

August 19, 2025

Attn: Aaron Fischer  
Division of Environmental Remediation  
New York State Department of Environmental Conservation  
625 Broadway  
Albany, New York 12233

**Re: Treatability Study Work Plan for In-Situ Stabilization/Solidification and  
In-Situ Geochemical Stabilization  
Gowanus Green (Former Citizens MGP Site – Parcels I & II)  
Brooklyn, NY  
BCP Site No. C224012  
Langan Project No. 170777301**

Dear Mr. Fischer,

This Treatability Study Work Plan (TSWP) for In-Situ Stabilization/Solidification (ISS) and In-Situ Geochemical Stabilization (ISGS) was prepared by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) on behalf of Gowanus Green Partners LLC (the Volunteer) for Parcels I and II of the Former Citizens Manufactured Gas Plant (MGP) site to evaluate feasibility and determine design parameters for ISS and ISGS as supplemental remedial measures to address remaining MGP-related source material.

This TSWP describes the scope of work required for the collection of soil, groundwater, and non-aqueous phase liquid (NAPL) samples from within the New York State Department of Environmental Conservation (NYSDEC)-specified treatment areas on Parcels I and II. The samples will be submitted to treatability or analytical laboratories for the completion of bench-scale treatability studies. The results of the treatability studies will be documented in a forthcoming remedial design document and will be used for the development of pilot tests and full-scale designs for the implementation of ISS and ISGS.

## **CERTIFICATION**

I, Gerald F. Nicholls, certify that I am currently a New York State (NYS) registered professional engineer and that this Treatability Study Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and Green Remediation (DER-31).

Gerald Nicholls

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NYS Professional Engineer #092433

8/19/2025

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Date



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Signature

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## **SITE BACKGROUND AND ENVIRONMENTAL HISTORY**

### **Site Location and Description**

The Gowanus Green site (NYS Brownfield Cleanup Program [BCP] Site No. C224012) is identified as Block 471, Lots 1 and 100 (Parcels I and II, respectively) on the Kings County Tax Map. The site encompasses a total area of about 247,877 square feet (5.69 acres) and is bound by 5<sup>th</sup> and Hoyt Streets to the north; Smith Street to the west; 459 Smith Street (NYS BCP Site No. C224012B) to the south; and the Gowanus Canal, a United States Environmental Protection Agency (US EPA) superfund site, to the east.

Parcels I and II of the Former Citizens MGP site are currently vacant following National Grid's implementation of the NYSDEC-approved 100% Remedial Design. Surface topography across the site generally slopes downward from the northwest to the south and east, and topographic elevations (el) range from approximately el 30 feet<sup>1</sup> near the intersection of Smith and 5th Streets, to between approximately el 7 and 12 feet along the Gowanus Canal. The New York City Department of Environmental Protection (NYCDEP) Bond-Lorraine sewer transects the site from the southeastern corner of the site to the northeastern corner of the site (generally along the bulkhead alignment), and a gas transmission tunnel transects Parcel II from the intersection of Hoyt and 5<sup>th</sup> Streets to the Gowanus Canal.

A site location map and site plan are included as Figure 1.

### **Site History**

According to the 2023 Draft Construction Completion Report (CCR) prepared by Arcadis (on behalf of National Grid), the site and the surrounding area were originally part of the wetlands system adjacent to Gowanus Creek. The area was artificially filled during construction of the Gowanus Canal in the 1860s and upon completion of the canal, the Citizens Gas Company constructed a coal gasification plant between 5<sup>th</sup> and 6<sup>th</sup> Streets on the northern part of Parcels I and II. The initial MGP site included three gas holders (Holder Nos. 1 through 3), a retort house, and coal storage areas.

The Brooklyn Union Gas Company acquired the MGP around 1895 and the chemical fertilizer production facility (on the southern-adjointing property) was closed for further expansion of the MGP between 1904 and 1915. Expansion of the MGP on the southern-adjointing property included the development of additional tar handling facilities and oil storage tanks to support the ongoing MGP-related operations on Parcels I and II. By 1939, the MGP included a new gas holder (Holder No. 5 to replace former Holder No. 1), two purifier houses, and additional oil storage on Parcel I; and a large tar separator on the southern-adjointing property. The plant was converted to an oil gasification plant in 1952 and operated as such until its closure in the early 1960s. The

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<sup>1</sup> Elevations herein are referenced to the North American Vertical Datum of 1988 (NAVD88)

Brooklyn Union Gas Company sold the MGP properties in 1969. Following the sale of the MGP properties, Parcels I and II were operated by a concrete plant from the 1970s until 2019.

### **Remaining Subsurface Structures**

Subsurface obstructions, including former MGP structures and critical infrastructure, are present on Parcels I and II of the Former Citizens Gas Works MGP site. Subsurface obstructions include the following and are shown on Figure 2:

- Concrete foundations supported by piles (timber, concrete, and steel filled with concrete);
- Historical MGP-related structures (gas holder foundations, oil tank foundations, and purifier house foundations etc.);
- Critical infrastructure, including the NYCDEP Bond-Lorraine Combined Sewer and the Brooklyn-Union Gas Company Gas Transmission Tunnel;
- Timber cribbing from the former bulkhead along the Gowanus Canal; and
- Structural elements of the newly installed bulkhead barrier wall.

### **Supplemental Remediation Requirements**

National Grid implemented the NYSDEC-approved 100% Remedial Design between July 2019 and April 2022. Remedial activities performed by National Grid included the complete or partial removal of shallow and intermediate MGP-related source areas, and former MGP structures and underground facilities. As documented in the January 2023 draft Interim Site Management Plan (ISMP) prepared by Arcadis, remaining soil at the site still exceeds the unrestricted use (UU) soil cleanup objectives (SCOs) and recoverable dense NAPL (DNAPL) also remains in the intermediate and deep zone soils (between about el -20 and el -110 feet NAVD88). The nature and extent of the remaining contamination are summarized in the figures and tables attached to the draft ISMP.

The NYSDEC and US EPA issued a joint letter on March 31, 2023, which requires supplemental remediation to address the potential recontamination of the Gowanus Canal by preventing the migration of coal tar-related contaminants anticipated to remain within the site. The NYSDEC and US EPA are requiring that remaining MGP-related source material (NAPL or grossly contaminated material [GCM]) be addressed to an elevation of about el -23 feet NAVD88, which is consistent with the base of the proposed multi-layer remedial cap in the Canal that will be installed as part of the US EPA's remediation of the Gowanus Canal superfund site, plus a 2-foot buffer.

The required treatment depths between surface grade and el -23 feet were defined in NYSDEC's October 23, 2024 "Maximum Remedial Depth" figure, which was issued in response to National Grid's initially proposed supplemental remediation measures. NYSDEC's response letter also memorialized the requirement to treat remaining NAPL/GCM-related source material using ISS



and/or ISGS technology. The extent of the required treatment area was defined in a response letter issued by the NYSDEC on June 18, 2024 and was subsequently refined following correspondence between the NYSDEC and National Grid on February 27, 2025.

The treatability study described in this work plan is aimed at establishing the feasibility of ISS and ISGS as potential remedial elements to address MGP-impacted soil remaining at the site. Previous environmental and geotechnical investigations and supplemental remedial design investigations will be used to inform feasibility of supplemental remediation methods in the forthcoming Remedial Design Document.

## **FIELD INVESTIGATION**

The proposed bench-scale treatability studies will require the advancement of soil borings and the collection of soil, groundwater, and NAPL samples. The field investigation will be performed in accordance with this section and samples will be submitted to treatability and analytical laboratories, as applicable.

The bench-scale treatability study for ISGS is anticipated to be completed by Resolution Partners, LLC, a testing laboratory in Madison, Wisconsin, in coordination with the company supplying and implementing the proprietary ISGS solution (Innovative Environmental Technologies, Inc. [IET], located in Pipersville, Pennsylvania). The bench-scale treatability study for ISS is anticipated to be completed by Langan's Treatability Facility at the New Jersey Institute of Technology (NJIT), located in Newark, New Jersey.

### **Pre-Screening for ISGS Feasibility**

Due to the varied geology and documented NAPL distribution throughout the site, six areas within the required treatment area were selected for pre-screening, in coordination with IET. Screening areas were selected based on three predominant soil types (i.e. fill, sand, or clay) identified during previous investigations at the site, the location of existing subsurface structures, and the proposed ISGS treatment zones/intervals. The results of the pre-screening investigation will be used to refine the design parameters for the ISGS treatability study. The objectives of the pre-screening exercise are:

- 1) To confirm the soil types across the target treatment area and to identify areas with similar soil characteristics to inform the number of treatability studies to be completed; and
- 2) To verify the feasibility of ISGS treatment through the introduction of ISGS solution into site-derived soil and NAPL samples collected during the pre-screening investigation

### **Soil Investigation**

An environmental drilling contractor will advance six soil borings (ISGS-01 through ISGS-06) from surface grade to depths between about 5 and 54 feet below grade surface (bgs) (between about el 7.5 and -25 feet NAVD88 [the maximum treatment depth required by the NYSDEC, plus a two-foot buffer]) using a direct-push or sonic drill rig. The proposed soil boring locations and associated pre-screening intervals are shown on Figure 3 and were selected to target specific soil types (i.e. fill, sand, or clay) and to target the potential ISGS treatment zones/intervals.

Soil/fill will be continuously recovered in 5-foot-long increments using dedicated Macrocore<sup>®</sup> samplers. A Langan field representative will document the work, screen the soil for environmental impacts, and collect soil samples. Soil will be screened continuously to the boring termination depth for volatile organic compounds (VOCs) using a photoionization detector (PID)

equipped with a 10.6 electron volt (eV) bulb, and for visual and olfactory indications of environmental impacts.

Recovered soil will be characterized from surface grade to the boring termination depth and soil samples will be collected from the intervals specified in Figure 3. Multiple soil samples may be collected from each soil boring based on soil types and degree of NAPL-related impacts observed. Each soil sample will consist of about 250 grams of recovered soil and will be collected into laboratory-supplied containers for transport to IET's testing laboratory in Pipersville, Pennsylvania.

Following soil sample collection, boreholes will be filled from the boring termination depth to surface grade using grout or hydrated bentonite. Excess soil/fill generated from the pre-screening investigation will be containerized in United Nations/Department of Transportation (UN/DOT)-approved 55-gallon drums for future waste characterization and off-site disposal.

#### NAPL Investigation

NAPL samples will be collected from existing recovery wells CGRW-08 (an existing NAPL recovery well on Parcel I screened from el -19.91 to el -49.91) and CGRW-03 (an existing NAPL recovery well on Parcel II screened from el -11.54 to el -41.54). About 200 milliliters (ml) of free-phase NAPL will be collected from each recovery well using a pump or a 2-inch diameter polyethylene bailer. Samples will be placed into high density polyethylene (HDPE) containers that will be sealed and labeled for transport to IET's testing laboratory in Pipersville, Pennsylvania.

#### Bench-scale Pre-screening

The pre-screening exercise will be performed by IET by introducing the ISGS reagent into the soil and NAPL samples to document short-term, qualitative changes in viscosity and solidification for the purposes of demonstrating feasibility prior to implementation of the bench-scale treatability study for ISGS. The site-derived soils and NAPLs to be tested by IET using the ISGS reagent may include (but are not limited to):

- Sands, silts, and clays with varying degrees of NAPL-related impacts
- Non-impacted soil with observed organic content (i.e. sandy loams)
- Free-phase NAPL
- Mechanically mixed soils with the addition of recovered free-phase NAPL

The results of the pre-screening exercise will be used to select the number and location of samples for the treatability study and will be summarized in the Treatability Study Report.

A request may be submitted to the NYSDEC to complete the pre-screening exercise prior to approval of this workplan.

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## **Treatability Study Sample Collection**

The bench-scale treatability studies for ISS and ISGS will require the collection of bulk soil, groundwater, and NAPL samples as described in this section. Three soil borings will be advanced for implementation of the bench-scale treatability study for ISS and based on the results of the pre-screening exercise, IET will recommend the number and location of samples to be collected under a separate mobilization for implementation of the bench-scale treatability study for ISGS. The proposed scope of work for the ISGS treatability study will be submitted to NYSDEC for review and approval prior to implementation.

The proposed ISS sample locations are shown on Figure 3.

### Soil Investigation

An environmental drilling contractor will advance soil borings (ISS-01, ISS-02, and ISS-03 for the ISS treatability study) from surface grade to depths between about 43 and 53 feet bgs (between about el -15 and el -25) using a direct-push or sonic drill rig.

Due to the volume of soil required for the bench-scale treatability studies, multiple borings may be advanced adjacent to the proposed sample locations until the minimum required sample volume is collected. A Langan field representative will document the work, screen the soil for environmental impacts, and collect soil samples. Soil will be screened continuously to the boring termination depth for VOCs using a PID equipped with a 10.6 eV bulb, and for visual and olfactory indications of environmental impacts. All soil borings will be logged, and each soil boring log will include a soil description, a description of environmental impacts (if encountered), and the depth intervals where bulk soil samples are collected for the bench-scale treatability studies. Soil boring logs will be submitted to the NYSDEC following the sampling event.

Up to three bulk soil samples will be collected for the ISS treatability study from the targeted treatment intervals (between surface grade and el -25 feet NAVD88 for ISS). The number of bulk soil samples to be collected for the ISGS treatability study will be determined based on the results of the pre-screening exercise and samples will be collected from the target treatment interval, plus a two-foot-buffer (between the groundwater table and el -25 feet NAVD88 for ISGS). To the extent practicable, bulk soil samples will be biased to intervals exhibiting the greatest degree of environmental impacts. The proposed scope of work for the ISGS treatability study will be submitted to NYSDEC for review and approval prior to implementation.

### *ISS Samples*

A minimum of 30 kilograms (kg) of soil will be collected for each predominant soil type (i.e. fill, sand, and clay) identified during advancement of the three ISS soil borings (ISS-01 through ISS-03). For each predominant soil type identified, about 10 kg of soil will be collected from each soil boring and homogenized in the field to create one bulk soil sample per strata. Gravel or cobbles

measuring greater than 0.5 inches in diameter will be removed from the bulk soil samples prior to homogenizing. Bulk soil samples for ISS will be collected into Ziploc® bags and placed into sealed five-gallon plastic buckets for overnight delivery to Langan's Treatability Facility at NJIT. Upon arrival at Langan's Treatability Facility, soil samples will be placed in refrigerated storage until the treatability study begins.

A portion of each of the three homogenized bulk soil samples for ISS will be collected into laboratory-supplied containers that will be sealed, labeled, and placed in a cooler containing ice (to maintain a temperature of approximately 4 degrees Celsius) for transport to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory for analysis of the following baseline parameters: Part 375/target compound list (TCL) VOCs, semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH) (diesel range organics [DRO] and oil range organics [ORO]), and total organic carbon (TOC). The results of the baseline sampling are anticipated to be used as an internal quality assurance / quality control (QA/QC) measure for the ISS treatability study to confirm the presence of MGP-related constituents and will not be relied upon for the purposes of site characterization.

#### *ISGS Samples*

A minimum of 15 kg (about 9 liters [L]) of soil will be collected from each of the recommended soil boring locations identified after the pre-screening exercise (one bulk soil sample per soil boring location). The proposed scope of work for the ISGS treatability study will be submitted to NYSDEC for review and approval prior to implementation.

Bulk soil samples will be biased toward the intervals exhibiting the greatest degree of environmental impacts and will be homogenized in the field. Gravel or cobbles measuring greater than 0.5 inches in diameter will be removed from the bulk soil samples prior to homogenizing. The bulk soil samples for ISGS will be placed into laboratory-supplied, 1-liter (L) containers for overnight delivery to ReSolution Partners. Upon arrival at ReSolution Partners, soil samples will be placed in refrigerated storage until the treatability study begins.

Following soil sample collection, boreholes will be filled from the boring termination depth to surface grade using grout or hydrated bentonite.

A summary of soil samples anticipated to be collected (excluding baseline samples) during the soil investigation is provided below:

Sample Type and Treatability Study Laboratory	Sample Rationale	Soil Boring IDs	Proposed Sample ID	Minimum Sample Weight Required
ISS – Langan’s Treatability Facility at NJIT	One sample per predominant strata identified	Homogenized samples between soil borings ISS-01, ISS-02, and ISS-03	ISS-FILL	30 kg
			ISS-SAND	30 kg
			ISS-CLAY	30 kg
ISGS – ReSolution Partners	One sample per soil boring selected by IET	To be determined (TBD) based on pre-screening results	ISGS-##	15 kg
			ISGS-##	15 kg
			ISGS-##	15 kg

### Groundwater Investigation

Up to three bulk groundwater samples will be collected for ISS from monitoring well CGMW-50 (an existing monitoring well on Parcel I). The number and location of bulk groundwater samples to be collected for ISGS will be determined based on the results of the pre-screening exercise. Prior to sampling, the monitoring wells will be gauged for static water levels and presence of NAPL, purged, and physical and chemical parameters (e.g., temperature, dissolved oxygen, oxygen reduction potential, turbidity) will be allowed to stabilize to the ranges specified in the USEPA’s Low Stress Purging and Sampling Procedure for the Collection of Groundwater Samples From Monitoring Wells, Dated July 30, 1996, and Revised January 19, 2010. Samples will be collected with a peristaltic pump (or equivalent) with dedicated polyethylene tubing.

#### *ISS Samples*

About 50 L (13± gallons) of groundwater will be collected for each bulk soil sample (for a total of up to three bulk groundwater samples). Each bulk groundwater sample will be collected into three, five-gallon HDPE containers for transport to Langan’s Treatability Facility for use during the ISS treatability study.

One groundwater sample will also be collected from monitoring well CGMW-50 for analysis of the following baseline parameters by a NYSDOH ELAP-certified analytical laboratory: Part 375/TCL VOCs, SVOCs, TPH (DRO and ORO), total and dissolved metals, chloride, and TOC.

#### *ISGS Samples*

For each bulk soil sample collected for the ISGS treatability study, about 47.5 L of groundwater will be collected into five, 9.5-L stainless-steel canisters for transport to ReSolution Partners.

ReSolution Partners will collect a portion of one sample set to establish pre-treatment conditions. The baseline analyses will include BTEX, PAHs, and TPH, and the sample analysis will be performed by Microbac Laboratories, Inc., a NYSDOH ELAP-certified laboratory located in Pittston, PA.

#### NAPL Investigation

NAPL samples will be collected from existing recovery wells CGRW-08 (on Parcel I) and CGRW-03 (on Parcel II) as part of the ISGS treatability study. NAPL samples will not be collected as a component of the bench-scale treatability study for ISS.

About 1 L of free-phase NAPL will be collected for each bulk soil sample for implementation of the bench-scale treatability study for ISGS. Each NAPL sample will be collected into one, laboratory-supplied 1-L container for transport to ReSolution Partners.

#### **Community Air Monitoring Plan (CAMP)**

Air monitoring will be implemented during ground-intrusive investigation activities in accordance with the site-specific CAMP included as Attachment 1, including the Special Requirements for Work within 20 feet of Potentially Exposed Individuals or Structures, and the Odor and Dust Control Plan, included as Attachment 2. At a minimum, the CAMP will include one upwind and one downwind CAMP station around each distinct area of intrusive work. If two drilling activities are ongoing, CAMP monitoring will be expanded to accommodate the area.

#### **Management of Investigation-Derived Waste**

Excess investigation-derived waste (IDW), including soil cuttings, purged groundwater, and decontamination fluids, will be containerized in properly labeled and sealed UN/DOT-approved 55-gallon drums for future waste characterization and off-site disposal at a facility permitted to accept the waste. The drums will be staged in a secure area on-site, pending receipt of laboratory data and off-site disposal to an appropriate facility.

#### **BENCH-SCALE TREATABILITY STUDIES**

Bench-scale treatability studies will be conducted for ISS and ISGS (if determined to be feasible based on the pre-screening tests) for the development of a full-scale remediation design.

#### **In-Situ Stabilization/Solidification Treatability Studies**

Langan's Treatability Facility will use the bulk soil and groundwater samples to evaluate the application of ISS as a supplemental remedial element to address NAPL/GCM impacts remaining on-site. The bench-scale treatability study will include:

##### Solidification Screening Test

A 7-day screening test will be setup using the homogenized soil prepared in the field. During the screening test, soil will be mixed with site groundwater and different doses of Portland I/II

cement and the corresponding soil-cement mixture will be packed into molds. Mold strength will be measured periodically for 7 days during the curing process using a pocket penetrometer. The results of the 7-day test will be used to refine the dosage of binder needed to setup ISS molds for the solidification test. Separate tests will be setup for each predominant soil type (i.e. each homogenized bulk soil sample).

#### Solidification Test Setup and ISS Mold Analysis

A solidification test will be conducted to determine the dosage of reagent required to achieve the targeted unconfined compressive strength (UCS) and hydraulic conductivity which are analyzed by methods ASTM D1633 and ASTM D5084, respectively. The homogenized soil sample will be tested by creating test molds using different dosages of Portland I/II cement, along with additives such as bentonite or blast furnace slag. Control molds, consisting of site soil without the addition of Portland cement or the selected additives, will also be prepared. The test molds will be constructed in duplicates, as needed, to verify the results of the solidification testing. The specific mixes (% by soil mass) to be tested for ISS include:

- Portland cement (5%, 10%, and 15%, respectively) without additives
- Portland cement (between 2% and 4%) with varying ratios of blast furnace slag (between 3% and 12%)
- Portland cement (between 2% and 10%) with varying ratios of blast furnace slag (between 2% and 6%) and bentonite (up to 1%)

Samples will be analyzed for UCS (via ASTM Method D1633) and hydraulic conductivity (via ASTM Method D5084) at 7-, 14-, and 28-days at a minimum. At the end of the curing period (up to 28 days), select molds will be submitted to a geotechnical laboratory for analysis of moisture content, density, UCS, and hydraulic conductivity. The grout mixes used for preparation of the test ISS molds will also be characterized for viscosity, density, and pH.

Modifications to the ISS treatability study may be required based on field and laboratory observations, and baseline sampling and screening. Modifications to the work plan (if required) will be communicated to the NYSDEC.

#### Data Analysis and Report

Results of the ISS treatability study, including test methods, observations, photographs, screening results, and laboratory analytical data will be tabulated, evaluated, and documented in a Treatability Study Report, which will be included in a forthcoming remedial design document to define the ISS design parameters.



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## **In-Situ Geochemical Stabilization Treatability Studies**

ReSolution Partners will use the bulk soil, groundwater, and NAPL samples to evaluate the application of ISGS as a supplemental remedial element to address NAPL/GCM impacts remaining on-site. The bench-scale treatability study will include:

### Baseline Analysis

A portion of each bulk soil and groundwater sample will be analyzed to establish pre-treatment conditions for the following parameters; benzene, toluene, ethylbenzene, and xylenes (BTEX) via USEPA method 8260, polycyclic aromatic hydrocarbons (PAHs) via USEPA 8270 SIM, and TPH (DRO and ORO) analysis. The sample analysis will be performed by Microbac Laboratories, Inc. (Microbac), a NYSDOH ELAP-certified analytical laboratory located in Pittston, Pennsylvania (ELAP ID No. 12150). The results of the baseline sampling are anticipated to be used as an internal quality assurance / quality control (QA/QC) measure for the ISGS treatability study to confirm the presence of MGP-related constituents and will not be relied upon for the purposes of site characterization.

### Column Evaluation

The primary objective of the ISGS test columns is to determine the degree to which the selected ISGS application reduces the leachable TPH, BTEX and PAH concentrations under dynamic (flowing) conditions relative to an unamended control under the same conditions. The columns will also be used to estimate the hydraulic conductivity change of the treated soil as a result of ISGS addition. The ISGS test columns will be constructed of 10.2 centimeter (cm)-diameter by 15-cm-long clear polyvinyl chloride (PVC).

Three columns will be prepared per sample set, as follows:

- One unamended control column
- One with 4.5% by mass ISGS solution at a dose specified IET
- One with 10% by mass ISGS solution at a dose specified by IET

ReSolution Partners will homogenize the bulk soil samples by mixing the soil by hand immediately prior to column packing. Although not anticipated, the addition of non-native soils to site-derived bulk soil samples will be discussed in coordination with NYSDEC prior to column preparation.

The unamended soil and soil amended with ISGS solution will be placed into the columns in 2- to 3-cm lifts with site groundwater, and the columns will be tapped to facilitate packing to a target of 1.5 to 1.8 kg/L (soil bulk density). If necessary, stirring will be applied to the lifts to facilitate the release of air bubbles. The amount of groundwater and solids added to the columns will be measured to estimate the bulk density of the columns fill. Adding groundwater during the filling

process will ensure that the columns are saturated as the ISGS reacts with the NAPL. Columns will react for 72 hours without flow to allow the ISGS encapsulation to proceed.

After the 72-hour reaction period, groundwater will be introduced to the top of the column to flush unreacted permanganate ( $\text{MnO}_4$ ) from the NAPL-spiked soil. Flushing will continue until effluent is visually free of unreacted  $\text{MnO}_4$ . The flushed volume and  $\text{MnO}_4$  concentrations will be measured to estimate the reacted and retained mass of  $\text{MnO}_4$ .

When flushing is complete, all columns will begin downward flow of groundwater under a constant head of water. The flow rates will vary between the columns and may vary within a column over time. The flow rate will be measured gravimetrically each business day. Initial estimates of column pore volumes suggest that approximately 6 pore volumes (1.5 L) will have to be collected to meet the sample size requirements for the analytical program. Samples will therefore be collected from the columns at approximately 6, 18 and 36 pore volumes. Each sample is a composite of previous six pore volumes: 0 to 6, 12 to 18 and 30 to 36. Additional samples will be tested for pH and ORP at approximately 9 and 24 pore volumes.

Samples will be collected in evacuated multi-layer bags with aliquots processed for analysis of BTEX, TPH, PAH, pH and ORP. ReSolution Partners will complete pH and ORP measurements, and Microbac Laboratories will complete analyses of BTEX, PAHs, and TPH under a standard 10-business day turnaround time (TAT). Individual compounds will be reported for BTEX and PAHs.

Concentration as a function of liquids to solids (L:S) will assess reductions relative to the control columns operated under conditions comparable to the ISGS-amended columns. The total mass of contaminants leached from the control and ISGS columns will also be determined.

#### Permeability Trials and Microscope Examination

Following the column evaluation, a permeability assessment will be completed, where the columns' plumbing will be modified to complete falling head permeability tests on all columns. After conclusion of the permeability testing, a microscopic evaluation will be conducted. The columns will be opened and examined microscopically and digitally photographed. Photographs in support of the visual observations will be provided as part of the project reporting.

Following the microscope examination, 2-cm-thick portions of each of the column solids will be analyzed by Microbac for manganese via USEPA method 6010. The results from the unamended columns subtracted from the ISGS-amended column results will provide a measure of retained manganese and provide a measure of the degree of manganese heterogeneity within the columns.

#### Data Analysis and Report

ReSolution Partners will provide a final report to Langan after completion of the bench-scale treatability study for ISGS. The final report will include the results of ISGS dose trials, column

trials, and analytical data, as well as a description of test methods, tabulations of results, and charts. These results, along with soil boring logs and field data, will be incorporated into a forthcoming remedial design document to determine if ISGS is a feasible solution to address NAPL/GCM impacts remaining on-site.

## **REPORTING**

A summary of drilling, soil sampling, and CAMP implementation (including CAMP station locations and results) will be documented in daily reports, which will be submitted to the NYSDEC and NYSDOH by the end of the following day along with tabulated CAMP data. The results of the treatability study will be submitted to the NYSDEC in a Treatability Study Report(s). The Treatability Study Report(s) may be included in a forthcoming pilot test work plan or remedial design document, and will describe the completed scope of work and present the field and analytical results of the sampling.

## SCHEDULE

The treatability study is being conducted to establish the feasibility of ISS and ISGS as a treatment for MGP-impacted soil remaining at the-site. Previous environmental and geotechnical investigations and any supplemental remedial design investigations will be used to inform feasibility of supplemental remediation methods in the forthcoming Remedial Design Document. The table below presents an estimated schedule for the proposed investigations and reporting.

Activity	Proposed Completion Dates (weeks after NYSDEC approval of the TSWP)
Pre-Screening Exercise / Treatability Study Field Investigation	2-4 weeks
ISS Treatability Study/Report	10-12 weeks
ISGS Treatability Study/Report	14-16 weeks
ISGS/ISS Remedial Design Document	20-22 weeks

## CLOSING

We respectfully request approval of this Treatability Study Work Plan. Please contact us with any questions or comments.

Sincerely,  
**Langan Engineering, Environmental, Surveying,  
Landscape Architecture and Geology, D.P.C.**



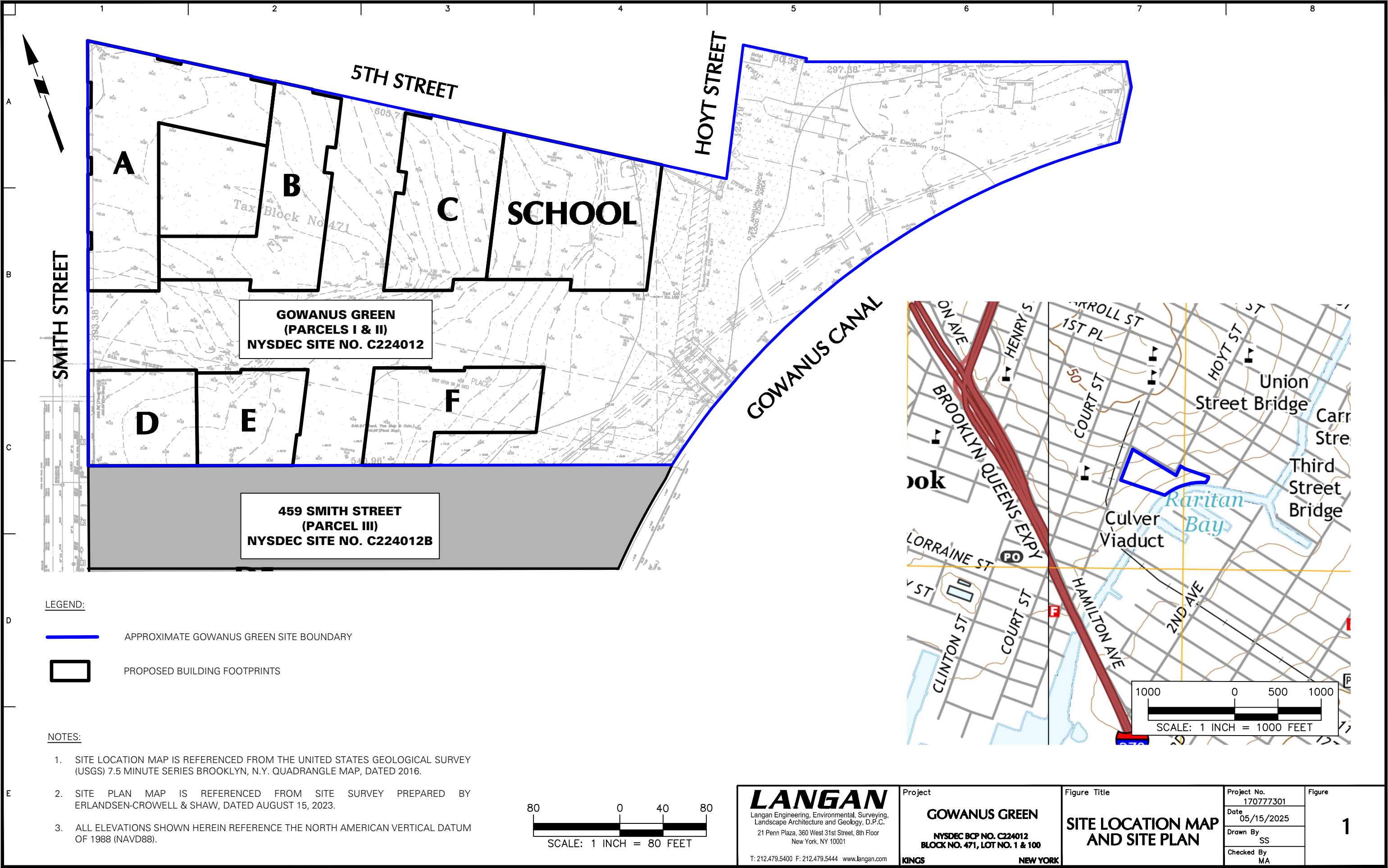
Gerald Nicholls, PE, CHMM  
Associate Principal

Enclosure(s): Figure 1      Site Location Map and Site Plan  
                  Figure 2      Subsurface Obstructions  
                  Figure 3      Proposed Sample Location Plan

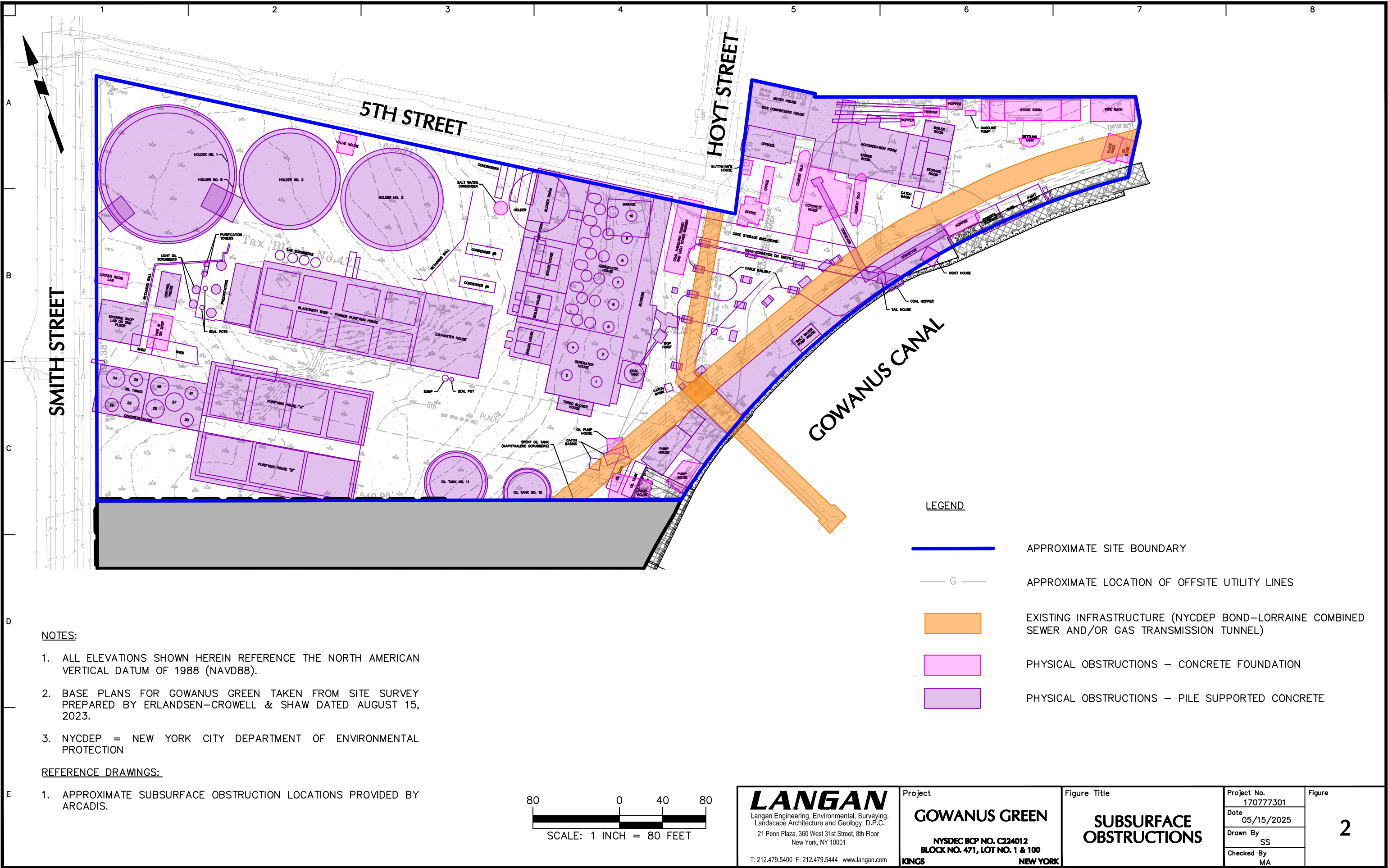
Attachment 1 Community Air Monitoring Plan  
Attachment 2 Odor and Dust Control Plan

cc:     L. Gorton, S. Deyette – NYSDEC  
         A. Foley, J. Azad – Gowanus Green Partners LLC  
         P. Van Rossem, A. Prophete – National Grid  
         M. Benoit, T. Young – Arcadis  
         D. Yudelson – Sive, Paget & Riesel  
         P. McMahon, M. Au, S. Simpson – Langan

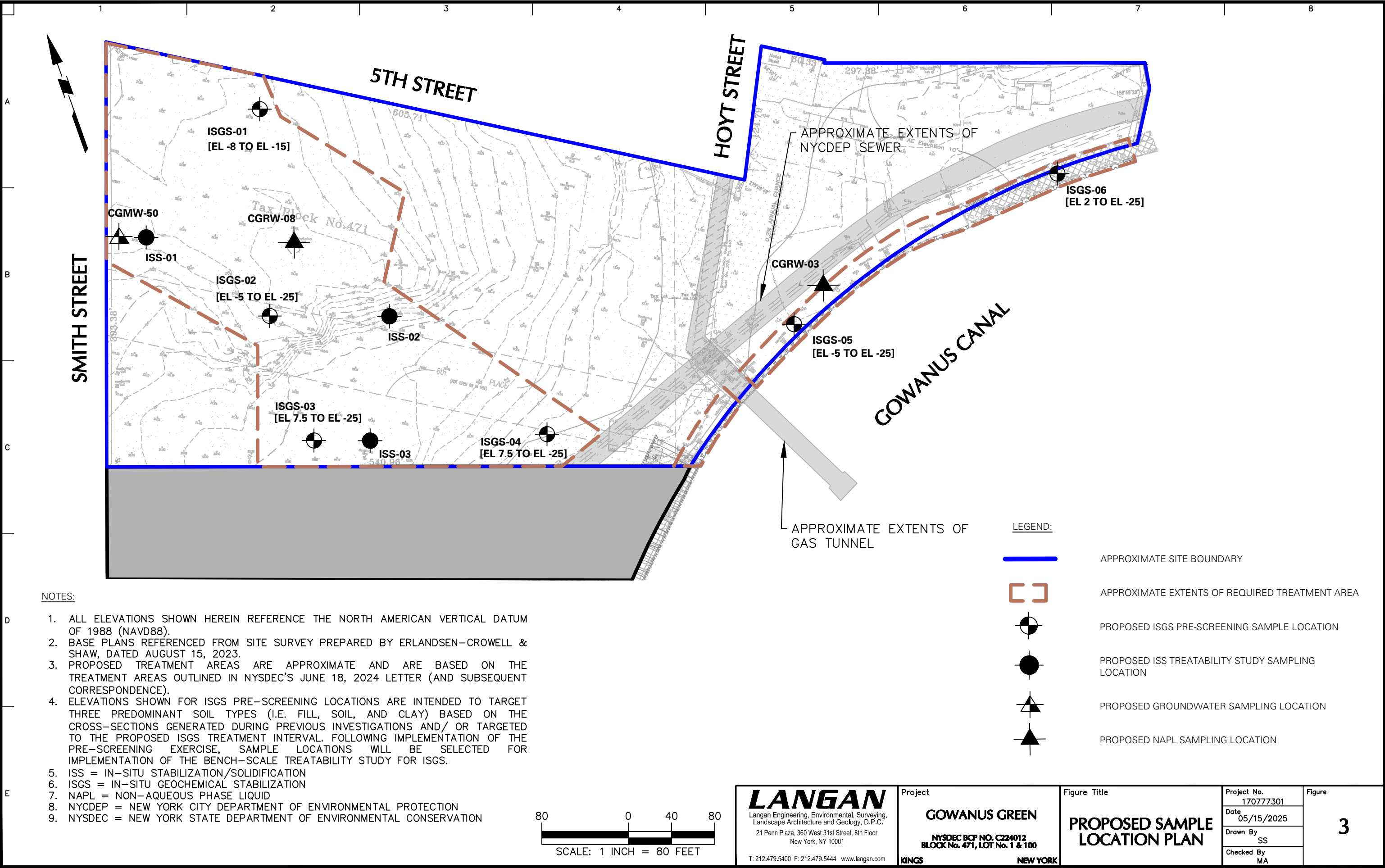
## FIGURES











**ATTACHMENT 1**  
**COMMUNITY AIR MONITORING PLAN**

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# COMMUNITY AIR MONITORING PLAN

for

## GOWANUS GREEN (PARCELS I & II) BROOKLYN, NEW YORK NYSDEC BCP SITE NO. C224012

*Prepared For:*

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Langan Project No. 170777301

# **LANGAN**

## **1.0 Introduction**

This site-specific community air monitoring plan (CAMP) was prepared in general compliance with the New York State Department of Health (NYSDOH) Generic CAMP and is intended to mitigate potential exposures of sensitive receptors to nuisance odors and dust resulting from ground-intrusive work. This CAMP is intended for use during implementation of the Treatability Study Work Plan (TSWP) for in-situ solidification/stabilization (ISS) and in-situ geochemical stabilization (ISGS), which includes but is not limited to, soil boring advancement and soil, groundwater, and non-aqueous phase liquid sampling.

## **2.0 Community Air Monitoring**

Monitoring for particulates and odors will be conducted during ground-intrusive work by a Langan field representative under the supervision of the remedial engineer (RE). The CAMP will include real-time monitoring for volatile organic compounds (VOCs) and particulates at the downwind perimeter of each designated work area when ground-intrusive work is in progress. Continuous monitoring will be required for all ground-intrusive work. Ground-intrusive work includes, but is not limited to, soil boring advancement and excavation. The work zone is defined as the general area in which machinery is operating in support of the investigation. At a minimum, the CAMP will include two perimeter CAMP stations (one upwind and one downwind) and one handheld photoionization detector (PID) within the work zone at each distinct area of intrusive work. Perimeter CAMP stations will be set to an inlet height between 3 and 5 feet above ground surface. CAMP stations will monitor for VOCs with a PID; and dust emissions with equipment using real-time monitoring capable of measuring PM-10 (e.g., DustTrak or equivalent). The site perimeter will also be visually monitored for fugitive dust emissions.

The day-to-day location of CAMP stations will be fluid and dynamic based on wind direction and work zone location and will take into account the location of sensitive receptors and/or ground-level air intakes (if any). In accordance with the CAMP, downwind CAMP monitoring data will be compared to upwind CAMP monitoring data, to provide a real-time comparison to ambient conditions. CAMP data will be provided with the daily field reports.

An on-site supply of odor/vapor suppressing foam (Atmos® [formerly Rusmar] AC-645, Atmos® Seal 900, or RE-approved equivalent) will be maintained for active mitigation within any areas where nuisance odors are identified during the investigation.

### CAMP Action Levels

For VOC monitoring, the following actions will be taken based on VOC levels measured:

- If total VOC levels exceed 5 parts per million (ppm) above background for the 15-minute average at the perimeter, work activities will be temporarily halted and monitoring continued. If levels

readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.

- If total VOC levels at the downwind perimeter of the hot zone persist at levels in excess of 5 ppm above background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps work activities will resume provided that the total organic vapor level 200 feet downwind of the hot 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 above background for the 15-minute average.
- If the downwind total VOC level persist above 25 ppm at the perimeter of the site, activities will be shut down.

For dust monitoring with field instrumentation, the following actions will be taken based on instrumentation measurements:

- If the downwind particulate level is 100 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression must be employed. Work may continue with dust suppression techniques provided that downwind particulate matter less than 10 microns (PM10) levels do not exceed 150  $\mu\text{g}/\text{m}^3$  above the background level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM10 levels are greater than 150  $\mu\text{g}/\text{m}^3$  above the background 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 PM10 concentration to within 150  $\mu\text{g}/\text{m}^3$  of the upwind level and in preventing visible dust migration.

### **3.0 Odor, Vapor, and Dust Suppression Techniques**

Work practices to minimize odors and vapors include covering drums and open boreholes, plugging monitoring wells, and minimizing the handling of contaminated material. Offending odor and organic vapor controls may include the application of foam suppressants or tarps over the odor or VOC source areas. Foam suppressants may include biodegradable foams applied over the source material for short-term control of the odor and VOCs.

### **4.0 Monitoring of Nearby Occupied Structures**

This section applies where structures within about 20 feet of the ground-intrusive work may be occupied

during the planned investigation. Where this condition exists, the following will be considered for incorporation into the CAMP:

- One of the CAMP monitoring stations will be placed between the work area and nearest outside wall of the occupied structure. If site conditions warrant, a third station may be used to accomplish this task.
  - If 15-minute-average total VOC concentrations exceed 1 ppm above background near the outside wall or next to intake vents of the occupied structure, periodic VOC monitoring will be performed within the occupied structure.
  - If 15-minute-average total PM10 concentrations exceed 150  $\mu\text{g}/\text{m}^3$  above background near the outside wall or next to intake vents of the occupied structure, work activities will be temporarily suspended until suppression techniques are implemented and concentrations return to background.
- Where nuisances have developed during investigation work and cannot be corrected using the techniques described in Section 3.0, use of additional engineering controls may be considered, such as vapor/dust barriers or ventilation devices.
- Consideration should be given to scheduling or sequencing ground-intrusive activities during periods when potentially exposed populations may not be occupying the structure.

## **5.0 Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures**

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.
- If total particulate concentrations opposite the walls of occupied structures or next to intake vents

exceed  $150 \mu\text{g}/\text{m}^3$ , work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to  $150 \mu\text{g}/\text{m}^3$  or less at the monitoring point.

- Depending upon the nature of contamination and investigation activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary.

## **6.0 Special Requirements for Indoor Work with Co-Located Residences or Facilities**

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under “Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures” except that in this instance “nearby/occupied structures” would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g., weekends or evenings) when building occupancy is at a minimum.

## **7.0 Reporting**

A summary of CAMP findings, including triggered action levels, will be provided daily to the New York State Department of Environmental Conservation (NYSDEC) and NYSDOH project managers as part of daily reporting. In addition to a summary of CAMP findings, daily reports will include:

- The NYSDEC assigned project number
- An update of progress made during the reporting day including a photograph log
- Locations of work
- References to an alpha-numeric map for site activities
- A summary of complaints (if any) with relevant details (names, phone numbers)
- A summary of CAMP findings, including exceedances, wind direction, work areas, location of CAMP monitoring stations and other relevant site information (exceedances of the 15-minute time weighted average will be reported to the NYSDEC as soon as they are calculated)
- An explanation of notable site conditions

Daily reports are not intended to be the mode of communication for notification to the NYSDEC of

emergencies (accident, spill), requests for changes to the TSWP, or other sensitive or time critical information; however, such conditions must also be included in the daily reports. Emergency conditions and changes to the TSWP will be addressed directly to NYSDEC Project Manager via personal communication.



**ATTACHMENT 2**  
**DUST AND ODOR CONTROL PLAN**

## **ATTACHMENT 2**

### **ODOR AND DUST CONTROL PLAN**

This odor and dust control plan was prepared to supplement the Treatability Study Work Plan (TSWP). The procedures outlined herein will be implemented in conjunction with the Community Air Monitoring Plan (CAMP) (Attachment 1), to inform the need for odor, vapor, and/or dust control during site remediation.

#### Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors off-site, if encountered during implementation of the TSWP. No excavation activities are proposed under the TSWP; however, if nuisance odors are identified off-site, work will be halted and the source of odors will be identified and addressed if the source is attributed to ground-intrusive activities being performed under the TSWP. Work will not resume until nuisance odors are abated. Specific odor control methods to be used will include application of foam suppressants or tarps over the odorous or volatile organic compounds (VOC) source areas.

The New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH) will be notified of all odor events and of all other complaints about the project. Implementation of odor monitoring, including notifying the contractor of conditions warranting the halt of work, will be the responsibility of the remedial engineer (RE), who is responsible for certifying the Final Engineering Report (FER). Application of odor controls is the responsibility of the contractor.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, odor control procedures may include phasing investigation activities to minimize exposed odorous soil or and using foams to cover odorous areas. An on-site supply of odor/vapor suppressing foam (Atmos<sup>®</sup> [formerly Rusmar] AC-645, Atmos<sup>®</sup> Seal 900, or RE-approved equivalent) will be maintained for potential use within any areas where nuisance odors are identified during implementation of the TSWP.

Atmos<sup>®</sup> foam products will be applied using their proprietary equipment/pumps. Biosolve<sup>®</sup> Pinkwater or similar odor suppressant may also be utilized to suppress odors and vapors during operations that produce nuisance odors or VOCs that are detected at concentrations exceeding the CAMP action levels. Safety Data Sheets and/or product information for Atmos<sup>®</sup> AC-645, Atmos<sup>®</sup> Seal 900, Atmos<sup>®</sup> RusScent Sleeves, and Biosolve<sup>®</sup> Pinkwater are included in this attachment.

### Dust Control Plan

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

- Dust suppression will be achieved through the use of dedicated on-site water spraying for road wetting.
- Clearing and grubbing, if required, will be done in stages to limit the area of exposed, unvegetated soil vulnerable to dust production;
- On-site roads will be limited in total area to minimize the area required for water spraying.

Preventative measures for dust generation may include wetting site soil and fill, covering soils with tarps and/or foam, and limiting vehicle speeds to five miles per hour. Investigation-derived waste generated from the TSWP will be containerized in sealed and labeled United Nations/Department of Transportation (UN/DOT)-approved 55-gallon drums to mitigate dust blowing off-site during and after working hours.



# SAFETY DATA SHEET

LONG DURATION FOAM AC-645

## Section 1. Identification

**GHS product identifier** : LONG DURATION FOAM AC-645  
**Chemical name** : Proprietary Surfactant.  
**Other means of identification** : Aqueous anionic surfactant mixture.  
**Product type** : Liquid.

### Relevant identified uses of the substance or mixture and uses advised against

**Product use** : Aqueous Surfactant. Spray application for VOC and Odor control.  
**Area of application** : Industrial applications.

**Supplier/Manufacturer** : Rusmar, Inc.  
216 Garfield Avenue  
West Chester, PA 19380  
Phone: 610-436-4314  
Fax: 610-436-8436

**e-mail address of person responsible for this SDS** : info@rusmarinc.com  
Website: www.rusmarinc.com

**Emergency telephone number (with hours of operation)** : 888 488 8044 or 212 682 1200  
CHEMTREC 800 424 9300

## Section 2. Hazards identification

**OSHA/HCS status** : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

**Classification of the substance or mixture** : Not classified.

### GHS label elements

**Signal word** : No signal word.  
**Hazard statements** : No known significant effects or critical hazards.

### Precautionary statements

**Prevention** : Not applicable.  
**Response** : Not applicable.  
**Storage** : Not applicable.  
**Disposal** : Not applicable.  
**Hazards not otherwise classified** : None known.

**Date of issue/Date of revision** : 05/28/2015 **Date of previous issue** : No previous validation **Version** : 1 1/11

## Section 3. Composition/information on ingredients

**Substance/mixture** : Substance  
**Chemical name** : Proprietary Surfactant.  
**Other means of identification** : Aqueous anionic surfactant mixture.

### CAS number/other identifiers

**CAS number** : Not available.  
**Product code** : Not available.

Ingredient name	Other names	%	CAS number
Proprietary Surfactant.	-	100	-

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 and hence require reporting in this section.**

## 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. Get medical attention if irritation occurs.

**Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

**Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

**Ingestion** : Wash out mouth with water. 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. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

### 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.  
**Ingestion** : No known significant effects or critical hazards.

#### 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.

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.

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

**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. 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".

**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).

### 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.

## Section 6. Accidental release measures

- Large spill** : Stop leak if without risk. Move containers from spill area. 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. 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).
- 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. 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

None.

- Appropriate engineering controls** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
- 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.
- 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. [Clear viscous liquid.]
- Color** : Translucent. White.
- Odor** : Odorless.
- Odor threshold** : Not available.
- pH** : Not available.
- Melting point** : Not available.
- Boiling point** : 99°C (210.2°F)
- Flash point** : Not applicable.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not applicable.
- Lower and upper explosive (flammable) limits** : Not available.
- Vapor pressure** : 3.3 kPa (25 mm Hg) [room temperature]
- Vapor density** : Not available.
- Relative density** : 1.01 to 1.06
- Solubility** : Easily soluble in the following materials: cold water and hot water.
- Solubility in water** : Easily soluble.
- Partition coefficient: n-octanol/water** : Not available.
- Auto-ignition temperature** : Not available.
- Decomposition temperature** : Not available.
- SADT** : Not available.
- Viscosity** : Not available.



## Section 10. Stability and reactivity

<b>Reactivity</b>	: No specific test data related to reactivity available for this product or its ingredients.
<b>Chemical stability</b>	: The product is stable.
<b>Possibility of hazardous reactions</b>	: Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous polymerization will not occur.
<b>Conditions to avoid</b>	: Keep away from heat.
<b>Incompatible materials</b>	: No specific data.
<b>Hazardous decomposition products</b>	: Low levels of sulfur oxides on exposure to high temperatures (concentrate).

## Section 11. Toxicological information

### Information on toxicological effects

#### Acute toxicity

Not available.

**Conclusion/Summary** : Not expected.

#### Irritation/Corrosion

Not available.

#### Sensitization

Not available.

#### Mutagenicity

**Conclusion/Summary** : Not available.

#### Carcinogenicity

**Conclusion/Summary** : Not available.

#### Reproductive toxicity

**Conclusion/Summary** : Not available.

#### Teratogenicity

**Conclusion/Summary** : 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.

## Section 11. Toxicological information

### Potential acute health effects

<b>Eye contact</b>	: No known significant effects or critical hazards.
<b>Inhalation</b>	: No known significant effects or critical hazards.
<b>Skin contact</b>	: No known significant effects or critical hazards.
<b>Ingestion</b>	: No known significant effects or critical hazards.

### Symptoms related to the physical, chemical and toxicological characteristics

<b>Eye contact</b>	: No specific data.
<b>Inhalation</b>	: No specific data.
<b>Skin contact</b>	: No specific data.
<b>Ingestion</b>	: No specific data.

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

#### Short term exposure

<b>Potential immediate effects</b>	: Not available.
<b>Potential delayed effects</b>	: Not available.

#### Long term exposure

<b>Potential immediate effects</b>	: Not available.
<b>Potential delayed effects</b>	: Not available.

### Potential chronic health effects

Not available.

<b>General</b>	: No known significant effects or critical hazards.
<b>Carcinogenicity</b>	: No known significant effects or critical hazards.
<b>Mutagenicity</b>	: No known significant effects or critical hazards.
<b>Teratogenicity</b>	: No known significant effects or critical hazards.
<b>Developmental effects</b>	: No known significant effects or critical hazards.
<b>Fertility effects</b>	: 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.

## Section 12. Ecological information

### Bioaccumulative potential

Not available.

### Mobility in soil

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

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

## Section 13. Disposal considerations

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

## Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.
Additional information	-	-	-

**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** : **United States inventory (TSCA 8b)**: Not determined.

**Clean Air Act Section 112** : Not listed

**(b) Hazardous Air Pollutants (HAPs)**

**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** : Not applicable.

#### Composition/information on ingredients

No products were found.

### SARA 313

Not applicable.

### State regulations

**Massachusetts** : This material is not listed.

**New York** : This material is not listed.

**New Jersey** : This material is not listed.

**Pennsylvania** : This material is not listed.

### California Prop. 65

None of the components are listed.

### 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 Inform Consent (PIC)

Not listed.

### UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

## Section 16. Other information

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

Health	0
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.)



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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
Not classified.	

### History

Date of issue/Date of revision	: 05/28/2015
Date of previous issue	: No previous validation
Version	: 1
Prepared by	: IHS
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

Section 16. Other information

References : HCS (U.S.A.)- Hazard Communication Standard  
International transport regulations

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.



RUSMAR INCORPORATED

## PRODUCT SELECTION GUIDE

### Compatible Products

(can be fed from same machine, sequentially without machine being flushed clean)

Product	Most Common Use	Duration	Recommended Depth	Most Common Dilution	Coverage per 450lb Drum at Recommended Depth	Color	Scent
<b>AC-645</b>	Active excavation and short-term emission control	12-17 Hours	3 Inches	6.5 : 1	4,500 ft <sup>2</sup>	White	<ul style="list-style-type: none"> <li>• Unscented</li> <li>• Wintergreen*</li> <li>• Vanilla*</li> </ul>
<b>AC-904</b>	Medium-Term Emission Control & Sealing	15-30 Days	2 Inches	Direct Use	800-900 ft <sup>2</sup>	<ul style="list-style-type: none"> <li>• Black</li> <li>• Red*</li> <li>• Green*</li> <li>• Brown*</li> </ul>	<ul style="list-style-type: none"> <li>• Unscented</li> <li>• Wintergreen*</li> <li>• Vanilla*</li> </ul>
<b>AC-912</b>	Long-Term Emission Control & Sealing	60-90 Days	2 Inches	Direct Use	800-900 ft <sup>2</sup>	<ul style="list-style-type: none"> <li>• Black</li> <li>• Red*</li> <li>• Green*</li> <li>• Brown*</li> </ul>	<ul style="list-style-type: none"> <li>• Unscented</li> <li>• Wintergreen*</li> <li>• Vanilla*</li> </ul>
<b>AC-920</b>	Extreme-Term Emission Control & Sealing	90-180 Days	2 Inches	Direct Use	800-900 ft <sup>2</sup>	<ul style="list-style-type: none"> <li>• Black</li> <li>• Red*</li> <li>• Green*</li> <li>• Brown*</li> </ul>	<ul style="list-style-type: none"> <li>• Unscented</li> <li>• Wintergreen*</li> <li>• Vanilla*</li> </ul>
<b>AC-667SE</b>	Landfill Daily Cover	24-48 Hours 72 Hours	3 Inches 6-7 Inches	6.5 : 1 4 : 1	4,500 ft <sup>2</sup> 1,830 ft <sup>2</sup>	White/Tan	Cinnamon

\*Indicates a Special Order item

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## EQUIPMENT SELECTION GUIDE

Pneumatic Foam Unit	Self-Contained?	Freeze-Protected?	Throw Range	Coverage/min. at 3" Depth	Tank Capacity	Approximate Coverage per Tank with 600 Series	Approximate Coverage per Tank with 900 Series	Compatible with all Products?	Self-Propelled?
<b>NTC/8</b>	No. Requires compressed air supply.	No	25 Feet	86 ft <sup>2</sup> /min.	Varies. Customer Supplied	Varies.	Varies.	No. Not compatible with AC-667SE	No. Skid Mounted
<b>PFU 400/25</b>	Yes	Yes	35 Feet	267 ft <sup>2</sup> /min.	400 Gallon	4,500 ft <sup>2</sup> @3" depth	5,600 ft <sup>2</sup> @2" depth	Yes	No. Trailer Mounted
<b>PFU 1600/40</b>	Yes	Yes	60 Feet	428 ft <sup>2</sup> /min.	1,600 Gallon	18,000 ft <sup>2</sup> @3" depth	22,400 ft <sup>2</sup> @2" depth	Yes	No. Trailer Mounted
<b>PFU 2500/60</b>	Yes	Yes	80 Feet or Spray Manifold	642 ft <sup>2</sup> /min.	2,500 Gallon	28,000 ft <sup>2</sup> @3" depth	35,000 ft <sup>2</sup> @2" depth	Yes	Yes

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## REMEDATION PRODUCT DATA SHEET

# PNEUMATIC FOAM UNIT NTC / 8



Our most compact and portable foam generating system designed for small remediation applications. The NTC/8 can be mounted on the tongue of most standard air compressors and can be drum or auxiliary tank fed.

This system is completely air driven and comes equipped with pump, foam generator, hose and pick-up tube. The unit requires a source of compressed air.

### FEATURES

- Simple to operate
- Remote control for one person operation
- Electrical system is powered by a 12 volt battery
- Minimal clean-up after use
- Durable, rugged construction
- Minimal preparation

### SPECIFICATIONS

Coverage Rate.....90 Sq. Ft./Min. @3" depth  
Compressed Air Required.....120 CFM @ 100 PSI  
Size.....36"L x 23"W x 26"H  
Weight.....375 Pounds  
Hose.....100 Feet of 1" Diameter  
Products.....AC-645 and All AC-900 Series Long Duration Foam Products



## REMEDIATION PRODUCT DATA SHEET

# PNEUMATIC FOAM UNIT 400/25



A completely self-contained and portable foam generating system designed to withstand the rugged demands and harsh elements found at remediation sites. Quick start-up time means that emission control is available when you need it. Recommended for small to medium size remediation projects, dredging operations and hazardous waste sites. Can be towed around site with a pick-up truck. Foam is applied using a hand-line.

System includes air compressor, pump, hoses, nozzles, solution storage tank and proprietary foam generating technology. Unit has freeze protection for outdoor storage year-round.

### FEATURES

- Simple to operate
- Durable, rugged construction
- No clean-up necessary
- Can be filled and placed aside until needed

### SPECIFICATIONS

Solution Storage Tank.....400 Gallons  
Coverage Rate.....270 Sq. Ft./Min. @3" depth  
Coverage Area per fill.....2,000 - 6,000 Sq. Ft.  
Size.....16'8" L x 8'6" W x 7'8" H  
Dry Weight.....6,880 Pounds  
Hose.....200 Feet of 1-1/2" Diameter  
Products.....All Long Duration and Soil Equivalent Foam Products  
Freeze Protection System.....120V or 230V, 30 amp, single phase



### RusScent Sleeves

Rusmar uses scientific findings of the workings of our olfactory system to reduce or eliminate nuisance odors. With environmentally safe essential oils, Rusmar neutralizes unpleasant smells without masking, without causing potentially toxic chemical reactions and without the need to handle caustic and volatile chemicals. Ideal for temporary project sites, RusScent Sleeves do not require power or plumbing.



#### Facts about the RusScent Sleeves:

- Fabric RusScent Sleeves are made to hold up to a pound of our odor neutralizing granules, about twice the amount of our RusScent Socks.
- Each sleeve is 3 feet long by 2.5 inches wide
- They have a small hole, surrounded by a metal grommet at the top, ready for hanging
- Occasionally, shake and moisten to intensify the sleeve's odor controlling effectiveness.
- Constructed with Velcro, sleeves can easily be emptied and refilled from the opening at the top.
- RusScent Sleeves are reusable; granules can be changed when odor-controlling properties are depleted.
- Versatile because different odor neutralizers can be substituted at will.
- User can control the amount of granules to insert.



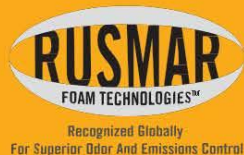
#### Usage Rates:

- When creating a barrier between a malodor and the public, hang one RusScent Sleeve every 10 feet
- When you use a RusScent Sleeve to control malodors in a room, use one for every 270 square feet. Hang in front of an air stream.
- Each RusScent Sleeve will last up to 90 Days. To intensify the odor controlling properties of a sock during its life, occasionally shake and moisten.
- Usage may vary with the perceived intensity of the malodor.

#### Rusmar Incorporated

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## RusScent Odor Neutralizing Granules



### RusScent Granules

Rusmar uses scientific findings of the workings of our olfactory system to reduce or eliminate nuisance odors. With environmentally safe essential oils, Rusmar neutralizes unpleasant smells without masking, without causing potentially toxic chemical reactions and without the need to handle caustic and volatile chemicals. Odor Neutralizing Granules are small dry pellets containing odor neutralizer that vaporizes at a slow, steady rate. They do not require utilities or equipment.



#### Facts about the RusScent Granules:

- The granules are small pellets that vaporize our odor controlling neutralizers at a slow steady rate.
- They can be used to create a barrier between the public and the malodors.
- They are heavy enough so as not to blow away under normal wind conditions.
- The granules effectiveness intensifies when wet- they do not dissolve.
- They are available with no scent or in a variety of scents- cinnamon, vanilla, apricot and evergreen.
- RusScent granules will last approximately 90 days.

#### Usage Rates:

- When creating a barrier between a malodor and the public, put a pound of granules in a RusScent Sleeve and hang one every 10 feet.
- When sprinkling granules on a malodorous area, use one ounce for every 270 square feet.
- When applying granules to a container, sprinkle 1-2 ounces weekly for every 80 cubic yards.
- To intensify the odor controlling properties of a sleeve during its life, occasionally shake and moisten.
- Usage may vary with the intensity of the malodor.



# RUSMAR

#### Rusmar Incorporated

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## PRODUCT DATA SHEET

# LONG DURATION FOAM AC-645

### GENERAL DESCRIPTION

AC-645 Long Duration Foam is a patented product which produces a thick, long-lasting, viscous foam barrier for immediate control of dust, odors and volatile organic compounds (VOCs). AC-645 is designed for use with Rusmar Pneumatic Foam Units.

AC-645 foam is recognized by the Environmental Protection Agency and the U.S. Army Corps of Engineers as providing superior emission control for a period up to 17 hours. AC-645 has been specified for use at Superfund and other hazardous waste sites across the United States and Canada.

### FEATURES

- Biodegradable
- Will not add to treatment costs
- No ambient temperature limitations
- Easy to use
- More effective than tarps
- Non-reactive
- Non-hazardous
- Safe for workers and the environment
- Requires only water dilution
- No clean up necessary
- Non-combustible
- Covers any contamination source

### APPLICATIONS

The primary application for AC-645 is control of odors, VOCs and dust during active excavation and for overnight coverage of contaminated soils at hazardous waste sites. AC-645 can also be applied on top of liquid surfaces.

### SPECIAL ODOR CONTROL PROBLEMS

The remediation of hazardous waste sites often includes excavation of soil contaminated with odorous compounds. AC-645 has little or no odor itself, although a pleasant wintergreen or vanilla scent can be added. It forms a barrier between contaminants and the atmosphere and can be applied during active excavation to provide an immediate and effective barrier to minimize odors. It is completely biodegradable and poses no threat to workers, neighboring residents or ground water. AC-645 will not add to soil volume or treatment costs.



## PRODUCT DATA SHEET

# LONG DURATION FOAM AC-645

AC-645 can also be applied on top of trucks for emission control during transport of materials such as contaminated soils or sewage sludge. Ammonia tests performed on trucks containing sewage sludge resulted in a drop of concentration levels from 170 ppm prior to foaming down to 6 ppm after coverage with AC-645.

- Minimizes worker exposure
- Maintains fence-line odor and VOC emission limits
- Works on lagoon and pond closures
- Can be applied to near vertical or liquid surfaces

### FUGITIVE DUST

At hazardous waste sites, fugitive dust can present a health hazard. AC-645 can be applied on top of the dusty material to prevent any wind-borne emissions. There is no need to mobilize equipment to immediately cover with soil or tarps. The Pneumatic Foam Unit can be filled and placed at the site to be used at a moment's notice.

### EMERGENCY SPILL CLEAN UP

In emergency spills, odor and VOC control is often difficult because of the terrain and accident conditions. AC-645 Long Duration Foam can be applied to any shaped object, as well as steep slopes, water, mud, snow and ice. It is non-flammable and non-reactive - difficult spill problems can be accommodated.

### METHOD OF APPLICATION

AC-645 Long Duration Foam is supplied in either 450 pound (55 gal.) drums or by bulk load (approximately 46,000 pounds). Bulk shipments can be stored outside in a Rusmar Bulk Storage-Dilution System. The Bulk Storage and Dilution system is comprised of a 7000 gallon heated and stirred chemical storage tank and a microprocessor to accurately dilute and transfer the chemical. AC-645 is designed to be applied with a Rusmar Pneumatic Foam Unit. The Pneumatic Foam Units are available in a variety of sizes to accommodate a range of site conditions and application needs.



## PRODUCT DATA SHEET

# SOIL EQUIVALENT FOAM AC-667SE

### GENERAL DESCRIPTION

AC-667SE Soil Equivalent Foam is a patented product which produces a thick, long-lasting, viscous foam barrier for immediate control of foul odors, blowing litter, disease vectors and scavengers when applied to landfills as a daily cover material. AC-667-SE is also an excellent choice for emission control at remediation sites where dust, odors and volatile organic compounds (VOCs) are a concern. AC-667SE maintains its integrity for up to 72 hours and is designed for use with Rusmar Pneumatic Foam Units.

### FEATURES

- Biodegradable
- Will not add to treatment costs
- No ambient temperature limitations
- Easy to use
- More effective than tarps
- Can withstand moderate rainfall
- Non-hazardous
- Safe for workers and the environment
- Requires only water dilution
- No clean up necessary
- Non-combustible
- Maintains integrity for up to 72 hrs

### APPLICATIONS

The primary application for AC-667SE is to replace soil for the daily cover of landfills. However it also effectively controls odors, VOCs and dust during active excavation and provides multi-day coverage of contaminated soils at hazardous waste sites. AC-667SE will adhere to vertical surfaces such as balefill landfills and can also be applied on top of liquid surfaces.

### SPECIAL ODOR CONTROL PROBLEMS

The remediation of hazardous waste sites often includes excavation of soil contaminated with odorous compounds. AC-667SE forms a barrier between contaminants and the atmosphere and can be applied during active excavation to provide a continuous and effective barrier to minimize odors. It is completely biodegradable and poses no threat to workers, neighboring residents or ground water. AC-667SE will not add to soil treatment costs.



## PRODUCT DATA SHEET

# LONG DURATION FOAM AC-667SE

AC-667SE can also be applied on top of trucks for emission control during transport of materials such as contaminated soils or sewage sludge.

- Minimizes worker exposure
- Maintains fence-line odor and VOC emission limits
- Works on lagoon and pond closures
- Can be applied to liquid surfaces

### FUGITIVE DUST

At hazardous waste sites, fugitive dust can present a health hazard. AC-667SE can be applied on top of the dusty material to prevent any wind-borne emissions. There is no need to mobilize equipment to immediately cover with soil or tarps. The Pneumatic Foam Unit can be filled and placed at the site to be used at a moment's notice.

### EMERGENCY SPILL CLEAN UP

In emergency spills, odor and VOC control is often difficult because of the terrain and accident conditions. AC-667SE foam can be applied to any shaped object, as well as vertical slopes, water, mud, snow and ice. It is non-flammable and non-reactive - difficult spill problems can be accommodated.

### METHOD OF APPLICATION

AC-667SE is supplied in either 450-pound (55 gal.) drums or by bulk load (approximately 46,000 pounds). Bulk shipments can be stored outside in a Rusmar Bulk Storage-Dilution System. The Bulk Storage and Dilution system is comprised of a 7000 gallon heated and mixed chemical storage tank and a microprocessor controlled dispensing system to accurately dilute and transfer the chemical.

AC-667SE is designed to be applied with a Rusmar Pneumatic Foam Unit. The Pneumatic Foam Units are available in a variety of sizes to accommodate a range of site conditions and application needs.





## PRODUCT DATA SHEET

# LONG DURATION FOAM AC-900 SERIES

### GENERAL DESCRIPTION

The AC-900 Series Long Duration Foam products produce an impermeable, flexible membrane that seals a surface to prevent emissions. AC-900 Series foam products utilize foam as a distribution method for latex. After the foam has been applied, the air bubbles begin to collapse and the latex coagulates to form a continuous flexible membrane that adheres to the substrate. AC-900 Series products are designed for use with Rusmar Pneumatic Foam Units.

AC-900 Series foams are recognized by the Environmental Protection Agency and the U.S. Army Corps of Engineers as providing superior emission control for periods up to 6 months. AC-900 Series foams have been specified for use at Superfund and other hazardous waste sites across the United States and Canada.

### FEATURES

- Adheres to vertical and irregular surfaces
- Completely controls odors & VOCs
- Prevents erosion
- Easy to use, no mixing necessary
- Available in black, red, green or brown
- Non-hazardous
- Controls dusting
- Repels water
- No temperature limitations
- More effective than tarps

### APPLICATIONS

AC-900 Series foams are the technology of choice when conditions demand superior coverage for periods up to 6 months. Some of the more common uses are:

#### ODOR AND VOC CONTROL

As a medium for controlling odors and VOCs, AC-900 Series has proven to be very effective with diverse applications.

- Can be left in place or disposed of with soil - will not interfere with thermal or bioremediation process
- Extended odor & VOC control of open excavations or exposed trash
- Extended odor & VOC control of stockpiled soils or debris
- Special odor control problems, such as sewage sludge
- Baled trash cover – the membrane seals the surface completely



## PRODUCT DATA SHEET

# LONG DURATION FOAM AC-900 SERIES

### FUGITIVE DUST

Exposed soil can often become a dust problem in windy locations, presenting a potential health hazard. Hazardous waste sites, receiving periodic shipments of dusty materials, can prevent windborne dust by immediately applying AC-900 Series foam.

- No need to mobilize equipment to immediately cover with soil or tarps. The Pneumatic Foam Unit can be filled and placed at the site to be used at a moment's notice.
- Extended dust control of stockpiled soils or debris

### EROSION CONTROL

Graded areas can be covered with AC-900 Series Membrane reducing erosion damage caused by rain, melting snow or ice and wind.

- On outside slopes of the landfill – prevents trash from being exposed
- On landfill caps - prevents erosion before growth of new vegetation
- Stockpiles

### SEALING HIGH PERCOLATION SOILS

Sand and other high percolation soils do not effectively repel rain water or melting snow and ice. Covering areas with AC-900 Series foam dramatically reduces soil permeability.

- Improved run-off from inside surfaces of the landfill
- Reduced leachate generation

### WASTE TRANSPORTATION

Trucks or railcars transporting trash, odorous or dusty materials can be quickly covered with AC-900 Series foam to form a complete barrier between emissions and the atmosphere.

- No wind blown losses
- Produces a better visual appearance



## PRODUCT DATA SHEET

# LONG DURATION FOAM AC-900 SERIES

### METHOD OF APPLICATION

AC-900 Series Long Duration Foam products are supplied in either 450 pound (55 gal.) drums or by bulk load (approximately 46,000 pounds). Bulk shipments can be stored outside in a Rusmar Bulk Storage-Dilution System. The Bulk Storage and Dilution system is comprised of a 7000 gallon heated and stirred chemical storage tank and a microprocessor to accurately transfer the chemical.

AC-900 Series products are designed to be applied with a Rusmar Pneumatic Foam Unit. The Pneumatic Foam Units are available in a variety of sizes to accommodate a range of site conditions and application needs.

## Safety Data Sheet

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### Section 1 – Chemical Products and Company Identification

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**Product Names:** BioSolve® Pinkwater®

**Product Uses:** Remediation of hydrocarbon (oil, fuel, petrochemical) contamination, including: impacted soils, suppression of VOCs, surface cleaning of equipment and protective clothing.

**Manufacturer:** The BioSolve Company  
329 Massachusetts Avenue  
Lexington, MA 02420 USA

**Contact Information:** +1 (800) 225-3909 US, Canada, Mexico and Puerto Rico  
+1 (781) 482-7900 All other locations

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### Section 2 – Hazards Identification

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**Health Hazards:** Eye Contact: Causes transient eye irritation  
Skin Contact: May cause mild, transient irritation  
Ingestion: May be harmful if swallowed; can cause gastrointestinal irritation, nausea, vomiting and/or diarrhea

**Hazard Mitigation:** Wear protective gloves and eye/face protection  
Avoid prolonged breathing of spray

**Environmental Hazards:** Moderately toxic to aquatic life. Avoid discharge to storm drains and waterways

**GHS Classification:** Toxic to aquatic life, Acute Category 2

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### Section 3 – Composition/Information on Ingredients

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Proprietary formulation with nonionic surfactants (32% active ingredients in water)

BioSolve products contain no caustic, d-limonene or hydrocarbon solvents.

BioSolve products do not contain any hazardous ingredients as defined by CERCLA, Massachusetts Right to Know Law and California Prop 65. All ingredients are TSCA compliant.

## Safety Data Sheet

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### Section 4 – First Aid Measures

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- Eyes:** Immediately flush eyes with water for at least 15 minutes. Hold eyelids apart while flushing to rinse entire surface of eye and lids with water. Seek medical attention for lasting irritation.
- Skin:** Rinse exposed area and wash with mild soap and water for several minutes. Seek medical attention if irritation develops.
- Ingestion:** Seek medical attention in the event of serious or persistent abdominal discomfort, nausea or diarrhea.
- Inhalation:** Inhalation of concentrated vapors resulting from spraying or heating in confined or poorly ventilated areas may cause irritation of nose and throat. Remove person to fresh air and seek medical attention if irritation persists.

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### Section 5 – Fire Fighting Measures

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**Suitable Extinguishing Media:** None required; BioSolve products are non-flammable

**Special Protective Equipment for Firefighters:** None necessary

**Unusual Fire or Explosive Hazards:** None

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### Section 6 – Accidental Release Measures

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In case of accidental release, breakage or leakage: Eliminate or contain source with inert material, such as sand, earth, absorbent pads, etc. Transfer liquid to suitable containers for recovery, re-use or disposal. Wipe up or mop up using water. Hard surfaces (e.g., floors, driveways) may be slippery; use care to avoid falling.

Rinse area with water. Avoid flow of run-off to surface waters. Always check with local regulations before discharging effluent to storm drains or sewers.

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### Section 7 – Handling and Storage

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- Handling:** Minimize periods of exposure to extreme temperatures. Keep from freezing. If frozen, separation may occur; thaw and stir thoroughly prior to use. Freezing will not affect product performance.
- Precautions:** Chemical resistant gloves and eye protection are recommended while mixing and using.
- Incompatibilities:** Avoid contact with strong acids or strong oxidants.
- Storage:** Recommended storage temperature: 35° – 120° F (1° – 48° C).
- Shelf Life:** If unopened, more than 10 years.
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## Safety Data Sheet

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### Section 8 – Exposure Controls / Personal Protection

- Eyes Protection:** Safety glasses; chemical goggles or face shield recommended when spraying to protect against backsplash and drift.
- Skin Protection:** Rubber or latex gloves recommended.
- Respiratory Protection:** None required, except if application results in significant misting of product. If so, use of an approved air purifying respirator is recommended.
- Engineering Controls:** For indoor use or for use in a confined space, normal ventilation is generally satisfactory.

### Section 9 – Physical and Chemical Properties

- Appearance:** Deep red
- Odor:** Mild, pleasant sassafras fragrance
- Concentration:** ~32% active ingredients as sold

<b>Boiling Point</b>	265°F/129°C	<b>Vapor Pressure mm/Hg</b>	Not available
<b>Melting/Freezing Point</b>	28°F/-2°C	<b>Vapor Density (Air=1)</b>	Not available
<b>Flash Point</b>	Non-flammable	<b>Surface Tension*</b>	29 Dyne/cm @25°C
<b>Flammability Limits</b>	Not applicable	<b>Viscosity (concentrate)</b>	490 centipoise
<b>Reactivity with Water</b>	None	<b>Viscosity (6% solution)</b>	1.5 centipoise
<b>Evaporation Rate</b>	Not determined	<b>Solubility in Water</b>	100%
<b>Specific Gravity</b>	1.01 gms/cc	<b>VOC Content</b>	Not determined
	8.43 lbs/U.S. gal	<b>pH</b>	9.1 +/- 0.3

\*6% solution

### Section 10 – Stability and Reactivity

- Chemical Stability:** Stable; will not decompose if used according to manufacturer's directions.
- Conditions to Avoid:** Prolonged exposure to heat may cause product degradation. Freezing should also be avoided as discussed in Section 7.
- Incompatible Materials:** Normally unreactive. Avoid strong alkalis, strong acids, strong oxidizing agents and materials with reactive hydroxyl compounds. These materials could damage the product and reduce its effectiveness during application.
- Hazardous Decomposition Products:** None are known.
- Hazardous Polymerization:** Will not occur.

## Safety Data Sheet

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### Section 11 – Toxicological Information

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**Overview:** No adverse acute or chronic health effects expected if product used in accordance with manufacturer's directions.

**Carcinogenicity:** No ingredient has been shown to cause cancer in laboratory animals.

**Specific Organ Toxicity:** None are known.

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### Section 12 – Ecological Considerations

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**Persistence and Degradability:** The total of the organic components contained in this product is not classified as readily biodegradable (OECD-301 A-F). However, this product is inherently biodegradable with 60% degradation in 28 days (OECD-301B) and estimated >95% degradation in 120 days.

**Bioaccumulation Potential:** The bioaccumulation factor in fish has been estimated to be low, ranging from 87 to 344.

**Mobility:** No data available

**Aquatic Toxicity:**

<b>LC<sub>50</sub> of Concentrate (As shipped)</b>		
<i>Mysidopsis bahia</i>	48-hours	3.6 mg/L
<i>Menidia beryllina</i>	96-hours	6.4 mg/L
<b>LC<sub>50</sub> of 3% Dilute Solution (As Used)</b>		
<i>Mysidopsis bahia</i>	48-hours	185 mg/L
<i>Menidia beryllina</i>	96-hours	247 mg/L
<b>LC<sub>50</sub> of 6% Dilute Solution (As Used)</b>		
<i>Daphnia magna</i>	48-hours	287 mg/L
<i>Pimephales promelas</i>	96-hours	124 mg/L
<i>Onchorhynchus mykiss</i>	96-hours	177 mg/L

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### Section 13 - Disposal

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DO NOT DUMP INTO STORM DRAINS OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. As manufactured, BioSolve products do not meet the definition of a hazardous waste. Small quantities of unused and uncontaminated product may be discharged to a qualified wastewater treatment facility. Always obtain approval from local and Federal regulatory agencies prior to discarding this product into public sewers.

As your supplier, we have no control over your handling and use of this product. However, the intended use of this product as a remediation and/or surface washing agent may produce wastewater containing emulsified or dispersed hydrocarbons that may be classified as a hazardous waste and should be treated and disposed of accordingly.

## Safety Data Sheet

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### Section 14 – Transportation Information

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USDOT Freight Class 55 (Liquid Cleaning Compound, Non-Hazardous)

This product is not regulated by USDOT or Canadian TDG when shipped domestically by land.

North American Industry Classification System (NAICS) # 325613

U.S. ITC, Harmonized Tariff Schedule B Classification: 3402.90.30.00

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### Section 15 – Regulatory Information

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This product is considered non-hazardous as defined by CERCLA, according to OSHA, Massachusetts Right to Know Law and California Prop 65.

**Toxic Substances Control Act:** All components of this product are on the TSCA inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30.

**CEPA – Domestic Substances List:** All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or not required to be listed.

**Canadian CPR Compliance:** This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the SDS contains all the information required by the CPR

**WHMIS Classification:** D2B                      Eye or skin irritant

Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with Federal, state or provincial and local laws.



## Safety Data Sheet

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### Section 16 – Other Information

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**HMIS Rating**

Health Hazard:	1 (Eye/Skin Irritant)
Fire Hazard:	0
Reactivity:	0
Personal Protective Equipment:	Rubber gloves, safety glasses or face shield

**NFPA Rating**

Health:	1 (Eye/Skin Irritant)
Flammability:	0
Reactivity:	0
Other Hazard:	None

BioSolve Pinkwater is on the US Environmental Protection Agency's NCP Product Schedule. This listing does NOT mean that EPA approves, recommends, licenses, certifies or authorizes the use of BioSolve Pinkwater on an oil discharge. This listing means only that data have been submitted to EPA as required by Subpart J of the National Contingency Plan, 40 CFR Section 300.915.

**SDS Effective Date:** May 12, 2016

The information contained herein is accurate to the best of our knowledge. The BioSolve Company makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or application or in combination with other substances.

For more information, visit: [www.biosolve.com](http://www.biosolve.com)