

**60-Day Advance Notification of Site Change of Use, Transfer of
Certificate of Completion, and/or Ownership**

Required by 6NYCRR Part 375-1.11(d) and 375-1.9(f)

To be submitted at least 60 days prior to change of use to:

Chief, Site Control Section
New York State Department of Environmental Conservation
Division of Environmental Remediation, 625 Broadway
Albany NY 12233-7020

I. Site Name: Bridge Cleaners **DEC Site ID No.** 241127

II. Contact Information of Person Submitting Notification:

Name: Steven Li (on behalf of Zhong Chuang Properties, LLC)
Address1: 33-54 Farrington Street #2C
Address2: Flushing, NY 11354
Phone: (203)-908-5112 E-mail: sli@jlsgrp.com

III. Type of Change and Date: Indicate the Type of Change(s) (check all that apply):

- ☐ Change in Ownership or Change in Remedial Party(ies)
☐ Transfer of Certificate of Completion (CoC)
☒ Other (e.g., any physical alteration or other change of use)

Proposed Date of Change (mm/dd/yyyy): Jan 11, 2022

IV. Description: Describe proposed change(s) indicated above and attach maps, drawings, and/or parcel information.

The change of use is for demolition of the current building and relocation of the AS/SVE system.

Please see attached Change of Use Work Plan for details.

If "Other," the description must explain and advise the Department how such change may or may not affect the site's proposed, ongoing, or completed remedial program (attach additional sheets if needed).

Please see attached Change of Use Work Plan.

V. Certification Statement: Where the change of use results in a change in ownership or in responsibility for the proposed, ongoing, or completed remedial program for the site, the following certification must be completed (by owner or designated representative; see §375-1.11(d)(3)(i)):

I hereby certify that the prospective purchaser and/or remedial party has been provided a copy of any order, agreement, Site Management Plan, or State Assistance Contract regarding the Site's remedial program as well as a copy of all approved remedial work plans and reports.

Name: _____
(Signature)

(Date)

(Print Name)

Address1:

Address2:

Phone: _____ E-mail: _____

VI. Contact Information for New Owner, Remedial Party, or CoC Holder: If the site will be sold or there will be a new remedial party, identify the prospective owner(s) or party(ies) along with contact information. If the site is subject to an Environmental Easement, Deed Restriction, or Site Management Plan requiring periodic certification of institutional controls/engineering controls (IC/ECs), indicate who will be the certifying party (attach additional sheets if needed).

☐ Prospective Owner ☐ Prospective Remedial Party ☐ Prospective Owner Representative

Name: _____

Address1:

Address2:

Phone: _____ E-mail: _____

Certifying Party Name: Nicholas Krasnecky, P.E.-Environmental Engineering Compliance Control, D.P.C.

Address1: One Emery Ave., Unit 2

Address2: Randolph, NJ 07869

Phone: (201)-552-0224 E-mail: nkrasnecky@envecc.com

VII. Agreement to Notify DEC after Transfer: If Section VI applies, and all or part of the site will be sold, a letter to notify the DEC of the completion of the transfer must be provided. If the current owner is also the holder of the CoC for the site, the CoC should be transferred to the new owner using DEC's form found at <http://www.dec.ny.gov/chemical/54736.html>. This form has its own filing requirements (see 6NYCRR Part 375-1.9(f)).

Signing below indicates that these notices will be provided to the DEC within the specified time frames. If the sale of the site also includes the transfer of a CoC, the DEC agrees to accept the notice given in VII.3 below in satisfaction of the notice required by VII.1 below (which normally must be submitted within 15 days of the sale of the site).

Within 30 days of the sale of the site, I agree to submit to the DEC:

1. the name and contact information for the new owner(s) (see §375-1.11(d)(3)(ii));
2. the name and contact information for any owner representative; and
3. a notice of transfer using the DEC's form found at <http://www.dec.ny.gov/chemical/54736.html> (see §375-1.9(f)).

Name: _____
(Signature)

(Date)

(Print Name)

Address1: _____

Address2: _____

Phone: _____ E-mail: _____



Change of Use Work Plan

For

Bridge Cleaners

39-26 30th Street

Long Island City, Queens County

New York

NYSDEC Site No. 241127

December 2021

Prepared for:

Zhong Chuang Properties LLC

39-26 30th St.

Long Island City, New York

Prepared by:

Environmental Engineering Compliance Control, D.P.C.

One Emery Ave.

Unit 2

Randolph, NJ, 07869



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Appendix B	Health and Safety Plan (HASP)
Appendix C	Community Air Monitoring Plan (CAMP)
Appendix D	AS/SVE Relocation Design Drawings
Appendix E	Proposed Implementation Schedule

Engineering Certification:

I, Nicholas Krasnecky, P.E., certify that I am a New York State registered Professional Engineer and that this Change of Use Work Plan was prepared in accordance with applicable statutes and regulations and in substantial conformance with the Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10).



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



1.0 Introduction

Zhong Chuang Properties, LLC (Zhong Chuang), retained Environmental Engineering Compliance Control, D.P.C. (EECC) to prepare this work plan for the change of use notification regarding the demolition of the current building, relocation and restart of the AS/SVE system, and associated remedial progress sampling at the Bridge Cleaners Site located at 39-26 30th St., Long Island City, New York (Site) (**Figure 1**). Zhong Chaung also retained Sustainable Development, Inc. (SDI) to provide project management services related to the site investigation and remediation activities. EECC prepared this Change of Use work plan (WP) to accompany a Change of Use notification for the demolition of the existing building at the Site. As detailed in the Construction Completion Report (CCR), dated August 2021 and the Interim Site Management Plan (SMP), dated November 2021 an Air Sparge/Soil Vapor Extraction (AS/SVE) system currently operates at the Site.

This Change of Use WP will provide the requisite details for the completed NYSDEC 60-Day Advance Notification of Site Change Use, Transfer of Certificate of Completion, and/or Ownership Form, which is provided as a cover page to this WP. The 60-Day Notification of Site Change of Use and associated Change of Use WP were prepared as required by 6NYCRR Part 375-1.11(d) and 375-1.9(f), DER-10 / *Technical Requirements for Site Investigation and Remediation*, dated May 2010 (DER-10), Section 1.4(b), and the Bridge Cleaners Interim SMP, Section 1.3. In addition, this Change of Use WP details proposed remedial progress sampling associated with the ongoing operations of the AS/SVE system which will be conducted in conjunction with the proposed Change of Use activities.

1.1 Site Location and Description

The Site is currently owned by Zhong Chuang Properties, LLC and is identified by the New York State Department of Environmental Conservation (NYSDEC) as Site No. 241127. The Site consists of a one-story slab-on-grade masonry building, identified as Block 399, Lot 31 on the New York City Tax Map (**Figure 2**), and is currently utilized for fabric storage (**Figure 3**). Adjacent buildings to the north and west appear to contain residential units. To the south, the adjacent lot is being redeveloped as a multi-story residential structure. To the east is 30th Street.

1.2 Report Organization

In addition to this introduction, this report is divided into seven sections as follows:

- *Section 2.0 – Site Background*: Presents information regarding the Site and its pertinent characteristics and history, including current Institutional Controls;
- *Section 3.0 – AS/SVE System Shutdown and Remedial Progress Sampling*: Presents a detailed description of the proposed AS/SVE system shutdown and proposed remedial progress sampling to be conducted while the system is shut down;



- *Section 4.0 – AS/SVE System Relocation and Restart:* Presents a detailed description of the proposed AS/SVE system relocation and restart with respect to the proposed building demolition;
- *Section 5.0 – Post AS/SVE System Relocation Plan:* Outlines any modifications to the Site Management Plan (SMP) or Institutional Controls/Engineer Controls (ICs/ECs) based on the AS/SVE system relocation;
- *Section 6.0 – Reporting:* Outlines the reporting and permit requirements prior to, and during, the implementation of this WP;
- *Section 7.0 – Schedule:* Presents the proposed schedule;
- *Section 8.0 – References:* Presents the references utilized in preparation of this WP.

This work plan has been prepared in accordance with DER-10 and supporting guidance documents. The outlined report structure is in general conformance with *Section 5.3* of DER-10.

2.0 Background

The Site was previously occupied by a commercial laundry and dry cleaner, Bridge Cleaners, until 2011. Records indicate at least 10 years of use as a commercial dry cleaner. Site investigations were conducted at the Site and off-site properties from 2009 to 2016. The results of these investigations indicated the presence of dry-cleaning related compounds tetrachloroethene (PCE) and its breakdown products, including trichloroethene (TCE), in the soil, soil vapor, and groundwater, at concentrations which exceeded the relevant NYSDEC standards and guidelines. The Site currently has an environmental easement in place, dated March 4, 2019 (**Appendix A**).

An Interim Remedial Design Document prepared by Integral Engineering, P.C. (Integral), was approved by the NYSDEC on March 29, 2016. The corresponding AS/SVE remedial system was installed and began operation in March 2018. Following the installation and operation of the system, Integral issued Draft 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, the system was modified in September 2020 per the Supplemental Interim Remedial Measures Work Plan (IRM WP), dated July 2020, prepared by TechSolutions Engineering, P.C. (TechSolutions). EECC oversaw the implementation of the Supplemental IRM WP and subsequently prepared a CCR, dated August 2021 and an Interim SMP, dated November 2021.



Zhong Chuang intends to redevelop the property, which includes the demolition of the current structure on site and interim termination of the utility access to the property. The existing building slab and sub-grade remediation infrastructure will remain on-site through the 60-day notice period for change of use, pursuant to the DER-10 *Section 1.4(b)*, through the system shutdown sampling, as described in *Section 3.0* below, and during the building demolition activities.

3.0 AS/SVE System Shutdown and Remedial Progress Sampling

3.1 Objectives

The objectives of the AS/SVE shutdown and remedial progress sampling are to:

- Shutdown the AS/SVE system in preparation of building demolition activities.
- Collect groundwater samples after the system has been shutdown for at least 30 days to assess the remedial progress of the AS treatment (this sampling is to coincide with the fourth quarter groundwater sampling as required by the approved Interim SMP).
- Collect sub-slab soil vapor (SSSV) and indoor air quality (IAQ) samples after the system has been shutdown for at least 30 days to assess the remedial progress of the AS/SVE system with respect to the potential vapor intrusion (VI) pathway.
- Develop and submit a report detailing the sampling results for NYSDEC and New York State Department of Health (NYSDOH) review and assessment for future remedial activities at the Site.

3.2 AS/SVE System Shutdown

Upon approval of this work plan, the AS/SVE system will be shut down by turning the operation switches for both the AS compressor and SVE blower to OFF. The AS/SVE system will be visually confirmed to be shut down via inspections of the pressures at the respective risers and direct observation of the compressor and blower within the system enclosure.

Once shutdown is confirmed, the system will be locked out/tagged out (if possible) to prevent accidental restart. If the system is unable to be locked out/tagged out, the hour meter will be photographed at the time of system shutdown. The system will be shut down for a minimum of 30 days and AS/SVE remedial progress sampling will be conducted as detailed in *Section 3.2.2*. Further details associated with the system shutdown are provided in *Section 4.0*.

After the AS/SVE system is shut down for a minimum of 30 days, groundwater, SSSV, and IAQ samples will be collected at the Site. These samples will be collected to monitor the remedial progress of the AS/SVE system with respect to the reduction of groundwater and SSSV concentrations of PCE and its daughter products. The data will be utilized to assess groundwater concentration trends and the current potential for VI at the Site. The hour meter will be photographed again during the sampling event and verified to be the same as the time photographed when the system was shut down.



3.3 AS/SVE Remedial Progress and Fourth Quarter Groundwater Sampling

Groundwater samples will be collected at the Site in accordance with the groundwater sampling requirements presented in Section 4.4.1 of the Interim SMP and detailed below:

- Groundwater analytical samples are to be collected from groundwater wells GW-1 thru GW-5 and MW-5 utilizing low-flow sampling techniques as detailed in the USEPA Standard Operating Procedure¹ (SOP) with dedicated TeflonTM-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 Method 8260C.
- The samples will be analyzed by a New York State-accredited laboratory and results will be issued as Category B deliverables.

3.4 Impacted Groundwater Disposal

Generated groundwater from the groundwater sampling activities will be properly containerized in a 55-gallon steel drum. The generated waste will be characterized and properly disposed of offsite in accordance with applicable state and federal regulations.

3.5 AS/SVE Remedial Progress SSSV and IAQ Sampling

SSSV and IAQ samples will be collected at the Site in accordance with the VI sampling requirements presented in Section 4.4.2 of the Interim SMP and detailed below.

3.5.1 Site Inspection and Inventory

The initial task of the VI sampling will be completion of a site reconnaissance to understand current site operations and to document any activities or chemical usage that may bias the results of the soil vapor and indoor air quality sampling program. As a minimum work under this task will include the following:

- A site inspection to determine the building layout and to optimize sampling locations;
- Review of site operations and current hazardous materials usage. To the degree possible, historic chemical usage will also be considered;
- Review of the heating ventilation and air conditioning system to determine air flow patterns, sources of makeup air, and possible preferential exposure pathways; and,
- Documentation of a facility chemical inventory.

¹ 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>



3.5.2 Proposed SSSV and IAQ Sampling Locations

The proposed scope of work will include the collection of SSSV samples at the seven (7) SSSV port locations (SP-1 thru SP-5, SP-7, SP-8). Four (4) IAQ samples will be co-located with four of the seven sub-slab soil vapor sampling locations to allow direct use of the NYSDOH matrix for evaluation of VI investigation data. The co-located samples will be consistent with the sampling detailed in the Remedial Investigation Report (RIR) by TechSolutions, P.C. in 2014. The locations of the SSSV ports and proposed co-located indoor air quality samples are shown on **Figure 4**.

In addition to the locations indicated on **Figure 4**, an ambient air sample positioned upwind at the exterior of the building will also be selected on the day of sampling to assist in documentation of background, ambient conditions.

3.5.3 SSSV and IAQ Sampling Procedures and Analyses

Sample collection of SSSV samples and IAQ samples will be completed according to the following procedures:

Tracer Gas Test

- Per NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006), a helium tracer gas will be utilized prior to the sampling of each permanent soil vapor implant. The tracer gas is used to verify that the infiltration of outdoor (ambient) air is not occurring during sample collection.
- An approximate one to two-quart enclosure will be placed over the implant protective casing and the interface between the enclosure and the ground surface will be sealed with modeling clay or a polyurethane foam gasket to prevent intrusion of outside air into the sampling apparatus;
- A tank containing ultra-high purity UHP helium (99.999%) will be connected to the side port of the enclosure and enough helium released to displace any ambient air within the enclosure and to maintain a positive pressure within the enclosure;
- Following the application of the tracer gas, one to three volumes of soil vapor /trapped air will be purged from the soil vapor implant using a Gilian GilAir-3 air sample pump (or equivalent method). A Dielectric MGD-2002 helium detector (or equivalent) will be used to check for the presence of the tracer gas in the purged soil vapor; if less than 10% of the tracer gas is detected, a soil vapor sample can be collected from the implant;
- If greater than 10% of the tracer gas is detected in the purged soil vapor, a determination will be made to fix the implant seal or abandon and reinstall the implant.
- It is anticipated the tracer gas test will be conducted the same day as the AS/SVE system shutdown, to allow for any SSSV port replacement/reinstallation, if needed. Conducting the tracer gas test 30 days prior to the sampling event complies with the tracer testing guidance within the NYSDOH, *Guidance for Evaluating Soil Vapor Intrusion in the State of New York, Section 2.7.5*.



SSSV and IAQ Sampling

- Sub-slab soil vapor and IAQ samples will be collected using laboratory-evacuated six-liter Summa® canisters, which are certified clean, with eight-hour flow regulators calibrated by the laboratory to ensure an 8-hour sampling duration. The flow rate will be less than the maximum flow rate of 0.2 liters per minute (LPM) (NYSDOH. 2006) provided by a NYSDEC-certified analytical laboratory.
- At the four locations where co-located IAQ samples are also to be collected, sampling times will be coordinated so that sub-slab vapor and IAQ samples at the same location are collected at the same time. IAQ samples shall be located in the breathing zone (3 to 5 feet above the finished floor) within 2 to 3 feet of the soil vapor probe locations;
- Summa canisters will be completely evacuated to negative pressure (30" Hg vacuum) before use. To start sampling of both the sub-slab sample and the IAQ sample, the valve on the Summa canisters will be opened and sample will be drawn into the canister at the pre-defined rate in accordance with laboratory calibration of the Summa canisters. The following specific procedures will be utilized to ensure proper collection of samples with the Summa canisters:
 - Verification and documentation of the initial vacuum reading of the canister;
 - Confirmation that the canister valve is fully closed. The knob should be turned clockwise;
 - Removal of the fitting from the top of the canister and attachment of the flow controller to the top of the canister;
 - Initiation of the sample collection by opening the valve on the canister counterclockwise and documentation of the "start" time;
 - Periodic sampling progress monitoring to note the vacuum. It may be necessary to terminate sampling slightly before the desired full sampling duration if the canister vacuum is waning near the end of sampling;
 - At the end of the sampling period, closure of the valve on the canister by turning clockwise until hand tight. Documentation of the "end" time and "end" vacuum. While the ideal reading on the can gauge should be slightly negative, the actual Summa canister vacuum will be tested with a calibrated gauge at the laboratory;
 - Removal of the flow controller and packaging for shipment to the laboratory;
 - Replacement of the fitting on top of the canister;
 - Documentation of the final vacuum of the canister and complete the Chain of Custody Record (to be provided by the laboratory);
- The samples will then be submitted to an Environmental Laboratory Accreditation Program (ELAP) and NYSDEC certified analytical laboratory for VOC analysis by US Environmental Protection Agency Method TO-15 and the results will be issued as a Category B deliverable.

The HVAC system will be in operation a minimum of 24 hours before the sample collection commences (during the heating season between November 15, 2021, and March 15, 2022) and



will be set for its normal heating season operation as if the building were occupied during the SSSV and IAQ sample events.

3.6 Data Evaluation and Reporting

Upon completion of activities, analytical data will be evaluated, and the work performed will be documented in a summary report to be provided to the NYSDEC and NYSDOH for review. At a minimum, the data evaluation and summary report will include the following:

- Documentation of field activities performed including AS/SVE system shutdown; and, groundwater, SSSV, and IAQ sampling;
- A summary of analytical data including groundwater, SSSV and IAQ sample results. Data will be discussed in comparison to applicable regulatory standards and guidelines, and will be presented in tabular and figure formats;
- Conclusions with respect to the remedial effectiveness of the AS/SVE system.
- Groundwater, SSSV, and IAQ data will be independently validated by a third-party data validator in accordance with the DER-10 guidance.
- EDDs will be submitted to NYSDEC via the EQuISTM database.²

Appendices will be provided as appropriate with backup data and full analytical laboratory deliverable packages (ASP Category B).

3.7 Air Monitoring

Air monitoring will be conducted during the remedial activities in accordance with the site-specific Health and Safety Plan (HASP) and the Community Air Monitoring Plan (CAMP) provided as **Appendix B** and **C**, respectively.

4.0 AS/SVE System Relocation and Restart

4.1 Objectives

The objectives of the AS/SVE system relocation and restart are to:

- Relocate the AS/SVE system to facilitate the demolition of the building and restart the system to continue remedial operations. The relocation and restart of the system and its operations will comply with the applicable Part 375 Remediation Program Regulations.
- Outline the AS/SVE system restart operations and monitoring plan to confirm the proper reinstallation and operation of the AS/SVE system.
- Review of the Interim SMP to assess for necessary revisions based on the relocation and restart of the AS/SVE system.

² 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>.



4.2 Scope of Work

4.2.1 Permitting

The building demolition contractor will be responsible for acquiring any necessary permits associated with the Change of Use activities, including the relocation of the AS/SVE system, as applicable.

4.2.2 Site Recon and Preparation

Prior to initiating AS/SVE system relocation activities, a site walk with the building demolition contractor will be conducted to confirm the demolition site plan, proposed AS/SVE system relocation location, and the associated AS/SVE piping and wells to protect. It is anticipated this site walkthrough will be conducted during the work activities outlined in *Section 3.0*.

Any modifications to be made to the final construction, relative to what is outlined in this WP, will be documented and described in a summary report, which will include as-built drawings, as detailed in *Section 6.0*.

4.2.3 AS/SVE System Shutdown and Electrical Disconnect

The AS/SVE System will be shut down as outlined in *Section 3.2* to facilitate the remedial progress sampling. While the system is shutdown the electrical servicing the AS/SVE system will be disconnected from the main breaker by a licensed electrician. Electric power to the AS/SVE system control panel and equipment will be confirmed disconnected and any required lock out/tag out procedures will be implemented. If the system is unable to be locked out/tagged out, a photograph of the hour meter will be taken when the system is shut down and verified to be the same time prior to completing the sampling procedures described in *Section 3.5*.

4.2.4 AS/SVE System Breakdown and Temporary Removal

The AS/SVE system will be broken down, removed, and stored offsite, or staged on-site, by the building demolition contractor prior to building demolition activities. All equipment utilized in the AS/SVE System operations is intended to be stored and reused during system reinstall, which includes, but is not limited to:

- SVE Blower
- AS Compressor
- Knockout Tank
- Heat Exchanger
- Air Filters
- Valves, gauges, and regulators
- Insulated Enclosure
- Electrical components (e.g. switches, wiring, connectors, breakers, alarms, etc.)
- Black steel pipe



- Sch. 40 PVC pipe (of good integrity)

The AS and SVE risers will be unthreaded or cut no more than one foot above the top of the slab and capped to prevent the entrance of dust and debris during the demolition activities. The stub-ups will be flagged with high vis spray paint or cones to provide visual identification for protection.

All wells and vapor monitoring points will also be painted around with high-vis spray paint to visually identify the locations and mark for protection.

4.2.5 Building Demolition

The building at the Site will undergo demolition in accordance with the plans submitted to the New York City Department of Buildings (DOB) by the building demolition contractor. Generally, the building demolition activities are not part of this Change of Use WP, except for confirming the building slab, which serves as the Site cover system, is not disturbed or removed, and ground intrusive activities do not occur during the proposed demolition activities at this time.

4.2.6 AS/SVE System Relocation, Reinstallation, and Restart

Upon completion of the building demolition activities the AS/SVE will be relocated and reinstalled as shown in the design drawings located in **Appendix D** and detailed below:

- The AS/SVE compressor and blower will be housed in the current insulated enclosure, in the current set-up, and located directly on the building slab.
- The control panel will be relocated to the northwest side of the enclosure and installed on free-standing supports. The control panel enclosure will be upgraded to an outdoor rated enclosure capable of protecting the internal electrical items from rain, wind, dust, and ice.
- A licensed electrician will perform the following work tasks:
 - Reinstall and rewire items within the control panel, as needed.
 - Run power from the neighboring building to the north, to the control panel, to power the AS/SVE system.
 - Reconnect power from the control panel to the AS/SVE system and rewire all associated controls and alarms.
- The AS and SVE piping will be reconnected to the air compressor and blower, respectively, as shown in the design drawings in **Appendix D**. From the stub-ups, the piping will be angled 90-degrees and run parallel to the concrete slab. The piping will be raised above the slab 6 to 12 inches to assist in keeping it above any inclement winter weather.
- The valves, gauges, and sampling ports will be kept on each riser/leg to allow adjustments during system restart operations.



- The solenoids installed on the AS legs will be removed as they have not been utilized during system operations in 2021 and they are not rated for outdoor use.
- The SVE exhaust, which consists of 2" Sch. 40 PVC, will exit the enclosure and extend vertically upwards. The exhaust will terminate 15 feet above the slab and be located a minimum of 25 feet from any operable openings or air intakes, in accordance with the specifications outlined in *NYSDOH, Guidance for Evaluating Soil Vapor Intrusion in the State of New York, Section 4.2.2*. The exhaust will be finished with a tee- cap on top to prevent snow/rain from entering.
- The AS/SVE system will be restarted to confirm proper operation of all electric components, all piping connections are competent, and the system generally operates as designed.

Detailed AS/SVE restart monitoring, in accordance with the Interim SMP, beyond the initial restart, to ensure continued proper function, is outlined in *Section 4.2.7*.

4.2.7 AS/SVE System Restart Monitoring and Optimization

As stated in the Interim SMP, Section 5.3.1 and Appendix 7 – Operations and Maintenance Manual: *"System Testing will be conducted if in the course of the AS/SVE system lifetime, the system goes down or significant changes are made to the system and the system must be restarted."* The proposed initial system testing to be conducted is as follows:

- Confirmation that all connections, pressures, and flows on the piping and components are within specifications to ensure no leakage or faulty operations;
- Wellhead pressure in the AS wells, pressure and air flow in the AS risers, vacuum and air flow in the SVE risers, and vacuum extension will be monitored to ensure the as designed proper function of the AS/SVE system components;
- Adjustments to valves as needed to ensure pressures, flows, and vacuums are within the design and operating criteria, due to the change in location of the AS/SVE system.

As the AS/SVE system will be shut down for an extended period of time (greater than 24 hours), differential pressure measurements at the sub-slab and vacuum monitoring points will be collected at a frequency of three times in the first month. This will ensure the pressure extension of the SVE system was not altered during the relocation and restart. Additional monitoring data will be collected from the system during the site visits, including pressures, flows, and PID readings to monitor the system restart.

Upon the completion of the restart monitoring outlined above, future operations monitoring, and maintenance of the Site and AS/SVE system will be conducted in accordance with the Interim SMP. Modifications to the SMP that may be required after the AS/SVE relocation are outlined in *Section 5.0*.



5.0 Post AS/SVE System Relocation Plan

5.1 Institutional and Engineering Controls (ICs/ECs)

The Site currently has an environmental easement in place, dated March 4, 2019. This environmental easement outlines the following control elements utilized as ICs/ECs at the Site:

- Groundwater Use Restriction
- Cover System
- Monitoring Plan
- SMP
- O&M Plan
- IC/EC Plan
- Air Sparging/Soil Vapor Extraction

The proposed building demolition and relocation of the AS/SVE system will not immediately alter the overall ICs/ECs outlined in the environmental easement, and therefore an update to the environmental easement will not be required at this time. Future development activities and/or alterations to the AS/SVE system may require an update to the environmental easement.

5.2 SMP Updates and Revisions

As stated in Section 1.2 of the Interim SMP, revisions to the SMP will be proposed in writing to the NYSDEC's project manager for the Site. Revisions to the SMP are expected to be necessary due to the shut-down and relocation of the AS/SVE system and building demolition activities. It is anticipated the proposed written revisions to the Interim SMP, will be provided to the NYSDEC within 60 days of the AS/SVE system restart.

6.0 Reporting

System shutdown sampling, relocation, and restart activities will be documented through collection of daily field notes and photo logs. As the AS/SVE system is being relocated without significant changes the relocation and restart activities will be reported in the periodic review report. The SMP will be updated with revised drawings, as indicated in Section 5.2, within 60 days of system re-start.

7.0 Schedule

A proposed schedule to conduct the proposed remedial progress sampling, AS/SVE system relocation and re-start activities, and any associated monitoring through the 2022 calendar year is provided as **Appendix E**.

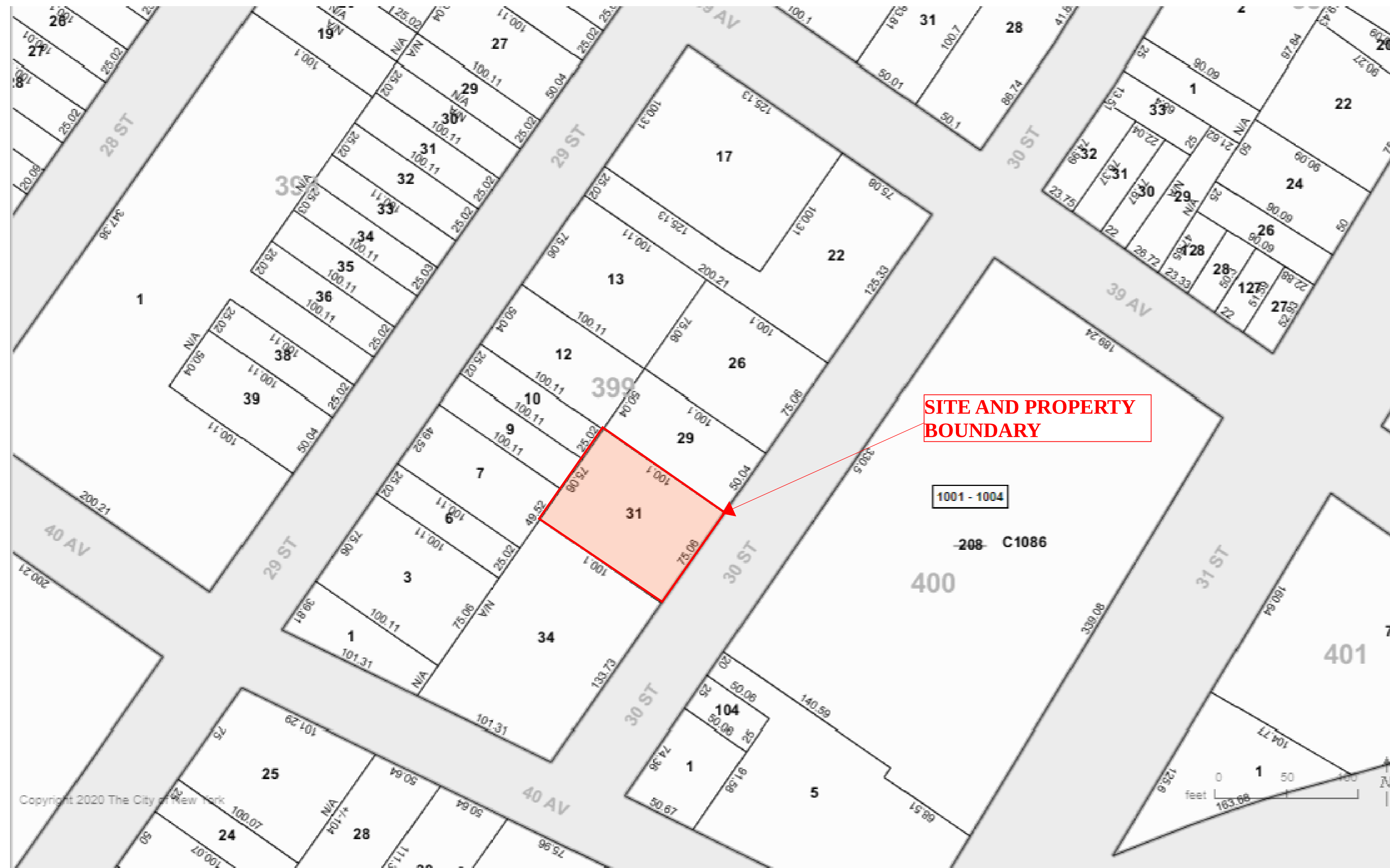


8.0 References

- Environmental Engineering Compliance Control, D.P.C. 2021. Construction Completion Report for Bridge Cleaners. August 2021
- Environmental Engineering Compliance Control, D.P.C. 2021. Interim Site Management Plan. November 2021.
- Integral Engineering, P.C. 2016. Interim Remedial Measure Design Document. Bridge Cleaners Site, BCP Site No C241127. March 29, 2016
- NYSDEC. 2010. Technical Guidance for Site Investigation and Remediation (DER-10). New York State Department of Environmental Conservation, Division of Environmental Remediation.
- NYSDOH. 2006. Guidance for Evaluating Soil Vapor Intrusion in the State of New York. New York State Department of Health. October 2006.
- 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
- TOGS 1.1.1. 1998. Division of Water Technical and Operation Guidance Series (1.1.1) – Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. New York Division of Water. June 1998.
- USEPA. 1996. Region 1 Low-Stress (Low-Flow) Standard Operating Procedure. United States Environmental Protection Agency, Region 1. July 30, 1996, Revised, September 19, 2017
- 6NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

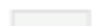


Figures



Source: BRIDGE CLEANERS TAX MAP - Digital Tax Map - New York City Dept. of Finance (1/31/2020)

LEGEND

 Borough Boundary	C50 Condo Flag/Condo Number		SUBJECT PROPERTY
 Tax Block Boundary	A50 Air Right Flag/Lot Number		
50 Tax Block Number	S50 Subterranean Right Flag/Lot Number		SITE AND PROPERTY BOUNDARY
 Tax Lot Boundary	R REUC Flag		
50 Tax Lot Number	 Under Water Tax Lot Boundary		
 Condo FKA Tax Lot Number	 Other Boundary		
 Tax Lot Dimension	 Possession Hook		
 Approximate Tax Lot Dimension	 Misc Miscellaneous Text		
 Condo Units Range Label	 Small Tax Lot Dimension		
 Building Footprint	 Surface Water		

[illegible]

1 EMERY AVE, UNIT 2
RANDOLPH, NJ 07869

ZHONG CHUANG PROPERTIES LLC

BRIDGE CLEANERS SITE

39-26 30th ST

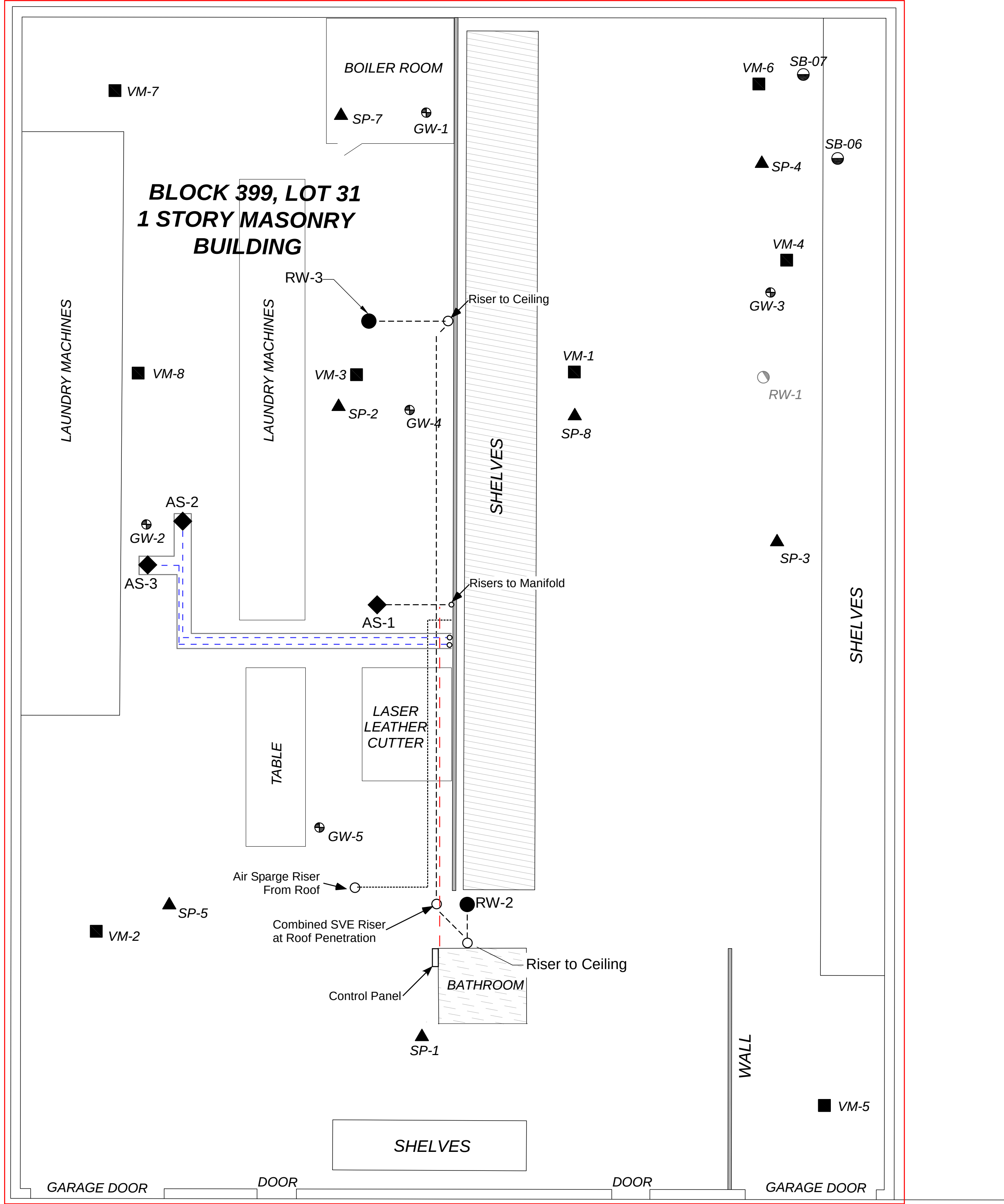
LONG ISLAND CITY NEW YORK

DRN	AN	DATE	<u>11-5-2021</u>
DES	NK	DATE	<u>11-5-2021</u>
CHK	NK	DATE	<u>11-5-2021</u>
SCALE	AS NOTED	PROJECT NO	BRIDGE CLEANERS

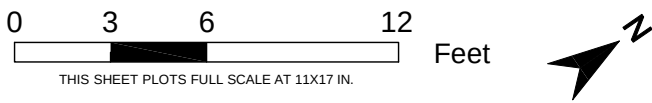
SITE LOCATION TAX MAP

FIGURE

2



- PVC PIPE
- STEEL PIPE
- ◆ AIR SPARGE WELL
- VAPOR EXTRACTION WELL
- ⊕ GROUNDWATER MONITORING WELL/SOIL BORING
- ◐ SOIL BORING
- VACUUM MONITORING POINT
- ▲ SOIL VAPOR POINT
- ABANDONED
- TRENCHING AND SUBGRADE PIPING
- - - ELECTRIC RUN ALONG STRUTS ON CEILING TO SOLENOID VALVES
- RISER LOCATION
- CONCRETE COVER



- SOURCES:
- BASEMAP: WELL ELEVATION SURVEY, BRIDGE CLEANERS, 39-26 30th STREET, LONG ISLAND CITY, NEW YORK, DONALD R. STEDGE, P.L.S., OCTOBER 30, 2015.
 - AS/SVE SYSTEM LAYOUT AND BUILDING FEATURES BASED ON INTEGRAL ENGINEERING FIGURE (OCTOBER 2018) AND UPDATED BY EECC (SEPTEMBER 2020)

APP									
DESCRIPTION									
DATE									
REV									



ZHONG CHUANG PROPERTIES LLC			
BRIDGE CLEANERS SITE 39-26 30th ST			
LONG ISLAND CITY		NEW YORK	
DRN	AN	DATE	11-5-2021
DES	NK	DATE	11-5-2021
CHK	NK	DATE	11-5-2021
SCALE	AS NOTED	PROJECT NO.	BRIDGE CLEANERS

CURRENT BUILDING PLAN

FIGURE
3

ANALYTE:	SP-7 (ug/m ³)		
	2/8/2014	9/9/2016	11/28/2018
PCE	44000	56000	675
TCE	575	432	6
cis- 1,2-DCE	251	143	1
trans -1,2- DCE	<160	<44.0	<0.793
Vinyl Chloride	<100	<28.4	<0.511
Isopropanol	47400	<67.8	9

ANALYTE:	VM-7 (ug/m ³)		
	9/9/2016	11/28/2018	
PCE	38900	NS	
TCE	268	NS	
cis- 1,2-DCE	<17.2	NS	
trans -1,2- DCE	<17.2	NS	
Vinyl Chloride	<11.1	NS	
Isopropanol	<26.5	NS	

ANALYTE:	VM-3 (ug/m ³)		
	9/9/2016	11/28/2018	
PCE	206000	1080	
TCE	1340	36	
cis- 1,2-DCE	599	192	
trans -1,2- DCE	<113	<1.98	
Vinyl Chloride	<72.6	<1.28	
Isopropanol	<175	<3.07	

ANALYTE:	VM-8 (ug/m ³)		
	9/9/2016	11/28/2018	
PCE	118000	<1.36	
TCE	1110	<1.07	
cis- 1,2-DCE	94.8	<0.793	
trans -1,2- DCE	<88.0	<0.793	
Vinyl Chloride	<56.7	<0.511	
Isopropanol	<136	21.8	

ANALYTE:	SP-2 (ug/m ³)		
	2/8/2014	9/9/2016	11/28/2018
PCE	30400	475000	NS
TCE	871	3750	NS
cis- 1,2-DCE	920	1400	NS
trans -1,2- DCE	<95	<579	NS
Vinyl Chloride	<61	<373	NS
Isopropanol	25300	<897	NS

ANALYTE:	IAQ-2 (ug/m ³)	
	2/8/2014	
PCE	236	
TCE	2.2	
cis- 1,2-DCE	<0.79	
trans -1,2- DCE	<0.79	
Vinyl Chloride	<0.51	
Isopropanol	3.9	

ANALYTE:	SP-5 (ug/m ³)		
	2/8/2014	9/9/2016	11/28/2018
PCE	21400	199000	1590
TCE	919	3120	72
cis- 1,2-DCE	<63	<99.5	<1.98
trans -1,2- DCE	<63	<99.5	<1.98
Vinyl Chloride	<41	<64.2	<1.28
Isopropanol	23500	<154	<3.07

ANALYTE:	VM-2 (ug/m ³)		
	9/9/2016	11/28/2018	
PCE	47500	70	
TCE	645	11	
cis- 1,2-DCE	<69.4	<0.793	
trans -1,2- DCE	<69.4	<0.793	
Vinyl Chloride	<44.7	<0.511	
Isopropanol	<108	9	

ANALYTE:	SP-1 (ug/m ³)		
	2/8/2014	9/9/2016	11/28/2018
PCE	31700	159000	233
TCE	623	1190	10
cis- 1,2-DCE	<130	<68.6	<0.793
trans -1,2- DCE	<130	<68.6	<0.793
Vinyl Chloride	<84	<44.2	<0.511
Isopropanol	26100	<106	<1.23

ANALYTE:	IAQ-1 (ug/m ³)	
	2/8/2014	
PCE	152	
TCE	1.2	
cis- 1,2-DCE	0.56	
trans -1,2- DCE	<0.79	
Vinyl Chloride	<0.51	
Isopropanol	3.7	

ANALYTE:	IAQ-4 (ug/m ³)	
	2/8/2014	
PCE	279	
TCE	1.8	
cis- 1,2-DCE	0.95	
trans -1,2- DCE	<0.79	
Vinyl Chloride	<0.51	
Isopropanol	22	

ANALYTE:	IAQ-3 (ug/m ³)	
	2/8/2014	
PCE	158	
TCE	1.1	
cis- 1,2-DCE	0.56	
trans -1,2- DCE	<0.79	
Vinyl Chloride	<0.51	
Isopropanol	3.2	

ANALYTE:	VM-6 (ug/m ³)		
	9/9/2016	11/28/2018	
PCE	24300	NS	
TCE	53.1	NS	
cis- 1,2-DCE	<17.0	NS	
trans -1,2- DCE	<17.0	NS	
Vinyl Chloride	<11.0	NS	
Isopropanol	396	NS	

ANALYTE:	SP-4 (ug/m ³)		
	2/8/2014	9/9/2016	11/28/2018
PCE	668000	89500	1660
TCE	2140	195	7
cis- 1,2-DCE	1330	<69.4	<1.98
trans -1,2- DCE	<670	<69.4	<1.98
Vinyl Chloride	<430	<44.7	<1.28
Isopropanol	32400	<108	<3.07

ANALYTE:	VM-4 (ug/m ³)		
	9/9/2016	11/28/2018	
PCE	25600	NS	
TCE	69.3	NS	
cis- 1,2-DCE	30.5	NS	
trans -1,2- DCE	<17.2	NS	
Vinyl Chloride	<11.1	NS	
Isopropanol	<26.5	NS	

ANALYTE:	VM-1 (ug/m ³)		
	9/9/2016	11/28/2018	
PCE	259000	<1.36	
TCE	962	<1.07	
cis- 1,2-DCE	299	<0.793	
trans -1,2- DCE	<135	<0.793	
Vinyl Chloride	<86.9	<0.511	
Isopropanol	<209	9	

ANALYTE:	SP-8 (ug/m ³)		
	2/8/2014*	9/9/2016	11/28/2018
PCE	246000	543000	1890
TCE	1930	2180	16
cis- 1,2-DCE	1590	<575	<3.96
trans -1,2- DCE	<1300	<575	<3.96
Vinyl Chloride	<870	<371	<2.56
Isopropanol	41500	<890	<6.15
* : Samples collected on 2/8/2014 from SP-6, as stated in the 2014 Remedial Investigation Report. SP-6 appears in the vicinity of SP-8.			

ANALYTE:	SP-3 (ug/m ³)		
	9/9/2016	11/28/2018	
PCE	394000	NS	
TCE	973	NS	
cis- 1,2-DCE	<436	NS	
trans -1,2- DCE	<436	NS	
Vinyl Chloride	<281	NS	
Isopropanol	<674	NS	

ANALYTE:	VM-5 (ug/m ³)		
	9/9/2016	11/28/2018	
PCE	34900	128	
TCE	74.2	3.14	
cis- 1,2-DCE	<17.1	<0.793	
trans -1,2- DCE	<17.1	<0.793	
Vinyl Chloride	<11.0	<0.511	
Isopropanol	<26.5	5.31	

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PVC PIPE

STEEL PIPE

AIR SPARGE WELL

VAPOR EXTRACTION WELL

GROUNDWATER MONITORING WELL/SOIL BORING

SOIL BORING

VACUUM MONITORING POINT

SOIL VAPOR POINT

ABANDONED

TRENCHING AND SUBGRADE PIPING

ELECTRIC RUN ALONG STRUTS ON CEILING TO SOLENOID VALVES

RISER LOCATION

CONCRETE COVER

PROPOSED SSSV SAMPLE LOCATION

PROPOSED PAIRED SSSV / IA SAMPLE LOCATION

NOTES:

DCE = Dichloroethene

PCE = Tetrachloroethylene

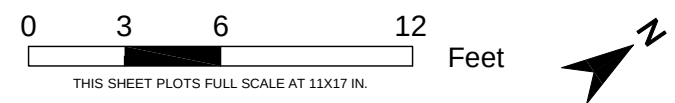
TCE = Trichloroethylene

B = Analyte detected in the Trip Blank

J = Estimated value

<1.07 = Less than method detection limit (non-detect)

NS = Not Sampled



- 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.
2.

AS/SVE SYSTEM LAYOUT AND BUILDING FEATURES BASED ON INTEGRAL ENGINEERING FIGURE (OCTOBER 2018) AND UPDATED BY EEC (SEPTEMBER 2020)



ZHONG CHUANG PROPERTIES LLC

BRIDGE CLEANERS SITE

39-26 30th ST

LONG ISLAND CITY NEW YORK

DRN

AN

DATE

11-5-2021

DES

NK

DATE

11-5-2021

CHK

NK

DATE

11-5-2021

SCALE

AS NOTED

PROJECT NO.

BRIDGE CLEANERS

HISTORIC AND REMAINING SOIL VAPOR CONTAMINATION AND PROPOSED SAMPLE LOCATIONS

FIGURE

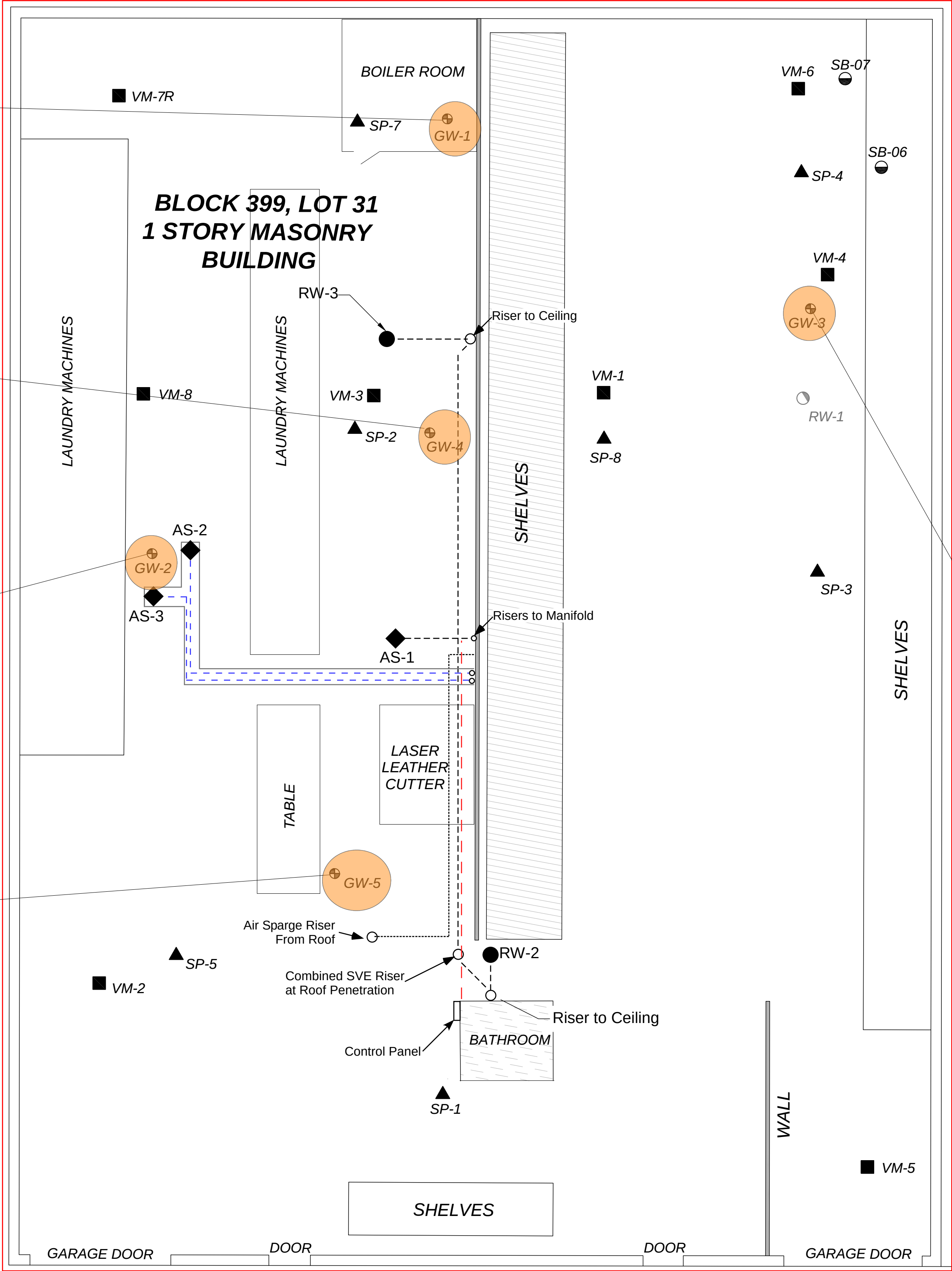
ANALYTE	GW-1 (µg/L)					
	Integral			EECC		
	09/09/16	11/18/18	05/17/19	06/15/20	01/25/21	04/28/21
PCE	140	74	7.8	15	19	9.1
TCE	1.6	1.4	0.34 J	0.65	1.1	0.59
cis-1,2-DCE	0.43 J	0.30 J	ND	ND	ND	ND
trans-1,2-DCE	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND
Isopropanol	ND	18 J	170 B	ND	ND	ND

ANALYTE	GW-4 (µg/L)					
	Integral			EECC		
	09/09/16	11/18/18	05/17/19	06/15/20	01/25/21	04/28/21
PCE	90	71	7	3.2	1.4	ND
TCE	1.5	1.3	0.44 J	0.26 J	ND	ND
cis-1,2-DCE	0.24 J	0.23 J	ND	ND	ND	ND
trans-1,2-DCE	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND
Isopropanol	ND	16 J	160 B	ND	ND	ND

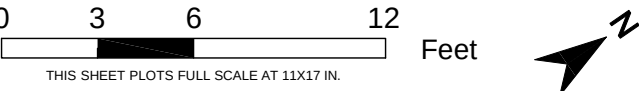
ANALYTE	GW-2 (µg/L)					
	Integral			EECC		
	09/09/16	11/18/18	05/17/19	06/15/20	01/25/21	04/28/21
PCE	200	240	210	300	18	0.4
TCE	14	5.6	4.1	11	ND	ND
cis-1,2-DCE	0.31 J	ND	ND	ND	ND	ND
trans-1,2-DCE	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND
Isopropanol	13 J	ND	130 BJ	ND	ND	ND

ANALYTE	GW-5 (µg/L)					
	Integral			EECC		
	09/09/16	11/18/18	05/17/19	06/15/20	01/25/21	04/28/21
PCE	95	87	48	50	67	72
TCE	2.8	3.7	1.9	1.9	2	2.5
cis-1,2-DCE	0.39 J	ND	ND	ND	ND	ND
trans-1,2-DCE	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND
Isopropanol	ND	21 J	190 B	ND	ND	ND

ANALYTE	MW-5 (µg/L)					
	Integral			EECC		
	09/09/16	11/18/18	05/17/19	06/15/20	01/25/21	04/28/21
PCE	22	31	14	NS	5.8	7.4
TCE	0.59	0.73	0.43 J		0.24	0.19 J
cis-1,2-DCE	ND	0.20 J	ND		ND	ND
trans-1,2-DCE	ND	ND	ND		ND	ND
Vinyl chloride	ND	ND	ND		ND	ND
Isopropanol	ND	ND	200 B	ND	ND	ND



ANALYTE	GW-3 (µg/L)					
	Integral			EECC		
	09/09/16	11/18/18	05/17/19	06/15/20	01/25/21	04/28/21
PCE	44	NS	10	25	23	23
TCE	1.2		0.87	1.1	0.87	0.77
cis-1,2-DCE	0.25 J		0.23 J	ND	ND	ND
trans-1,2-DCE	ND		ND	ND	ND	ND
Vinyl chloride	ND		ND	ND	ND	ND
Isopropanol	8.5 J		160 B	ND	ND	ND



- SOURCES:
- BASEMAP: WELL ELEVATION SURVEY, BRIDGE CLEANERS, 39-26 30th STREET, LONG ISLAND CITY, NEW YORK, DONALD R. STEDGE, P.L.S., OCTOBER 30, 2015.
 - AS/SVE SYSTEM LAYOUT AND BUILDING FEATURES BASED ON INTEGRAL ENGINEERING FIGURE (OCTOBER 2018) AND UPDATED BY EECC (SEPTEMBER 2020)

APP	DESCRIPTION	DATE	REV



ZHONG CHUANG PROPERTIES LLC			
BRIDGE CLEANERS SITE 39-26 30th ST			
LONG ISLAND CITY		NEW YORK	
DRN	AN	DATE	11-5-2021
DES	NK	DATE	11-5-2021
CHK	NK	DATE	11-5-2021
SCALE	AS NOTED	PROJECT NO.	BRIDGE CLEANERS
HISTORIC AND REMAINING GROUNDWATER CONTAMINATION AND PROPOSED SAMPLE LOCATIONS			

FIGURE

5



Appendix A
Environmental Easement Order on Consent, March 4, 2019

**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: CO2-20170509-174, 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: SK

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.

[Signature]
Notary Public - State of New York

SAMMIE HUANG
Notary Public, State of New York
Qualified in New York County
No. 01HU8114472
Commission Expires 8/18/ 2020

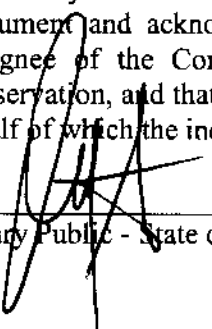
THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

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, 2022

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 YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE WESTERLY SIDE OF 30TH STREET, DISTANT 133.72 FEET (DEED) (133.73 FEET ON TAX MAP) NORTHERLY FROM THE CORNER 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 TOPOGRAPHICAL 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 TO THE WESTERLY SIDE OF 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



Appendix B

Health and Safety Plan (HASP)

HEALTH AND SAFETY PLAN – Level 2

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.

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.	Site Name and Location Bridge Cleaners; 39-26 30 th Street, Long Island City, New York	
	Client Contact and Phone Steven Li – (203)-908-5112	
	Project Name Bridge Cleaners	
	Health & Safety Plan Date November 2021	Revision Number and Date
	Field Work Start Date November 2021	Anticipated Field Work End Date TBD
	Project Manager (<i>responsible for implementing the site health and safety program on this project</i>) Nick Krasnecky, PE EECC	Site Safety Officer (SSO) (<i>responsible for overall site health and safety performance on this project</i>). TBD

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 AS/SVE Shutdown and Performance sampling (groundwater, sub-slab soil vapor (SSSV) and Indoor Air Quality (IAQ)), AS/SVE system relocation and restart oversight, System restart monitoring
	Subcontractor Scope of Work: System shutdown, electrical disconnection, building demolition, system relocation

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) <table> <tr> <td>☒ Active Facility</td> <td>☐ Remote Facility</td> <td>☐ Inactive Facility</td> <td>☐ Residential</td> </tr> <tr> <td>☐ Mine</td> <td>☐ Railroad</td> <td>☒ Industrial</td> <td>☐ Secured</td> </tr> <tr> <td>☐ Uncontrolled</td> <td>☐ Agricultural</td> <td>☐ Commercial</td> <td>☐ Other (specify)</td> </tr> </table>	☒ Active Facility	☐ Remote Facility	☐ Inactive Facility	☐ Residential	☐ Mine	☐ Railroad	☒ Industrial	☐ Secured	☐ Uncontrolled	☐ Agricultural	☐ Commercial	☐ Other (specify)																			
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Main Site Hazards (check all applicable boxes) <table> <tr> <td>☒ Slip/Trip/Fall</td> <td>☒ Cold Stress</td> <td>☐ Heat Stress</td> <td>☐ Extreme Weather</td> </tr> <tr> <td>☐ Biological</td> <td>☒ Organic/Inorganic Chemicals</td> <td>☐ High Noise</td> <td>☐ Construction Traffic</td> </tr> <tr> <td>☐ Vehicular Traffic</td> <td>☒ Respirable Particles</td> <td>☐ Excavations</td> <td>☒ Buried/Overhead Utilities</td> </tr> <tr> <td>☐ Non-Ionizing Radiation</td> <td>☒ Security</td> <td>☐ ASTs/USTs</td> <td>☐ Manlift/Cherry Picker Use</td> </tr> <tr> <td>☒ Work Over 6' High</td> <td>☒ Hand/Portable Power Tools</td> <td>☐ Oxygen Deficiency</td> <td>☒ Construction</td> </tr> <tr> <td>☐ Blasting Agents</td> <td>☐ Confined Spaces</td> <td>☐ Welding or Hot Work</td> <td>☐ Chemical Mixing**</td> </tr> <tr> <td>☒ Lockout/Tagout</td> <td>☐ Forklift Use</td> <td>☐ Sharps</td> <td></td> </tr> <tr> <td>☐ Scaffold Use</td> <td>☒ Portable Ladders</td> <td>☐ Other (specify)</td> <td></td> </tr> </table>	☒ 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)	
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Chemical Products to Use or Store Onsite For each chemical product identified, an SDS must be attached to this HASP	☒ Alconox or Liquinox ☒ Hydrochloric acid (HCl)* ☐ Nitric acid (HNO₃)* ☐ Sodium hydroxide (NaOH)* ☐ Gasoline ☐ Calibration gas (Methane) ☒ Calibration gas (Isobutylene) ☐ Calibration gas (Pentane) ☐ Calibration gas (4-gas mixture) ☐ Methanol ☐ Isopropyl Alcohol ☐ Household bleach (NaOCl)* ☐ Sulfuric acid (H₂SO₄)* ☐ Hexane ☐ Other (specify) *NOTE: Eyewash solution shall be readily available on ALL projects where corrosive materials are used or stored, including sample preservatives.
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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) <table style="width: 100%;"> <tr> <td>☒ Hazard Communication</td> <td>☒ Medical Services and First Aid</td> <td>☐ Airborne Contaminants</td> <td>☐ Heat Stress</td> </tr> <tr> <td>☒ Cold Stress</td> <td>☐ Natural Hazards</td> <td>☒ Personal Protective Equipment</td> <td>☐ Respiratory Protection</td> </tr> <tr> <td>☐ Confined Space Entry</td> <td>☒ Drum Handling</td> <td>☐ Excavation</td> <td>☐ Fall Protection and Prevention</td> </tr> <tr> <td>☐ Forklift and Truck Operations</td> <td>☒ Hand/Power Tool Use</td> <td>☐ Heavy and Material Handling Equipment</td> <td>☒ Ladder Safety</td> </tr> <tr> <td>☐ Wet Utilities – Maintenance, Inspection, Repair</td> <td>☒ Other Task (specify) Lock Out/Tag Out</td> <td>☒ Other Task (specify) Mechanical Equipment</td> <td>☒ Other Task (specify) Pressurized Lines</td> </tr> <tr> <td>☐ Other Task (specify)</td> <td>☐ Other Task (specify)</td> <td>☐ Other Task (specify)</td> <td>☐ Other Task (specify)</td> </tr> </table>	☒ 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)
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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
	AS/SVE Shutdown Performance Sampling	☐	☐	☐	☒
	AS/SVE system relocation and restart oversight	☐	☐	☐	☒
	System restart monitoring	☐	☐	☐	☒
		☐	☐	☐	☐

Personal Protective Equipment Req=Required Rec=Recommended An asterisk (*) indicates that employees must be a participant in the respiratory program, including, annual training and fit testing.	Equipment	Req	Rec	NA	Equipment	Req	Rec	NA
	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) COVID mask	☐	☒	☐
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 or work area
	Contamination Reduction Zone: Area between the 10 and 15-foot radius around equipment or work area
	Support Zone: Area between the 15 and 25-foot radius around equipment or work area

Site Access/Control How do we limit unauthorized entry to the site itself?	Access Control Procedures: While building is still standing: 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. Once building is demolished: Secure fence around site with lock, set up cones on sidewalk in front of the building as necessary, traffic control during demolition activities, as necessary
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 ☐ RCRA Metals ☐ Lead ☐ Benzene ☒ Trichloroethylene (TCE) ☒ Tetrachloroethylene (PCE) ☐ Acetone ☐ Lithium ☐ Other
	☐ Vinyl chloride ☐ Inorganic Arsenic ☐ Cadmium ☐ Formaldehyde ☐ Fuel Oils ☐ Methylene chloride ☐ Other ☐ Other ☐ Other ☐ No exposure to these
	☐ Toluene ☐ Ethylbenzene ☐ Xylene ☐ Polyaromatic hydrocarbons (PAHs) ☐ Polychlorinated biphenyl (PCBs) ☐ Chromium (VI) ☐ Other ☐ Other ☐ Other

Materials Present or Suspected at Site	Highest Reported Concentration (specify units and sample medium)	Exposure Limit (specify ppm or mg/m ³)	IDLH Level (specify ppm or mg/m ³)	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: 2.8 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: 62 ug/L	PEL = 100 ppm REL = 25 ppm 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	0 to 10% LEL	Monitor; evacuate if confined space	
	☐ 2	10 to 25% LEL	Potential explosion hazard	
	☐ 3			
	☐ 4	>25% LEL	Explosion hazard; interrupt task; evacuate site	
	☐ 5			
☐ Oxygen meter model:	☐ 1	>23.5% Oxygen	Potential fire hazard; evacuate site	
	☐ 2	23.5 to 19.5% Oxygen	Oxygen level normal	
	☐ 3			
	☐ 4	<19.5% Oxygen	Oxygen deficiency; interrupt task; evacuate site	
	☐ 5			
☐ Radiation survey meter model:	☐ 1	Normal background	Proceed	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
	☐ 2			
	☐ 3	Two to three times background	Notify SSO	
	☐ 4	>Three times background	Radiological hazard; interrupt task; evacuate site	
	☐ 5			
☒ Photoionization detector model: ☐ 11.7 eV ☒ 10.6 eV ☐ 10.2 eV ☐ 9.8 eV ☐ ____ eV	☒ 1	Any response above background to 5 ppm above background	Level D is acceptable	Action levels must be determined based on the COCs and concentrations identified in the media sampled. If no COC concentrations are known, then use 5 ppm sustained within the breathing zone as your action level until the contaminants are identified.
	☒ 2			
	☒ 3	5 ppm above background	Level C (not anticipated)	
	☐ 4			
	☐ 5	10 ppm above background	Discontinue work	
☐ Flame ionization detector model:	☐ 1	Any response above background to ____ ppm above background	Level C is acceptable Level B is recommended	Action levels must be determined based on the COCs and concentrations identified in the media sampled. If no COC concentrations are known, then use 5 ppm sustained within the breathing zone as your action level until the contaminants are identified.
	☐ 2	____ ppm above background	Level B	
	☐ 3			
	☐ 4	above background	Level A	
	☐ 5			
☐ Detector tube models:	☐ 1	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.
	☐ 2			
	☐ 3			
	☐ 4			
	☐ 5			
☒ Other (specify):	☒ 1	Specify: Any response greater than 100 ug/m ³ above background indoor air levels	Specify: Implement dust suppression techniques	If, after implementation of dust suppression techniques, indoor PM-10 particulate levels are greater than 150 ug/m ³ above the background level, work must be stopped and a reevaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the indoor PM-10 particulate concentration to within 150 ug/m ³ of the background level and in preventing visible dust migration.
	☐ 2			
	☐ 3			
	☐ 4			
	☐ 5			

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:

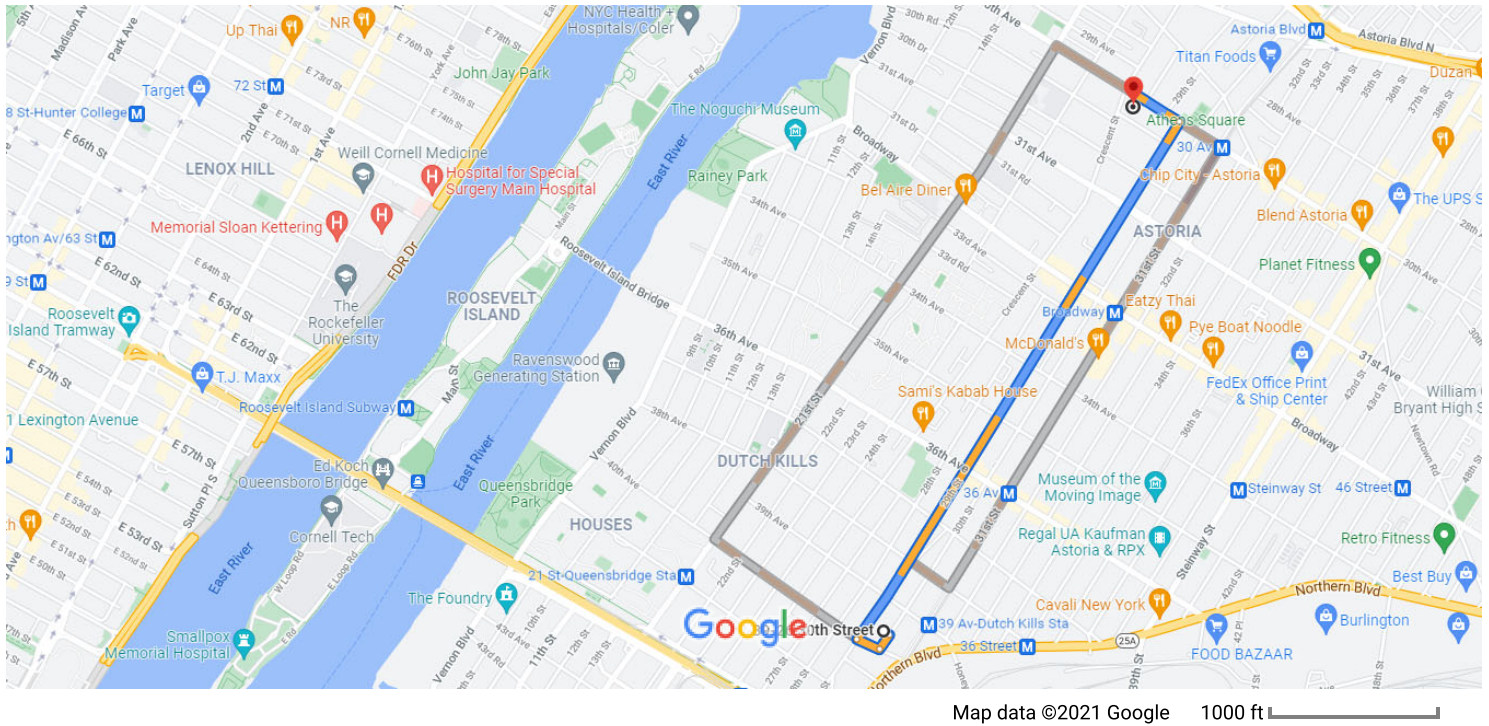
- Site work shall not be conducted during severe weather, including high winds and lightning.
- In the event of severe weather, stop work, lower any equipment (drill rigs), and evacuate the affected area.
- Monitor internet or other sources for severe weather alerts before resuming work.
- In the event 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 30 th Ave, Queens, NY	718-932-1000	
Police	NYCPD	4707 Pearson Pl, LIC, NY	718-361-1021	
Fire	FDNY Ladder 116	37-20 29 th 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	

Google Maps

39-26 30th Street, Queens, NY to Mount Sinai Queens

Drive 1.4 miles, 9 min



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

i

 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

M34514 - ANSI - EN



Occidental Chemical Corporation

A subsidiary of Occidental Petroleum Corporation



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)

SDS No.: M34514

SDS Revision Date: 21-Jan-2016

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

HYDROCHLORIC ACID (HCl) (ALL GRADES)

SDS No.: M34514

SDS Revision Date: 21-Jan-2016

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.

HYDROCHLORIC ACID (HCl) (ALL GRADES)

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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

HYDROCHLORIC ACID (HCl) (ALL GRADES)

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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.

HYDROCHLORIC ACID (HCl) (ALL GRADES)

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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 PEL Ceiling
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.

HYDROCHLORIC ACID (HCl) (ALL GRADES)

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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®
- Trelchem® 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

HYDROCHLORIC ACID (HCl) (ALL GRADES)

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

HYDROCHLORIC ACID (HCl) (ALL GRADES)

SDS No.: M34514

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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.

HYDROCHLORIC ACID (HCl) (ALL GRADES)

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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

HYDROCHLORIC ACID (HCl) (ALL GRADES)

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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)

HYDROCHLORIC ACID (HCl) (ALL GRADES)

SDS No.: M34514

SDS Revision Date: 21-Jan-2016

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

HYDROCHLORIC ACID (HCl) (ALL GRADES)

SDS No.: M34514

SDS Revision Date: 21-Jan-2016

Component	Status:
Hydrochloric Acid [Hydrogen Chloride]	1.0 %

DEPARTMENT OF HOMELAND SECURITY (DHS)- Chemical Facility Anti-Terrorism Standards (6 CFR 27):

This product 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]

HYDROCHLORIC ACID (HCl) (ALL GRADES)

SDS No.: M34514

SDS Revision Date: 21-Jan-2016

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

Isobutylene

Airgas
an Air Liquide company

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 (ft³/lb)** : 6.6845
- Gas Density (lb/ft³)** : 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/m ³	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.)

Health	/ 1
Flammability	4
Physical hazards	3

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.)



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

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
2

Flammability
0

Instability
0

Physical hazards
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	C ₂ Cl ₄
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

A1 - Known Human Carcinogen

A2 - Suspected Human Carcinogen

A3 - Animal Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

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 Disruptors 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

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** : C₂H-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 (ft³/lb)	: 0.6849
Gas Density (lb/ft³)	: 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	Rat	140700 mg/m ³	1 hours
	LD50 Dermal	Rabbit	>20 g/kg	-
	LD50 Oral	Rat	4920 mg/kg	-

IDLH : 1000 ppm

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
trichloroethylene	Eyes - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Skin - Severe irritant	Rabbit	-	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.
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Other adverse effects	: No known significant effects or critical hazards.
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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.
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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.
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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).
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Hazardous Material Information System (U.S.A.)

Health	*	2
Flammability		0
Physical hazards		0

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

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
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

Date of printing : 11/21/2016

Date of issue/Date of revision : 11/21/2016

Date of previous issue : No previous validation

Version : 0.01

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.

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****Supplier**

Alconox, Inc.

30 Glenn Street

White Plains, NY 10603

1-914-948-4040

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.

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**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) Respirable 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.	Decomposition	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: Label: LTD. QTY: None None 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
I4.4 Packing group: ADR, ADN, DOT, IMDG, IATA	None
I4.5 Environmental hazards :	None
I4.6 Special precautions for user: Danger code (Kemler): EMS number: Segregation groups:	None None None None
I4.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.	
I4.8 Transport/Additional information: Transport category: Tunnel restriction code: UN "Model Regulation":	
None None None	

I5 Regulatory information**I5.1 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.**I 6 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.

TASK HAZARD ASSESSMENT	
Task Being Assessed:	Demo Oversight of Asbestos Remediation
Date of Assessment / Reassessment:	January 2020
Person(s) Completing the Assessment:	Brandon Cresencia, Nick Carlo, Michael Huston
Person Certifying the Assessment:	Chris Del Monico, Corporate Health & Safety Officer
Potential Hazards	Consequences
Asbestos-containing building materials	Exposure
Engineering Controls	
Use of critical barriers over all openings to work area Isolation of HVAC systems Use of impermeable dropcloths & coverage of all objects within regulated areas. Air movement away from employees performing removal work. Smoke testing or equivalent for detection of leaks and air direction. Deactivation of electrical circuits, if not provided with GFCI's. All engineering controls to be handled by qualified asbestos remediation experts	
Administrative Controls	
Stay outside of asbestos exclusion zone (Exclusion zone to be determined by asbestos remediation contractor) during demolition and until all asbestos has been removed. Avoid all contact with asbestos	
Minimum PPE Required	
N/A	
Comments / Specific Training / Special Permits	
This THA is for oversight only. ECC personnel will remain a safe distance from all asbestos remediation	

TASK HAZARD ASSESSMENT	
Task Being Assessed:	Ground water sampling
Date of Assessment / Reassessment:	January 2020
Person(s) Completing the Assessment:	Brandon Cresencia, Nick Carlo, Michael Huston
Person Certifying the Assessment:	Chris Del Monico, Corporate Health & Safety Officer
Potential Hazards	Consequences
Ergonomics (e.g. Lifting equipment)	Back injury
Chemicals - Site contaminant(s)	Chemical exposure
Chemicals - Sample preservative	Chemical exposure
Broken sample jars	Lacerations
Cutting tubing	Lacerations
Generator (Exhaust, hot areas, handling gasoline)	Burns, exposure to gasoline and/or exhaust
Engineering Controls	
None.	
Administrative Controls	
When sampling for volatile compounds, screen the headspace of the well with PID. Inspect site and area surrounding well for hazards. Maintain proper posture when lifting and do not lift more weight than is comfortable. Review site specific HASP for hazards related to chemicals that may be present at the site. Allow the generator to cool before handling; always fill the fuel tank in a well ventilated area. Personnel that use ground water sampling equipment should be trained in its proper use.	
Minimum PPE Required	
Level D ensemble. Nitrile gloves. Leather-palm gloves when cutting.	
Comments / Specific Training / Special Permits	
None.	

TASK HAZARD ASSESSMENT	
<i>Task Being Assessed:</i>	Working in / near a roadway
<i>Date of Assessment/ Reassessment:</i>	January 2020
<i>Person(s) Completing the Assessment:</i>	Brandon Cresencia, Nick Carlo, Michael Huston
<i>Person Certifying the Assessment:</i>	Chris Del Monico, Corporate Health & Safety Officer
Potential Hazards	Consequences
Vehicle traffic	Personnel can be struck by vehicles
Engineering Controls	
Display signage to alert approaching vehicles to the presence of work crews. Divert traffic around the work area using reflective cones. When working along major thoroughfares, coordinate work with local law enforcement.	
Administrative Controls	
To the extent practical, all personnel will stay out of the roadway. Stay alert for passing traffic.	
Minimum PPE Required	
Level D ensemble. Reflective vest (Class-II or better)	
Comments / Specific Training / Special Permits	
A road closure permit may be required from the local municipality.	

TASK HAZARD ASSESSMENT	
<i>Task Being Assessed:</i>	Drum handling - contaminated soil or water where contaminant is known
<i>Date of Assessment / Reassessment:</i>	January 2020
<i>Person(s) Completing the Assessment:</i>	Brandon Cresencia, Nick Carlo, Michael Huston
<i>Person Certifying the Assessment:</i>	Chris Del Monico, Corporate Health & Safety Officer
Potential Hazards	Consequences
Weight of drum Loose ring around top or loose bung Sharp edges Drum contents	Injury to back (strain) or foot (crushing) Spills Laceration Chemical exposure, environmental damage
Engineering Controls	
When possible, fill drums at their storage area to avoid excessive movement. Properly label all drums as soon as any contents are placed into it (regardless of whether it's full).	
Administrative Controls	
Use a drum dolly to move full drums. Tilting and rolling full drums is NOT acceptable.	
Minimum PPE Required	
Level D ensemble. Steel toe boots Leather-palm work gloves.	
Comments / Specific Training / Special Permits	
Inspect drum label to confirm contents. This THA is specifically for drums of contaminated soil or water where the contaminant is known. This DOES NOT APPLY to unknown or unlabeled drums.	



Appendix C

Community Air Monitoring Program (CAMP)

**BRIDGE CLEANERS
QUEENS COUNTY
LONG ISLAND CITY, NEW YORK**

Community Air Monitoring Program

NYSDEC Site No. 241127

Prepared for:

Zhong Chuang Properties, LLC
39-26 30th Street
Long Island City, New York

Prepared by:

Environmental Engineering Compliance Control, D.P.C.
1 Emery Ave, Unit 2
Randolph, NJ 07869

November 2021

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 $150 \text{ mcg}/\text{m}^3$ 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 $150 \text{ mcg}/\text{m}^3$ 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 $150 \text{ mcg}/\text{m}^3$ 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 D

AS/SVE Relocation Design Drawings



1. ALL ABOVE-GRADE AIR SPARGE COMPONENTS ARE MADE OF STEEL OR EQUIVALENT PRESSURE RATED METAL PIPE AND FITTINGS.



1. ALL ABOVE-GRADE AIR SPARGE COMPONENTS ARE MADE OF STEEL OR EQUIVALENT PRESSURE RATED METAL PIPE AND FITTINGS.
2. ALL ABOVE-GRADE PIPING WILL BE INSULATED.

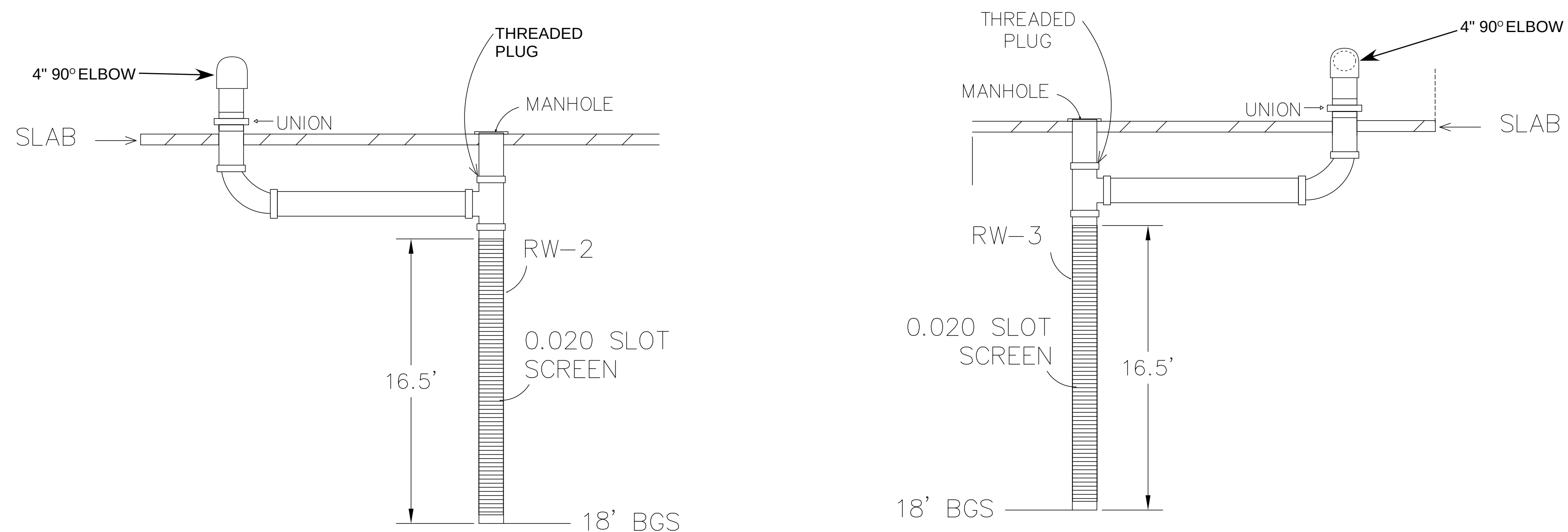


1. ALL ABOVE-GRADE AIR SPARGE COMPONENTS ARE MADE OF STEEL OR EQUIVALENT PRESSURE RATED METAL PIPE AND FITTINGS.
2. ALL ABOVE-GRADE PIPING WILL BE INSULATED.

SHEET

2

REV 0



4 SVE (RW-2) STUB UP PROFILE
NTS

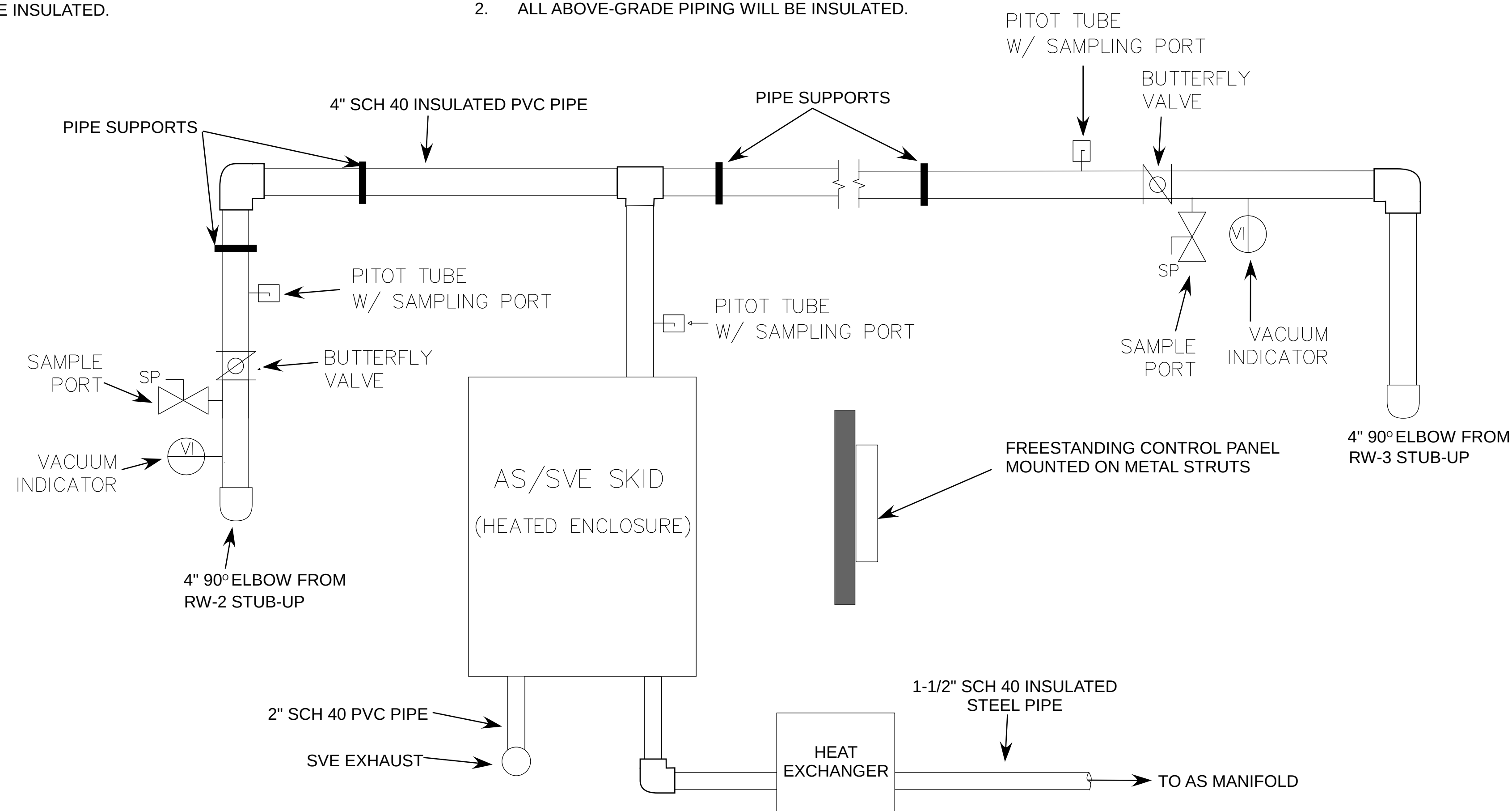
NOTES:

- NOTES:**
1. SOUTHEAST VIEW OF RW-2
 2. ALL ABOVE-GRADE PIPING WILL BE INSULATED.

5 SVE (RW-3) STUB UP PROFILE
NTS

NOTES:

1. NORTHWEST VIEW OF RW-3
2. ALL ABOVE-GRADE PIPING WILL BE INSULATED.



6 AS/SVE SYSTEM PLAN
NTS

NOTES:

- NOTES:
1. ALL ABOVE-GRADE PIPING WILL BE INSULATED.
 2. CONTROL PANEL TO BE RATED FOR OUTDOOR USE.

[illegible]

1 EMERY AVE, UNIT 2
RANDOLPH, NJ 07869

Engineering Seal and
Signature
to be Applied to Final
NYSDEC-approved
drawings.

CERTIFIED BY _____ DATE _____

IT IS A VIOLATION OF THE NEW YORK STATE
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IS ACTING UNDER THE DIRECTION OF A LICENSED
PROFESSIONAL ENGINEER.

ZHONG CHUANG PROPERTIES LLC

BRIDGE CLEANERS SITE
39-26 30th ST

LONG ISLAND CITY NEW YORK

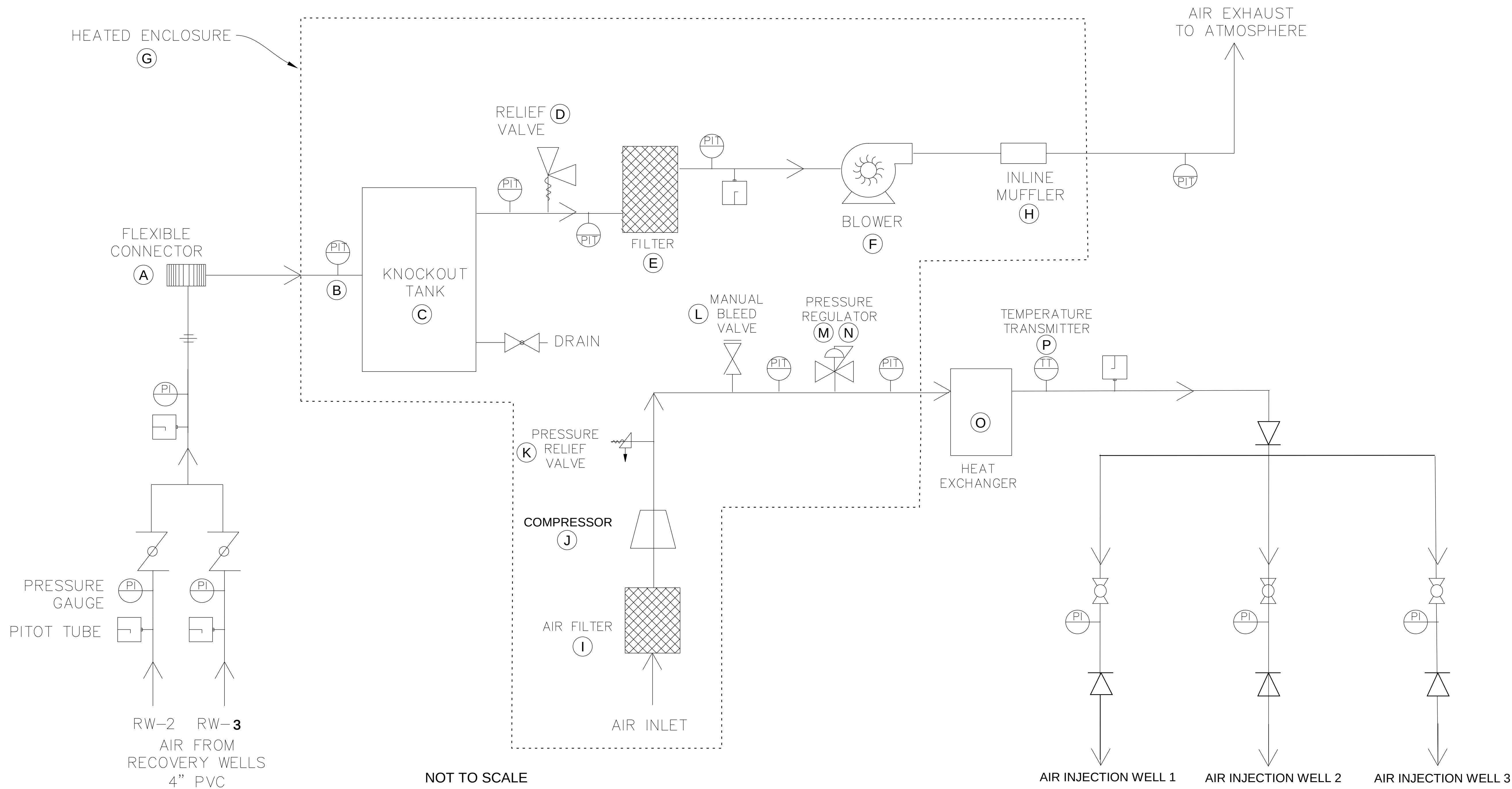
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DES	NK	DATE	11-3-2021
CHK	NK	DATE	11-3-2021
SCALE	NOT TO SCALE	PROJECT NO.	BRIDGE CLEANERS

PROPOSED SVE SYSTEM RELOCATION DETAILS

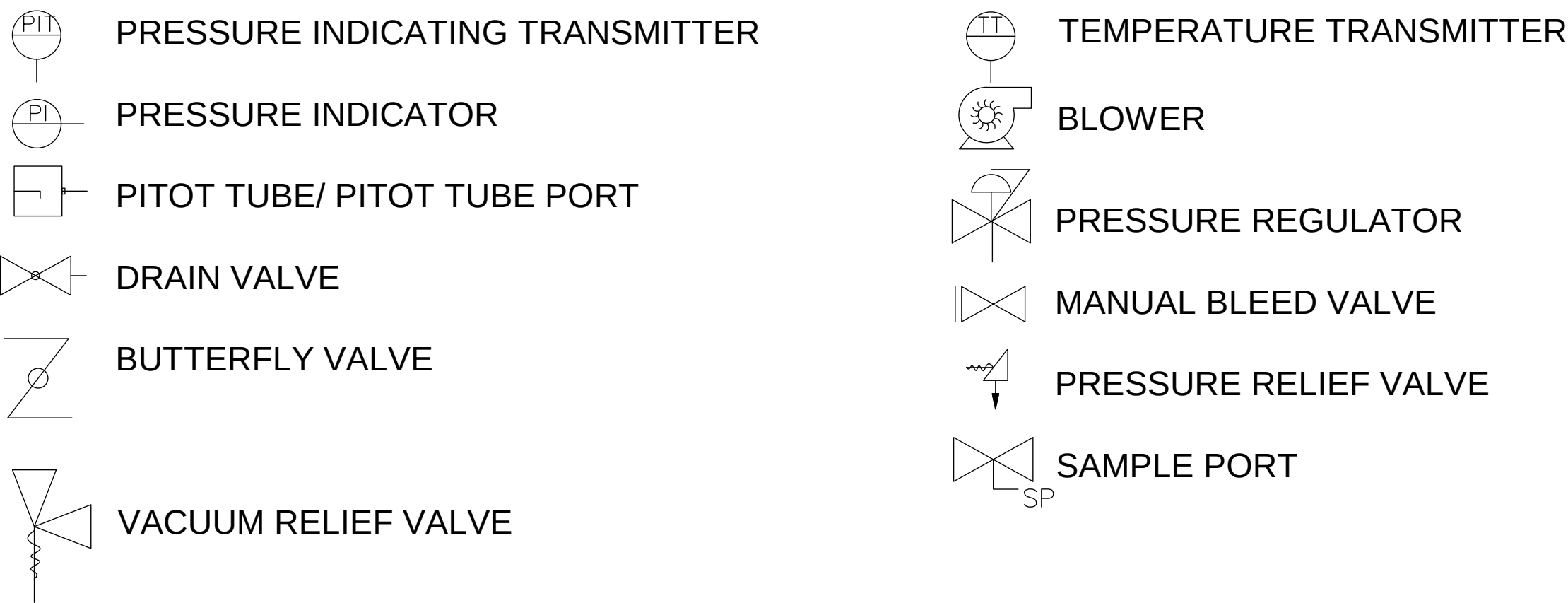
SHEET

3

REV 0



LEGEND



- NOTES:
1. FREESTANDING CONTROL PANEL TO BE MOUNTED ON METAL STRUTS.
 2. CONTROL PANEL ENCLOSURE TO BE RATED FOR OUTDOOR USE.

Soil Vapor Extraction System			
Label	Description	Supplier	Vendor Part Number
A	Reducing Flex Coupling	Pipeline	1059-22
B	Pressure Gauge	Precision Instrument Co.	LP4-254-60" H ₂ OP
C	Moisture Separator	Ametek Rotron	la
D	Vacuum Relief Valve	Fisher	289H-41
E	2" Inline Filter	Solberg Mfg.	CSL-851-200HC
F	Regenerative Blower	Ametek Rotron	EN505AX72ML
G	Sound Enclosure, outdoor	ARTUSA	71.5" x 42.75 x 48.5"
H	Inline Muffler	Universal Silencer	U5-1.25/11-121-AA

Air Sparge System			
Label	Description	Supplier	Vendor Part Number
I	Inlet Filter with paper element	Universal Silencer	CCS-2; Paper Filter: 810471
J	Rotary Claw Compressor	Reitschle	DLR60 5 HP, 230/460/3/60 TEFC
K	Relief Valve	Fisher	289H-41
L	1" Bleed Valve Assembly	Universal Silencer	U5-1"
M	Liquid Filled Pressure Gauge	Precision Instrument Co.	204L-404C, LF, 4" FM, 0-30 PSIG
N	1/4" Isolation Valve	SMC Specialties	VA BRS 4F4M-BT
O	Air to Air Heat Exchanger	XChanger	AA-250, 1 HP, TEFC, 230/460/3/60
P	Discharge Temp Gauge/Switch	Jumo	608523

APP	DESCRIPTION	DATE	REV



Engineering Seal and Signature to be Applied to Final NYSDEC-approved drawings.

CERTIFIED BY: DATE:

IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON TO ALTER ANY DOCUMENT THAT BEARS THE SEAL OF A PROFESSIONAL ENGINEER, UNLESS THE PERSON IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER.

ZHONG CHUANG PROPERTIES LLC

BRIDGE CLEANERS SITE
39-26 30th ST

LONG ISLAND CITY NEW YORK

DRN	AN	DATE	11-3-2021
DES	NK	DATE	11-3-2021
CHK	NK	DATE	11-3-2021
SCALE	NOT TO SCALE	PROJECT NO.	BRIDGE CLEANERS

PROPOSED SYSTEM
RELOCATION
PROCESS AND
INSTRUMENTATION
DIAGRAM

SHEET
4
REV 0



Appendix E

Proposed Implementation Schedule

39-26 30th St, Long Island City, NY Remedial Action Schedule

**Project: Bridge Cleaners
Remedial Action Schedule**

Regulatory Approval

AS/SVE ON/OFF

Monitoring

Sampling & Evaluation

Contractor

Reporting

Milestone Schedule

November 2021	December 2021	January 2022	February 2022	March 2022	April 2022	May 2022	June 2022	July 2022	Estimated # Days Req'd	Project Milestone or Major Activity
									N/A	System Relocation WP Approval, Change of Use Notification
									30	30-day system shut-down
									2	SSSV, IAQ, and Semi-Annual Groundwater Sampling and Data Evaluation (30-day & SMP)
									21	SSSV, IAQ, and Semi-Annual Groundwater Data Evaluation (30-day & SMP)
									N/A	SSSV, IAQ, and Groundwater Analytical Report Submittal to DEC/DOH
									14	System breakdown and removal from roof
									45	Building Demolition & system relocation
									1	System Restart
									3	System Restart Monitoring
									1	SVE Exhaust Sampling (SMP)
									N/A	Interim SMP Revisions
									1	Semi-annual groundwater sampling (SMP)