emergency or unexpected field situation, conduct the action(s) described below:

- In the event of a medical or safety emergency contact 911 and the site Health and Safety Officer.
- In the event of a spill or release to the environment, initiate spill containment and emergency response procedures and contact the Licensed Professional Engineer or site Health and Safety Officer.
- In the event that unexpected site conditions are encountered during a site visit, contact a Project Team member.
- In the event that field activities cannot be conducted in a manner consistent with this QAPP, or state regulatory or guidance documents, contact a Project Team member.

Contact information is provided in Section 2.1, above.

4.2 Field Equipment and Supplies

Routine sampling and data collection may utilize the following equipment and supplies:

- Laboratory sampling containers with preservation chemicals, as needed
- Electric water level meter
- Disposable Teflon® bailers
- Disposable polyethylene bailers
- Submersible or peristaltic pumps
- Camera
- Teflon®-lined polyethylene tubing
- Temperature, pH, dissolved oxygen, specific conductivity and turbidity meters
- Photoionization Detector, calibrated
- Field logbook and field logs
- Sample Cooler with ice
- Chain of custody

- 55-gallon drums for purge water disposal
- Decontamination supplies (Alconox or Liquinox and Distilled water)
- Hand tools

Pre-cleaned sampling containers will not be used if they are (a) opened while in storage, (b) stored with contaminated materials, or (c) stored beyond their intended use date. All pre-cleaned materials will have certificates of cleanliness or testing.

4.3 Decontamination Procedures

To avoid cross contamination, all sampling equipment shall be clean and free from the residue of any previous samples. The use of new, dedicated sampling equipment and materials is preferred whenever possible. If equipment or materials are re-used, they should be decontaminated using, at a *minimum,* the following procedure:

- Clean equipment initially and following use with low phosphate detergent;
- Rinse with tap water;
- Rinse with de-ionized water; and
- Air dry

The foregoing procedure does not apply to decontamination of heavy equipment, drilling equipment, or heavily contaminated equipment. All heavy and drilling equipment decontamination will be detailed in a corresponding work plan. Heavily contaminated materials may require multiple washes and rinses, as well as rinsing in dilute hydrochloric acid.

Reusable groundwater sampling equipment such as submersible pumps shall be decontaminated by thoroughly washing all internal and external surfaces with detergent and water and rinsing with both potable and de-ionized water prior to use. All sample tubing shall be disposable and dedicated to individual wells.

Field instruments shall be cleaned as per the manufacturer's instructions. Probes, such as those used in pH and conductivity meters, and thermometers, must be rinsed with de-ionized water prior to, and after, each use. Avoid bringing field instruments into contact with heavily contaminated media.

4.4 Sample Designation

Sample designation will consist of an alpha-numeric name of at least two components as described below. Variations are permitted for clarity purposes.

- Sample type: The first component, which identifies the sample type, will consist of a 2- or 3-letter code as follows:
    - MW or GW- Monitoring Well sample
    - SS, SP, or VM – Sub-slab soil vapor sample
    - IA – Indoor Air sample
    - SB – Soil Boring sample

- Sample Location: The second component identifies the sample location using a unique number or number and letter for the sample type and corresponds to a specified location on a scaled site plan.
- Sample Identification: The third component is always offset with parentheses ( ) from the sample location, and indicates the interval from which the sample was collected. All samples of soil will have this component. This component is optional for other sample media and should be used only to indicate intervals that can vary.
- Instead of the two-letter sample type code listed above, QA/QC samples will be labeled with the following:

    TB - Trip Blank

    FB – Field Blank

    DUP – Field Duplicate Sample

The label of a field duplicate sample shall not reference the sampling location or depth of the sample that was collected. This information shall be indexed to the duplicate sample ID and recorded in the field book.

4.5 Field Records

All field records are evidentiary documents that may be subject to discovery and litigation. The site manager, designee, or other team member may be required to testify in legal proceedings regarding any field activity. As a result, field records should document, to the extent practicable, all critical components of the field activity by providing sufficient information to reconstruct the activity. Field records will be used by the Project Team to make regulatory decisions. Inaccurate, misleading or incomplete field records could result in improper decisions by the Project Team, which in turn could lead to future litigation, or even law enforcement actions.

Field logbook entries must be legibly written and provide an unbiased, concise, detailed record of the field activities. A new page shall be used each day to begin field book entries. The first written page shall include the date, time, site name, location, EECC personnel and their responsibilities, other on-site personnel, and observed weather conditions. The remaining pages will be numerically serialized, contain the total number of pages for the daily entry, the site number, and the name or initials of the logbook preparer. The logbook must contain the staff member's printed name on the cover page.

All logbook entries shall be made in ink. Waterproof ink is recommended. All entries shall be accompanied by the appropriate time, preferably in military units (such as 1530 instead of 3:30). Errors shall be lined through and initiated. Field records shall conform to the regulatory and guidance documents and SOPs.
Examples of appropriate field book records include:

- Equipment used on site: manufacturer, model, number, owner;
- Full names of personnel on site;

- Summary of pertinent site or telephone conversations, including full name of person spoken to;
- Record of telephone conversations;
- A site map or sketch;
- A chronological record of sampling activity;
- Descriptions of samples collected, including sample matrix, physical description (color, texture, odor, soil type, anthropogenic material content, etc.) and any other important or distinguishing sample characteristics;
- Description of preservatives used in samples, and handling processes;
- Sample locations triangulated to permanent recognizable landmarks;
- Decontamination procedures, if used.

The above list is not comprehensive. Sample numbers shall correspond to sample locations on the site sketch in the logbook. The offer and/or act of providing split samples to a thirty party (responsible party, government official, consultant, etc.) must be documented.

Control and maintenance of field logbooks and records is the responsibility of each field staff member. Each field staff member shall make an electronic copy of each daily field record upon returning to the office. Sampling log forms may be used, but only to supplement field book entries. Sample descriptions and sampling processes must be included in the field book.

4.6 Pre-Sampling Procedures

Prior to sampling, the investigator is required to complete certain procedures that pertain to the sample media as described below.

INSTRUMENTS: Calibrate all required field instruments (photoionization detector (PID), pH meter, conductivity meter) pursuant to the operations manual(s), SOP(s), and laboratory procedures. Service all instruments on a schedule that is sufficient to retain calibration and accuracy. Maintain calibration and service records at the Project Team office location. Records shall indicate the make, model, and serial number of the equipment being serviced or calibrated, the service or calibration procedure being performed, and a description of the service or calibration results. A copy of the service records shall be maintained in an electronic format. The generic CAMP requires the use of a real-time particulate monitoring instrument capable of measuring 10-micron particulate matter. This equipment is factory-calibrated and, thus, does not require calibration in the field.

SOIL: Prior to sampling, evaluate soil structure and composition and enter observations into a logbook. Screen recovered cores and other soil samples every 6-inches with a PID and examine for visual and other indications of impact. Evaluate selected soil samples using a jar headspace method if the work order requires. Record all information in a bound logbook.

GROUNDWATER: Immediately after breaking the pressure cap seal on each monitoring well, measure the head space with a PID being careful not to release vapors. After measuring the headspace, remove cap and gauge the well using an oil/water probe. Alternatively, use an

electronic water level meter if there is no possibility that product is in the well. Measure the depth of water to the nearest hundredth of a foot from the measuring mark on the well riser, or from the highest point on the riser if there is no mark. Record the data in the field book. Decontaminate the instrument prior to using in another well.

SOIL VAPOR or INDOOR AIR: Follow NYSDOH *SVI Guidance* for procedures.

Data collection activities at this site will, at a minimum, be directed and supervised by a QEP or a licensed PE, as defined and required by DER-10. Data and samples will be collected only by qualified persons. Qualifications are established for work tasks by demonstrating a level of education, training, and experience that would be generally acceptable within the environmental industry. Survey data shall be collected by a licensed surveyor. Wells shall be installed by a licensed well installer.

Disposable gloves shall be worn by all sampling personnel and will be changed between sampling points and after decontaminating field equipment. Field and procedural data shall be recorded in a bound field logbook. Field sampling data sheets may supplement, but not replace, logbook entries.

4.7 Quality Control Procedures

All groundwater and soil sample containers will be labeled before they are filled. Samples will be placed into a cooler and cooled with ice to 4°C or below, and the sampling technician will ensure that ice remains in the sample cooler at all times. Air samples are not to be cooled on ice after collection. The sampling technician will maintain physical control of the sample cooler and/or air sample container(s) until relinquished to a project team member, courier, or laboratory.

All samples will be recorded on a chain-of-custody form prior to leaving the site, and the form will accompany the sample cooler at all times. **All persons** who establish custody of any sample at any time will sign the chain of custody form, including multiple sampling technicians if used.

At a minimum, the chain of custody form will include the following information in the title block:

- Project name
- Project number
- Contact person and telephone number

In addition, the chain of custody form will include the following information:

- Environmental media sampled
- Sample identification number
- Sample time
- Sample date
- Analytical procedure
- Sample preservative

Entries on the chain of custody form must be made in indelible ink and not pencil or other erasable marking. If an incorrect entry is made, the information will be crossed out with a single strike mark with initials and the date next to the marked-out text.

A signature block with the sample custodian's signature, printed name, and date must be included on the form. In addition, the chain of custody form will include signature blocks for subsequent custodians.

Before shipping from the project site, a copy of the chain of custody form will be made and placed in the project files. Then the original form will be placed into a zip-lock bag and taped to the top of the inside of the cooler or sample container. The cooler/sample container will then be sealed with a chain-of-custody seal, which will be signed and dated. Finally, the cooler/sample container will be taped shut.

The samples will be delivered to the laboratory within 2 days of the sample collection. Samples will be processed at the laboratory within established holding times for the methods. Samples and residuals will be held by the laboratory for 60 days, after which they will be discarded unless alternative arrangements are made.

Trip blanks, field blanks, and field duplicates will provide a quantitative basis for validating the analytical data.

4.7.1 Trip Blanks

Trip blanks provided by the laboratory will consist of 40 ml sample vials with de-ionized, analyte-free water. One trip blank shall at all times accompany any sample container holding samples for VOC analysis. The trip blanks originate at the laboratory and are returned to the laboratory without opening. Each trip blank shall be analyzed for VOCs to detect possible contamination during shipment.

4.7.2 Field Blanks

Field Blanks shall be collected at the minimum rate of 1 per day, and 1 per 20 samples for events lasting more than 1 day. Field blanks shall be collected by passing laboratory-prepared, de-ionized, analyte-free water over the sampling equipment in the area where the samples are being processed and collecting the water into the sample containers. The field blanks shall be analyzed for VOCs to detect possible cross-contamination from the sampling equipment or atmospheric vapors.

4.7.3 Field Duplicate Samples

Field duplicate samples assess the laboratory's ability to reproduce results accurately by comparing the laboratory results from two samples collected at the same location. Field duplicate samples shall be collected at the rate of 1 per 20 samples and shall be submitted as "blind" samples to the laboratory. Field duplicate samples shall be prepared as "split" samples in aqueous sampling.

4.8 Reconciliation with DQOs

Upon completion of each sampling event and receipt of laboratory analytical data, evaluations of the data precision, accuracy, and completeness will be made by the Project Team. If data quality does not comply with the project requirements, the data may be discarded or qualified for use. The reasons for the failure will be evaluated and the necessary corrective actions will be implemented.

If equipment failure, calibration, or maintenance of equipment is the cause of data quality degradation, then corrections will be implemented, and samples re-analyzed. If sampling error is the cause of data quality degradation, then the sampling methods or protocols will be corrected and additional samples collected, if needed. If completeness, representativeness, and comparability goals are not met, data will be qualified, and resampling will be performed as the project budget allows.

Data limitations will be detailed in each report submittal. Any change to sampling methodology, processing, or analytical method will be updated by appending a supplemental update to the QAPP.

5.0 Analytical and Other Data Requirements

The analytical and sampling and analysis requirements for the site are found in the Interim SMP.

5.1 Laboratory Deliverables

The laboratory will provide all groundwater and air data in electronic, Category B deliverable format unless otherwise requested. The analytical data package will be accompanied by an electronic data deliverable (EDD). Data for this site will be evaluated and qualified in accordance with the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, USEPA-540-R-07-003, July 2007 and USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, EPA-540-R-04-004, October 2004, as appropriate for the analytical methods employed.

Data generated will be uploaded to the NYSDEC's Environmental Information Management System in accordance with the NYSDEC Electronic Data Deliverable Manual, V. 4 (NYSDEC, 2018). The EDD format required is current format Earthsoft EQuIS® Environmental Data Management Software. Each EDD must be formatted and copied using an MS-DOS operating system. To avoid transcription errors, data will be loaded directly into the ASCII format from the laboratory information management system (LIMS). The laboratory will perform a QC check on the EDD before delivery. The original data, tabulations, and electronic media must be stored in a secure and retrievable fashion.

5.2 Data Records Management

All field information will be recorded in bound field books using permanent ink and recorded in electronic format on the corporate server. Paper records will be archived at the Site Team's office location.

Errors discovered in records will be corrected by entering a single line through the error and writing the corrected information above the error. The person correcting a record will initial the correction and place the date of correction next to the initial. If the person correcting the record is not the person who made the initial record, then the correcting person shall explain the correction in a permanent memo in the project file.

5.3 Data Verification and Validation

Field records and data will be provided to a Project Team member for review as soon as possible after collection or generation. The Project Team member will review field records and data deliverables for legibility, usability, and completeness within 1 week of receipt. Any noted deficiencies will be corrected as soon as possible thereafter.

Field records will conform to the specifications and requirements of the QAPP and referenced documents herein. Data will be compared to the DQOs to evaluate data usability.

An independent third-party quality assurance chemist will review the laboratory data package and prepare a data usability summary report (DUSR). The validation will conform to the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, USEPA-540-R-07-003, July 2007 and USEPA Contract Laboratory Program National

Functional Guidelines for Inorganic Data Review, EPA-540-R-04-004, October 2004, as appropriate for the analytical methods employed.

The DUSR will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each sample delivery group will be presented in the data validation report.

The validated analytical results reported by the laboratory and validated by the third-party validator will be assigned one of the following USEPA-defined data usability qualifiers:

- U – Not detected at given value
- UJ – Estimated not detected at given value (applied by third party validator)
- J – Estimated value
- N – Presumptive evidence at the value given (applied by third party validator)
- R – Result not useable (applied by third party validator)
- No Flag – Result accepted without qualification

5.4 Data Usability Summary Report

The analytical data review will be summarized by a third-party validator in a DUSR, which will include a review and evaluation of all the analytical results. The following parameters will be reviewed to ensure compliance with the analytical method protocols:

- Initial and continuing calibrations
- Blanks
- Laboratory control standards and matrix spikes
- Surrogate recoveries
- Matrix interference checks
- Field and laboratory duplicates
- Sample data
- Chain-of-custody forms
- Holding times

The report will describe the samples and parameters reviewed. Any deficiencies identified during the review will be noted and the effect on the generated data will be discussed. If warranted, the report will include recommendations for re-sampling or re-analysis.

5.5 Data Precision and Assessment Procedures

5.5.1 Field Precision

Field precision is difficult to measure because of temporal variations in field parameters. However, precision will be controlled through the use of experienced field personnel, properly calibrated meters, and duplicate field measurements. Field duplicates will be used to assess

precision for the measurement system.

5.5.2 Laboratory Precision

Laboratory data precision for organic analyses will be monitored through the use of surrogate spikes and laboratory duplicates. The precision of data will be measured by calculating the relative percent difference (RPD) by the following equation:

RPD = 100*(A-B) /((A+B)/2)

Where:

A = Analytical result from one of two duplicate measurements
B = Analytical result from the second measurement

Precision objectives for laboratory duplicate analyses are identified in the NYSDEC ASP Revision 2016.

5.5.3 Data Accuracy Assessment Procedures

Experienced field personnel, properly calibrated field meters, and adherence to established protocols will control the accuracy of field measurements. The accuracy of field meters will be assessed by review of calibration and maintenance logs.

Laboratory accuracy will be assessed via the use of surrogate spikes, internal standards, and reference standards. Where available and appropriate, quality assurance performance standards will be analyzed periodically to assess laboratory accuracy.

Accuracy will be calculated in terms of percent recovery as follows:
% Recovery = 100*(A-X)/B

Where:

A = Value measured in spiked sample or standard
X = Value measured in original sample
B = True value of amount added to sample or true value of standard

This formula is derived under the assumption of constant accuracy over the original and spiked measurements. If any accuracy calculated by this formula is outside of the acceptable levels, data will be evaluated to determine whether the deviation represents unacceptable accuracy, or variable, but acceptable accuracy. Accuracy objectives for surrogate recovery objectives are identified in the NYSDEC ASP 2016 Revision.

5.5.4 Data Completeness Assessment Procedures

The laboratory will calculate the completeness of laboratory data sets by comparing the number

of valid sample results generated to the total number of results generated.

Completeness = 100*(Number valid results/Total number of results generated)

As a general guideline, overall project completeness is expected to be at least 90%.

5.6 Corrective Actions

The corrective actions typically taken by the laboratory are described below. If the calibration, instrument performance, or blank criteria are not met, the cause of the problem will be investigated and corrected. The analytical system then will be recalibrated. As part of the laboratory's operating protocol, sample analysis does not begin until calibration, instrument performance, and blank criteria are met. If matrix spike, reference standard, or duplicate analyses are found to be out of acceptable limits, the cause of the issue must be researched. Then, depending on the results of the overall QC program for the sample set, the data may be accepted, accepted with qualification, or determined to be unusable. If deemed unusable, the samples either must be reanalyzed, or a new set of samples collected and analyzed.

Deviations from the QAPP will be identified by the QA Coordinator and corrected, to the extent practicable. If the QAPP requires amending, a QAPP amendment will be attached and distributed to affected persons.

5.7 Distribution

A copy of this QAPP and any amendments will be provided to all Team Members and field personnel.

6.0 References

New York State Department of Environmental Conservation (NYSDEC). (2009, November 11). CP-43: Groundwater Monitoring Well Decommissioning Policy.

New York State Department of Environmental Conservation (NYSDEC). (2012, October 17). New York State (NYS) Environmental Laboratory Approval Program (ELAP) accreditation for EPA 5035 and 5035A Guidance.

New York State Department of Environmental Conservation (NYSDEC). (2016, October). Analytical Services Protocol.

New York State Department of Environmental Conservation (NYSDEC). (2018, November). Electronic Data Deliverable Manual, V. 4.

U.S. Environmental Protection Agency (US EPA). (2005). Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4).

U.S. Environmental Protection Agency (US EPA). (1996). Test Methods for Evaluating Solid Waste. SW-846 3rd Edition, Update 3. Office of Solid Waste. December.

U.S. Environmental Protection Agency (US EPA). (1996a). Method 5035: Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods (SW-846), Volume 1B.

APPENDIX 9
ENVIRONMENTAL FOOTPRINT
ANALYSIS SUMMARY

Environmental Footprint Summary

Core Element		Metric	Unit of Measure	Footprint			
				Post-Corrective Measures - Quarterly GW Monitoring (2 remaining events)	Annual GW Monitoring and Site Inspection	SVI Evaluation (One Time Event)	Total
Materials & Waste	M&W-1	Refined materials used on-site	Tons	0.0	0.0	0.0	0.0
	M&W-2	% of refined materials from recycled or reused material	%				
	M&W-3	Unrefined materials used on-site	Tons	0.000	0.000	0.000	0.0
	M&W-4	% of unrefined materials from recycled or reused material	%				
	M&W-5	On-site hazardous waste disposed of off-site	Tons	0.0	0.0	0.0	0.0
	M&W-6	On-site non-hazardous waste disposed of off-site	Tons	0.0	0.0	0.0	0.0
	M&W-7	Recycled or reused waste	Tons	0.0	0.0	0.0	0.0
	M&W-8	% of total potential waste recycled or reused	%				
Water (used on-site)	W-1	Public water use	MG	0.0	0.0	0.0	0.0
	W-2	Groundwater use	MG	0.0	0.0	0.0	0.0
	W-3	Surface water use	MG	0.0	0.0	0.0	0.0
	W-4	Reclaimed water use	MG	0.0	0.0	0.0	0.0
	W-5	Storm water use	MG	0.0	0.0	0.0	0.0
	W-6	User-defined water resource #1	MG	0.0	0.0	0.0	0.0
	W-7	User-defined water resource #2	MG	0.0	0.0	0.0	0.0
	W-8	Wastewater generated	MG	0.0	0.0	0.0	0.0
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	2.0	1.2	1.4	4.7
	E-2	Energy voluntarily derived from renewable resources					
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	0.000	0.000	0.001	0.0
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	0.0	0.0	0.0	0.0
	A-2	On-site HAP emissions	Pounds	0.0	0.0	0.0	0.0
	A-3	Total NOx, SOx, and PM emissions	Pounds	7.5	3.9	5.1	16.5
	A-3A	Total NOx emissions	Pounds	2.3	1.2	1.5	5.0
	A-3B	Total SOx emissions	Pounds	4.6	2.3	3.1	9.9
	A-3C	Total PM emissions	Pounds	0.7	0.4	0.5	1.5
	A-4	Total HAP emissions	Pounds	0.5	0.3	0.4	1.1
	A-5	Total greenhouse gas emissions	Tons CO2e*	0.1	0.1	0.1	0.3
Land & Ecosystems		Not Applicable					

** Total greenhouse gases emissions (in CO2e) include consideration of CO2, CH4, and N2O (Nitrous oxide) emissions.*
"MMBtu" = millions of Btus
"MG" = millions of gallons
"CO2e" = carbon dioxide equivalents of global warming potential
"MWh" = megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)
"Tons" = short tons (2,000 pounds)

Understanding and Reducing a Project's Environmental Footprint (EPA 542-R-12-002), February 2012

Notes: