FORMER SCHOLES STREET HOLDER STATION SITE

KINGS COUNTY

BROOKLYN, NEW YORK

INTERIM SITE MANAGEMENT PLAN

NYSDEC Site Number: 224067

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Prepared for:

The Brooklyn Union Gas Company d/b/a

National Grid NY

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Brooklyn, NY 11201

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Revisions to Final Approved Interim Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

SEPTEMBER 2022

CERTIFICATION STATEMENT

I, Terry W. Young, P.E., certify that I am currently a NYS registered professional engineer as in defined in 6 NYCRR Part 375 and that this Interim Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

_____ P.E.

_____ DATE

It is a violation of Article 145 of New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

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List of Acronyms

BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
BUG	The Brooklyn Union Gas Company
CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulation
CP	Commissioner Policy
CPP	Citizen Participation Plan (CPP)
CVOC	Chlorinated Volatile Organic Compound
DER	Division of Environmental Remediation
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval Program
EWP	Excavation Work Plan
FT BLS	Feet Below Land Surface
HASP	Health and Safety Plan
IC	Institutional Control
ISMP	Interim Site Management Plan
LiRo	LiRo Engineers, Inc.
mg/kg	milligrams per kilogram
MGP	Manufactured Gas Plant
NAPL	Non-Aqueous Phase Liquid
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbon
PFAS	Per- and Polyfluoroalkyl Substances
PID	Photoionization Detector
QEP	Qualified Environmental Professional
RP	Remedial Party and Respondent
SC	Site Characterization
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

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ES EXECUTIVE SUMMARY

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

Site Identification: Site Identification No. 224067
Former Scholes Street Holder Station Site
338 & 350 Scholes Street & 154 Bogart Street
Brooklyn, New York 11206

Institutional Controls:	1. The Site may be used for commercial and industrial use, in accordance with New York City zoning regulations.
	2. One Institutional Control (IC), an Environmental Easement, is required by this ISMP for Block 3048, Lots 1, 7, and 11.
Engineering Controls:	1. Cover system comprised of concrete-covered ground surfaces and building slabs, where present. The Site is secure with existing roll-up doors and building walls.

Inspections:	Frequency
1. Site-Wide Inspection	Annually
Monitoring:	
1. Not required until the remedy is completed, except when intrusive activities dictate environmental oversight.	Not Applicable
2. Soil Vapor Intrusion	As Needed for Any Redeveloped or Newly Occupied Buildings
Reporting:	
1. Interim Site-Wide Inspection Summary	Annually

Further descriptions of the above requirements are provided in detail in Sections 3, 4, and 6 of this ISMP.

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Key components of the Environmental Easement are:

- The properties (Lots 1, 7, and 11) may be used for commercial and industrial use;
- The Engineering Control (EC) must be maintained by National Grid and/or Property Owner as specified in this ISMP (see Section 3);
- The EC must be inspected at a frequency and in a manner defined in the ISMP (see Section 4);
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the New York State Department of Health (NYSDOH) or the New York City Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the NYSDEC;
- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this ISMP (see Section 6);
- All future intrusive activities that will disturb impacts must be conducted in accordance with this ISMP (see Section 3);
- Maintenance, monitoring, inspection, and reporting of any physical component of the remedy shall be performed as defined in this ISMP (see Sections 3, 4, and 6);
- Access to the Site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement;
- The potential for vapor intrusion must be evaluated for any redeveloped or newly occupied buildings in the area within the IC boundaries shown in the figures associated with the Environmental Easement package, and any potential impacts that are identified must be monitored or mitigated.

The property owner is required to comply with this ISMP including all notifications to National Grid and to the New York State Department of Environmental Conservation (NYSDEC), and the provisions in the Excavation Work Plan (Appendix B). If property ownership changes after the submission of the ISMP, the IC (Environmental Easement) must be addressed by the property owner's successors.

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Boundaries that are covered by this ISMP will be revaluated after the approval of the Final Engineering Report.

National Grid is responsible for Manufactured Gas Plant (MGP)-related impacts and costs associated therewith, only. If a remedy is determined to be necessary to address sources of non-MGP-related impacts present at the Site, this will be evaluated separately by NYSDEC, for further action. **While National Grid has voluntarily assumed responsibility for preparation of this ISMP, National Grid reserves all of its rights under federal and state environmental laws to pursue other parties who may have responsibilities at this Site and for violations of the ISMP.**

Further descriptions of the above requirements are provided in detail in the latter sections of this ISMP.

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1.0 INTRODUCTION

1.1 General

This Interim Site Management Plan (ISMP) is a required element of the remedial program for the former Scholes Street Holder Station Site located in Brooklyn, New York (hereinafter referred to as the "Site"). See Figures 1 (Site Location) and 2 (2016 Aerial Photograph). The Site is currently in the New York State (NYS) Inactive Hazardous Waste Disposal Site Remedial Program, Site No. 224067, which is administered by New York State Department of Environmental Conservation (NYSDEC).

National Grid (hereinafter "National Grid" or "Remedial Party" (RP)) entered into a Multi-Site Order on Consent and Administrative Settlement (Order & Settlement Agreement) (Index # A2-0552-0606) in 2007 with the NYSDEC to remediate MGP-related impacts at the Site (the Order). The Order covers the former holder facility located in the East Williamsburg section of Brooklyn. A figure showing the Site location and boundaries of this Site is provided in Figure 3 (Site Plan). The boundaries of the Site are more fully described in the metes and bounds Site description that is part of the Environmental Easement provided in Appendix C. The Environmental Easement is granted by the owners of the Site (the "Grantors") to the NYSDEC and shall be recorded at the County Clerk by the RP or the NYSDEC. In a letter dated December 31, 2019 (provided in Appendix H), the NYSDEC indicated that the Site requires an Environmental Easement.

After completion of the Site Characterization (SC), it was determined that performing surface-intrusive activities within the Site may result in contact with some target compounds and target analytes at this Site. The impacts are generally limited to the unsaturated zone soil within the former holder footprint, where present on Lots 7 and 11 at the Site and do not have the potential for day-to-day exposure to the public. An Institutional Control (IC) and an Engineering Control (EC) have been incorporated into the ISMP to control exposure to target compounds and target analytes detected at concentrations exceeding applicable Standards, Criteria, and Guidance (SCGs) in environmental samples collected at the Site (i.e., impacts) to ensure protection of public health and the environment

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prior to implementation of the final remedy. An Environmental Easement granted to the NYSDEC by the property owners (see Table 8, hereinafter "the Property Owners" and/or "the Grantors"), and recorded with the Kings County Clerk, requires compliance with this ISMP and the EC and IC placed on the Site. The Environmental Easement is located in Appendix C.

The EC and IC will be incorporated into this ISMP to control exposure to impacts to ensure protection of public health and the environment. The EC on the Site includes a soil cover system comprised of concrete-covered surfaces, building slabs, and roll-up doors. The IC on the Site consists of an Environmental Easement granted to the NYSDEC, by the Property Owners and recorded with the Kings County Clerk which requires compliance with the ISMP and the established EC and IC for the Site. Since the final remedy has not yet been completed for the Site, this ISMP will be implemented to address intrusive activities prior to the final remedy or any portion of the final remedy at the Site. If a remedy is determined to be necessary to address sources of non-MGP-related impacts present at the Site, this will be evaluated separately for further action. Any necessary remediation will be completed prior to, or in association with, redevelopment. A SMP will be prepared once the final remedy for the Site has been implemented.

Based on the results of the SC, groundwater monitoring is not necessary and monitoring wells MW-1 through MW-4 were abandoned on April 22 and 23, 2015 with approval of the NYSDEC. A letter documenting the monitoring well decommissioning was submitted to the NYSDEC on September 18, 2015.

Interim Site-Wide inspections of the Site will be conducted to assess compliance with the provisions of the Environmental Easement, and this ISMP, on an annual basis.

This ISMP was prepared to manage impacts at the Site until the Environmental Easement is extinguished by the NYSDEC in accordance with Environmental Conservation Law (ECL) Article 71, Title 36, or until this ISMP is superseded by another SMP approved by the NYSDEC. This plan has been approved by the NYSDEC, and

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compliance with this plan is required by the Grantors of the Environmental Easement and the Grantor's successors and assigns. This ISMP may only be revised with the approval of the NYSDEC.

It is important to note that:

- This ISMP details the Site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the ISMP is a violation of the Environmental Easement;
- Failure to comply with this ISMP is a violation of ECL Article 71, Title 36 Environmental Easements, 6 New York Codes, Rules, and Regulations (NYCRR) Part 375, and the Order (Index # A2-0552-0606) for the Site, and thereby subject to applicable penalties. If the failure to comply with this ISMP occurs, the NYSDEC may take action against the violating party.
- The property owner is required to comply with this ISMP including all notifications to National Grid and NYSDEC, and the provisions in the Excavation Work Plan (Appendix B). National Grid is only responsible for costs associated with MGP-related impacts. This ISMP will be provided to the current Site property owners by National Grid. This ISMP is also on-file with the NYSDEC. Any revisions to this ISMP shall be provided to the current Site property owners and the file maintained by the NYSDEC after NYSDEC review and approval.
- NYSDEC can take action against an on-site and/or off-site owner if they interfere with the remedial program under the ECL. Triggers include improper disposal, release of COCs to the environment, lack of odor control, etc.

Annual inspections of the Site will be conducted to assess compliance with the provisions of the Environmental Easement and this ISMP.

All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the Site is provided in Appendix A of this ISMP.

This ISMP was prepared by Arcadis of New York, Inc., on behalf of National Grid, in accordance with the requirements of the NYSDEC's Division of Environmental

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Remediation (DER-10) ("Technical Guidance for Site Investigation and Remediation"), dated May 2010 (NYSDEC, 2010), and the guidelines provided by the NYSDEC. This ISMP addresses the means for implementing the IC and EC that are required by the Environmental Easement for the Site. **While National Grid has voluntarily assumed the costs of preparing this ISMP, National Grid reserves all of its rights under federal and state environmental laws to pursue other parties who may have responsibilities at this Site and for violations of the ISMP**.

This ISMP includes the following two plans:

1. An Institutional and Engineering Control Plan that identifies all use restrictions and engineering controls for the Site and details the steps and media-specific requirements necessary to ensure the following institutional and/or engineering controls remain in place and effective:
    - Institutional Control: Environmental Easement; and
    - Engineering Control: Cover system.

The Institutional and Engineering Control Plan, which is presented in Section 3 of this ISMP, includes the following plans and provisions:

- An Excavation Work Plan which details the provisions for management of limited excavations in areas of impacts;
- A Health and Safety Plan;
- Community Air Monitoring Plans;
- Further investigation and possible remediation should large-scale redevelopment occur (see Section 3.8);
- The potential for vapor intrusion must be evaluated for any redeveloped or newly occupied buildings in the area within the IC boundaries (see Section 3.3.1);
- Management and inspection of the identified engineering control (see Section 4); and
- Maintenance of Site access controls and NYSDEC notification.

2. A Monitoring Plan to assess the performance and effectiveness of the EC. The plan includes:
    - A schedule of monitoring and frequency of submittals to the NYSDEC.

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- Soil vapor intrusion sampling for any redeveloped or newly occupied buildings on the Site, as may be required by the Institutional and Engineering Control Plan discussed above and if needed based on the evaluation of the potential for vapor intrusion.

The Monitoring Plan is presented in Section 4 of this ISMP.

1.2 Revisions

Revisions to this plan will be proposed in writing to the NYSDEC's project manager as an addendum. Revisions will be necessary upon, but not limited to, a significant change to the Site conditions. In accordance with the Environmental Easement for the Site, the NYSDEC will provide a notice of any approved changes to the ISMP, and append these notices to the ISMP that is retained in its files.

1.3 Notifications

All intrusive activities must be approved by the NYSDEC. Sufficient notification must be made to the NYSDEC so they can make the decision on the type of reporting. Typically, the type of notification and reporting requirements depend on the scope of work. Large-scale intrusive work will require additional investigation and, depending on findings of the investigation, may require a detailed work plan, such as a Remedial Action Work Plan while smaller scale (i.e., "limited") intrusive activities will comply with the Excavation Work Plan (Appendix B) and may require a Notice of Intrusion letter or a simple letter work plan.

Notifications shall be submitted, in writing, to National Grid and to the NYSDEC, as needed, in accordance with NYSDEC's DER-10 for the following reasons:

- 60-day advance notice of any proposed changes in Site use that are required under the terms of the Order, 6 NYCRR Part 375 and/or ECL.
- 30-day advance notice of any field activity not pursuant to the EWP.

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- Notify National Grid as soon as possible of any proposed ground-intrusive activity pursuant to the EWP. Notify NYSDEC at least 15 days prior to the proposed start of activity.

- Notify National Grid and the NYSDEC as soon as possible (minimum 12-month advance notice) of any redevelopment or demolition of structures.

- Once identified, notice will be provided to National Grid and the NYSDEC within 48 hours of any damage or defect to the foundation, structures or EC that reduces or has the potential to reduce the effectiveness of the EC, and likewise, any action to be taken to mitigate the damage or defect.

- Verbal notice will be provided to National Grid and the NYSDEC by noon of the following day of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of EC in place at the Site. National Grid will provide written confirmation to the NYSDEC within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

- Follow-up status reports on actions taken to respond to any damage or defect to the EC requiring ongoing responsive action will be prepared by National Grid and submitted to the NYSDEC within 45 days describing and documenting actions taken to restore the effectiveness of the EC.

Any proposed change in the ownership of the Site, use of the Site, or the responsibility for implementing this ISMP will include the following notifications:

- At least 60 days prior to the change, National Grid and the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the Order, and all approved work plans and reports, including this ISMP.

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

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

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Table 1: Notifications*

Name	Contact Information
Scott Deyette, NYSDEC Project Manager	(518) 402-9662 scott.deyette@dec.ny.gov
Donald Campbell, National Grid Project Manager	(718) 963-5453 Donald.Campbell@nationalgrid.com

* Note: Notifications are subject to change and will be updated as necessary.

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2.0 SUMMARY OF PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

2.1 Site Location and Description

The Site is located in Brooklyn, Kings County, New York and is identified as a portion of Block 3048, Lot Nos. 1, 7, and 11 on the New York City Tax Map (see Figure 3). The Site is an approximately 0.92-acre area and is bounded by Scholes Street to the north, Meserole Street to the south, commercial-use buildings to the east, and Bogart Street to the west (see Figure 3 – Site Plan). The boundaries of the Site are more fully described in Appendix C - Environmental Easement. The owners of the Site parcels at the time of issuance of this ISMP are:

Lot 1 (154 Bogart Street): Bright Dimension, LLC. The parcel is used as a warehouse.

Lot 7 (338 Scholes Street): BP Hartung LLC. The parcel is occupied by a construction company with buildings and a paved storage yard.

Lot 11 (350 Scholes Street): Meserole Management LLC. The parcel is used as a warehouse.

2.2 Site History

The Scholes Street Holder Station was constructed in the 18th Ward of the City of Brooklyn, circa 1892 to 1894.[1,2] It was constructed by The Fulton Municipal Gas Company.[3] The Scholes Street Holder Station was used until 1951, when the gas holder was demolished. The Brooklyn Union Gas Company (BUG) acquired the property and Scholes Street Holder Station from The Fulton Municipal Gas Company on November 4,

[1] New York City Department of Buildings, *Gas Holder Construction Information*, 1916, 1920, and 1921.
[2] American Gas Light Journal, July 2, 1894, p. 12.
[3] Ibid, p. 12.

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1895.[4] The BUG Board of Directors authorized the sale of the former Fulton Municipal Gas Company works, in 1934.[5] After decommissioning of The Fulton Municipal Gas Company works, and until the demolition of the Scholes Street Holder Station site in 1951, gas stored at the Scholes Street Holder Station would have come from active BUG plants.

2.3 Physical Setting

2.3.1 Land Use

The Site consists of the following: buildings and a storage yard. The storage yard contains some permanent equipment that cannot be easily moved. The Site and most of the surrounding areas are covered by buildings and/or concrete/asphalt surfaces. The paved surfaces and building slabs function as a cover system. The Site is zoned M1-1 (manufacturing district) according to the New York City Zoning Map and is currently utilized for commercial uses. Site occupants include a construction company, with buildings and a paved storage yard (Lot 7), and warehouses (Lots 1 and 11). M1 zoning districts typically include light industrial uses, such as woodworking shops, repair shops, and wholesale service and storage facilities. Offices, hotels, and most retail uses are also permitted in M1 zoning districts. Based on the New York City Zoning Map, the nearest residential district (R6 zoning district) is approximately 750 feet to the northwest, at the intersection of Waterbury Street and Stagg Street.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include commercial and industrial properties. Based on the New York City Zoning Map, a M3-1 manufacturing district is located approximately 400 feet east of the Site. M3 districts are designated for areas with heavy industries that generate noise, traffic, or pollutants. Typical uses include power plants, solid waste transfer facilities and recycling plants, and fuel supply depots. The properties immediately south of the Site include commercial/light industrial properties; the properties immediately north of the Site include commercial/light industrial properties; the properties immediately east of the Site

[4] Stewart Title Insurance Company. *Title No. ST-K-6246-SS.* 2006.
[5] Murphy, p. 56.

include commercial/light industrial properties; and the properties immediately west of the Site include commercial/light industrial properties.

2.3.2 Geology

The Site is located north of the Harbor Hill terminal moraine and the surficial deposits consist of fill material and till (upper glacial aquifer).

Based on the soil borings that were drilled during the SC, primarily fine to coarse sand and pebbles (upper glacial aquifer deposits) were encountered during the subsurface investigation. Clay or silty clay was observed in the shallow portion (i.e., generally upper 15 feet) of a number of soil borings. These fine-grained deposits may be associated with fill material, most notably observed in the eastern portion of the Site between approximately 11 and 16 feet below land surface (ft bls). Approximately 5 to 11 feet of fill material was encountered in the upper portion of the soil borings. No site-wide confining layers were observed during the SC drilling activities (to a depth of 40 ft bls). Site specific boring logs are provided in Appendix D.

2.3.3 Hydrogeology

The depth to groundwater at the Site ranges from approximately 9 to 12 ft bls. Groundwater exists under water-table conditions beneath the Site (i.e., under unconfined conditions). Water-level elevation data collected at the Site in March 2014 indicate a prevailing horizontal direction of shallow groundwater flow generally to the northeast (see Figure 4) and a horizontal hydraulic gradient of approximately 0.001 ft/ft.

A groundwater contour map is shown in Figure 4. Groundwater elevation data is provided in Table 2. Groundwater monitoring well construction logs are provided in Appendix D.

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2.4 Investigation History

The following narrative provides a brief summary of the available project records to document key investigative milestones for the Site. Full titles for each of the reports referenced below are provided in Section 7.0 - References.

Soil and groundwater conditions for off-site properties are not described herein.

A Holder Station was constructed on the Site circa 1892-1894 by The Fulton Municipal Gas Company and was used until 1951, when the gas holder was demolished. BUG acquired the Holder Station from The Fulton Municipal Gas Company on November 4, 1895. Figure 3 shows the approximate locations of the former Holder Station structures. The 1907 Sanborn map indicates that BUG occupies the Site and shows one (1) gas holder with a capacity of 1,500,000 cubic feet, an engine room, exhausters, and a photometer house (see Figure 3). Historical drawings indicate that the holder was constructed with a foundation that extended approximately 5 feet below ground surface and that the holder was constructed of steel, included three lifts, and had a concrete foundation. Hand written notes on a 1936 BUG Property Plan indicate that the gas holder was demolished in February 1951 and the property was sold on May 4, 1951. The gas holder is not shown on the 1951 Sanborn map, but the former structures that housed the exhausters and engine room remain, and are labeled “vacant”. The photometer house structure also appears to have been demolished. Some of the holder station buildings remain on Lot 7 to date.

The 1965 Sanborn map shows a chemical storage area (Lot 7) occupying the former engine room and exhausters area, a basket storage area (Lot 1), and laminated products manufacturing (Lot 11). The 1968 Sanborn map shows minor changes; the basket storage area changed to carton storage (Lot 1), and the laminated products manufacturing changed to a warehouse (Lot 11). The 1968 through 2001 Sanborn maps show similar features but the 2001 Sanborn map no longer indicates chemical storage; the 2001 Sanborn map shows storage in the previous chemical storage area (Lot 7). The 2001 through 2007 (most recent) Sanborn maps show similar features.

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Between 2005 and the SC implementation, a two-story warehouse structure has been renovated and constructed on Lot 11. In 2005, LiRo Engineers, Inc. (LiRo) completed a limited site investigation as described below.

During informal conversations National Grid learned that drum storage and washing occurred on Lot 1 in recent history. The contents of the drums are unknown, but odors were apparent during washing activities. No records from the information reviewed could verify the accounts or the possible contents of the drums.

On Lot 1, a new building was constructed, starting in 2010. At the corner of Meserole Street and Bogart Street, the building is a two-story concrete block structure with a basement (approximately 10 feet deep as observed by National Grid on October 18, 2013) and includes a sub-grade loading dock. A Lot 1 property representative confirmed that the basement is approximately 10 to 11 feet deep. The northern portion of the Lot 1 building (adjacent to Lot 7) is a high, one-story structure used as a warehouse space.

A SC was performed to determine if potential MGP-related and/or non-MGP-related chemical constituents were present in soil and groundwater at the Site. The results of the SC are described in detail in the Site Characterization Report dated August 2014 (Arcadis, 2014).

To determine whether the soil and groundwater contain residual MGP constituents at levels of concern, data from the SC were compared to the following standards, criteria and guidance (SCGs):

- Groundwater SCGs are based on the NYSDEC Ambient Water Quality Standards and Guidance Values.
- Soil SCGs are based on the NYSDEC Division of Environmental Remediation, 6 NYCRR Part 375 Restricted Use Protection of Public Health Commercial Use Soil Cleanup Objectives (SCOs) and Protection of Groundwater SCOs, as well as NYSDEC's alternative polycyclic aromatic hydrocarbons (PAHs) soil

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cleanup level for non-residential use sites, which is 500 milligrams per kilogram (mg/kg) for total PAHs for all subsurface soil, specified in DEC Policy CP-51 Soil Cleanup Guidance, October 2010 (NYSDEC, 2010).

Generally, the SC determined that MGP-related impacts were observed on Lot 7. In addition, LiRo Engineers, Inc. (LiRo) performed a limited site investigation on Lot 11 in 2005 on behalf of the property owner at the time. No visible impacts (i.e., non-aqueous phase liquid [NAPL], sheens) were observed in the soil borings, but strong "creosote" odors were noted in two of the borings and elevated photoionization detector (PID) readings were recorded. It appears that the MGP-related impacts have not migrated to the water table or penetrated into the unconfined saturated zone and are limited to the unsaturated zone soil within the former holder footprint, where present on Lots 7 and 11. MGP-related impacts were not observed on Lot 1 during the SC, and the holder foundation was not encountered during drilling at SB-2.

Petroleum hydrocarbon impacts were observed on Lot 1 and may be associated with fill material that was placed in the holder foundation after the demolition of the holder on the Site or may be associated with spills, placement of fill materials, or construction activities after 1951 by others. Site operations (e.g., chemical storage) subsequent to the former holder station operations may have impacted the groundwater (e.g., chlorinated volatile organic compounds [CVOCs] and metals) beneath the Site.

The Site and most of the surrounding areas are covered by buildings and/or concrete/asphalt surfaces. The paved surfaces and building slabs function as a cover system which reduces the likelihood of direct contact with soil containing residual MGP constituents. The presence of volatile organic compounds (VOCs), PAHs, and metals in the shallow soil could have the potential to impact Site workers should subsurface activities be required at the Site in the future. Thus, the appropriate protective measures (detailed in this ISMP) must be utilized by any workers should a need arise to perform activities within the shallow soil at the Site.

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Soil and groundwater samples were collected during the SC to determine if potential MGP-related and/or non-MGP-related chemical constituents were present in soil and groundwater at the Site. The main categories of residuals that exceed their SCGs are VOCs, semi-volatile organic compounds (SVOCs), and metals. The principal human health and environmental risks posed by this Site relate to the presence of residual MGP material located in soil at depths greater than approximately 5 ft bls.

Tables 3 through 7 summarize the analytical data for the constituents of concern in subsurface soil and groundwater, and compare the data with the SCGs for the Site. The locations of the samples are shown on Figure 3.

Below is a summary of Site conditions when the SC was performed in 2014:

2.4.1 Soil

Benzene, toluene, ethylbenzene, and xylenes (BTEX) constituents exceeded SCGs in one soil sample collected from SB-1 and benzene exceeded SCGs in two soil samples collected from SB-2. PAHs exceeded SCGs in soil samples collected from SB-1, SB-2, and MW-2. The PAHs exceedances appear to be associated with fill material.

MGP-related material was observed in soil boring SB-1 (near the edge of the former gas holder's circular foundation). NAPL-impacted soil and a naphthalene-like odor were observed in SB-1 in the interval of 5 to 7 ft bls. Soil boring visual observations are shown on Figure 5.

Petroleum hydrocarbon impacts (staining, odors, PID readings) were observed in soil boring SB-2 (in the approximate center of the former gas holder's circular foundation). The impacts were encountered in SB-2 between approximately 4 to 8 ft bls. These petroleum hydrocarbon impacts may be associated with fill material that was placed in the holder foundation after the demolition of the holder on the Site or may be associated with spills, placement of fill materials, or construction activities after 1951 by others.

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Four (4) metals (barium, copper, lead, and mercury) were detected in soil above SCGs. The majority of the mercury exceedances appear to be associated with the fill material; the SB-1 (5-7') soil sample mercury exceedance may also be associated with fill material.

A summary of constituents detected in subsurface soil above SCGs are provided in Tables 3 through 5. Concentrations of VOCs, SVOCs, and metals that were detected in subsurface soil above SCGs are shown on Figures 6 through 8.

2.4.2 Groundwater

The primary VOCs that were detected in groundwater above SCGs were CVOCs that are not associated with the former holder station operations. Other VOCs that were detected above SCGs include benzene, chlorobenzene, 1,2- dichlorobenzene, and 1,4-dichlorobenzene.

Metals were detected in groundwater above SCGs in the temporary monitoring well SB-2 groundwater sample. Iron, manganese, and sodium were detected above SCGs in monitoring wells MW-1 through MW-4 but are considered to be naturally occurring at the Site.

A number of VOCs (including CVOCs) and naphthalene were detected at concentrations below SCGs in the SB-2 temporary monitoring well sample, suggesting that the groundwater directly beneath the former holder is not impacted from the former holder operations. A number of metals were detected at concentrations above SCGs in the SB-2 temporary monitoring well sample that may be related to a source other than the former holder station operations. Site operations (e.g., chemical storage) subsequent to the former holder station operations may have impacted the groundwater (e.g., CVOCs and metals) beneath the Site, along with off-site impacts from other light-industrial operations, based on the groundwater quality data collected from temporary monitoring well SB-2 and downgradient monitoring well MW-3 and other known upgradient light-industrial operations.

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A summary of constituents detected in groundwater above SCGs are provided in Tables 6 and 7. Concentrations of VOCs and metals that were detected in groundwater above SCGs are shown on Figures 9 and 10.

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3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

As stated above, since the final remedy has not yet been completed for the Site, no governing documents regarding the remedy have been issued for the Site. Since impacts exist at the Site, an IC and an EC are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of the IC and EC at the Site. The IC/EC Plan is one component of the ISMP and is subject to revision by the NYSDEC.

This Institutional and Engineering Control Plan provides:

- A description of the Site IC and EC;
- The intended role of the IC and EC;
- A description of the key components of the IC (i.e., Environmental Easement);
- A description of the control to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for the IC and EC, such as the EWP (as provided in Appendix B) for the proper handling of impacted material that may be disturbed during small scale (i.e. limited) intrusive work and/or activities on the Site, Health and Safety Plan (HASP) (Appendix E), and Community Air Monitoring Plan (CAMP) (Appendix F);
- A description of the roles and responsibilities of each party with respect to this ISMP; and
- Other provisions necessary for the IC and EC, as determined by the NYSDEC:
    - an EWP (provided in Appendix B) that details the provisions for management of small-scale (i.e., limited) excavations, in areas of impacts detected in soil and/or groundwater samples, including the proper handling of impacted material that may be disturbed during small-scale intrusive work and/or activities at the Site;
    - further investigation and remediation should large-scale redevelopment occur, if any of the existing structures are demolished, or if the subsurface is otherwise made accessible;

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- the management and inspection of the identified EC; and
- maintenance of site access controls and NYSDEC notification.

3.2 Roles and Responsibilities

A description of the roles and responsibilities of each party (i.e., the NYSDEC, the property owner, and National Grid) with respect to this ISMP is included as the Matrix of Responsibility (Table 8). A decision tree outlining the steps for on-site intrusive work by the property owners, is included as Figure 11.

3.3 Institutional Controls

3.3.1 Site Institutional Controls

One IC, an Environmental Easement, is required by this ISMP for Lots 1, 7, and 11 to: (1) maintain and monitor the EC; (2) prevent future exposure to impacts; and, (3) limit the use and development of the Site to commercial and industrial uses only. The Environmental Easement requires compliance with this ISMP. Restrictions identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are shown in the figures associated with the Environmental Easement package included in Appendix C. Key components of the Environmental Easement and this ISMP are:

- The properties (Lots 1, 7, and 11) may be used for commercial and industrial use;
- All ECs must be maintained by the Property Owner as specified in this ISMP (see Section 3);
- All ECs must be inspected at a frequency and in a manner defined in the ISMP (see Section 4);
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the NYSDEC;

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- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this ISMP (see Section 6);

- All future intrusive activities that will disturb impacts must be conducted in accordance with this ISMP (see Section 3);

- Maintenance, monitoring, inspection, and reporting of any physical component of the remedy shall be performed as defined in this ISMP (see Sections 3, 4, and 6);

- Access to the Site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement for Lots 1, 7, and 11;

- The potential for vapor intrusion must be evaluated for any redeveloped or newly occupied buildings in the area within the IC boundaries shown in the figures associated with the Environmental Easement package (Appendix C), and any potential impacts that are identified must be monitored or mitigated (see Section 4).

Components of the Environmental Easement may be modified, added, or deleted from this list as warranted by Site-specific conditions with approval with NYSDEC.

The responsibility for the elements of the Environmental Easement is discussed in Table 8 – Matrix of Responsibilities. Table 8 defines the responsibilities for National Grid and the property owner(s).

3.4 Engineering Controls

3.4.1 Cover (or Cap)

Exposure to impacts at the Site is prevented by an existing cover system present at the Site. This cover system is comprised of concrete-covered surfaces and building slabs. The EWP provided in Appendix B outlines the procedures required to be implemented in the event the cover system is breached, penetrated or temporarily removed, and any underlying impacts are disturbed. Procedures for the inspection of this cover are provided in the Monitoring Plan included in Section 4.0 of this ISMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a HASP and associated CAMP prepared for the Site. A sample HASP, that is in current compliance with DER-10, and 29 Code of Federal Regulations (CFR) 1910, 29 CFR 1926, and all other

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applicable Federal, State and local regulations, is provided in Appendix E. A sample CAMP is provided in Appendix F. Based on future changes to State and Federal health and safety requirements, and specific methods employed by future contractors, the HASP and CAMP will be updated and re-submitted with the notification provided in Section B-1 of the EWP.

The property owners and associated parties preparing the remedial documents submitted to the NYSDEC, and parties performing this work, are completely responsible for the safe performance of all intrusive work, the structural integrity of excavations, proper disposal of any liquid dewatered from the excavation, control of run-off from open excavations into remaining impacts, and for structures that may be affected by excavations (such as building foundations and bridge footings). The property owners will ensure that Site development activities will not interfere with, or otherwise impair or compromise, the EC described in this ISMP. If the activities of the property owner impair or compromise the EC, the property owner shall be responsible for the ultimate repair or replacement of the EC, which prevents exposure to the impacts beneath the Site.

The cover system is a permanent control and the quality and integrity of this system will be inspected annually in accordance with this ISMP in perpetuity or until this document is superseded by another NYSDEC approved SMP. The cover system's purpose is to maintain a barrier between the public and impacts and the inspection will focus on the structural/remedial integrity of the cover system. Monitoring for aesthetics or functionality apart from the remedial purpose is not required by the ISMP.

3.5 Plans and Procedures to be Followed for Implementation of IC/ECs

A description of each of the plans to be followed for implementation of IC/ECs is provided below.

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3.5.1 Steps to Be Taken in Advance of On-Site Intrusive Work

A decision tree describing notifications and actions to be taken in advance of on-site work by the property owner is included as Figure 11.

3.5.2 Excavation Work Plan

This ISMP includes an EWP that is to be used for small-scale (i.e., limited) excavations (Appendix B). NYSDEC will make the determination of small-scale or large-scale, with respect to excavations. This EWP will be implemented to address any intrusive activities prior to the final remedy or any portion of the final remedy at the Site. The property owners, their tenants, consultants, and contractors are required to implement this EWP. National Grid is only responsible for costs associated with MGP-related impacts.

3.5.3 HASP

This ISMP includes a Health and Safety Plan that is to be used for small-scale (i.e., limited) excavations and large-scale redevelopment. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in the HASP provided in Appendix E. This HASP establishes policies and procedures to protect personnel from the potential hazards posed by the activities at the Site. Site workers are required to review and sign the HASP, acknowledging that they understand and will adhere to the HASP. Subcontractors will also prepare their own Site-specific HASP for the protection of their employees from the hazards associated with their work tasks and may use this document as a guide.

3.5.4 CAMP

A sample CAMP for future activities at the Site is provided in Appendix F. This CAMP can be used for small-scale and/or large-scale activities. This plan describes the proposed air monitoring means and methods that will be implemented during intrusive activities.

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3.6 Maintenance of Site Access Controls

Access to the Site is controlled by existing buildings, their walls and doors, and roll-up doors. Control of access to the Site is to be maintained. Responsibility for maintenance of site access controls (e.g., buildings, walls, doors, fences, gates, etc.) is per the Matrix of Responsibility (Table 8).

3.7 Notification of the NYSDEC

As stated in Section 1.3, NYSDEC must be notified in advance of all intrusive work performed at the Site. Responsibility for notifications to the NYSDEC, including those described in Section 1.3 of this ISMP, is per the Matrix of Responsibility (Table 8).

3.8 Further Investigation and Possible Remedial Work Plan

Further investigation of the Site will be required should large-scale redevelopment occur, if any of the existing structures are demolished, or if the subsurface is otherwise made accessible anywhere on the Site. The nature and extent, if any, of impacts in areas where access was previously limited or unavailable, will be investigated pursuant to a plan approved by the NYSDEC. Based on the investigation results and the NYSDEC's determination of the need for a remedy, a remedial work plan will be developed for the final remedy for MGP-related impacts at the Site, including removal and/or treatment of any source areas to the extent feasible. If a remedy is determined to be necessary to address sources of non-MGP-related impacts present at the Site, this will be evaluated separately for further action. A Citizen Participation Plan (CPP) will continue through this process. Any necessary remediation will be completed prior to, or in association with, redevelopment.

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4.0 MONITORING PLAN

4.1 General

This Monitoring Plan describes the measures for evaluating the overall performance and effectiveness of the EC at the Site (a cover system) to address impacts at the Site. Based on the results of the SC, groundwater monitoring is not a necessary component of the Monitoring Plan and monitoring wells MW-1 through MW-4 were abandoned on April 22 and 23, 2015 with approval of the NYSDEC. A letter documenting the monitoring well decommissioning was submitted to the NYSDEC on September 18, 2015. This Monitoring Plan may only be revised with the approval of the NYSDEC.

This Monitoring Plan describes the methods to be used for:

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

To adequately address the items described above, this Monitoring Plan provides information on:

- Annual inspection and periodic certification; and
- Interim Media Evaluation/Sampling.

Reporting requirements are provided in Section 6.0 of this ISMP.

4.2 Site-Wide Inspection

Site-wide inspections will be performed by National Grid's Qualified Environmental Professional (QEP) on a regular schedule at a minimum of once per year. Modification to the frequency or duration of the inspections will require approval from the NYSDEC. Site-wide inspections will also be performed after all severe weather conditions that may affect the EC. During these inspections, an inspection form will be completed as

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provided in Appendix G – Site Management Form. The form will compile sufficient information to assess the following:

- Compliance with the IC (Lots 1, 7, and 11), including Site usage;
- An evaluation of the condition and continued effectiveness of the EC;
- General Site conditions at the time of the inspection;
- The Site management activities being conducted including, where appropriate, a health and safety inspection; and
- Confirm that Site records are up to date.

A comprehensive Site-wide inspection will be conducted annually. The inspections will determine and document the following:

- Whether the EC continues to perform as intended;
- If EC continues to be protective of human health and the environment;
- Compliance with requirements of this ISMP and the Environmental Easement; and
- If Site records are complete and up to date.

Reporting requirements are outlined in Section 6.0 of this ISMP.

Inspections will also be performed in the event of an emergency. If an emergency, such as a natural disaster or an unforeseen failure of the EC occurs that reduces or has the potential to reduce the effectiveness of the EC in place at the Site, the property owner will notify National Grid and the NYSDEC as soon as possible but at least before noon of the following day. In addition, an inspection of the Site will be conducted within 5 days of the event (to the extent possible) to verify the effectiveness of the IC/EC at the Site by a QEP, as determined by the NYSDEC. Written confirmation must be provided to the NYSDEC within 7 days of the event (to the extent possible) that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.

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4.3 Interim Media Evaluation/Sampling

Any redeveloped or newly occupied buildings on the Site would require evaluation of the potential for soil vapor intrusion.

4.3.1 Soil Vapor Intrusion Sampling

Soil vapor intrusion sampling, if needed based on the evaluation of the potential for vapor intrusion, will be performed in the future for any redeveloped or newly occupied buildings. This ISMP covers soil vapor intrusion sampling for MGP-related impacts at the Site. If soil vapor intrusion sampling needs to be performed in the future, sampling details will be developed and a work plan will be submitted for approval from the NYSDEC project manager. In addition, any modification to the approved work plan, including frequency or sampling requirements, will be submitted for approval from the NYSDEC project manager.

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5.0 OPERATION AND MAINTENANCE PLAN

5.1 General

The Site EC does not rely on any mechanical systems, such as groundwater treatment systems, sub-slab depressurization systems or air sparge/soil vapor extraction systems, to protect public health and the environment. Since there are no mechanical systems at the Site, the operation and maintenance of such components is not included in this ISMP.

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6.0 REPORTING REQUIREMENTS

6.1 Interim Site Management Inspection Reports

All site management inspection events will be recorded on the appropriate site management form provided in Appendix G. This form is subject to revision by NYSDEC for use on the Site.

All applicable inspection forms and other records generated for the Site during the reporting period will be provided in electronic format to the NYSDEC by National Grid's QEP in accordance with the requirements of Table 9 and summarized in the Interim Site-Wide Inspection Summary.

Table 9: Schedule of Interim Inspection Reports

Task/Report	Reporting Frequency*
Interim Site-Wide Inspection Summary	Annually, or as otherwise determined by the NYSDEC

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

All interim inspection reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Copies of all field forms completed (e.g., applicable inspection form and other records, etc.); and
- Any observations, conclusions, or recommendations.

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An Interim Site-Wide Inspection Summary will be submitted by National Grid's QEP to the NYSDEC every year, beginning with the initial period that will be within three months of NYSDEC approval of this ISMP. After submittal of the initial Interim Site-Wide Inspection Summary, the next Interim Site-Wide Inspection Summary shall be submitted annually to the NYSDEC or at another frequency as may be required by the NYSDEC. The Site is subdivided into separate parcels with different ownership, but a single Interim Site-Wide Inspection Summary will be prepared that addresses the Site described in Appendix C - Environmental Easement. The report will be submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Interim Site-Wide Inspection Summary. The report will include:

- Identification, assessment and certification of the EC/IC required for the Site.
- Results of the required annual Site inspections and severe condition inspections, if applicable.
- All applicable site management forms and other records generated for the Site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- A summary of any information generated during the reporting period, with comments and conclusions.
- A Site evaluation, which includes the following:
  - Any new conclusions or observations regarding site impacts based on inspections;
  - Recommendations regarding any necessary changes to the EC and/or Monitoring Plan; and
  - The overall performance and effectiveness of the EC.

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The annual Site-Wide Inspection Summary will be qualified to the extent that National Grid does not own the property and National Grid and/or National Grid's representatives are only present at the Site on an intermittent basis. National Grid does not have direct control over the property owners or their employees. A summary of the matrix of responsibilities identified in this ISMP for the property owner and National Grid is presented in Table 8.

The Interim Site-Wide Inspection Summary will be submitted, in electronic format, to the NYSDEC Central Office, Regional Office in which the Site is located and the NYSDOH Bureau of Environmental Exposure Investigation. The Interim Site-Wide Inspection Summary may need to be submitted in hard-copy format, as requested by the NYSDEC project manager.

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7.0 REFERENCES

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

Arcadis. 2014. Site Characterization Report, Former Scholes Street Holder Station Site, Brooklyn, New York, Site No. 224067, Index # A2-0552-0606. August 2014.

NYSDEC. 2010. CP-51 / Soil Cleanup Guidance. October 21, 2010.

NYSDEC. 2010. DER-10 / Technical Guidance for Site Investigation and Remediation. May 3, 2010.

NYSDEC. 2010. DER-31 / Green Remediation. August 11, 2010 (Revised January 20, 2011).

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

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ARCADIS Design & Consultancy for natural and built assets

Table 2. Water-Level Measurements Collected from Monitoring Wells on March 11, 2014, Former Scholes Street Holder Station Site, Brooklyn, New York.

Well Designation	Screened Interval (feet bls)	Elevation of Measuring Point (feet NGVD 29)	Depth to Water (feet bmp)	Water-Level Elevation (feet NGVD 29)
MW-1	10 - 25	16.48	11.65	4.83
MW-2	10 - 25	16.35	11.62	4.73
MW-3	8 - 23	14.78	10.20	4.58
MW-4	10 - 25	13.99	9.30	4.69

NGVD 29	National Geodetic Vertical Datum of 1929.
bls	Below land surface.
bmp	Below measuring point.

Table 3. Concentrations of Volatile Organic Compounds in Soil Samples Collected from Soil Borings, Former Scholes Street Holder Station Site, Brooklyn, New York.

Compound (Units in ug/kg)	NYSDEC Subpart 375-6 Protection of Public Health Commercial Use SCO [1] (ug/kg)	NYSDEC Subpart 375-6 Protection of Groundwater SCO [1] (ug/kg)	Sample ID: / Sample Depth (ft bls): / Sample Date:	MW-1 (2-3') 2 - 3 01/28/14	MW-1 (15-17') 15 - 17 02/07/14	MW-2 (2-3') 2 - 3 01/28/14	MW-2 (15-17') 15 - 17 02/06/14	MW-3 (2-3') 2 - 3 01/31/14	MW-3 (10-12') 10 - 12 02/12/14	MW-4 (2-3') 2 - 3 01/31/14	MW-4 (10-12') 10 - 12 02/11/14	SB-1 (1-2') 1 - 2 02/12/14	DUP021214 1 - 2 02/12/14 SB-1 (1-2') Duplicate	SB-1 (5-7') 5 - 7 02/12/14	SB-2 (4-5') 4 - 5 01/29/14	SB-2 (5-6.5') 5 - 6.5 01/29/14	SB-2 (15-17') 15 - 17 01/29/14
Acetone	500,000	50		<39 B	<29 BJ	<30 B	<28 BJ	<24 B	<28 B	<32 B	**260**	<32 B	<28 B	<590	<61 B	<640	<27 B
Dichlorodifluoromethane	-	-		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	<120	<5.9	<130	<5.4
Benzene	44,000	60		<5.6	<5.9	**1.1 J**	<5.6	<4.9	<5.4	<6.4	<7.5	**0.67 J**	**0.68 J**	**2700**	**69**	**680**	<5.4
Bromodichloromethane	-	-		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	<120	<5.9	<130	<5.4
Bromoform	-	-		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4 J	<6.4	<7.5 J	<6.5 J	<5.7 J	<120 J	<5.9	<130 J	<5.4
Bromomethane	-	-		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4 J	<6.4	<7.5 J	<6.5 J	<5.7 J	<120 J	<5.9	<130	<5.4
2-Butanone (MEK)	500,000	120		**4.5 J**	<29	<30	<28	<24	<27	<32	**19 J**	<32	<28	<590	**5.2 J**	<640	<27
Trichlorofluoromethane	-	-		<5.6	<5.9	<6.1 J	<5.6	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	<120	<5.9	<130	<5.4
Carbon disulfide	500,000 [2]	2,700 [2]		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	**1.4 J**	**0.22 J**	**0.2 J**	<120	**0.49 J**	<130	<5.4
Carbon tetrachloride	22,000	760		<5.6	<5.9 J	<6.1	<5.6 J	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	<120	<5.9	<130	<5.4
Chlorobenzene	500,000	1,100		<5.6	<5.9	<6.1	<5.6	<4.9	**0.92 J**	<6.4	**3 J**	**2.1 J**	**2.4 J**	<120	**2.7 J**	<130	<5.4
1,1,2-Trichloro-1,2,2-trifluoroethane	500,000 [2]	6,000 [2]		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	<120	<5.9	<130	<5.4
Chloroethane	-	1,900 [2]		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	<120	<5.9	<130 J	<5.4
Chloroform	350,000	370		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	**3.5 J**	**5.4 J**	<120	<5.9	<130	<5.4
Chloromethane	-	-		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	<120	<5.9	<130	<5.4
Dibromochloromethane	-	-		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	<120	<5.9	<130 J	<5.4
1,1-Dichloroethane	240,000	270		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	**0.23 J**	**0.4 J**	<120	<5.9	<130	<5.4
1,2-Dichloroethane	30,000	20		<5.6	<5.9	<6.1	<5.6	<4.9	**1.2 J**	**0.57 J**	**3.7 J**	**4.1 J**	**4.1 J**	<120	<5.9	<130	<5.4
1,1-Dichloroethene	500,000	330		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	**0.9 J**	<7.5	<6.5	**0.32 J**	<120	<5.9	<130	<5.4
1,2-Dichloropropane	-	-		<5.6	<5.9	<6.1	<5.6	<4.9	**1.5 J**	<6.4	**8.2**	**5.3 J**	**3.8 J**	<120	<5.9	<130	<5.4
cis-1,3-Dichloropropene	-	-		<5.6	<5.9 J	<6.1	<5.6 J	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	<120	<5.9	<130	<5.4
Methyl acetate	-	-		<5.6 J	<5.9	<6.1 J	<5.6	<4.9 J	<5.4	<6.4 J	<7.5	<6.5	<5.7	<590	<5.9 J	<640	<5.4 J
trans-1,3-Dichloropropene	-	-		<5.6	<5.9 J	<6.1	<5.6 J	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	<120	<5.9	<130	<5.4
Ethylbenzene	390,000	1,000		**0.37 J**	<5.9	**0.23 J**	<5.6	<4.9	**0.27 J**	<6.4	**1.1 J**	**0.55 J**	**0.51 J**	**6000**	**37**	**810**	<5.4
2-Hexanone	-	-		<28	<29	<30	<28	<24 J	<27 J	<32	<38 J	<32 J	<28 J	<590 J	<30	<640	<27
Methylene Chloride	500,000	50		<22	<23 B	<24 B	<22 B	<19	**1.1 J**	<26	**8.8 J**	**4.9 J**	**3.8 J**	<120	<24	<130	<22 B
4-Methyl-2-pentanone (MIBK)	-	1,000 [2]		<28	<29	<30	<28	<24 J	<27	<32	<38	<32	<28	<590	<30	<640	<27
Styrene	-	-		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4 J	<6.4	<7.5 J	<6.5 J	<5.7 J	**910 J**	<5.9	<130	<5.4
1,1,2,2-Tetrachloroethane	-	600 [2]		<5.6	<5.9	<6.1	<5.6	<4.9 J	<5.4	<6.4	<7.5	<6.5	<5.7	<120	<5.9	<130	<5.4
Tetrachloroethene	150,000	1,300		<5.6	<5.9	**1.4 J**	<5.6	**0.17 J**	<5.4	<6.4	**0.19 J**	**230**	**350**	**54 J**	<5.9	<130	<5.4
Toluene	500,000	700		<5.6	<5.9	**0.81 J**	<5.6	<4.9	<5.4	<6.4	<7.5 B	**1.1 J**	**0.97 J**	**4800**	**0.97 J**	**83 J**	<5.4
1,1,1-Trichloroethane	500,000	680		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	**0.57 J**	**1 J**	<120	<5.9	<130	<5.4
1,1,2-Trichloroethane	-	-		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	**4.8 J**	**5.3 J**	<120	<5.9	<130	<5.4
Trichloroethene	200,000	470		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	**20**	**27**	<120	<5.9	<130	<5.4
Vinyl chloride	13,000	20		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	<120	<5.9	<130	<5.4
Xylenes, Total	500,000	1,600		<11	<12	<12	<11	<9.7	<11	<13	**2 J**	<13	**0.89 J**	**11000**	**30**	**390**	<11
cis-1,2-Dichloroethene	500,000	250		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	**21**	**26**	<120	<5.9	<130	<5.4
Cyclohexane	-	-		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	<120	**1.1 J**	<130	<5.4
trans-1,2-Dichloroethene	500,000	190		<5.6	<5.9 B	<6.1	<5.6 B	<4.9	<5.4	<6.4	<7.5	**1 J**	**1.3 J**	<120	<5.9	<130	<5.4
Isopropylbenzene	500,000 [2]	2,300 [2]		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	**800**	**78**	**490**	<5.4
1,3-Dichlorobenzene	280,000	2,400		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	<120	<5.9	<130	<5.4
1,4-Dichlorobenzene	130,000	1,800		<5.6	<5.9	<6.1	<5.6	<4.9	**0.17 J**	<6.4	<7.5	<6.5	**0.25 J**	<120	<5.9	<130	<5.4
1,2-Dichlorobenzene	500,000	1,100		<5.6	<5.9	<6.1	<5.6	<4.9	**0.13 J**	<6.4	<7.5	<6.5	<5.7	**46 J**	**1.1 J**	<130	<5.4
1,2-Dibromo-3-Chloropropane	-	-		<11	<12	<12	<11	<9.7	<11	<13	<15	<13	<11	<120	<12	<130 J	<11
1,2,4-Trichlorobenzene	-	3,400 [2]		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4 J	<6.4	<7.5 J	<6.5 J	<5.7 J	<120 J	<5.9	<130	<5.4
1,2-Dibromoethane	-	-		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	<120	<5.9	<130	<5.4
Methyl tert-butyl ether	500,000	930		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	**1.2 J**	<6.5	<5.7	<120	**0.57 J**	<130	<5.4
Methylcyclohexane	-	-		<5.6	<5.9	<6.1	<5.6	<4.9	<5.4	<6.4	<7.5	<6.5	<5.7	**60 J**	**3 J**	<130	<5.4

See footnotes on last page.

Table 3. Concentrations of Volatile Organic Compounds in Soil Samples Collected from Soil Borings, Former Scholes Street Holder Station Site, Brooklyn, New York.

1	Table 375-6.8(b): Restricted Use Soil Cleanup Objectives.
2	NYSDEC CP-51 / Soil Cleanup Guidance.
NYSDEC	New York State Department of Environmental Conservation.
SCO	Soil Cleanup Objective.
ug/kg	Micrograms per kilogram.
B	Non-detect at the listed value due to associated blank contamination.
J	Estimated value.
ft bls	Feet below land surface.
-	Not available.
Bold	Indicates detection above laboratory Method Detection Limit.
	Compound concentration exceeds Protection of Groundwater SCO.

Table 4. Concentrations of Semi-Volatile Organic Compounds in Soil Samples Collected from Soil Borings, Former Scholes Street Holder Station Site, Brooklyn, New York.

Compound (Units in ug/kg)	NYSDEC Subpart 375-6 Protection of Public Health Commercial Use SCO [1] (ug/kg)	NYSDEC Subpart 375-6 Protection of Groundwater SCO [1] (ug/kg)	Sample ID: / Sample Depth (ft bls): / Sample Date:	MW-1 (2-3') 2 - 3 01/28/14	MW-1 (15-17') 15 - 17 02/07/14	MW-2 (2-3') 2 - 3 01/28/14	MW-2 (15-17') 15 - 17 02/06/14	MW-3 (2-3') 2 - 3 01/31/14	MW-3 (10-12') 10 - 12 02/12/14	MW-4 (2-3') 2 - 3 01/31/14	MW-4 (10-12') 10 - 12 02/11/14	SB-1 (1-2') 1 - 2 02/12/14	DUP021214 1 - 2 02/12/14 SB-1 (1-2') Duplicate	SB-1 (5-7') 5 - 7 02/12/14	SB-2 (4-5') 4 - 5 01/29/14	SB-2 (5-6.5') 5 - 6.5 01/29/14	SB-2 (15-17') 15 - 17 01/29/14
Phenol	500,000	330		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Bis(2-chloroethyl)ether	-	-		<39	<37	<40	<38	<36	<39	<42	<49	<39	<39	<42	<40	<41	<38
2-Chlorophenol	500,000 [2]	-		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Benzaldehyde	-	-		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	**86 J**	<400	<410	<380
2,2'-oxybis[1-chloropropane]	-	-		<390 J	<370	<400 J	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
2-Methylphenol	500,000	330		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Hexachloroethane	-	-		<39	<37	<40	<38	<36	<39	<42	<49	<39	<39	<42	<40	<41	<38
N-Nitrosodi-n-propylamine	-	-		<39	<37	<40	<38	<36	<39	<42	<49	<39	<39	<42	<40	<41	<38
4-Methylphenol	500,000	330		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Nitrobenzene	69,000 [2]	170 [2]		<39	<37	<40	<38	<36	<39	<42	<49	<39	<39	<42	<40	<41	<38
Isophorone	500,000 [2]	4,400 [2]		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
2-Nitrophenol	-	300 [2]		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Acetophenone	-	-		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	**110 J**	<400	<410	<380
2,4-Dimethylphenol	-	-		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Bis(2-chloroethoxy)methane	-	-		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
2,4-Dichlorophenol	500,000 [2]	400 [2]		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Naphthalene	500,000	12,000		<390	<370	<400	<380	<360	<390	<420	<490	**290 J**	**340 J**	**4200**	**230 J**	**4900**	<380
4-Chloroaniline	500,000 [2]	220 [2]		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Hexachlorobutadiene	-	-		<80	<75	<81	<77	<73	<79	<85	<100	<79	<79	<86	<81	<82	<76
4-Chloro-3-methylphenol	-	-		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
2-Methylnaphthalene	-	36,400 [2]		<390	<370	<400	<380	<360	<390	<420	<490	**370 J**	**400**	**1400**	**110 J**	**2700**	<380
Hexachlorocyclopentadiene	-	-		<390	<370 J	<400	<380 J	<360	<390 J	<420	<490 J	<390 J	<390 J	<420 J	<400	<410	<380
2,4,6-Trichlorophenol	-	-		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
2,4,5-Trichlorophenol	500,000 [2]	100 [2]		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
2-Chloronaphthalene	-	-		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
2-Nitroaniline	-	400 [2]		<390 J	<370	<400 J	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Acenaphthylene	500,000	107,000		<390	<370	<400	<380	<360	<390	<420	<490	**1100**	**650**	<420	**250 J**	**140 J**	<380
Caprolactam	-	-		<390	<370 J	<400	<380	<360	<390	<420	<490 J	<390	<390	<420	<400	<410	<380
Dimethyl phthalate	500,000 [2]	27,000 [2]		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
2,6-Dinitrotoluene	-	1,000 [2]		<80	<75	<81	<77	<73	<79	<85	<100	<79	<79	<86	<81	<82	<76
Acenaphthene	500,000	98,000		<390	<370	**110 J**	<380	<360	<390	<420	<490	**110 J**	**130 J**	**72 J**	**360 J**	**150 J**	<380
3-Nitroaniline	-	500 [2]		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
2,4-Dinitrophenol	500,000 [2]	200 [2]		<800	<750	<810	<770 J	<730	<790	<850	<1000	<790 J	<790	<860	<810	<820	<760
Dibenzofuran	-	6,200 [2]		<390	<370	<400	<380	<360	<390	<420	<490	**88 J**	**120 J**	**74 J**	**140 J**	**97 J**	<380
2,4-Dinitrotoluene	-	-		<80	<75	<81	<77	<73	<79	<85	<100	<79	<79	<86	<81	<82	<76
4-Nitrophenol	-	100 [2]		<390	<370	<400	<380 J	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Fluorene	500,000	386,000		<390	<370	**73 J**	<380	<360	<390	<420	<490	**340 J**	**450**	**110 J**	**440**	**240 J**	<380
1,1'-Biphenyl	-	-		<390	<370	<400	<380	<360	<390	<420	<490	**53 J**	**68 J**	**110 J**	<400	**140 J**	<380
4-Chlorophenyl phenyl ether	-	-		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Diethyl phthalate	500,000 [2]	7,100 [2]		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
4-Nitroaniline	-	-		<800	<750	<810	<770	<730	<790	<850	<1000	<790	<790	<860	<810	<820	<760
4,6-Dinitro-2-methylphenol	-	-		<800 J	<750 J	<810 J	<770 J	<730	<790 J	<850	<1000	<790 J	<790 J	<860 J	<810	<820	<760
N-Nitrosodiphenylamine	-	-		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
4-Bromophenyl phenyl ether	-	-		<390 J	<370	<400 J	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Hexachlorobenzene	6,000	3,200		<39	<37	<40	<38	<36	<39	<42	<49	<39	<39	<42	<40	<41	<38
Pentachlorophenol	6,700	800		<800 J	<750	<810 J	<770	<730	<790 J	<850	<1000 J	<790	<790	<860	<810	<820	<760
Phenanthrene	500,000	1,000,000		**110 J**	<370	**1600**	<380	<360	<390	**140 J**	**140 J**	**2600**	**3700**	**570**	**2100**	**850**	<380
Carbazole	-	-		<390	<370	**110 J**	<380	<360	<390	<420	<490	**120 J**	**140 J**	**58 J**	**140 J**	**62 J**	<380
Anthracene	500,000	1,000,000		<390	<370	**350 J**	<380	<360	<390	<420	<490	**810**	**870**	**100 J**	**800**	**220 J**	<380
Di-n-butyl phthalate	500,000 [2]	8,100 [2]		<390	<370	<400	<380	<360	<390	**71 J**	<490	<390	<390	<420	<400	<410	<380
Fluoranthene	500,000	1,000,000		**180 J**	<370	**3400**	<380	**55 J**	<390	**210 J**	**230 J**	**3500**	**3700**	**930**	**4000**	**1400**	<380
Pyrene	500,000	1,000,000		**160 J**	<370	**2200**	<380	**52 J**	<390	**180 J**	**170 J**	**3500**	**4700**	**850**	**2600**	**1000**	<380
Butyl benzyl phthalate	500,000 [2]	122,000 [2]		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
3,3'-Dichlorobenzidine	-	-		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Benzo[a]anthracene	5,600	1,000		**94**	<37	**1500**	<38	**35 J**	<39	**100**	**110**	**2200**	**2800**	**400**	**1700**	**610**	<38
Chrysene	56,000	1,000		**110 J**	<370	**1600**	<380	<360	<390	**93 J**	**120 J**	**2700**	**3300**	**470**	**1800**	**640**	<380
Bis(2-ethylhexyl) phthalate	-	435,000 [2]		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Di-n-octyl phthalate	500,000 [2]	120,000 [2]		<390 J	<370	<400 J	<380	<360	<390	<420	<490 J	<390	<390	<420	<400	<410	<380
Benzo[b]fluoranthene	5,600	1,700		**120**	<37	**2000**	<38	**39 J**	<39	**160**	**140**	**3200**	**3300**	**500**	**2300**	**950**	<38
Atrazine	-	-		<390	<370	<400	<380	<360	<390	<420	<490	<390	<390	<420	<400	<410	<380
Benzo[k]fluoranthene	56,000	1,700		**51**	<37	**850**	<38	<36	<39	<42	**54**	**1200**	**1300**	**200**	**760**	**320**	<38
Benzo[a]pyrene	1,000	22,000		**88**	<37	**1700**	<38	<36	<39	**110**	**110**	**3200**	**3600**	**380**	**1800**	**770**	<38
Indeno[1,2,3-cd]pyrene	5,600	8,200		**61**	<37	**1700**	<38	<36	<39	**66**	**42 J**	**2100 J**	**3700 J**	**280**	**1200**	**670**	<38
Dibenz(a,h)anthracene	560	1,000,000		<39 J	<37	**360 J**	<38	<36	<39	<42	**10 J**	**610**	**960**	**55**	**280**	**160**	<38
Benzo[g,h,i]perylene	500,000	1,000,000		**58 J**	<370	**1500**	<380	<360	<390	**52 J**	**51 J**	**2200 J**	**4100 J**	**250 J**	**980**	**640**	<380

See footnotes on next page.

Table 4. Concentrations of Semi-Volatile Organic Compounds in Soil Samples Collected from Soil Borings, Former Scholes Street Holder Station Site, Brooklyn, New York.

1	Table 375-6.8(b): Restricted Use Soil Cleanup Objectives.
2	NYSDEC CP-51 / Soil Cleanup Guidance.
NYSDEC	New York State Department of Environmental Conservation.
SCO	Soil Cleanup Objective.
ug/kg	Micrograms per kilogram.
J	Estimated value.
ft bls	Feet below land surface.
-	Not available.
Bold	Indicates detection above laboratory Method Detection Limit.
	Compound concentration exceeds Protection of Public Health Commercial Use SCO.
	Compound concentration exceeds Protection of Groundwater SCO.

Table 5. Concentrations of Metals in Soil Samples Collected from Soil Borings, Former Scholes Street Holder Station Site, Brooklyn, New York.

Analyte (Units in mg/kg)	NYSDEC Subpart 375-6 Protection of Public Health Commercial Use SCO [1] (mg/kg)	NYSDEC Subpart 375-6 Protection of Groundwater SCO [1] (mg/kg)	Sample ID: / Sample Depth (ft bls): / Sample Date:	MW-1 (2-3') 2 - 3 01/28/14	MW-1 (15-17') 15 - 17 02/07/14	MW-2 (2-3') 2 - 3 01/28/14	MW-2 (15-17') 15 - 17 02/06/14	MW-3 (2-3') 2 - 3 01/31/14	MW-3 (10-12') 10 - 12 02/12/14	MW-4 (2-3') 2 - 3 01/31/14	MW-4 (10-12') 10 - 12 02/11/14	SB-1 (1-2') 1 - 2 02/12/14	DUP021214 1 - 2 02/12/14 SB-1 (1-2') Duplicate	SB-1 (5-7') 5 - 7 02/12/14	SB-2 (4-5') 4 - 5 01/29/14	SB-2 (5-6.5') 5 - 6.5 01/29/14	SB-2 (15-17') 15 - 17 01/29/14
Aluminum	-	-		**6930**	**3010**	**8550**	**2770**	**7240**	**7420**	**4990**	**8470**	**6640**	**7020**	**4340**	**11000**	**10700**	**4680**
Antimony	-	-		<4.6 J	<3.8 J	<4.6 J	<3.9 J	<4 J	<4.6 J	<4.7 J	<14.7 J	**2.8 J**	**1.6 J**	**4.8 J**	<3.3 J	<3.3 J	<3.1 J
Arsenic	16	16		**5.6**	**1.3 J**	**8.6**	<2.9	**2.2 J**	**2.6 J**	**12.2**	**8.1**	**9.8**	**10.2**	**11.6**	**4.1**	**5.5**	**1.2 J**
Barium	400	820		**149**	**63.7**	**70.3**	**12.3 J**	**49.4**	**22.5 J**	**157**	**66.1**	**99.3**	**105**	**571**	**135**	**131**	**27.7 J**
Beryllium	590	47		**0.43 J**	<0.38	**0.47**	<0.39	**0.42**	<0.46	**0.56**	**0.8 J**	<0.44	<0.41	<0.47	**0.96**	**0.86**	**0.34**
Cadmium	9.3	7.5		<0.93	<0.76	<0.92	<0.78	<0.81	<0.92	<0.94	<1.5	<0.88	<0.83	**4.3**	**0.1 J**	<0.66	<0.63
Calcium	-	-		**2380**	**1100 J**	**2690**	**492 J**	**997 J**	**685 J**	**5990**	**5790 J**	**4130 J**	**3530 J**	**33200 J**	**24100**	**32700**	**629 J**
Chromium	1,500	-		**16.3**	**9.8 J**	**18.5**	**10 J**	**17.3**	**13.5 J**	**9.5**	**25.2 J**	**92.3 J**	**44.3 J**	**41.6 J**	**23.7**	**24.1**	**10.2**
Cobalt	-	-		**5.5 J**	**3.8 J**	**6 J**	**2.5 J**	**6.5 J**	**5.1 J**	**5.7 J**	**11.7**	**24.8**	**17.7**	**8.3 J**	**9.5**	**9.5**	**3.7 J**
Copper	270	1,720		**56.2**	**7.9**	**107**	**5.4**	**17.7**	**10.7**	**88.4**	**34.6**	**82.4**	**83.7**	**1790**	**75.4**	**81.1**	**11.1**
Iron	-	-		**13300**	**9740**	**18800**	**6080**	**19300**	**14800**	**9670**	**16800**	**16300**	**15900**	**43700**	**22000**	**30200**	**11300**
Lead	1,000	450		**252 J**	**2.8**	**248 J**	**2**	**66.5 J**	**4.1**	**266 J**	**127**	**164**	**193**	**3890**	**246 J**	**243 J**	**3.6 J**
Magnesium	-	-		**1370**	**1410 J**	**2160**	**959 J**	**1800**	**1650 J**	**412 J**	**2240 J**	**2470 J**	**2310 J**	**3470 J**	**6980**	**6490**	**1570**
Manganese	10,000	2,000		**125**	**1250**	**417**	**44.5**	**375**	**270**	**81.9**	**127**	**215**	**253**	**428**	**314**	**321**	**337**
Nickel	310	130		**11.7**	**8.9**	**14.1**	**4.8 J**	**12.8**	**12.2**	**22.4**	**16.7**	**16.8**	**16.2**	**36.7**	**21.8**	**24**	**9.4**
Potassium	-	-		**672 J**	**439 J**	**692 J**	**398 J**	**729 J**	**524 J**	**504 J**	<883 B	**933 J**	**875 J**	**620 J**	**3760**	**3150**	**488 J**
Selenium	1,500	4		<4.6	<3.8	<4.6	<3.9	<4	<4.6	**2.2 J**	<2.9	<4.4	<4.1	<4.7	<3.3	<3.3	<3.1
Silver	1,500	8.3		<2.3	<1.9	<2.3	<2	<2	<2.3	**0.39 J**	**0.91 J**	<2.2	<2.1	<2.3	<1.7	<1.7	<1.6
Sodium	-	-		**483 J**	**88.2 J**	<1150	<976	<1010	**96.8 J**	<1180 B	<295 B	**176 J**	**188 J**	**166 J**	**224 J**	**154 J**	**73.5 J**
Thallium	-	-		<4.6	<3.8	<4.6	<3.9	<4	<4.6	<4.7	<2.9	<4.4	<4.1	<4.7	<3.3	<3.3	<3.1
Vanadium	-	-		**22.7**	**18.4**	**24.4**	**10.4**	**22**	**19.1**	**23.7**	**31.6**	**27.9**	**26.5**	**25.1**	**31**	**28.6**	**14.2**
Zinc	10,000	2,480		**136**	**16.2**	**70.9**	**11.1**	**51.7**	**20.2**	**222**	**129**	**174**	**165**	**1530**	**178**	**183**	**19**
Mercury	2.8	0.73		**1.9**	<0.017	**1**	<0.019	**0.15**	**0.014 J**	**32.5**	**22.5**	**0.47**	**0.58**	**5.3**	**0.91**	**0.46**	<0.018

1 Table 375-6.8(b): Restricted Use Soil Cleanup Objectives.
NYSDEC New York State Department of Environmental Conservation.
SCO Soil Cleanup Objective.
mg/kg Milligrams per kilogram.
B Non-detect at the listed value due to associated blank contamination.
J Estimated value.
ft bls Feet below land surface.
- Not available.
Bold Indicates detection above laboratory Method Detection Limit.
Analyte concentration exceeds Protection of Public Health Commercial Use SCO.
Analyte concentration exceeds Protection of Groundwater SCO.
Analyte concentration exceeds Protection of Groundwater SCO and Protection of Public Health Commerical Use SCO.

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Table 6. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Former Scholes Street Holder Station Site, Brooklyn, New York.

Compound (Units in ug/L)	NYSDEC TOGS (1.1.1) SGV (ug/L)	Sample ID: / Screen Interval (ft bls): / Sample Date:	MW-1 10 - 25 3/11/2014	MW-2 10 - 25 3/11/2014	MW-3 8 - 23 3/11/2014	DUP031114 8 - 23 3/11/2014 MW-3 Duplicate	MW-4 10 - 25 3/11/2014
Acetone	50		<10	<10	<10	<10	<10
Dichlorodifluoromethane	5		<5	<5	<5	<5	<5
Benzene	1		<5	<5	**1.7 J**	**1.8 J**	<5
Bromodichloromethane	50		<5	<5	<5	<5	<5
Bromoform	50		<5	<5	<5	<5	<5
Bromomethane	5		<5	<5	<5	<5	<5
Methyl Ethyl Ketone	50		<10	<10	<10	<10	<10
Trichlorofluoromethane	5		<5	<5	<5	<5	<5
Carbon disulfide	60		<5	<5	<5	<5	<5
Carbon tetrachloride	5		<5	<5	<5	<5	<5
Chlorobenzene	5		<5	<5	**15**	**16**	<5
1,1,2-Trichloro-1,2,2-trifluoroethane	5		<5	<5	<5	<5	<5
Chloroethane	5		<5	<5	<5	<5	<5
Chloroform	7		<5	<5	<5	<5	<5
Chloromethane	5		<5	<5	<5	<5	<5
Dibromochloromethane	50		<5	<5	<5	<5	<5
1,1-Dichloroethane	5		**0.45 J**	<5	**0.24 J**	**0.28 J**	<5
1,2-Dichloroethane	0.6		<5	<5	<5	<5	<5
1,1-Dichloroethene	5		**0.32 J**	<5	**0.21 J**	**0.17 J**	**0.18 J**
1,2-Dichloropropane	1		<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	0.4*		<5	<5	<5	<5	<5
Methyl acetate	-		<5	<5	<5	<5	<5
trans-1,3-Dichloropropene	0.4*		<5	<5	<5	<5	<5
Ethylbenzene	5		<5	<5	**0.59 J**	**0.67 J**	<5
2-Hexanone	50		<10 J	<10 J	<10 J	<10 J	<10 J
Methylene Chloride	5		<5	<5	<5	<5	<5
methyl isobutyl ketone	-		<10	<10	<10	<10	<10
Styrene	5		<5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	5		<5	<5	<5	<5	<5
Tetrachloroethene	5		**6**	**0.53 J**	**0.15 J**	**0.15 J**	<5
Toluene	5		<5	<5	<5 B	<5 B	<5
1,1,1-Trichloroethane	5		<5	<5	<5	<5	<5
1,1,2-Trichloroethane	1		<5	<5	<5	<5	<5
Trichloroethene	5		**7.8**	**0.56 J**	**10**	**9.7**	**0.12 J**
Vinyl chloride	2		**0.23 J**	<5	**17**	**16**	**0.2 J**
Xylenes, Total	5		<5	<5	**2.6 J**	**2.8 J**	<5
cis-1,2-Dichloroethene	5		**2.2 J**	<5	**43**	**40**	**6.9**
Cyclohexane	-		<5	<5	<5	<5	<5
trans-1,2-Dichloroethene	5		**0.16 J**	<5	**0.28 J**	**0.22 J**	<5
Isopropylbenzene	5		<5	<5	**0.4 J**	**0.42 J**	<5
1,3-Dichlorobenzene	3		<5	<5	**1.4 J**	**1.4 J**	<5
1,4-Dichlorobenzene	3		<5	<5	**4.6 J**	**4.9 J**	<5
1,2-Dichlorobenzene	3		<5	<5	**4.4 J**	**4.6 J**	<5
1,2-Dibromo-3-Chloropropane	0.04		<5	<5	<5	<5	<5
1,2,4-Trichlorobenzene	5		<5	<5	<5	<5	<5
1,2-Dibromoethane	0.0006		<5	<5	<5	<5	<5
Methyl tert-butyl ether	10		**0.21 J**	<5	<5	<5	**0.88 J**
Methylcyclohexane	-		<5	<5	<5	<5	<5

NYSDEC	New York State Department of Environmental Conservation.
TOGS	Technical and Operational Guidance Series.
SGV	Ambient Water Quality Standards and Guidance Values.
ug/L	Micrograms per liter.
B	Non-detect at the listed value due to associated blank contamination.
J	Estimated value.
ft bls	Feet below land surface.
*	Applies to the sum of cis- and trans-1,3-dichloropropene.
-	Not available.
Bold	Indicates detection above laboratory Method Detection Limit.
	Compound concentration exceeds SGV.

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Table 7. Concentrations of Metals in Groundwater Samples Collected from Temporary and Permanent Monitoring Wells, Former Scholes Street Holder Station Site, Brooklyn, New York.

Analyte (Units in ug/L)	NYSDEC TOGS (1.1.1) SGV (ug/L)	Sample ID:	SB-2-GW (17-20')	MW-1	MW-2
		Screen Interval (ft bls):	17 - 20	10 - 25	10 - 25
		Sample Date:	01/29/14	3/11/2014	3/11/2014
Aluminum	-		**498000**	**2240**	**1770**
Antimony	3		<100	<20	<20
Arsenic	25		**123**	<15	<15
Barium	1,000		**3670**	**91.5 J**	**144 J**
Beryllium	3		**27**	<2	<2
Cadmium	5		<20	<4	<4
Calcium	-		**104000**	**88700**	**72300**
Chromium	50		**915**	**12.9**	**13.3**
Cobalt	-		**286**	<50	**3.9 J**
Copper	200		**1010**	<25	<25
Iron	300		**756000**	**3480**	**3230**
Lead	25		**294**	**4.6 J**	**5.3 J**
Magnesium	35,000		**95100**	**23400**	**11500**
Manganese	300		**29400**	**2020**	**4640**
Nickel	100		**662**	**10.8 J**	**11.1 J**
Potassium	-		**50600**	**10600**	**13400**
Selenium	10		<100	<20	<20
Silver	50		<50	<10	<10
Sodium	20,000		**130000**	**82400**	**73300**
Thallium	0.5		<100	<20	<20
Vanadium	-		**1030**	**4.3 J**	**4.7 J**
Zinc	2,000		**1500**	**14.9 J**	**16 J**
Mercury	0.7		**1.9**	<0.2	<0.2

NYSDEC	New York State Department of Environmental Conservation.
TOGS	Technical and Operational Guidance Series.
SGV	Ambient Water Quality Standards and Guidance Values.
ug/L	Micrograms per liter.
J	Estimated value.
ft bls	Feet below land surface.
-	Not available.
Bold	Indicates detection above laboratory Method Detection Limit.
	Analyte concentration exceeds SGV.

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Table 7. Concentrations of Metals in Groundwater Samples Collected from Temporary and Permanent Monitoring Wells, Former Scholes Street Holder Station Site, Brooklyn, New York.

Analyte (Units in ug/L)	NYSDEC TOGS (1.1.1) SGV (ug/L)	Sample ID:	MW-3	DUP031114	MW-4
		Screen Interval (ft bls):	8 - 23	8 - 23	10 - 25
		Sample Date:	3/11/2014	3/11/2014	3/11/2014
				MW-3 Duplicate	
Aluminum	-		**885**	**1210**	**1920**
Antimony	3		<20	<20	<20
Arsenic	25		<15	**5.8 J**	**7.1 J**
Barium	1,000		**243**	**247**	**164 J**
Beryllium	3		<2	<2	<2
Cadmium	5		<4	<4	<4
Calcium	-		**159000**	**164000**	**88500**
Chromium	50		<10	<10	**6.4 J**
Cobalt	-		**5.9 J**	**6 J**	<50
Copper	200		<25	<25	**6.5 J**
Iron	300		**14100**	**14800**	**10400**
Lead	25		<10	<10	**9.6 J**
Magnesium	35,000		**20900**	**21600**	**24800**
Manganese	300		**3650**	**3740**	**760**
Nickel	100		<40	<40	<40
Potassium	-		**22100**	**22400**	**15900**
Selenium	10		<20	<20	<20
Silver	50		<10	<10	<10
Sodium	20,000		**354000**	**355000**	**57500**
Thallium	0.5		<20	<20	<20
Vanadium	-		<50	<50	**4.2 J**
Zinc	2,000		**14.4 J**	**15.3 J**	**16.8 J**
Mercury	0.7		<0.2	<0.2	**0.28**

NYSDEC	New York State Department of Environmental Conservation.
TOGS	Technical and Operational Guidance Series.
SGV	Ambient Water Quality Standards and Guidance Values.
ug/L	Micrograms per liter.
J	Estimated value.
ft bls	Feet below land surface.
-	Not available.
Bold	Indicates detection above laboratory Method Detection Limit.
	Analyte concentration exceeds SGV.

Table 8. Matrix of Responsibility by Property Owners, National Grid, and Governing Agency
Interim Site Management Plan
Former Scholes Street Holder Station Site
Brooklyn, New York

DRAFT

Task	NYSDEC	National Grid	Property Owner	Responsibility		
				NYSDEC	National Grid	Property Owners
Access Agreement (AA)	✓	✓	✓	If access is not granted to National Grid by the property owner, NYSDEC to intervene, if necessary.	AA will be executed between the Property Owner and National Grid for Site inspection, or as otherwise required. Reference to the ISMP to be included in the text of the AA. National Grid will request NYSDEC intervention on their behalf, if necessary.	AA will be executed between the Property Owner and National Grid for Site Inspection, or as otherwise required. Access to the Site will be provided to National Grid and NYSDEC.
Community Air Monitoring Plan (CAMP)	✓	✓	✓	Review and Comment.	National Grid's environmental professional consultants will follow Site-specific CAMP procedures during intrusive work in MGP-impacted areas that require remediation or in areas where investigation for MGP impacts are required.	Owner's contractors and consultants will abide by direction given by National Grid's environmental consultant based on Community Air Monitoring results.
Field Activity not Pursuant to the EWP	✓	✓	✓	Review and Comment.	Review and Comment.	30-day advance notice to National Grid and NYSDEC.
Future Property Development	✓	✓	✓	Review and Comment. Review results of any further investigation and determine if remediation is required.	National Grid to review and decide if oversight is required. Following development, National Grid to update ISMP and submit to NYSDEC.	Property Owner to notify National Grid and NYSDEC as soon as possible, and provide at a minimum 12-month advance notice to National Grid and NYSDEC of property redevelopment or demolition of structures. Notify National Grid as soon as possible prior to intrusive activity. Notify NYSDEC at least 15 days prior to the proposed start of activity. All ground intrusive activities have to follow the ISMP.
Future Site Subdivision			✓			Property owner notifies NYSDEC and National Grid of the subdivision.
Groundwater Use and Fluids Management			✓			Property owner is restricted from use of groundwater as a source of potable water or process water. Property Owner is responsible for fluids management during excavation in accordance with the EWP. Discharge of water generated during construction activities will be performed according to ISMP requirements or a remedial plan.
HASP	✓	✓	✓	Review and Comment.	Develop a Site-specific HASP to be included in the ISMP.	Direct consultants and contractors to develop a Site-specific HASP for any subsurface work.
Inspections	✓	✓	✓	Review and Comment.	National Grid will complete inspections once per year. A Site-Wide Inspection Form will be completed and provided to NYSDEC.	Property Owner will provide access.
Interim Site Management Plan (ISMP)	✓	✓	✓	Review and Approve ISMP and revisions. Append revisions to ISMP.	Prepare the ISMP and update when required. Implement the ISMP for Site inspection.	Implement the ISMP for any ground intrusive work.

Table 8. Matrix of Responsibility by Property Owners, National Grid, and Governing Agency
Interim Site Management Plan
Former Scholes Street Holder Station Site
Brooklyn, New York

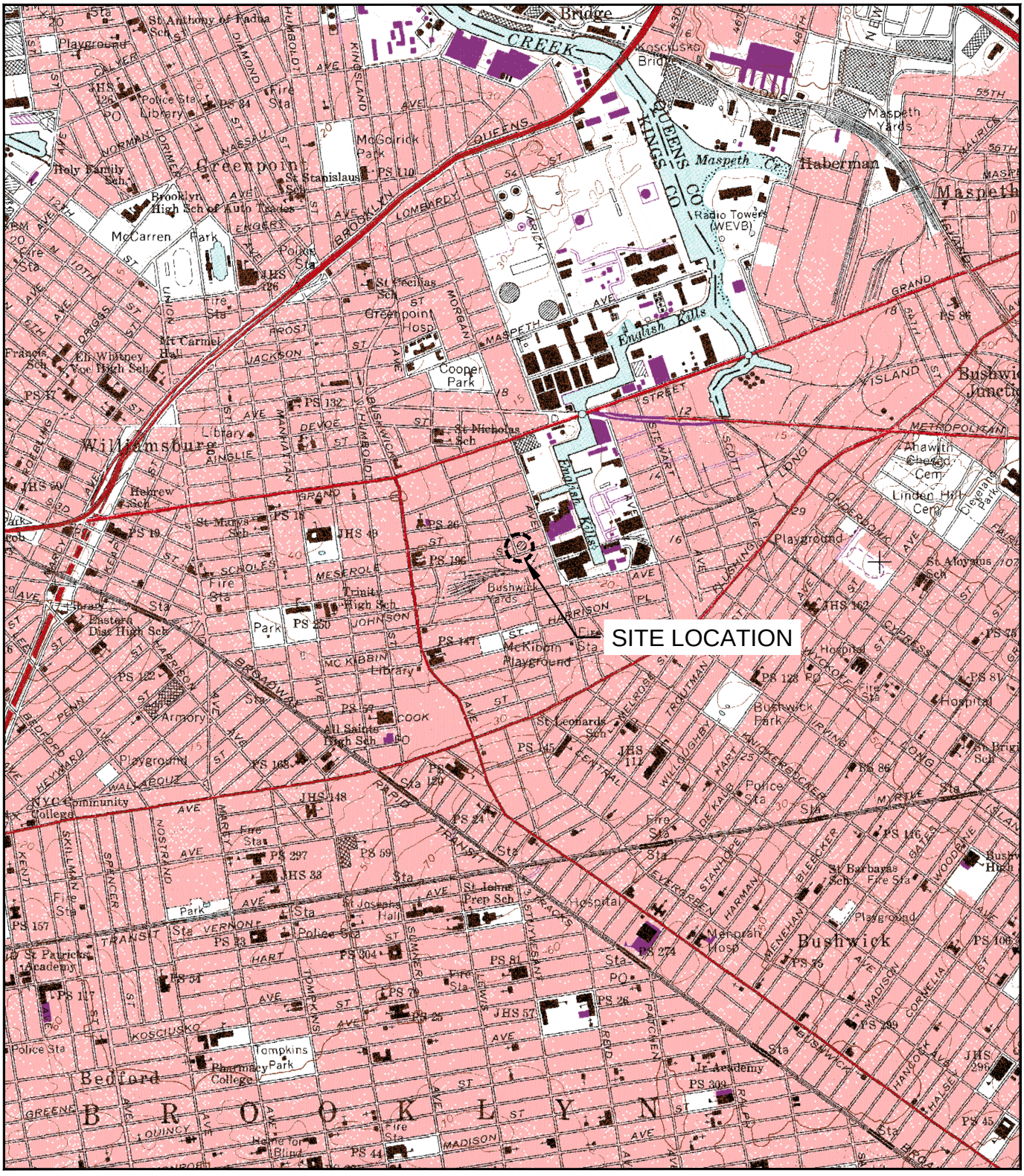
DRAFT

Task	NYSDEC	National Grid	Property Owner	Responsibility		
				NYSDEC	National Grid	Property Owners
Institutional Control (IC) - Environmental Easement (EE)	✓	✓	✓	The EE will be executed between the Property Owner and the NYSDEC.	National Grid will prepare the EE.	The EE will be executed between the Property Owner and the NYSDEC.
Intrusive Work Performed under the Excavation Work Plan (EWP)	✓	✓	✓	Review and Comment.	National Grid to review and decide if oversight is required. Following development, National Grid to update ISMP and submit to NYSDEC.	Property Owner to notify National Grid as soon as possible prior to intrusive activity. Notify NYSDEC at least 15 days prior to the proposed start of activity. All ground intrusive activities have to follow
Metes and Bounds Survey		✓	✓		National Grid will perform a Metes and Bounds (or similar) Survey to include in the ISMP and Environmental Easement.	Property Owner will provide access.
Soil Vapor Intrusion Evaluation/Sampling	✓	✓	✓	Review and Comment.	National Grid will evaluate the potential for soil vapor intrusion in the future for any redeveloped or newly occupied buildings, and if needed, develop sampling details and perform soil vapor intrusion sampling. A work plan for soil vapor intrusion sampling, if required, will be submitted for approval from the NYSDEC project manager. In addition, any modification to the approved work plan, including frequency or sampling requirements, will require approval from the NYSDEC project manager.	Property Owner will provide access. Property Owner to notify National Grid and NYSDEC as soon as possible, and provide at a minimum 3-month advance notice prior to any building redevelopment or new occupancy. Property Owner will provide information to support National Grid's evaluation of the potential for soil vapor intrusion.
Monitoring Well Damage/Maintenance or Well Decommissioning	**N/A**	**N/A**	**N/A**			
Property Use Change (currently Restricted Use Commercial)	✓	✓	✓	Review and Comment.	National Grid to review and confer with NYSDEC if ISMP revision and/or additional restrictions are required. Following use change, National Grid to update ISMP and submit to NYSDEC, if required.	Provide at a minimum 60 days notice to National Grid and NYSDEC.
Property Ownership Change		✓	✓		Notification receipt confirmation to Property Owner in 15 days (business).	Provide at a minimum 60 days notice to National Grid and NYSDEC.
Reporting	✓	✓	✓	Review and Comment.	National Grid's contracted qualified environmental professional will prepare and provide annual Site inspection reports to NYSDEC.	Provide certification in writing that ICs remain in place and are complied with annually and when requested by National Grid or
Security			✓			Property Owner is responsible for site security.

Notes:
The property owner is required to comply with the ISMP including all notifications to National Grid and NYSDEC and provisions of the Excavation Work Plan. National Grid is only responsible for costs associated with MGP-related impacts.
Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the Site.
N/A - Not applicable because monitoring wells were decommissioned.

FIGURES

DRAFT



SOURCE: USGS 7.5 MINUTE QUADRANGLE, BROOKLYN, NEW YORK 1967, PHOTOREVISED 1979



0 2000' 4000'

SCALE IN FEET

NATIONAL GRID
FORMER SCHOLES STREET HOLDER STATION SITE
BROOKLYN, NEW YORK
INTERIM SITE MANAGEMENT PLAN

SITE LOCATION

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

CITY:SYRACUSE-NY DIV/GROUP:ENVCAD DB:A.SANCHEZ LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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0 40' 80'

APPROXIMATE SCALE IN FEET

SOURCE: SITE AERIAL PHOTOGRAPH ADOPTED FROM GOOGLE EARTH PRO WITH AN IMAGERY DATE OF 04.19.2016.

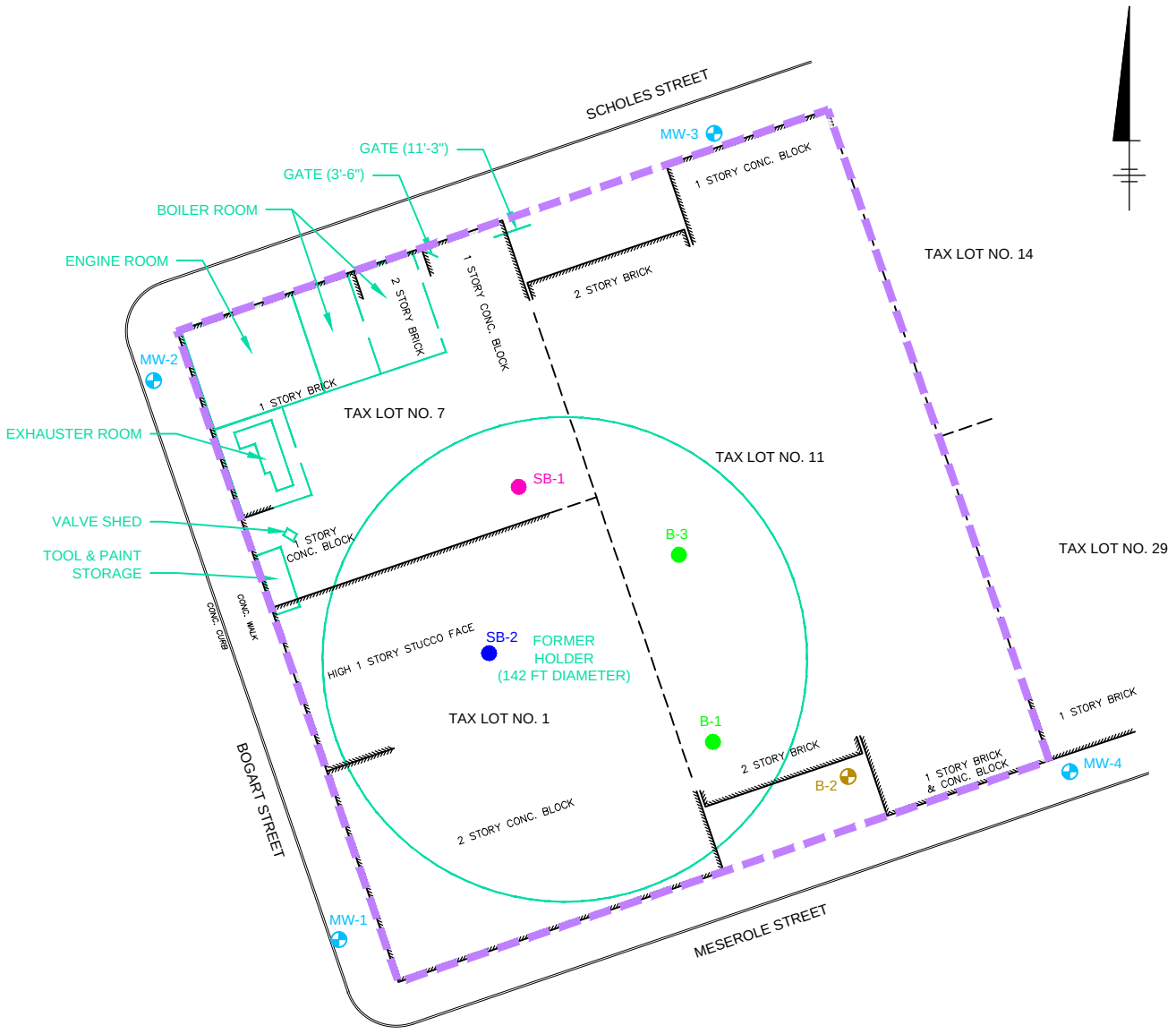
NATIONAL GRID
FORMER SCHOLES STREET HOLDER STATION SITE
BROOKLYN, NEW YORK
INTERIM SITE MANAGEMENT PLAN

2016 AERIAL PHOTOGRAPH

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2

CITY:SYRACUSE-NY DIV/GROUP:ENVCAD DB:A.SANCHEZ LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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LEGEND:

- APPROXIMATE SITE BOUNDARY (WITHIN BLOCK 3048)
- APPROXIMATE FORMER SITE FEATURE LOCATIONS (BASED ON 1936 BROOKLYN UNION GAS CO. PROPERTY PLAN)
- SOIL BORING LOCATION (ARCADIS, 2014)
- SOIL BORING/TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2014)
- SOIL BORING/MONITORING WELL LOCATION (ARCADIS, 2014)
- APPROXIMATE SOIL BORING LOCATION (LiRo ENGINEERS, 2005)
- APPROXIMATE SOIL BORING/MONITORING WELL LOCATION (LiRo ENGINEERS, 2005)

0 50' 100'

SCALE IN FEET

NOTES:

1. MONITORING WELL AND SOIL BORING LOCATIONS SURVEYED RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. BASE MAP BY DONALD G. DEKENIPP L.S., P.C., PROFESSIONAL LAND SURVEYOR.
3. THE APPROXIMATE LOCATIONS OF SOIL BORINGS B-1 THROUGH B-3 ARE BASED ON A LIRO ENGINEERS, INC. MONITORING WELL LOCATION MAP DATED JULY 2005.
4. MONITORING WELLS MW-1 THROUGH MW-4 WERE ABANDONED ON APRIL 22 AND 23, 2015.

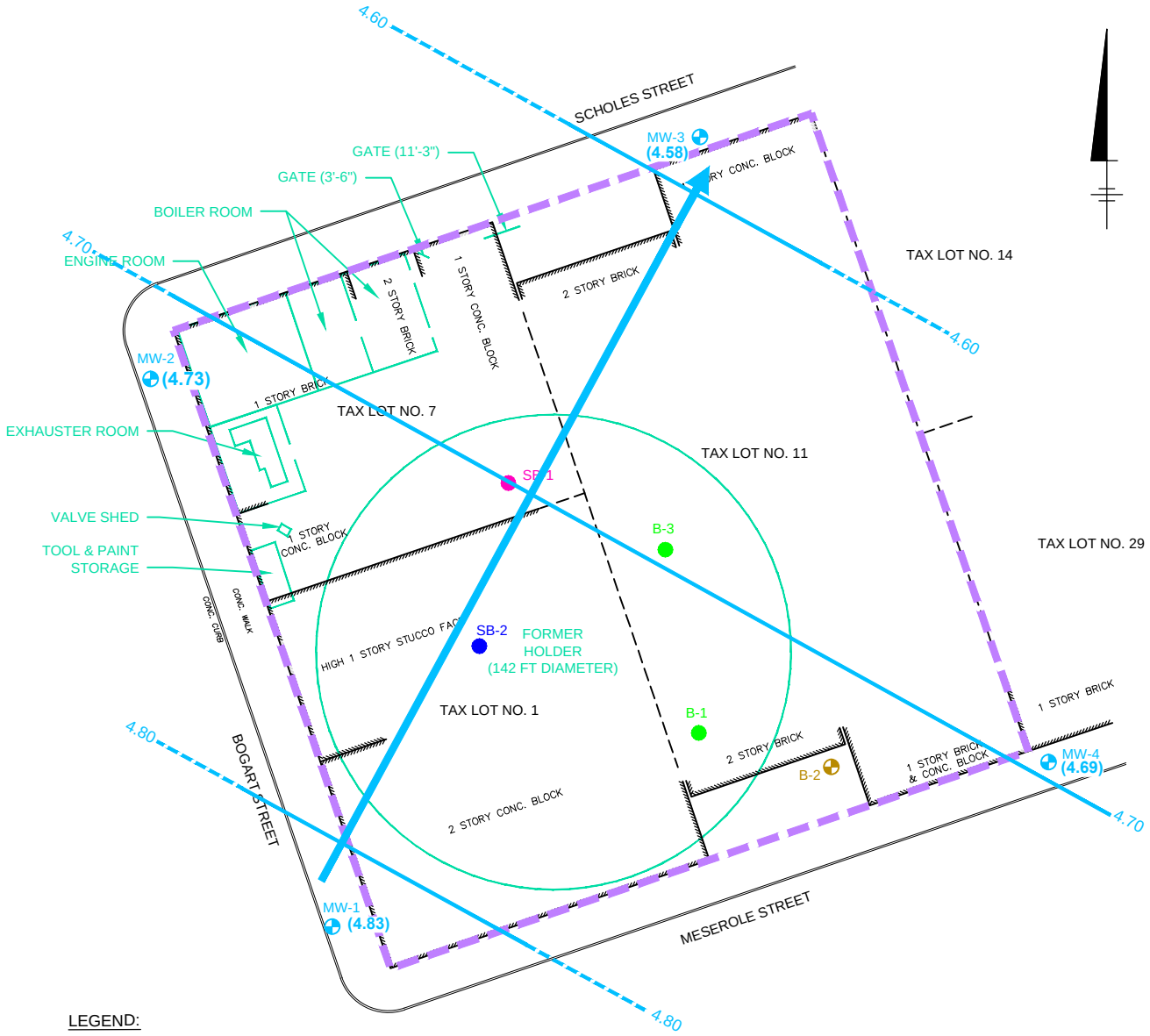
NATIONAL GRID
FORMER SCHOLES STREET HOLDER STATION SITE
BROOKLYN, NEW YORK
INTERIM SITE MANAGEMENT PLAN

SITE PLAN

ARCADIS Design & Consultancy for natural and built assets

FIGURE 3

CITY:SYRACUSE-NY DIV/GROUP:ENVCAD DB:A.SANCHEZ LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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- APPROXIMATE SOIL BORING LOCATION (LiRo ENGINEERS, 2005)
- APPROXIMATE SOIL BORING/MONITORING WELL LOCATION (LiRo ENGINEERS, 2005)
- (4.83) WATER-LEVEL ELEVATION
- 4.80 LINE OF EQUAL WATER-LEVEL ELEVATION (DASHED WHERE INFERRED)
- DIRECTION OF HORIZONTAL COMPONENT OF GROUNDWATER FLOW

0 50' 100'

SCALE IN FEET

NOTES:

1. MONITORING WELL AND SOIL BORING LOCATIONS SURVEYED RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. BASE MAP BY DONALD G. DEKENIPP L.S., P.C., PROFESSIONAL LAND SURVEYOR.
3. THE APPROXIMATE LOCATIONS OF SOIL BORINGS B-1 THROUGH B-3 ARE BASED ON A LIRO ENGINEERS, INC. MONITORING WELL LOCATION MAP DATED JULY 2005.
4. ELEVATIONS ARE RELATIVE TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD 29).
5. CONTOUR INTERVAL IS 0.10 FEET.
6. WATER-LEVEL ELEVATIONS WERE MEASURED ON MARCH 11, 2014.
7. MONITORING WELLS MW-1 THROUGH MW-4 WERE ABANDONED ON APRIL 22 AND 23, 2015.

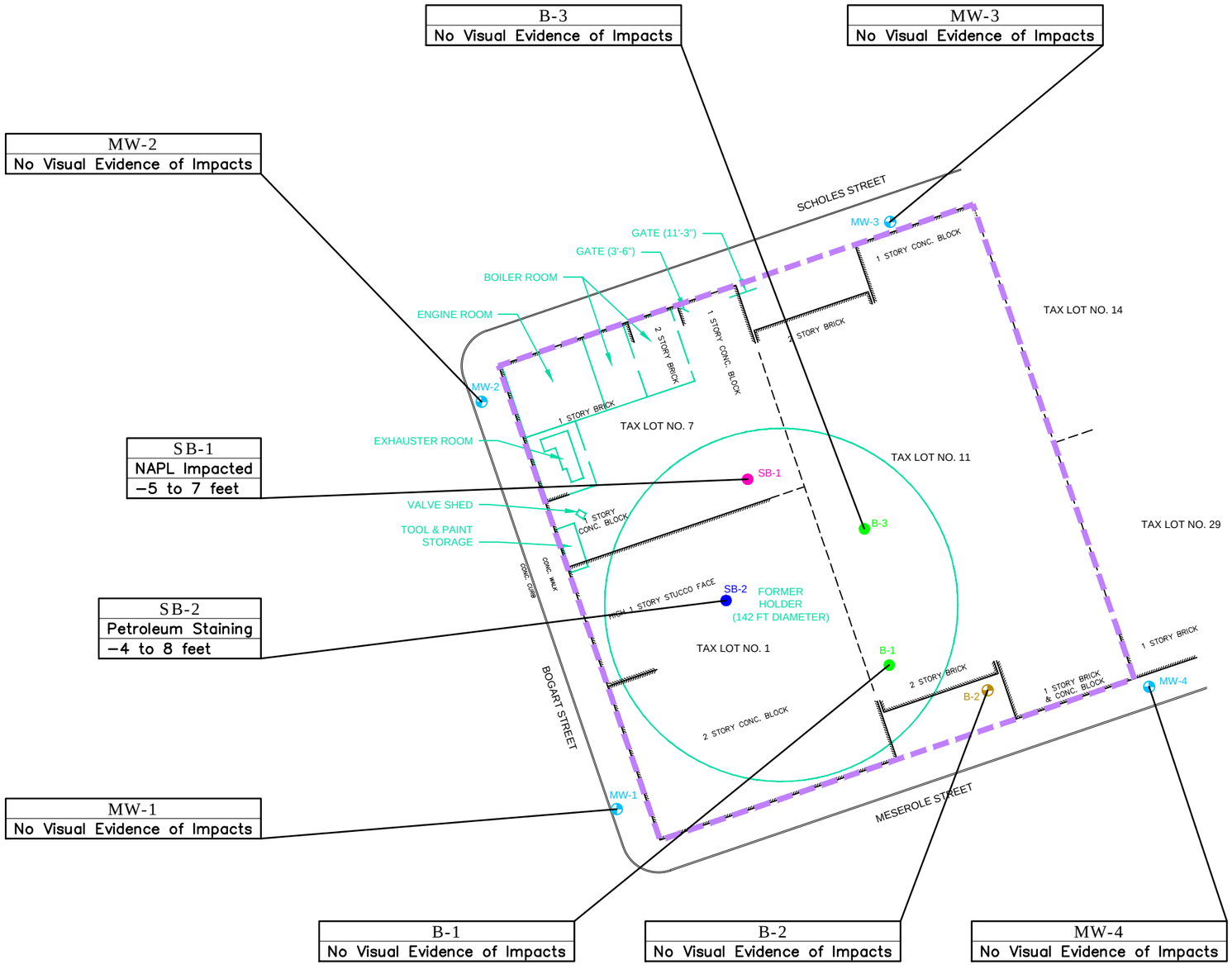
NATIONAL GRID
FORMER SCHOLES STREET HOLDER STATION SITE
BROOKLYN, NEW YORK
INTERIM SITE MANAGEMENT PLAN

CONFIGURATION OF THE WATER TABLE AND GROUNDWATER FLOW DIRECTION MARCH 2014

ARCADIS Design & Consultancy for natural and built assets

FIGURE 4

CITY:SYRACUSE-NY DIV/GROUP:ENVCAD DB:A.SANCHEZ LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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XREFS: IMAGES: PROJECTNAME: ---
X:\BDR-Ap X:\36709X01



LEGEND:

- APPROXIMATE SITE BOUNDARY (WITHIN BLOCK 3048)
- APPROXIMATE FORMER SITE FEATURE LOCATIONS (BASED ON 1936 BROOKLYN UNION GAS CO. PROPERTY PLAN)
- SOIL BORING LOCATION (ARCADIS, 2014)
- SOIL BORING/TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2014)
- SOIL BORING/MONITORING WELL LOCATION (ARCADIS, 2014)
- APPROXIMATE SOIL BORING LOCATION (LiRo ENGINEERS, 2005)
- APPROXIMATE SOIL BORING/MONITORING WELL LOCATION (LiRo ENGINEERS, 2005)

NOTES:

1. MONITORING WELL AND SOIL BORING LOCATIONS SURVEYED RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. BASE MAP BY DONALD G. DEKENIPP L.S., P.C., PROFESSIONAL LAND SURVEYOR.
3. THE APPROXIMATE LOCATIONS OF SOIL BORINGS B-1 THROUGH B-3 ARE BASED ON A LIRO ENGINEERS, INC. MONITORING WELL LOCATION MAP DATED JULY 2005.
4. MONITORING WELLS MW-1 THROUGH MW-4 WERE ABANDONED ON APRIL 22 AND 23, 2015.

0 50' 100'

SCALE IN FEET

NATIONAL GRID
FORMER SCHOLES STREET HOLDER STATION SITE
BROOKLYN, NEW YORK
INTERIM SITE MANAGEMENT PLAN

SOIL BORING VISUAL OBSERVATIONS

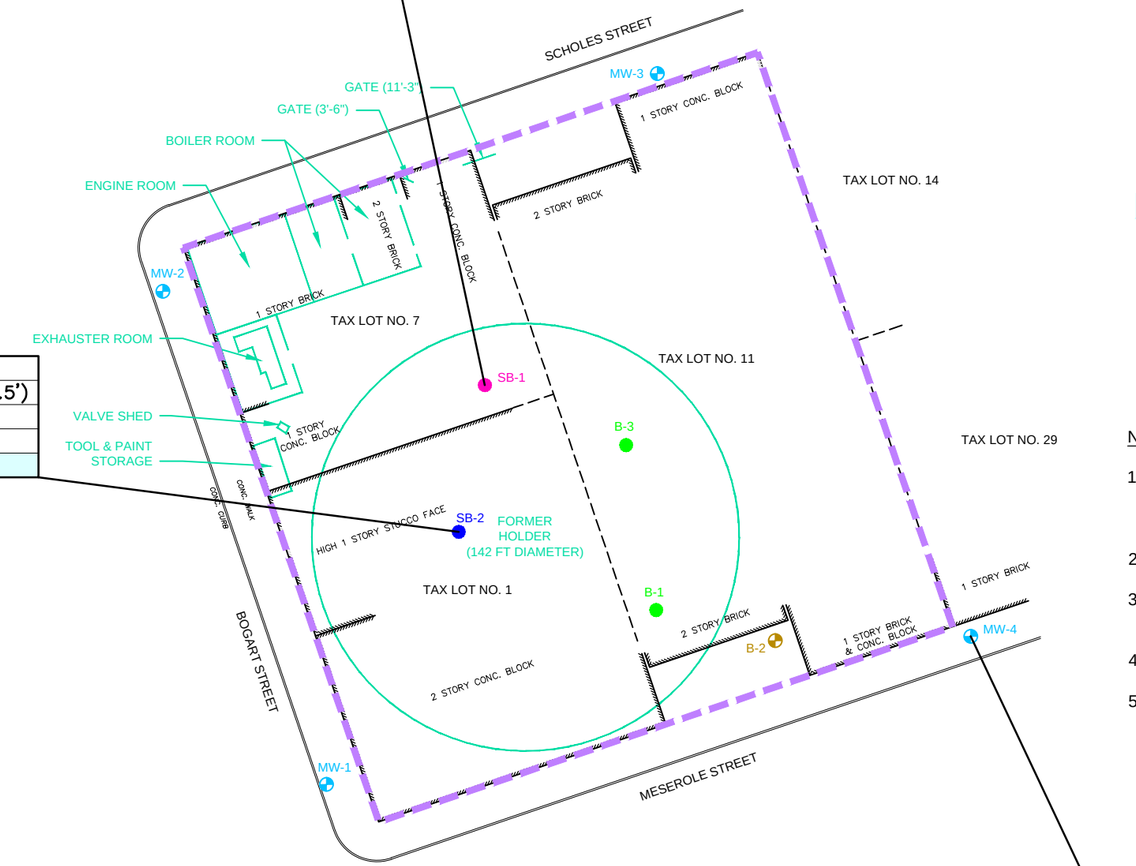
ARCADIS Design & Consultancy for natural and built assets

FIGURE 5

CITY:SYRACUSE-NY DIVGROUP:ENV DB:ASIAF LD:AS PIC:(Opt) PM:(Reqd) TM:CK LYR:(Opt)ON=*OFF=*REF*
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XREFS:
XrBDR-BI
X\36709X01
IMAGES: PROJECTNAME: ----

SB-1	
Sample ID	SB–1 (5–7')
Sample Date	2/12/2014
Sample Depth (ft)	5 – 7
Benzene	2700
Ethylbenzene	6000
Toluene	4800
Xylenes, Total	11000

SB-2		
Sample ID	SB–2 (4–5')	SB–2 (5–6.5')
Sample Date	1/29/2014	1/29/2014
Sample Depth (ft)	4 – 5	5 – 6.5
Benzene	69	680



MW-4	
Sample ID	MW–4 (10–12')
Sample Date	2/11/2014
Sample Depth (ft)	10 – 12
Acetone	260

LEGEND:

- APPROXIMATE SITE BOUNDARY (WITHIN BLOCK 3048)
- APPROXIMATE FORMER SITE FEATURE LOCATIONS (BASED ON 1936 BROOKLYN UNION GAS CO. PROPERTY PLAN)
- SOIL BORING LOCATION (ARCADIS, 2014)
- SOIL BORING/TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2014)
- SOIL BORING/MONITORING WELL LOCATION (ARCADIS, 2014)
- APPROXIMATE SOIL BORING LOCATION (LiRo ENGINEERS, 2005)
- APPROXIMATE SOIL BORING/MONITORING WELL LOCATION (LiRo ENGINEERS, 2005)
- **BOLD** COMPOUND CONCENTRATION EXCEEDS PROTECTION OF GROUNDWATER SCO
- SCO SOIL CLEANUP OBJECTIVE

NOTES:

1. MONITORING WELL AND SOIL BORING LOCATIONS SURVEYED RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. BASE MAP BY DONALD G. DEKENIPP L.S., P.C., PROFESSIONAL LAND SURVEYOR.
3. THE APPROXIMATE LOCATIONS OF SOIL BORINGS B-1 THROUGH B-3 ARE BASED ON A LIRO ENGINEERS, INC. MONITORING WELL LOCATION MAP DATED JULY 2005.
4. CONCENTRATIONS ARE PROVIDED IN MICROGRAMS PER KILOGRAM (ug/kg).
5. MONITORING WELLS MW-1 THROUGH MW-4 WERE ABANDONED ON APRIL 22 AND 23, 2015.

0 50' 100'

SCALE IN FEET

NATIONAL GRID
FORMER SCHOLES STREET HOLDER STATION SITE
BROOKLYN, NEW YORK
INTERIM SITE MANAGEMENT PLAN

VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING SCGS

ARCADIS Design & Consultancy for natural and built assets

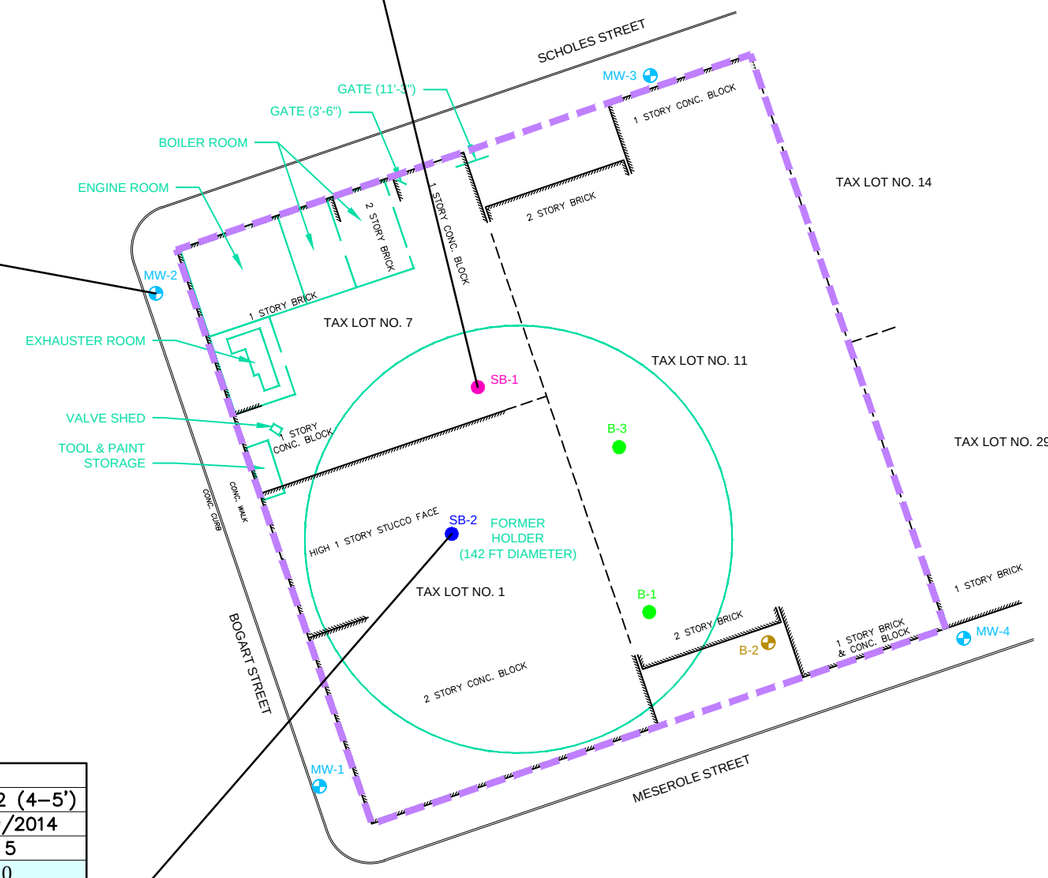
FIGURE 6

CITY:SYRACUSE-NY DIVGROUP:ENV DB:AS/AE LD:AS PIC:(Opt) PM:(Reqd) TM:CK LYR:(Opt)ON=*;OFF=*REF*
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XREFS: IMAGES: PROJECTNAME: ----
XrBDR-BI
X36709X01

SB-1	
Sample ID	SB–1 (1–2')
Sample Date	2/12/2014
Sample Depth (ft)	1 – 2
Benzo(a)anthracene	2200
Chrysene	2700
Benzo(b)fluoranthene	3200
Benzo(a)pyrene	3200
Dibenz(a,h)anthracene	610

MW-2	
Sample ID	MW–2 (2–3')
Sample Date	1/28/2014
Sample Depth (ft)	2 – 3
Benzo(a)anthracene	1500
Chrysene	1600
Benzo(b)fluoranthene	2000
Benzo(a)pyrene	1700

SB-2	
Sample ID	SB–2 (4–5')
Sample Date	1/29/2014
Sample Depth (ft)	4 – 5
Benzo(a)anthracene	1700
Chrysene	1800
Benzo(b)fluoranthene	2300
Benzo(a)pyrene	1800



LEGEND:

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- APPROXIMATE FORMER SITE FEATURE LOCATIONS (BASED ON 1936 BROOKLYN UNION GAS CO. PROPERTY PLAN)
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- SOIL BORING/TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2014)
- SOIL BORING/MONITORING WELL LOCATION (ARCADIS, 2014)
- APPROXIMATE SOIL BORING LOCATION (LiRo ENGINEERS, 2005)
- APPROXIMATE SOIL BORING/MONITORING WELL LOCATION (LiRo ENGINEERS, 2005)
- **BOLD** COMPOUND CONCENTRATION EXCEEDS PROTECTION OF GROUNDWATER SCO
- **BOLD** COMPOUND CONCENTRATION EXCEEDS PROTECTION OF PUBLIC HEALTH COMMERCIAL USE SCO
- SCO SOIL CLEANUP OBJECTIVE

NOTES:

1. MONITORING WELL AND SOIL BORING LOCATIONS SURVEYED RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. BASE MAP BY DONALD G. DEKENIPP L.S., P.C., PROFESSIONAL LAND SURVEYOR.
3. THE APPROXIMATE LOCATIONS OF SOIL BORINGS B-1 THROUGH B-3 ARE BASED ON A LIRO ENGINEERS, INC. MONITORING WELL LOCATION MAP DATED JULY 2005.
4. CONCENTRATIONS ARE PROVIDED IN MICROGRAMS PER KILOGRAM (ug/kg).
5. MONITORING WELLS MW-1 THROUGH MW-4 WERE ABANDONED ON APRIL 22 AND 23, 2015.

0 50' 100'

SCALE IN FEET

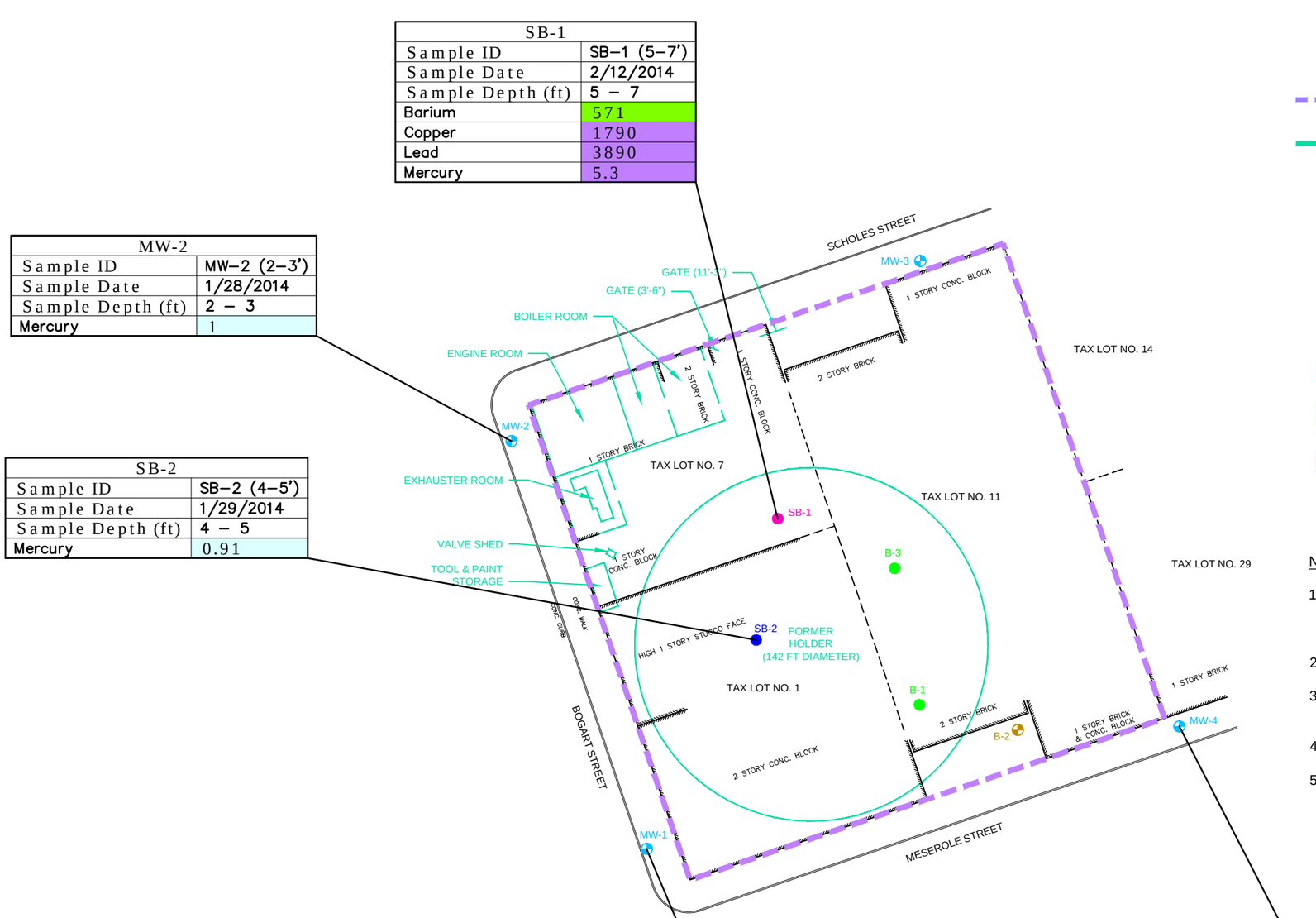
NATIONAL GRID
FORMER SCHOLES STREET HOLDER STATION SITE
BROOKLYN, NEW YORK
INTERIM SITE MANAGEMENT PLAN

SEMI-VOLATILE ORGANIC COMPOUNDS IN SOIL EXCEEDING SCGS

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FIGURE 7

CITY:SYRACUSE-NY DIVGROUP:ENV DB:ASIAF LD:AS PIC:(Opt) PM:(Reqd) TM:CK LYR:(Opt)ON=*OFF=*REF*
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XREFS:
XrBDR-BI
X\B0036709X01
IMAGES:
PROJECTNAME: ----



SB-1	
Sample ID	SB–1 (5–7')
Sample Date	2/12/2014
Sample Depth (ft)	5 – 7
Barium	571
Copper	1790
Lead	3890
Mercury	5.3

MW-2	
Sample ID	MW–2 (2–3')
Sample Date	1/28/2014
Sample Depth (ft)	2 – 3
Mercury	1

SB-2	
Sample ID	SB–2 (4–5')
Sample Date	1/29/2014
Sample Depth (ft)	4 – 5
Mercury	0.91

MW-1	
Sample ID	MW–1 (2–3')
Sample Date	1/28/2014
Sample Depth (ft)	2 – 3
Mercury	1.9

MW-4		
Sample ID	MW–4 (2–3')	MW–4 (10–12')
Sample Date	1/31/2014	2/11/2014
Sample Depth (ft)	2 – 3	10 – 12
Mercury	32.5	22.5

LEGEND:

- APPROXIMATE SITE BOUNDARY (WITHIN BLOCK 3048)
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- SOIL BORING LOCATION (ARCADIS, 2014)
- SOIL BORING/TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2014)
- SOIL BORING/MONITORING WELL LOCATION (ARCADIS, 2014)
- APPROXIMATE SOIL BORING LOCATION (LiRo ENGINEERS, 2005)
- APPROXIMATE SOIL BORING/MONITORING WELL LOCATION (LiRo ENGINEERS, 2005)
- **BOLD** ANALYTE CONCENTRATION EXCEEDS PROTECTION OF GROUNDWATER SCO
- **BOLD** ANALYTE CONCENTRATION EXCEEDS PROTECTION OF PUBLIC HEALTH COMMERCIAL USE SCO
- **BOLD** ANALYTE CONCENTRATION EXCEEDS PROTECTION OF GROUNDWATER SCO AND PROTECTION OF PUBLIC HEALTH COMMERCIAL USE SCO
- SCO SOIL CLEANUP OBJECTIVE

NOTES:

1. MONITORING WELL AND SOIL BORING LOCATIONS SURVEYED RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. BASE MAP BY DONALD G. DEKENIPP L.S., P.C., PROFESSIONAL LAND SURVEYOR.
3. THE APPROXIMATE LOCATIONS OF SOIL BORINGS B-1 THROUGH B-3 ARE BASED ON A LIRO ENGINEERS, INC. MONITORING WELL LOCATION MAP DATED JULY 2005.
4. CONCENTRATIONS ARE PROVIDED IN MILLIGRAMS PER KILOGRAM (mg/kg).
5. MONITORING WELLS MW-1 THROUGH MW-4 WERE ABANDONED ON APRIL 22 AND 23, 2015.

0 50' 100'

SCALE IN FEET

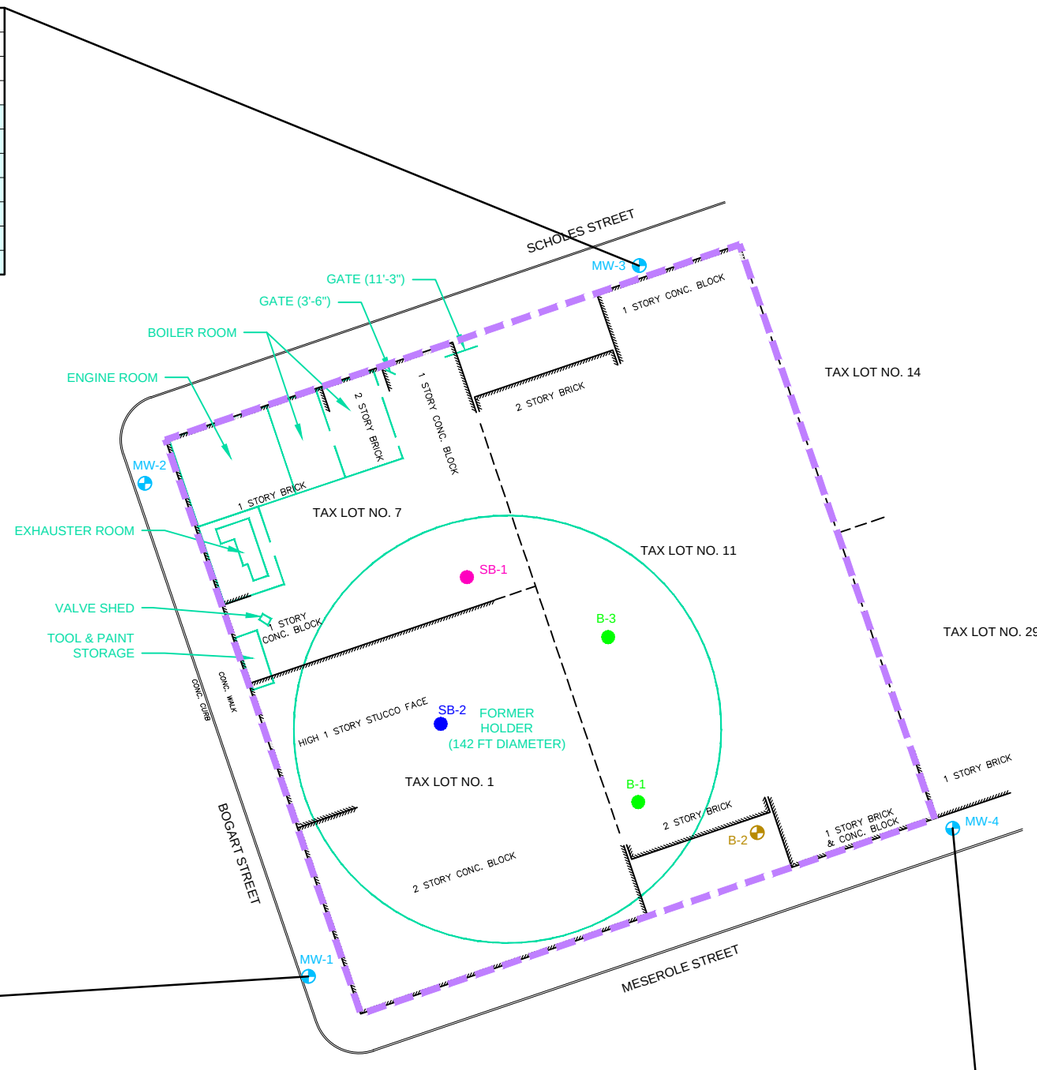
NATIONAL GRID
FORMER SCHOLES STREET HOLDER STATION SITE
BROOKLYN, NEW YORK
INTERIM SITE MANAGEMENT PLAN

METALS IN SOIL EXCEEDING SCGS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 8

CITY:SYRACUSE-NY DIVGROUP:ENV DB:AS/AE LD:AS PIC:(Opt) PM:(Reqd) TM:CK LYR:(Opt)ON=*;OFF=*REF*
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XREFS:
XrBDR-BI
X3679X01
IMAGES:
PROJECTNAME: ----



MW-3	
Sample ID	MW-3
Sample Date	3/11/2014
Screen Interval (ft)	8 – 23
Benzene	1.7 J
Chlorobenzene	15
Trichloroethene	10
Vinyl chloride	17
Cis-1,2-Dichloroethene	43
1,4-Dichlorobenzene	4.6 J
1,2-Dichlorobenzene	4.4 J

MW-1	
Sample ID	MW-1
Sample Date	3/11/2014
Screen Interval (ft)	10 – 25
Tetrachloroethene	6
Trichloroethene	7.8

MW-4	
Sample ID	MW-4
Sample Date	3/11/2014
Screen Interval (ft)	10 – 25
Cis-1,2-Dichloroethene	6.9

LEGEND:

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- APPROXIMATE FORMER SITE FEATURE LOCATIONS (BASED ON 1936 BROOKLYN UNION GAS CO. PROPERTY PLAN)
- SOIL BORING LOCATION (ARCADIS, 2014)
- SOIL BORING/TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2014)
- SOIL BORING/MONITORING WELL LOCATION (ARCADIS, 2014)
- APPROXIMATE SOIL BORING LOCATION (LiRo ENGINEERS, 2005)
- APPROXIMATE SOIL BORING/MONITORING WELL LOCATION (LiRo ENGINEERS, 2005)
- **BOLD** COMPOUND CONCENTRATION EXCEEDS SGV
- SGV AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES
- J ESTIMATED VALUE

NOTES:

1. MONITORING WELL AND SOIL BORING LOCATIONS SURVEYED RELATIVE TO THE NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. BASE MAP BY DONALD G. DEKENIPP L.S., P.C., PROFESSIONAL LAND SURVEYOR.
3. THE APPROXIMATE LOCATIONS OF SOIL BORINGS B-1 THROUGH B-3 ARE BASED ON A LIRO ENGINEERS, INC. MONITORING WELL LOCATION MAP DATED JULY 2005.
4. CONCENTRATIONS ARE PROVIDED IN MICROGRAMS PER LITER (ug/L).
5. MONITORING WELLS MW-1 THROUGH MW-4 WERE ABANDONED ON APRIL 22 AND 23, 2015.

0 50' 100'

SCALE IN FEET

NATIONAL GRID
FORMER SCHOLES STREET HOLDER STATION SITE
BROOKLYN, NEW YORK
INTERIM SITE MANAGEMENT PLAN

VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER EXCEEDING SCGS

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FIGURE 9

CITY:SYRACUSE-NY DIVGROUP:ENV DB:BASIAE LD:AS PIC:(Opt) PM:(Reqd) TM:CK LYR:(Opt)ON=*;OFF=*REF*
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XREFS: IMAGES: PROJECTNAME: ----
XrBDR-BI
X36709X01

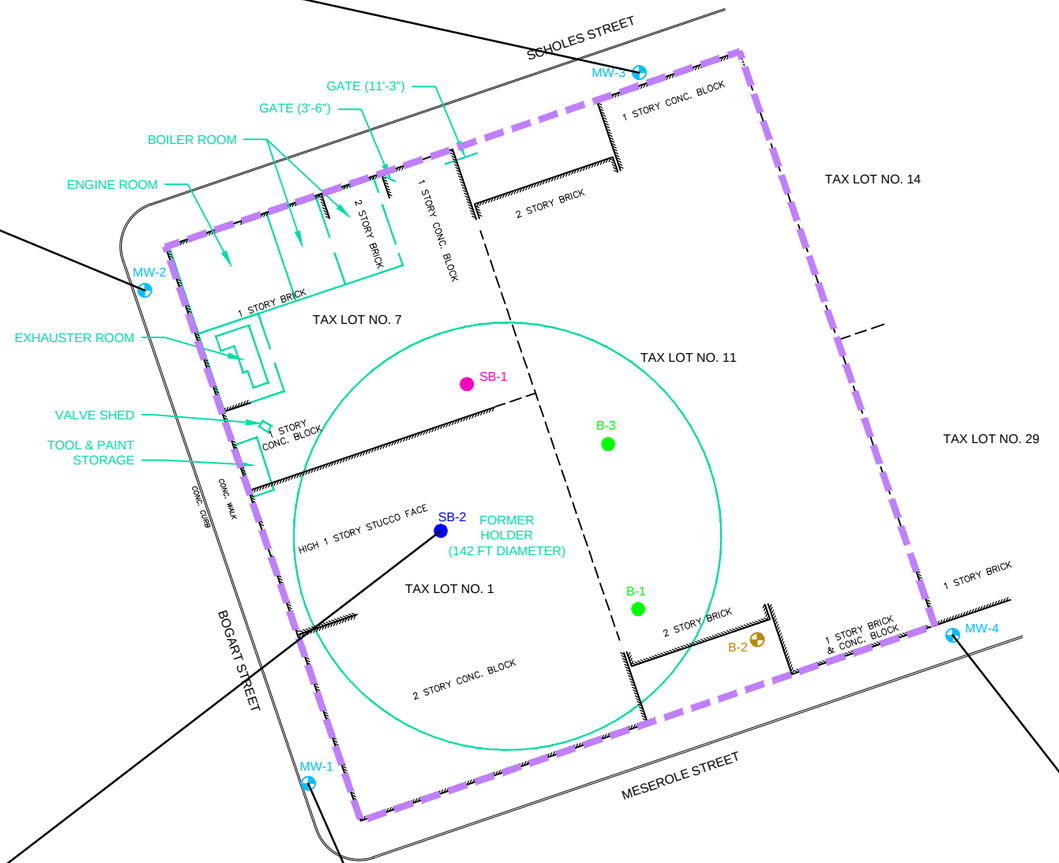
MW-3	
Sample ID	MW-3
Sample Date	3/11/2014
Screen Interval (ft)	8 – 23
Iron	14100
Manganese	3650
Sodium	354000

MW-2	
Sample ID	MW-2
Sample Date	3/11/2014
Screen Interval (ft)	10 – 25
Iron	3230
Manganese	4640
Sodium	73300

SB-2	
Sample ID	SB-2-GW (17-20')
Sample Date	1/29/2014
Sample Depth (ft)	17 – 20
Arsenic	123
Barium	3670
Beryllium	27
Chromium	915
Copper	1010
Iron	756000
Lead	294
Magnesium	95100
Manganese	29400
Mercury	1.9
Nickel	662
Sodium	130000

MW-1	
Sample ID	MW-1
Sample Date	3/11/2014
Screen Interval (ft)	10 – 25
Iron	3480
Manganese	2020
Sodium	82400

MW-4	
Sample ID	MW-4
Sample Date	3/11/2014
Screen Interval (ft)	10 – 25
Iron	10400
Manganese	760
Sodium	57500



LEGEND:

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- SOIL BORING/TEMPORARY MONITORING WELL LOCATION (ARCADIS, 2014)
- SOIL BORING/MONITORING WELL LOCATION (ARCADIS, 2014)
- APPROXIMATE SOIL BORING LOCATION (LiRo ENGINEERS, 2005)
- APPROXIMATE SOIL BORING/MONITORING WELL LOCATION (LiRo ENGINEERS, 2005)
- **BOLD** ANALYTE CONCENTRATION EXCEEDS SGV
- SGV AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES
- J ESTIMATED VALUE

NOTES:

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3. THE APPROXIMATE LOCATIONS OF SOIL BORINGS B-1 THROUGH B-3 ARE BASED ON A LIRO ENGINEERS, INC. MONITORING WELL LOCATION MAP DATED JULY 2005.
4. CONCENTRATIONS ARE PROVIDED IN MICROGRAMS PER LITER (ug/L).
5. MONITORING WELLS MW-1 THROUGH MW-4 WERE ABANDONED ON APRIL 22 AND 23, 2015.

0 50' 100'

SCALE IN FEET

NATIONAL GRID
FORMER SCHOLES STREET HOLDER STATION SITE
BROOKLYN, NEW YORK
INTERIM SITE MANAGEMENT PLAN

METALS IN GROUNDWATER EXCEEDING SCGS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 10

CITY:SYRACUSE-NY DIV/GROUP:ENV DB:AS/AF LD:AS PIC:(Opt) PM:(Reqd) TM:CK LYR:(Opt)ON=*;OFF=*REF*
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XREFS: IMAGES: PROJECTNAME: ----
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X=36709X01

Identify Change Or Action

Change of Ownership

Notify NYSDEC and National Grid in writing 60 days prior

Within 15 days after the transfer of ownership, provide NYSDEC and National Grid the new owner name, contact representative and contact information

Change of Use

Notify NYSDEC and National Grid in writing 60 days prior

Redevelopment

Notify NYSDEC and National Grid in writing as early as possible, minimum 12 months

Excavation

Notify National Grid in writing as early as possible

Notify NYSDEC in writing at least 15 days prior to starting field activities

Prepare and submit:

- Notice of Intrusion Letter
- Excavation Work Plan
- CAMP requirements

Emergency Situation Only

Provide verbal notice to NYSDEC and National Grid by noon of the following day.

Written confirmation to follow within 7 days.

NATIONAL GRID
FORMER SCHOLES STREET HOLDER STATION SITE
BROOKLYN, NEW YORK
INTERIM SITE MANAGEMENT PLAN

DECISION TREE FOR INTRUSIVE ACTIVITIES ON-SITE

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FIGURE
11

C:\BIM\OneDrive - ARCADIS\Sidetergy\ACCDocs\Arcadis\AUS-NATIONAL GRID-SCHOLES STREET HOLDER STATION\Project Files\302201-DWG\NG-SCHOLES-DECISION_TREE.dwg SAVED: 1/13/2022 3:11 PM BY: DECLERCQ, BRIAN
XREFS:
IMAGES:
A-BDR-BI

APPENDICES

DRAFT

APPENDIX A – LIST OF SITE CONTACTS

Name	Phone/Email Address
338 Scholes Street BP Hartung LLC Piotr Zendzian Damian Dajka, Esq.	(718) 383-0909
350 Scholes Street Meserole Management LLC Eric Ching Jerry J. Kim, Esq.	(212) 736-3116
154 Bogart Street Bright Dimension, LLC Jerry Huang	(646) 742-1678
Donald Campbell, National Grid Project Manager	(718) 963-5453 Donald.Campbell@nationalgrid.com
Terry W. Young, P.E. (Arcadis), National Grid's Consultant (serving as Certifying Engineer)	(315) 671-9478 Terry.Young2@arcadis.com
Scott Deyette, NYSDEC DER Project Manager	(518) 402-9662 scott.deyette@dec.ny.gov
Carolyn Rooney, National Grid Attorney	(516) 477-6042 Carolyn.Rooney@nationalgrid.com

DRAFT

APPENDIX B – EXCAVATION WORK PLAN (EWP)

Since the final remedy has not yet been completed, this EWP will be implemented to address any intrusive activities prior to the final remedy or any portion of the final remedy at the Site. The property owner is required to comply with this EWP. National Grid is only responsible for costs associated with MGP-related impacts.

There is MGP-related impacted material in the soil at the Site. MGP-related impacted material includes non-aqueous phase liquid (NAPL), adsorbed to soil particles, and/or as sheens or a naphthalene-like odor. This EWP pertains to all intrusive subsurface activities within the area of the ISMP. Intrusive subsurface activities may encounter impacts, and thus must be managed in accordance with this EWP and the ISMP.

B-1 NOTIFICATION

At least 15 days prior to the start of any small-scale (limited[1]) excavation activity that is anticipated to encounter impacts on the Site, the property owner or their representative will notify the NYSDEC and National Grid. Table B-1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of Site-related contact information is provided in Appendix A of the ISMP.

Table B-1: Notifications*

Scott Deyette, NYSDEC Project Manager	(518) 402-9662 scott.deyette@dec.ny.gov
Donald Campbell, National Grid Project Manager	(718) 963-5453 Donald.Campbell@nationalgrid.com

* Note: Notifications are subject to change and will be updated as necessary.

[1] Note that NYSDEC makes the determination of which excavations are small-scale (e.g. limited) and which are large-scale. To know with certainty that the proposed excavation is considered to be small-scale (e.g. limited) will require a prior notification to NYSDEC describing the work to be performed.

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All subsurface intrusive activities must be approved by NYSDEC. These activities may include, but are not limited to: excavations; installing or repairing utilities (including sewer and water); foundation work; demolition of pavement, concrete slabs, or foundations; installing fence posts, bollards, guide rail posts; constructing subsurface vaults; performing subsurface investigation activities (including geotechnical investigation activities); etc. Notification must be made to NYSDEC in accordance with Section 1.3 of the ISMP.

The property owner will generate the notification to NYSDEC via a Notice of Intrusion letter. This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of impacted soil to be excavated and any work that may impact the engineering control;
- Whether proposed activities will require dewatering, proposed containment of dewatering liquids and planned disposal options for dewatering liquids;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of constituents of concern, potential presence of grossly impacted media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this EWP;
- A statement from the party performing the work that the work will be performed in compliance with this EWP, 29 Code of Federal Regulations (CFR) 1910.120 and 29 CFR 1926 Subpart P;
- A copy of the contractor's HASP, in electronic format;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

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The NYSDEC project manager will review the notification and may impose additional requirements for the excavation that are not listed in this EWP.

B-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based (e.g. photoionization detector) soil screening will be performed by a Qualified Environmental Professional (QEP) or person under their supervision during all limited excavations into known or potentially impacted material. Soil screening will be performed when the intrusive work is done and will include screening of all excavation and intrusive work performed during development, such as excavations for foundations and utility work.

Based on previous environmental data and screening results, soils will be segregated into material that requires off-site disposal and material that requires testing to determine if the material can be reused beneath the cover. Further discussion of off-site disposal of materials and on-site reuse is provided in Sections B-6 and B-7 of this EWP.

B-3 SOIL STAGING METHODS

Material removed from the subsurface will be screened and then segregated as described above. Stockpiles of excavated material will, at minimum, be placed on top of polyethylene sheeting. If required by NYSDEC, stockpiles of excavated material will be placed within an engineered staging area (which may include a bermed area with a continuous liner, a liquid collection sump, and a stone drainage layer or other requirements to satisfy the NYSDEC). Stockpiles will be kept covered whenever soils are not actively being placed into or removed from the stockpile, during overnight/weekend hours, during periods of precipitation, or whenever dust action levels are exceeded with appropriately anchored impervious covers (e.g., tarps or plastic sheeting) to reduce potential infiltration of precipitation, migration of wind-blown dust, and direct contact exposures. Stockpiles will be routinely inspected and damaged covers will be promptly replaced.

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During all soil disturbance activities, erosion and sediment controls will be employed in accordance with this ISMP and in conformance with applicable laws and regulations (good work practices that require erosion and sediment controls are not limited to potentially impacted areas). Proven soil conservation practices will be incorporated in any such plans to mitigate soil erosion, off-Site sediment migration, and water pollution from erosion. Such practices would include the use of sediment control and erosion control measures (hay bales, silt fence, etc.) or other methods (e.g., inlet protection as needed near catch basins, surface waters and other discharge points) to prevent soil from entering these features. Appropriate temporary erosion and sediment control measures (e.g., silt fencing, hay bales, etc.) will be installed and maintained around all impacted and potentially-impacted soil/fill stockpiles and bare soil surfaces during such activities. Such stockpiles will be graded and compacted as necessary for positive surface water run-off and dust control. Stockpiles will be located and sized to minimize potential for material or run-off to enter discharge points.

Stockpiles will be segregated on-site based on the soil/material type. These soil/material types will include impacted soils, reuse soil, and imported fill.

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

B-4 MATERIALS EXCAVATION AND LOAD-OUT

A QEP or person under their supervision will oversee all intrusive work at the Site and the excavation and load-out of all excavated material.

To the extent that they perform work under this EWP, the property owner(s) and their contractors are responsible for safe execution of all intrusive and other work; including the structural integrity of excavations and structures; such as subsurface utilities and buildings that may be affected by excavations.

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The presence of utilities and easements on the Site will be investigated. Based on this investigation, it will be determined whether a risk or impediment to the work planned under this EWP is posed by utilities or easements on the Site.

To the extent practicable, queuing of trucks will be performed on-Site in order to minimize off-Site disturbance. Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and New York State Department of Transportation (NYSDOT) requirements (and all other applicable transportation requirements).

A truck wash will be operated on Site, as appropriate. The property owner's QEP will be responsible for monitoring that all outbound trucks will be washed at the truck wash before leaving the Site until the activities performed under this section are complete. Truck wash waters will be collected and disposed off-site in an appropriate manner.

The property owner's QEP will be responsible for monitoring that all egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the Site during intrusive excavation activities. Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-site soil tracking. If there is evidence of off-site soil tracking, trucks will be cleaned (via approved dry or wet methods) of loose soil found on the outside of vehicle or tires prior to exiting the Site. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition, relative to conditions prior to the start of work and with respect to site-derived materials.

B-5 MATERIALS TRANSPORT OFF-SITE

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

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Material transported by trucks exiting the Site will be secured with tight-fitting water-proof tarpaulin covers. At a minimum, trucks transporting any material off-site shall be water-tight and structurally sound, have competent cover systems and functional locking tailgates. The bed and sidewalls of each dump box or trailer will be completely lined with not less than six-mil polyethylene sheeting prior to loading contaminated waste. Loose-fitting canvas-type truck covers or mesh covers will be prohibited. All trucks transporting impacted material will be decontaminated prior to leaving the Site. Decontamination water, if any, will be collected and disposed of off-site in an appropriate manner.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site. Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

The NYSDOT-approved truck transport routes are included in Figure B-1. All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes. Selection of the most appropriate route takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

It is the property owner/contractor's responsibility to follow all applicable State, local, and municipal rules, regulations, and guidelines (including New York City Department of Transportation [NYCDOT] and NYSDOT) regarding truck routes.

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

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B-6 MATERIALS DISPOSAL OFF-SITE

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

Regulated soils will be stockpiled and transported to a National Grid approved facility. Off-site disposal locations for excavated soils will be identified in the pre-excavation notification prepared by the owner and provided to National Grid for review and submittal to NYSDEC. This will include estimated quantities and a breakdown by class of disposal facility if appropriate. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Interim Site-Wide Inspection Summary. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and impacted soils taken off-site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364, and 365. Material that does not meet Unrestricted Use SCOs is prohibited from being taken to a New York State C&D debris recovery facility (6 NYCRR Subpart 360-5 registered or permitted facility).

B-7 MATERIALS REUSE ON-SITE

This section provides details for methods to be followed for materials reuse on-site. ‘Reuse on-site’ applies to material that originates at the Site, which does not leave the Site during the excavation, and is replaced into the excavation during backfilling. All MGP-related impacted material exposed and removed as part of the work at the Site shall be

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disposed off-site as detailed in this EWP. All other material excavated during work will require NYSDEC approval prior to any reuse on-site.

A Request to Import/Reuse Fill or Soil form, which can be found in Attachment B-1 and at http://www.dec.ny.gov/regulations/67386.html, will be prepared by the property owner and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review.

Excavated material that is visibly stained or exhibits an obvious odor shall be considered potentially impacted and stockpiled on site for further assessment. Potentially impacted material shall be placed on polyethylene sheeting in stockpiles not to exceed 250 cubic yards (CY). The stockpiled potentially impacted material shall be covered whenever soils are not actively being placed into or removed from the stockpile, during overnight/weekend hours, during periods of precipitation, or whenever dust action levels are exceeded. This material shall be covered using polyethylene sheeting to reduce potential infiltration of precipitation, migration of wind-blown dust, and direct contact exposures.

Prior to reuse, stockpiled potentially impacted material shall be sampled and analyzed by an Environmental Laboratory Approval Program (ELAP)-certified laboratory to evaluate whether the material can be replaced beneath the cover system at the Site or must be transported for off-site disposal. One grab sample and one composite sample shall be collected for each 250 CY of potentially impacted soils. The grab sample will be analyzed for target compound list (TCL) VOCs using U.S. Environmental Protection Agency (EPA) Method 8260. Each composite sample shall be formed using individual grab samples collected from five locations within each stockpile (i.e., five discrete grab samples per composite). The composite sample shall be formed by placing equal portions of soil from each of the five discrete grab sampling locations into a pre-cleaned, stainless steel bowl (or dedicated container). The composite sample shall be thoroughly homogenized using a stainless steel scoop or trowel before being transferred into the sample containers provided by the laboratory. The filled sample containers shall be labeled and transported

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to the laboratory using a chain-of-custody form. The composite sample will be submitted for the following analyses:

- TCL SVOCs using USEPA Method 8270
- Total cyanide using USEPA Method 9012
- Target analyte list (TAL) metals using USEPA Methods 6010 and 7471

Chemical criteria for on-site reuse of material will be the Restricted Use Protection of Public Health Commercial Use SCOs and Protection of Groundwater SCOs presented in 6 NYCRR Part 375. The QEP will document that procedures defined for materials reuse in this EWP are followed and that unacceptable material does not remain on Site. Impacted soil that is approved by NYSDEC for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

Any demolition material, including former subsurface MGP-related structures, that is not visibly impacted and is proposed for reuse on site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Demolition debris proposed for reuse on site that is not associated with the former MGP-related structures is the responsibility of the Owner. Concrete crushing or processing on site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site will not be reused on site. As discussed above, all MGP-related impacted material, including demolition debris, exposed and removed as part of the work at the Site shall be disposed off-site as detailed in this EWP.

B-8 FLUIDS MANAGEMENT

All impacted liquids to be removed from the Site, including but not limited to, excavation dewatering and decontamination waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Impacted

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liquids removed from the Site will be disposed of at a National Grid approved disposal facility. Dewatering fluids will not be recharged back to the land surface or subsurface of the Site, and will be managed off-site, unless prior approval is obtained from NYSDEC.

Discharge of water generated during construction activities into sanitary or combined sewers will require approval from the NYSDEC and the New York City Department of Environmental Protection (NYCDEP) and will be performed under a NYCDEP dewatering permit, as coordinated by the property owner and its contractor(s).

B-9 COVER SYSTEM RESTORATION

After the completion of soil removal and any other intrusive activities the cover system will be restored in a manner that complies with the decision document by National Grid. The existing cover system is comprised of concrete covered surfaces and building slabs. The demarcation layer, consisting of orange snow fencing material or equivalent material, will be placed in excavation areas with impacted material to provide a visual reference to the top of the impacted material zone, the zone that requires adherence to special conditions for disturbance of impacted soils defined in this EWP. The property owner shall not change the type of cover system following excavation without prior written permission from National Grid. A figure showing the modified surface will be included in the subsequent Interim Site-Wide Inspection Summary and in an updated ISMP.

B-10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the Site will be approved by National Grid's QEP and will be in compliance with provisions in this EWP prior to receipt at the Site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html, will be prepared by the owner and submitted to the NYSDEC project manager by National Grid allowing a minimum of 5 business days for review. The Request to Import/Reuse Fill or Soil form is included in Attachment B-1. This will include analytical sampling of the borrow source or existing documentation of agency approvals of the source (i.e., NYSDOT virgin source certification

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and latest analytical sampling results). NYSDEC approval must be received before material is imported to the Site.

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

All imported soils will meet the backfill and cover soil quality standards established in 6 NYCRR 375-6.7(d). Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the soil quality standards to be used for the Site are 6 NYCRR Part 375 Restricted Use Protection of Public Health Commercial Use SCOs and Protection of Groundwater SCOs. Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Solid waste will not be imported onto the Site.

Samples will be collected from imported fill in accordance with the analytical sampling requirements of DER-10 and the frequency requirements in NYSDEC's Soil Cleanup Guidance, CP-51. At a minimum, samples will be analyzed for inorganics, pesticides, PCBs, VOCs, SVOCs, per- and polyfluoroalkyl substances (PFAS), and 1,4-dioxane in accordance with the analytes for the Restricted Commercial Use SCOs listed in Table 375-6.8(b) of 6 NYCRR Part 375. The frequency and type of the sampling (i.e., discrete or composite) will be based on the quantity of material imported in accordance with Table 4 of CP-51.

Trucks entering the Site with imported soils will be securely covered with tight fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases (Section B-3).

B-11 STORMWATER POLLUTION PREVENTION

For excavations less than 1 acre that are not part of a larger disturbance, the following stormwater management practices will be completed in accordance with the

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requirements in the New York State Stormwater Management Design Manual, latest revision.

Silt fencing and/or hay bale checks will be installed for erosion control around the entire perimeter of the construction area and will be inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the silt fencing and/or hay bale check functional.

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

Manufacturer's recommendations will be followed for installation and for replacing silt fencing damaged due to weathering or other causes.

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

In the event that the work on the property is part of a larger plan that disturbs more than 1 acre, the respective property owner must obtain coverage under the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity.

B-12 EXCAVATION CONTINGENCY PLAN

Identification of unknown or unexpected potentially impacted media identified by screening during intrusive site work will be promptly communicated by phone to National Grid and National Grid will notify NYSDEC’s Project Manager. Reportable quantities of

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petroleum product will also be reported to the NYSDEC spills hotline. These findings will also be included in the Interim Site-Wide Inspection Summary.

If underground tanks or other previously unidentified contaminant sources are found during subsurface excavations, excavation activities will be suspended until the appropriate personnel and sufficient equipment is mobilized to address the condition.

In the event that potential impacts are encountered at unexpected depth or locations, Site activities will be suspended and National Grid will be notified and will evaluate the observed conditions in a manner and timeframe that does not interfere with the property owner's(s') construction schedule, to the extent reasonably feasible. National Grid may determine that laboratory testing is required to evaluate the observed conditions for concentrations and characteristics. If the encountered materials are determined to be MGP-impacted, then the encountered materials will be segregated and stockpiled for disposal at a National Grid approved facility.

Sampling will be performed on product, surrounding soils, and groundwater, if present, as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (TAL metals, target compound list (TCL) VOCs, SVOCs, pesticides, and PCBs, and free cyanide). In the event that future sampling results provide a sufficient justification to limit the list of analytes, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

B-13 COMMUNITY AIR MONITORING PLAN

The CAMP will consist of a real-time monitoring and action level reporting system. The CAMP will be conducted during all intrusive activity on the Site and will be performed in accordance with a project-specific Community Air Monitoring Plan (CAMP) that will be prepared in accordance with the NYSDOH Generic CAMP (Appendix 1A of DER-10). The NYSDOH Generic CAMP and the Fugitive Dust and Particulate Monitoring (Appendix 1B of DER-10) are included as Appendix F of this ISMP as these documents

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set-forth minimum requirements applicable to a project-specific CAMP. Air monitoring station locations will be chosen based on generally prevailing wind conditions and adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

Exceedances of action levels listed in the CAMP (Appendix F of this ISMP) will be reported to NYSDEC and NYSDOH Project Managers.

B-13A: 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 part per million, 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 the NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 micrograms per cubic meter, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 micrograms per cubic meter or less at the monitoring location.

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- Depending upon the nature of contamination and remedial 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, for each site.

B-13B: 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.

B-14 ODOR CONTROL PLAN

Odors which derive from site impacts may cause a nuisance to some site workers and the surrounding community, even though the impacts are at levels well below the action levels defined in the CAMP. This odor control plan provides the means and methods for controlling emissions of nuisance odors on site and off site. Specific odor control methods to be used on a routine basis will include all reasonable and necessary means as described in the following paragraph. If nuisance odors are identified at the Site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated.

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NYSDEC and NYSDOH will be notified by National Grid of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the property owner, and their contractors and their Remediation Engineer, and any measures that are implemented will be discussed in the Interim Site-Wide Inspection Summary.

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

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

B-15 DUST CONTROL PLAN

Dust which derives from site impacts may cause a nuisance to some site workers and the surrounding community, even though the impacts are at levels well below the action levels defined in the CAMP. Dust monitoring will be performed in accordance with the project-specific CAMP. Real-time air monitoring will be implemented at representative upwind and downwind locations in the vicinity of the intrusive activities for particulate matter less than 10 microns in diameter (PM10). Perimeter monitoring will include the use of a real-time particulate monitoring instrument. As required by the NYSDOH Generic CAMP, real-time airborne particulate monitoring will be conducted continuously during

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intrusive activities, including soil excavation, backfilling, and related soil handling. Fugitive dust migration will be visually assessed during work activities, and reasonable dust suppression techniques will be used during Site activities that may generate fugitive dust.

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

- Dust suppression will be achieved through the use of a dedicated on-site water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.
- Water in the truck should be only from a verified clean source. On-site groundwater cannot be used for dust mitigation.

In the event that complaints are received for dust, the contractor will take the appropriate response actions for dust suppression.

B-16 OTHER NUISANCES

The following items may be necessary depending on the type of wastes present, the location of the site and other site-specific concerns. These plans are generally not required for submission to the NYSDEC but are generally required as part of construction.

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

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

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FIGURE B-1 – NYCDOT TRUCK ROUTE MAP

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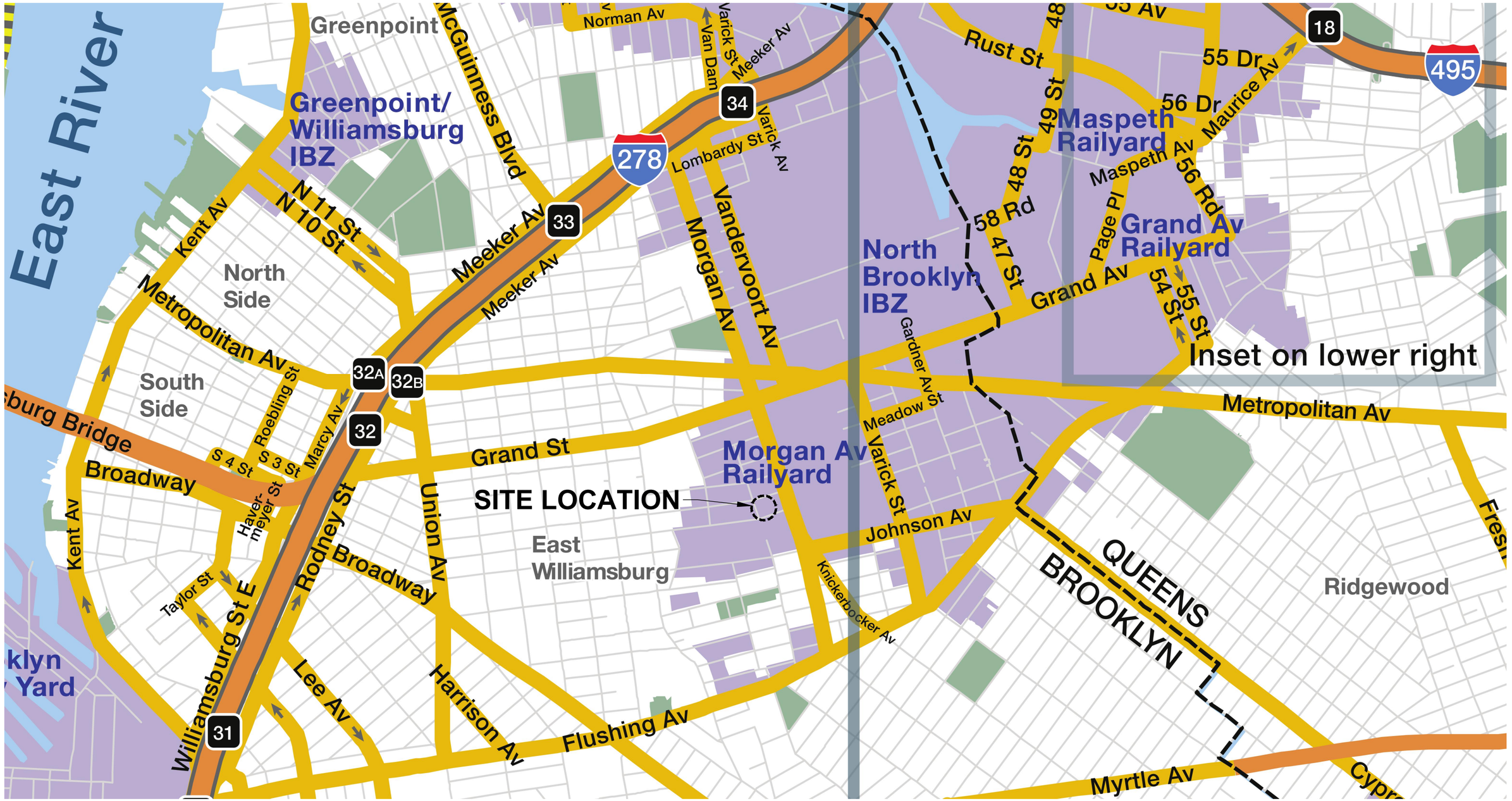


IMAGE SOURCE: NYCDOT 2015 NEW YORK CITY TRUCK ROUTE MAP.

LEGEND:

- LOCAL TRUCK ROUTE
- THROUGH TRUCK ROUTE
- THROUGH TRUCK ROUTE ON EXPRESSWAY

NATIONAL GRID
FORMER SCHOLES STREET HOLDER STATION SITE
BROOKLYN, NEW YORK
EXCAVATION WORK PLAN

NYCDOT TRUCK ROUTE MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
B-1

CITY:SYRACUSE-NY DIV/GROUP:ENV DB:AS/AF LD:AS PIC:(Opt) PM:(Reqd) TM:CK LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIB003670\900000005\B36709N01.dwg LAYOUT: B-1 SAVED: 7/27/2017 2:26 PM ACADVER: 20.1S (LMS TECH) PAGESETUP: ----
XREFS: IMAGES: PROJECTNAME: ----
XBDR-BI

ATTACHMENT B-1 – REQUEST TO IMPORT/REUSE FILL OR SOIL FORM

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NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Request to Import/Reuse Fill or Soil

This form is based on the information required by DER-10, Section 5.4(e). Use of this form is not a substitute for reading the applicable Technical Guidance document.

SECTION 1 – SITE BACKGROUND

The allowable site use is: Choose an item

Have Ecological Resources been identified? Choose an item

Is this soil originating from the site? Choose an item

How many cubic yards of soil will be imported/reused? Choose an item

If greater than 1000 cubic yards will be imported, enter volume to be imported:

SECTION 2 – MATERIAL OTHER THAN SOIL

Is the material to be imported gravel, rock or stone? Choose an item

Does it contain less than 10%, by weight, material that would pass a size 80 sieve? Choose an item

Is this virgin material from a permitted mine or quarry? Choose an item

Is this material recycled concrete or brick from a DEC registered processing facility? Choose an item

SECTION 3 - SAMPLING

Provide a brief description of the number and type of samples collected in the space below:

Example Text: 5 discrete samples were collected and analyzed for VOCs. 2 composite samples were collected and analyzed for SVOCs, Inorganics & PCBs/Pesticides.

If the material meets requirements of DER-10 section 5.5 (other material), no chemical testing needed.

SECTION 3 CONT'D - SAMPLING

Provide a brief written summary of the sampling results or attach evaluation tables (compare to DER-10, Appendix 5):

Example Text: Arsenic was detected up to 17 ppm in 1 (of 5) samples; the allowable level is 16 ppm.

If Ecological Resources have been identified use the "If Ecological Resources are Present" column in Appendix 5.

SECTION 4 – SOURCE OF FILL

Name of person providing fill and relationship to the source:

Location where fill was obtained:

Identification of any state or local approvals as a fill source:

If no approvals are available, provide a brief history of the use of the property that is the fill source:

Provide a list of supporting documentation included with this request:

The information provided on this form is accurate and complete.

_____ _____

Signature Date

_____

Print Name

_____

Firm

Revised August 2014

APPENDIX C – ENVIRONMENTAL EASEMENT
(Not available when ISMP drafted)

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APPENDIX D – MONITORING WELL BORING AND CONSTRUCTON LOGS

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ARCADIS

SOIL CORE/SAMPLE LOG

Boring/Well: MW-1 | Project/No.: Former Scholes Street Holder Station / B0036709.0000 | Page: 1 of 1

Site Location: Brooklyn, NY | Drilling Started: 2/7/2014 | Drilling Completed: 2/7/2014

Drilling Contractor: SGS North America Inc. | Driller: Brian Siecker | Helper: Bradford Osborne

Drilling Method: Direct Push (Geoprobe) | Drilling Fluid Used: None

Length and Diameter of Coring Device: 5' x 1.85" | Sampling Interval: Continuous feet

Land Surface Elev.: _____ feet ☐ Surveyed ☐ Estimated | Datum: _____

Total Depth Drilled: 40 Feet | Hole Diameter: 3.25" | Type of Sample/ Coring Device: DT325 Dual Tube Sampling System

Prepared By: Stephen Schwarz | Hammer Weight: ---- pounds | Hammer Drop: ---- inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Blows per 6 inches	Sample/Core Description
2	3	Utility Clearance/ Soft Digging	0.2		(2'-3') fill, fine to medium sand, some pebbles, little brick fragments, brown, wet,
			0.3		no odor (Sample collected on 1/28/14)
					Note: Air knifing/vacuum excavation conducted from 0-2 ft and 3-5 ft
					Hand augered from 2-3 ft
5	10	2.5			(5'-5'6") utility clearance backfill sand
			0.2		(5'6"-6'9") clay, little silt, medium plasticity, slow dilatancy, very soft, moist, brown to
			0.2		dark brown, no odor, no sheen
					(6'9"-7'6") fine sand, little small pebbles, poorly sorted, moist, brown, no odor, no sheen
10	15	0.0			No recovery
15	20	2.6	1.4		(15'-16'6") fine to medium sand, subrounded, well sorted, wet,
			1.4		brown to dark brown to black, no odor
					(16'6"-17'7") medium sand, some coarse sand, trace pebbles, dark brown, no odor,
					no staining
20	25	2.5	0.4		(20'-20'6") coarse sand, subangular, well sorted, brown, wet, no staining, no odor
			0.4		(20'6"-21'11") fine sand, well sorted, brown, wet, no odor, no staining
					(21'11"-22'6") coarse sand, subrounded, poorly sorted, brown, wet, no odor, no staining
25	30	2.3	0.4		(25'-26'2") coarse sand, subangular, poorly sorted, brown, wet, no odor, no staining
			0.4		(26'2"-27'4") coarse sand and pebbles, poorly sorted, brown, wet, no odor,
					no staining
30	35	2.6	0.4		(30'-32'7") medium to coarse sand, little pebbles, poorly sorted, brown, wet,
			0.9		no odor, no staining
35	40	2.7	0.4		(35'-36') coarse sand, poorly sorted brown to dark grey, wet, no odor, no staining
			1.1		(36'-37'8") medium to coarse sand, trace pebbles, poorly sorted, brown, wet,
					no odor, no staining
					END OF BORING

ARCADIS

SOIL CORE/SAMPLE LOG

Boring/Well: MW-2 | Project/No.: Former Scholes Street Holder Station / B0036709.0000 | Page: 1 of 1

Site Location: Brooklyn, NY | Drilling Started: 2/6/2014 | Drilling Completed: 2/6/2014

Drilling Contractor: SGS North America Inc. | Driller: Brian Siecker | Helper: Bradford Osborne

Drilling Method: Direct Push (Geoprobe) | Drilling Fluid Used: None

Length and Diameter of Coring Device: 5' x 1.85" | Sampling Interval: Continuous feet

Land Surface Elev.: ____ feet ☐ Surveyed ☐ Estimated | Datum: ____

Total Depth Drilled: 40 Feet | Hole Diameter: 3.25" | Type of Sample/ Coring Device: DT325 Dual Tube Sampling System

Prepared By: Stephen Schwarz | Hammer Weight: ---- pounds | Hammer Drop: ---- inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Blows per 6 inches	Sample/Core Description
2	3	Utility Clearance/ Soft Digging	0.1		(2'-3') medium to fine sand, loamy soil, little fill material (brick, pebbles), little clay,
			0.1		moist, light brown to brown, no odor (Sample collected on 1/28/14)
					Note: Air knifing/vacuum excavation conducted from 0-2 ft and 3-5 ft
					Hand augered from 2-3 ft
5	10	2.9	0.4		(5'-5'2") utility clearance backfill sand
			0.4		(5'2"-7'1") silty clay, little fine sand, trace pebbles, low plasticity, no dilatancy, brown,
			0.3		moist, no odor, no sheen
					(7'1"-7'11") fine to medium sand, trace pebbles and rock fragments, poorly sorted,
					no odor
10	15	2.5	0.3		(10'-12'6") medium to coarse sand, trace pebbles, subrounded, well sorted, brown,
			0.1		moist, no odor, no sheen
			0.2		
15	20	3.3	0.8		(15'-16') medium sand, subrounded, well sorted, grayish brown, no odor, no sheen
			0.6		(16'-18'4") medium sand, some coarse sand, trace pebbles, brown, wet, no odor
			0.6		
20	25	2.5	0.8		(20'-21') fine sand, well sorted, brown, wet, no odor, no sheen
			0.5		(21'-21'6") medium sand, well sorted, brown, wet, no odor, no sheen
			0.7		(21'6"-22'6") coarse sand, some medium sand, trace large pebbles, brown, wet,
					no odor, no sheen
25	30	1.3	0.5		(25'-26'4") coarse sand, subangular, trace large (>1") pebbles, subrounded, brown,
					wet, no odor
30	35	1.7	0.4		(30'-31'2") coarse sand, subangular, trace pebbles, gray, no odor, no sheen
			0.4		(31'2"-31'8") fine to medium sand, poorly sorted, brown, no odor, no sheen
35	40	2.1	0.5		(35'-36'1") coarse sand, subangular, little pebbles, brown, wet, no odor, no sheen
			0.6		(36'1"-36'7") fine sand, subrounded, well sorted, brown, wet
					(36'7"-37'1") coarse sand, subangular, well sorted, brown, wet, no odors, no sheen
					END OF BORING

ARCADIS

SOIL CORE/SAMPLE LOG

Boring/Well: MW-3 | Project/No.: Former Scholes Street Holder Station / B0036709.0000 | Page: 1 of 1

Site Location: Brooklyn, NY | Drilling Started: 2/12/2014 | Drilling Completed: 2/12/2014

Drilling Contractor: SGS North America Inc. | Driller: Brian Siecker | Helper: Bradford Osborne

Drilling Method: Direct Push (Geoprobe) | Drilling Fluid Used: None

Length and Diameter of Coring Device: 5' x 1.85" | Sampling Interval: Continuous feet

Land Surface Elev.: _____ feet ☐ Surveyed ☐ Estimated | Datum: _____

Total Depth Drilled: 40 Feet | Hole Diameter: 3.25" | Type of Sample/ Coring Device: DT325 Dual Tube Sampling System

Prepared By: Stephen Schwarz | Hammer Weight: ---- pounds | Hammer Drop: ---- inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Blows per 6 inches	Sample/Core Description
2	3	Utility Clearance/ Soft Digging	0.2		(2'-3') loamy soil, sand, trace clay, poorly sorted, brown, moist, no odor, no staining
					(Sample collected on 1/31/14)
					Note: Air knifing/vacuum excavation conducted from 0-2 ft and 3-8 ft
					Hand augered from 2-3 ft
8	10	1.4	0.5		(8'-9'5") silty clay, soft, low plasticity, dark to light brown, moist, no staining,
			0.6		slight naphthalene-like odor
10	15	4.0	0.4		(10'-10'10") silty clay, soft, low plasticity, brown, no odor, no staining
			0.7		(10'10"-12'6") fine to medium sand, subrounded, well sorted, wet, no odor,
			1.1		no staining
			1.1		(12'6"-13'6") large pebbles, well rounded; little fine to medium sand, brown, wet,
					no odor, no staining
					(13'6"-14') fine to medium sand, subrounded, trace coarse sand, dark brown, wet,
					no odor, no staining
15	20	2.7	0.9		(15'-15'9") coarse sand, subangular, brown, wet, no odor, no staining
			0.9		(15'9"-17'8") medium sand, some pebbles, poorly sorted, subrounded, wet, no odor,
					no staining
20	25	0.0			No recovery
25	30	2.0	1.1		(25'-25'8") coarse sand, little medium sand, subangular, poorly sorted, brown, wet,
			1.1		no odor, no staining
					(25'8"-25'10") fine sand, well sorted, brown, wet, no odor, no staining
					(25'10"-27') coarse sand, some pebbles, subrounded, poorly sorted, brown, wet,
					no odor, no staining
30	35	2.0	0.5		(30'-30'9") coarse sand, subrounded, brown, wet, no odor, no staining
			1.1		(30'9"-31'2") fine sand, well sorted, brown, wet, no odor, no staining
					(31'2"-32') coarse sand, some medium sand, little pebbles, poorly sorted, brown,
					wet, no odor, no staining
35	40	2.9	0.6		(35'-36'6") fine sand, well sorted, brown, wet, no odor, no staining
			0.8		(36'6"-37'11") coarse sand, little pebbles, brown, wet, no odor, no staining
					END OF BORING

ARCADIS

SOIL CORE/SAMPLE LOG

Boring/Well: MW-4 | Project/No.: Former Scholes Street Holder Station / B0036709.0000 | Page: 1 of 1

Site Location: Brooklyn, NY | Drilling Started: 2/11/2014 | Drilling Completed: 2/11/2014

Drilling Contractor: SGS North America Inc. | Driller: Brian Siecker | Helper: Bradford Osborne

Drilling Method: Direct Push (Geoprobe) | Drilling Fluid Used: None

Length and Diameter of Coring Device: 5' x 1.85" | Sampling Interval: Continuous feet

Land Surface Elev.: _____ feet ☐ Surveyed ☐ Estimated | Datum: _____

Total Depth Drilled: 40 Feet | Hole Diameter: 3.25" | Type of Sample/ Coring Device: DT325 Dual Tube Sampling System

Prepared By: Stephen Schwarz | Hammer Weight: ---- pounds | Hammer Drop: ---- inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Blows per 6 inches	Sample/Core Description
2	3	Utility Clearance/ Soft Digging	0.1		(2'-3') fill material, some wood chips, sand, pebbles, brick fragments, black/light gray,
					no odor, no staining (Sample collected on 1/31/14)
					Note: Air knifing/vacuum excavation conducted from 0-2 ft and 3-5 ft
					Hand augered from 2-3 ft
5	10	3.2	0.2		(5'-8'2") fill material, poorly sorted sand-brick-tile fragments, black, dry, slight odor,
			0.2		no sheen
			0.2		
10	15	3.1	0.3		(10'-10'8") fill material, poorly sorted sand-brick-tile fragments, light gray, dry,
			0.5		slight odor, no sheen
			0.4		(10'8"-12'2") silty clay, soft, low plasticity, black, moist, no odor, no sheen, no staining
					(12'2"-12'7") fine sand, some twigs, little silt, well sorted, no odor, no staining
					(12'7"-13'1") alternating layers of clay, soft, light gray, moist, and silty clay, hard, red,
					dry, no odor, no staining
15	20	4.6	0.3		(15'-16') silty clay, medium stiff, some pebbles, light gray, no odor, no staining
			0.3		(16'-19') fine sand, little silty clay, trace pebbles, well sorted, light gray to brown,
			0.3		no odor, no staining
			0.3		(19'-19'7") coarse sand, subangular, trace pebbles, well sorted, brown, wet, no odor,
					no staining
20	25	3.8	0.4		(20'-23'10") coarse sand, little medium sand, little pebbles, subrounded, brown, wet,
			0.4		no odor, no staining
			0.4		
25	30	2.7	0.4		(25'-25'5") pebbles and coarse sand, brown, wet, no odor, no staining
			0.7		(25'5"-27'8") medium to coarse sand, trace pebbles, subrounded, brown, wet,
					no odor, no staining
30	35	2.1	0.4		(30'-32'1") coarse sand, little medium sand, subrounded to subangular, well sorted,
			0.7		wet, no odor, no staining
35	40	0.9	0.4		(35'-35'11") medium to coarse sand, little pebbles, subrounded, poorly sorted, wet,
					no odor, no staining
					END OF BORING

ARCADIS

SOIL CORE/SAMPLE LOG

Boring/Well: SB-1 | Project/No.: Former Scholes Street Holder Station / B0036709.0000 | Page: 1 of 1

Site Location: Brooklyn, NY | Drilling Started: 2/12/2014 | Drilling Completed: 2/12/2014

Drilling Contractor: SGS North America Inc. | Driller: Brian Siecker | Helper: Bradford Osborne

Drilling Method: Direct Push (Geoprobe) | Drilling Fluid Used: None

Length and Diameter of Coring Device: 5' x 1.85" | Sampling Interval: Continuous feet

Land Surface Elev.: _____ feet ☐ Surveyed ☐ Estimated | Datum: _____

Total Depth Drilled: 7 Feet | Hole Diameter: 3.25" | Type of Sample/ Coring Device: DT325 Dual Tube Sampling System

Prepared By: Stephen Schwarz | Hammer Weight: ---- pounds | Hammer Drop: ---- inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Blows per 6 inches	Sample/Core Description
0	1	Utility Clearance/ Soft Digging			Concrete
1	2	Utility Clearance/ Soft Digging	2.3		(1'-1'6") stone
					(1'6"-2') fill material, sand, poorly sorted, brown, some pebbles, little red brick fragments,
					wet (from core drilling), no odor
2	3	Utility Clearance/ Soft Digging	1.7		(2'-3') fill material, brick, some sand, little pebbles, moist, no odor
3	4	Utility Clearance/ Soft Digging	0.9		(3'-4') fill material, sand, brick, pebbles, poorly sorted, tan, wet, no odor
4	5	Utility Clearance/ Soft Digging	0.9		(4'-4'6") same as above
					(4'6"-5') no recovery due to sones
5	7	0.5	15.7		(5'-5'6") medium sand, poorly sorted, brick fragments, black, wet,
			407.0		strong naphthalene-like odor, iridescent sheen
					END OF BORING (REFUSAL - At probable foundation of former holder)

ARCADIS

SOIL CORE/SAMPLE LOG

Boring/Well: SB-2 | Project/No.: Former Scholes Street Holder Station / B0036709.0000 | Page: 1 of 2

Site Location: Brooklyn, NY | Drilling Started: 1/29/2014 | Drilling Completed: 1/30/2014

Drilling Contractor: SGS North America Inc. | Driller: Brian Siecker | Helper: Bradford Osborne

Drilling Method: Direct Push (Geoprobe) | Drilling Fluid Used: None

Length and Diameter of Coring Device: 5' x 1.85" | Sampling Interval: Continuous feet

Land Surface Elev.: ____ feet ☐ Surveyed ☐ Estimated | Datum: ____

Total Depth Drilled: 40 Feet | Hole Diameter: 3.25" | Type of Sample/ Coring Device: DT325 Dual Tube Sampling System

Prepared By: Stephen Schwarz | Hammer Weight: ---- pounds | Hammer Drop: ---- inches

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Blows per 6 inches	Sample/Core Description
0	1	Utility Clearance/ Soft Digging	0.4		(0'-6") concrete
			3.0		(6"-8") fine to coarse pebbles, trace medium sand, brown, wet, no odor
					(8"-1') fill material, asphalt, trace brick fragments, black, no odor
1	2	Utility Clearance/ Soft Digging	0.5		(1'-2') fill material, bits of brick and concrete, some sand, little pebbles, brown,
					dry to moist, no odor
2	3	Utility Clearance/ Soft Digging	0.1		(2'-3') fill material, some brick and stone, some fine to medium sand, brown,
					little pieces of white to light gray fine sand bedding, dry to moist, no odor
3	4	Utility Clearance/ Soft Digging	0.2		(3'-4') fill material, sticks and wood fragments, some sand, little pebbles,
					little brick fragments, no odor
4	5	Utility Clearance/ Soft Digging	11.0		(4'-5') fine sand, some medium sand, dark brown to black, wet,
					moderate petroleum-like odor (perched water at 4'6"), no sheen
5	7	1.3	38.3		(5'-5'5") medium sand and medium pebbles, brown, wet, slight petroleum-like odor
					(5'5"-6'4") rock chips and rock fragments, black, strong petroleum-like odor, dry,
					no sheen
7	10	2.0	37.5		(7'-8') fill material, trap rock, glass, angular pebbles, brown to black,
			3.5		moderate petroleum-like odor
					(8'-9') silty clay, little fine sand, low plasticity, soft, reddish-brown, moist,
					slight petroleum-like odor
10	15	2.9	1.5		(10'-10'7") silty clay, low plasticity, soft, reddish-brown, moist, slight petroleum-like odor
			3.4		(10'7"-10'9") quartzite stone
			0.7		(10'9"--12') very fine sand, dense, light brown, moist, no odor
					(12'-12'11") medium to coarse sand, fining upward, well sorted, brown, moist,
					no odor
15	20	3.0	0.7		(15'-18') medium to coarse sand, poorly sorted, wet, slight petroleum-like odor
					(water level appears to be approximately 16 ft)
20	25	4.6	1.3		(20'-24'7") same as above, slight petroleum-like odor, no staining
			1.8		
			0.9		
			0.9		
			1.0		

ARCADIS

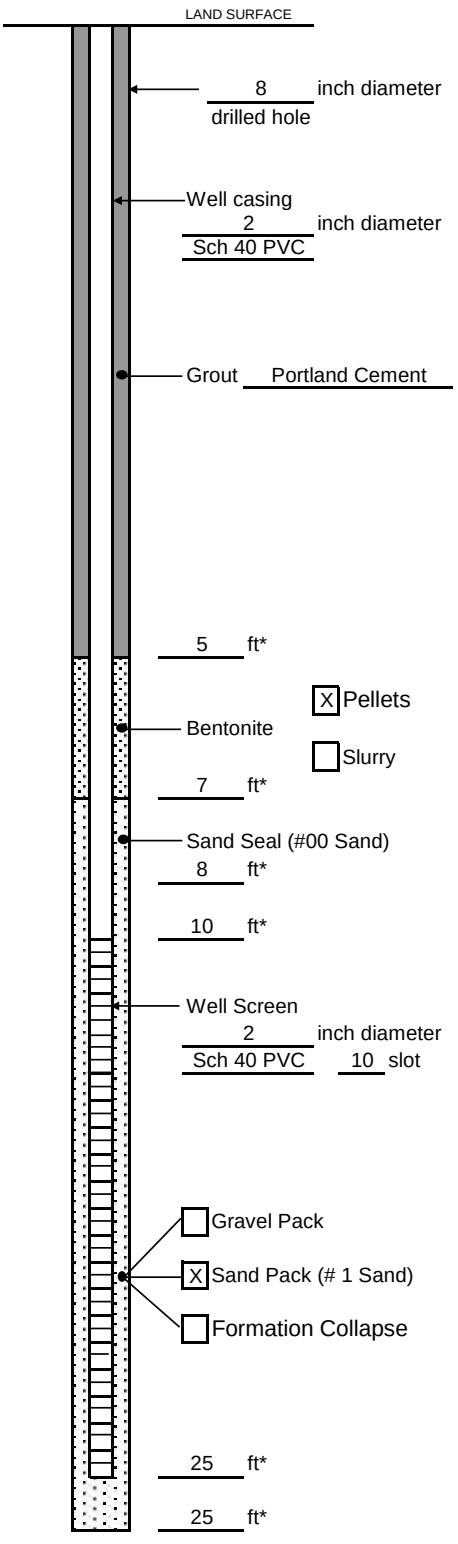
SOIL CORE/SAMPLE LOG (Cont.)

Boring/Well SB-2

Prepared By Stephen Schwarz

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	PID Reading (ppm)	Blows per 6 inches	Sample/Core Description
25	30	3.0	14.6		(25'-25'6") coarse sand, subangular, well sorted, dark gray, wet,
			1.4		moderate petroleum-like odor, no staining
			1.5		(25'6"-27'6") medium to coarse sand, subrounded, well sorted, brown, wet,
					no odor, no staining
					(27'6"-28') fine sand, subrouned, well sorted, brown, wet, no odor, no staining
30	35	3.3	3.7		(30'-33'4") medium and coarse sand, subangular, poorly sorted,
			1.4		brown to reddish-brown, wet, slight petroleum-like odor, no staining
			1.7		
35	40	2.8	1.7		(35'-37'10") medium to coarse sand, subangular to subrounded, poorly sorted;
			1.9		little pebbles, subrounded, brown to dark brown, wet, no odor, no staining
			1.8		
			1.6		
					END OF BORING

WELL CONSTRUCTION LOG



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project: Former Scholes Street Holder Station Well: MW-1

Town/City: Brooklyn

County: Kings State: NY

Permit No.:

Land Surface and Measuring Point Elevation: Datum: NGVD 29

Land Surface: 16.97 feet [X] Surveyed

Measuring Point: 16.48 feet [ ] Estimated

Installation Date(s): 2/7/2014

Drilling Method: Hollow-Stem Auger (4.25-inch ID)

Drilling Contractor: SGS North America, Inc.

Drilling Fluid: None

Development Technique(s) and Date(s)

Pump and Surge

2/19/2014

Fluid Loss During Driling: _____ gallons

Static Depth to Water: 11.27 feet below M.P.

Water Removed During Development: 50 gallons

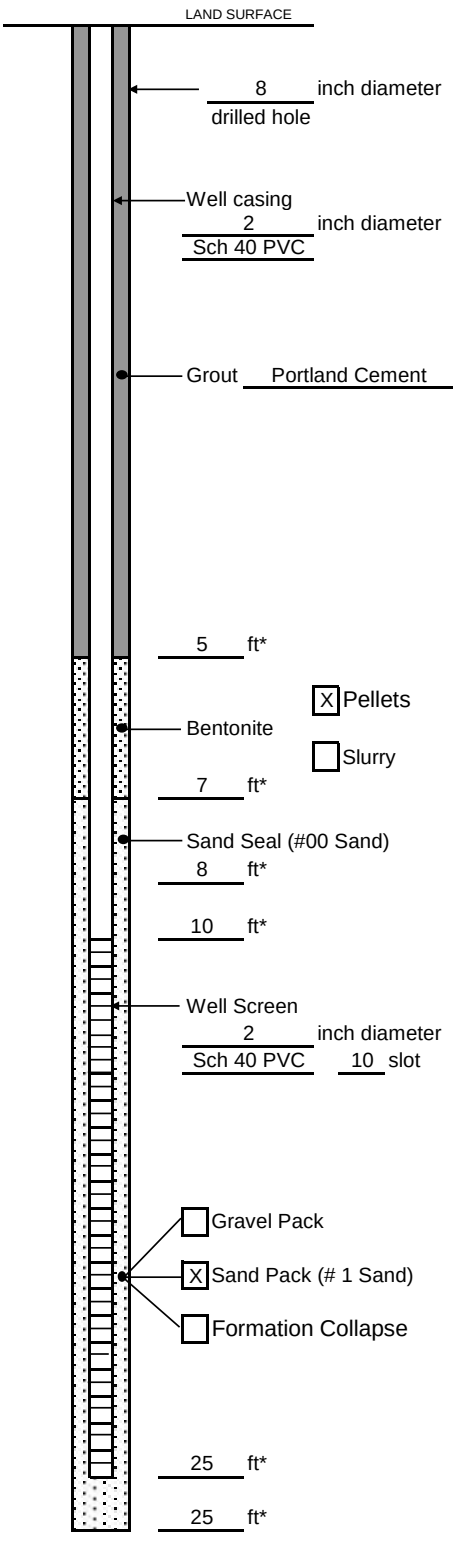
Pumping Duration: 0.5 hours

Well Purpose: Monitoring Well

Remarks:

Prepared by: Stephen Schwarz

WELL CONSTRUCTION LOG



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project: Former Scholes Street Holder Station Well: MW-2

Town/City: Brooklyn

County: Kings State: NY

Permit No.:

Land Surface and Measuring Point Elevation: Datum: NGVD 29

Land Surface: 16.80 feet [X] Surveyed

Measuring Point: 16.35 feet [ ] Estimated

Installation Date(s): 2/6/2014

Drilling Method: Hollow-Stem Auger (4.25-inch ID)

Drilling Contractor: SGS North America, Inc.

Drilling Fluid: None

Development Technique(s) and Date(s)

Pump and Surge

2/19/2014

Fluid Loss During Driling: _____ gallons

Static Depth to Water: _____ feet below M.P.

Water Removed During Development: 45 gallons

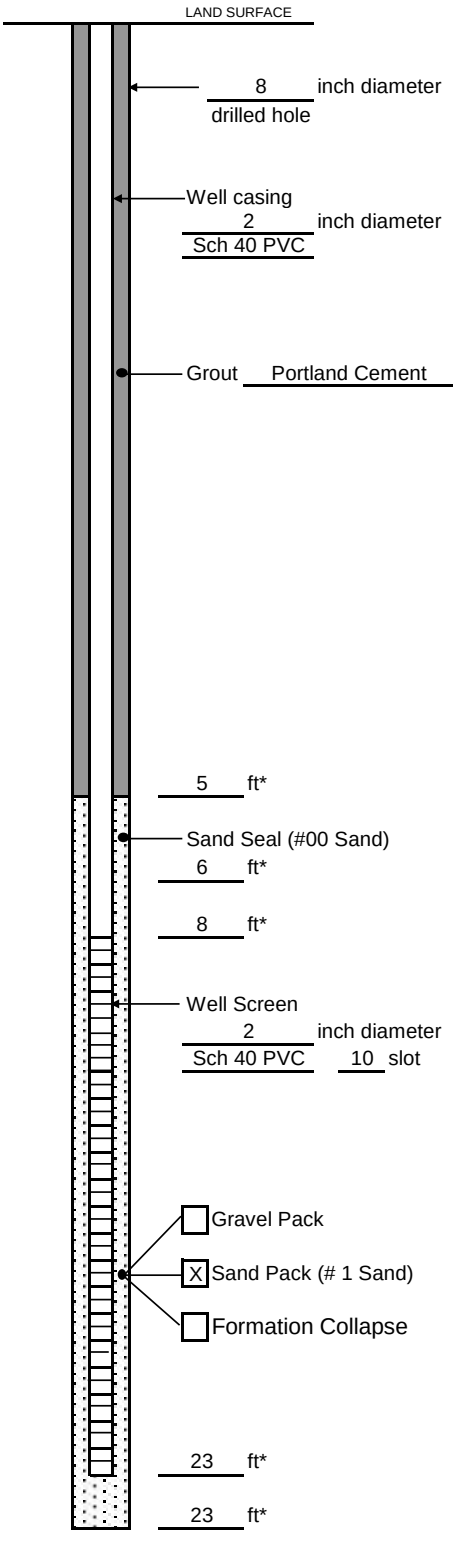
Pumping Duration: 1 hours

Well Purpose: Monitoring Well

Remarks:

Prepared by: Stephen Schwarz

WELL CONSTRUCTION LOG



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project: Former Scholes Street Holder Station Well: MW-3

Town/City: Brooklyn

County: Kings State: NY

Permit No.:

Land Surface and Measuring Point Elevation: Datum: NGVD 29

Land Surface: 15.00 feet [X] Surveyed

Measuring Point: 14.78 feet [ ] Estimated

Installation Date(s): 2/18/2014

Drilling Method: Hollow-Stem Auger (4.25-inch ID)

Drilling Contractor: SGS North America, Inc.

Drilling Fluid: None

Development Technique(s) and Date(s)

Pump and Surge

2/19/2014

Fluid Loss During Driling: _____ gallons

Static Depth to Water: _____ feet below M.P.

Water Removed During Development: 95 gallons

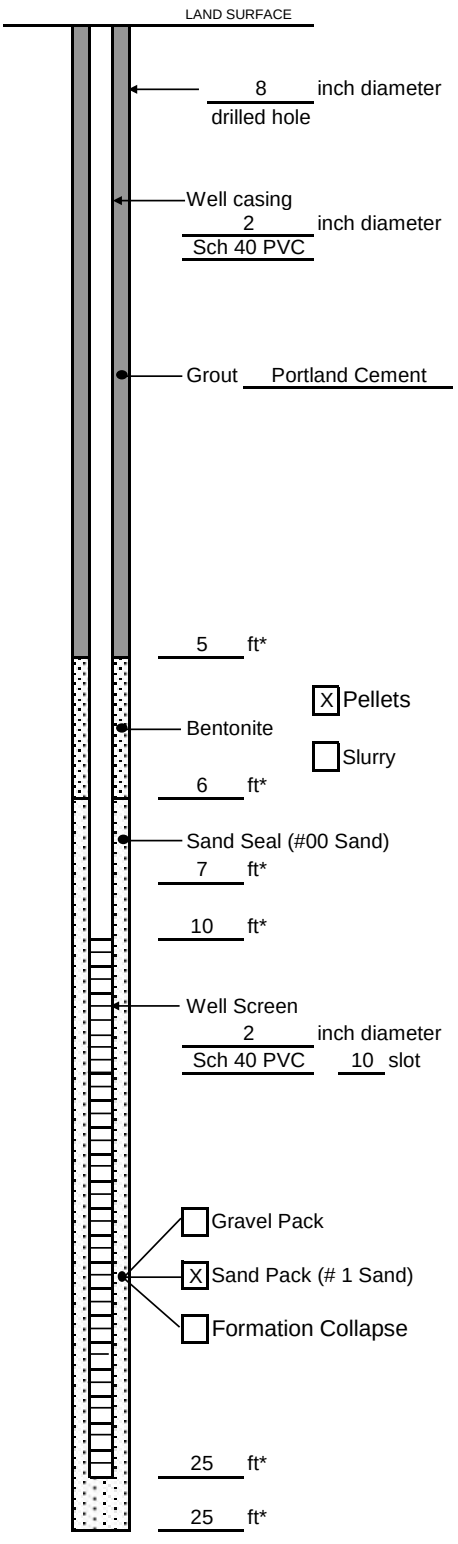
Pumping Duration: 1.5 hours

Well Purpose: Monitoring Well

Remarks:

Prepared by: Stephen Schwarz

WELL CONSTRUCTION LOG



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project: Former Scholes Street Holder Station Well: MW-4

Town/City: Brooklyn

County: Kings State: NY

Permit No.:

Land Surface and Measuring Point Elevation: Datum: NGVD 29

Land Surface: 14.40 feet [X] Surveyed

Measuring Point: 13.99 feet [ ] Estimated

Installation Date(s): 2/11/2014

Drilling Method: Hollow-Stem Auger (4.25-inch ID)

Drilling Contractor: SGS North America, Inc.

Drilling Fluid: None

Development Technique(s) and Date(s)

Pump and Surge

2/19/2014

Fluid Loss During Driling: _____ gallons

Static Depth to Water: _____ feet below M.P.

Water Removed During Development: 40 gallons

Pumping Duration: 0.5 hours

Well Purpose: Monitoring Well

Remarks:

Prepared by: Stephen Schwarz

APPENDIX E – HEALTH AND SAFETY PLAN

DRAFT

Site Specific Health and Safety Plan

Revision 17b

Project Name:	Former Scholes Street Holder Station Site
Project Number:	30004000
Client Name:	National Grid
Date:	3/15/2022
Revision:	1

Approvals:

HASP Developer: Doug Nodine

Project Manager: Steven Feldman

HASP Reviewer: Dan Zuck



HASP Reviewer Signature (handwritten or digital signature)

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COVID-19 Guidance

The Arcadis Field and Embedded Staff COVID-19 Guidance is provided in Attachment 4. The National Grid Safety Procedure COVID-19 Health & Safety Plan is provided in Attachment 5. The Arcadis Guidance and National Grid Procedure will be reviewed prior to and followed during all field activities.

New York City Workplace Vaccination Requirement

In accordance with the New York City Workplace Vaccination Requirement all Arcadis Employees and Subcontractors must present proof of vaccination prior to commencing work.

Face Coverings

Face coverings are required when performing work indoors. Face coverings are required when performing work outdoors only when six-foot social distancing can not be maintained.

Reporting a COVID-19 Exposure

If you have tested positive or learned you have been in close contact with a positive COVID-19 case follow the steps as presented in the Arcadis Field and Embedded Staff COVID-19 Guidance Section 2.9.

Hygiene

In accordance with Section 2.4 of the Arcadis Field and Embedded Staff COVID-19 Guidance Employees should practice good hygiene including washing hands with soap and water for at least 20 seconds and having hand sanitizer with at least 60% alcohol for instances when soap and water are not readily available.

Employees will continue to monitor and comply with current NYS and NYC COVID compliance.

Arcadis Culture of Caring

Arcadis is committed to a Culture of Caring that ensures each Arcadis employee, part time as needed employee (PTAN), temporary agency employee under Arcadis day to day control, Inexperienced Workers and contractor (cumulatively referred to here as "field staff") goes home at the end of the day free from injury or illness. I certify that the following has been performed with all Arcadis field staff on this project either in person or by Skype:

☐ Reviewed the HASP including a discussion of hazard identification and controls.

- ☐ If conducting activities deemed by Arcadis to be "High Risk", frontline management has reviewed applicable H&S standards (Job Safety Analysis [JSA] when authorized by H&S) for these activities with field staff.
- ☐ If permit to work is required, frontline management has reviewed the permit(s) with field staff.

☐ Reviewed proactive H&S engagement expectations/injury prevention actions.
☐ Reviewed Stop Work Authority.
☐ Reviewed the incident reporting process and expectations including when WorkCare should be contacted by staff (WorkCare incident intervention for all minor, non-emergency injuries) and that the WorkCare phone number is programmed into field team cell phone.
☐ For Inexperienced Workers, a mentor has been assigned for the new task being performed.

For short service employees (SSEs), PTANS* and temporary agency employees* :

☐ Provided coaching and mentoring on Arcadis H&S expectations during project work. Reviewed in detail specific hazards and controls and provided a resource who can be contacted if individual has questions regarding planned or unplanned work tasks.

Mentor/Resource # _____ _____
Name Phone Number

Signed:

_____ Select

* Upon hiring/contracting for the first time.

Emergency Information/Organizational Structure

Site Address: 338 Scholes Street
Brooklyn, NY 11206

Emergency Phone Numbers:

Emergency (fire, police, ambulance)		911
Emergency (facility specific, if applicable):		
NYPD 90th Precinct (non-emergency)		718-963-5311
FDNY Engine 237		911
Emergency Other (specify):		
Primary Client Contact:	Donald Campbell	718-963-5453
WorkCare (non-life-threatening injury/illness):		1-888-449-7787
Project H&S:	Doug Nodine	315-671-9377
Project Manager:	Steven Feldman	631-391-5244
Corporate H&S Specialist:	Greg Mason	859-806-0746
Corporate H&S Director:	Andrew McDonald	410-923-7820

Hospital Name and Address: NYC Health + Hospitals/Woodhull
760 Broadway
Brooklyn, NY 11206

Hospital Phone Number: 718-963-8000

Walk-In Clinic Name and Address: ModernMD Urgent Care - S.E. Williamsburg
68 Graham Ave
Brooklyn, NY 11206

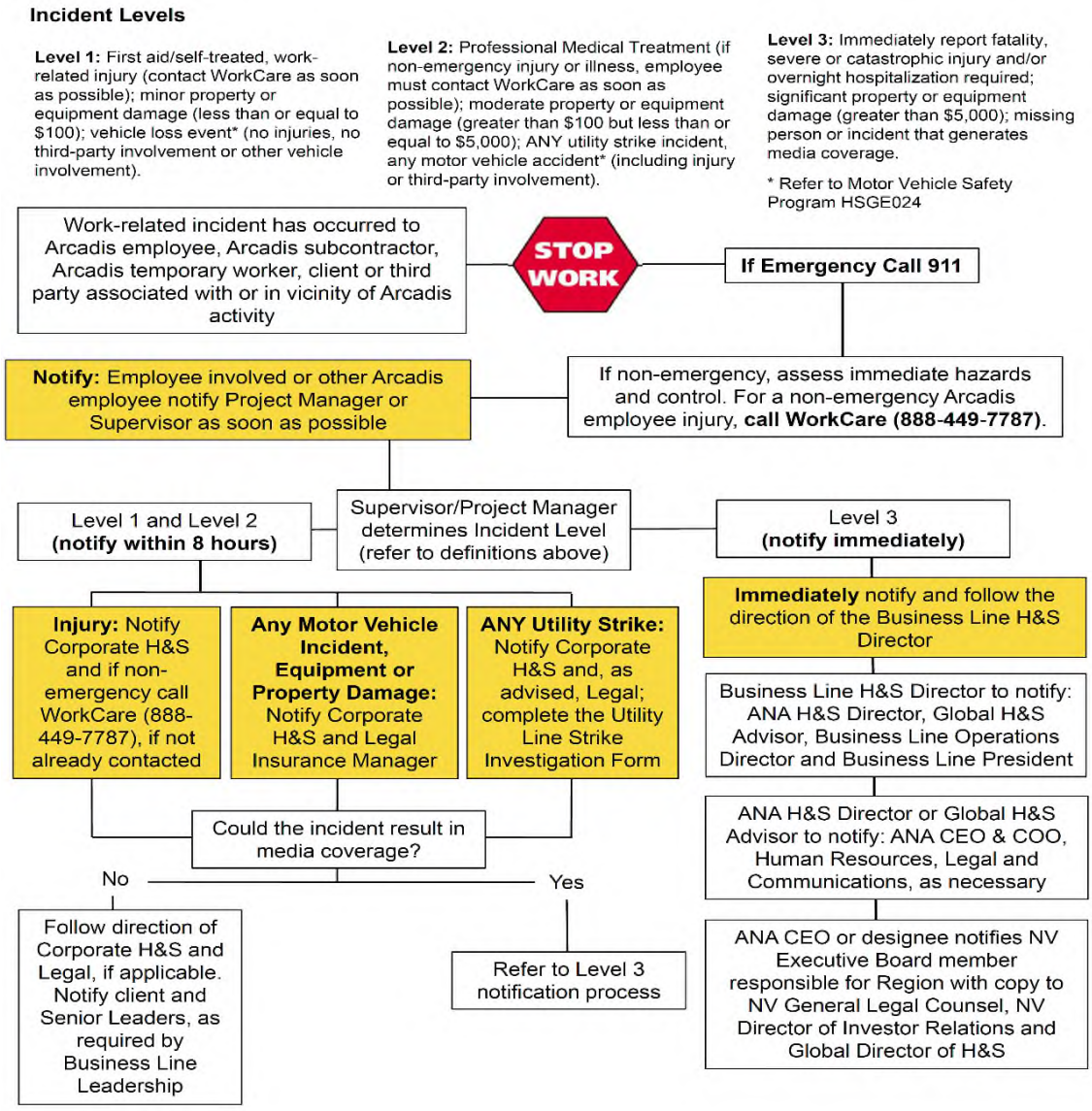
Walk-In Clinic Phone Number: 646-604-8120

Supplemental Client Contact Information:

Other Important Phone Numbers:

Poison Control Center	1-800-222-1222
Nat. Response Ctr. (spills in reportable quantities)	1-800-424-8802
U.S. Coast Guard (spills to water)	1-800-424-8802

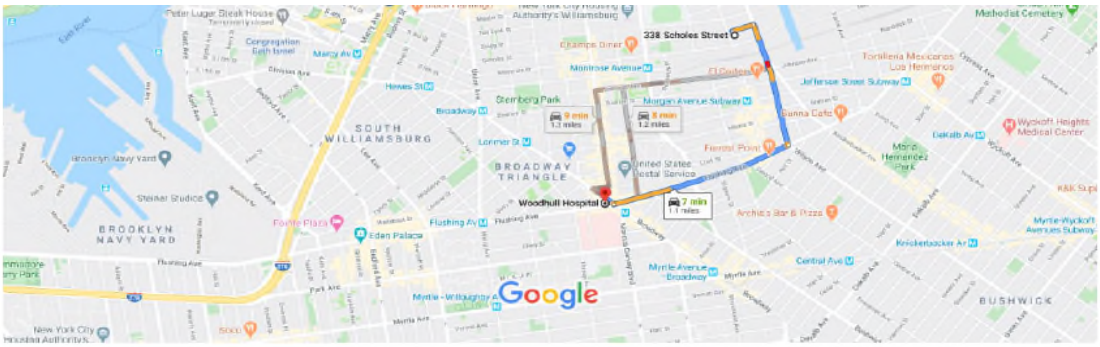
Incident Reporting Protocol Within Arcadis



Client Incident Reporting Protocol

Emergency Notification Procedure:
Step 1: Dial 911 (if necessary) and/or WorkCare at 888.449.7787
Step 2: Contact Arcadis Project Manager (Steven Feldman)
Step 3: Contact Arcadis H&S Specialist (Greg Mason) or H&S Director (Andrew McDonald)
Step 4: Contact Client - verbal communication within one hour of incident (Donald Campbell)
Step 5: Written Incident Report and/or email summary to Client - Draft Incident Report within 4 hours of the incident and Final Incident Report within 24 hours of the incident. The National Grid Incident Reporting Requirements are provided in Attachment 6.

Route to the Hospital



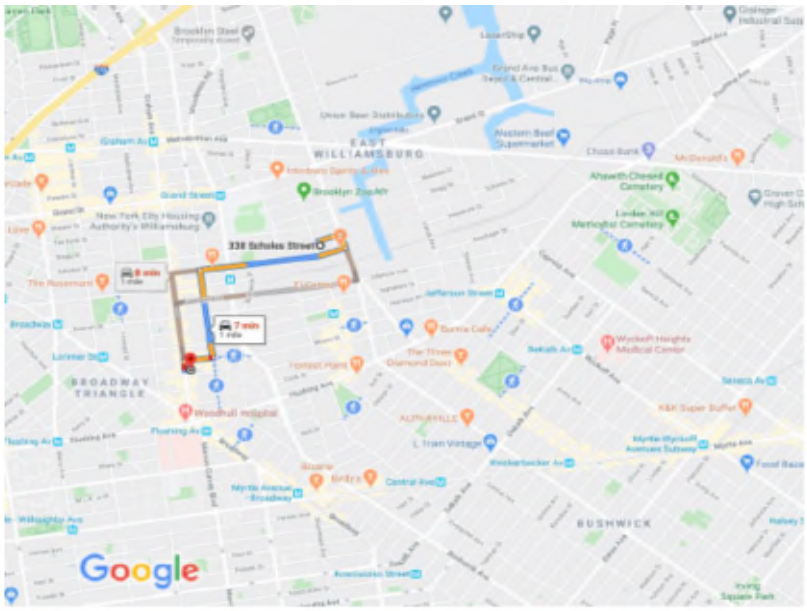
Map data ©2020 1000 ft

338 Scholes St
Brooklyn, NY 11206

1. Head east on Scholes St toward Morgan Ave
381 ft
2. Turn right onto Morgan Ave
0.4 mi
3. Turn right onto Flushing Ave
0.6 mi
4. Turn right after Taco Bell (on the right)
Destination will be on the left
135 ft

Woodhull Hospital
760 Broadway, Brooklyn, NY 11206

Route to the Walk-In Clinic



Map data ©2020 1000 ft

338 Scholes St
Brooklyn, NY 11206

1. Head east on Scholes St toward Morgan Ave — 381 ft
2. Turn right onto Morgan Ave — 259 ft
3. Turn right onto Meserole St — 0.5 mi
4. Turn left onto Humboldt St — 0.3 mi
5. Turn right onto Moore St — 492 ft
6. Turn left at the 1st cross street onto Graham Ave/Ave of Puerto Rico — 171 ft
   Destination will be on the left

ModernMD Urgent Care - S.E. Williamsburg
68 Graham Ave, Brooklyn, NY 11206

Site Type

The project site is an active commercial facility with the following attributes:

Commercial Buildings	

Surrounding Land Use and Topography

The Site is bounded by Scholes Street to the north, commercial-use buildings to the east (Block 3048, Lots 14 and 29), Meserole Street to the south, and Bogart Street to the west. The Site is located approximately 900 feet west of English Kills and approximately 9,750 feet east of the East River. The Site is generally flat with an elevation of approximately 18 feet above mean sea level (amsl). The closest natural surface water body is English Kills, which is located approximately 0.17 miles to the east of the Site.

Simultaneous Operations (SimOps)

Planned Arcadis site work will not be in proximity to SimOps work activities performed by non Arcadis employees or subcontractors. Arcadis will initiate stop work and evaluate the work activities through the JSA process if during the course of work a SimOps activity is identified that could reasonably affect health and safety of Arcadis employees and subcontractors.

Site Background

A Holder Station was constructed on the Site circa 1892-1894 by The Fulton Municipal Gas Company and was present until 1951, when the gas holder was demolished. The Brooklyn Union Gas Company acquired the Holder Station from The Fulton Municipal Gas Company on November 4, 1895. The 1907 Sanborn map indicates that the Brooklyn Union Gas Company occupies the Site and shows one (1) gas holder with a capacity of 1,500,000 cubic feet, an engine room, exhausters, and a photometer house. A 1936 Brooklyn Union Gas Company Property Plan shows the gas holder, a tool and paint storage building, a valve shed, an exhauster room, an engine room, and a boiler room. Notes on the 1936 Brooklyn Union Gas Company Property Plan indicate that the gas holder was demolished in February 1951 and the property was sold on May 4, 1951.

The Site is located in the East Williamsburg community district of Brooklyn on approximately 1 acre of land. The Site is located at 154 Bogart Street, 338 Scholes Street, and 350 Scholes Street in the Borough of Brooklyn, New York City, Kings County, New York and is identified by Tax Map Number: Block 3048, Lots 1, 7, and 11. Currently, the Site is developed with several concrete and brick buildings.

Project Tasks

The following tasks are identified for this project:

1	Site Visits/Inspections
2	Groundwater Sampling
3	Monitoring Well Decommissioning
4	Soil Boring Drilling
5	Test Pit Excavation
6	Monitoring Well Installation and Development

Supplemental requirements associated with the above task(s):
Not applicable

[X] Required Checklists/Work Forms

- *Tailgate Safety Briefing Form*
- *Vehicle Inspection Checklist*
- *Utility and Structures Checklist*

[ ] Required Permits

- *Not Applicable*

[X] Required H&S Standards

- *Utility Location Procedures_ARC HSFS019*
- *Excavation and Trenching_ARC HSCS005*
- *Heavy and Mechanized Equipment_ARC HSCS*

Short Service Employees (SSEs)

SSEs (employees who are employed with Arcadis for less than 1 year or are Inexperienced Workers) have the potential to work on this project. If SSEs are utilized, the project team working in conjunction with the SSE's administrative supervisor will ensure requirements of ARC HSGE019 "Short Service Employees" are completed. SSE's will be identified on the project Tailgate Safety Meeting Form.

Roles and Responsibilities

	Name	Role	Short Service Employee
1	Steven Feldman	Project Manager (PM)	No
2	Chris Keen	Task Manager	No
3	Stephen Vlavianos	Field Technical Lead	No
4	Patrick Quinlan	Field Staff	No
5			
6			
7			
8			
9			
10			

Training

All Arcadis employees are required to have the following training to be on site:

Defensive Driving - Smith On-Line
HAZCOM GHS/EAP (non-certificate)
H&S Program Orientation (non-certificat
None
None
None
None
None
None
None
None
None
None
Client specific:
Other:

Selected Arcadis employees are required to have the following additional training:

	Names or Numbers from above
DOT HazMat #1	3,4
Hazwoper 40-Hour	3,4
Hazwoper 8-Hour Annual Refresher	3,4
Hazwoper 8-Hour Supervisor	3
First Aid/CPR	3,4
Silica General Awareness	3
BBP (Bloodborne Pathogens)	3,4
None	
None	
None	
None	
None	
None	
None	
None	
None	
Other:	

The Arcadis Fundamental H&S Principles

Staff working on any of the task(s) listed above must utilize the six Arcadis Fundamental H&S Principles to ensure work is conducted safely. These principles include: 1) Use of TRACK (THINK through the task, RECOGNIZE the hazards, ASSESS the risks, CONTROL the risks, KEEP health and safety first in all things), 2) H&S Planning, 3) Stop Work Authority, 4) "If Not Me Then Who", 5) Stewardship, and 6) Incident Reporting. Every project team member plays an important role in project health and safety. This is more than just having a HASP, training, or PPE. Proactive staff engagement with these principles is critical to a safe work environment.



General Task Hazard Assessment and Risk Control (HARC)

General:	Hazards Applicable to All Project Tasks

The 12 hazard category HARC ratings are not available in this General THA. The mitigated and unmitigated ratings for the hazards presented are based on the Risk Assessment Matrix below. Modify hazards and ratings as necessary to meet project needs.

Risk Assessment Matrix		Likelihood Ratings			
Consequences Ratings		A	B	C	D
People	Property	0 Almost Impossible	1 Possible but Unlikely	2 Likely to Happen	3 Almost Certain to Happen
1-Slight or No Health Effect	Slight or No Damage	0-Low	1-Low	2-Low	3-Low
2-Minor Health Effect	Minor Damage	0-Low	2-Low	4-Medium	6-Medium
3-Major Health Effect	Local Damage	0-Low	3-Low	6-Medium	9-High
4-Fatalities	Major Damage	0-Low	4-Medium	8-High	12-High

Hazard #1

Driving - On road - Injury or vehicle damage from motor vehicle accident or incident

Suggested Field Health and Safety Handbook (FHSHB) Ref:	III V, W, U, AO	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Smith System (on line)
Mitigated Risk:	MEDIUM	JSAs
Comments:	Use Smith System "5-Keys" when driving. See Driving JSA for details.	

Hazard #2

Driving - Driver - Injury, death or property damage due to driver distraction, fatigue, etc.

Suggested FHSHB Ref:	III V, AO	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Smith System (on line)
Mitigated Risk:	LOW	Driver awareness and use of stop work authority
Comments:	Use route planning. Keep eyes moving while driving. See Driving JSA.	

Hazard #3

Biological - skin/eye irritation or damage from poisonous plants

Suggested FHSHB Ref:	III N, AE	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	LOW	Job Briefing/Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	Use skin pre-treatment lotions when available. Be aware of and avoid poison ivy.	

Hazard #4

Biological - bites or stings from exposure to insects or arachnids

Suggested FHSHB Ref:	III N	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	LOW	Job Briefing/Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	Do body check daily (or after contact with tall grass/vegetation) for ticks and insect bites.	

Hazard #5

Biological - cuts, scrapes, skin/eye puncture from exposure to physically damaging plants

Suggested FHSHB Ref:	III N, AE	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:		

General Task HARC (continued)

Hazard #6		
Environmental - Thermal stress - Injury or illness from heat or cold		
Suggested FHSHB Ref:	III M	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Field H&S Handbook (see ref. above)
Mitigated Risk:	LOW	JSAs
Comments:	Use job rotation or rest breaks. Stay hydrated and eat regularly.	
Hazard #7		
Environmental - Inclement weather -Injury or equipment damage from inclement weather		
Suggested FHSHB Ref:	III I	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Weather Monitoring
Mitigated Risk:	LOW	Cont./Emerg. Planning
Comments:	Use 30/30 rule for lightning. See FHSHB for details.	
Hazard #8		
Motion - Musculoskeletal - Injury from lifting, twisting , stooping, or awkward body positions		
Suggested FHSHB Ref:	III AF	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Admin. Controls (specify in comments)
Comments:	Use proper lifting techniques. Use job rotation when applicable. See FHSHB for details.	
Hazard #9		
Motion - Musculoskeletal - Injury from repeated work activity or body motion		
Suggested FHSHB Ref:	III AF	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Admin. Controls (specify in comments)
Comments:	Use proper lifting techniques. Use job rotation when applicable. See FHSHB for details.	
Hazard #10		
Sound - Noise - Injury or illness due to noise exposure		
Suggested FHSHB Ref:	III L	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	Increase distance from source if possible. Maintain equipment.	
Hazard #11		
Gravity - Falls - Injury due to slips and trips		
Suggested FHSHB Ref:	III F	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Housekeeping
Comments:	Use footwear appropriate for site conditions, plan routes and do not hurry while walking.	
Hazard #12		
None		
Suggested FHSHB Ref:	None	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	Not Ranked	Select
Mitigated Risk:	Not Ranked	Select
Comments:		

Task Specific HARC

Task 1:	Site Visits/Inspections

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III F

Biological	L	Chemical	L	Driving	M	Electrical	L
Environmental	L	Gravity	M	Mechanical	L	Motion	L
Personal Safety	L	Pressure	L	Radiation	L	Sound	L

Hazard #1

Gravity - Falls - Injury due to slips and trips

Suggested FHSHB Ref:	III F	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Housekeeping
Mitigated Risk:	LOW	Site Awareness
Comments:	Be aware of site conditions at daily tailgate safety meetings. Maintain housekeeping for Arcadis equipment and materials.	

Hazard #2

Biological - bites or stings from exposure to insects or arachnids

Suggested FHSHB Ref:	III N	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	LOW	Job Briefing/Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	Wear insect repellant when ticks/biting insects are present and avoid wearing perfumes/deodorants with strong scents. Adjust work location if bees/wasps are present or STOP WORK and call exterminator to mitigate hazard if work area cannot be relocated. Do body check daily (or after contact with tall grass/vegetation) for ticks and insect bites.	

Hazard #3

Motion - Musculoskeletal - Injury from lifting, twisting , stooping, or awkward body positions

Suggested FHSHB Ref:	III AF	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Select
Comments:	Utilize warm-up activities and neck/back/leg stretches to prepare body for exertion. Bend/squat at the knees and not at the waist when picking up equipment. Wear knee pads or use a kneeling pad if necessary.	

Task Specific HARC (continued)

Task 2:	Groundwater Sampling							
HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low):						FHSHB Ref:		III F
Biological	L	Chemical	M	Driving	-	Electrical	L	
Environmental	M	Gravity	M	Mechanical	L	Motion	M	
Personal Safety	L	Pressure	L	Radiation	-	Sound	M	

Hazard #1

Chemical - liquids, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:	HAZWOPER training, review historical analytical groundwater results, and select appropriate PPE. Use absorbent pads to eliminate direct contact with PPE.	

Hazard #2

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	III S IV, E, F, G, O	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	Utilize proper tools and PPE. Use leather gloves when necessary and be cautious when opening and closing well covers/caps.	

Hazard #3

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Install cones/barricades as necessary to delineate work areas. Review site map observe vehiclular traffic adjacent to the work area.	

Hazard #4

Chemical - liquids - injury or illness from vapor inhalation

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	Allow well venting and perform initial screening as needed with a PID.	

Task Specific HARC (continued)

Task 3:	Monitoring Well Decommissioning

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III F

Biological	L	Chemical	L	Driving	-	Electrical	-
Environmental	L	Gravity	M	Mechanical	L	Motion	L
Personal Safety	-	Pressure	L	Radiation	-	Sound	M

Hazard #1

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	III S IV, E, F, G, O	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Machine Guarding
Mitigated Risk:	LOW	Inspections
Comments:	Be aware of machinery/equipment while in use and keep a safe distance as permitted by the work.	

Hazard #2

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Engineering Controls
Comments:	Make sure equipment guards are in place and keep a safe distance as permitted by the work. Make sure equipment locks and safety mechanisms are in working order.	

Hazard #3

Motion - Cuts and scrapes - Injury from moving object impacting skin or eye

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Engineering Controls
Comments:	Make sure equipment guards are in place and keep a safe distance as permitted by the work. Make sure equipment locks and safety mechanisms are in working order.	

Hazard #4

Chemical - liquids, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:	HAZWOPER training, review historical analytical groundwater results, and select appropriate PPE. Use absorbent pads to eliminate direct contact with PPE.	

Task Specific HARC (continued)

Task 4:	Soil Boring Drilling							
HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low):						FHSHB Ref:		II M
Biological	L	Chemical	L	Driving	-	Electrical	L	
Environmental	L	Gravity	M	Mechanical	M	Motion	M	
Personal Safety	-	Pressure	L	Radiation	-	Sound	M	

Hazard #1

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	III S IV, E, F, G, O	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Machine Guarding
Mitigated Risk:	LOW	Inspections
Comments:	Be aware of machinery while in use and keep a safe distance as permitted by the work.	

Hazard #2

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	Make sure equipment guards are in place and keep a safe distance as permitted by the work. Make sure equipment locks and safety mechanisms are in working order.	

Hazard #3

Motion - Cuts and scrapes - Injury from moving object impacting skin or eye

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	Make sure equipment guards are in place and keep a safe distance as permitted by the work. Make sure equipment locks and safety mechanisms are in working order.	

Task Specific HARC (continued)

Task 5:	Test Pit Excavation

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: IV D

Biological	L	Chemical	L	Driving	-	Electrical	M
Environmental	L	Gravity	L	Mechanical	M	Motion	M
Personal Safety	-	Pressure	L	Radiation	-	Sound	L

Hazard #1

Gravity - Falls - Injury due to slips and trips

Suggested FHSHB Ref:	III F	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Housekeeping
Comments:	Be aware of site conditions and discuss at daily tailgate safety meetings. Note areas where housekeeping may need to be performed to project team. Maintain housekeeping for equipment and materials.	

Hazard #2

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Stay clear of large equipment and keep eye contact with equipment operators. Discuss planned daily activities at tailgate meeting. Select safe location for observing excavation activities and avoid locations that pose unnecessary hazards.	

Hazard #3

Gravity - Struck by - Injury from falling object

Suggested FHSHB Ref:	III AC, IV A	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Site Awareness
Comments:	Stay clear of large equipment and keep eye contact with equipment operators. Discuss planned daily activities at tailgate meeting. Select safe location for observing excavation activities and avoid locations that pose unnecessary hazards.	

Hazard #4

Environmental - Utilities - Injury or property damage from utility strike/damage

Suggested FHSHB Ref:	III AN	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Specialized Checklist/Forms
Mitigated Risk:	MEDIUM	Admin. Controls (specify in comments)
Comments:	Confirm Utility Checklist has been completed prior to intrusive activities.	

Hazard #5

Chemical - gasses - injury due to inhalation, asphyxiation, skin/eye contact

Suggested FHSHB Ref:	III S, AI	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	See HASP "Monitoring" section
Comments:	Perform work zone air monitoring for site COCs.	

Task Specific HARC (continued)

Task 6:	Monitoring Well Installation and Development

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III F

Biological	L	Chemical	L	Driving	-	Electrical	-
Environmental	L	Gravity	M	Mechanical	L	Motion	L
Personal Safety	-	Pressure	L	Radiation	-	Sound	M

Hazard #1

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	III S IV, E, F, G, O	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Machine Guarding
Mitigated Risk:	LOW	Inspections
Comments:	Be aware of machinery/equipment while in use and keep a safe distance as permitted by the work.	

Hazard #2

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	Make sure equipment guards are in place and keep a safe distance as permitted by the work. Make sure equipment locks and safety mechanisms are in working order.	

Hazard #3

Chemical- liquids - injury or illness from skin absorption

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:	Maintain proper PPE and review JSAs prior to work activities.	

Hazard Communication (HAZCOM)/Global Harmonization System (GHS)

[ ] HAZCOM/GHS for this project is managed by the client or general contractor

List the chemicals anticipated to be used by Arcadis on this project per HAZCOM/GHS requirements.
(Modify quantities as needed)

	Preservatives	Qty
[ ]	Not applicable	
[X]	Hydrochloric acid	<500 ml
[ ]	Nitric acid	<500 ml
[ ]	Sulfuric acid	<500 ml
[ ]	Sodium hydroxide	<500 ml
[ ]	Zinc acetate	<500 ml
[ ]	Ascorbic acid	<500 ml
[ ]	Acetic acid	<500 ml
[ ]	Isopropyl alcohol	< 4 gal.
[ ]	Formalin (<10%)	< 4 gal.
[ ]	Methanol	<500 ml
[ ]	Sodium bisulfate	<500 ml

	Decontamination	Qty
[ ]	Not applicable	
[X]	Alconox	≤ 5 lbs
[ ]	Liquinox	≤ 1 gal
[ ]	Acetone	≤ 1 gal
[ ]	Methanol	≤ 1 gal
[ ]	Hexane	≤ 1 gal
[ ]	Isopropyl alcohol	≤ 4 gal
[ ]	Nitric acid	≤ 1 L
[ ]	Other:	

	Calibration	Qty.
[ ]	Not applicable	
[X]	Isobutylene/air	1 cyl
[ ]	Methane/air	1 cyl
[ ]	Pentane/air	1 cyl
[ ]	Hydrogen/air	1 cyl
[ ]	Propane/air	1 cyl
[ ]	Hydrogen sulfide/air	1 cyl
[ ]	Carbon monoxide/air	1 cyl
[X]	pH standards (4,7,10)	≤ 1 gal
[X]	Conductivity standards	≤ 1 gal
[X]	Other:	
	ORP Solution	

	Fuels	Qty.
[ ]	Not applicable	
[X]	Gasoline	≤ 5 gal
[ ]	Diesel	≤ 5 gal
[ ]	Kerosene	≤ 5 gal
[ ]	Propane	1 cyl
[X]	Other:	
	Motor Oil	

	Kits	Qty.
[X]	Not applicable	
[ ]	Hach (specify):	1 kit
[ ]	DTECH (specify):	1 kit
[ ]	Other:	1 kit

	Remediation	Qty.
[X]	Not applicable	
[ ]		
[ ]		
[ ]		
[ ]		
[ ]		

	Other:	Qty.
[X]	Not applicable	
[ ]	Spray paint	≤ 6 cans
[ ]	WD-40	≤ 1 can
[ ]	Pipe cement	≤ 1 can
[ ]	Pipe primer	≤ 1 can
[ ]	Mineral spirits	≤ 1 gal

	DOT(1):	Qty.
[ ]	MOT eligible soils	
[ ]	MOT eligible water	
[ ]	MOT eligible solids	
[ ]	MOT eligible liquids	
[ ]		
[ ]		
[ ]		

(1) Attach applicable Materials of Trade (MOT) generic shipping determination. SDS not generally applicable to this category.

SDSs for this project are attached to this HASP.

Air Monitoring

☐ There are no atmospheric chemical, radiological, or particulate hazards on this project requiring air monitoring.
☐ Air monitoring is the responsibility of the client or subcontractor.

Constituents of Interest:

Time Weighted Averages (TWAs) are ACGIH 8-Hr Threshold Limit Values (TLVs) unless noted.

Benzene			
TWA	0.5 ppm, OSHA Reg. See Notes	LEL/UEL (%):	1.2/7.8
STEL	2.5 ppm	VD (Air = 1):	NA
IDLH	500 ppm, NIOSH	VP (mmHg):	75
Ethylbenzene			
TWA	20 ppm	LEL/UEL (%):	0.8/6.7
STEL	125 ppm	VD (Air = 1):	NA
IDLH	800 ppm, NIOSH	VP (mmHg):	7
Toluene			
TWA	20 ppm	LEL/UEL (%):	1.1/7.1
STEL	150 ppm, NIOSH	VD (Air = 1):	NA
IDLH	500 ppm, NIOSH	VP (mmHg):	21
Xylenes			
TWA	100 ppm	LEL/UEL (%):	1.1/7.0
STEL	150 ppm	VD (Air = 1):	NA
IDLH	900 ppm, NIOSH	VP (mmHg):	9
Naphthalene			
TWA	10 ppm, skin	LEL/UEL (%):	0.9/5.9
STEL	NA	VD (Air = 1):	NA
IDLH	250 ppm, NIOSH	VP (mmHg):	0.08
None			
TWA	NA	LEL/UEL (%):	NA
STEL	NA	RGD (Air = 1):	NA
IDLH	NA	VP (mmHg):	NA

TWA - Time Weighted Average (ACGIH TLV unless noted)
STEL - Short Term Exposure Limit
IDLH - Immediately Dangerous to Life and Health
LEL/UEL - Lower /Upper Explosive Limit
RGD - Relative Gas Density
VP - Vapor Pressure

Notes:
One or more constituents above is listed with a skin notation. Avoid conditions where dusts, mists, or aerosols are created. Avoid skin contact with impacted media.

As noted, one or more of the above constituents is an OSHA regulated substance. If exposure is expected to be above the TWA or STEL, contact a CIH or CSP for assistance unless otherwise permitted by a substance specific plan template identified in this section.

Required Monitoring Instruments, Action Levels and Monitoring Frequency

Gray fields below are not automated. Make necessary selections from drop down menus.

Photoionization Detector — Select Lamp: 10.6 eV

Computed action levels (PID units) (1):			Computed action levels have been manually adjusted.
<	2		Continue working
	2	- 5	Levels sustained > 5 minutes, monitor continuously and review engineering controls and PPE. Proceed with caution.
>	5		Stop work and contact SSO

(1) Computed action levels are for PIDs which have not been programmed to correct TLVs for specific constituents or mixtures.

Particulate/Aerosol monitoring is required.

Action levels are in mg/m3			Computed action levels have been manually adjusted.
<	1.5		Continue working
	1.5 - 3		Levels sustained > 5 minutes, monitor continuously and review engineering controls and PPE. Proceed with caution.
>	3		Stop work and contact SSO

Breathing zone air monitoring using the above instruments will be performed at the following frequency:
15 Minute intervals

Data logging instruments are preferred for this monitoring frequency. Staff using these instruments must be trained in data logging procedures for the actual instrument(s) used. Data logging results must be backed up daily. If manually logging, all results (including non detects) must be documented.

Standard 4 Gas Monitoring (LEL,O2,H2S,CO) with a multigas meter is required

LEL/O2 Meter	0-5% LEL	Continue work
	>5-10% LEL	Continually monitor, review engineering controls, proceed with caution
Monitoring Required	>10% LEL	Stop work, evacuate, contact SSO
	19.5%-23.5% O2	Normal, continue work
	<19.5% O2	O2 deficient, stop work, evacuate, contact SSO
	>23.5% O2	O2 enriched, stop work, evacuate, contact SSO

Checked gases require monitoring:

		1/2 TLV	Stop Work Action Level	Comments
	Ammonia	12.5 ppm	25 ppm	Use a multigas meter equipped with a sensor(s) capable of detecting checked gases identified to the right. Review engineering controls and perform continuous monitoring with data logging at concentrations >1/2 TLV. Stop work action levels are based on Level D protection.
	Carbon dioxide	2500 ppm	5000 ppm	
X	Carbon monoxide	12.5 ppm	25 ppm	
	Chlorine	0.05 ppm	0.1 ppm	
	Hydrogen cyanide	2.35 ppm (skin)	4.7 ppm* (skin)	
X	Hydrogen sulfide	0.5 ppm	1 ppm	
	Nitrogen dioxide	0.1 ppm	0.2 ppm	
	Phosphine	0.025 ppm	0.05 ppm	
	Sulfur dioxide	0.125 ppm	0.25* ppm	
	Mercury vapor	0.0125 mg/m3	0.025 mg/m3	

* Ceiling or STEL value

All air-monitoring instruments must be calibration checked daily, if used, per manufacturer's instructions. Calibration checks, including calibration gases used, must be documented.

Compound specific monitoring using indicator tubes or chips is not required.

Indicator:		≤TWA	Continue work
	Tube	>TWA	Stop work, review engineering controls and PPE, contact SSO
	Chip		
Compound(s):			

Indicator tube/chip monitoring frequency: Not applicable

Personal Protective Equipment (PPE)

See JSA or Permit for the task being performed for required PPE. If work is not conducted under a JSA or Permit, refer to the governing document for PPE requirements. At a minimum, the following checked PPE is required for all tasks during field work (outside of field office trailers and vehicles) not covered by a JSA or Permit on this project:

Minimum PPE required to be worn by all staff on project:						Specify Type:
X	Hard hat		Snake chaps/guards		Coveralls:	
X	Safety glasses		Briar chaps		Apron:	
	Safety goggles		Chainsaw chaps		Chem. resistant gloves:	
	Face shield		Sturdy boot	X	Gloves other:	Leather Work Gloves
	Hearing protection	X	Steel or comp. toe boot		Chemical boot:	
	Rain suit		Metatarsal boot		Boot other:	
X	Other:			X	Traffic vest, shirt or coat:	Class II
	Hand Sanitizer				Life vest:	

Task specific PPE: Review the activity specific JSAs the required PPE for the task.

Comments:

AUS Personal Protective Equipment List by Business Line

This matrix outlines **basic** PPE requirements for each Business Line. **Specific client, task, or regulatory requirements may dictate the type of PPE beyond what is listed in this matrix.** Additionally, task specific PPE requirements may also be included in the HASP or JSA. Hazard/task specific PPE or emergency supply recommendations are outlined by hazard/task in the Field H&S Handbook. PPE and equipment should be charged to the project. For any supplies that the PM determines cannot be billed, the equipment should be charged to the employee's overhead charge number. PPE associated with specialized training such as NFPA 70E Arc Flash is not included in this matrix. Refer to the specific training program for a description of the necessary PPE for tasks involving such requirements.

Listed "General PPE" is required for field staff, the last column specifies PPE for Arcadis staff visiting project sites.	Environment [1]	Infrastructure [1]	Water [1]	Staff Visiting Project Sites
Minimum PPE Required to Be Worn				
Hard Hat	R	R	R	R
Reflective Traffic Vest (Minimum Class 2)	R	R	R	R
Safety Glasses - Clear and Tinted	R	R	R	R
ANSI Compliant Safety - Toe Boots	R	R	R	R
Minimum PPE Required to Have On Hand		**Minimu**	**Minimum PPE Rec**	
Hearing Protection - Ear plugs (Need for ear muffs TBD)	R	R	R	R
Leather gloves and glove clip	R	R	R	R
First Aid Supplies [2]				
Small first aid kit	R	R	R	O
16 oz. bottle of Eye Wash	R	R	R	O
Tick Remover (fine tip tweezers) (See THA for high risk locations)	O	O	O	O
PPE Supplies Required As Appropriate				
PPE duffel bag with logo, or equivalent	O	O	O	O
Half Face or Full-Face Respirator [3] (See THA)	O [3]	O [3]	O [3]	O [3]
Insect Repellent (See THA.) (Recommended 20-30% DEET)	O	O	O	O
Sunscreen	O	O	O	O
Hand sanitizer	O	O	O	O
Cut Resistant or Chemical Resistant Gloves [4]	O	O	O	O
Poison Ivy pre-exposure wipes or post exposure cleanser (i.e., Tecnu or Zanfel) (see THA for high risk locations)	O	O	O	O
Other specialized protective equipment (See THA for Work Tasks)	O	O	O	O
Outdoor wilderness survival kit [5]	O	O	O	O

Notes:

R - Required

O - Optional. Based on HASP Task Hazard Analysis (THA) or geographic location of work.

THA - Task Hazard Analysis.
Review the HASP Task Hazard Analysis (THA) in making this determination. Certain specific factors can influence the determination for requiring this PPE for the site or task. For example, certain geographic regions may have a higher incidence of the hazard or associated risk, the proximity of the site relative to emergency services may require such, previous observations of the hazard at the site, or where unknown hazard conditions apply. Modifications to the minimum required PPE are required to be communicated via the HASP and/or JSA.

1. The Business Line Director, Operations Manager, Project Manager, or Employee Supervisor is responsible for making the decision to provide Arcadis branded shirts to employees. Billing of such shirts is related to the authority level of the decision maker.

2. For project sites with an office/trailer, first aid/emergency response supplies can be kept in a central location, and may not be required to be carried by each Arcadis employee.

3. Staff must comply with the Arcadis Respiratory Protection H&S Standard before a respirator can be worn. The H&S Standard is available on the H&S Team webpage via the H&S Standards Library link.

Arcadis Standards

4. Determination for use of cut resistant, chemical resistant gloves or other specialized hand protection are to be based on THA in the project HASP.

5. Outdoor survival kits are generally required when working in remote wilderness locations. See the HASP THA and the Field H&S Handbook for requirements and supply list.

Medical Surveillance

All Arcadis employees and subcontractors performing field work will be required to be current in HAZWOPER medical surveillance.

Client and DOT mandated drug and alcohol testing is not required for this project and will not be performed.

Hazardous Materials Shipping and Transportation

A blank copy of the shipping determination form has been saved to the project folder and will be filled out prior to the shipping of samples.

Traffic Safety and Traffic Safety Plans (TSPs)

A Non-ROW TSP addressing the work is attached to this HASP.

Confined Space Entry

Confined space entry is not anticipated.

Arcadis Commercial Motor Vehicles (CMVs)

CMVs operated by Arcadis employees on public roadways will not be utilized on this project. Arcadis defines a CMV as any single vehicle with a gross vehicle weight rating (GVWR) ≥10,001 pounds or a truck and trailer combination with a combined GVWR ≥10,001 pounds (GVWR of truck + GVWR of trailer = ≥10,001 pounds).

Site Control

Based on the low hazards associated with the work being performed, a standard 10 ft diameter exclusion zone will be enforced around active work being performed on this project. The exclusion zone will be demarcated with cones and/or caution tape.

Decontamination

On HAZWOPER sites, all personnel wearing Modified Level D or Level C PPE in the exclusion zone must undergo personal decontamination before entering the support zone. The personnel decontamination will consisit of (at a minimum): 1. removal of gross contamination from outer clothing and boots; 2. removal of outer garments and gloves with disposal in properly lableled containers followed by decontamination of hard hats and boots with aqueous solution of detergent; and 3. hand washing and PPE sanitation.

Sanitation

The project scope is a mobile work operation. The project field team will have reasonable access to restroom facilities within 10 minutes of the work area where the mobile work activity is actively taking place. Potable water will be carried by the field team in the vehicle used for the project. Unless alternate requirements are stipulated in a plan supplement (i.e. Heat Injury and Illness Prevention Plan), permit or JSA, bottled or water coolers with potable water will be provided to project workers at 1 gallon/worker/day.

Safety Briefings

Safety briefings will occur at the beginning of the day before work activities commence. All safety briefings will be documented on a Tailgate Safety Meeting form or logbook. All project workers, including Arcadis subcontractors, will participate in the safety briefings if they are scheduled to be working at the time when the briefing is offered. Site visitors and project workers not on duty during the morning safety briefing will receive the safety briefing upon their arrival onto the project site for the day.

Employee Health and Safety Engagement

The CPM is responsible for reviewing and establishing H&S engagement goals for the project. These goals are summarized below.

Hazard Observations (via H&S App or TIP) required at the following frequency on this project:

1 task improvement process per task
Close Call reporting (via H&S app) goals for this project:
1 near miss per event
Other (specify):

Safety Equipment and Supplies

Safety equipment/supply requirements are addressed in the JSA or Permit for the task being performed. If work is not performed under a JSA or Permit, the following safety equipment is required to be present on site in good condition (Check all that apply):

X	First aid kit	X	Insect repellent:
	Bloodborne pathogens kit	X	Sunscreen
X	Fire extinguisher		Air horn
	Eyewash (ANSI compliant)	X	Traffic cones
X	Eyewash (bottle)		2-way radios
X	Drinking water		Heat stress monitor
	Other:		Poisonous plant pre/post exposure lotion/soap

Control of Ticks and Poisonous Plants

Work on this project has a low tick exposure hazard. Use of inspect repellent (DEET and/or permethrin) is recommended. Wear light colored clothing to help identify presence of ticks on staff. Keep shirt tails inside pants.

Work on this project has a low poisonous plant exposure hazard. First aid kits should be equipped with post exposure soap as a precaution. Inspect work area for presence of hazard prior to initiating work at the location. Wear disposable gloves during work and while removing outer footwear.

International Travel

International travel is not required for this project.

Spill Control and Containment

Spill control and containment planning and implementation, if required, is the responsibility of another contractor working with Arcadis. Arcadis will validate the contractor has the necessary equipment and supplies on site to control and contain spills prior to start of work.

Use of Electronic Devices in Areas of Increased Safety Risk

Arcadis employees and subcontractors must abide by the National Grid policy on electronic devices. Electronic devices will only be used in designated locations or during suspended work activities. Electronic devices and cell phones will not be used (including hands free devices) while commuting to and from the job site. Electronic device use and distractions to be discussed and documented in the job briefing/safety briefing.

Signatures

I have read, understand and agree to abide by the requirements presented in this health and safety plan. I understand that I have the absolute right to stop work if I recognize an unsafe condition affecting my work until corrected.

Printed Name	Signature	Date

Add additional sheets if necessary

You have an absolute right to STOP WORK if unsafe conditions exist!

Arcadis Visitor Acknowledgement and Acceptance of HASP Signature Form

By signing below, I waive, release, and discharge the owner of the site and Arcadis and their employees from any future claims for bodily and personal injuries which may result from my presence at, entering, or leaving the site and in any way arising from or related to any and all known and unknown conditions on the site.

Printed Name	Signature	Company	Date/Time On Site	Date/Time Off Site

Forms

Task Improvement Process

General

Observed Company:

Observation Type:

TIP Form: H&S Field Multi-Task (General)

Task Observed:

Observee Name:

Observer Name:

Observation Date:

Project Number: 30004000

Project Name: Former Scholes Street Holder Station Site

Supervisor:

Equipment On Site:

Pertinent Information:

Observation

Task	Correct	Questionable	Comments
General			
PPE worn according to HASP/JLA specifications and inspected before use?			
STOP work authority used where appropriate?			
Body Use/Positioning			
Proper lifting/pushing/pulling techniques used (no awkward positions/posture; no twisting or excessive reaching; no straining; no excessive weight; load under control/stable; etc.)?			
Body parts away from pinch points (clear or protected from being caught between objects/equipment or from contacting sharp objects/edges, etc.)?			
Body parts not in the Line of Fire (protected from being struck by traffic, equipment, falling/flying objects, etc.)?			

Work Procedures/Environment			
Correct type and number of barricades/warning devices/cones?			
Communication with others when necessary (hand signals, flags, etc.)?			
Right tools and equipment selected for the job and inspected before use?			
Tools and equipment used properly?			
Housekeeping performed (work areas and pathways clear of hazards, uneven surfaces addressed, etc.)?			
Slip/trip/fall hazards addressed (path selected and cleared, eyes on path, speed footing, etc.)?			
Proper energy control (electrical systems grounded, lock out/tag out performed, isolated, cords/fixtures in good condition, GFCI inspected and utilized when appropriate and used properly, etc.)?			
Protected from overhead/underground utilities (proper clearance, properly marked, spotters as necessary, etc.)?			
Safe work on/near water (appropriate flotation device, appropriate boat for body of water and operation of boat, etc.)?			
Chemical/Radiation protection (decontamination zones set up properly, air monitoring, completed, and logged, etc.)?			
Fall from elevated height prevention (maintains 3-points of contact, appropriate ladder, mounting/dismounting vehicle/equipment, fall arrest system, etc.)?			
Any additional safety issues identified:			

Tip Summary Enter details of the TIP and follow up discussion provide details on how any questionable items were resolved.

Discussion following the TIP led by: _____

Date of follow-up discussion: _____

Positive Comments:

Discussion Summary Completed:

- ☐ Supervisor Led
- ☐ Peer to Peer
- ☐ Arcadis Employee to Subcontractor

Summary of Questionable Items

Action Items (Optional) Assign appropriate action items based on the observations made. You can add more than one action item if needed.

Item #	Action Item	Responsible Person	Due Date	Comp. Date
1				
2				
3				

Standard Review

Reviews to be performed after entry of this TIP into 4-Sight.

Quality Review

Quality Reviews to be performed after entry of this TIP into 4-Sight.

Field Validation and Verification

Use the 4-Sight generated copy of this TIP to perform field V&V activities.

PID Calibration Log

ARCADIS

Zero Gas Source: _____ Instrument Type: _____ PAGE ____ of ____

Lot Number/Expiration Date: _____ Serial Number: _____

Calibration Gas Source: _____ Instrument Type: _____

Lot Number/Expiration Date: _____ Serial Number: _____

Concentration: _____ _____

Instrument Number	Date	Time	Zero Cal. OK (Y/N)	Calibration Gas Reading	Comments	Calibration w/in 2% (Y/N)?	Alarms Set (Yes/No)?	User Initials

Air Monitoring Documentation Form

PID Model: _____ Monitor Frequency: _____

LEL/O_2 Model: _____

CIT Model: _____

Dust Mon. Model: _____

Air Monitoring Results

Date	Time	PID (units)	O_2 (%)	LEL (% LEL)	CIT (ppm)	Dusts (mg/m^3)	Location

CIT = Colorimetric Indicator Tube
LEL = Lower Explosive Limit
mg/m3 = Milligram per cubic meter
O2 = Oxygen
ppm = Part per million
% = Percent
PID = Photoionization Detector

LEL/O_2 Calibration Log

ARCADIS

Calibration Gas Source: _____ Instrument Type: _____
Lot Number/Expiration Date: _____ Serial Number: _____
Concentration: _____ Instrument Type: _____ PAGE ____ of ____
Other: _____ Serial Number: _____
Other: _____

Instrument Number	Date	Time		Alarms OK? (Y/N)	Oxygen Reading	Zero Cal. OK? (Y/N)	Span Reading	Calibration OK? (Y/N)	User Initials

THIS FORM MUST BE COMPLETED IN ENTIRETY PRIOR TO BEGINNING ANY INTRUSIVE WORK

Project: Former Scholes Street Holder Station Site
Project Number: 30004000
Form Completion Date: _____ Form Expiration Date: _____
(15 business days post form completion date)

Pre-Field Work

Required: One Call or "811" notified 48-72 hours in advance of work? #: _____
Ticket Expiration Date _____ (Review State Requirements)
Utility companies notified during the One Call process ☐ See attached ticket

_____ _____ _____ _____
_____ _____ _____ _____

List any other utilities requiring notification:
☐ None
_____ _____ _____

Private Locator Contacted ☐ Yes ☐ No
Plan private utility clearance subcontractor assignments, areas, required clearance equipment, depth of clearance needed, types of utilities. When possible re-clear 811 markings to confirm utility locations.

Client provided utility maps or "as built" drawings showing utilities? ☐ Yes ☐ No

Field Work - This must be completed on site, by staff who have a minimum of one year of field experience in identifying utilities. Review check list with PM or designee prior to beginning intrusive work.

List Soil Boring / Well IDs or Excavation Locations applicable to this clearance checklist:

3 Reliable Lines of Evidence Required Prior to Starting any Subsurface Intrusive Work

☐ One Call/"811" (Reliable as a line of evidence when working in public right of way or easement)
Utility Markings Present: ☐ Paint ☐ Pin flags/stakes ☐ Other ☐ None

☐ Client Provided Maps/Drawings **OR** ☐ Maps/Drawings requested but not provided
☐ Client Clearance Name(s)/Affiliation(s) _____
☐ Interview(s): Name(s)/Affiliation(s) _____
_____

Did person(s) interviewed indicate depths of any utilities in the subsurface?
☐ Yes, depths provided: ☐ Did not know or refused to answer
Additional Comments:

☐ Site Inspection (**Complete Page 2 & Photo Document Marked Utilities & Utility Structures**)
☐ Public Records / Maps / Asbuilts
☐ Private Locator: (Name and Company) _____
☐ Ground Penetrating Radar (GPR)
☐ Radiofrequency (RFLoc)
☐ Electromagnetic (EM)
☐ Metal Detector

Soft Dig Methods
☐ Termination Depth _____ft. bgs
☐ Potholing / Vacuum Extraction
☐ Air-Knife or Hydro-Knife
☐ Probing
☐ Hand Auguring

Tips for Successful Utility Location:
1. Don't forget to look up
2. Be on site with Private Utility Locators
3. Ask Private Locators to "confirm" other's markings
4. Select alternate/backup locations during clearance process
5. Mark out all known utilities. Leave nothing to question
6. No hammering - no pickaxes - no digging bars - no shortcutting
7. No excessive turning or downward force of hand augers/shovels
8. Utilities may run in or directly under asphalt/concrete

☐ Other: _____
☐ Marine Locator: (Name and Company) _____

During the site inspection look for the following: **("YES" requires additional investigation and the utility must be marked properly prior to beginning subsurface intrusive work)**:

Site Inspection	**Utility Color Codes**	**Present**
a) Natural gas line present (evidence of a gas meter)?	Yellow	☐ Yes ☐ No
i) Feeder Lines to buildings or homes?		☐ Yes ☐ No
b) Evidence of electric lines:	Red	
i) Conduits to ground from electric meter or along wall?		☐ Yes ☐ No
iii) Conduits from power poles running into ground?		☐ Yes ☐ No
ii) Light poles, electric devices with no overhead lines?		☐ Yes ☐ No
iii) Overhead electric lines present? (See Section l)		☐ Yes ☐ No
c) Evidence of sewer drains:	Green	
i) Restrooms or kitchen on site?		☐ Yes ☐ No
ii) Sewer cleanouts present?		☐ Yes ☐ No
iii) Combined sewer/storm lines or multiple sewer lines?		☐ Yes ☐ No
d) Evidence of water lines:	Blue	
i) Water meter on site or multiple water lines?		☐ Yes ☐ No
ii) Fire hydrants in vicinity of work?		☐ Yes ☐ No
iii) Irrigation systems? (Sprinkler heads, valve boxes, controls in building)		☐ Yes ☐ No
e) Evidence of storm drains:	Green	
i) Open curbside or slotted grate storm drains		☐ Yes ☐ No
ii) Gutter down spouts going into ground		☐ Yes ☐ No
f) Evidence of telecommunication lines:	Orange	
i) Fiber optic warning signs in areas?		☐ Yes ☐ No
iv) Aboveground cable boxes or housings or wires in work area?		☐ Yes ☐ No
g) Underground storage tanks:		
i) Tank pit present, tank vent present?		☐ Yes ☐ No
ii) Product lines running to dispensers/buildings?		☐ Yes ☐ No
h) Do utilities enter or exit existing structures/buildings?		
If Yes, confirm the utility markings outside of structure/building match up.		☐ Yes ☐ No
i) Proposed excavation marked in white?	White	☐ Yes ☐ No
j) Unclassed utilities / anomalies marked in pink?	Pink	☐ Yes ☐ No
k) **Overhead** Utilities/Communication Lines - **Look Up**:		
i) Overhead electrical conduit, pipe chases, cable trays, product lines?		☐ Yes ☐ No
ii) Overhead fire sprinkler system?		☐ Yes ☐ No
l) **Overhead** Power lines in or near the work area:		
i) < 50 kV within 10 ft. of work area?		☐ Yes ☐ No
ii) >50 - 200 kV within 15 ft. of work area?		☐ Yes ☐ No
iii) >200-350 kV within 20 ft. of work area?		☐ Yes ☐ No
iv) >350-500 kV within 25 ft. of work area?		☐ Yes ☐ No
v) >500-750 kV within 35 ft. or work area?		☐ Yes ☐ No
vi) >750-1000 kV within 45 ft. of work area?		☐ Yes ☐ No
m) Other:		
i) Evidence of linear asphalt or concrete repair?		☐ Yes ☐ No
ii) Evidence of linear ground subsidence or change in vegetation?		☐ Yes ☐ No
iii) Unmarked manholes or valve covers in work area?		☐ Yes ☐ No
iv) Warning signs ("Call Before you Dig", etc.) on or adjacent to site?		☐ Yes ☐ No
v) Utility color markings not illustrated in this checklist?	Purple	☐ Yes ☐ No
n) Has the Utilities & Structures Checklist been reviewed by the PM or Designee		☐ Yes ☐ No

PM or Designee Name: _____

Name and Signature of person completing the checklist: _____

Date: _____

Do not perform **mechanized** intrusive work within 30 inches of a utility marking without receiving pre-approval by Corporate H&S .

Arcadis Weekly Vehicle Inspection Form

Vehicle # / License Plate # _____ **Lease Plan # / Last 6 of Vin #** _____

	Inspection Date												
	Odometer reading												
	Driver / Inspector Name												
	Check the appropriate box and enter repair date for identified repairs:	OK	Needs Repair	Repair Date	OK	Needs Repair	Repair Date	OK	Needs Repair	Repair Date	OK	Needs Repair	Repair Date
Interior	Horn operational												
	Door Locks operational												
	Seat Belts in good repair												
	Seats and Seating Controls												
	Steering Wheel - No Excessive Play												
	Interior Lights and Light Controls												
	Instrument Panel/Gauges												
	Wiper Controls operational												
	Heat/Defrost/Air Conditioning working												
	Rear View Mirror present												
	Backup Camera/Sensors working												
	Jack and Lug Wrench present												
Exterior[1]	Lights and Signals operational												
	Tires properly inflated/good tread depth												
	Spare Tire properly inflated												
	Doors operational												
	Windows Not Cracked/Damaged												
	Side View Mirrors												
	Body Panels and Bumpers												
Engine & Brakes	Engine Start & Running Smoothly												
	Fluid Levels, No Noticeable Leaks												
	Belts tight, no cracks												
	Brakes operational, no squeaking												
Emergency Equipment[2]	First Aid Kit, inspected weekly												
	Fire Extinguisher properly secured												
	Fire Extinguisher inspected weekly												
	Orange/Yellow emergency warning light												
	Roadside Assistance Information												
	Recommend spotter cones available												
Cargo	Cargo Secure and Properly Distributed												
	Securing Devices in Good Condition												
Registration	License Plate /Tags												
	Registration and Insurance												
	City/State Inspection Decal												
	Lease Plan information/Fuel Card												

[1] **Note all damages to the vehicle on the back of this page**

[2] **Emergency Equipment required per Motor Vehicle Standard ARC HSGE024**

Note All Vehicle Damage Below

All Vehicle Damage must be reported to Sue Berndt (Corporate Legal), Andrew McDonald (Corporate H&S), and Roger Elliot (Corporate Fleet Manger)

CODES:

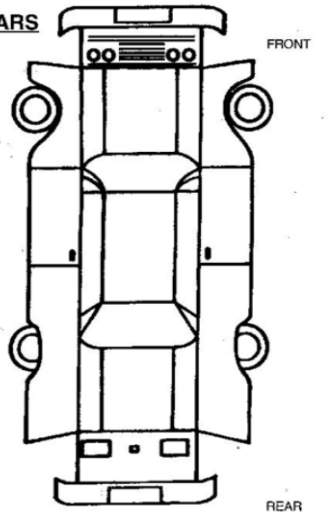
B-BENT
BR-BROKEN
BU-BULGE
C-CHAFED
CH-CHIPPED

CPM-COVERED WITH PROTECTIVE MATERIAL-UNABLE TO DETERMINE DEFECTS IF ANY
CSA-CHAFED AND SCRATCHED ALL OVER
CR-CRACKED
D-DENTED

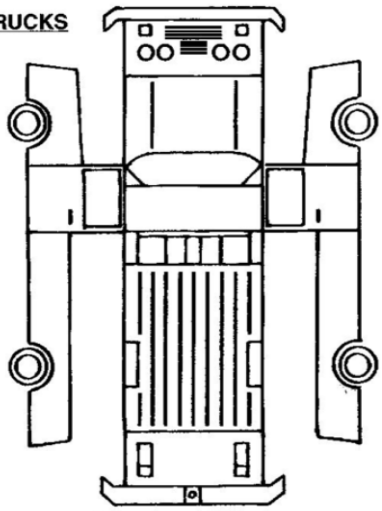
DMC-DUST AND MUD COVERED UNABLE TO DETERMINE OTHER DEFECTS IF ANY
G-GOUGED OR CUT
GC-GLASS CRACKED
HS-HAIRLINE SCRATCH
M-MISSING

P-PUNCTURED
R-RUSTY
S-SCRATCHED
SC-SCRAPED
SM-SMASHED
ST-STAINED AND/OR SOILED
T-TORN

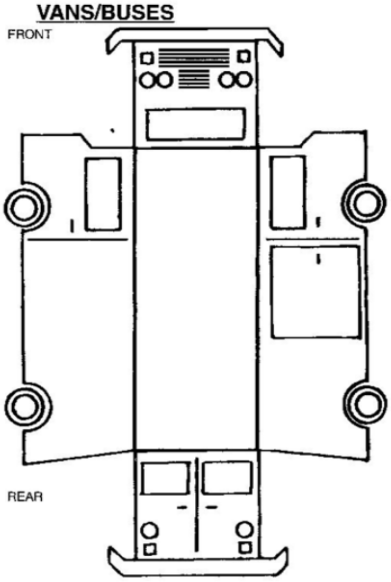
CARS



TRUCKS



VANS/BUSES



-INDICATE ON DIAGRAM-
-GIVE DIMENSIONS-
-CIRCLE WHERE APPLICABLE-

Notes:

Tread guide: If a tread gauge is not available coins may be used to determine remaining tread. 2/32” is the minimum by law in most states (top of Lincoln’s head on penny), 4/32” is minimum recommended for wet surfaces (top of Washington’s head on quarter), 6/32” is minimum recommended for snowy surfaces (top of Lincoln Memorial on penny).Vehicle tires should be replaced if the tread depth is less than 6/32”.



2/32” remaining 4/32” remaining 6/32” remaining

Reference JSA 10907 For Weekly Vehicle Inspection

Control Number: TSM- 30004000

TSM + project number plus date as follows: xxxxxxxx.xxxx.xxxxx - dd/mm/year

ARCADIS

TAILGATE HEALTH & SAFETY MEETING FORM

Project Name:			**Project Location:**
Date:	**Time:**	**Conducted by:**	**Signature/Title:**

Issues or concerns from previous day's activities:

Task anticipated to be performed today:

☐ Additional permits/checklists attached

USE TRACK! Evaluate the hazards (h) for the tasks being performed today and rank as Low (L), Medium (M) or High (H). Use relevant JSAs, FHSHB, permit or other work standard to communicate controls (c) to be used to eliminate or mitigate identified hazards.

☐ Gravity (i.e., ladder, trips) (L M H) h: c:	☐ Motion (i.e., traffic, machinery) (L M H) h: c:	☐ Mechanical (i.e., augers, motors) (L M H) h: c:
☐ Electrical (i.e., utilities) (L M H) h: c:	☐ Pressure (i.e., gas cyl., wells) (L M H) h: c:	☐ Environment (i.e., heat, cold) (L M H) h: c:
☐ Chemical (i.e., fuel, acid, paint) (L M H) h: c:	☐ Biological (i.e., ticks, poison ivy) (L M H) h: c:	☐ Radiation (i.e., alpha, sun, laser) (L M H) h: c:
☐ Sound (i.e., machinery) (L M H) h: c:	☐ Personal (i.e. alone, night) (L M H) h: c:	☐ Driving (i.e. car, ATV, boat) (L M H) h: c:

☐ Refer to the attached Hazard Analysis Sheet(s) or JSA

Comments:

Signature and Certification: I have read and understand the project specific HASP for this project.

Non-Life Threatening Injury or Illness
Call WorkCare 1-888-449-7787

SSE Employee*	Printed Name/Signature/Company	Sign In Time	Sign Out Time

***Short Service Employee (SSE) working for Arcadis <1 year.**

I will STOP the job any time anyone is concerned or uncertain about health & safety or if anyone identifies a hazard or additional mitigation not recorded in the site, project, job or task hazard assessment.

I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original hazard assessments.

If it is necessary to **STOP THE JOB,** I will perform **TRACK**; and then amend the hazard assessments or the HASP as needed.

I will not assist a subcontractor or other party with their work unless it is absolutely necessary and then only after I have done TRACK and I have thoroughly controlled the hazard.

All site staff should arrive fit for work. If not, they should report to the supervisor any restrictions or concerns.

In the event of an injury, employees will call **WorkCare at 1.888.449-7787** and then notify the field supervisor.

Utility strike, motor vehicle accident or 3rd party property damage - field supervisor will immediately notify the Project or Task Manager

Attachment 1
NON-Row Traffic
Safety Plan

Traffic Safety Plan (TSP)

Notes: ROW - Right of Way (Public) formerly known as "TCP"
Non-ROW - Not in the ROW (parking lots, etc.) formerly known as "STAR"

1.0 General

Plan type	Non-Right of Way (Non-ROW)
Project Name:	Former Scholes Street Holder Station
Project Number:	30004000
Developer Name:	Doug Nodine
Duration of Project (in hours or days):	365 Days

☐ Working on multiple roads?

Comments:

2.0 Work Description

Provide a brief description of scope of work:

The work activities conducted under this Traffic Safety Plan (TSP) will be performed on an active commercial property. Site traffic will consist of pedestrians, cars, trucks, and large trucks. Work is not anticipated to be performed outside the site boundary or in the public right-of-way.

3.0 Type and Duration

Work locations on this project will be: Intermediate work (1-8 hours per location)

Non-ROW work will be performed in: Active parking lot

Special traffic conditions may include (select most prevalent): Not applicable

4.0 Traffic Control Layout, Number of Devices Required, and Phasing

The following Non-ROW requirements in the Traffic Safety Handbook applies:

Section 7.3 Intermediate Duration Work in Parking Areas (1 to 8 Hours) (DOT Facts-302b)

Non-ROW configuration:
An example non-ROW traffic control configuration for this project is illustrated below. The actual type and number of devices required are specified below. Don't leave vehicle doors open. Don't establish controls within 25 ft of the front or rear of parked large vehicles/rolling equipment without coordinating with the vehicle/equipment operator.



Intermediate Term (1-8 Hours)
Channelizing Cones with Flags and Caution Tape



Short Term (<1 Hour)
Channelizing Cones with Flags

ROW minimum sign spacing distances for "A", "B" and "C" (as applicable) in referenced DOT Facts.			ROW oncoming traffic minimum site distance required to see Flagger and properly decelerate and stop.
A	NA	ft.	
B	NA	ft.	
C	NA	ft.	NA ft.

ROW Cone Calculation (Values are default. Light grey fields may be modified based on actual road conditions)

	Active work area length (feet)	NA
☐	Apply Optional Longitudinal Buffer (ft)?	NA
	Lane width of offset (feet)	NA
	Shoulder width of offset (feet)	NA
	Posted speed limit	NA

☐ **Shoulder Taper**

Taper Length (feet)	NA
Cones Required	NA
Cones Spacing (max., ft)	NA

☐ **Merging Taper**

Taper Length (feet)	NA
Cones Required	NA
Cones Spacing (max., ft)	NA

☐ **Work Area**

Cone Spacing (max., ft)	NA
Cones Required	NA

☐ **Downstream Taper**

Taper Length (feet)	NA
Cones Required	NA
Cone Spacing (max., ft)	NA

Cones Required (minimum) NA

Note: Review taper configuration and cone spacing after ROW implementation to ensure traffic is moving efficiently without motorist confusion in the RWZ.

Select the traffic control devices to be used and enter number each required:

Check all that apply:		*Wording or Pictogram*	*Number:*
☐	Warning signs		
☐	Warning signs		
☐	Warning signs		
☐	Stop/Slow paddle		
☐	Red flag		
☐	Drums		
☐	Channelizer cone (42 inch height, 10 lb base)		
☐	Channelizer cone (42 inch height, 30 lb base)		
X	Traffic cones (≥ 18 inches tall)		9
☐	Barricade:		
X	Flags for cones		9
☐	Lights (for night work)		
☐	Plastic fencing (rolls)		
X	Caution tape (rolls)		2
☐	Other (specify):		

Non-ROW Phasing:

1) Position truck as shield, if practical

2) Deploy traffic control devices

3) Affix flags, caution tape or fencing

4) Unload project equipment

5) Commence work

6) SSO to maintain controls

7) Remove controls in reverse order

Electronic Device Use Safety

Electronic devices (tablets, laptops and cell phones) used to collect data or document activities in active parking lots must be used in a manner that does not interfere with the user's ability to see and react to vehicle movements in the work area. If this requirement cannot maintained, a spotter must be used. When possible position vehicle to act as a shield. Short-term traffic control scenarios provided by this TSP are not authorized if a spotter is not used.

Reviewed By:

HASP Reviewer: _____

_____

Attachment 2
Job Safety Analyses

Job Safety Analysis

General

JSA ID	166	**Status**	(3) Completed
Job Name	Environment-Sample cooler handling	**Created Date**	5/1/2009
Task Description	Sample cooler handling	**Completed Date**	05/13/2009
Template	True	**Auto Closed**	False

Client / Project

Client	Arcadis AGMI
Project Number	000000100000
Project Name	GENERAL OVERHEAD
PIC	
Project Manager	

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Coppola, Mija	12/19/2011	5/11/2009	Coppola, Mija	☐
HASP Reviewer	Moyers, Samuel	5/25/2009	5/13/2009	Tremblay, Tony	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Transfer field samples to sample packing area	1	Lifting heavy coolers may result in muscle strain especially to lower back.	Use proper lifting techniques and keep back straight. Use buddy system for large coolers, Use mechanical aids like hand trucks if readily available to move coolers. Do not over fill coolers with full sample containers for temporary movement to the sample prep area. Ensure an adequate supply of sample coolers are in field.	
		2	Hazards to hands from broken glass caused by over tightening lids or improper placement in cooler	Inspect all bottles and bottle caps for cracks/leaks before and after filling container. Do not over tighten sample lids. Clean up any broken bottles immediately, avoid contact with sample preservatives. Wear leather gloves when handling broken glass.	
		3	Exposure to chemicals (acid preservatives or site contaminants) on the exterior of sample bottles after filling.	Wear protective gloves for acid preservatives and safety glasses with side shields during all sample container handling activities (before and after filling), Once filled follow project specific HASP PPE requirements for skin and eye protection.	
		4	Samples containing hazardous materials may violate DOT/IATA HazMat shipping regulations	All persons filling a sample bottle or preparing a cooler for shipment must have complete ARCADIS DOT HazMat shipping training. Compare the samples collected to the materials described in the Shipping Determination for the Project and ensure consistent. Re-perform all Shipping determinations if free product is collected and not anticipated during planning.	
2	Sample cooler selection	1	Sample coolers with defective handles, lid hinges, lid hasps cracked or otherwise damaged may result in injury (cuts to hands, crushing of feet if handle breaks etc)	Only use coolers that are new or in like new condition, No rope handled coolers unless part of the manufacturer's handle design.	ARCADIS Shipping Guide US-001
		2	Selection of excessively large coolers introduces lifting hazards once the cooler is filled.	Select coolers and instruct lab to only provide coolers of a size appropriate for the material being shipped. For ordinary sample shipping sample coolers should be 48 quart capacity or smaller to reduce lifting hazards.	
3	Pack Samples	1	Pinch points and abrasions to hands from cooler lid closing unexpectedly	Beware that lid could slam shut; block/brace if needed; be wary of packing in strong winds. New coolers may be more prone to self closing, tilt cooler back slightly to facilitate keeping lid open.	

3	Pack Samples	2	Awkward body positions and contact stress to legs and knees when preparing coolers on irregular or hard ground surfaces.	Plan cooler prep activities. Situate cooler where neutral body positions can be maintained if practical, like truck tailgate. Avoid cooler prep on rough gravel surfaces unless knees and legs protected during kneeling.	
		3	Frostbite or potential for oxygen deficiency when packing with dry ice. Contact cold stress to fingers handling blue ice or wet ice	Dry ice temperature is -109.30F. Wear thermal protective gloves. DO NOT TOUCH with bare skin! Dry ice sublimates at room temp and could create oxygen deficiency in closed environment. Maintain adequate ventilation! Do not keep dry ice in cab of truck. Wear gloves when handling blue ice or gaging wet ice. Dry Ice is DOT regulated for air shipping, follow procedures in Shipping Determination.	
4	Sealing, labeling and Marking Cooler	1	Cuts to hands and forearms from strapping tape placement or removing old tape and labels	Do not use a fixed, open-blade knife to remove old tags/labels, USE SCISSORS or other safety style cutting device. Only use devices designed for cutting. Do not hurry through task.	
		2	Lifting and awkward body position hazards from taping heavy coolers, dropping coolers on feet during taping.	Do not hurry through the taping tasks, ensure samples in cooler are evenly distributed in cooler to reduce potential for overhanging cooler falling off edge of tailgate/table when taping.	
		3	Improper labeling and marking may result in violation of DOT/IATA HazMat shipping regulations delaying shipment or resulting in regulatory penalty	Do not deviate from ARCADIS Shipping Guide or Shipping Determination marking or labeling requirements.	
5	Offering sample cooler to a carrier or lab courier for shipment.	1	Lifting heavy coolers may result in muscle strain especially to lower back.	See lifting hazard controls above.	
		2	Carrier refusal to accept cooler may cause shipping delay and/or result in violation of DOT HazMat shipping regulations.	Promptly report all rejected and refused shipments to the ARCADIS DOT Program Manager. Do Not re-offer shipment if carrier requires additional labels markings or paperwork inconsistent with your training or Shipping Determination without contacting the ARCADIS DOT Compliance Manager.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Hand Protection	chemical resistant gloves (specify type)	nitrile	Required
	work gloves (specify type)	leather	Required

Supplies

Type	Supply	Description	Required
Miscellaneous	Other	Scissors	Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Moyers, Samuel HASP Reviewer Revise 5/11/2009	Kevlar is required? Leather work gloves are listed. i suggest just leather gloves.
Employee: **Role** **Review Type** **Completed Date**	Moyers, Samuel HASP Reviewer Approve 5/13/2009	

Job Safety Analysis

General

JSA ID	44	**Status**	(3) Completed
Job Name	Environment-Drilling, soil sampling, well installation	**Created Date**	2/4/2009
Task Description	Drilling, and well installation	**Completed Date**	12/08/2017
Template	True	**Auto Closed**	False

Client / Project

Client	
Project Number	
Project Name	US010 US Extra Time Overhead Project
PIC	
Project Manager	

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	McDonald, Andrew	12/22/2017	12/8/2017	Tremblay, Tony	☑
Developer	Merkle, Kurt	12/22/2017	12/8/2017	Merkle, Kurt	☐
HASP Reviewer	McDonald, Andrew	12/22/2017	12/8/2017	Tremblay, Tony	☑
Quality Reviewer	Abou Abdallah, Said	12/11/2017	12/11/2017	Carpenter, Matt	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Set up necessary traffic and public access controls	1	Struck by vehicle due to improper traffic controls	Use a buddy system for placing site control cones and/or signage. Position vehicle so that you are protected from moving traffic. Wear Class II traffic vest	
2	Utility Clearance	1	Potential to encounter underground or above ground utilities while drilling.	Complete utility clearance in accordance with the ARCADIS Utility Clearance H&S Standard.	ARCADIS H&S Standard ARCHSFS019
3	General drill rig operation	1	Excessive noise is generated by rig operation.	When the engine is used at high RPMs or soil samples are being collected, use hearing protection.	
		2	During drill rig operation, surfaces will become hot and cause burns if touched, and COCs in the soils more readily vaporize generating airborne contaminates.	Due to friction and lack of a drilling fluid, heat will be produced during this method. Mainly drill augers. Be careful handling split spoons. Wear proper work gloves. When soils and parts become heated, the COC could volatilize. Air monitoring should always be performed in accordance with the HASP.	
		3	Moving parts of the drilling rig can pull you in causing injury. Pinch points on the rig and auger connections can cause pinching or crushing of body parts.	Stay at least 5 feet away from moving parts of the drill rig. Know where the kill switch is, and have the drillers test it to verify that it is working. Do not wear loose clothing, and tie long hair back. Avoid wearing jewelry while drilling. Cone off the work area to keep general public away from the drilling rig.	
		4	Dust and debris can cause eye injury and soil cuttings and/or water could contain COCs.	Wear safety glasses and stay as far away from actual drilling operation as practicable. Wear appropriate gloves to protect from COCs.	
		5	Drilling equipment laying on the ground (i.e. augers, split spoons, decon equipment, coolers, etc), create a tripping hazard. Water from decon buckets generate mud and cause a slipping hazard.	Keep equipment and trash picked up, and store away from the primary work area.	
		6	The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Clearance H&S Standard for guidance.	

4	Mud rotary drilling	1	The raised derrick can strike overhead utilities, tree limbs or other elevated items.	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
		2	This technology uses fluid, which collects with sediments in large basin. Fluid can splash out and cause slipping/mud hazard. Liquid mixture can splash into your eyes.	Wear rubber boots if needed, and keep clear of muddy/wet area as much as practicable. If area becomes excessively muddy, consider mud spikes or covering the area with a material that improves traction. Wear safety glasses.	
5	Hollow stem auger drilling	1	All hazards in step 3 apply. Additionally,The raised derrick can strike overhead utilities, tree limbs or other elevated items	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	
		2	Hands or fingers can get caught and crushed if trying to clean by hand or with tools while the auger is still turning.	Auger should always be stopped and clutch disengaged prior to cleaning.	
6	Air Rotary Drilling	1	This drilling method works with high air pressure and can generate flying debris that can strike your body or get in your eyes.	When the drill rig is being driven into media, it will produce flying debris. The flaps behind the drill rig should stay closed whenever possible to reduce the risk of flying debris. Safety glasses and hard hat should always be worn when the drill rig is operating. When penetrating asphalt, protect surrounding cars that may be present to avoid damage to pain or windshields.	
		2	The raise derrick can strike overhead utilities, tree limbs or other elevated items.	Never move this rig with the derrick up. Ensure there is proper clearance to raise the derrick and that you are far enough away from overhead power lines. See the Utility clearance H&S Standard for guidance.	
		3	When drilling through bedrock prior to groundwater, dust can be produced from pulverization. Inhalation of dusts/powder can occur.	Supplemental water should be used to manage dust and/or dust masks should be used if necessary.	
7	Reverse rotary drilling	1	This method will use fresh water to pump out drill cuttings through the center of the casing. Water/sediment mixture is generated and could cause contact with impacted soils or groundwater.	Ensure the pit construction can hold the amount of cuttings that are anticipated. Air monitoring should also be used of pit area.	
		2	Fire hydrants are often used for water source. Hydrants deliver water at high pressure. Pressurized water can cause flying parts/debris and excessive slipping hazards.	Water usage from fire hydrants should be cleared with local municipalities prior to use. Only persons that know how to use the hydrant should be performing this task. Ensure all connections are tight, and hose line is not run over to cut by traffic. Any leaks from the hydrant should be reported immediately.	
		3	Settling pit construction can cause tripping hazard from excavated soils, and plastic sheeting can cause slipping.	Cone off the area to keep the general public/visitors away from the settling pit. Ensure proper sloping of excavation.	
		4	The raised derrick can strike overhead utilities, tree limbs or other elevated items.	Never move the rig with the derrick up. Ensure there is proper clearance to raise the derrick, and that you are far enough away from overhead power lines. See the Utility Location H&S policy and procedure for guidance.	

8	Rotosonic drilling	1	Fire hydrants are often used for water source. Hydrants deliver water at high pressure. Pressurized water can cause flying parts/debris and excessive slipping hazards.	Water usage from fire hydrants should be cleared with local muncipalities prior to use. Only persons that know how to use the hydrant should be performing this task. Ensure all connections are tight, and hose line is not run over to cut by traffic. Any leaks from the hydrant should be reported immediately.	
		2	This method requires a lot of clearance. The drill head can turn 90 degrees to attach to the next drill flight or casing. This usually requires a large support truck to park directly behind the rig. As the drill head raises the new casing flight is angled down at the same time until it can be turned completely vertical.	Ensure sufficient overhead clearance.	
		3	Heavy lifting of cores can cause muscle strain.	Always use 2 people to move core containers. Use caution moving core samples to layout area. Plan layout area to ensure adequate aisle space between core runs for logging. Keep back straight and use job rotation.	
		4	The rotosonic drill head can move very quickly up and down while working on a borehole. Moving parts can strike someone or catch body parts.	The operator and helper must communicate and stay clear of the path of the drill head. The drill utilizes two large hydraulic clamps to continuously hold casings while load/unloading previous casings. Do not wear loose clothing.	
9	Direct push drilling	1	The drill rods will be handled by workers most of the time rather than the rig doing it, therefore pinch points can cause lacerations and crushing of fingers/body parts.	Keep a minimum of 5 feet away from drill rig operation and moving parts.	
		2	The direct push rigs are usually meant to fit in spaces where larger rig can't. Tight spaces can pin workers.	Do not put yourself between the rig and a fixed object. Use Spotters or a tape measure to ensure clearances in tight areas. Pre-plan equipment movement from one location to the next.	
		3	Some direct push equipment is controlled by wireless devices. These controls can fail and equipment can strike workers or cause damage to property.	The drill rig should be used in a large open area to test wireless controls prior to moving to boring locations. The operator of the rig will test the kill switch with wireless remote prior to use. Operator will stay in range of rig while moving so that wireless signal will not be too weak and cause errors to the controls.	
		4	Sampling sleeves must be cut to obtain access to soil. Cutting can cause lacerations.	It's preferable to let the driller cut the sleeves open. Many drillers have holders for the sleeve to allow for stability when cutting. If you cut the sleeves, use a hook blade, change blade regularly, and cut away from the body.	
		5	Soil cores may contain contaminated media.	Wear nitrile gloves and saftey glasses for protection from contaminated media when logging soil borings.	
10	Rock coring	1	Flying debris can hit workers or cause debris to get in eyes.	Rock chips or overburden may become airborne from drilling method. Wear safety glasses and hard hat and remain at a safe distance from back of drill rig.	
		2	Heavy lifting of cores can cause muscle strain.	Always use 2 people to move core containers. Use caution moving core samples to layout area. Plan layout area to ensure adequate aisle space between core runs for logging. Keep back straight and use job rotation.	

11	Sample collection and processing	1	Injuries can result from pinch points on sampling equipment, and from breakage of sample containers.	Care should be taken when opening sampling equipment. Look at empty containers before picking them up, and do not over-tighten container caps. Use dividers to store containers in the cooler so they do not break.	Sample Cooler Handling JSA
		2	Lifting heavy coolers can cause back injuries.	Use two people to move heavy coolers. Use proper lifting techniques.	
12	Monitoring well installation	1	Same hazards as in Step 3 with general drill rig operation	See step 3	
		2	Monitoring well construction materials can clutter the work area causing tripping hazards.	Well construction materials should be picked up during the well installation process.	
		3	Heavy lifting can cause muscle strains, and cutting open bags can cause lacerations.	Well construction materials are usually 50 lbs or greater. Team lift or use drill rig to hoist bags. Always use work gloves while cutting open bags.	
		4	Well pack material (i.e. sand, grout, bentonite) can become airborne and get in your eyes.	Wear safety glasses for protection from airborne sand and dust.	
		5	Cutting the top of the well to size can cause jagged/sharp edges on the top of the well casing.	Wear gloves when working with the top of the well casing, and file any sharp jagged edges that resulted from cutting to size.	
13	Soil cutting and purge water management	1	Moving full drums can cause back injury, or pinching/crushing injury.	Preferably have the drilling contractor move full drums with their equipment. If this is not practicable, use lift assist devices such as drum dollies, lift gates, etc. Employ proper lifting techniques, and perfrom TRACK to identify pinch/crush points. Wear leather work gloves, and clear all walking and work areas of debris prior to moving a drum.	Drum Handling JSA

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Required
Miscellaneous PPE	traffic vest--Class II or III		Required
Respiratory Protection	dust mask		Recommended

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)	Driller to provide and manage	Recommended
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
Personal	eye wash (specify type)	bottle	Required
	water/fluid replacement		Recommended
Traffic Control	traffic cones		Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	McDonald, Andrew HASP Reviewer Approve 12/8/2017	
Employee: **Role** **Review Type** **Completed Date**	Abou Abdallah, Said Quality Reviewer NA 12/11/2017	Useful hints to consider when attending field soil borings for utility type work.

Job Safety Analysis

General

JSA ID	HASP 1	**Status**	Complete
Job Name	General Industry-Driving - passenger vehicles	**Created Date**	3/15/2022
Task Description	Driving a car, van, or truck on public roadways.	**Completed Date**	03/15/2022

Client / Project

Client	National Grid
Project Number	30004000
Project Name	Former Scholes Street Holder Station Site
Project Manager	Steven Feldman

User Roles

Role	Employee	Due Date	Completed Date
Developer	Doug Nodine	3/15/2022	3/15/2022
HASP Reviewer	Andrew McDonald	3/15/2022	3/15/2022
Quality Reviewer			

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Pre-Trip Inspection	1	Failing to perform pre-trip inspections may cause mechanical failure, accident or injury.	Perform walk around of vehicle with particular attention to tire inflation and condition. Check lights, wipers, seatbelts for proper operating condition. Properly adjust seat and mirrors prior to vehicle operation. Use or review vehicle inspection checklist as required under the MVSP.	ARC HSGE024 Motor Vehicle Safety Standard (MVSP)
		2	Scrapes, cuts, burns to hand if inspecting engine fluids and/or tires. Eye splash hazard if inspecting engine fluids. Pinch or crush hazards when opening or closing hood, trunk, or tailgate.	Wear protective gloves and safety glasses as described below when checking under hood or tires. Use TRACK and keep hands clear when opening/closing hood, trunk, or tailgate to avoid crush or pinch hazard.	
		3	Struck by other vehicles while walking around vehicle performing inspections.	Wear high visibility vest, shirt, or coat while performing inspections in parking lots or other areas with a traffic hazard. Remain vigilant of moving vehicles or equipment in area, face oncoming vehicles to extent practical.	
		4	Improperly secured cargo may dislodge creating injury, property damage, or road hazard.	Ensure all cargo is properly secured to prevent movement while the vehicle is in operation. This includes cargo in the cab of the vehicle.	
2	Driving a motor vehicle on public streets	1	Failing to observe traffic flow ahead increases risk of hard braking resulting in potential impact of vehicle ahead, being struck by another vehicle from behind, and decreases decision making time.	Use Smith System Key #1, "Aim High in Steering". **Look ahead (15 seconds if possible) to observe traffic flow and traffic signals.** Adjust speed accordingly to keep vehicle moving and avoid frequent braking. Select lane of least traffic and adjust speed based on observed signal timing when possible. Avoid following directly behind large vehicles that obscure view ahead.	Smith System "5-Keys" is a registered trademark of Smith System Driver Improvement Institute, Inc.

2	Driving a motor vehicle on public streets	2	Failing to observe vehicles, pedestrians, bicyclists, and other relevant objects in vicinity of your vehicle increases risk of side swipes, rear ending, and third party injury.	Use Smith System Key #2, "Get the Big Picture". **Maintain 360 degrees of awareness around vehicle.** Check a mirror every 6-8 seconds, maintain space around the vehicle, choose a lane that avoids being boxed in. Look for pedestrian activity ahead in crosswalks or sidewalks. Watch for construction zone approach signs and act early by executing lane changes and reducing speed.	
		3	Failing to keep your eyes moving increases risk of not seeing relevant vehicles, pedestrians, and objects in your vicinity that may impair your ability to make timely and appropriate driving decisions and also increases risk of accident.	Use Smith System Key #3, "Keep Your Eyes Moving". **Move your eyes every 2 seconds and avoid staring while evaluating relevant objects.** Scan major and minor intersections prior to entering them. Check mirrors.	
		4	Failing to maintain space around and in front of your vehicle increases risk of striking another vehicle or being struck by another vehicle. Insufficient space shortens time for effective driving decision making resulting in increased accident risk.	Use Smith System #4, "Leave Yourself an Out". **Use 4 second rule when following a vehicle.** Avoid driving in vehicle clusters by adjusting speed and using lanes that permit maximum space and visibility. When stopped, keep one car length space in front of vehicle ahead or white line.	
		5	Failing to communicate with other drivers and pedestrians increases risk of striking vehicles, pedestrians, or being struck by other vehicles, especially from the rear.	Use Smith System Key #5, "Make Sure They See You". **Brake early and gradually when stopping to reduce potential of being rear ended.** Keep foot on brake while stopped. Use turn signals and horn effectively. Establish eye contact with other drivers and pedestrians to extent practical. Use vehicle positioning that promotes being seen.	
		6	Distractions within the vehicle takes focus off driving, increases risk of accident decreases time for making effective driving decisions.	**Cell phone use (any type or configuration) is prohibited while the vehicle is in motion.** Familiarize yourself with vehicle layout and controls (radio, temperature controls, etc.) prior to operating unfamiliar vehicles. Set controls prior to operating vehicle. Use GPS in unfamiliar areas to avoid use of paper maps/directions while driving. Set GPS prior to vehicle operation. Pull over and stop to modify GPS functions. Avoid consuming food or drink while driving.	
3	Parking	1	Parking vehicle in areas of clustered parked vehicles or near facility entrance may impair visibility to oncoming traffic in lot and increase exposure to pedestrian traffic.	**Use pull through parking or back into parking space when permitted or practical.** When practical and safe to do so, park away from other vehicles and avoid parking near the facility entrance or loading docks. If available, use a spotter to aid in backing activity. Back no further than necessary and back slowly. Get out and look (GOAL) if uncertain of immediate surroundings. Tap horn prior to backing.	

PPE Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses	While checking engine or tires	Required
Hand Protection	work gloves (specify type)	Leather or equivalent checking engine or tires	Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
	other	Vehicle kit (applies to company trucks)	Required
Miscellaneous	fire extinguisher	Applies to company trucks	Required
	first aid kit	Applies to company trucks	Required

Job Safety Analysis

General

JSA ID	7983	**Status**	(3) Completed
Job Name	Environment-Drum sampling/handling	**Created Date**	7/26/2012
Task Description	Drum Handling, Sampling and Transfer of Drum Contents	**Completed Date**	07/26/2012
Template	True	**Auto Closed**	False

Client / Project

Client	Arcadis AGMI
Project Number	000000100000
Project Name	GENERAL OVERHEAD
PIC	
Project Manager	

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Betancourt, Ketzia	8/16/2012	7/26/2012	Betancourt, Ketzia	☐
HASP Reviewer	Hubbard, Lauren	8/9/2012	7/26/2012	Tremblay, Tony	☑
Quality Reviewer	Hubbard, Lauren	7/27/2012	7/27/2012	Tremblay, Tony	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Inspect Drums for signs of Bulging, Leaking, Crystals, Temperature, and Odor	1	Exposure to chemicals stored in drum or container.	Read drum labels for information about contents. Review all relevant MSDSs about chemical contents. If labels are not attached, call PM or Local H&S Representative.	None
		2	Contents of the drum can cause fire/explosion hazard.	Use air monitoring meters to screen drums. % LEL and VOCs (PPM). If either of the values are above the action levels described in the HASP or MSDS then Stop Work, move away from the area, and reassess the situation. Call PM and H&S staff for support.	
2	Remove lids or bungs from Drums	1	Hand Injuries can occur from sharp edges, pinch points, and from use of hand tools.	Wear appropriate work gloves. When removing ring from drum, fingers can get pinched between ring and drum. Keep fingers clear of this space. Select proper tool for task. If large amount of drums will be encountered, use a speed or drum wrench.	Employee H&S Field book, Section III Subpart II, page 104. Also Section III Subpart L, page 38.
		2	Rapid depressurization from empty or partially full drums can cause flying parts or volatile COCs releasing on staff.	Do not handle or open bulging drums (contact Corp H&S for assistance). Bleed any built up pressure by carefully loosening bung prior to removing ring. Keep face and arms away from bung opening when loosening. Slightly lift lid, insert end of air monitoring device to monitor air inside drum.	
		3	Use of mechanical tools to remove bolts from drum lids causes excessive noise.	Wear hearing protection.	
		4	Splashing can occur if filling drum, or collecting samples.	Wear eye and face protection. Pour liquids into drum slowly to minimize splashing.	
		5	When working with COCs that have fire/explosive properties, sparking or heat could cause fire/explosion.	Use brass or non Spark Hand Tools if such a hazard exists or is suspected.	
3	Sample Contents from Drums	1	Exposure to COCs can occur by contacting impacted contents.	Select proper dermal protection for task, at a minimum nitrile gloves should be worn. Wear appropriate eye face and body protection as outlined in the HASP.	
		2	Staff can be exposed to chemical vapors/fumes when sampling.	Conduct air monitoring as outlined in the HASP, and if required, select appropriate respiratory protection for the task.	
		3	Sharp edges and broken sample containers can cause lacerations.	Discard any broken sample ware or glass properly. Do not over tighten sample containers.	

3	Sample Contents from Drums	4	Chemical burns or skin irritation can occur from contact with sample preservatives.	Wear chemical protective gloves when collecting samples, or when handling damaged sample containers.	
4	Replace drum lids	1	Hand Injuries can occur from sharp edges, pinch points, and from use of hand tools.	see step 2 above	
5	Moving and Storing Drums	1	Drum storage areas can be accessed by the general public, or may not be secure.	Calculate how many drums will be stored in new location. Ensure that drums are not easily accessed by the general public. Do not store such that drums impede pedestrian or vehicular traffic.	
		2	Muscle strain can occur when lifting/pulling/pushing drums.	Drums that are full can weigh as much as 800 lbs. Use a lift assist device whenever possible, and use a team lift approach. When moving soil drum generated by drilling, have drillers use their equipment to move the drums. Using dolly, slightly lift drum away from dolly to install forks under drum. Slowly let drum come back down and rest on dolly. Using hook on top of dolly, ensure it latches on top of drum bung.	
		3	Body parts can be pinched between lift device, or drum and the ground.	Be aware of hand and foot placement during drum staging. Do not hurry through task.	
		4	When moving, the drum can tip or the dolly could become unstable from uneven ground surface.	Plan travel route with drum prior to moving. With drum secure on dolly, have one employee pull back on dolly, and other employee slowly push back on drum toward dolly. Have second worker act as spotter for traffic, pedestrians, and any trip hazards along the way.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	chemical protective suit (specify type)		Required
Eye Protection	faceshield		Required
	safety goggles		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)		Required
Hearing Protection	ear plugs		Required

Supplies

Type	Supply	Description	Required
Miscellaneous	Other	dolly	Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Hubbard, Lauren HASP Reviewer Approve 7/26/2012	
Employee: **Role** **Review Type** **Completed Date**	Hubbard, Lauren Quality Reviewer NA 7/27/2012	Reviewed by Corporate H&S Department

Job Safety Analysis

General

JSA ID	2796	**Status**	(3) Completed
Job Name	Construction-Oversight - excavation and construction	**Created Date**	6/14/2010
Task Description	Excavation/Trenching Oversight (Outdoors)	**Completed Date**	06/17/2010
Template	True	**Auto Closed**	False

Client / Project

Client	Arcadis AGMI
Project Number	000000100000
Project Name	GENERAL OVERHEAD
PIC	
Project Manager	

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Stewart, Ian	5/21/2012	6/14/2010	Stewart, Ian	☐
HASP Reviewer	Tremblay, Tony	6/28/2010	6/17/2010	Tremblay, Tony	☐
Quality Reviewer	Crandall, James M.	6/25/2010	6/25/2010	Johnson, Gary	☐

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Utility Clearance	1	Contact with utilities can cause injury, property damage, and cause releases of hazardous substances to the environment.	Establish a minimum of three lines of evidence, and obtain additional lines of evidence as needed for site specific conditions. Maintain utility markings, perform detailed site inspections, and keep open and constant communication between operators, onsite staff, and project management. Always Use Stop Work Authority if there is a question or concern about the location of a utility.	ARCHSFS019 - Utility Clearance HS Standard
		2	Slip trip and falls while performing site clearance activities	Focus on task at hand and do not hurry through task. Avoid reading maps/drawings while walking, stop walking when looking up for overhead utilities.	
2	Excavation/Trenching and Backfilling Oversight	1	Slips trips and falls from poor housekeeping around trench or excavation.	Maintain work area and minimize clutter near excavation. Place excavated material properly and at least 2 feet away from the edge of excavation. Remove potential hazards when possible. Mark hazards when it cannot be removed. Create and maintain awareness of hazard. Maintain barriers, fall hazard warning signage and traffic controls properly. Do not cross over caution tape, safety fencing etc. Follow Project specific STAR Plan	FHSHB IV(D)
		2	Excavation or trench collapse trapping workers or creating falls.	Excavation/Trench greater than five (5) feet deep in which subcontractor, employees or others will be entering must be properly sloped, benched, shored or have a trench box in place. Sloping, benching, shoring or use of trench box is not required IF an excavation is less than five (5) feet in depth and examination of the ground by a competent person provides no indication of a potential cave-in. Ensure a Competent Person is on site to inspect and oversee excavation/ trenching activities. Where feasible, stay six (6) feet from edge of excavation/trench. A safe means of egress, such as a stairway, ladder, or ramp, shall be located so that no more than twenty-five (25) feet of lateral travel is necessary for site workers conducting activities in trenches exceeding four (4) feet in depth.	

2	Excavation/Trenching and Backfilling Oversight	3	Potential high level of dust, fumes, vapors or particulates creating visibility or inhalation/contact hazards could result in exposure above occupational exposure limit or create an IDLH atmosphere.	Visually monitor air for dust, and wet excavated soil as needed to control dust. Monitor for chemical vapors if hazard exists. The atmosphere must be tested in excavations greater than four (4) feet in depth where oxygen deficiency or toxic or flammable gases are likely to be present, before workers will be permitted to enter. Ensure downwind and perimeter monitoring also performed, if atmospheric hazards exists.	
		4	Excessive noise from excavating equipment or pumps.	Make sure all authorized personnel including subcontractors are wearing hearing protection (ear plugs/muffs) when working around noisy equipment. Increase distance from noise hazard when practical.	
		5	Potential Leaks of Petroleum Fluids and Lubricants from excavating equipment and support equipment.	Make sure all authorized personnel including subcontractors perform equipment inspections looking for leaks, cracked hoses, and loose fittings. Promptly and properly repair all leaks.	
		6	Open Excavation, Unauthorized Entry, or Property Damage	Make sure all authorized personnel including subcontractors mark open excavation with demarcation tape, orange fencing, orange cones, etc. to prevent unauthorized / accidental entry. Make sure controls are adequate for traffic protection after dark or when the site is unstaffed. Backfill excavation area as soon as possible and fence off any excavation not backfilled at the end of the work day.	
		7	Contact with potentially impacted groundwater and soil.	Conduct task in a calm, cautious manner. Wear appropriate PPE. Ensure equipment is in working conditions before start of work every day. Stop work immediately and report to the site manager, if any life threatening conditions exist.	
		8	Working Around Heavy Machinery	Where feasible, maintain distance from excavation equipment in excess of the swing radius. Maintain eye contact with operators at all time. Ensure equipment is in good working condition before work begins. Wear appropriate PPE, including safety vest. Do not wear loose clothing and pull back long hair. Be aware of and avoid standing in red zones (equipment operator "blind-spots"). No personnel are permitted to stand underneath suspended loads.	
3	Stockpile Maintenance and Sampling	1	Falls climbing on or during covering of stockpile.	Avoid climbing on stockpiles when possible, keep hands free, do not hurry trough tasks such as pulling plastic sheeting up onto or over piles.	
		2	Overexertion placing plastic sheeting, weight, and straw bales.	Use proper lifting techniques, avoid twisting of body, and forceful pulling/pushing. Do not hurry through task.	
		3	Cuts, scrapes, impalement from debris in stockpiles.	Have excavation contractor remove/isolate large chunks of concrete, exposed rebar etc. from stockpile to extent practical. Inspect areas prior to kneeling or placing hands when sampling upon stockpile.	

PPE	Personal Protective Equipment		
Type	**Personal Protective Equipment**	**Description**	**Required**
Dermal Protection	long sleeve shirt/pants		Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	When sampling groundwater	Required
	work gloves (specify type)	Leather when hand hazard exists; nitrile for soil/	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs	When working near heavy equipment	Required
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone	Remote area, check reception	Required
Decontamination	Decon supplies (specify type)		Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
	flashlight		Required
Personal	eye wash (specify type)		Required
	insect repellent		Recommended
Traffic Control	Other	Cones/tape to delineate trenches prior to backfill	Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Tremblay, Tony HASP Reviewer Approve 6/17/2010	
Employee: **Role** **Review Type** **Completed Date**	Crandall, James M. Quality Reviewer NA 6/25/2010	No additional comments. Very well done.

Job Safety Analysis

General

JSA ID	45	**Status**	(3) Completed
Job Name	Environment-Groundwater Sampling and free product recovery	**Created Date**	2/4/2009
Task Description	Groundwater sampling	**Completed Date**	02/06/2009
Template	True	**Auto Closed**	False

Client / Project

Client	Arcadis AGMI
Project Number	000000100000
Project Name	GENERAL OVERHEAD
PIC	
Project Manager	

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Mason, Greg	6/1/2018	2/4/2009	Balcer, Denis	☑
HASP Reviewer	Coppola, Mija	2/6/2009	2/6/2009	Coppola, Mija	☐

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Stage at pre-determined sampling location and set up work zone and sampling equipment	1	Personnel could be hit by vehicular traffic	Set up cones and establish work area. Position vehicle so that field crew is protected from site traffic. Unload as close to work area as safely possible.	
		2	Vehicles parked too close to stationary objects may strike them when driving from location.	Park vehicle so first movement is forward. Park in a location that will be free of stationary objects, such as bollards, monitoring wells, fence posts, etc. when the vehicle pulls forward. Avoid backing! At work locations where space is not restricted, leave a minimum of 10 feet between the work vehicle and the nearest stationary object.	
		3	Sampling equipment, tools and monitoring well covers can cause tripping hazard	Keep equipment picked up and use TRACK to assess changes.	
2	Open wells to equilibrate and gauge wells	1	When squatting, personnel can be difficult to see by vehicular traffic.	Wear class II traffic vest if wells are located proximal to vehicular traffic. Use tall cones and the buddy system if practicable.	
		2	Pinchpoints on well vault can pinch or lacerate fingers	Use correct tools to open well vault/cap. Wear leather gloves when removing well vault lids, and chemical protective gloves while gauging. Wear proper PPE including safety boots, knee pads and safety glasses.	
		3	Lifting sampling equipment can cause muscle strain	Unload as close to work area as safely possible; use proper lifting and reaching techniques and body positioning; don't carry more than you can handle, and get help moving heavy or awkward objects.	
		4	Pressure can build up inside well causing cap to release under pressure	Keep head away from well cap when removing. If pressure relief valves are on well use prior to opening well	
3	Begin Purging Well and Collecting Parameter Measurements	1	Electrical shock can occur when connecting/disconnecting pump from the battery.	Make sure equipment is turned off when connecting/disconnecting. Wear leather gloves. Use GFCIs when using powered tools and pumps. Do not use in the rain or run electrical cords through wet areas.	
		2	Purge water can spill or leak from equipment	Stop purging activities immediately, stop leakage and block any drainage grate with absorbent pads. Call PM to notify them of any reportable spill.	
		3	Water spilling on the ground can cause muddy/slippery conditions	Be careful walking in work area when using plastic around well to protect from spillage	

3	Begin Purging Well and Collecting Parameter Measurements	4	Lacerations can occur when cutting materials such as plastic tubing	When cutting tubing, use tubing cutter. No open fixed blades should ever be used. When possible wear work gloves, leather type.	
		5	Purge water can splash into eyes	Pour water slowly into buckets/drums to minimize splashing. Wear safety glasses.	
4	Collect GW or Free Product Sample	1	Working with bailer rope can cause rope burns on hands.	Slowly raise and lower the rope or string for the bailer. Wear appropriate gloves for the task.	
		2	Sample containers could break or leak preservative	Discard any broken sampleware or glass properly. Do not overtighten sample containers. Wear chemical protective gloves.	
5	Recovery of Free Product from well	1	Exposure to free product	Additional chemical protection may be necessary based on the type of product. Additionally, safety goggles, a faceshield, or respiratory protection may be required. Verify in the HASP.	
6	Staging of Well Purge water and/or Free Product	1	Muscle strains can occur when moving purge water or drums	If using buckets, do not fill buckets up to the top. Always keep lid on buckets when traveling or moving them to another location. Only half fill buckets so when dumping the buckets weigh less. See drum handling JSA for movement of drums.	Drum handling JSA

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants		Recommended
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Recommended
Miscellaneous PPE	other	Knee pads	Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)	alconox, DI water, spray bottle	Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
	flashlight		Required
Personal	eye wash (specify type)	bottle	Required
	insect repellent		Recommended
	sunscreen		Recommended
Traffic Control	barricades		Recommended
	traffic cones		Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Coppola, Mija HASP Reviewer Approve 2/6/2009	

Job Safety Analysis

General

JSA ID	4079	**Status**	(3) Completed
Job Name	General Industry-Site inspection/walkover	**Created Date**	12/9/2010
Task Description	Site Inspection	**Completed Date**	12/14/2010
Template	True	**Auto Closed**	False

Client / Project

Client	Arcadis AGMI
Project Number	000000100000
Project Name	GENERAL OVERHEAD
PIC	
Project Manager	

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Coppola, Mija	1/26/2012	12/10/2010	Coppola, Mija	☐
HASP Reviewer	Tremblay, Tony	12/24/2010	12/14/2010	Polinsky, Heather	☑
Quality Reviewer	Brien, Jason	12/14/2010	12/14/2010	VanDewalker, Heather	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Site Walk (Winter Conditions)	1	Slippery/icy conditions	Use caution and proper footwear with traction	
		2	Eye/face injury	Use caution when walking through trees and brush. Wear proper eye protection to avoid eye injury	
		3	Hypothermia/frostbite	Assess weather conditions and wear proper clothing to avoid hypothermia/frostbite and freezing	
		4	Falling ice/snow	Assess the site for falling ice/snow from trees/powerlines. Use caution when walking around trees and powerlines. Wear hard hat	
		5	Stray animals	Make lots of noise while walking through the site. Carry repellent in the event of encountering stray animals. If a dangerous or aggravated animal is spotted, leave the area, return to your vehicle and contact animal control.	
		6	Vehicular traffic	Asses the site and the surrounding area for vehicle traffic. Use caution when walking near busy roadways. Wear type II or III traffic vest.	
2	Site Walk (Summer Conditions)	1	Slips/trips/falls	Use caution when walking on un-even surfaces. Use proper footwear with traction	
		2	Eye injury	Use caution when walking through areas of trees and brush. Wear proper eye protection to avoid eye injury from tree limbs	
		3	Dehydration	Drink plenty of water and avoid long periods of direct sun exposure	
		4	Sunburn	Wear sunscreen. Avoid long periods of direct sun exposure. Work in the shade if possible.	
		5	Vehicular traffic	Assess the site and the surrounding area for vehicular traffic. Use caution when walking near busy roadways. Wear type II or III traffic vest.	
		6	Stray animals, ticks, bugs	Make lots of noise when traveling through the site and carry repellent spray. If a dangerous or aggravated animal is spotted, leave the area and return to your vehicle and contact animal control. Wear long pants/long sleeve shirt and use insect repellent as necessary	

PPE	Personal Protective Equipment		
Type	**Personal Protective Equipment**	**Description**	**Required**
Dermal Protection	long sleeve shirt/pants		Required
Foot Protection	steel-toe boots		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Miscellaneous	first aid kit		Required
Personal	eye wash (specify type)		Required
	insect repellent		Recommended
	sunscreen		Recommended

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Tremblay, Tony HASP Reviewer Revise 12/10/2010	Please refer to JLA 1602 and use the exterior site walk information as a template for this JLA. Thanks Ahren
Employee: **Role** **Review Type** **Completed Date**	Tremblay, Tony HASP Reviewer Approve 12/14/2010	
Employee: **Role** **Review Type** **Completed Date**	Brien, Jason Quality Reviewer NA 12/14/2010	Well thought out. Appropriate hazards and critical actions have been identified.

Attachment 3
HS Standards

EXECUTIVE SUMMARY

This Standard sets forth the accepted practice for and establishes the requirements for workplace safety near excavations and trenches and employee and subcontractor entry into such.

It is ARCADIS' policy that ARCADIS staff will not enter excavations and trenches unless it is absolutely necessary and that an OSHA-defined Excavation Competent Person is on-site for all excavation work under ARCADIS contractual control. The competent person will be provided by the entity on site responsible for performing the excavation work unless otherwise required by the client. Thus, if an ARCADIS subcontractor is conducting the excavation work, that subcontractor will provide the competent person. If ARCADIS is self-performing the excavation services, then ARCADIS will provide a competent person whether a specialized subcontractor or authorized employee.

An excavation Competent Person must be involved in the excavation/trenching hazard assessment process. This will assist in determining the need for an engineering opinion when excavating near or adjacent to structures and determining the need and timing of inspections.

Prior to excavation, all underground installations (water, electric, telephone, gas, etc.) must be located and documented in accordance with ARCADIS Utility Clearance Policy and Standard ARC HSFS019.

All excavations over four feet in depth (or less than 4 feet in depth if deemed necessary by the Competent Person) shall be provided with a stairway, ladder, ramp, or other safe means of egress so as to require no more than 25 feet of lateral travel.

Water must not be allowed to accumulate in open excavations where employees are working. When necessary, means such as diverting natural drainage around the excavation or actively pumping water must be used to prevent or control water accumulation.

Excavated materials (spoil) must be placed no closer than 2 feet from the edge of an open excavation, and otherwise retained to prevent loose material from falling into the excavation.

Each employee at the edge of an excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, or barricades *when the excavations are not readily seen because of plant growth or other visual barrier*.

Any excavation over 5 feet in depth into which employees will enter that is not entirely in stable rock as defined in this Standard requires use of a protective system.

All excavations over 20 feet in depth must be designed by a registered professional engineer regardless of whether personnel will enter it or not.

All excavations over 4 feet in depth must be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency. Excavations less than 4 feet in depth must be evaluated by the competent person and at the competent person's discretion be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency.

1. POLICY

It is ARCADIS US policy to be proactive in the identification, assessment and control of health and safety hazards and associated risks. To those means, any work involving trenching and excavation that is under the control or direction of ARCADIS or an ARCADIS subcontractor will be accomplished following, at a minimum, this Standard.

It is ARCADIS' policy that ARCADIS staff will not enter excavations and trenches unless it is absolutely necessary. If there are no suitable alternatives and it becomes necessary to enter excavations or trenches, this standard, at a minimum will be strictly followed.

It is also the policy of ARCADIS to ensure an OSHA-defined Excavation Competent Person is on-site for all excavation work under ARCADIS contractual control. The competent person will be provided by the entity on site responsible for performing the excavation work unless otherwise required by the client. Thus, if an ARCADIS subcontractor is conducting the excavation work, that subcontractor will provide the competent person. If ARCADIS is self-performing the excavation services, then ARCADIS will provide a competent person whether a specialized subcontractor or authorized employee.

2. PURPOSE AND SCOPE

2.1 Purpose

To effectively control or eliminate the hazards presented by working near or entry into excavations or trenches, this Standard sets forth the accepted practice for and establishes the requirements for workplace safety near excavations and trenches and employee and subcontractor entry into such.

2.2 Scope

This standard along with associated checklists and the Utility Location Standard (ARC HSFS019) apply to all employees of ARCADIS-US. Only trained and authorized personnel are permitted to work near or enter excavations and trenches, perform rescue services, or act as the excavation competent person.

3. DEFINITIONS

Exhibit 1 includes relevant definitions to this Standard including that for competent person qualifications.

4. RESPONSIBILITIES

4.1 Corporate H&S with Division and Practice Experts

- On a routine basis, review and update, as necessary, this standard.
- As requested by Operations Leadership, review cancelled checklists periodically to ensure conformance to this standard.
- Coordinate with the Training Group to ensure that the excavation competent person qualifications and training/retraining requirements are met.

- Conduct excavation competent person evaluations for nominated individuals as necessary, in order to approve and designate them as competent.
- Recommend qualified training provider for excavation awareness training for employees working in or around excavation/trenching operations.
- Provide technical assistance regarding excavation and trench protocol, atmospheric testing equipment, PPE, hazard assessment and research information on unusual hazards.
- Audit project-specific excavation sites for compliance with this standard.

4.2 Principal in Charge (PIC), Project Manager (PM), and/or Task Manager (TM)

- Verify that excavation and trench protocols are properly identified and addressed within the project work plan, project health & safety plan, and/or other project-related documents.
- Verify that their divisional or project team employees have received the proper training provided by Corporate Health & Safety or qualified training source prior to conducting excavation/trenching entry activities.
- Verify that any ARCADIS employee acting as the Excavation Competent person has been designated and authorized to do so per the requirements specified in section 4.4 of this standard.
- Verify that the proper entry equipment, including personal protective equipment (PPE), atmospheric testing equipment and safety equipment, is available for use by their divisional employees.
- Verify that copies of the completed checklists are available for Corporate Health and Safety review and retained with the project files.
- Request that Corporate Health and Safety review cancelled checklists as necessary and appropriate

4.3 Health and Safety Plan Writers and Reviewers

Use this standard as guidance to ensure the appropriate identification, assessment and control of excavation and trenching hazards for documentation in project HASPs and development of task specific Job Safety Analysis (JSA).

4.4 Competent Person

Competent Person responsibilities include:

- Anticipation, identification and control of excavation and trenching hazards, as well as the signs and symptoms of exposure to the hazard(s), and the Authority to implement all corrective actions including Stopping Work.

  Note: An excavation Competent Person must be involved in the excavation/trenching hazard assessment process. This will assist in

determining the need for an engineering opinion when excavating near or adjacent to structures and determining the need and timing of inspections.

- Review existing soil sampling data (if any) or other pertinent hazard characterization information recorded by the client.
- Investigate the client's excavation/trenching protocol, to verify that any identified hazards and previous experience with earthwork at the site is properly communicated.
- Coordinate entry operations with the client's employees when both client and ARCADIS employees will be working in or near an excavation/trench.
- Offer all entrants an opportunity to review the applicable control measures and testing results and an opportunity to request a reevaluation as necessary.
- Design of structural ramps that are used solely by employees as a means of access or egress from excavations.
- Monitoring of water removal equipment and operations, if water is controlled or prevented from accumulating by the use of water removal equipment,
- Inspection of excavations subject to runoff from heavy rains.
- Daily inspections of excavations, the adjacent areas, and protective systems when required.
- If evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions are present, the Competent Person is responsible for ensuring that exposed employees are removed from the hazardous area until the necessary precautions have been taken to ensure their safety.
- Examining material or equipment used for protective systems that is damaged to evaluate its suitability for continued use. If the competent person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service, and shall be evaluated and approved by a registered professional engineer before being returned to service.
- For excavations less than 5 feet (1.52 m) in depth, in which employees will be entering, a Competent Person must examine the ground to determine if there are indications of a potential cave-in hazard. If there are potential indicators of a cave-in

hazard, the Competent Person will require some form of cave-in protection be implemented before employees can enter.

- Classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits.
- Soil and rock deposits shall be classified by a Competent Person as Stable Rock, Type A, Type B, or Type C based on the results of at least one visual and at least one manual analysis.
- If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a Competent Person. The deposit shall be reclassified as necessary to reflect the changed circumstances.
- When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person shall determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such reduction is achieved.
- Order evacuation of the excavation/trench if an uncontrolled hazard develops, either within or outside the space, or upon observing a behavioral effect of hazard exposure among excavation/trench entrants.
- Verify that all tests and precautionary measures identified on the Daily/Periodic Inspection Checklist located in Exhibit 2 and the ARCADIS Utility Location Policy and Standard ARC HSFS019 has been performed prior to authorizing subsurface work or entry into an excavation or trench.

ARCADIS employees must meet the following requirements to be a designated and approved Competent Person:

- Attend an Excavation Competent Person training course approved by Corporate Health and Safety or have equivalent training; and
- Approval by Corporate Health and Safety through demonstration of practical field experience and/or knowledge of the subject matter.
    - Documentation of the evaluation and approval of each excavation competent person will be completed using the form provided in Exhibit 3.
    - This documentation and a listing of the approved ARCADIS excavation competent person will be maintained by the Training Group; and
- If on an Environmental project where HAZWOPER training is required by ARCADIS, the Competent Person must also have completed the 40 Hour HAZWOPER training, be current on their annual 8 Hour HAZWOPER refresher and it is recommended, but

not required, that the Competent Person completed the HAZWOPER Supervisor training course.

4.5 Site Safety Officer (SSO)

When ARCADIS and/or our subcontractor is in control of an excavation project, the SSO will be responsible for the following:

- Interface with the client representative and Competent Person to identify and understand hazards associated with the client's excavation and trenching and/or work permit programs.
- Implement the ARCADIS Utility Clearance Policy and Procedure and complete the Daily/Periodic Excavation Inspection Checklist, when the excavation project is under the control of ARCADIS.
- Verify adequate training and experience of those ARCADIS employees working in and around excavations.
- Verify that the safety procedures identified in this Standard, the site specific HASP, and applicable regulatory requirements are used when required to protect employees during excavation activities.
- Verify that the client takes the necessary precautions in notifying their employees that our employees will be installing an excavation or trench.
- Review the lockout/tagout and isolation measures implemented by ARCADIS, our subcontractor and/or the client as necessary based on proximity of utilities or other energy sources in the area of the excavation/trench.
- Immediately report any unusual or unplanned excavation or trenching hazards to both the Competent Person and the Project Manager or Task Manager.
- Keep unauthorized persons away from the excavation area.
- Confirm that the ARCADIS Utility Location Policy and Standard ARC HSFS019 has been performed prior to authorizing subsurface work or entry into an excavation or trench.
- Issue, authorize, and have the Utility Clearance and Daily/Periodic Inspection forms readily available for review
- Verify that copies of the completed clearance forms and checklists are properly disseminated to Corporate Health and Safety and retained with the project files, as specified in Section 8.0 – Records.

4.6 Employees

- Notify the PIC, PM, TM or SSO if they have not received appropriate training.
- Review the site specific HASP, task specific JSAs, and other written plans that are associated with their work.

- Use the TRACK process regularly and frequently to recognize the hazards which may be faced during work around or in excavation/trenches, as well as to understand the signs and symptoms of exposure to airborne hazard(s).

- Never enter an excavation/trench without verifying that the required Utility Location Procedure, Daily/Periodic Inspection Checklist and required air monitoring is conducted.

- Use Stop Work Authority if excavation/trenching hazard(s) have not been appropriately addressed. Immediately consult with SSO, Competent Person and ARCADIS Project/Task Manager.

- Use the PPE, air monitoring and testing equipment that has been provided or have access to the information documenting that results are within the defined Action Levels established within the HASP.

- Maintain an awareness of all required hazard controls and consult with the Competent Person as necessary.

- If unexpected conditions arise during entry, immediately notify other entrants, evacuate the space and inform the designated Competent Person

- Obey evacuation orders given by the Competent Person, SSO, automatic alarm activation, or when self-perceived.

- At least one person on site must maintain current certification in basic first aid and cardiopulmonary resuscitation (CPR).

5. PROCEDURE

5.1 General Safety Requirements for all Excavations

- If excavation work encounters unanticipated groundwater contamination, soil contamination or other unanticipated contaminants, ARCADIS staff will Stop Work and notify the Project Manager. An appropriate work plan to sample the suspected contaminants shall be developed, samples collected by HAZWOPER trained personnel, the HASP modified and a contaminant management plan developed, as necessary.

- All surface obstructions must be moved or supported so as to protect employees and equipment.

- Prior to excavation, all underground installations (water, electric, telephone, gas, etc.) must be located and documented in accordance with ARCADIS Utility Clearance Policy and Standard ARC HSFS019.

- When excavating in areas near underground installations, proper precautions must be taken to determine the exact location of the installations and to adequately protect and support them. While an excavation is open, underground installations shall be protected, supported or removed as necessary to protect employees.

- Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person.

- Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

- Ladders must extend at least 36” (3 feet) above the landing surface.

- All excavations over four feet in depth shall be provided with a stairway, ladder, ramp, or other safe means of egress so as to require no more than 25 feet of lateral travel. As deemed necessary by the competent person, excavations less than 4 feet in depth will be provided with a stairway, ladder, ramp, or other safe means of egress so as to require no more than 25 feet of lateral travel.

- If personnel are working in a location exposed to vehicular traffic they must be provided with and be required to wear reflective safety vests. Adequate, signs, barriers or other equivalent traffic controls must be used to protect employees.

- Personnel are not permitted to be beneath elevated loads handled by equipment or be in excavations when heavy equipment is digging in or near the excavation.

- Mobile equipment located near open excavations must be adequately protected from falling or rolling into excavations by the use of barricades or warning devices.

- Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

- Water must not be allowed to accumulate in open excavations where employees are working. When necessary, means such as diverting natural drainage around the excavation or actively pumping water must be used to prevent or control water accumulation.

- Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

- All structures adjacent to an open excavation must be supported, or a registered professional engineer (PE) must determine that the structure will not be affected by the excavation activities.

- Excavated materials (spoil) must be placed no closer than 2 feet from the edge of an open excavation, and otherwise retained to prevent loose material from falling into the excavation.

- Each employee at the edge of an excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barrier.

- Employees at the edge of a well, pit, shaft, and similar excavation 6 feet (1.8m) or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers.

- Work tasks will be designed to limit the number of personnel required to enter any excavation. All tasks that can be completed remotely from outside the excavation (such as soil sampling) will be conducted in such a manner.

- Personnel will not be allowed to enter any excavation unless required protective systems and procedures are used to prevent accidents and injury.

Best Management Practice: *In some instances, an excavation will not have any protective systems in place when employees will not be entering into the excavation. Even if employees are not entering into this type of excavation, a competent person should be consulted to establish a safe zone distance away from the edge of any open excavation to minimize the hazard of falling into this type of excavation. Standing at the edge of an excavation places an employee at risk of falling into the excavation, thereby subjecting themselves to the hazard of excavation/trench collapse, which then triggers the requirement for protective system use as defined in this standard. General guidance would be for employees to remain 6 feet or more away from the edge of any excavation.*

- Dust control measures will be implemented during excavation and soil-moving activities as required by the Health and Safety Plan (HASP). As necessary, dust control measures will also be used to manage soil located in temporary storage areas or stockpile areas. Specific dust control measures will be detailed in the HASP. The Competent Person must be consulted prior to initiating “wet” dust control measures to discuss limits/impact to protective systems.

- Excavations cut through a firewall or containment berm/bund shall provide alternate means of containment while the job is progressing. A specific containment procedure or diversion procedure will be included as a supplement to the HASP or defined in the Remedial Work Plan.

- Excavating in archeological sites requires special consideration and compliance with local legal requirements and shall be avoided wherever possible. Archaeological investigations on federal and state lands have additional requirements. For example, permit provisions are established in federal (specifically the federal Archaeological Resources Protection Act) and some state statutes. If an artifact or archeological feature is unearthed during excavation, ARCADIS shall stop work and consult with client, regulatory agencies and professional archaeologist, as necessary.

5.2 Excavations Requiring Protective Systems

This section defines excavations that require protective systems.

- All excavations into which employees will enter, regardless of depth, where the potential for cave-in exists.
- Any excavation over 5 feet in depth into which employees will enter that is not entirely in stable rock as defined in this Standard.
- Any excavation near a structure, (e.g. foundations, piers, footers, walls, sidewalks, tanks, roadways, etc.), as required by the registered professional engineer reviewing the stability of the excavation and the structure.
- All excavations over 20 feet in depth must be designed by a registered professional engineer regardless of whether personnel will enter it or not.
- All excavations that could potentially impact adjacent structures shall be reviewed by a registered professional engineer to determine if the stability of the structure will be affected by the excavation.
- Support systems for an adjacent structure must be designed by a registered professional engineer.

5.3 Selection and Use of Protective Systems

5.3.1 Shoring or Shielding

If shoring or shielding is selected as the protective system for an excavation, soil classification in accordance with 1926 Subpart P Appendix A is required.

One of the following options must be used for excavations which will be shored or shielded.

- Timber shoring as specified in 1926 Subpart P Appendix C must be utilized
- Hydraulic shoring, trench jacks, air shores, or shields as required in 1926.652 (c)(2) must be utilized following the system manufacturer's data
- A system which follows other tabulated data (approved by a registered professional engineer) must be utilized
- The excavation must be designed by a registered professional engineer

5.3.2 Sloping

If sloping is selected as the protective system for an excavation, the excavation sides must be sloped at a maximum of 34 degrees (1.5 Horizontal: 1 Vertical), unless the procedure listed above is followed.

Soil classification is required for all excavations with sides which will be sloped greater than 34º (1.5 Horizontal: 1 Vertical). If it will be sloped greater than 34º, the one of the following options must be utilized:

- Option 1 - assume Type C and slope 1.5/1 - default sloping classification
- Option 2 - classify soil according to the standard and use Type A/B sloping requirements
- Option 3 – use other tabulated data with PE approval
- Option 4 – PE approval of sloping/benching design

5.4 Atmospheric Testing for Entry

All excavations over 4 feet in depth must be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency. Excavations less than 4 feet in depth must be evaluated by the competent person and at the competent person's discretion be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency.

Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use.

The site designated "Competent Person" and/or SSO will document initial and periodic air monitoring results for all activities requiring entry into the excavation. All atmospheric testing of excavations must be conducted in the following sequence and meet the following air quality criteria.

- Oxygen content must be between 19.5% to 23.5%
- Combustible gas or vapor less than (<) or equal to 5% of its lower explosive limit (LEL): Level D. Continue to monitor atmospheric conditions as detailed in project specific Health and Safety Plan.
- Combustible gas or vapor levels greater than (>) 5%, but < 10% of its LEL: Continuous atmospheric monitoring required; review use/implementation of engineering controls (ventilation, etc.) and PPE; evaluate potential source(s) of ignition and where feasible, remove from the area; fire extinguisher must be available; and use TRACK to assess condition/controls and proceed with caution.
- Combustible gas or vapor levels > or equal to 10% of its LEL: Stop Work; evacuate the excavation/trench; contact the Competent Person and SSO; and re-evaluate source/controls of combustible gas,
- Carbon monoxide levels must not exceed 25 ppm as an 8-hour Time Weighted Average (TWA).

- Hydrogen sulfide must not exceed 5 ppm as a Short-Term Exposure Limit (STEL) value or 1 ppm as an 8-hour TWA.

- Toxic air contaminant levels must not exceed 50% of the PEL or the TLV for the specific contaminant (whichever is lower).

5.5 Location of Underground/Overhead Utilities

- The competent person and the project manager shall both verify that local underground facilities location/protection agencies are notified within the required time frame prior to the initiation of excavation activities and meet all requirements in the ARCADIS Utility Location Policy and Standard ARC HSFS019.

- Prior to initiation of excavation or trenching operations the competent person shall verify that all utilities have been located.

5.6 Daily/Periodic Inspections

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a Competent Person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the Competent Person:

- Prior to initiation of daily excavation or trenching operations the competent person shall complete a daily inspection of the excavation.

- During excavation or trenching operations the competent person shall complete a periodic inspection after any event (e.g., thunderstorm, vibration, excessive drying) that may affect excavation stability.

Note: In order to correctly ascertain the soil types, the competent person must identify the locations and the limits of each type of soil, and must conduct visual and all appropriate manual tests to classify the initial (opening) soil types observed.

Note: These inspections are only required when employee exposure can be reasonably anticipated. Not just in-trench exposure, but also ANY hazardous condition in the area that an employee could be exposed to.

The competent person shall complete the daily/periodic inspection checklist (A copy of the checklist is attached to this Policy as Exhibit A) – Subcontractors must complete the ARCADIS checklist or an equivalent inspection form for each inspection of excavation and trenching activities.

5.7 Soil Classification for Selection of Protective Systems

5.7.1 Soil Classification

This section describes a method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. This

section contains definitions, sets forth requirements, and describes acceptable visual and manual tests for use in classifying soils.

This section applies when a sloping, benching or shoring system is utilized as a method of protection for employees from cave-ins.

5.7.2 Soil Classification Definitions

5.7.2.1 Types/Classes of Soil

5.7.2.1.1 Type Class A Soils

Type/Class A Soils are cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144kPa) or greater. Examples of cohesive soils are: Clay, silty clay, sandy clay, clay loam and in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if the following apply.

- The soil is fissured;
- The soil is subject to vibration from heavy traffic, pile driving, or similar effects;
- The soil has been previously disturbed;
- The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4 Horizontal:1 Vertical) or greater;
- The material is subject to other factors that would require it to be classified as a less stable material

5.7.2.1.2 Type Class B Soils

Type/Class B Soils are:

- Cohesive soils with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa)
- Granular cohesion-less soils including angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam
- Previously disturbed soils except those which would otherwise be classed as Type C soil
- Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration
- Dry rock that is not stable
- Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4 Horizontal:1 Vertical), but only if the material would otherwise be classified as Type B

5.7.2.1.3 Type/Class C Soils

Type/Class C Soils are:

- Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less

- Granular soils including gravel, sand, and loamy sand
- Submerged soil or soil from which water is freely seeping
- Submerged rock that is not stable
- Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4 Horizontal:1 Vertical) or steeper

5.7.2.2 Methods for Classifying Soils

Each soil and rock deposit shall be classified by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in this section. The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis conducted by a competent person using tests described below, or in other recognized methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Department of Agriculture textural classification system.

The visual and manual analyses, such as those noted as being acceptable in this section, shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors, and conditions affecting the classification of the deposits. Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.

Observe the following:

- Samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine grained material is cohesive material. Soil composed primarily of coarse grained sand or gravel is granular material.

- Soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.

- The side of the open excavation and the surface area adjacent to the excavation. Crack like openings such as tension cracks could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.

- The area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.

- The open side of the excavation to identify layered systems. Examine layered systems to identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.

- The area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.

- The area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

5.7.2.3 Classifications

- *Plasticity*. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8 inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of 1/8 inch thread can be held on one end without tearing, the soil is cohesive.

- *Dry strength*. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.

- *Thumb penetration*. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences. If the excavation is later exposed to wetting influences (rain, flooding), the classification of the soil must be changed accordingly.

- *Other strength tests*. Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand operated shearvane.

- *Drying test*. The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick (2.54 cm) and six inches (15.24 cm) in diameter until it is thoroughly dry:

    1. If the sample develops cracks as it dries, significant fissures are indicated.

    2. Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as an unfissured cohesive material and the unconfined compressive strength should be determined by using the thumb penetration or other test.

5.7.2.4 Cohesive with Fissures vs Granular

If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.

5.7.2.5 Layered system

A layered system shall be classified in accordance with its weakest layer. Each layer may be classified individually where a more stable layer lies under a less stable layer.

5.7.2.6 Reclassifying Soils

A layered system shall be classified in accordance with its weakest layer. Each layer may be classified individually where a more stable layer lies under a less stable layer.

In most instances the ARCADIS designated Excavation/Trenching Competent person will assume Type C soil, unless they have conclusive data to validate Type A or B.

5.7.2.7 Excavation Construction Based on Soil Type

The maximum allowable slope means the steepest incline of an excavation face that is acceptable for the most favorable site conditions as protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V). Short-term exposure means a period of time less than or equal to 24 hours that an excavation is open. Soil and rock deposits must be classified in accordance with Appendix A to Subpart P of Part 1926. The maximum allowable slope for a soil or rock deposit must be determined from the table provided below. The actual slope must not be steeper than the maximum allowable slope. The actual slope must be less steep than the maximum allowable slope, when there are signs of distress. If that situation occurs, the slope must be cut back to an actual slope which is at least horizontal to one vertical (1/2H:1V) less steep than the maximum allowable slope. When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person must determine the degree to which the actual slope must be reduced below the maximum allowable slope, and must assure that such reduction is achieved. Surcharge loads from adjacent structures must be evaluated in accordance with 1926.651(I). Configurations of sloping and benching systems must be in accordance with 29 CFR 1926 Subpart P, Appendix B.

EXCAVATION SLOPE INFORMATION FROM 29 CFR 1926 SUBPART P APPENDIX B MAXIMUM ALLOWABLE SLOPES	
Soil or Rock Type	**Maximum Allowable Slopes (H:V)[1] for Excavations Less Than 20 Feet Deep[2]**
Stable Rock	Vertical (90 degrees)
Type A[3]	¾:1 (53 degrees)
Type B	1:1 (45 degrees)
Type C	1½:1 (34 degrees)

1. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal (H). Angles have been rounded off.

2. Sloping or benching for excavations greater than 20 feet deep must be designed by a registered professional engineer.
3. A short-term maximum allowable slope of 1/2H:1V (63 degrees) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth must be 3/4H:1V (53 degrees).

6. TRAINING

6.1 Project - Specific Orientation

All staff working on a site where trenching and excavation activities are being conducted by ARCADIS or its subcontractors will be provided with site orientation on excavation projects and participate in daily safety meetings that include a discussion of the following:

- Site excavation hazards and procedures;
- Requirements for conducting activities remotely whenever possible;
- Client requirements and procedures for excavation activities;
- Review of applicable federal, state and/or local excavation requirements; and
- This Excavation and Trenching Standard, as appropriate

6.2 Employee Training

Besides site orientation training, additional training will be provided as follows based on the employee's activities:

- All employees who work in the area of potential excavation/trenching sites will receive awareness level training as provided and/or approved by ARCADIS Corporate H&S in order to recognize and to understand the hazards associated with trenching/excavation work.
- On an as needed basis, employees will receive site specific instruction regarding the excavation/trenching operation from the Competent Person and/or the SSO.

6.3 Competent Person Training

Competent Persons will be provided training as follows:

In order for ARCADIS employees to be assigned duties as a competent person, with respect to excavation and trenching, in addition to the criteria noted in section 4.4, personnel must attend an Excavation Competent Person training course approved by Corporate Health and Safety or have equivalent training. The course shall include, but is not limited to the following:

- Introduction to and definition of trenches and excavations.
- General requirements of OSHA 29 CFR 1926 Subpart P.
- Responsibilities and requirements of a competent person.
- Hazards associated with trenches/excavations and Identification and Assessment of these hazards.
- Hazard controls

- Soil analysis and testing (visual and manual;
- Protective systems;
- Personal protective equipment;
- Utility location;
- Atmospheric testing;
- Water drainage and pumping;
- Site housekeeping and management;
- Communications;
- Access and egress

- Emergency Procedures.
- Inspections.

All training provided must be reviewed and approved by Corporate Health & Safety and will be managed through the Training Team.

Documentation of training certification received by attendance at any training course including externally provided training courses will be kept by the employee with copies provided to the Training Team.

7. REFERENCES

ARCADIS Health and Safety Standard ARC HSFS010– Health and Safety Planning

ARCADIS Health and Safety Standard ARC HSFS004 – Control of Hazardous Energy (Lockout/Tagout)

ARCADIS Utility Clearance Policy and Standard ARC HSF019

OSHA 29 CFR Part 1926 Subpart P - Excavations

8. RECORDS

8.1 Training records will be kept by the individual employee with copies of such certificates kept by the Training Team. Training dates and times will be kept by the Training Team.

8.2 Completed clearance forms and checklists will be kept in the project files with copies available for Corporate H&S review.

8.3 Copies of all HASPs that document excavation trenching procedures will be kept in the project files.

9. APPROVALS AND HISTORY OF CHANGE

Approved By: Anthony Tremblay, CSP, CIAQP – Corporate H&S, Director of Technical Programs



History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
12 May 2008	01	Greg Ertel	Original document
13 June 2008	02		Modified Section 5.1 – 4th bullet related to structural ramps. Modified Section 5.2 to designate a 6x factor for structural integrity of structures near the excavation. Revised Exhibit 1 to modify the definition of a Competent person
9 January 2009	03		Cleaned up definitions, deleted training requirements from Section 5.0 and moved them to Section 6.0, modified purpose statement
31 March 2011	04		Updated Competent Person training and qualification requirements in section 4.6, section 6.2 and definition in Exhibit 1.
27 March 2012	05	Tremblay	Section 4 competent person, SSO and employee responsibilities revised; Confined Space references eliminated; Training requirements clarified; use of ladders detailed; Fall prevention requirements clarified in section 5.1; depth of protective system requirement corrected to 5 feet; spoils pile must be minimum 2 feet from edge of excavation; Atmospheric Monitoring Action Levels revised; Employee Awareness Training and Competent Person Training requirements clarified
4 June 2012	06	Tremblay	Section 4.4 typo corrected; 8-hour HAZWOPER Supervisor course for competent person was made a recommended practice instead of a requirement; Section 4.5 SSO responsibilities revised to eliminate those responsibilities that belong with the Competent Person; Section 5 Best Management Guidance to maintain safe distance from the edge of excavation; checklists hyperlinked

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
18 September 2013	07	Tremblay	Tracking table format updated; Section 5.1 revised to include information about encountering unanticipated contaminants, implementing dust control measures, instituting containment measures when breeching a containment berm and avoiding excavating in archeological sites
26 September 2013	08	Tremblay	Section 5.7.2.7 Maximum Allowable Slope Table had a typo in Type C soil line H:V ratio (corrected the ratio to read 1 ½ : 1). The value of 34 degrees is correct; Header format update and pages renumbered
23 February 2015	09	Tremblay	Page numbering correction; Exhibit 2 checklist and Exhibit 3 Competent Person Checklist inserted to supplement the existing hyperlink to documents

Exhibit 1 – Definitions

Attendant is a trained qualified individual stationed outside the excavation whose duty is to monitor authorized entrants inside the excavation or trench and have a means of communication with the designated rescue services.

Benching/Benching system means a method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Cave-in means the separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury or otherwise injure and immobilize a person.

Cemented soil means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand size sample cannot be crushed into powder or individual soil particles by finger pressure.

Cohesive soil means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sides, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

Competent person means one who, through education, training, and/or experience, is capable of identifying existing and predictable hazards or working conditions which are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them.

Dry soil means soil that does not exhibit visible signs of moisture content.

Excavation means any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal into which a person can bodily enter.

Entry constitutes the act by which an employee proceeds into an excavation or trench. Consideration of hazards, especially cave-ins and fall protection must still be considered and accounted for when equipment or personnel are near an excavation or trench, even if personnel will not be entering.

Entrants are employee's who are trained and authorized to enter a trench or excavation. Entrants must have attended a Qualified Excavation Training course offered or approved by Corporate Health and Safety.

Failure means the breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

Fissured means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

Granular soil means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

Hazardous Atmosphere is an atmosphere which exposes employees to a risk of death, incapacitation, injury, or acute illness from one or more of the following:

- An atmospheric concentration of any substance in excess of 50% of its established permissible exposure limit (PEL); or its assigned threshold limit value (TLV) or other value listed on the Material Safety Data Sheet (MSDS) for the chemical constituent, whichever is lower.
- A flammable gas, vapor, or mist in excess of 10% of its lower explosive limit (LEL).
- An airborne combustible dust at a concentration that obscures vision at a distance of 5 feet or less.
- An atmospheric oxygen concentration below 19.5% (oxygen-deficient atmosphere) or above 23.5% (oxygen-enriched atmosphere).
- An atmosphere which is immediately dangerous to life and health.

Immediately Danger to Life and Health (IDLH) means any condition which poses an immediate threat to loss of life; may result in irreversible or immediate-severe health effects; may result in eye damage, irritation, or other conditions which could impair escape from the space.

Layered system means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

Moist soil means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

Plastic means a property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.

Protective system means a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems and other systems that provide protection.

Ramp means an inclined walking or working surface that is used to gain access to one point from another, and is constructed from earth or from structural materials such as steel or wood.

Registered Professional Engineer means a person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce. To oversee an excavation/trench activity the PE must have experience with and expertise in excavation, soil and stability considerations.

Saturated soil means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or sheer vane.

Sheeting means the members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield (Shield system) means a structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shield can be

either pre-manufactured or job-built in accordance with 1926.652 (c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields".

Shoring (Shoring system) means a structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sloping (Sloping system) means a method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Soil classification system means, for the purpose of this procedure, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the characteristics of the deposits and the environmental conditions of exposure.

Stable rock means natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Submerged soil means soil which is underwater or is free seeping.

Support system means a structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Trench means a narrow excavation (in relation to its length) made below the surface of the ground to which a person can bodily enter. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 meters). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 meters) or less (measured at the bottom of the excavation), the excavation is considered to be a trench.

Unconfined compressive strength means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.

Wet soil means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

Exhibit 2 – Daily / Periodic Excavation Inspection Checklist

Daily / Periodic Excavation Inspection Checklist

ARCADIS Infrastructure · Water · Environment · Buildings

Daily / Periodic Excavation Inspection Checklist

Project Name:	**Date / Time:**
Project Number:	**Location:**
Prepared By:	**Project Manager:**

This checklist or similar must be completed for all excavations. It documents that daily and post-event / periodic inspections are conducted.

Soil Classified As:	☐ Stable Rock	☐ Type A	☐ Type B	☐ Type C
Soil Classified On:		By:		
Type of Protective System in Use	☐ Sloping	☐ Shoring	☐ Shielding	☐ Benching	☐ Other
Description:				

Inspection Item	YES	NO	N/A	Comments
Has the ARCADIS Utility Clearance Procedure been completed?	☐	☐	☐	
Are underground installations protected from damage?	☐	☐	☐	
Has a Competent Person been identified?	☐	☐	☐	
Are adequate means of entry / exit available in the excavation – at least every 25 feet?	☐	☐	☐	
If exposed to traffic, are personnel wearing reflective vests and adequate barriers/traffic controls installed?	☐	☐	☐	
Do barriers exist to prevent equipment from rolling into the excavation?	☐	☐	☐	
Was air monitoring conducted prior to and during excavation entry?	☐	☐	☐	
Was the stability of adjacent structures reviewed by a registered P.E.?	☐	☐	☐	
Are spoil piles at least 2 feet from the excavation edge?	☐	☐	☐	
Are employees protected from falling into excavation by guardrail systems, fences, or barricades *if the excavation is not readily seen because of plant growth or other visual barrier*? Best Management Practice Note: Even if employees are not entering into an excavation, competent person should be consulted to establish a safe zone distance away from the edge of any open excavation. General guidance would be for employees to remain 6 feet or more away from the edge of any excavation	☐	☐	☐	
If the well, pit, shaft, or similar excavation is 6 feet (1.8m) or more in depth are employees protected from falling by guardrail systems, fences or barricades?	☐	☐	☐	
Are work tasks completed remotely if feasible?	☐	☐	☐	
Is a protective system in place and in good repair?	☐	☐	☐	
Is excavation isolated from the effects of vibration?	☐	☐	☐	
Are employees protected from falling / elevated material?	☐	☐	☐	
Is soil classification adequate for current environmental / weather conditions?	☐	☐	☐	
Do portable ladders extend at least 3feet above the excavation?	☐	☐	☐	
Are portable ladders or ramps secured in place?	☐	☐	☐	
Have all personnel attended safety meeting on excavation hazards?	☐	☐	☐	
Are support systems for adjacent structures in place?	☐	☐	☐	
Is the excavation free from standing water?	☐	☐	☐	
Is water control and diversion of surface runoff adequate?	☐	☐	☐	
Are employees wearing required protective equipment?	☐	☐	☐	
Excavation Competent Person:				**Date/Time:**

Exhibit 3 – Competent Person Evaluation Form for Excavation / Trenching

Exhibit 3 – Competent Person Evaluation Form for Excavation / Trenching

Name of Employee:_____Job Title:_____

Department:_____Office Location:_____

Experience with Excavations/Trenching:

_____
_____
_____
_____
_____
_____

Relevant Training:

_____
_____
_____
_____
_____
_____
_____

Other Relevant Qualifications:

_____
_____
_____
_____
_____
_____
_____

*Include documentation from employee's Supervisor that acknowledges their capacity to work as a designated competent person.

Based on the information listed above and an evaluation of this employee's knowledge and experience, I consider them to be a Competent Person for Excavation and Trenching.

Evaluation By:_____ Job Title:_____

Signature:_____ Date:_____

Exhibit 3_Competent Person Evaluation Form for Trenching/Excavation_rev6_4June2012 Page 1 of 1

Implementation Date	Arcadis HS Standard Name	ARCADIS Design & Consultancy for natural and built assets
13 December 2006	Utility Location and Clearance	
Revision Date	Arcadis HS Standard No.	Revision Number
17 March 2017	ARCHSFS019	16

EXECUTIVE SUMMARY

Damaging an underground or aboveground utility can result in serious injury and loss of life, disrupt essential services, and create significant liability to Arcadis, clients, and subcontractors. Therefore, it is Arcadis policy that the following steps be completed prior to beginning any subsurface intrusive work (i.e., any work or activity that breaks the plane of the ground surface):

- The presence of existing or known utilities will be investigated and cleared (to the extent feasible) by locating and marking before the start of any subsurface intrusive work and where appropriate, visually verifying through soft dig methods (referred to as potholing or daylighting) before the start of any subsurface intrusive activity.

- A minimum of **three (3) reliable lines** of evidence are required for an acceptable utility clearance. Each location of subsurface intrusive work must have at least 3 reliable lines of evidence. All lines of evidence used during the utility clearance procedure will be recorded on the Utility and Structures Checklist or equivalent client-provided checklist or permit. If a line of evidence is lost or not apparent, STOP WORK, and re-establish the line of evidence prior to resuming subsurface intrusive work.

- The lines of evidence used will be reasonable and appropriate for the conditions expected to be encountered (soil type, water table, etc.) and the type of utilities expected to be encountered (e.g., gas line versus an irrigation line).

- Contact the State One Call or equivalent service (Nationwide "811") as required by law. The State One Call or equivalent service (Nationwide "811") can only be used as a reliable line of evidence when working within the public right-of-way or easement.

- For point clearance (single intrusive point, used as 1 of the 3 required reliable lines of evidence), the borehole must be cleared to 110% of the diameter of the intrusive device (e.g., auger, drill head, etc.) or an additional 2 inches of overall diameter, whichever is greater.

- Utility clearance information will be documented on the Arcadis Utility and Structures Checklist (USC) or equivalent client-provided checklist or permit. The Utility Structures and Checklist is valid for 15 business days from the date of completion. A copy of the completed Utility and Structures Checklist will remain on-site during all subsurface intrusive work.

- Employees overseeing utility clearance activities will:

    - Be familiar with the contents of this standard and ARC HSFS-019 Supplement 2;
    - Have one year of field experience in the visual identification of utilities; and
    - If operating equipment, have training and six months of experience in the proper operation and results interpretation of any clearance equipment, including without limitation, magnetometers and ground penetrating radar.

- A utility strike is an unplanned contact of a utility during the course of work that results in damage requiring repairs, making a report to the utility owner, or requiring further assessment to evaluate the potential for damage. All utility strikes must be reported within 24 hours using the Utility Line Strike Investigation Form. **Do not enter the incident into 4-Sight until approved to do so by Corporate Legal. Refer to** ARC HSFS-019 Supplement 5**, Utility Strike Emergency Action Plan Guidelines.**

Report Utility Incident Now

1. POLICY

It is the practice of Arcadis and its affiliated companies to implement appropriate, reasonable, and practical standards within acceptable and customary industry practices to promote the health and safety of its employees and avoid and mitigate exposure of risk in the performance of their work. In furtherance of this policy, Arcadis promotes and encourages compliance by all employees with this policy and standards relating to work in the vicinity of subsurface, submerged, or aboveground utilities.

2. PURPOSE AND SCOPE

2.1 Purpose

This standard directs general safety standards and best practices associated with the identification and management of subsurface, submerged, and aboveground utilities on project sites. Utility location standard operating procedures (SOP) for submerged utilities can found in ARC HSFS-019 Supplement 6.

2.2 Scope

This standard assigns responsibilities and expectations for proper utility clearance by both Arcadis employees and Arcadis subcontractors at project sites.

3. DEFINITIONS

Definitions relating to Utility Clearance can be found in Exhibit 1.

4. RESPONSIBILITIES

4.1 Project Manager Responsibilities

For every project site having the potential to come into contact with utilities, Project Managers must ensure that:

- The requirements of this standard are followed.
- Local regulations governing utility clearance are followed. This includes ensuring local and/or state laws defining activities or depth of intrusive work/excavation requiring utility clearance are reviewed as they vary by location. For further information, refer to One Call and State Law Directory.
- Efforts are made to work with the client, project site representatives, public utility companies, and subcontractors to identify the nature of any utilities and to determine control processes that need to be implemented by Arcadis and the subcontractors to prevent damage to these utilities and to properly manage the effects in the event there is utility damage.
- Utility clearance activities are only delegated to a Task Manager or other individual meeting the requirements of Section 4.2 below, as appropriate. However, even if the Project Manager delegates certain responsibilities, the Project Manager maintains primary responsibility for a complete utility clearance.

For additional information on Project Manager responsibilities and best practices, refer to ARC HSFS-019 Supplement 1.

- Project Managers or designee must review the Utility and Structures Checklist with staff and Arcadis subcontractors conducting subsurface intrusive work (including "Sub-of-Subs" when conducting subsurface intrusive work) prior to staff beginning subsurface intrusive work. The Project Manager or designee review must be documented on the Utility and Structures Checklist prior to starting subsurface intrusive work.

4.2 Field Personnel Responsibilities

Arcadis field personnel conducting work on a project site having the potential to come into contact with utilities have the responsibility to:

- Read, understand, and follow this standard and ARC HSFS-019 Supplement 2 and complete the appropriate checklists during the on-site utility and structures locate and clearance process.

- Complete a minimum of one year of utility clearance-related experience before accepting responsibility for any utility clearance tasks. This requires on-site training led by another Arcadis employee with detailed knowledge and experience in identifying utilities and structures.

- Complete training and have 6 months of experience in operating and interpreting the results of remote sensing technologies, including without limitation, magnetometers and ground penetrating radar, before operating such technologies. Field staff should understand the technologies being utilized by a private utility locate contractor and how they are operating in comparison with the site conditions. Refer to ARC HSFS-019 Supplement 3 for more information.

- Prior to beginning subsurface intrusive work, the Utility and Structures Checklist must be completed and signed by the staff member completing or overseeing the clearance. Confirm that the Utility and Structures Checklist was reviewed by the Project Manager or designee as discussed in Section 4.1 above. Review the Utility and Structures Checklist daily prior to starting subsurface intrusive activities to ensure all utilities are identified and markings are present. A copy of the completed Utility and Structures Checklist will remain on-site during all subsurface intrusive work (i.e., any work or activity that breaks the plan of the ground surface).

- Use their STOP WORK Authority to eliminate any reasonable concern if utilities cannot be reasonably located and contact the Project Manager to review the STOP WORK situation and confirm the direction of action before moving forward.

- Ensure that Arcadis subcontractors conduct their own reasonable independent utility clearance efforts as required by Arcadis' standard subcontract and are aware of any Arcadis clearance standards used on-site.

- Be on-site and provide oversight during utility locate activities and any active subsurface intrusive work or activities involving contractor under contract to Arcadis.

- If a utility is damaged and repaired during the course of the field event, field staff must provide oversight and document that the repair appears competent and complete to prevent further damage to the site when the damaged utility is re-activated.

4.3 Arcadis Subcontractor Responsibilities

According to Arcadis' standard subcontract, subcontractors have agreed to take responsibility for any damages resulting from a utility impact caused by their work. Therefore, Arcadis subcontractors are expected to take reasonable time and diligence to conduct their own independent utility clearance using reasonable standards and processes. Subcontractors have the responsibility to stop their work if utility concerns are identified and will report those concerns to the Arcadis employee overseeing their work activities. Arcadis staff should reinforce these responsibilities with subcontractors during job safety briefings.

In jurisdictions where the actual contractor performing the subsurface intrusive work is required to perform utility clearance notifications, the contractor will perform the clearance notification and will provide evidence of the notification to Arcadis (ticket or ticket number, etc.). Refer to ARC HSFS-019 Supplement 4 for Best Practices for State One Call procedures.

- If overhead utilities are present in areas where heavy equipment will be operated, ensure adequate clearance is provided. For heavy equipment that is extendable or telescoping (e.g., excavators, dump trucks, extendable lift trucks), evaluate whether the use of a spotter is necessary prior to operating heavy equipment when in proximity to the overhead utility.

- If a utility is damaged and repaired during the course of the field event, the field subcontractor must verify that the repair is competent and complete to prevent further damage to the site when the damaged utility is re-activated.

5. PROCEDURE

5.1 General

Protocols to be followed during utility and structures location and clearance activities are outlined in:

- Best Practices for Project Managers (or Their Delegates) Concerning Utility Clearance (ARC HSFS-019 Supplement 1).

- Best Practices for Field Personnel Concerning Utility Clearance (ARC HSFS-019 Supplement 2).

- Use and Limitations of Common Underground Locating Technologies and Clearance Methods (ARC HSFS-019 Supplement 3).

- Best Practices for State One Call Procedures (ARC HSFS-019 Supplement 4).
- Emergency Action Plan guidelines for Utility Strikes (HSFS-019 Supplement 5).
- Utility Location Standard Operating Procedure for Aquatic Work Activities (ARC HSFS-019 Supplement 6).

5.2 Lines of Evidence

When locating underground utilities, three (3) reliable "lines of evidence" must be established to help determine where a subsurface utility may be located. A line of evidence may be a site drawing that shows where a utility is located, it could be anecdotal information obtained from owners or employees, it could be established using any number of non-intrusive geophysical methods [e.g., ground penetrating radar (GPR), electromagnetic survey (EM), radio-frequency methods (RF), etc.], or it could involve probing for or exposing the utility by soft dig technologies (i.e., daylighting or potholing). Some lines of evidence will identify utility locations with a high degree of certainty (e.g., direct connect radio-frequency technique, daylighting or potholing, sonde tracing, etc.). Other lines of evidence will identify utilities will less certainty (e.g., anecdotal reports, design drawings, etc.).

Effective utility locate practices must use multiple lines of evidence until there is a high degree of certainty that the underground services have been adequately located. Three (3) reliable lines of evidence are required for an appropriate utility clearance as defined in this standard. All reliable lines of evidence used during the utility clearance procedure will be recorded on the Utility and Structures Checklist or equivalent client-provided checklist or permit. If three (3) reliable lines of evidence have not established certainty in the location of a utility, STOP WORK and do not proceed. Additional reliable lines of evidence must be utilized until the presence or absence of the underground utility can be established. During work activities, if a line of evidence is lost or not apparent (e.g., paint markings have faded), STOP WORK, and re-establish the line of evidence prior to resuming subsurface intrusive work.

Generally, the following lines of evidence may be used to meet this minimum utility clearance requirement:

1. Contacting the State One Call or equivalent service (Nationwide "811") is REQUIRED BY LAW regardless if it will be used as a line of evidence. Contacting the State One Call or equivalent service (Nationwide "811") is an acceptable reliable line of evidence when working within the public right of way or easement. Note that the State One Call can provide valuable information regarding locations and types of utilities entering the private property.

   Note: For work on private property or in areas not served by State One Call or equivalent service, consider using a reputable private utility locating company to locate and mark the utilities. **Use of a reputable private utility locator is encouraged for all projects with subsurface or submerged utilities.** When working with a private locater, it is best practice to pre-plan clearance areas, review required clearance equipment and the re-clearing/confirmation of any public utility mark outs (State One Call or equivalent service Nationwide "811").

2. Use detailed, scaled site utility plans, preferably in the form of an “as-built” or “record” drawing, to identify and/or confirm utility locations. Document request and/or receipt of utility drawings from the property owner/client on the Utilities and Structures Checklist.

3. Interview(s) with knowledgeable site or client personnel. The following questions should be asked during the interview and answers documented on the Utility and Structures Checklist:

   - Employees(s) Name and Affiliation(s) with the site;
   - Types of utilities, including utility composition and location of utilities on-site;
   - Depths of known utilities; and
   - Any other pertinent information regarding utilities on the site.

View the Utilities and Structures Checklist

4. Conduct a detailed visual site inspection of areas around all planned subsurface intrusive work points or areas to identify and/or confirm utility locations. For underground utilities, conduct an inspection for structures that tend to indicate the presence and general location of such utilities, including, but not limited to manholes, vaults, valve covers, valve markers, telephone pedestals, transformer housings, fire hydrants, spigots, sprinkler heads, air relief valves, backflow preventers, meters, downspouts going into the subsurface, power poles with wiring going into the subsurface and line markers. Saw cut lines and concrete/asphalt repairs often yield valuable information regarding utility locations.

   Always discuss the presence of utilities with the site owner, operator, and/or occupant to identify any potential utilities that might not be readily identified by non-intrusive clearing methods or may be:

   - At depths > 5 feet below ground surface; or
   - At very shallow depths (< 2 feet below ground surface), such as communication lines, electrical conduits/wiring, irrigation lines, etc.

If one of the above lines of evidence cannot be utilized or if using the above lines of evidence does not adequately identify utilities with reasonable certainty, one or more additional lines of evidence must be utilized. Commonly used lines of evidence are listed on the Utility and Structures Checklist.

A discussion of use and limitations associated with common utility location and clearance methods is provided in ARC HSFS-019 Supplement 3.

Standard operating procedures for utility location in submerged settings are presented in ARC HSFS-019 Supplement 6.

The lines of evidence will be recorded on the Utility and Structures Checklist or equivalent client-provided checklist or permit.

Note: If a line of evidence is lost, utility markings are removed/worn, or area of previous clearance is not confirmed, STOP WORK and re-establish the

line(s) of evidence prior to resuming subsurface intrusive work. Each location of subsurface intrusive work must have 3 reliable lines of evidence. All lines of evidence used during the utility clearance procedure will be recorded on the Utility and Structures Checklist of equivalent client-provided checklist or permit. If a line of evidence is lost or not apparent, STOP WORK, and re-establish the line of evidence prior to resuming subsurface intrusive work. The Utility Structures and Checklist is valid for 15 business days from the date of completion.

If and when any line of evidence reveals that planned subsurface work will be located inside the 30-inch Tolerance Zone of known/marked/located/observed utilities, the project team must Stop Work and contact Corporate H&S as early as possible for pre-approval.

5.3 Color Codes used for Utility Markings

The following colors are used for marking utilities. Some government agencies or large industrial facilities may use additional colors not provided below. Arcadis policy is to assume any paint marking or pin flag color not provided below is a subsurface utility marking until proven otherwise.

If utilities or subsurface anomalies are identified but the utility type or anomalies are not classified, it is recommend that a pink (Temporary Survey Marking) marking be used. Once the type of utility is established, the pink marks should be repainted/remarked to represent the correct type of utility.

COLOR	Utility Line
WHITE	Proposed Excavation
PINK	Temporary Survey Markings
RED	Electrical Power Lines, Cables, Conduit and Lighting Cables
YELLOW	Gas, Oil, Steam, Petroleum or Gaseous Materials
ORANGE	Communication, Alarm or Signal Lines, Cables or Conduit
BLUE	Potable Water
PURPLE	Reclaimed Water, Irrigation and Slurry Lines
GREEN	Sewer and Drain Lines

APWA and ANSI standard Z-53.1

5.4 Locating Technologies

There are several types of locating technologies that can be used to identify and locate utilities in the subsurface. Project teams need to work closely with private utility locators (PUL) in order to best match locating technology with site conditions. To provide the best results, all possible locating technologies should be available for use and implementation at the project location. Any potential interferences should also be discussed up front and then at the project site during utility location activities. Potential interferences could be soil moisture, soil type, standing water on concrete/asphalt, rebar, fencing, and metal

structures that are in the subsurface. Employees overseeing locating technology activities should have an understanding of device operation and limitations. For further information, refer to ARC HSFS-019 Supplement 3, Use and Limitations of Common Utility Location Technologies and Clearance Methods.

5.5 Clearance Methods

In some cases, proposed subsurface intrusive locations may be pre-cleared using other intrusive methods. Determine the clearance or soft dig method based on-site conditions and utilize the least invasive method possible. The number of subsurface intrusive locations and soil type should be taken into consideration. The following clearance methods are listed from least invasive to most:

1. Vacuum Extraction/Potholing (air or water-based),
2. Air knifing,
3. Hydroknifing,
4. Probing,
5. Hand augering,
6. Hand digging, and
7. Posthole digging.

Single-Point clearance must be 110% of the proposed subsurface intrusive area or the diameter plus 2 inches, whichever is greater. Three-Point clearance must be installed in a triangular pattern around the proposed borehole and in a configuration not to allow for utilities to enter the borehole. Three-Point clearance must be 110% of the proposed intrusive area or the diameter of the intrusive area plus 2 inches, whichever is greater. Each method of clearance should be documented on the Utility and Structure Checklist.

Manual clearing methods, such as shoveling, using pick axes, digging bars and other hand tools, should be avoided completely or only used when absolutely necessary and used with caution. Excessive downward force, prying or use in poor/obstructed visibility conditions is prohibited as these tools can damage utilities.

Surface cover (e.g., asphalt) removal methods within the 30-inch Tolerance Zone that pose excessive downward force, such as jackhammering, should be used with extreme caution. Methods that only cut the surface cover (coring or saw cutting) present less risk due to the absence of the downward force, which could cause collateral damage to shallow subsurface utilities. Note that utilities are often present at the concrete or pavement/soil interface or encased within the concrete or pavement and are easily damaged during concrete coring or pavement removal. Always work slowly, methodically and frequently STOP WORK to evaluate conditions during these work activities.

For borings and excavations, if the utility is known to be at depths where hand clearing is not feasible or creates additional safety concerns, no work will be performed within the 30-inch Tolerance Zone vertically or horizontally of the utility unless manual clearing is performed under the oversight of an Excavation Competent Person as defined in ARC HSCS005 Arcadis Excavation and Trenching.

5.5.1 Temporary Backfilling of Pre-Cleared Boreholes

In some cases, it may be necessary to temporarily backfill a pre-cleared location until the remaining subsurface activities are performed. At these locations where subsurface intrusive work does not immediately follow pre-clearance, it is important to properly backfill and mark the pre-cleared location in order to relocate the pre-cleared location. In general, wooden stakes, survey markers, whiskers, paint marking or other surficial markings alone are inadequate because these markings can be easily removed, damaged or otherwise lost leading to uncertainty regarding the pre-cleared location. Although the specific steps for backfilling a pre-cleared location will depend on site-specific conditions, use the following additional steps to prevent loss of the pre-cleared location:

- Backfill a pre-cleared location with clean sand or other granular material that is significantly different than the surrounding subsurface native material. Native soil should not be used to backfill a pre-cleared location that may require further subsurface work.
- Backfill the top 2 feet of a pre-cleared location with dyed sand or gravel to facilitate re-location.
- Use hammered wooden stakes or delineators to mark locations as an additional measure, if practical.
- In the event that the pre-cleared borehole is located on asphalt or concrete and an asphalt cold patch is required, use white paint to mark the intrusive location with a circle over the asphalt cold patch.
- In some instances, such as projects potentially affected by unexploded ordinance (UXO), the pre-cleared borehole may require that a PVC of matching diameter pipe be inserted into the pre-cleared borehole, filled with clean sand and affixed with a matching cap. Contact the project manager to identify any client-specific requirements.
- Always use a physical subsurface marker such as described above to identify the pre-cleared borehole location. Never rely solely on field measurements or GPS coordinates.
- If a utility or anomaly/obstruction is encountered during the pre-clearing process, backfill the hole with the native soil and mark the location with a pink-painted X and/or NO.

In the event that a previously pre-cleared location cannot be located, the location must be re-cleared prior to performing subsurface intrusive work.

5.6 Clearance for Working in Vicinity of Subsurface Utilities

Prior to the start of subsurface intrusive activities (i.e., excavations, vertical drilling, installing grounding rod, and soil sampling), all utilities must be located and measures must be instituted to avoid subsurface utility hazards. See exemptions for subsurface intrusive work in Exhibit 1 (Definitions). Do not conduct subsurface work within 30 inches of a line marking in all directions. If the centerline of the utility is marked, the diameter of

the utility or utility bank (Exhibit 1) must be incorporated into the 30-inch Tolerance Zone, see Figure 1 located in Exhibit 2 for further instructions.

If and when any line of evidence reveals that planned subsurface work will be located inside the 30-inch Tolerance Zone of known/marked/located/observed utilities, the project team must Stop Work and contact Corporate H&S as early as possible for pre-approval.

If subsurface work must take place within the 30-inch Tolerance Zone of the line marking, the utility must be exposed (potholed) by soft dig/clearance methods prior to starting subsurface intrusive activities (see Section 5.5 for options); **no mechanized equipment is permitted for the exposing of the utility**.

Once the utility has been exposed, if mechanized equipment is planned for use within the 30-inch Tolerance Zone of the utility, such activity must receive pre-approval by Corporate H&S, as necessary, to mitigate or accept the risk associated with the planned work. Additional excavation safety procedures may have to be developed as part of the approval to proceed. It should be noted that any disturbance within the 30 inches or disruption of the bedding materials could affect the integrity of the utility.

For horizontal borings, to avoid striking a utility, damage from vibration, damage by pressure of the advancing boring, do not drill within 30 inches in all directions (3-Dimensional cylinder) of a line marking. Make sure to factor the diameter of the line or utility bank when computing 30-inch Tolerance Zone. When crossing a utility during horizontal drilling, it is recommend that the utility be exposed 30 inches in a 360°-direction. When exposing utilities for horizontal borings, the utility must be exposed (potholed) by soft dig/clearance methods. This recommendation applies even if the operating contractor has technology that places the location to within a few inches. Make sure to factor the diameter of the utility when determining the 30-inch Tolerance Zone. If subsurface work must take place within the 30-inch Tolerance Zone of the line marking, the utility must be exposed (potholed) by soft dig/clearance methods prior to starting subsurface intrusive work (see Section 5.5 for options); **no mechanized equipment is permitted for the exposing of the utility**. Once the utility has been exposed, if mechanized equipment is planned for use within the 30-inch Tolerance Zone of the utility, such activity must receive pre-approval by Corporate H&S, as necessary, to mitigate or accept the risk associated with the planned work. Additional excavation safety procedures may have to be developed as part of the approval to proceed. It should be noted that any disturbance within the 30 inches or disruption of the bedding materials could affect the integrity of the utility.

Additional cautions for horizontal borings include gravity utilities, such as sewers and storm drains, as the depth of these utilities will change (sometimes significantly) as they run across the project site. Always obtain the utility depth at the location where the boring will actually cross the line by collecting sewer depth inverts from identified manholes and interpolating those depths to the area of the subsurface intrusive work.

During well installations and well abandonment via mechanical equipment, the 30-inch Tolerance Zone rule applies outward from the outside edge of the largest diameter auger or tool to be used for installation and abandonment (over drilling). In cases where wells have been previously installed and the 30-inch rule has not been followed, work proposed using mechanized equipment to work within the 30-inch Tolerance Zone will

require approval from Corporate H&S. For more information, see Exhibit 2 for further instructions.

5.6.1 Aboveground Activities causing Subsurface Disturbance in the Vicinity of Underground Utilities

Aboveground activities can cause damage to shallow underground utilities or structures. Plan the intended path/mobilization/operation of Heavy Equipment is cleared to ensure that shallow utilities are not damaged. If Heavy Equipment must cross over shallow utilities, the utilities will be protected. Other subsurface disturbances may lead to damage such as clearing trees/shrubs/vegetation as roots may be entangled with underground piping or structures. For more information, see Best Practices for Field Personnel Concerning Utility Clearance (ARC HSFS-019 Supplement 2).

5.7 Acceptable Clearance for Working in Vicinity of Overhead Power Lines and Other Overhead Lines and Structures

No work will be performed by Arcadis or our subcontractor near overhead power lines where any Unqualified Person or equipment is within the limits specified below unless the power line has been properly covered or de-energized by the owner or operator of the power line. Qualified Person approach distances are defined in Exhibit 5A and 5B of ARC HSFS0006 Electrical Safety Standard.

Power Line Voltage Phase to phase (kV)	Minimum Safe Clearance (feet)
50 or below	10
Above 50 to 200	15
Above 200 to 350	20
Above 350 to 500	25
Above 500 to 750	35
Above 750 to 1,000	45

ANSI standard B30.5-1994, 5-3.4.5

5.7.1 Reducing Vehicle and Mechanical Equipment Clearance Requirements

Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that a clearance of 10 feet (305 centimeters (cm)) is maintained. If the voltage is higher than 50 kilovolts (kV), the clearance shall be increased 4 inches (10 cm) for every 10 kV over that voltage. However, under any of the following conditions, the clearance may be reduced:

- If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 feet (122 cm). If the voltage is higher than 50 kV, the clearance shall be increased 4 inches (10 cm) for every 10 kV over that voltage.

- If insulating barriers are installed to prevent contact with the lines and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.

- If the equipment is an aerial lift that is insulated for the voltage involved and if the work is performed by a qualified person, the clearance (between the uninsulated portion of the aerial lift and the power line) may be reduced to the distance given in OSHA 1910.333(c)(3)(ii)(C) Table S-5. Reference information from OSHA 1910.333 Table S-5 and NFPA 70E Table 130.4(C)(a) for alternating-current systems and 130.4(C)(b) for the distances associated with direct-current voltage systems is included as Exhibit 5 of ARC HSFS0006 Electrical Safety Standard.

Employees standing on the ground may not contact the vehicle or mechanical equipment or any of its attachments unless:

- The employee is using protective equipment rated for the voltage; or

- The equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the line than permitted in this section of this standard.

If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, shall be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

When a machine is in contact with an overhead power line, do not allow anyone to come near or touch the machine. Stay away from the machine and summon outside assistance.

5.7.2 Acceptable Clearance for Working in Vicinity of Non-Electrical Overhead Utilities and Structures

Arcadis field personnel will identify non-electrical overhead utilities and structures and where possible, work is not be conducted within the 30-inch Tolerance Zone of these overhead utilities and structures. It is recommended that if work will be completed in the vicinity of non-electric overhead utilities, the overhead utilities should be labeled with warning signs, protective barricades, and/or flags. Non-electrical overhead utilities and structures may include, but is not limited to, pipe chases, water lines, ceilings in buildings, etc. Arcadis field personnel will notify its site workers

(employees, subcontractors, vendors, etc.) of known overhead utilities and structures during the tailgate safety meeting. See Exhibit 2 for additional details.

5.8 Reporting Utility Incidents

Arcadis field personnel involved with any subsurface, submerged, and aboveground utility strikes should immediately STOP WORK and contact the Project Manager to discuss the incident unless there are injuries, then call 911 or the available emergency services number for the area and then the Project Manager. The utility strike must be reported to Corporate Health and Safety and Legal Departments immediately and no later than 24 hours. Use the Utility Line Strike Investigation Form as part of the notification process.

Selected utility strike incidents may also utilize a conference call with operations management to review findings and lessons learned. The Business Line Health and Safety Director will make the determination concerning the need to have the incident review call and will arrange the call, if deemed necessary.

5.9 Relationship of this standard to the Project Specific HASP

With the exception of the Utility and Structures Checklist, this standard, including most supplements, are not designed to be printed off and attached to project HASPs. During project health and safety planning, this standard will be reviewed and applicable clearance technologies and methods will be documented on the Utility and Structures Checklist.

Additionally, emergency action standards specific to utility strikes should be addressed. ARC HSFS-019 Supplement 5 provides general guidelines for emergency response to utility strikes. Applicable information may be attached to the Utility and Structures Checklist to facilitate communication of response expectations.

5.10 Required Contract Terms and Conditions

Arcadis' standard client and subcontractor contracts contain required terms and conditions defining responsibility for utility clearance and the allocation of risk associated with an impacted utility. These terms and conditions have prescribed language concerning subsurface work that is presented in Arcadis client contracts and Arcadis' subcontractor contracts, which can be found on the Legal Source site. If such provisions cannot be agreed upon, the reasons are documented and other risk-management actions should be identified, such as limits of liability, add additional physical investigations, additional lines of evidence or utility location, assignment of risk to subcontractors, etc. In addition, any changes to these terms and conditions require approval by Legal Services.

6. TRAINING

Employees responsible for coordinating or conducting utility clearance activities will be familiar with the requirements of this standard. Arcadis in-house 8-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) refresher may provide awareness-level training regarding this utility location and clearance standard.

7. REFERENCES (regulation citation, technical links, publications, etc.)

- Utility and Structures Checklist
- Utility Line Strike Investigation Form
- ARC HSFS-019 Supplement 1, Best Practices for Project Managers (or Their Delegates) Concerning Utility Clearance
- ARC HSFS-019 Supplement 2, Best Practices for Field Personnel Concerning Utility Clearance
- ARC HSFS-019 Supplement 3, Use and Limitations Associated with Location Technologies and Common Utility Clearance Methods
- ARC HSFS-019 Supplement 4, Best Practices for State One Call Procedures and Notifications
- ARC HSFS-019 Supplement 5, Emergency Action Plan guidelines for Utility Strikes
- ARC HSFS-019 Supplement 6, Utility Location SOP for Aquatic Work Activities
- Figure 1 – 30-Inch Tolerance Zone
- ARC HSCS005 Excavation and Trenching
- ARC HSFS0006 Electrical Safety Standard
- One Call and State Law Directory

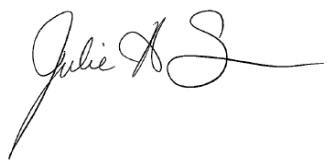
8. RECORDS - DATA RECORDING AND MANAGEMENT

8.1 Utility Clearance Records

All records (maps, checklists and documentation of communications) used to determine the location of utilities should be retained and kept in the project file.

9. APPROVALS AND HISTORY OF CHANGE

Approved By: Julie Santaniello, CSP – Corporate H&S, Manager of Technical Programs



History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
13 December 2006	01	Mike Thomas/Pat Vollertsen	Original document
26 March 2007	02	Mike Thomas/Pat Vollertsen	Put in new company format
15 May 2007	03	Mike Thomas/Pat Vollertsen	Added nation-wide 811 number
6 September 2007	04	Mike Thomas/Pat Vollertsen	Changing over to new template format
22 February 2008	05	Mija Coppola	Changing over to new template format
13 January 2009	06	Mija Coppola	Define lines of evidence
4 October 2010	07	Sam Moyers/Mija Coppola	Reformatting and addition of utility clearance information
13 February 2012	08	Sam Moyers/Mija Coppola	Modified link information for utility strike reporting, clarified local/state requirements in section 4.1 and 4.3
28 January 2013	09	Tony Tremblay	Utility and Structures Checklist revised; hyperlink updated
12 February 2013	10	Amanda Tine/Tony Tremblay	Clarified clearance boundaries for Unqualified staff in Section 5.7 and added information about vehicles and equipment being used near power lines in Section 5.7.1

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
15 March 2013	11	Kurt Merkle, Rebecca Lindeman / Tony Tremblay	Added additional text to standard for recent lessons learned, added section 5.4 (Locating Technologies) and 5.5 (Clearance Methodologies), added additional details to section 5.6 when working in close proximity to subsurface utilities, and added Supplement 6 - Utility Location SOP for Aquatic Work Activities.
07 July 2013	12	Andrew McDonald/ Tony Tremblay	Removed HSFS-019 Supplement 1, Utility Definitions. Added hyperlink for One Call and State Law Directory. Segregated evidence of sewer or storm drains in USC list. Removed Sam Moyers and added Andrew McDonald as author.
26 September 2014	13	Andrew McDonald/Tony Tremblay	Added Exhibit 1. Definitions and 30 inch tolerance zone. Clarified use of 811 or state one call as a reliable line of evidence. Added best practice to cover backfilling of pre-cleared boreholes. Updated USC list to cover soft dig termination depths and PM review.
23 February 2015	14	Tony Tremblay	Page number correction

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
10 May 2016	15	Denis Balcer/Sharon Lingle/Alec MacAdam/Andrew McDonald/Tony Tremblay/Julie Santaniello	ES and Section 4.2 - define subsurface intrusive work; clarify employees providing oversight of utility contractors, Arcadis requirements of operating and interpreting results of utility clearance equipment, and utility clearance before all subsurface intrusive work. Sections 1 and 5.8- changed submarine to submerged. Section 4.1 – added contacting public utility companies to help clear utilities. Section 4.2 – Clarified requirement to complete one year of utility clearance-related experience. Section 4.2 and 4.3 - Added discussion on aboveground activities causing subsurface disturbances. Added responsibility to clear overhead utilities when heavy equipment will be used and to evaluate use of a spotter. Added that repairs to damaged utilities need to be verified as competent and complete. Section 5.2 – Clarified reliable lines of evidence for each subsurface intrusive work point and degrees of certainty. Added all work within 30-inch Tolerance Zone needs Corp H&S preapproval. Section 5.6 and Exhibit 1- Clarify subsurface intrusive work and activity and exemptions for subsurface intrusive work. Section 5.6.1 – Add requirement to evaluate aboveground activities that may lead to subsurface disturbances that may cause damage to shallow underground utilities or structures.

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
10 May 2016	15	Denis Balcer/Sharon Lingle/Alec MacAdam/Andrew McDonald/Tony Tremblay/Julie Santaniello	Section 5.7.2 – added non-electric overhead utilities and structures other than power lines need to be identified and marked if working in that area. Section 9 – Changed reviewer from Tony Tremblay to Julie Santaniello. Exhibit 1 – added definitions of Utility Strike, Daylighting, Potholing, Subsurface Intrusive Work, Subsurface Intrusive Activities, and Utility Bank. Standard and Supplements placed on new Arcadis headers. Updated Supplement revision numbers to be consistent with standard. Supplement 2 revised. Utility Clearance and Structures Checklist and Utility Strike Investigation Form revised.
17 March 2017	16	Alec MacAdam/Julie Santaniello	Hyperlink updates; minor formatting; Utility Clearance and Structures Checklist revised.

EXHIBIT 1 – DEFINITIONS

Aboveground Utilities - For the purpose of this procedure, aboveground utilities include, but are not limited to: any aboveground line, pipe, conduit, system, or facility used for producing, storing, conveying, transmitting or distributing communication or telecommunications signals, electricity, gas, liquid, petroleum and petroleum products, coal slurry, hazardous liquids or gases, water under pressure, steam, sanitary sewage, storm water, or other materials, liquids, or gases.

Daylighting – exposing underground utilities or structures through soft dig technology/clearance prior to completing subsurface intrusive activities.

Excavation - Any man-made cut, cavity, trench, or depression, in an earth surface formed by earth removal into which a person can bodily enter.

Overhead Utilities and Structures – Overhead water lines, overhead pipe chases, ceilings in buildings.

Potholing – exposing underground utilities or structures through soft dig technology/clearance prior to completing subsurface intrusive activities.

Subsurface Intrusive Activities – For the purposes of this procedure, subsurface intrusive activities include, but are not limited to: excavations, vertical drilling, installing grounding rod, soil sampling, etc,

Subsurface Intrusive Work – Is any work or activity that breaks the plane of the ground surface. Exemptions include soil sampling using a non-conductive sampling tool to a depth of 6 inches below ground surface (bgs), placement of survey flagging to a depth of 6 inches bgs, and placement of non-conductive survey stake(s) to a depth of 6 inches bgs).

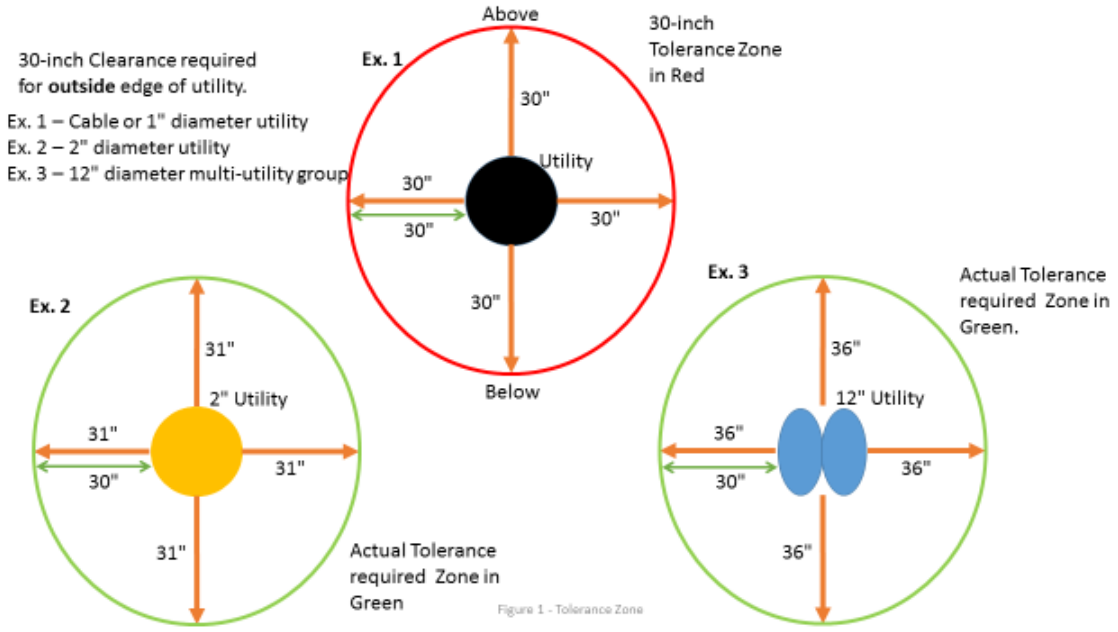
Subsurface Utilities - For the purposes of this procedure, subsurface utilities include, but are not limited to: any underground line, pipe, conduit, system, or facility used for producing, storing, conveying, transmitting or distributing communication or telecommunications signals, electricity, gas, liquid, petroleum and petroleum products, coal slurry, hazardous liquids or gases, water under pressure, steam, storm water, or sanitary sewage; underground storage tanks; tunnels and cisterns; and septic tanks and lines.

Tolerance Zone – The area within 30 inches in all directions from the outside diameter of a located/marked utility in which special care is to be taken. If the centerline of the utility is marked, the diameter of the utility or utility bank/trench must be incorporated into the 30 inches. This area must be hand cleared with non-mechanized equipment. Once the utility has been exposed, if mechanized equipment is planned for use within the 30-inch Tolerance Zone of the utility, such activity must receive pre-approval by Corporate H&S, to mitigate or accept the risk associated with the planned work. See Figure 1 – 30-inch Tolerance Zone.

Utility Bank – a structure containing two or more conduits. A conduit is a single enclosure containing one or more facilities.

Utility Strike – An unplanned contact of a utility (i.e., overhead and structures, aboveground, underground or submerged) during the course of work that results in damage requiring repairs, making a report to the utility owner or requiring further assessment to evaluate the potential for damage

EXHIBIT 2 – FIGURE 1 – TOLERANCE ZONE



Attachment 4
Arcadis COVID-19
Guidance

Arcadis Field and Embedded Staff COVID-19 Guidance

16 February 2022

Version Control

Revision No.	Date Issued	Description
1	3/17/20	Original document.
2	3/20/20	Added guidance for multiple occupants traveling in the same vehicle.
3	3/24/20	Updated introduction to include links to Orange Line information; added requirement of Arcadis COVID-19 Health Screening Self-Assessment Questionnaires; moved client questionnaire section forward in the document; and made minor updates to the social distancing, vehicle/transportation, lodging and equipment sections.
4	3/30/20	Updated social distancing section to include CDC “close contact” definition; added section for work in team settings; added AirBnB to lodging discussion.
5	4/2/20	Document template updated and sections rearranged; updated Hand Hygiene section; updated Cleaning of Frequently Touched Surfaces section; updated close contact definition; added section on PPE; added section for Traveling Between States, Provinces and Territories; added section for Construction/Construction Management; added section on Post-Shift Work
6	4/3/20	Added Appendix D – Interim Guidance for the Use of Face Coverings; Updated links, Section 2.3 added bullet to avoid sharing tools and equipment unless cleaned; Section 4.7.2 updated with a bullet for maintaining social distancing at choke points; Section 4.8 added section for Face Coverings and guidance in Appendix D.
7	4/10/20	Added Section 2.8 Other Considerations for journey and emergency action planning; Section 4.6 updated with current information regarding COVID-19 in sewage; Section 4.8 and Appendix D updated to include CDC’s recommends of wearing cloth face coverings in public settings where other social distancing measures are difficult to maintain.
8	4/13/20	Revised Section 2.6 by adding information about gloves being required in some jurisdictions; revised Section 4.8 and Appendix D with latest CDC and Health Canada guidance information.
9	4/20/20	Revised Section 2.1 to discuss both digital and hardcopy COVID-19 Health Screening Self-Assessment Questionnaires; revised Section 2.3.1 to include instructions on alcohol-based hand sanitizer use.
10	4/26/20	Revised Section 2.1 by adding the definition of fever and process for elevated temperature; revised section 2.4 by adding a reminder to understand the appropriate uses and limitations of the disinfectant; revised Section 2.6 by adding link to PPE request form and email address; Section 3.1 added link to “Locations with Travel Restrictions”

Revision No.	Date Issued	Description
		dashboard; revised Section 3.2 to consider face coverings when multiple occupants are riding in a single vehicle; revised Section 4.2 adding critical infrastructure/essential worker language; updated hyperlinks
11	5/1/20	Section 1 revised with latest symptoms of COVID-19; Section 2.5 reinforced Stop Work Authority and reporting where social distancing is not being practiced; inserted Interim Guidelines for Cardiopulmonary Resuscitation as Section 2.8 and moved “Other Considerations” to Section 2.9; added a bullet referencing Continuity Plan in Section 2.9
12	5/4/20	Revised Appendix C per jurisdictional updates.
13	6/16/20	Updated symptom list per CDC guidance; revised CDC close contact definition notes (Section 2.4); added plan for breaks bullets in Section 4.2; added Section 4.9 KN95; updated CDC’s face covering laundering recommendations in Appendix D.
14	8/14/20	Updated footnotes for “close contact” definition (Section 2.5); updated Sections 3.1 and 3.3 to reflect current travel recommendations; updated Section 4.8 and Appendix D to indicate exhalation valves or vents should NOT be worn; added links to the Face Covering Guide in Section 4.8.
15	10/23/20	Added Appendix E with additional signage that may be used; added reference to signage (Section 2.3.1); updated social distancing and close contact definitions (Section 2.5); added Yellow Guidance sub bullet (Section 2.7); updated order hyperlink (Section 3.1); added airline and other transportation (Section 3.2); added reporting requirement documentation (Section 4.3); updated Section 4.7.1 to clarify occupancy and documentation of visitors for contact tracing; added guidance to hold meetings outside (Section 4.7.2); minor edits to Section 4.8 and Appendix D.
16	11/13/20	Section 3.2 updated protocol to only one person in a vehicle; Section 3.3 updated protocol regarding room sharing and dining; Sections 4.2 through 4.7 added a face covering bullet; Section 4.8 and Appendix D added information from recent study that face coverings provide protection to the wearer.
17	12/4/20	Revised the reporting process in Section 2.7 to contact WorkCare instead of Brian Kundert. Added Section 2.7.1 describing WorkCare’s risk stratification and return to work process.
18	1/29/21	Updated all hyperlinks to new Intranet; added COVID-19 vaccine to Section 2.3; moved the Face Covering and KN95 section from 4.8 and 4.9, respectively, to Section 2.6; renumbered all sections; Section 2.9 clarified the continuity plan is required by the jurisdiction or client and is

Revision No.	Date Issued	Description
		recommended for all projects; revised poster in Appendix B; Appendix D updated with current CDC language and added CDC graphics.
19	2/25/21	Updated links in Section 2.1.2; updated Section 2.6 and Appendix D with revised face covering and KN95 guidance.
20	5/18/21	Added U.S. quarantine exemptions in Section 2.8; updated U.S. ridesharing requirements in Section 3.2; updated U.S. dining protocol in Section 3.3; updated face covering bullets in Section 4.0 work-specific situations; template update.
21	7/23/2021	Updated Section 2.1 and 2.8.1 to reflect the revised WorkCare Daily Screen and risk stratification process; removed outdated Section 2.6.1; updated U.S. vehicle sharing protocol in Section 3.2; Section 4.7 updated with guidance for vaccinated and unvaccinated employees.
22	8/13/21	Removed “Jurisdictional Social Distancing” template from Appendix C and renumber appendices; changed temperature at which individuals will not visit an office or project site to 100.0°F (37.8°C) in Section 2.1; updated face covering protocol for indoor spaces in Section 2.6 and Appendix C; updated U.S. vehicle sharing protocol in Section 3.2.
23	9/10/21	Added Section 2.3 Vaccine Policy and renumbered sections; Section 2.8 removed reference to retired “Yellow Caution Status” flowchart; Section 3.2 updated Canada ridesharing; Section 3.3 updated Canada and U.S. dining protocol; Section 4.7.1 removed reference to unvaccinated employees.
24	2/14/22	Updated vaccination terminology and definition in Section 2.9; revised U.S. ridesharing and lodging requirements for unvaccinated staff in Sections 3.2 and 3.3, respectively; added requirement that staff entering residential settings must be vaccinated in Section 4.5; updated Appendix C with latest CDC mask guidance; updated hyperlinks throughout the document.
25	2/16/22	Revised Section 4.5 recommending staff entering residential settings be vaccinated and added recommendation for an N95.

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Acronyms and Abbreviations

AED	Automated external defibrillators
CDC	U.S. Centers for Disease Control and Prevention
CPR	Cardiopulmonary resuscitation
HC	Health Canada
PPE	Personal protective equipment
SDS	Safety Data Sheet

1 Introduction

Currently Arcadis is following CDC and Health Canada guidelines, as well as applicable government directives. The health and safety of our people is of utmost importance to us. Arcadians are empowered to use TRACK to evaluate individual situations and Stop Work Authority anytime safety is at risk. Employees will not come to work if exhibiting any respiratory illness symptoms, including but not limited to COVID-19.

It is recommended that all field and embedded staff review and have access to the current version of this document. The most current version can be viewed and downloaded from the ANA H&S COVID-19 Resources intranet page. COVID-19 symptoms may appear 2-14 days after exposure to the virus. People with these symptoms or combinations of symptoms may have COVID-19:

- Fever or chills
- Cough
- Shortness of breath or difficulty breathing
- Fatigue
- Muscle or body aches
- Headache
- New loss of taste or smell
- Sore throat
- Congestion or runny nose
- Nausea or vomiting
- Diarrhea

This list is not all inclusive. Please consult your medical professional for any other symptoms that are severe or concerning to you.

2 Guidance for Project Activities

Employees will complete the following for all project activities.

2.1 Arcadis COVID-19 Health Screening Self-Assessment Questionnaires

All employees going to an Arcadis office, a project site, or a client site will be required to complete a Daily Screening through WorkCare's WorkMatters app, regardless of vaccination status. Individuals should continuously monitor for signs and symptoms of COVID-19 and, if not feeling well, complete the WorkCare Daily Screen Process again.

When individuals take their own temperature to evaluate whether they have a fever, the temperature measurements will be completed without the use of fever-reducing medicines that contains ibuprofen or acetaminophen and not within 30 minutes of exercise. The CDC defines a fever as a temperature of 100.4°F (38°C) or greater. If the individual's temperature is between 99°F (37.2°C) and 99.9°F (37.7°C) it is recommended the individual pay close attention for signs and symptoms of COVID-19 and complete the WorkCare COVID-19 Daily Screen Process more frequently. Individuals with temperatures of 100.0°F (37.8°C) or greater should not

visit an office or project site. You may also contact WorkCare's COVID-19 services if you are experiencing symptoms consistent with COVID-19 and are concerned it may be COVID-19.

2.1.1 COVID-19 Daily Screen Process

All Arcadis staff will register in WorkCare's WorkMatters app. Arcadis staff can use the WorkCare WorkMatters app once a day (or multiple times a day, if appropriate) to complete their COVID-19 health screening self-assessment using the Daily Screen Survey.

Upon completion of the COVID-19 Daily Screen Process in the WorkMatters app, the user will receive a green or red completion message:

- Green – Proceed to the office or project site.
- Red – Do not proceed to the office or project site. Complete Survey 2 and follow end guidance. You and your supervisor will receive an email that you have not been cleared to work. You will need to conduct contact tracing with Corporate Health & Safety, if necessary. You must log into the URL or App to complete the Daily Symptom Tracker, each day you are Not Cleared To Return To Work.

Once you have been cleared to Return to Work by a WorkCare physician, you and your supervisor will receive an email that states you have been Cleared to Return to Work.

2.1.2 COVID-19 Health Screening Self-Assessment Questionnaire (Hardcopy)

The COVID-19 Health Screening Self-Assessment Questionnaire must be:

- Distributed to scheduled visitors, clients, and contractors before visiting Arcadis offices or sites.
- Post the self-assessment questionnaire and post Appendix A at entrances and/or field trailers.

Minimize visitors on site. All visitors (staff, subcontractors, clients, anticipated guests, unanticipated guests) to the site must be asked to review the applicable questionnaire from the following list.

Canada COVID-19 Health Screening Self-Assessment Questionnaire for Staff (English)

U.S. COVID-19 Health Screening Self-Assessment Questionnaire for Staff, Contractors and Visitors (English)

U.S. COVID-19 Health Screening Self-Assessment Questionnaire for Staff, Contractors and Visitors (Spanish)

If a client has a similar questionnaire that Arcadis staff are required to complete, the client questionnaire may be substituted for Arcadis questionnaire.

2.2 Client COVID-19 Health Screening Forms

Some clients are requiring our employees to complete their COVID-19 health screening forms.

- You are not required to share personal medical information with clients; therefore, Arcadis is not requiring you to complete any form requesting medical information. Your disclosure of personal medical information to clients is completely voluntary.
- Please understand, if you do not complete the form, you will not be allowed on the client's sites and facilities, per the client's directive.
- Also, if you complete the form, you have an ongoing duty to provide prompt notice of any changes to any of your responses. (Some clients may require periodically signing updated forms).
- If you are restricted from a client site as a result of your answers to the COVID-19 health screening form, or because you have chosen not to complete the form, Arcadis will attempt to find you alternative work that does not involve access to the client's site or facility; although, Arcadis cannot guarantee that other work will be available.

If your Project Manager is not already aware of the client COVID-19 health screening form, please alert them when you receive one from a client.

2.3 U.S. Vaccine Policy

Arcadis strongly encourages all employees to receive a COVID-19 vaccination. COVID-19 vaccines are effective at helping protect against severe disease and death from variants of the virus that causes COVID-19. In accordance with the Arcadis U.S. Vaccine Policy, all U.S. employees are encouraged to upload the vaccination details into WorkCare's WorkMatters portal.

Clients may require employees working at their sites be fully vaccinated or if unvaccinated, to complete surveillance testing. If the client requires Arcadis verification, Project Managers or Account Managers will reach out to HR Operations (HROperations.ANA@arcadis.com) with a list of names to be checked. If testing is required, contact Corporate Health & Safety.

2.4 Practice Good Hygiene

The best way to prevent illness is to avoid exposure to the virus. CDC and Health Canada recommend common flu and cold season preventative measures, including:

- Wash hands often with soap and water for at least 20 seconds. If soap and water are not readily available, use a hand sanitizer with at least 60% alcohol.
    - If hand sanitizer or soap & water are not available on site, bring your own source of water and hand soap to accommodate hand washing.
- Avoid touching your eyes, nose, and mouth.
- Cover your nose and mouth with a tissue when sneezing or coughing.
- Monitor your health daily by completing a self-assessment.
- Stay 6 feet (2 metres) away from others.
- Avoid crowds and poorly ventilated spaces.
- Do not share Personal Protective Equipment (PPE).
- Maintain and thoroughly clean PPE in accordance with manufacturer's instructions.
- Avoid sharing phones, offices, tools, and equipment. If sharing is necessary, clean and disinfect prior to use.
- Clean high touch surfaces daily.
- Get a vaccine (flu to reduce the risk of flu illness and COVID-19).

2.4.1 Hand Hygiene

Hand hygiene for infection prevention is an important part of the U.S. and Canada response to COVID-19. Washing hands with soap and water has been and will continue to be our primary method for good hand hygiene. Both CDC and HC recommend that you wash hands often with soap and water for at least 20 seconds especially after you have been in a public place, or after blowing your nose, coughing, or sneezing. Hand washing mechanically removes pathogens.

Alcohol based hand sanitizer is a flammable liquid and vapor. However, there is no evidence to suggest hand sanitizer poses a fire hazard when used according to package directions and warnings. To use hand sanitizer:

- Follow manufacturer instructions for use.
- Rub your hands together, covering all surfaces of both hands, including between your fingers and up around your fingertips and nails.
- Rub hands together for 30 seconds to allow your hands to completely absorb the product.
- Allow the hand sanitizer to completely dry.
- Do not touch food or anything until your hands are dry.
- Refer to the Safety Data Sheet (SDS) for hazards information.

If hand sanitizer is not available, Arcadis requires that project teams assess and address the need for hand washing (e.g., access to water and soap) while working on site. This can be achieved by having access to a functioning restroom, a portable hand washing station or as simple as having hand soap, bottled water and paper towels to clean hands as necessary. A handwashing sign that may be posted near handwashing stations is provided in Appendix D.

2.5 Clean Frequently Touched Surfaces

Arcadis recommends that project teams identify who is responsible for cleaning frequently touched surfaces in our workplaces (field trailers, client facilities, etc.). CDC and HC recommend that these surfaces are disinfected daily. This includes tables, doorknobs, light switches, countertops, handles, desks, phones, keyboards, toilets, faucets, and sinks. Before using a disinfectant product, understand the appropriate uses and limitations of the disinfectant, and refer to equipment/tool manufacturer care instructions to determine whether the disinfectant is compatible (e.g., using isopropyl alcohol to disinfect an iPhone).

> CDC cleaning and disinfecting facilities: https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html
>
> Health Canada cleaning and disinfecting public spaces: https://www.canada.ca/en/public-health/services/publications/diseases-conditions/cleaning-disinfecting-public-spaces.html
>
> Health Canada hard surface disinfectants: https://www.canada.ca/en/health-canada/services/drugs-health-products/disinfectants/covid-19.html

If surfaces are dirty, clean them using detergent or soap and water prior to disinfection. To disinfect, most common EPA-registered or HC-approved household disinfectants will work. Use disinfectants appropriate for the surface.

If the sourcing of disinfectant products is limited, CDC and HC have outlined an option to use a diluted household bleach solution (at least 1,000 ppm sodium hypochlorite) as a disinfectant.

Standard household bleach is typically 5.25% sodium hypochlorite (52,500 ppm), whereas ultra-strength household bleach is typically 6% sodium hypochlorite (60,000 ppm). In accordance with Hazard Communication requirements, always refer to and have a copy of the Safety Data Sheet (SDS) available and on site with you. To **make a daily bleach solution** for use as a disinfectant:

- Mix 5 tablespoons (1/3rd cup) of standard bleach per gallon of water or for a smaller spray bottle size dilution, mix 4 teaspoons bleach per quart of water.
  OR
- 1 teaspoon (5 mL) per cup (250 mL) OR 4 teaspoons (20 mL) per litre (1000mL).
  Note: Solution must be mixed daily, because the solution will lose effectiveness as a disinfectant after 24-hours.

Follow manufacturer's instructions (e.g., Clorox) for application and proper ventilation, ensuring a contact time of at least 1 minute (for specific products and contact time information, refer to the CDC and HC links above). Check to ensure the product is not past its expiration date. Never mix household bleach with ammonia or any other cleanser. According to the HC, CDC and U.S. EPA, unexpired household bleach will be effective against coronaviruses when properly diluted.

A second alternative is to use an alcohol solution. The solution must have at least 70% isopropanol.

If supplies cannot be sourced locally, email PPErequests@arcadis.com.

2.6 Practice Social (Physical) Distancing

The CDC definition of **social distancing, also called "physical distancing,"** means keeping a safe space (approximately 6 feet, 2 metres or about two arm lengths) between yourself and other people who are not from your household in both indoor and outdoor spaces. Situations where social/physical distancing should be practiced include but are not limited to tailgate and safety briefing meetings, breaks in field trailers, entering stores and workstations. Plan work activities to maximize social (physical) distancing and minimize close contact with others. Social (physical) distancing is mandatory for unvaccinated individuals and highly recommended for vaccinated individuals. If there are instances where social distancing is not being practiced where it should, Stop Work and remove yourself from the situation. Contact the Project Manager or your Supervisor and document in the H&S App as an "Close Call" or "Unsafe Behavior."

Additional information when working in teams is required is discussed in the "work specific situations" section below.

> **Note:** The CDC defines **close contact** as: a person who was within 6 feet of an infected person for a cumulative total of 15 minutes or more over a 24-hour period starting from 2 days before illness onset (or, for asymptomatic patients, 2 days prior to test specimen collection) until the time the patient is isolated.[1]

[1] Individual exposures added together over a 24-hour period (e.g., three 5-minute exposures for a total of 15 minutes). Data are limited, making it difficult to precisely define "close contact;" however, 15 cumulative minutes of exposure at a distance of 6 feet or less can be used as an operational definition for contact investigation. Factors to consider when defining close contact include proximity (closer distance likely increases exposure risk), the duration of exposure (longer exposure time likely increases exposure risk), whether the infected individual has symptoms (the period around onset of symptoms is associated with the highest levels of viral shedding), if the infected person was likely to generate respiratory aerosols (e.g., was coughing, singing, shouting), and other environmental factors (crowding, adequacy of ventilation, whether exposure was indoors or outdoors). Because the general public has not received training on proper selection and use of respiratory PPE, such as an N95, the determination of close contact should generally be made irrespective of whether the contact was wearing respiratory PPE. At this time, differential determination of close contact for those using fabric face coverings is not recommended.

2.7 Face Coverings

Health Canada and CDC recommends wearing face coverings in public settings, like on public and mass transportation, at events and anywhere you will be around other people. In the U.S., face coverings are required on planes, buses, trains, and other forms of public transportation traveling into, within, or out of the United States and in U.S. transportation hubs such as airports and stations. When visiting Arcadis offices and project sites, face coverings will be worn when moving about the space, in common areas and during meetings. If social/physical distancing can be maintained, face coverings may be removed when sitting at individual workstations or actively eating in cafés. Some jurisdictions require face coverings to be worn at all times indoors regardless of vaccination status.

In Canada, non-surgical face coverings are mandatory when flying and travelling through airports. The wearing of face coverings is either required or recommended in all other public settings across Canada (indoors and outdoors).

Studies show that face coverings reduce the spray of droplets when worn over the nose and mouth. Studies also show face coverings can reduce wearers' exposure to infectious droplets through filtration. How well the face covering protects the wearer depends on the fabrics used and how it is made (e.g., the type of fabric, the number of layers of fabric, how well the mask fits). Health Canada and CDC still recommends that you stay at least 6 feet away from other people (social distancing), frequent hand cleaning, avoid contact with people who are sick and other everyday preventive actions. Face coverings are not a substitute for social/physical distancing. Face coverings with exhalation valves or vents should NOT be worn to help prevent the person wearing the mask from spreading COVID-19 to others. Face shields and goggles are not a substitute for face coverings.

Face coverings offering various features appropriate for different work environments, including moisture wicking and FR, are now in stock at Airgas (U.S.). The Face Covering Guide outlines several options to facilitate selection of the face covering that is appropriate for your work.

Some jurisdictional entities and clients require the use of face coverings based on Health Canada and CDC guidance. CDC guidance on selection of face coverings is included in Appendix C.

2.8 Personal Protective Equipment

Be prudent with PPE use (PPE with a purpose). Continue to work with our vendors on your PPE ordering needs and consider alternatives (e.g., N95 dust masks may not be available, but half face elastomeric respirators with P100 cartridges are available in limited supplies). If PPE and supplies cannot be sourced locally, email PPErequests@arcadis.com.

Select the appropriate glove for the task and include in the HASP, JSA and/or COVID-19 Preparedness, Response and Continuity Plan. Before using nitrile gloves as personal protective equipment (PPE), make sure to:

- Wash and dry your hands before and immediately after using gloves.
- Understand how to put nitrile gloves on and take them off (Ansell Donning & Doffing Technical Release).
- Nitrile gloves offer protection against common consumer cleaning supplies, chlorinated solvents, and offer good dexterity and sensitivity.
- Change gloves between tasks or wash gloved hands with soap and water between tasks.
- Do not touch your face.

- Inspect gloves frequently for rips, tears, etc. and replace as necessary.
- Understand limitations of nitrile gloves.

2.9 Reporting a COVID-19 Exposure

Contact WorkCare (888-449-7787, press 9) to initiate the COVID-19 Screening and Return to Work Process if you have tested positive for COVID-19, have been asked to be tested for COVID-19 by a medical professional or have received a red "Stop" screen during the COVID-19 self-assessment instructing you to call WorkCare.

If you learn you have been in **close contact** with a worker, client or member of the public who is COVID-19 positive:

- Stop work.
- Notify your Supervisor and Project Manager.
- Self-quarantine in accordance with country-specific requirements (Canada and U.S.) and contact your personal physician for additional direction.
    - If working in the U.S., the following people are exempt from self-quarantine due to close contact and are asymptomatic
        - Fully vaccinated and up-to-date on COVID-19 vaccines[2]
        - Had COVID-19 in the past 3 months

If you've been tested or asked to be tested for COVID-19 by a medical professional, please contact WorkCare (888-449-7787, press 9) to initiate the return to work process.

2.9.1 WorkCare COVID-19 Screening & Return to Work Process

Contact WorkCare (888-449-7787, press 9) for access to doctors and nurses who will discuss your symptoms, complete a risk stratification process, and advise on return-to-work process. If you complete the Daily Screen Process through the WorkMatters App and receive a red screen, you will be prompted to complete the risk stratification process electronically and depending on the outcome, you may receive a call from a WorkCare nurse or physician. If prompted to complete the risk stratification process, you can expect to:

- Be placed into a low, moderate or high-risk category
    - Low Risk – you may be cleared to return to work at an office or project site
    - Moderate and High Risk – you will not be cleared to return to work at an office or project site and instructed to remain at home
    - An email will be sent to you, Corporate H&S, HR, and your Supervisor indicating whether you can proceed to an office or project site (cleared) or whether you must work remotely (not cleared). If you are not cleared, this will initiate Arcadis' internal contact tracing process.
- Moderate and High-Risk individuals will be required to complete the "Daily Symptom Tracker" during their self-isolation period.
- At the end of your self-isolation period, you will complete a Return-to-Work Survey in the WorkMatters Portal. The survey and daily symptom tracker will be reviewed by a WorkCare physician.

[2] People are considered fully vaccinated and up-to-date when they have received all recommended COVID-19 vaccines, including any booster dose(s) when eligible. "Fully vaccinated" two weeks after second dose in a two-dose series, such as Pfizer/Moderna vaccines, or two weeks after a single-does vaccine, such as Johnson & Johnson's Janssen vaccine.

- You will receive a written notice from WorkCare indicating whether you are cleared or not cleared to return to work at an office or project site.

If you are not cleared, you will receive additional instruction, which may include continuing daily assessments and completing another return-to-work survey at a later date.

2.10 Interim Guidelines for Cardiopulmonary Resuscitation

The American Heart Association and Hearth & Stroke Foundation of Canada have issued interim Hands-only cardiopulmonary resuscitation (CPR) guidelines to reduce the risk when helping victims of cardiac arrest with suspected or confirmed COVID-19.

CPR and the use of automated external defibrillators (AED) significantly improve the chance of survival of patients experiencing cardiac arrest. During the COVID-19 pandemic, first aid trained folks and bystanders may feel uncomfortable performing lifesaving CPR and increasing their own risk of contracting the virus.

Hands-only CPR involves performing chest compressions only at a rate of 100 to 120 compressions per minute until an ambulance arrives.

When administering CPR, consider:

- Wearing a face covering
- Laying a cloth, towel, or clothing over the person's mouth and nose
- Perform hands-only CPR
- Use an AED, if available

2.11 Other Considerations

When planning field work, consider the following:

- Plan your journey to and from the site to manage social distancing and hand hygiene when you need to stop for gas or at a store for supplies
- Reevaluate the current field work situation as it relates to lone worker protocols
- A COVID-19 Preparation, Response and Continuity Plan template is required for all projects.

3 Travel Guidance

3.1 Traveling Between States, Provinces or Territories

Some states, provinces and territories have issued executive orders requiring self-quarantine, travel health screening questionnaires and/or COVID-19 testing for people traveling into or from certain locations. While some jurisdictions exempt essential workers, self-quarantine requirements may apply during off-work hours, confining the employee to their lodging location. Check local requirements before you travel to determine whether you can travel or if there is a need to self-quarantine at the destination. Prior to travel, it is important to have a destination plan in place and understand the steps you will take to remain safe and healthy throughout your trip. Whenever possible, use local project teams within a 4-hour drive radius.

3.2 Field Vehicles and Transportation

When using shared vehicles (fleet, rental, ride sharing services) follow the cleaning guidance above for frequently touched surfaces. Check with your rental agency before vehicle pick-up to understand their cleaning procedures, and supplement with your own cleaning, as necessary. Note: if using wipes, make sure the wipe is compatible with the surface being cleaned.

Canada: A limit of two vaccinated employees may share a vehicle. Unvaccinated individuals are not permitted to share vehicles.

U.S.: There is no limit to the number of vaccinated employees that may share a vehicle. Face coverings must be worn at all times when multiple people are in the vehicle. Unvaccinated employees are not allowed to share vehicles.

When traveling by air for business-critical travel, check with the airline to obtain their latest COVID-19 requirements. A summary of current airline COVID-19 policies can be found here.

3.3 Lodging Considerations

Most hotel chains have implemented additional cleaning, disinfection and face covering in common area procedures. Check with your hotel before check-in to understand their procedures. Consider bringing a surface cleaner or disinfecting wipes to clean frequently touched surfaces such as doorknobs, tv remote, etc.

In instances where AirBnB has been authorized and approved in writing by the Project Manager and Supervisor, consider the following:

- The entire team should not stay at the same residential facility.
- In the U.S., only vaccinated individuals may share lodging provided the configuration allows each individual to have their own dedicated living space (e.g., own bedroom). Face coverings are required in common spaces.
- Understand the AirBnB may need additional cleaning and disinfection of commonly touched surfaces upon arrival.

Lodging together is not permitted for unvaccinated employees.

Always maintain good personal hygiene and avoid crowded places such as restaurants or bars. Consider using take out or outdoor seating. If self-quarantine is required by the jurisdiction during off-work hours, plan ahead and evaluate local food and/or grocery delivery options.

Canada: Dining together outdoors and indoors without face coverings is permitted if everyone is fully vaccinated. Outdoor dining is preferable. Indoor dining should be limited, and groups kept small. Dining together is not permitted if anyone is not vaccinated.

U.S.: Dining together outdoors without face coverings is permitted if everyone is fully vaccinated. Indoor dining is permitted if everyone is fully vaccinated and face coverings are worn in public spaces. Dining together is not permitted if anyone is not vaccinated.

3.4 Rental Equipment and Sample Cooler Handling

Clean the exterior of rental equipment and sample coolers upon arrival at the job site using a cleaning product that will not impact data quality. Wear gloves and safety glasses when handling sample coolers to prevent contact with acid preservation of the bottles in coolers. Where possible, order separate sets of equipment and "assign" equipment to individuals for use through the duration of the event.

4 Work-Specific Situations

4.1 Working with Little or No Contact with Others

Follow procedures listed in Section 2.0 and Section 3.0.

4.2 Working in Project Teams

When working in project teams (paired Arcadians, embedded staff, contractors, clients, etc.):

- If feasible, prior to visiting the site, have a H&S check in to confirm all attendees are complying with CDC or Health Canada guidelines, including:
    - Confirm understanding that workers or clients should not go to the job site if they have personally tested positive for COVID-19, have been in close contact to anyone else who has tested positive for COVID-19 or are exhibiting symptoms. If a worker discloses close contact with someone COVID-19 positive and the worker is asymptomatic, instruct the employee to complete the WorkCare Daily Screen and follow the instructions provided following the survey.
- Out of respect for all, ask everyone to self-disclose if they are not feeling well (exhibiting flu-like symptoms), and request that they should go home.
- Observe person(s) for symptoms, and use Stop Work, as necessary, and contact Project Manager.
- Set visual or physical barriers to keep the public away (caution tape and cones).
- Consider if "split shifts" can be used to limit contact, or if work can be scheduled during hours of low to no facility operations.
- Arcadis staff plan work activities, continuously use TRACK and re-plan work activities to maximize social distancing and minimize "close contact"
    - Practice good hygiene and clean commonly touched surfaces
        - Clean clipboard and pen prior to use
        - Bring your own pen
        - Disinfect shared equipment (water level meters, pumps, etc.)
        - Coordinate with sanitation vendor for portable hand wash station (soap & water or hand sanitizer)
    - Use work practices and tools to minimize close contact when feasible, such as:
        - Single person operating a winch instead of a two-person manual lift
        - Tools to maximize distance
    - Use PPE in accordance with the Job Safety Analysis (face shield, safety glasses, gloves, etc.)
    - Plan for breaks to allow for hydration, nutrition and rest/prevention of heat related illness
        - Select locations where social distancing can be maintained
        - Allow time for safe doffing/donning of personal safety items
        - Communicate individual needs for breaks before beginning work.

- If social distancing or other controls are not feasible discuss this with your supervisor and PM, discuss “Is the work necessary?” or “Can the work be rescheduled for a later date?”
  - Refer to Section 2.6 for the definition of close contact. CDC has indicated short periods of time in close contact may not increase risk of exposure.
- Wear face coverings in accordance with Section 2.7 and jurisdictional requirements.
- Subcontractors need to develop and implement their own procedures to protect their workers.

4.3 Embedded Employee Working at a Client Facility

Embedded employee at a client facility should:

- Inquire whether working remotely is an option.
- If not, and Arcadis must work at the client facility:
  - Ask if arrangements can be made to practice social distancing (e.g., split shift, separate workstation, etc.)
  - Practice good hygiene, and if you do not feel the situation is safe, you can execute your stop work authority by having discussions with your Supervisor and Project Manager.
- Wear face coverings when social/physical distancing cannot be maintained or in accordance with client or jurisdictional requirements.
- If client facility cleanliness is a concern discuss concerns with Project Manager. The Project Manager will discuss with the client. If the client will not increase cleaning, Arcadis employees will be provided with the supplies to clean and disinfect frequently touched surfaces as well as supplies to clean hands.
- Discuss and document Arcadis, client and jurisdictional protocol for reporting a COVID-19 case using the template in the Arcadis COVID-19 Preparedness, Response and Continuity Plan or similar form.

4.4 Working in Contact with the Public

When working in contact with the public (mall areas, parks, outdoor residential settings):

- Set visual or physical barriers (caution tape and cones) to keep the public away and maintain social distancing.
- Wear face coverings when working indoors or in enclosed spaces. Refer to Appendix C for guidance on the appropriate face covering.
- Consider posting signs reminding the public of social distancing guidance (example in Appendix B).

4.5 Working at Indoor Residential Settings

When working at indoor residential settings, consider the following guidelines:

- It is recommended that employees entering residential settings are fully vaccinated.
- A N95 is recommended when entering residential settings.
- Call ahead to ask if the resident(s) is experiencing flu-like symptoms or if anyone in the house is in mandatory or precautionary self-quarantine. Reschedule the work if the resident is experiencing symptoms or under quarantine. Also share Arcadis work procedures and explain that Arcadis will be practicing social distancing during the work.
- Upon arrival, assess the residents for signs of flu-like symptoms. If observed, use Stop Work, exercise social distancing and contact the Project Manager.

- Where feasible, wear gloves, wipe down surfaces prior to touching them and thoroughly wash hands after completing the work (do not touch face).
- Ask if arrangements can be made to practice social distancing (meaning stay 6 feet [2 metres] away).
- Schedule your work when resident is not home, if your work area allows for access (e.g., a basement crawl space the doesn't require entry to the main living area of the home).

4.6 Projects Involving Drinking Water Systems, Recreational Water and/or Wastewater

According to the CDC, at this time, the risk of transmission of the virus that causes COVID-19 through sewerage systems is thought to be low. Although transmission of the virus that causes COVID-19 through sewage may be possible, there is no evidence to date that this has occurred.

Wastewater and sewage workers should use standard practices, practice basic hygiene precautions, and wear personal protective equipment (PPE) as prescribed for current work tasks.

When working on projects involving drinking water systems, recreational water and/or wastewater:

- The COVID-19 virus has not been detected in drinking water.
- Conventional water treatment methods that use filtration and disinfection, such as those in most municipal drinking water systems, should remove or inactivate the virus that causes COVID-19.
- Standard practices associated with wastewater treatment plant operations should be sufficient to protect wastewater workers from the virus that causes COVID-19.
- Review the project Health & Safety Plan and task-specific Job Safety Analysis for required personal protective equipment and other controls.
- Wear face coverings when working indoors. Refer to Appendix C for guidance on the appropriate face covering.

4.7 Construction Management/Construction

4.7.1 Field Trailers

Field trailers may present unique challenges for social distancing. Consider the following:

- Restrict access by posting site signage (Appendix D) requesting all visitors, including site workers. All who enter the field trailer should knock and don a face covering before entering.
    - The project team will determine the maximum occupancy based on the ability to maintain social distancing.
- Local jurisdictions may require face coverings in all indoor spaces regardless of vaccination status. In areas without jurisdictional mandates, all workers will wear face coverings in common spaces and when social/physical distancing cannot be maintained. Refer to Appendix C for guidance on the appropriate face covering.
- Maintain a log of visitors entering the trailer use the "Arcadis Contact Tracing Log" in Appendix E. Assign a person responsible for signing visitors in and out.
- Clean surfaces regularly. In the absence of professional cleaning services, occupants will develop a schedule for site personnel to complete cleaning of commonly touched surfaces.

    - When using common surfaces, each individual is responsible for wiping down the shared surface before and after use.
- Assess and address the need for the availability of hand washing (e.g., access to water and soap) while working on site. This can be achieved by:
    - Having access to a functioning restroom
    - Portable hand washing station
    - Hand soap and bottled water to clean hands as necessary.
- Plan seating arrangement so that personnel inside the trailer maintain social distancing, at least 6-feet (2 m) of separation.
- Meetings in the trailer will not exceed the maximum occupancy as determined based on the ability to maintain social distancing. Unvaccinated individuals must wear face coverings and maintain 6 feet (2 m) of physical distance.
- Consider the use of physical barriers to separate the field trailer from the public and/or site activities.

4.7.2 Other Construction Guidance

Additional guidance related to construction and construction management activities include:

- Consider use of technology (e.g., digital sign in using QR codes, virtual tailgate, or construction meetings, video camera systems to minimize the number of people on site).
- For tailgate or other meetings that are not virtual:
    - Unvaccinated individuals must wear face coverings at all times, when meeting indoors. Refer to Appendix C for guidance on the appropriate face covering.
    - Maintain 6 feet (2 m) of physical distance at all times between attendees (both seated and standing).
    - Have the person leading the meeting sign everyone in.
    - If signature is required, everyone should have their own pen.
    - Hold meetings in outdoor spaces whenever feasible.
- For work outdoors:
    - Masks are optional when working outside more than 6 feet (2 m) apart (socially distanced).
    - Determine comfort level and vaccination status of field team when deciding whether to wear face covering for work tasks that need to be completed within 6 feet (2 m) and physical distancing cannot be maintained. Unvaccinated staff must wear face coverings when physical distancing cannot be maintained.
    - Refer to Appendix C for guidance on the appropriate face covering.
- Simultaneous operations coordination to separate contractors:
    - Coordinate movements around the site
    - Set up work zones with visual barriers for specific activities with transition areas in common spaces
    - Post social distancing signage (refer to Section 4.4)
    - Maintain social distancing with at least 6-feet (2 m) of separation whenever feasible
    - Consider the following administrative controls:
        - Activity rotation - schedule work when the fewest number of people are present
        - “Split shifts” can be used to limit contact, or if work can be scheduled during hours of low to no facility operations.

- Work in teams/pairs:
    - Plan work activities, continuously use TRACK and re-plan work activities to maximize social distancing and minimize “close contact”
    - Use equipment or tools to increase distance between personnel to greater than 6-feet (2m) or eliminate the need for a second person.
- Coordinate with contractors to make sure they are following the same social distancing, hand hygiene and cleaning guidance to reduce the risk to other project personnel.

5 Post Shift Considerations

At the end of the work shift, clean the vehicle, if used throughout the day. Wash hands prior to leaving the site and after the commute.

Upon arriving home or at lodging, shower and launder clothing.

Appendix A

Site Signage – Self-Assessment Required

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Arcadis Employees

Have you done your “Daily Screen “ today?

Before each day, you must complete the online **“Daily Screen”.**

QR Code for daily self-assessment.

SAFE Return

Appendix B

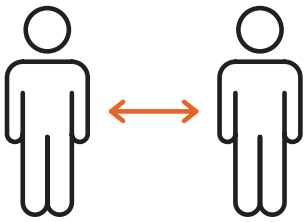
Site Signage – Social Distancing

ARCADIS

Project Sites

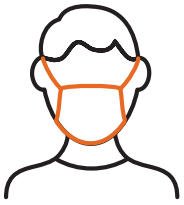
Keep Yourself and Others Working Safely

100% compliance is required by you and our subcontractors.



Maintain physical (social) distance of six feet, about two arms' length.

Need to talk? Shut equipment down if noise is interfering, use hand signals, radios, or move to another area of the site where distance can be maintained.



Face coverings must be worn when six feet of physical distance cannot be maintained.

***Stop Work** if procedures are not followed. It's mandatory!*

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Appendix C

Guidance for the Use of Face Coverings

COVID-19 Face Covering Recommendations

Scenario	Mask Type			Respirators	
	Cloth Masks	Procedure Masks	Masks that Meet a Standard	Respirators that Meet International Standards[3]	NIOSH-Approved Respirators[3]
Working Indoors					
Entering a resident, school, or hospital	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Working indoors with coworkers[1] and physically distanced	Not Recommended	Recommended	Preferred	--	--
Working indoors in close proximity to coworkers, no physical distancing	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Working indoors with the general public and physically distanced	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Working indoors in close proximity to the general public (no physical distancing)	Not Recommended	Not Recommended	Not Recommended	CDC Recommended	CDC Preferred
Working in an Arcadis Office[2]	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Working Outdoors					
Working outdoors with coworker and physically distanced	--	--	--	--	--
Working outdoors with a coworker and not physical distancing	Not Recommended	Recommended	Preferred	--	--
Working outdoors with the general public and physically distanced	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Working outdoors with the general public and not physical distancing	Not Recommended	Not Recommended	Not Recommended	CDC Recommended	CDC Preferred
Travel					
Travel on public transportation	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Ridesharing with coworker (Fully Vaccinated Only)	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Ridesharing	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Communal lodging	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred

Notes:

[1]Coworkers includes Arcadis employees, Arcadis or client subcontractors, and Arcadis clients

[2]Masks must be worn when entering an office or job trailer, moving about the space and in common areas. Masks may be removed when seated at a individual workstation and physically distanced from others or alone in a enclosed space with floor to ceiling walls and door closed. Additional jurisdiction requirements may apply.

[3]Required use of a respirator meeting an international standard or NIOSH-approved respirator will need to follow the Arcadis Respiratory Protection H&S Standard.

References:

CDC Types of Masks and Respirators

Types of Masks and Respirators



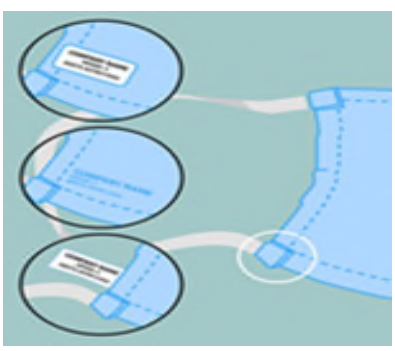
Cloth masks:

- Multiple layers of tightly woven, breathable fabric
- Nose wire
- Fabric that blocks light when held up to bright light source
- Do not wear mask with exhalation valve

Procedure masks:

- Multiple layers of non-woven material
- Nose wire
- Protects others from the wearer's respiratory emissions





Mask that meets a standard:

- Designed and tested to ensure they perform at a consistent level
- Must be labeled with the standard the mask meets
- Multiple layers of non-woven material

Respirators that meet international standards:

- Designed and tested to meet international standards
- Filters varying levels of particles in the air depending on the standard they are designed to meet
- Seals tightly to the face when fitted properly
- Medical surveillance and fit testing required if using when required under Arcadis' Respiratory H&S Standard





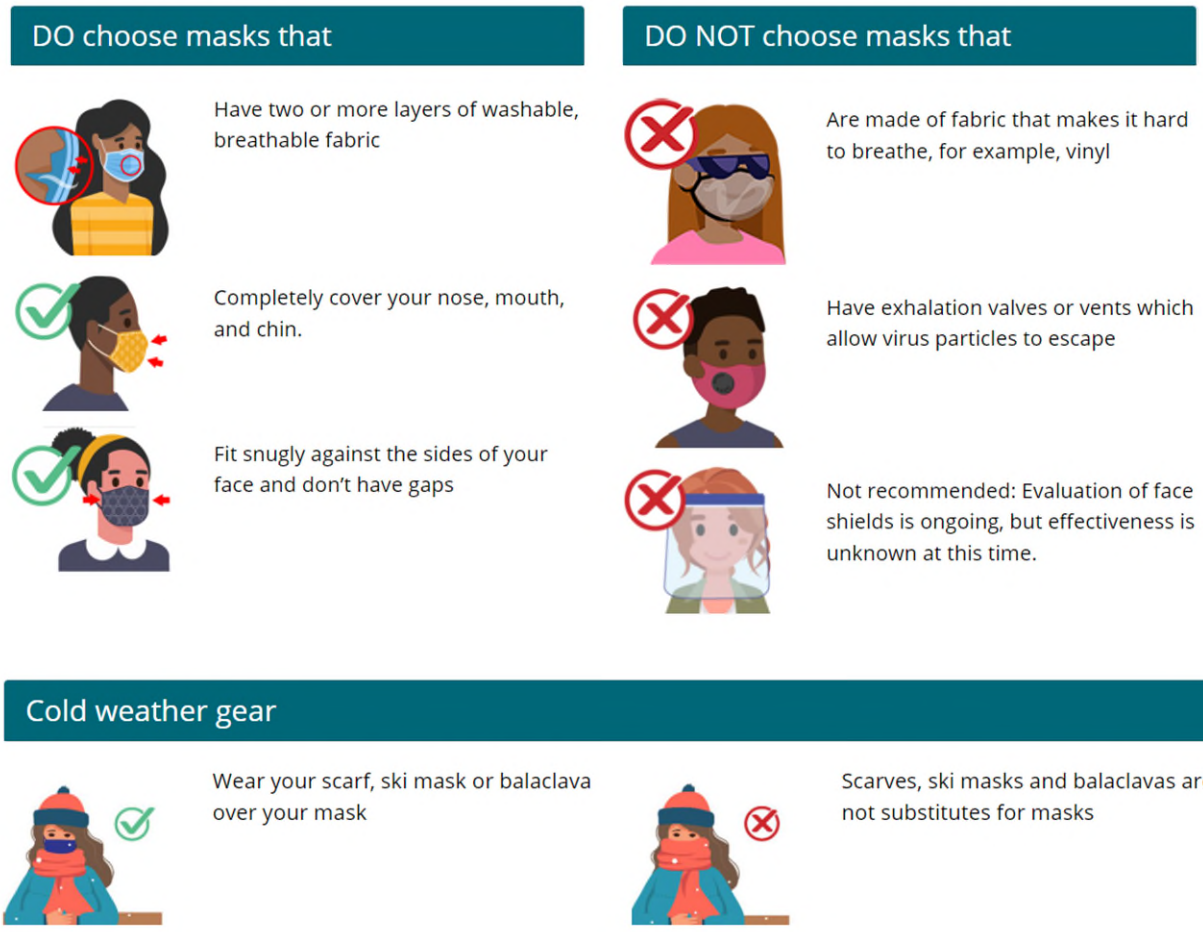
NIOSH-approved respirators:

- Respirators listed on the NIOSH-Approved Particulate Filtering Facepiece Respirators webpage
- Evaluated against a specific US standard that includes a quality requirement
- Filters at least 95% of particles in the air with proper fit
- Seals tightly on the face
- Medical surveillance and fit testing required if using when required under Arcadis' Respiratory H&S Standard

Resource: CDC Types of Mask and Respirators

Rev. 16 February 2022

The following graphics are from the U.S. CDC:



Note: Some jurisdictions may not consider gaiters or bandanas acceptable face coverings.

How to Wear a Mask

Wear a well-fitting mask **correctly** and **consistently** for the best protection.

- Be sure to wash your hands or use hand sanitizer before putting on a mask.
- Do **NOT** touch the mask when wearing it. If you have to touch/adjust your mask often, it doesn't fit you properly, and you may need to find a different mask or make adjustments.

Do wear a mask that



- Covers your nose and mouth and can be secured under your chin.
- Fits snugly against the sides of your face.

Two important ways to make sure your mask works the best it can

1. **Make sure your mask fits snugly against your face.** Gaps can let air with respiratory droplets leak in and out around the edges of the mask

2. **Pick a mask with layers to keep your respiratory droplets in and others' out.** A mask with layers will stop more respiratory droplets getting inside your mask or escaping from your mask if you are sick.



16 February 2022

Do

Choose a mask with a nose wire



- A nose wire is a metal strip along the top of the mask
- Nose wires prevent air from leaking out of the top of the mask.
- Bend the nose wire over your nose to fit close to your face.

Use a mask fitter or brace



- Use a mask fitter or brace over a disposable mask or a cloth mask to prevent air from leaking around the edges of the mask.

Check that it fits snugly over your nose, mouth, and chin



- Check for gaps by cupping your hands around the outside edges of the mask.
- Make sure no air is flowing from the area near your eyes or from the sides of the mask.
- If the mask has a good fit, you will feel warm air come through the front of the mask and may be able to see the mask material move in and out with each breath.

Add layers of material



2 ways to layer

- Use a cloth mask that has multiple layers of fabric.
- Wear a disposable mask underneath a cloth mask.
  - The cloth mask should push the edges of the disposable mask against your face.

Make sure you can see and breathe easily

Knot and tuck ear loops of a 3-ply mask



- Knot the ear loops of a 3-ply face mask where they join the edge of the mask
- Fold and tuck the unneeded material under the edges
- For instructions, see the following https://youtu.be/GzTAZDsNBe0 .

16 February 2022

Other things to consider

Certain types of facial hair, like beards, can make mask fitting difficult. People with beards can do one or more of the following:

- Shave their beards.
- Trim their beards close to the face.
- Use a mask fitter or brace.
- Wear one disposable mask underneath a cloth mask that has multiple layers of fabric. The second mask should push the edges of the inner mask snugly against the face and beard.

Masks designed for people with beards are being evaluated, and information will be provided when it becomes available.





Do NOT

Combine two disposable masks

- Disposable masks are not designed to fit tightly and wearing more than one will not improve fit.



Combine a N95 or KN95 mask with any other mask.

- Only use one N95 or KN95 mask at a time.



How NOT to Wear a Mask



How to take off a mask



1

Carefully, untie the strings behind your head or stretch the ear loops



2

Handle only by the ear loops or ties



3

Fold the outside corners together



4

Be careful not to touch your eyes, nose, and mouth when removing and wash hands immediately after removing

16 February 2022

Appendix D

Additional Signage

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Best Practices

Wash your hands.

Wash in hot water for 40 seconds: 20 seconds with soap, 20 seconds to rinse.

Wipe surfaces with disinfectant wipes after you are finished.

Maintain proper social distancing.

Stand back 6 feet from others who may be washing their hands, or waiting in line to wash.

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Best Practices

You touch it, you clean it.



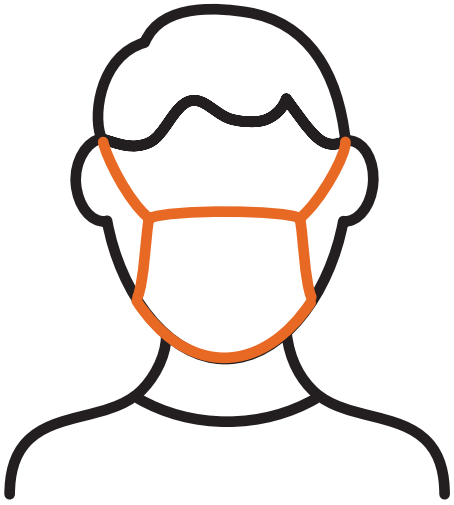
Remember to clean any surface you touch with the provided disinfectant spray.

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ARCADIS

Arcadis Staff, Visitors & Deliveries

Wear face cover.



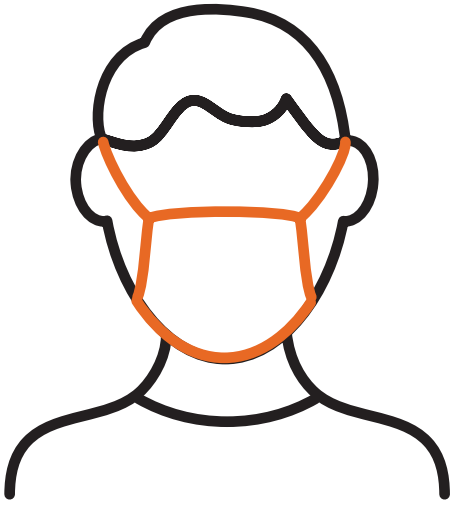
Face covering must be worn at
all times.

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ARCADIS

Arcadis Staff, Visitors & Deliveries

Wear face cover.



Please wear face covering when moving about the space. Face coverings can be removed while seated at workstation.

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Visitors & Deliveries

All staff, visitors or deliveries must use the main entrance.

Located: Main lobby front door

Firstname Lastname: 123 555 1212
Firstname Lastname: 123 555 1212

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ARCADIS

Restricted

Authorized Stafl Only

In order to maintain proper social distancing, this area is restricted to authorized stafi.

Need something?

Contact: Firstname Lastname 123 555 1218

SAFE Return

ARCADIS

Restricted

Maximum Occupancy

2

In order to maintain proper social distancing, the number of people allowed in this area is limited.

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Closure

Room Closed

In order to maintain proper social distancing guidelines, this room is temporarily closed.

SAFE Return

Off limits

CUT

Do not use

CUT

Restricted

Appendix E

Arcadis Contact Tracing Log

Arcadis Contact Tracing Log

Printed Name	Company	Cell phone or email	Date/Time On Site	Date/Time Off Site

Arcadis U.S., Inc.
1 Executive Drive, Suite 303
Chelmsford
Massachusetts 01824
Phone: 978 937 9999
Fax:
www.arcadis.com

Attachment 5
National Grid Safety Procedure
COVID-19 Health & Safety Plan

FORWARD

National Grid's vision is to be a world-class safety organization, with zero injuries every day. A critical component of achieving this vision is the careful development, implementation and maintenance of safety procedures. This guidance document, COVID-19 Health and Safety Plan, describes pandemic response measures, taken by National Grid, to help prevent the spread of COVID-19.

Questions regarding this guidance should be referred to National Grid's Safety Department.

Record of Change

Revision	Date	Description
Initial	04/28/2020	Initial creation
1	5/6/2020	Updated Job Brief Checklist to reflect current face covering requirements, vehicle cleaning guide correction
2	5/27/21	Updated face covering guidelines

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1.0 SCOPE OF HEALTH & SAFETY PLAN

National Grid has developed this Health & Safety Plan (HASP) to uniformly apply pandemic response measures to help prevent the spread of the COVID-19 virus. National Grid field personnel and crews have been provided this information and communications.

2.0 PROJECT PERSONNEL

2.1 Roles and Responsibilities

National Grid shall be responsible for the safety of all its employees and shall ensure COVID-19 pandemic measures are in place. Key National Grid personnel are as follows:

Incident Command Structure

The National Grid Incident Command Structure (ICS) has been activated within all Business Units of National Grid's US Operations to respond to the COVID-19 pandemic. Members of the ICS review and approve all operational decisions, with the Incident Commander ultimately responsible for these decisions. The Incident Commander relies upon subject matter experts within the ICS, including the Operations Officer, the Safety and Health Officer, to help set standards and guidance for protective measures to be used to limit the spread of the COVID-19 virus. These Officers, in turn, utilize the expertise of other members of the organization within Operations, Safety, and Health, to assess risks associated with the work being performed and provide guidance on the most effective measures to be used by employees to protect themselves, their coworkers, our customers, and members of the public.

Field Supervisor

The Field Supervisor shall have the responsibility for monitoring and enforcing National Grid COVID-19 pandemic measures and shall ensure that all employees have received and reviewed this Health & Safety plan.

- Serve as the appointed supervisor to oversee field personnel and ensure pandemic measures are being followed
- Ensure field personnel have the appropriate pandemic supplies
- Disseminate all new National Grid COVID-19 communications to all field employees
- Where non-compliance is observed, take prompt corrective action; and
- Have the authority to order a safety stop in the event of a serious safety issue.

Crew Leader

The National Grid crew leader shall be in charge of the day-to-day details of the work to be performed. They shall ensure that work is performed in accordance with National Grid COVID-19 pandemic measures. They will:

- Walk the job site at the start of each day to ensure a safe work environment;
- Where non-compliance is observed, take prompt corrective action; and
- Have the authority to order a safety stop in the event of a serious safety issue.
- Perform the daily job safety briefing before commencing work, whenever a visitor arrives to the job site, and if there is a significant change in the work or when an extended break occurs. As part of the COVID-19 pandemic response, the COVID-19 job brief checklist (Appendix A) shall be used in addition to the applicable departmental job brief form.

Employees

National Grid employees are responsible for following all COVID-19 pandemic measures;

- Each employee is responsible for reporting to supervision any symptoms of COVID-19, of any direct contact with an individual confirmed to have COVID-19, or in contact with a person in quarantine.
- Each employee is obligated to call a safety stop when a hazardous condition is observed.
- All lone workers shall conduct a self-assessment utilizing the COVID-19 job brief checklist (Appendix A) and adhere to the guidance outlined in this plan.

National Grid Field Safety Representative

National Grid Field Safety Representatives conduct routine and random crew visits to National Grid job sites. The National Grid Field Safety Department shall act as a resource for National Grid field personnel to effectively implement this COVID-19 Health & Safety Plan and will be available on an as-needed basis for inquiries related to this HASP.

3.0 COVID-19 PANDEMIC RESPONSE MEASURES

3.1 COVID-19 Symptoms

COVID-19 Symptoms may include the following:

- Fever
- Cough

- Shortness of Breath
- Chills
- Repeated shaking with chills
- Muscle Pain
- Headache
- Sore Throat
- New loss of taste or smell

3.2 Hygiene and Social Distancing

- Wash your hands often with soap and water for at least 20 seconds, especially after using the restroom, before eating, and after blowing your nose, coughing, or sneezing. Hand washing is the best way to prevent the spread of viruses.
- If soap and water are not readily available, use an alcohol-based hand sanitizer with at least 60% alcohol. Always wash hands with soap and water if hands are visibly dirty.
- **Proper hand washing/sanitizing products will be provided to all employees**
- Maintain a minimum of 6' social distance from other employees on site while performing work and during routine breaks. When work tasks prevent this, ensure proper face coverings are continued to be worn and proper hygiene
- Avoid touching your eyes, nose, and mouth.
- Cover your cough or sneeze with a tissue, then throw the tissue in the trash.
- Clean and disinfect frequently touched objects and surfaces using a disinfecting cleaning spray or wipe; if not available, use a soap and water solution.
- All cleaning product trash and potentially contaminated PPE will be stored in a trash bag and immediately disposed of at a National Grid facility at the end of each shift. Trash should not accumulate in any National Grid vehicle. Immediately wash hands upon disposing of trash bag.

3.3 COVID-19 PPE and Face Coverings

Effective June 1, 2021, National Grid will be revising its <u>outdoor face covering</u> policy to align with recent state guidelines and CDC recommendations. All other COVID protocols, including those related to indoor face covering requirements, will remain in place. The Company will continue to monitor federal and state guidance and will revisit the remaining protocols within 30 days.

Outdoors:
Face coverings will **<u>not</u>** be required outside in public for **fully vaccinated persons** or **where 6 ft socially distancing** can be accomplished. Employee that prefer to continue to mask- up even if fully vaccinated are encouraged to do so.

Indoors:
Face coverings are required inside National Grid facilities and must be worn upon entry. They can be temporarily removed while seated and working alone at a desk/cubicle with 6 ft of distance from

others. Face coverings must be put back on when standing up, moving about or when a coworker is standing or walking in their vicinity. Face coverings can also be removed when an employee is working alone in an enclosed room with a door, such as an individual office. Face coverings cannot be removed in enclosed spaces, including individual offices, conference rooms, training rooms, huddle rooms, storm rooms, locker rooms or any other such space when occupied by more than one person, regardless of ability to social distance within the room.

3.4 COVID-19 Virus Risk Assessment and Adopted Measures

National Grid's prescribed measures (work practices, PPE, hygiene) were selected based upon the risk assessments completed by subject matter experts and reported up through the ICS for approval. They are based upon the Centers for Disease Control & Prevention (CDC) and OSHA guidance, as well as input from Operations, Safety, and Health team members. They are believed to address all risks posed to our workforce, as well as to our customers and members of the public, when jobs are conducted in public places. These measures are reviewed on a continuous basis, for both effectiveness and to ensure the latest guidance is incorporated, with changes made, as necessary, after these reviews.

4.0 COVID-19 REPORTING PROCESS

4.1 COVID-19 Job Brief Checklist

In addition to the applicable departmental job brief form, all crew leaders shall utilize the COVID-19 job brief checklist to facilitate crew discussion regarding symptoms of COVID-19 and allow for discussion to help facilitate the reporting of a COVID-19 incident. All visitors to the job site will be required to have the job brief and COVID-19 checklist reviewed with them by the crew leader prior to entry on the job site.

Remember to maintain social distancing while conducting the job brief

4.2 COVID-19 Incident Reporting

To ensure the safety of all employees and the public, any employee shall immediately contact their Supervisor and National Grid Employee Services if one of the following conditions occur:

- Employee is exhibiting symptoms of COVID-19
- Employee has been in close contact of another individual with COVID-19
- Employee has been in close contact of another individual who is currently being quarantine for a suspected case of COVID-19

Close contact is defined as being within 6' of a sick/quarantined individual for more than 15 minutes.

Please refer to the COVID-19 Suspected/Confirmed Positive Process guidance document in Appendix A.

Appendix A – National Grid COVID-19 Communications

A Message from John Bruckner

National Grid US Coronavirus Incident Commander

Updated Guidance on Face Coverings

April 16, 2020



The state of New York and the state of Rhode Island recently issued executive orders requiring all essential employees who are working in public places to wear face coverings when distance from the public or co-workers cannot be maintained. As a result, we are updating our company policy to align safety standards for all employees.

We had previously communicated that wearing a face covering was voluntary based on CDC recommendations. We are now **requiring** National Grid employees to wear face coverings in the situations below. Please note that this applies to both **office** and **field-based** employees, and applies across **all jurisdictions**.

Face coverings must be worn:

- ✓ When working in public places
- ✓ When working in a customer's premises
- ✓ When social distancing is not able to be maintained with a co-worker, customer or member of the public in a National Grid facility, barn/yard, work location or company vehicle.

- This directive is effective at 8:00 pm this evening for all New York employees.
- It is effective starting this Saturday for all Rhode Island and Massachusetts employees.
- If you are working from home, our company guidance remains: If you can work from home, you should.

What qualifies as a face covering?

Employees may use either a company-issued or a personal face covering, depending on preference and availability. These include:

- Disposable masks, which need to be changed daily or if significantly dirty.
- Reusable FR Balaclavas, which need to be laundered daily, according to CDC cleaning guidance.
- Reusable FR neck warmers, which need to be laundered daily, according to CDC cleaning guidance.
  - Please note: Face pieces must be made from Flame Resistant (FR) material if they are worn when working in an energized zone or there is potential for a gas ignition.

nationalgrid

How to get a face covering:

Our procurement and warehouse teams are working directly with teams to ensure a steady supply of face coverings.

It is our intention to provide company-supplied face coverings widely, but in instances where one is not available or preferred, a personal covering may still be used.

Operations teams should work through their normal channels to order face coverings. We will be providing further guidance to office-based colleagues on where they can access face coverings.

CDC guidance on personal face coverings can be found here:

- https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cloth-face-cover.html
- https://www.cdc.gov/coronavirus/2019-ncov/downloads/DIY-cloth-face-covering-instructions.pdf

Face coverings should:

- Fit snugly but comfortably against the side of the face
- Be secured with ties or ear loops, if provided
- Include multiple layers of fabric
- Allow for breathing without restriction
- Be removed from behind head or ears to minimize hand contact with face
- Be laundered and machine dried if reusable

Cleaned, dried coverings can be kept in a clean plastic bag until needed for use

It is important to note that face coverings, whether company-issued or personal, are not a substitute for taking measures that are known to be effective in stopping the spread.

Handwashing, and maintaining a social distance of 6 feet apart from others remains the most critical guidance that we can follow.

Sincerely,

John Bruckner

nationalgrid

COVID-19 Job Brief Checklist

Please Distribute

During this trying time it is important that we maintain our same level of focus at work locations conducting hazard assessments and identifying risks prior to the start of each task. Prior to beginning work at every location, when conditions, job focus or crew members change, after each meal period and after any prolonged interruption to the work, a **Job Briefing** shall be held.

The work to be performed shall be discussed and assigned, and the safety aspects of the job shall be reviewed. The National Grid protocol to screen all individuals to determine who may have been exposed to COVID-19 outside of work **must be reviewed** at the start of the workday and Job Briefing.

(Employees working alone shall conduct a self-assessment to determine if they may have been exposed to COVID-19 outside of work or should their condition change during the workday)

The questions are:

- ☐ Are you feeling ill in any way? For instance, do you have any of the following symptoms: A fever? A cough? Shortness of breath? Chills? Repeated shaking with chills? Muscle pain? Headache? Sore throat? New loss of taste or smell?
- ☐ Have you had close contact with a symptomatic person (e.g., fever, cough, and/or shortness of breath, chills, repeated shaking with chills, muscle pain, headache, sore throat, new loss of taste or smell) within the last 14 days?
- ☐ Have you had close contact with a person who was tested with results pending or positive for coronavirus within the last 14 days?
- ☐ Have you recently been out of state for non-work related travel (within the last 14 days)?

*Employees who answer **"YES"** to any of these questions must distance themselves from others, not enter the work area, and immediately contact their supervisor privately for further instruction.*

The employee must also contact the National Grid Employee Services Hotline 1-888-483-2123.

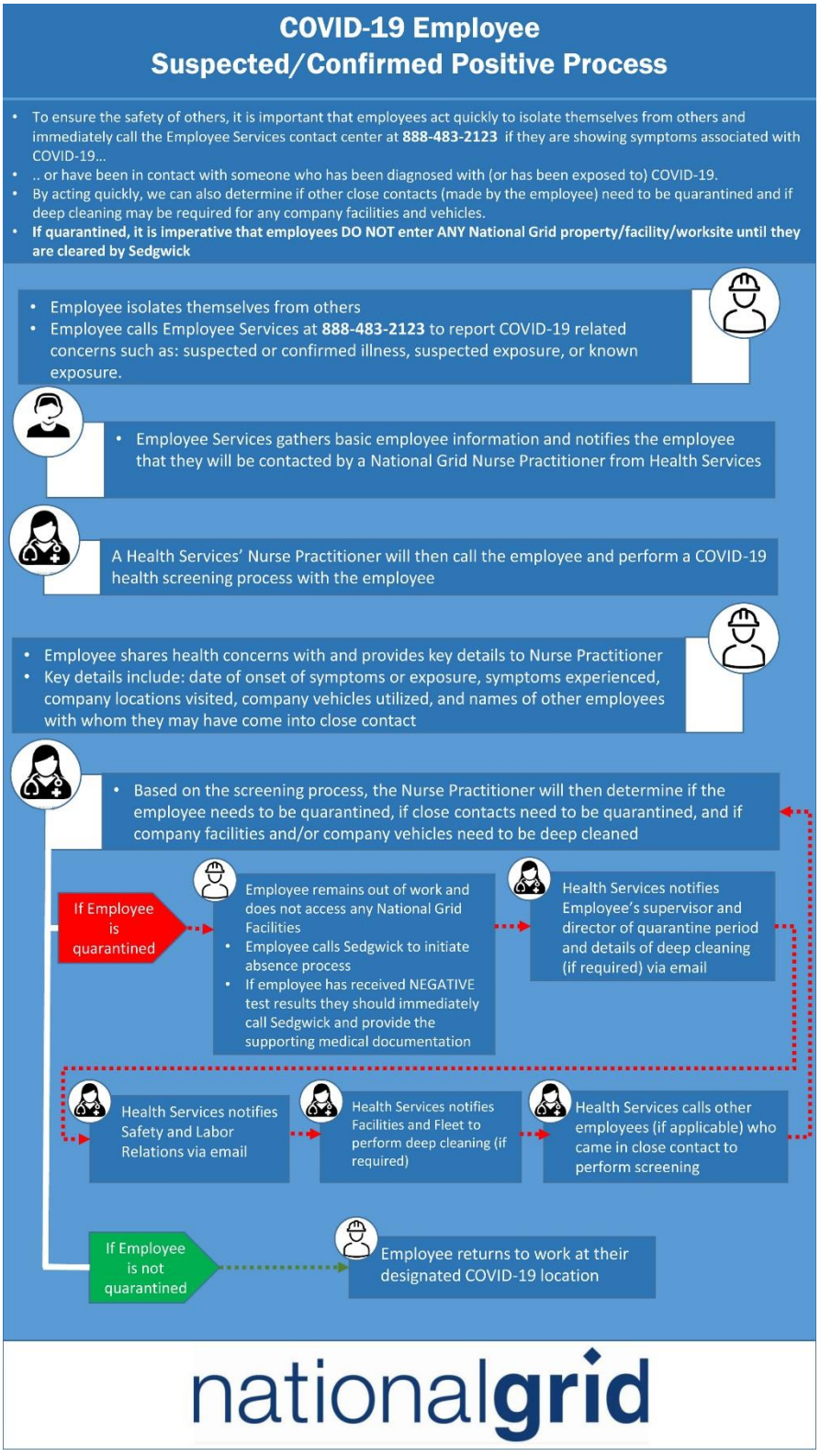
Employees who answer **"NO"** to all of these questions proceed with work activities as planned.

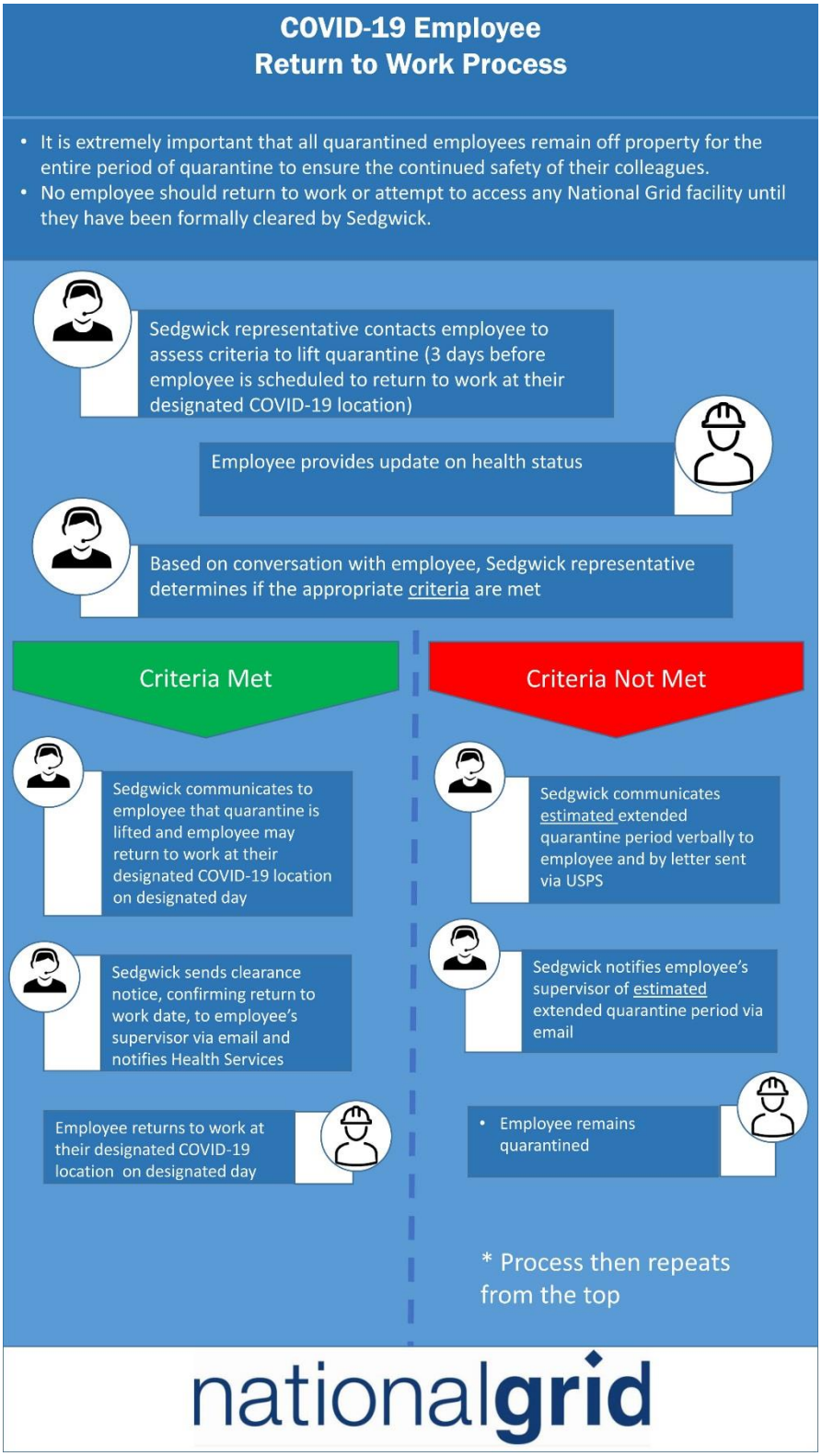
Please note on the Job Brief that you asked these COVID-19 Screening Questions.

To reduce multiple people handling the job brief during the COVID-19 pandemic crew leaders should handle all documentation and record who is present on site after they have reviewed the job brief with each employee or visitor.

REMINDER - Please be sure to follow CDC recommendations

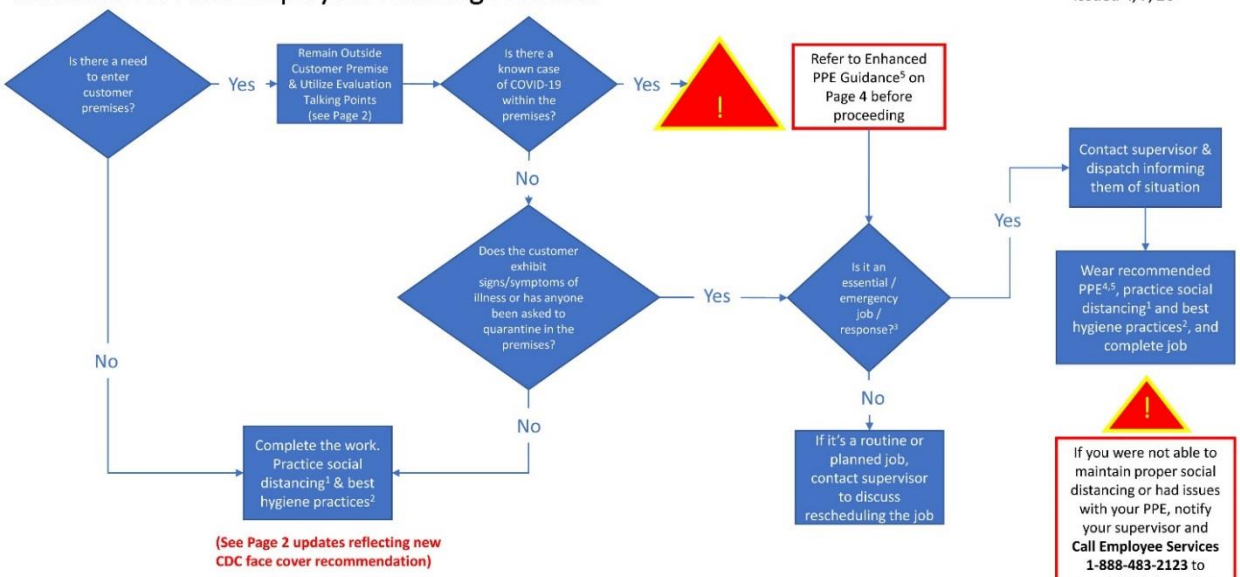
- Maintain a minimum 6' social distance from other people
- Employees must wear a face covering: when working in public places, when working in a customers premise, or when social distancing is not able to be maintained with a co-worker, customer, or member of the public in a National Gird facility, barn/yard, work location, or company vehicle.
- Avoid touching your eyes, nose, and mouth.
- Clean and disinfect frequently touched objects and surfaces using either a EPA registered disinfectant (Lysol, Clorox, etc.), soap and water, or a bleach and water mixture (1/3rd cup bleach per gallon of water)
- Use the fold of your arm to cover a sneeze or cough
- Wash your hands often with soap and water for at least 20 seconds, especially after going to the bathroom; before eating; and after blowing your nose, coughing, or sneezing.
    - If soap and water are not readily available, use an alcohol-based hand sanitizer with at least 60% alcohol. Always wash hands with soap and water if hands are visibly dirty.


COVID-19 Employee
Suspected/Confirmed Positive Process
To ensure the safety of others, it is important that employees act quickly to isolate themselves from others and immediately call the Employee Services contact center at 888-483-2123 if they are showing symptoms associated with COVID-19...
.. or have been in contact with someone who has been diagnosed with (or has been exposed to) COVID-19.
By acting quickly, we can also determine if other close contacts (made by the employee) need to be quarantined and if deep cleaning may be required for any company facilities and vehicles.
If quarantined, it is imperative that employees DO NOT enter ANY National Grid property/facility/worksite until they are cleared by Sedgwick
Employee isolates themselves from others
Employee calls Employee Services at 888-483-2123 to report COVID-19 related concerns such as: suspected or confirmed illness, suspected exposure, or known exposure.
Employee Services gathers basic employee information and notifies the employee that they will be contacted by a National Grid Nurse Practitioner from Health Services
A Health Services' Nurse Practitioner will then call the employee and perform a COVID-19 health screening process with the employee
Employee shares health concerns with and provides key details to Nurse Practitioner
Key details include: date of onset of symptoms or exposure, symptoms experienced, company locations visited, company vehicles utilized, and names of other employees with whom they may have come into close contact
Based on the screening process, the Nurse Practitioner will then determine if the employee needs to be quarantined, if close contacts need to be quarantined, and if company facilities and/or company vehicles need to be deep cleaned
If Employee is quarantined
Employee remains out of work and does not access any National Grid Facilities
Employee calls Sedgwick to initiate absence process
If employee has received NEGATIVE test results they should immediately call Sedgwick and provide the supporting medical documentation
Health Services notifies Employee's supervisor and director of quarantine period and details of deep cleaning (if required) via email
Health Services notifies Safety and Labor Relations via email
Health Services notifies Facilities and Fleet to perform deep cleaning (if required)
Health Services calls other employees (if applicable) who came in close contact to perform screening
If Employee is not quarantined
Employee returns to work at their designated COVID-19 location
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COVID-19 Employee
Return to Work Process
It is extremely important that all quarantined employees remain off property for the entire period of quarantine to ensure the continued safety of their colleagues.
No employee should return to work or attempt to access any National Grid facility until they have been formally cleared by Sedgwick.
Sedgwick representative contacts employee to assess criteria to lift quarantine (3 days before employee is scheduled to return to work at their designated COVID-19 location)
Employee provides update on health status
Based on conversation with employee, Sedgwick representative determines if the appropriate criteria are met
Criteria Met
Criteria Not Met
Sedgwick communicates to employee that quarantine is lifted and employee may return to work at their designated COVID-19 location on designated day
Sedgwick sends clearance notice, confirming return to work date, to employee's supervisor via email and notifies Health Services
Employee returns to work at their designated COVID-19 location on designated day
Sedgwick communicates estimated extended quarantine period verbally to employee and by letter sent via USPS
Sedgwick notifies employee's supervisor of estimated extended quarantine period via email
Employee remains quarantined
* Process then repeats from the top
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Guidance for Field Employees Entering Premises

Issued 4/7/20



See Page 2 for additional information on Talking Points, CDC Recommendations for (1) Social Distancing and (2) Best Hygiene Practices
See Page 3 for National Grid (3) Emergency Work at a Premises and (4) Standard PPE Guidance
See Page 4 for National Grid (5) Enhanced PPE Guidance

1

Issued 4/8/20

Talking Points - Engage Customer

Prior to entry, engage the customer and advise of social distancing practices. Here are some questions and statements.

- Does someone within the premises have a known case of COVID-19? Has someone within the premises tested positive for the COVID-19 virus?

(IF ANSWER IS 'YES' TO EITHER OF THE ABOVE QUESTIONS, REFER TO ENHANCED PPE GUIDANCE ON PAGE 4)

- Do you mind if I follow the social distancing practice today?
- Is anyone currently sick inside the premises?
- If you are feeling sick, would you mind remaining in another room while I am working This is a best practice policy my company is recommending. Can you tell me where your equipment is located?
- I will do my job, keep you updated and tell you when I am done

(1) Social Distancing

- Maintain at least 6 feet distance between yourself and the customer at all times
- Where social distancing measures cannot be maintained, face cover can be worn to help limit the spread of the virus (see National Grid's Face Cover Guidance for details)

(2) Best Hygiene Practices

- Face covering can be worn in public settings where social distancing measures cannot be maintained (see National Grid's Face Cover Guidance for details)
- Use alcohol-based hand sanitizer (at least 60% alcohol), before and after each home visit; OR wash hands using soap and water for 20 seconds

2

Issued 4/8/20

(3) Emergency Work at a Premises

On arrival, assess the premise/situation in its entirety and consider these questions.

- Is it a multi-unit building?
  - Is the unit where work is required affected?
- What work can be done without interaction/entry?
- Is entry through a side or back door possible to limit exposure?
- Can make safe actions be taken without interaction/entry?
  - Securing Outside Meter/Curb Valve
- Would a hardship be caused by isolating the service?

Note: These questions and considerations are meant to help guide in the decision making process. There may be instances where access to a premise cannot be avoided in order to address immediate public safety concerns. Please reference the Social Distancing and applicable PPE Guidance in all situations.

(4) Standard PPE Guidance for Entering a Premises (No Known COVID-19 cases are present)

- Avoid touching ANYTHING in customer premises other than company equipment and customer equipment related to the job
- Wear disposable latex or nitrile gloves to prevent touching contaminated surfaces
- Latex or nitrile gloves should be donned before entering the home
  - If work gloves are needed to perform the task, remove disposable latex or nitrile gloves and dispose of them. Don work gloves and perform task. Once task is complete remove work gloves and store them. Don a new pair of disposable latex or nitrile gloves to exit the home.
- Remove latex or nitrile gloves and dispose in way that won't create other opportunities for exposure
- Immediately wash / sanitize hands after removing latex or nitrile gloves
- All other PPE normally required for the work being performed should be used

3

Issued 4/8/20

(5) Enhanced PPE Guidance for Entering a Premise (Where a Known COVID-19 Case is Present)

The most effective way to protect the employees from contracting the virus is physical distance; if at all possible, the customer diagnosed with COVID-19 should be asked to move to a separate room before premises entry. When available and practicable, the following PPE items may be used at the premises with a known COVID-19 case present. These PPE items can be used in combination with our Social Distancing and Best Hygiene Practices to limit the spread of the virus.

- N-95 / KN-95 mask (see Page 5 for pictures of typical N-95 / KN-95 masks available)
- Reusable Face Shield
- Disposable Surgical Gloves (nitrile or latex)
- All other PPE required for doing the work (i.e. safety glasses, hard hat, etc.)
- If desired, FR-rated balaclava may be worn to provide additional protection while working

The following steps should be taken while conducting work in the premises:

- Prepare a paper or plastic bag for disposal of used PPE prior to entering the premises.
- Avoid touching ANYTHING in customer premises other than company equipment and customer equipment related to the job.
- Wear disposable latex or nitrile gloves to prevent touching contaminated surfaces.
- Any PPE should be donned before entering the home.
- If a mask is in use, avoid touching your face or adjusting the mask.
- If work gloves are needed to perform the task, remove disposable latex or nitrile gloves and dispose of them. Don work gloves and perform task. Once task is complete remove work gloves and store them. Don a new pair of disposable latex or nitrile gloves to exit the home.

Once work is completed in the home, follow these steps to safely remove the PPE items

- Remove face shield, taking care to avoid touching your face. Clean / disinfect and store properly.
- Remove mask from the back of the head first, taking care to avoid touching your face. Place used mask in a bag and dispose in normal trash.
- If balaclava has been worn, remove covering from back of head, similar to removal of mask.
- Remove latex or nitrile gloves (turn inside out while removing) and place in a bag. Dispose of bag in normal trash.
- Immediately wash / sanitize hands after removing latex or nitrile gloves, following Best Hygiene Practices.

4

Issued 4/8/20

Typical N-95 / KN-95 masks





5

Safeguarding your Vehicle

Now, more than ever, with COVID-19, precautions to safeguard your vehicle when transferring the vehicle to another employee, or when taking your vehicle in for maintenance, is very important.

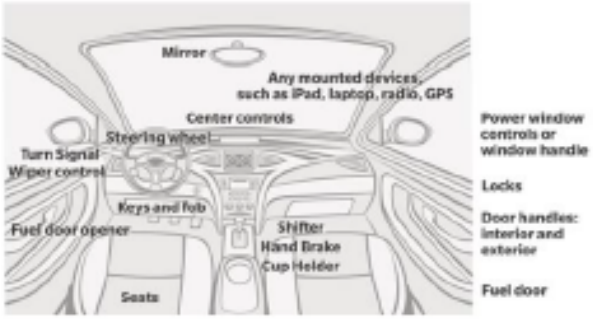
Here are some high-touch areas that should **never** be missed:

• Mirror • Center controls • Keys and fob • Wiper control • Climate control • Audio controls • Hand brake • Seats *(driver/passenger)*/Seatbelts • Fuel door opener • Windows • Headrests • Armrests	• All mounted devices *(any and all electronic devised used - i.e. iPad, laptop, radio, GPS, phone chargers)* • Steering wheel • Headlight switch • All cabin lighting controls • Shifter • Cup holder • Door handle*(inside and out)*/Window control/locks • Air vent • Sun visors

Use disinfectant wipes, diluted bleach solution, or damp soapy water wipes when cleaning all hard surfaces throughout the vehicle.

To guide your efforts when cleaning the vehicle, think about where droplets would fall when you sneeze or cough (*for example: do you turn your head to the side?) and remember to think about your own personal safety:*

- Be sure to wash your hands for **20 seconds** after completing the cleaning process.
- If you take your vehicle home at night, be sure to lock it to prevent it from being compromised.
- Make sure you have a mask and gloves (when/where appropriate).



Before you leave or enter the vehicle – here's a checklist to keep you safe and your team members safe as well:

Activity to Safeguard	✔
Keys / Fob	
Door Handles (interior/exterior)	
Steering Wheel, Shift Lever, Brake Lever, Wiper Stalk, Turn Signal Stalk	
Air Vents, Console, Dashboard, Cup Holder	
Exterior and Interior Fueling Latch, Cover, Cap	
Seats, Seatbelts, Headrests	
Mirrors, Windows, Window Controls	
Interior Lights	
Sun Visors	
Passenger and Driver Door Armrests, Grab Handles, Seat Adjusters	
All Electronic Devices used while in vehicle (iPads, Navigation Systems, Phone Chargers, Laptops, etc.)	

Additional considerations for crew trucks:

Handles on bin doors	
Equipment controls (bucket / digger)	

**** Please consider any other touch point identified by a crew member but not listed***



Contract Employees COVID-19 Reporting Process

Health Services does not typically manage the absences of our contract employees, "contractors". However, to protect our employees, we are screening sick/exposed contractors to determine if they have come into contact with National Grid employees, or if a facilities/vehicle deep cleaning is required. Contract employees are required to call Employee Services (ES) (888) 483-2123 directly. If the contractor does not call Employee Services, the National Grid supervisor may call ES to report the contractor out of work and to initiate contact tracing.

Contractors must be cleared to return to work (RTW) at National Grid by their employer. Per National Grid best practices, we are recommending a 14-day quarantine beginning on the date of notification for all contractors who are sick or believe they have been exposed to COVID-19.

Reporting Process:

1. Contractors call Employee Services **(888) 483-2123** for screening
2. Nurse Practitioner (NP) screens the contractor to determine National Grid close contacts, or if a National Grid facility or vehicle requires deep cleaning. NP obtains employer name and contact email from contractor
3. NP advises contractor to contact their doctor and their employer
4. An email will be sent to National Grid supervisor and the contractor's employer with quarantine start and end date (see email below)
5. Contractor must follow employer's RTW process and complete recommended quarantine (and be symptom free for 3 days)
6. NP will notify any National Grid close contacts to quarantine for 14 days and email National Grid supervisor(s)
7. After 14 days have elapsed, the contractor's employer must send an email to NP confirming that the contractor has returned to work, i.e., all RTW notifications and documentation must be forwarded to Mary Brown, NP Mary.Brown2@nationalgrid.com

Supervisor:

If you are calling Employee Services to report a contractor out of work so that we may initiate contact tracing, or a facilities deep cleaning, please be prepared to answer the following questions when speaking with the NP regarding your contractor:

- Contract employee name

- Contract Employer
- Contract Employer supervisor and email address
- Last date contractor was on National Grid worksite
- National Grid employees the contractor has been in close contact with
- Facilities/vehicle deep cleaning required

email sent to supervisor when contractor is taken out of work for quarantine:

RE: Quarantine Confidential

The contract employee "contractor" listed below has been quarantined and cannot report to a National Grid worksite until they have completed the recommended quarantine. This contractor will follow their employer's process for return to work. After the recommended quarantine has elapsed, and the contractor has been cleared to return to work by their employer, please send email to (Mary.Brown2@nationalgrid.com) to let us know the contractor is back on site.

Contract Employee Name:
Department/Contractor company:
National Grid Supervisor:
Quarantine start date:
End Date:

Attachment 6
National Grid
Incident Reporting

National Grid Incident Reporting Requirements

All contractors and consultants working on National Grid projects hired either by National Grid or its representative will report incidents involving their personnel or subcontractor personnel to National Grid. Incidents include but are not limited to injuries, illnesses, near misses, motor vehicle incidents, environmental releases, fires, incidents involving the public, and property damage. The person reporting the incident is the Incident Reporter.

The Incident Reporter will notify the Project-Specific National Grid Project Manager (PM) **verbally** within **1 hour** of the incident. All work will be suspended until contact is made with the Project-Specific PM so that National Grid can assess if continued work suspension or if a stand down is necessary. If the National Grid PM cannot be reached, contact the National Grid SIR Regional Safety Lead as noted in the table below.

Name	Region	Phone Numbers	E-Mail
William Ryan	Downstate NY	W- (516) 545-2586 C - (516) 790-1660	William.Ryan@nationalgrid.com
Brian Stearns	Upstate NY	W- (315) 428-5731 C - (315) 461-7892	Brian.Stearns@nationalgrid.com
Elizabeth Greene	MA/RI	W- (781) 907-3656 C- (781) 248-6469	Elizabeth.Greene@nationalgrid.com

A DRAFT written Incident Report and/or email summary must be completed and submitted by the Incident Reporter to the Project-Specific National Grid PM, National Grid SIR Safety Lead, and/or other designated National Grid representative **within 4 hours** of the incident.

The Incident Reporter will provide a FINAL Incident Report within **24 hours** via e-mail to the Project-Specific National Grid PM, National Grid Regional Safety Lead, and/or the person to whom the verbal notification was initially provided.

Figures, photographs and/or sketches should be included within the Incident Report. Photographs of the incident area and/or vehicle (not of the personal injury) should be included. For vehicle incidents and cases of damaged or stolen property, a police report should be filed and a copy provided to the Project-Specific PM. A representative with knowledge of the incident should be available to provide incident information until the investigation is completed by National Grid. In some municipalities police will not be dispatched to a non-injury accident, but every effort needs to be made to try and obtain the report.

All personnel must be made aware that preventing or promptly addressing accidents and injuries takes precedence over completing field work. In addition, if any worker believes that working

conditions pose a risk of harm to on-site personnel or members of the public, work must stop and the situation must be addressed.

Incident Report Information

The following information should be included when reporting the incident to National Grid.

1. Incident Date and time

2. Date/Time National Grid PM was initially notified. Record different times and methods of notification (Call cell, Call office, Left message, e mail, text, etc.).

3. Employee type (regular, temp, contractor, consultant), company, company address, and what position held. Name, DOB, sex, full/part time.

4. Incident Type
    a. Injury/Illness to Employee (NG employee, temporary, consultant, contractor)
    b. Injury/Illness to Contractor
    c. Near Miss
    d. Motor Vehicle
    e. Public Incident
    f. Hazardous Condition
    g. Company property Damage/Equipment Damage/Equipment Failure
    h. Switching/Relay Incident
    i. Environmental

5. Incident location. Address where incident happened, site name/Owner.

6. Description of what happened, number people injured, fatalities, voltage, pressure (if applicable). Type of activity/task being performed.

7. Medical attention received

8. Spills (if applicable) - material, source, quantity, weather conditions, cause, responsible party for cleanup, PCB level, environmental media (land, water, and/or air) impacted. Clean up and Corrective actions.

9. Equipment details (if applicable) - type, number, size, unit, manufacturer

10. Witness Detail (name, address, statement).

11. OSHA severity

12. Name and address of medical care facility/doctor (if treated by a doctor or hospital). Was employee treated overnight? In the emergency room?

13. Nature of injury - part injured. Be specific.

14. Object that caused injury. Be specific.

15. What was employee doing just prior to injury?

16. How could this incident been prevented?

17. List any unsafe acts / unsafe conditions

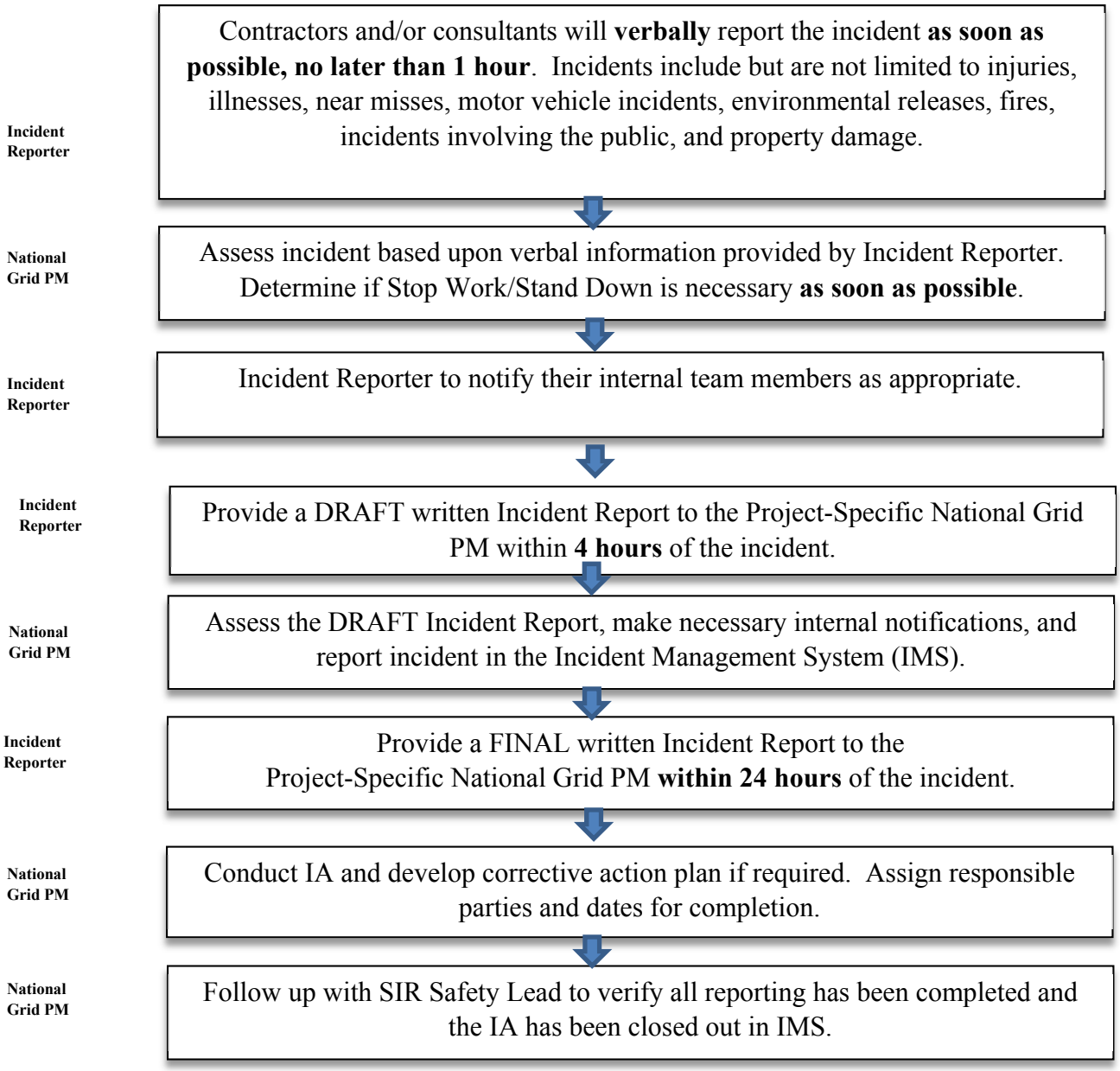
18. Were safety rules, work methods, procedures violated?

19. Was proper protective equipment worn?

20. List any prior accidents with dates that this employee has experienced

21. Lessons Learned

Flow Chart for Accident Reporting



Attachment 7
Safety Data Sheets

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950
US GHS

Synonyms: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

* * * Section 1 - Product and Company Identification * * *

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquid - Category 2
Skin Corrosion/Irritation - Category 2
Germ Cell Mutagenicity - Category 1B
Carcinogenicity - Category 1B
Toxic to Reproduction - Category 1A
Specific Target Organ Toxicity (Single Exposure) - Category 3 (respiratory irritation, narcosis)
Specific Target Organ Toxicity (Repeat Exposure) - Category 1 (liver, kidneys, bladder, blood, bone marrow, nervous system)
Aspiration Hazard - Category 1
Hazardous to the Aquatic Environment – Acute Hazard - Category 3

GHS LABEL ELEMENTS

Symbol(s)



Signal Word

DANGER

Hazard Statements

Highly flammable liquid and vapour.
Causes skin irritation.
May cause genetic defects.
May cause cancer.
May damage fertility or the unborn child.
May cause respiratory irritation.
May cause drowsiness or dizziness.
Causes damage to organs (liver, kidneys, bladder, blood, bone marrow, nervous system) through prolonged or repeated exposure.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe mist/vapours/spray.
Use only outdoors or in well-ventilated area.
Do not eat, drink or smoke when using this product.
Avoid release to the environment.

Response

In case of fire: Use water spray, fog, dry chemical fire extinguishers or hand held fire extinguisher.
IF ON SKIN (or hair): Wash with plenty of soap and water. Remove/Take off immediately all contaminated clothing and wash before reuse. If skin irritation occurs, get medical advice/attention.
IF exposed or concerned: Get medical advice/attention.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
Get medical advice/attention if you feel unwell.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do not induce vomiting.

Storage

Store in a well-ventilated place.
Keep cool. Keep container tightly closed.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
86290-81-5	Gasoline, motor fuel	100
108-88-3	Toluene	1-25
106-97-8	Butane	<10
1330-20-7	Xylenes (o-, m-, p- isomers)	1-15
95-63-6	Benzene, 1,2,4-trimethyl-	<6
64-17-5	Ethyl alcohol	0-10
100-41-4	Ethylbenzene	<3
71-43-2	Benzene	0.1-4.9

110-54-3	Hexane	0.5-4

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol). Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

First Aid: Skin

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or gaseous extinguishing agent.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration.

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Caution, flammable vapors may accumulate in closed containers.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

USE ONLY AS A MOTOR FUEL.
DO NOT SIPHON BY MOUTH

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

Incompatibilities

Keep away from strong oxidizers.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

Gasoline, motor fuel (86290-81-5)

ACGIH: 300 ppm TWA
500 ppm STEL

Toluene (108-88-3)

ACGIH: 20 ppm TWA
OSHA: 200 ppm TWA; 375 mg/m3 TWA
150 ppm STEL; 560 mg/m3 STEL
NIOSH: 100 ppm TWA; 375 mg/m3 TWA
150 ppm STEL; 560 mg/m3 STEL

Butane (106-97-8)

ACGIH: 1000 ppm TWA (listed under Aliphatic hydrocarbon gases: Alkane C1-4)
OSHA: 800 ppm TWA; 1900 mg/m3 TWA
NIOSH: 800 ppm TWA; 1900 mg/m3 TWA

Xylenes (o-, m-, p- isomers) (1330-20-7)

ACGIH: 100 ppm TWA
150 ppm STEL
OSHA: 100 ppm TWA; 435 mg/m3 TWA
150 ppm STEL; 655 mg/m3 STEL

Benzene, 1,2,4-trimethyl- (95-63-6)

NIOSH: 25 ppm TWA; 125 mg/m3 TWA

Ethyl alcohol (64-17-5)

ACGIH: 1000 ppm STEL
OSHA: 1000 ppm TWA; 1900 mg/m3 TWA
NIOSH: 1000 ppm TWA; 1900 mg/m3 TWA

Ethylbenzene (100-41-4)

ACGIH: 20 ppm TWA
OSHA: 100 ppm TWA; 435 mg/m3 TWA
125 ppm STEL; 545 mg/m3 STEL
NIOSH: 100 ppm TWA; 435 mg/m3 TWA
125 ppm STEL; 545 mg/m3 STEL

Benzene (71-43-2)

ACGIH: 0.5 ppm TWA
2.5 ppm STEL
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 5 ppm STEL (Cancer hazard, Flammable, See 29 CFR 1910.1028, 15 min); 0.5 ppm Action Level; 1 ppm TWA
NIOSH: 0.1 ppm TWA
1 ppm STEL

Hexane (110-54-3)

ACGIH: 50 ppm TWA
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 500 ppm TWA; 1800 mg/m3 TWA
NIOSH: 50 ppm TWA; 180 mg/m3 TWA

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Translucent, straw-colored or light yellow	**Odor:**	Strong, characteristic aromatic hydrocarbon odor. Sweet-ether like
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	6.4 - 15 RVP @ 100 °F (38 °C) (275-475 mm Hg @ 68 °F (20 °C)	**Vapor Density:**	AP 3-4
Boiling Point:	85-437 °F (39-200 °C)	**Melting Point:**	ND
Solubility (H2O):	Negligible to Slight	**Specific Gravity:**	0.70-0.78
Evaporation Rate:	10-11	**VOC:**	ND
Percent Volatile:	100%	**Octanol/H2O Coeff.:**	ND
Flash Point:	-45 °F (-43 °C)	**Flash Point Method:**	PMCC
Upper Flammability Limit (UFL):	7.6%	**Lower Flammability Limit (LFL):**	1.4%
Burning Rate:	ND	**Auto Ignition:**	>530°F (>280°C)

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

Keep away from strong oxidizers.

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

A: General Product Information

Harmful if swallowed.

B: Component Analysis - LD50/LC50

Gasoline, motor fuel (86290-81-5)

Inhalation LC50 Rat >5.2 mg/L 4 h; Oral LD50 Rat 14000 mg/kg; Dermal LD50 Rabbit >2000 mg/kg

Toluene (108-88-3)

Inhalation LC50 Rat 12.5 mg/L 4 h; Inhalation LC50 Rat >26700 ppm 1 h; Oral LD50 Rat 636 mg/kg; Dermal LD50 Rabbit 8390 mg/kg; Dermal LD50 Rat 12124 mg/kg

Butane (106-97-8)

Inhalation LC50 Rat 658 mg/L 4 h

Xylenes (o-, m-, p- isomers) (1330-20-7)
Inhalation LC50 Rat 5000 ppm 4 h; Inhalation LC50 Rat 47635 mg/L 4 h; Oral LD50 Rat 4300 mg/kg; Dermal LD50 Rabbit >1700 mg/kg

Benzene, 1,2,4-trimethyl- (95-63-6)
Inhalation LC50 Rat 18 g/m3 4 h; Oral LD50 Rat 3400 mg/kg; Dermal LD50 Rabbit >3160 mg/kg

Ethyl alcohol (64-17-5)
Oral LD50 Rat 7060 mg/kg; Inhalation LC50 Rat 124.7 mg/L 4 h

Ethylbenzene (100-41-4)
Inhalation LC50 Rat 17.2 mg/L 4 h; Oral LD50 Rat 3500 mg/kg; Dermal LD50 Rabbit 15354 mg/kg

Benzene (71-43-2)
Inhalation LC50 Rat 13050-14380 ppm 4 h; Oral LD50 Rat 1800 mg/kg

Hexane (110-54-3)
Inhalation LC50 Rat 48000 ppm 4 h; Oral LD50 Rat 25 g/kg; Dermal LD50 Rabbit 3000 mg/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Moderate irritant. Contact with liquid or vapor may cause irritation.

Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This product may cause genetic defects.

Carcinogenicity

A: General Product Information

May cause cancer.

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

B: Component Carcinogenicity

Gasoline, motor fuel (86290-81-5)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Toluene (108-88-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Xylenes (o-, m-, p- isomers) (1330-20-7)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Ethyl alcohol (64-17-5)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 100E [in preparation] (in alcoholic beverages); Monograph 96 [2010] (in alcoholic beverages) (Group 1 (carcinogenic to humans))

Ethylbenzene (100-41-4)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 77 [2000] (Group 2B (possibly carcinogenic to humans))

Benzene (71-43-2)

ACGIH: A1 - Confirmed Human Carcinogen
OSHA: 5 ppm STEL (Cancer hazard, Flammable, See 29 CFR 1910.1028, 15 min); 0.5 ppm Action Level; 1 ppm TWA
NIOSH: potential occupational carcinogen
NTP: Known Human Carcinogen (Select Carcinogen)
IARC: Monograph 100F [in preparation]; Supplement 7 [1987]; Monograph 29 [1982] (Group 1 (carcinogenic to humans))

Reproductive Toxicity

This product is suspected of damaging fertility or the unborn child.

Specified Target Organ General Toxicity: Single Exposure

This product may cause drowsiness or dizziness.

Specified Target Organ General Toxicity: Repeated Exposure

This product causes damage to organs through prolonged or repeated exposure.

Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Very toxic to aquatic life with long lasting effects. Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Gasoline, motor fuel (86290-81-5)

Test & Species		Conditions
96 Hr LC50 Alburnus alburnus	119 mg/L [static]	
96 Hr LC50 Cyprinodon variegatus	82 mg/L [static]	
72 Hr EC50 Pseudokirchneriella subcapitata	56 mg/L	
24 Hr EC50 Daphnia magna	170 mg/L	

Toluene (108-88-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	15.22-19.05 mg/L [flow-through]	1 day old
96 Hr LC50 Pimephales promelas	12.6 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	5.89-7.81 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	14.1-17.16 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	5.8 mg/L [semi-static]	
96 Hr LC50 Lepomis macrochirus	11.0-15.0 mg/L [static]	
96 Hr LC50 Oryzias latipes	54 mg/L [static]	
96 Hr LC50 Poecilia reticulata	28.2 mg/L [semi-static]	
96 Hr LC50 Poecilia reticulata	50.87-70.34 mg/L [static]	
96 Hr EC50 Pseudokirchneriella subcapitata	>433 mg/L	
72 Hr EC50 Pseudokirchneriella subcapitata	12.5 mg/L [static]	
48 Hr EC50 Daphnia magna	5.46 - 9.83 mg/L [Static]	
48 Hr EC50 Daphnia magna	11.5 mg/L	

Xylenes (o-, m-, p- isomers) (1330-20-7)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	13.4 mg/L [flow-through]	

96 Hr LC50 Oncorhynchus mykiss	2.661-4.093 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	13.5-17.3 mg/L
96 Hr LC50 Lepomis macrochirus	13.1-16.5 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	19 mg/L
96 Hr LC50 Lepomis macrochirus	7.711-9.591 mg/L [static]
96 Hr LC50 Pimephales promelas	23.53-29.97 mg/L [static]
96 Hr LC50 Cyprinus carpio	780 mg/L [semi-static]
96 Hr LC50 Cyprinus carpio	>780 mg/L
96 Hr LC50 Poecilia reticulata	30.26-40.75 mg/L [static]
48 Hr EC50 water flea	3.82 mg/L
48 Hr LC50 Gammarus lacustris	0.6 mg/L

Benzene, 1,2,4-trimethyl- (95-63-6)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	7.19-8.28 mg/L [flow-through]
48 Hr EC50 Daphnia magna	6.14 mg/L

Ethyl alcohol (64-17-5)

Test & Species	Conditions
96 Hr LC50 Oncorhynchus mykiss	12.0 - 16.0 mL/L [static]
96 Hr LC50 Pimephales promelas	>100 mg/L [static]
96 Hr LC50 Pimephales promelas	13400 - 15100 mg/L [flow-through]
48 Hr LC50 Daphnia magna	9268 - 14221 mg/L
24 Hr EC50 Daphnia magna	10800 mg/L
48 Hr EC50 Daphnia magna	2 mg/L [Static]

Ethylbenzene (100-41-4)

Test & Species	Conditions
96 Hr LC50 Oncorhynchus mykiss	11.0-18.0 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	4.2 mg/L [semi-static]
96 Hr LC50 Pimephales promelas	7.55-11 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	32 mg/L [static]
96 Hr LC50 Pimephales promelas	9.1-15.6 mg/L [static]
96 Hr LC50 Poecilia reticulata	9.6 mg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	4.6 mg/L
96 Hr EC50 Pseudokirchneriella subcapitata	>438 mg/L
72 Hr EC50 Pseudokirchneriella subcapitata	2.6 - 11.3 mg/L [static]

96 Hr EC50 Pseudokirchneriella subcapitata	1.7 - 7.6 mg/L [static]
48 Hr EC50 Daphnia magna	1.8 - 2.4 mg/L

Benzene (71-43-2)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	10.7-14.7 mg/L [flow-through]
96 Hr LC50 Oncorhynchus mykiss	5.3 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	22.49 mg/L [static]
96 Hr LC50 Poecilia reticulata	28.6 mg/L [static]
96 Hr LC50 Pimephales promelas	22330-41160 µg/L [static]
96 Hr LC50 Lepomis macrochirus	70000-142000 µg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	29 mg/L
48 Hr EC50 Daphnia magna	8.76 - 15.6 mg/L [Static]
48 Hr EC50 Daphnia magna	10 mg/L

Hexane (110-54-3)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	2.1-2.98 mg/L [flow-through]
24 Hr EC50 Daphnia magna	>1000 mg/L

Persistence/Degradability

No information available.

Bioaccumulation

No information available.

Mobility in Soil

No information available.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Gasoline, motor fuel	86290-81-5	DOT regulated marine pollutant

DOT Information

Shipping Name: Gasoline
UN #: 1203 **Hazard Class:** 3 **Packing Group:** II
Placard:



* * * Section 15 - Regulatory Information * * *

Regulatory Information

A: Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Toluene (108-88-3)
SARA 313: 1.0 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

Xylenes (o-, m-, p- isomers) (1330-20-7)
SARA 313: 1.0 % de minimis concentration
CERCLA: 100 lb final RQ; 45.4 kg final RQ

Benzene, 1,2,4-trimethyl- (95-63-6)
SARA 313: 1.0 % de minimis concentration

Ethylbenzene (100-41-4)
SARA 313: 0.1 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

Benzene (71-43-2)
SARA 313: 0.1 % de minimis concentration
CERCLA: 10 lb final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule); 4.54 kg final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule)

Hexane (110-54-3)

SARA 313: 1.0 % de minimis concentration
CERCLA: 5000 lb final RQ; 2270 kg final RQ

SARA Section 311/312 – Hazard Classes

Acute Health	Chronic Health	Fire	Sudden Release of Pressure	Reactive
X	X	X	--	--

Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Gasoline, motor fuel	86290-81-5	DOT regulated marine pollutant

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	**CAS**	**CA**	**MA**	**MN**	**NJ**	**PA**	**RI**
Gasoline, motor fuel	86290-81-5	No	No	No	No	Yes	No
Toluene	108-88-3	Yes	Yes	Yes	Yes	Yes	No
Butane	106-97-8	Yes	Yes	Yes	Yes	Yes	No
Xylenes (o-, m-, p- isomers)	1330-20-7	Yes	Yes	Yes	Yes	Yes	No
Benzene, 1,2,4-trimethyl-	95-63-6	No	Yes	Yes	Yes	Yes	No
Ethyl alcohol	64-17-5	Yes	Yes	Yes	Yes	Yes	No
Ethylbenzene	100-41-4	Yes	Yes	Yes	Yes	Yes	No
Benzene	71-43-2	Yes	Yes	Yes	Yes	Yes	No
Hexane	110-54-3	No	Yes	Yes	Yes	Yes	No

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.
WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Toluene	108-88-3	1 %
Butane	106-97-8	1 %
Benzene, 1,2,4-trimethyl-	95-63-6	0.1 %
Ethyl alcohol	64-17-5	0.1 %
Ethylbenzene	100-41-4	0.1 %
Benzene	71-43-2	0.1 %
Hexane	110-54-3	1 %

Additional Regulatory Information

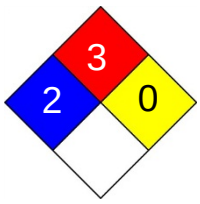
Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Gasoline, motor fuel	86290-81-5	No	DSL	EINECS
Toluene	108-88-3	Yes	DSL	EINECS
Butane	106-97-8	Yes	DSL	EINECS
Xylenes (o-, m-, p- isomers)	1330-20-7	Yes	DSL	EINECS
Benzene, 1,2,4-trimethyl-	95-63-6	Yes	DSL	EINECS
Ethyl alcohol	64-17-5	Yes	DSL	EINECS
Ethylbenzene	100-41-4	Yes	DSL	EINECS
Benzene	71-43-2	Yes	DSL	EINECS
Hexane	110-54-3	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

NFPA® Hazard Rating

Health	2
Fire	3
Reactivity	0



HMIS® Hazard Rating

Health	2	Moderate
Fire	3	Serious
Physical	0	Minimal
		*Chronic

Key/Legend

EPA = Environmental Protection Agency; TSCA = Toxic Substance Control Act; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration., NJTSR = New Jersey Trade Secret Registry.

Literature References

None

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

Safety Data Sheet

Material Name: Hess 10W30 Motor Oil

SDS No. 8957
US GHS

Synonyms: Valvoline Product Code 52670413

* * * Section 1 - Product and Company Identification * * *

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Skin Corrosion/Irritation – Category 2
Specific Target Organ Toxicity – Category 3 (narcosis)
Carcinogenicity - Category 1B

GHS LABEL ELEMENTS

Symbol(s)



Signal Word

WARNING

Hazard Statements

Causes skin irritation.
May cause cancer.
May cause drowsiness or dizziness.

Precautionary Statements

Prevention

Wash hands and forearms thoroughly after handling.
Wear protective gloves/protective clothing/eye protection.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing fume/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.

Response

If on skin: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention.
If exposed or concerned: Get medical advice/attention.
If inhaled: Remove person to fresh air and keep in a position comfortable for breathing. Call poison center or doctor if you feel unwell.

Storage

Store locked up.
Store in a well-ventilated place.
Keep container tightly closed.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
64742-65-0	Petroleum distillates, solvent dewaxed heavy paraffinic	83-93

Petroleum-based lubricating oil with detergent/dispersant engine oil package with zinc compounds.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

If symptoms develop, move individual away from exposure and into fresh air. Flush eyes gently with water while holding eyelids apart. If symptoms persist or there is visual difficulty, seek medical attention.

First Aid: Skin

Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention. Launder clothing before reuse.

First Aid: Ingestion

Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

First Aid: Notes to Physician

Acute aspiration of large amounts of oil-laden material may produce a serious aspiration hazard. Patients who aspirate these oils should be followed for the development of long-term sequelae. Repeated aspiration of mineral oil can produce chronic inflammation of the lungs (i.e. lipoid pneumonia) that may progress to pulmonary fibrosis. Symptoms are often subtle and radiological changes appear worse than clinical abnormalities. Occasionally, persistent cough, irritation of the upper respiratory tract, shortness of breath with exertion, fever, and bloody sputum occur. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities. Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: skin.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.
Never use welding or cutting torch on or near drum (even empty) because product (even just residue) can ignite explosively. No special fire hazards are known to be associated with this product. Dense smoke may be generated while burning.

Hazardous Combustion Products

May form: carbon dioxide and carbon monoxide, oxides of sulfur, nitrogen and phosphorous, various hydrocarbons.

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or gaseous extinguishing agent.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Caution, flammable vapors may accumulate in closed containers.

SMALL SPILL: Absorb liquid on vermiculite, floor absorbent or other absorbent material. Persons not wearing proper personal protective equipment should be excluded from area of spill.

LARGE SPILL: Prevent run-off to sewers, streams, or other bodies of water. If run-off occurs, notify authorities as required, that a spill has occurred. Persons not wearing proper personal protective equipment should be excluded from area of spill until clean-up has been completed.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Handle as a combustible liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks."

Incompatibilities

Avoid contact with: acids, halogens, strong oxidizing agents.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

ACGIH, OSHA, and NIOSH have not developed exposure limits for any of this product's components.

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Not normally required. However, wear resistant gloves such as nitrile rubber to prevent irritation which may result from prolonged or repeated skin contact with product.

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

To prevent repeated or prolonged skin contact, wear impervious clothing and boots. Wear normal work clothing covering arms and legs.

Hygiene Measures

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Dry, clear and bright	**Odor:**	None
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	ND	**Vapor Density:**	ND
Boiling Point:	>425 °F (218.3°C) @ 760.00 mmHg	**Melting Point:**	ND
Solubility (H2O):	Negligible	**Specific Gravity:**	0.881 @ 60°F (16°C)
Evaporation Rate:	Slower than ethyl ether	**VOC:**	ND
Viscosity:	<= 3300.0 cps @ -20°C; 10.0 - 11.0 cst @ 100°C	**Octanol/H2O Coeff.:**	ND
Flash Point:	430 °F (221.1 °C)	**Flash Point Method:**	COC
Upper Flammability Limit (UFL):	ND	**Lower Flammability Limit (LFL):**	ND
Burning Rate:	ND	**Auto Ignition:**	ND

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

None

Incompatible Products

Avoid contact with: acids, halogens, strong oxidizing agents.

Hazardous Decomposition Products

May form: aldehydes, carbon dioxide and carbon monoxide, hydrogen sulfide, oxides of sulfur, nitrogen and phosphorus, toxic fumes, various hydrocarbons.

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

A: General Product Information

Harmful if large amounts are swallowed.

B: Component Analysis - LD50/LC50

Petroleum distillates, solvent dewaxed heavy paraffinic (64742-65-0)

Inhalation LC50 Rat >4.7 mg/L 4 h; Oral LD50 Rat >5000 mg/kg; Dermal LD50 Rabbit >5000 mg/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

May cause mild skin irritation. Prolonged or repeated contact may dry the skin. Symptoms include redness, burning, drying and cracking of the skin, and skin burns. Additional symptoms of skin contact include: acne. Passage of this material into the body through the skin is possible, but it is unlikely that this would result in harmful effects during safe handling and use.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

May cause mild eye irritation. Symptoms include stinging, tearing, and redness.

Potential Health Effects: Ingestion

Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful.

Potential Health Effects: Inhalation

It is possible to breathe this material under certain conditions of handling and use (for example, during heating, spraying, or stirring). Breathing small amounts of this material during normal handling is not likely to cause harmful effects. Breathing large amounts may be harmful. Symptoms usually occur at air concentrations higher than the recommended exposure limits.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This product is not reported to have any mutagenic effects.

Carcinogenicity

A: General Product Information

May cause cancer.

Used motor oil has been shown to cause skin cancer in laboratory animal continually exposed by repeated applications.

B: Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, OSHA, NIOSH, or NTP.

Reproductive Toxicity

This product is not reported to have any reproductive toxicity effects.

Specified Target Organ General Toxicity: Single Exposure

This product is not reported to have any specific target organ general toxicity single exposure effects.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ general toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

Acute aspiration of large amounts of oil-laden material may produce a serious aspiration hazard.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Petroleum distillates, solvent dewaxed heavy paraffinic (64742-65-0)

Test & Species	Conditions
96 Hr LC50 Oncorhynchus mykiss	>5000 mg/L
48 Hr EC50 Daphnia magna	>1000 mg/L

Persistence/Degradability

No information available.

Bioaccumulation

No information available.

Mobility in Soil

No information available.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information

Shipping Name: Not Regulated

* * * Section 15 - Regulatory Information * * *

Regulatory Information

Component Analysis

None of this products components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), or CERCLA (40 CFR 302.4).

SARA Section 311/312 – Hazard Classes

Acute Health	Chronic Health	Fire	Sudden Release of Pressure	Reactive
X	X	--	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

ZINC C1-C14 ALKYLDITHIOPHOSPHATE (CAS No. 68649-42-3)

State Regulations

Component Analysis - State

None of this product's components are listed on the state lists from CA, MA, MN, NJ, PA, or RI.

Component Analysis - WHMIS IDL

No components are listed in the WHMIS IDL.

Additional Regulatory Information

Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Petroleum distillates, solvent dewaxed heavy paraffinic	64742-65-0	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

NFPA® Hazard Rating

Health	1
Fire	1
Reactivity	0



HMIS® Hazard Rating

Health	1*	Slight
Fire	1	Slight
Physical	0	Minimal
		*Chronic

Key/Legend

EPA = Environmental Protection Agency; TSCA = Toxic Substance Control Act; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration., NJTSR = New Jersey Trade Secret Registry.

Literature References

None

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and GHS

Printing date: 31.12.2013 **Revision:** 31.12.2013

1 Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: ALCONOX**

· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.

· **Application of the substance / the mixture:** Cleaning material/ Detergent

· **1.3 Details of the supplier of the Safety Data Sheet**

· **Manufacturer/Supplier:**
Alconox, Inc.
30 Glenn St., Suite 309
White Plains, NY 10603
Phone: 914-948-4040

· **Further information obtainable from:** Product Safety Department

· **1.4 Emergency telephone number:**
ChemTel Inc.
(800)255-3924, +1 (813)248-0585

2 Hazards identification

· **2.1 Classification of the substance or mixture**

· **Classification according to Regulation (EC) No 1272/2008**


GHS05 corrosion

Eye Dam. 1; H318: Causes serious eye damage.


GHS07

Skin Irrit. 2; H315: Causes skin irritation.

· **Classification according to Directive 67/548/EEC or Directive 1999/45/EC**


Xi; Irritant

R38-41: Irritating to skin. Risk of serious damage to eyes.

· **Information concerning particular hazards for human and environment:**
The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

· **Classification system:**
The classification is according to the latest editions of the EU-lists, and extended by company and literature data.
The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

· **2.2 Label elements**

· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

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· **Hazard pictograms**



GHS05

· **Signal word:** Danger

· **Hazard-determining components of labelling:**
sodium dodecylbenzene sulfonate
· **Hazard statements**
H315: Causes skin irritation.
H318: Causes serious eye damage.
· **Precautionary statements**
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P264: Wash thoroughly after handling.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER or doctor/physician.
P321: Specific treatment (see on this label).
P362: Take off contaminated clothing and wash before reuse.
P332+P313: If skin irritation occurs: Get medical advice/attention.
P302+P352: IF ON SKIN: Wash with plenty of soap and water.
· **Hazard description:**
· **WHMIS-symbols:**
D2B - Toxic material causing other toxic effects



· **NFPA ratings (scale 0 - 4)**



Health = 1
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**



Health = 1
Fire = 0
Reactivity = 0

· **HMIS Long Term Health Hazard Substances**
None of the ingredients is listed.

· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

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3 Composition/information on ingredients

· **3.2 Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**		
CAS: 68081-81-2	sodium dodecylbenzene sulfonate Xn R22; Xi R36 Acute Tox. 4, H302; Eye Irrit. 2, H319	10-25%
CAS: 497-19-8 EINECS: 207-838-8 Index number: 011-005-00-2	Sodium Carbonate Xi R36 Eye Irrit. 2, H319	2,5-10%
CAS: 7722-88-5 EINECS: 231-767-1	tetrasodium pyrophosphate substance with a Community workplace exposure limit	2,5-10%
CAS: 151-21-3 EINECS: 205-788-1	sodium dodecyl sulphate Xn R21/22; Xi R36/38 Acute Tox. 4, H302; Acute Tox. 4, H312; Skin Irrit. 2, H315; Eye Irrit. 2, H319	2,5-10%

· **Additional information:** For the wording of the listed risk phrases refer to section 16.

4 First aid measures

· **4.1 Description of first aid measures**
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:**
Immediately wash with water and soap and rinse thoroughly.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Remove contact lenses if worn.
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
· **After swallowing:**
Rinse out mouth and then drink plenty of water.
Do not induce vomiting; call for medical help immediately.
· **4.2 Most important symptoms and effects, both acute and delayed**
No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:**
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

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· **5.2 Special hazards arising from the substance or mixture:** No further relevant information available.
· **5.3 Advice for firefighters**
· **Protective equipment:**
Wear self-contained respiratory protective device.
Wear fully protective suit.
· **Additional information:** No further relevant information available.

6 Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**
Product forms slippery surface when combined with water.
· **6.2 Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **6.3 Methods and material for containment and cleaning up:**
Pick up mechanically.
Clean the affected area carefully; suitable cleaners are:
Warm water
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **7.1 Precautions for safe handling**
Prevent formation of dust.
Keep receptacles tightly sealed.
· **Information about fire - and explosion protection:** No special measures required.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** No special requirements.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** Protect from humidity and water.
· **7.3 Specific end use(s):** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**	
7722-88-5 tetrasodium pyrophosphate	
REL (USA)	5 mg/m³
TLV (USA)	TLV withdrawn
EV (Canada)	5 mg/m³

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· **Additional information:** The lists valid during the making were used as basis.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the skin.
Avoid contact with the eyes and skin.
· **Respiratory protection:**
Not required under normal conditions of use.
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.
· **Protection of hands:**


Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation.
· **Material of gloves**
Butyl rubber, BR
Nitrile rubber, NBR
Natural rubber, NR
Neoprene gloves
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material cannot be calculated in advance and has therefore to be checked prior to the application.
· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Eye protection:**


Safety glasses

· **Body protection:** Protective work clothing

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9 Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Powder
Colour:	White
· **Odour:**	Odourless
· **Odour threshold:**	Not determined.
· **pH-value (10 g/l) at 20 °C:**	9,5 (- NA for Powder form)
· **Change in condition**	
Melting point/Melting range:	Not Determined.
Boiling point/Boiling range:	Undetermined.
· **Flash point:**	Not applicable.
· **Flammability (solid, gaseous):**	Not determined.
· **Ignition temperature:**	
Decomposition temperature:	Not determined.
· **Self-igniting:**	Product is not self-igniting.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure:**	Not applicable.
· **Density at 20 °C:**	1,1 g/cm³
· **Relative density**	Not determined.
· **Vapour density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with water:**	Soluble.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Solvent content:**	
Organic solvents:	0,0 %
Solids content:	100 %
· **9.2 Other information**	No further relevant information available.

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10 Stability and reactivity

· **10.1 Reactivity**
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions**
Reacts with acids.
Reacts with strong alkali.
Reacts with strong oxidizing agents.
· **10.4 Conditions to avoid:** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:**
Carbon monoxide and carbon dioxide
Phosphorus compounds
Sulphur oxides (SOx)

11 Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity:**
· **Primary irritant effect:**
· **On the skin:** Irritant to skin and mucous membranes.
· **On the eye:** Strong irritant with the danger of severe eye injury.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**
The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version:
Irritant
Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

12 Ecological information

· **12.1 Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **12.2 Persistence and degradability:** No further relevant information available.
· **12.3 Bioaccumulative potential:** Not worth-mentioning accumulating in organisms
· **12.4 Mobility in soil:** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water.
Do not allow product to reach ground water, water course or sewage system.
Danger to drinking water if even small quantities leak into the ground.
· **12.5 Results of PBT and vPvB assessment**
· **PBT:** Not applicable.

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· **vPvB:** Not applicable.
· **12.6 Other adverse effects:** No further relevant information available.

13 Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Smaller quantities can be disposed of with household waste.
Small amounts may be diluted with plenty of water and washed away. Dispose of bigger amounts in accordance with Local Authority requirements.
The surfactant used in this product complies with the biodegradability criteria as laid down in Regulation (EC) No. 648/2004 on detergents. Data to support this assertion are held at the disposal of the competent authorities of the Member States and will be made available to them, at their direct request or at the request of a detergent manufacturer.

· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

14 Transport information

· **14.1 UN-Number** · **DOT, ADR, IMDG, IATA, ICAO**	Not Regulated
· **14.2 UN proper shipping name** · **DOT, ADR, IMDG, IATA, ICAO**	Not Regulated
· **14.3 Transport hazard class(es)** · **DOT, ADR, IMDG, IATA, ICAO** · **Class**	Not Regulated
· **14.4 Packing group** · **DOT, ADR, IMDG, IATA, ICAO**	Not Regulated
· **14.5 Environmental hazards:** · **Marine pollutant:**	No
· **14.6 Special precautions for user**	Not applicable.
· **14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **UN "Model Regulation":**	Not Regulated

(Contd. on page 9)

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Safety Data Sheet
according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and GHS

Printing date: 31.12.2013 **Revision:** 31.12.2013

Trade name: ALCONOX

(Contd. of page 8)

15 Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **United States (USA)**
· **SARA**

· **Section 355 (extremely hazardous substances):**
None of the ingredients is listed.
· **Section 313 (Specific toxic chemical listings):**
None of the ingredients is listed.
· **TSCA (Toxic Substances Control Act):**
All ingredients are listed.

· **Proposition 65 (California):**

· **Chemicals known to cause cancer:**
None of the ingredients is listed.
· **Chemicals known to cause reproductive toxicity for females:**
None of the ingredients is listed.
· **Chemicals known to cause reproductive toxicity for males:**
None of the ingredients is listed.
· **Chemicals known to cause developmental toxicity:**
None of the ingredients is listed.

· **Carcinogenic Categories**

· **EPA (Environmental Protection Agency)**
None of the ingredients is listed.
· **IARC (International Agency for Research on Cancer)**
None of the ingredients is listed.
· **TLV (Threshold Limit Value established by ACGIH)**
None of the ingredients is listed.
· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
None of the ingredients is listed.
· **OSHA-Ca (Occupational Safety & Health Administration)**
None of the ingredients is listed.

(Contd. on page 10)

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Printing date: 31.12.2013 **Revision:** 31.12.2013

Trade name: ALCONOX

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· **Canada**

· **Canadian Domestic Substances List (DSL)**	
All ingredients are listed.	
· **Canadian Ingredient Disclosure list (limit 0.1%)**	
None of the ingredients is listed.	
· **Canadian Ingredient Disclosure list (limit 1%)**	
497-19-8	Sodium Carbonate
7722-88-5	tetrasodium pyrophosphate
151-21-3	sodium dodecyl sulphate

· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Relevant phrases**
H302: Harmful if swallowed.
H312: Harmful in contact with skin.
H315: Causes skin irritation.
H319: Causes serious eye irritation.
R21/22: Harmful in contact with skin and if swallowed.
R22: Harmful if swallowed.
R36: Irritating to eyes.
R36/38: Irritating to eyes and skin.

· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road) IMDG: International Maritime Code for Dangerous Goods DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)

Created by Global Safety Management, Inc. -Tel: 1-813-435-5161 - www.globalsafetynet.com

Safety Data Sheet

According to Regulation (EC) No. 1907/2006
OSHA Regulation 29 CFR 1910.1200
Canadian Regulation SOR/88-66

Revision Date: 2013-06-14
Reason for Revision: Regulation (EC) No. 1272/2008 Compliance

SECTION 1: IDENTIFICATION OF THE PRODUCT AND COMPANY

Product Name: HI 7021 ORP Solution

Application: ORP Solution for Platinum and Gold Electrodes.
240 mV @ 25°C/77°F

Additional Product Codes: HI 7021L
HI 7021M
HI 7021/G

Company Information (USA):
Hanna Instruments, Inc.
584 Park East Dr, Woonsocket, Rhode Island, USA 02895

Technical Service Contact Information:
1-800-426-6287 (8:30AM - 5:00PM ET)
+1-401-766-4260 (8:30AM - 5:00PM ET)

USA Emergency Contact Information: 1-800-424-9300 (Chemtrec 24Hr. Emergency)

International Emergency Contact Information: +1-703-527-3887 (Chemtrec 24Hr. Emergency)

E-mail Address: tech@hannainst.com

SECTION 2: HAZARD IDENTIFICATION

Non-hazardous product as specified in Directives 67/548/EEC and 1999/45/EC.
Non-hazardous product as specified in OSHA Regulation 29 CFR 1910.1200.
Non-hazardous product as specified in Canadian Regulation SOR/88-66.
Non-hazardous product as specified in Regulation (EC) 1272/2008.

SECTION 3: COMPOSITION AND COMPONENT INFORMATION

Aqueous Solution

SECTION 4: FIRST AID MEASURES

After Inhalation: Remove to fresh air.

After Skin Contact: Wash affected area with plenty of water.

After Eye Contact: Rinse out with water.

After Swallowing: Wash out mouth thoroughly with water and give plenty of water to drink. In severe cases obtain medical attention.

General Information: Remove contaminated, soaked clothing immediately and dispose of safely.

SECTION 5: FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:
Water spray, Carbon Dioxide, Dry Chemical Powder, Appropriate Foam.

Special Risks:
Non-combustible.

Special Protective Equipment:
Do not stay in dangerous zone without suitable chemical protection clothing and self-contained breathing apparatus.

Additional Information:
NA

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions:

Avoid formation of dusts. Do not inhale dusts. Avoid substance contact.

Environmental Precautions:

Do not discharge into the drains/surface waters/groundwater.

Additional Notes:

Take up with liquid-absorbent material. Clean up affected area and dispose according to local regulation. Avoid generation of dusts.

SECTION 7: HANDLING AND STORAGE

Handling:

Cannot be stored indefinitely.

Storage:

Tightly closed. Store at room temperature (+15 to +25 °C recommended). Protect from light.

SECTION 8: EXPOSURE CONTROL/PERSONAL PROTECTION

Engineering:

Maintain general industrial hygiene practice.

Personal Protective Equipment:

Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled.

Respiratory Protection:	***Protective Gloves:***	***Eye Protection:***
Required when vapors/aerosols are generated. Work under hood.	Rubber or plastic	Goggles or face mask

Industrial Hygiene:

Change contaminated clothing. Wash hands after working with substance.

SECTION 9: PHYSICAL/CHEMICAL PROPERTIES

Appearance:	Yellow liquid	***Odor:***	Odorless	***Density at 20°C:***	~ 1 g/cm³
Melting Point:	NA	***Boiling Point:***	ND	***Solubility:***	Soluble
pH at 20°C:	~ 7	***Explosion Limit:***	NA	***Flash Point:***	NA
Thermal Decomp.:	NA				

SECTION 10: STABILITY AND REACTIVITY

Conditions to be Avoided:

Strong Heating

Hazardous Decomposition Products:

None

Hazardous Polymerization:

Will not occur.

Substances to be Avoided:

The generally known reaction partners of water

Further Information:

Not available

SECTION 11: TOXICOLOGICAL INFORMATION

Product Toxicity

No toxic effects are to be expected when the product is handled appropriately.

Component Toxicity

Acute Toxicity:

Not Available

Chronic Toxicity:

Not Available

Additional Data:

Not Available

SECTION 12: ECOLOGICAL INFORMATION

No environmental hazard.

Further Data: Can be safely disposed off as ordinary refuse.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal:

SECTION 14: TRANSPORTATION INFORMATION

Land:	***Sea:***	***Air:***
Not subject to transport regulations	Not subject to transport regulations	Not subject to transport regulations

SECTION 15: REGULATORY INFORMATION

Complies with European Regulations (EC) No. 1907/2006 and No. 1272/2008.
Complies with European Council Directives 67/548/EEC and 1999/45/EC.
Complies with OSHA Regulation 29 CFR 1910.1200.
Complies with Canadian Regulation SOR/88-66

SECTION 16: OTHER INFORMATION

Text of phrases under Section 3

NA

Revision Information

Revision Date:	2013-06-14
Supersedes edition of:	2012-06-01
Reason for revision:	Regulation (EC) No. 1272/2008 Compliance
Legend	NA: Not Applicable ND: Not Determined

THE INFORMATION CONTAINED HEREIN IS BASED ON THE PRESENT STATE OF OUR KNOWLEDGE. IT CHARACTERIZES THE PRODUCT WITH REGARD TO THE APPROPRIATE SAFETY PRECAUTIONS. IT DOES NOT REPRESENT A GUARANTEE OF THE PROPERTIES OF THE PRODUCT.

Safety Data Sheet

According to Regulation (EC) No. 1907/2006
OSHA Regulation 29 CFR 1910.1200
Canadian Regulation SOR/88-66

Revision Date: 2013-06-14
Reason for Revision: Regulation (EC) No. 1272/2008 Compliance

SECTION 1: IDENTIFICATION OF THE PRODUCT AND COMPANY

Product Name: HI 7031 Conductivity Calibration Solution

Application: For calibrating electrodes. 1413 µS/cm @ 25°C/77°F

Additional Product Codes: HI 7031/1G HI 7031L HI 7031L/C HI 7031M HI 7031/120ML

Company Information (USA):
Hanna Instruments, Inc.
584 Park East Dr, Woonsocket, Rhode Island, USA 02895

Technical Service Contact Information: 1-800-426-6287 (8:30AM - 5:00PM ET)
+1-401-766-4260 (8:30AM - 5:00PM ET)

USA Emergency Contact Information: 1-800-424-9300 (Chemtrec 24Hr. Emergency)

International Emergency Contact Information: +1-703-527-3887 (Chemtrec 24Hr. Emergency)

E-mail Address: tech@hannainst.com

SECTION 2: HAZARD IDENTIFICATION

Non-hazardous product as specified in Directives 67/548/EEC and 1999/45/EC.
Non-hazardous product as specified in OSHA Regulation 29 CFR 1910.1200.
Non-hazardous product as specified in Canadian Regulation SOR/88-66.
Non-hazardous product as specified in Regulation (EC) 1272/2008.

SECTION 3: COMPOSITION AND COMPONENT INFORMATION

Aqueous Solution

SECTION 4: FIRST AID MEASURES

After Inhalation: Remove to fresh air. Call a physician if breathing becomes difficult.

After Skin Contact: Wash affected area with water and soap.

After Eye Contact: Rinse out with plenty of water for at least 15 minutes. If pain persists, summon medical advice.

After Swallowing: Wash out mouth with plenty of water, provided person is conscious. Obtain medical attention if feeling unwell.

General Information: Not available

SECTION 5: FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:
Water Spray, Foam, Dry Powder, Carbon Dioxide

Special Risks:
Non-combustible.

Special Protective Equipment:
Do not stay in dangerous zone without suitable chemical protection clothing and self-contained breathing apparatus.

Additional Information:
Contain escaping vapors with water.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions:

None

Environmental Precautions:

None

Additional Notes:

None

SECTION 7: HANDLING AND STORAGE

Handling:

No restrictions

Storage:

Keep container closed and protected from direct sunlight. Store at room temperature (+15°C to +25°C).

SECTION 8: EXPOSURE CONTROL/PERSONAL PROTECTION

Engineering:

Maintain general industrial hygiene practice.

Personal Protective Equipment:

As appropriate to quantity handled.

Respiratory Protection:	***Protective Gloves:***	***Eye Protection:***
Required when vapors/aerosols are generated.	Rubber or plastic	Goggles or face mask

Industrial Hygiene:

Change contaminated clothing. Wash hands after working with substance.

SECTION 9: PHYSICAL/CHEMICAL PROPERTIES

Appearance:	Colorless liquid	***Odor:***	Odorless	***Density at 20°C:***	~ 1 g/cm³
Melting Point:	NA	***Boiling Point:***	~ 100°C	***Solubility:***	Soluble
pH at 20°C:	~ 7	***Explosion Limit:***	NA	***Flash Point:***	NA
Thermal Decomp.:	NA				

SECTION 10: STABILITY AND REACTIVITY

Conditions to be Avoided:

Strong Heating (above boiling point). Stable in the recommended storage conditions.

Hazardous Decomposition Products:

In the event of fire: See section 5.

Hazardous Polymerization:

Will not occur.

Substances to be Avoided:

The generally known reaction partners of water

Further Information:

Not available

SECTION 11: TOXICOLOGICAL INFORMATION

Product Toxicity

Quantitative data on the toxicity of this product is not available.

Potential Health Effects:

Further Data: Hazardous properties cannot be excluded, but are relatively unlikely because of the low concentration of the dissolved substances, when the product is handled appropriately. The product should be handled with the usual care when dealing with chemicals.

Component Toxicity

Acute Toxicity:

Not Available

Chronic Toxicity:

Not Available

Additional Data:

Not Available

SECTION 12: ECOLOGICAL INFORMATION

Quantitative data on the ecological effect of this product is not available.

Further Data: No ecological problems are to be expected when the product is handled and used with due care and attention.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal: Can be safely disposed of as ordinary refuse.

SECTION 14: TRANSPORTATION INFORMATION

Land:	***Sea:***	***Air:***
Not subject to transport regulations	Not subject to transport regulations	Not subject to transport regulations

SECTION 15: REGULATORY INFORMATION

Complies with European Regulations (EC) No. 1907/2006 and No. 1272/2008.
Complies with European Council Directives 67/548/EEC and 1999/45/EC.
Complies with OSHA Regulation 29 CFR 1910.1200.
Complies with Canadian Regulation SOR/88-66

SECTION 16: OTHER INFORMATION

Text of phrases under Section 3

NA

Revision Information

Revision Date:	2013-06-14
Supersedes edition of:	2012-06-01
Reason for revision:	Regulation (EC) No. 1272/2008 Compliance
Legend	NA: Not Applicable ND: Not Determined

THE INFORMATION CONTAINED HEREIN IS BASED ON THE PRESENT STATE OF OUR KNOWLEDGE. IT CHARACTERIZES THE PRODUCT WITH REGARD TO THE APPROPRIATE SAFETY PRECAUTIONS. IT DOES NOT REPRESENT A GUARANTEE OF THE PROPERTIES OF THE PRODUCT.

Safety Data Sheet

According to Regulation (EC) No. 1907/2006
OSHA Regulation 29 CFR 1910.1200
Canadian Regulation SOR/88-66

Revision Date: 2016-02-17
Reason for Revision: Section 3, 15 updated

SECTION 1: IDENTIFICATION OF THE PRODUCT AND COMPANY

Product Name: HI 7004 Buffer Solution pH 4.01

Application: pH Buffer Solution, ± 0.01 @ 25°C/77°F

Additional Product Codes: HI 7004/1G HI 7004/1L HI 7004L HI 7004L/C HI 7004M HI 7004P/5 HI 7004M/S HI 7004/120ML HI 7004/1LB HI 7004C HI 7004LB HI 7004M-0 HI 7004W

Company Information (USA):
Hanna Instruments, Inc.
584 Park East Dr, Woonsocket, Rhode Island, USA 02895

Technical Service Contact Information:
1-800-426-6287 (8:30AM - 5:00PM ET)
+1-401-766-4260 (8:30AM - 5:00PM ET)

USA Emergency Contact Information: 1-800-424-9300 (Chemtrec 24Hr. Emergency)

International Emergency Contact Information: +1-703-527-3887 (Chemtrec 24Hr. Emergency)

E-mail Address: tech@hannainst.com

SECTION 2: HAZARD IDENTIFICATION

Non-hazardous product as specified in OSHA Regulation 29 CFR 1910.1200.
Non-hazardous product as specified in Canadian Regulation SOR/88-66.
Non-hazardous product as specified in Regulation (EC) 1272/2008.

SECTION 3: COMPOSITION AND COMPONENT INFORMATION

Component:	EC No:	CAS No:	Hazard Class:	Phrases:	Concentration:
Water	231-791-2	7732-18-5	-	-	> 95%
Other components, disclosure not required according to Regulation (EC) No. 1907/2006	-	-	-	-	< 5%

SECTION 4: FIRST AID MEASURES

After Inhalation: Remove to fresh air. Call a physician if breathing becomes difficult.

After Skin Contact: Wash affected area with water and soap.

After Eye Contact: Rinse out with plenty of water for at least 15 minutes. If pain persists, summon medical advice.

After Swallowing: Wash out mouth with plenty of water, provided person is conscious. Obtain medical attention if feeling unwell.

General Information: Not available

SECTION 5: FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:
Water Spray, Foam, Dry Powder, Carbon Dioxide

Special Risks:
Non-combustible. Development of hazardous combustion gases or vapors possible in the event of fire.

Special Protective Equipment:
Do not stay in dangerous zone without suitable chemical protection clothing and self-contained breathing apparatus.

Additional Information:
Contain escaping vapors with water.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions:

None

Environmental Precautions:

None

Additional Notes:

None

SECTION 7: HANDLING AND STORAGE

Handling:

No restrictions

Storage:

Keep container closed and protected from direct sunlight. Store at room temperature (+15°C to +25°C).

SECTION 8: EXPOSURE CONTROL/PERSONAL PROTECTION

Engineering:

Maintain general industrial hygiene practice.

Personal Protective Equipment:

As appropriate to quantity handled.

Respiratory Protection:	***Protective Gloves:***	***Eye Protection:***
Required when vapors/aerosols are generated.	Rubber or plastic	Goggles or face mask

Industrial Hygiene:

Change contaminated clothing. Wash hands after working with substance.

SECTION 9: PHYSICAL/CHEMICAL PROPERTIES

Appearance:	Colorless or red liquid	***Odor:***	Odorless	***Density at 20°C:***	1.0 g/cm³
Melting Point:	NA	***Boiling Point:***	~ 100°C	***Solubility:***	Soluble
pH at 20°C:	4.01 at 25°C	***Explosion Limit:***	NA	***Flash Point:***	NA
Thermal Decomp.:	NA				

SECTION 10: STABILITY AND REACTIVITY

Conditions to be Avoided:

Heating

Hazardous Decomposition Products:

In the event of fire: See section 5.

Hazardous Polymerization:

Will not occur.

Substances to be Avoided:

The generally known reaction partners of water

Further Information:

Not available

SECTION 11: TOXICOLOGICAL INFORMATION

Product Toxicity

Quantitative data on the toxicity of this product is not available.

Potential Health Effects:

Further Data: Hazardous properties cannot be excluded, but are relatively unlikely because of the low concentration of the dissolved substances, when the product is handled appropriately. The product should be handled with the usual care when dealing with chemicals.

Component Toxicity

Acute Toxicity:

Not Available

Chronic Toxicity:

Not Available

Additional Data:

Not Available

SECTION 12: ECOLOGICAL INFORMATION

Quantitative data on the ecological effect of this product is not available.

Further Data: No ecological problems are to be expected when the product is handled and used with due care and attention.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal: Can be safely disposed of as ordinary refuse.

SECTION 14: TRANSPORTATION INFORMATION

Land:	***Sea:***	***Air:***
Not subject to transport regulations	Not subject to transport regulations	Not subject to transport regulations

SECTION 15: REGULATORY INFORMATION

Complies with European Regulations (EC) No. 1907/2006 and No. 1272/2008.
Complies with OSHA Regulation 29 CFR 1910.1200.
Complies with Canadian Regulation SOR/88-66.
All chemical substances in this product are listed on the TSCA Inventory.

SECTION 16: OTHER INFORMATION

Text of phrases under Section 3

NA

Revision Information

Revision Date:	2016-02-17
Supersedes edition of:	2013-04-01
Reason for revision:	Section 3, 15 updated
Legend	NA: Not Applicable ND: Not Determined

THE INFORMATION CONTAINED HEREIN IS BASED ON THE PRESENT STATE OF OUR KNOWLEDGE. IT CHARACTERIZES THE PRODUCT WITH REGARD TO THE APPROPRIATE SAFETY PRECAUTIONS. IT DOES NOT REPRESENT A GUARANTEE OF THE PROPERTIES OF THE PRODUCT.

Safety Data Sheet

According to Regulation (EC) No. 1907/2006
OSHA Regulation 29 CFR 1910.1200
Canadian Regulation SOR/88-66

Revision Date: 2016-02-17
Reason for Revision: Section 3, 15 updated

SECTION 1: IDENTIFICATION OF THE PRODUCT AND COMPANY

Product Name: HI 7007 Buffer Solution pH 7.01

Application: pH Buffer Solution. ± 0.01 @ 25°C/77°F

Additional Product Codes: HI 7007/1G HI 7007/1L HI 7007L HI 7007L/C HI 7007M HI 7007P/5 HI 7007/120ML HI 7007AN HI 7007C HI 7007LB HI 7007M/S HI 7007QC

Company Information (USA):
Hanna Instruments, Inc.
584 Park East Dr, Woonsocket, Rhode Island, USA 02895

Technical Service Contact Information:
1-800-426-6287 (8:30AM - 5:00PM ET)
+1-401-766-4260 (8:30AM - 5:00PM ET)

USA Emergency Contact Information: 1-800-424-9300 (Chemtrec 24Hr. Emergency)

International Emergency Contact Information: +1-703-527-3887 (Chemtrec 24Hr. Emergency)

E-mail Address: tech@hannainst.com

SECTION 2: HAZARD IDENTIFICATION

Non-hazardous product as specified in OSHA Regulation 29 CFR 1910.1200.
Non-hazardous product as specified in Canadian Regulation SOR/88-66.
Non-hazardous product as specified in Regulation (EC) 1272/2008.

SECTION 3: COMPOSITION AND COMPONENT INFORMATION

Component:	*EC No:*	*CAS No:*	*Hazard Class:*	*Phrases:*	*Concentration:*
Water	231-791-2	7732-18-5	-	-	> 95%
Other components, disclosure not required according to Regulation (EC) No. 1907/2006	-	-	-	-	< 5%

SECTION 4: FIRST AID MEASURES

After Inhalation: Remove to fresh air. Call a physician if breathing becomes difficult.

After Skin Contact: Wash affected area with water and soap.

After Eye Contact: Rinse out with plenty of water for at least 15 minutes. If pain persists, summon medical advice.

After Swallowing: Wash out mouth with plenty of water, provided person is conscious. Obtain medical attention if feeling unwell.

General Information: Not available

SECTION 5: FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:

Water Spray, Foam, Dry Powder, Carbon Dioxide

Special Risks:

Non-combustible. Development of hazardous combustion gases or vapors possible in the event of fire.

Special Protective Equipment:

Do not stay in dangerous zone without suitable chemical protection clothing and self-contained breathing apparatus.

Additional Information:

Contain escaping vapors with water.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions:

None

Environmental Precautions:

None

Additional Notes:

None

SECTION 7: HANDLING AND STORAGE

Handling:

No restrictions

Storage:

Keep container closed and protected from direct sunlight. Store at room temperature (+15°C to +25°C).

SECTION 8: EXPOSURE CONTROL/PERSONAL PROTECTION

Engineering:

Maintain general industrial hygiene practice.

Personal Protective Equipment:

As appropriate to quantity handled.

Respiratory Protection:	***Protective Gloves:***	***Eye Protection:***
Required when vapors/aerosols are generated.	Rubber or plastic	Goggles or face mask

Industrial Hygiene:

Change contaminated clothing. Wash hands after working with substance.

SECTION 9: PHYSICAL/CHEMICAL PROPERTIES

Appearance:	Colorless or green liquid	***Odor:***	Odorless	***Density at 20°C:***	1.0 g/cm³
Melting Point:	NA	***Boiling Point:***	~ 100°C	***Solubility:***	Soluble
pH at 20°C:	7.01 at 25°C	***Explosion Limit:***	NA	***Flash Point:***	NA
Thermal Decomp.:	NA				

SECTION 10: STABILITY AND REACTIVITY

Conditions to be Avoided:

Heating

Hazardous Decomposition Products:

In the event of fire: See section 5.

Hazardous Polymerization:

Will not occur.

Substances to be Avoided:

The generally known reaction partners of water

Further Information:

Not available

SECTION 11: TOXICOLOGICAL INFORMATION

Product Toxicity

Quantitative data on the toxicity of this product is not available.

Potential Health Effects:

Further Data: Hazardous properties cannot be excluded, but are relatively unlikely because of the low concentration of the dissolved substances, when the product is handled appropriately. The product should be handled with the usual care when dealing with chemicals.

Component Toxicity

Acute Toxicity:

Not Available

Chronic Toxicity:

Not Available

Additional Data:

Not Available

SECTION 12: ECOLOGICAL INFORMATION

Quantitative data on the ecological effect of this product is not available.

Further Data: No ecological problems are to be expected when the product is handled and used with due care and attention.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal: Can be safely disposed of as ordinary refuse.

SECTION 14: TRANSPORTATION INFORMATION

Land:	***Sea:***	***Air:***
Not subject to transport regulations	Not subject to transport regulations	Not subject to transport regulations

SECTION 15: REGULATORY INFORMATION

Complies with European Regulations (EC) No. 1907/2006 and No. 1272/2008.
Complies with OSHA Regulation 29 CFR 1910.1200.
Complies with Canadian Regulation SOR/88-66.
All chemical substances in this product are listed on the TSCA Inventory.

SECTION 16: OTHER INFORMATION

Text of phrases under Section 3

NA

Revision Information

Revision Date:	2016-02-17
Supersedes edition of:	2013-04-01
Reason for revision:	Section 3, 15 updated
Legend	NA: Not Applicable ND: Not Determined

THE INFORMATION CONTAINED HEREIN IS BASED ON THE PRESENT STATE OF OUR KNOWLEDGE. IT CHARACTERIZES THE PRODUCT WITH REGARD TO THE APPROPRIATE SAFETY PRECAUTIONS. IT DOES NOT REPRESENT A GUARANTEE OF THE PROPERTIES OF THE PRODUCT.

HI 7010
Buffer Solution pH 10.01

Safety Data Sheet

According to Regulation (EC) No. 1907/2006
OSHA Regulation 29 CFR 1910.1200
Canadian Regulation SOR/88-66

Revision Date: 2016-02-17
Reason for Revision: Section 3, 15 updated

SECTION 1: IDENTIFICATION OF THE PRODUCT AND COMPANY

Product Name: HI 7010 Buffer Solution pH 10.01

Application: pH Buffer Solution. ± 0.01 @ 25°C/77°F

Additional Product Codes: HI 7010/1G HI 7010/1L HI 7010L HI 7010L/C HI 7010M HI 7010/1LB HI 7010C HI 7010LB HI 7010M-0 HI 7010W HI 7010QC

Company Information (USA):
Hanna Instruments, Inc.
584 Park East Dr, Woonsocket, Rhode Island, USA 02895

Technical Service Contact Information:
1-800-426-6287 (8:30AM - 5:00PM ET)
+1-401-766-4260 (8:30AM - 5:00PM ET)

USA Emergency Contact Information: 1-800-424-9300 (Chemtrec 24Hr. Emergency)

International Emergency Contact Information: +1-703-527-3887 (Chemtrec 24Hr. Emergency)

E-mail Address: tech@hannainst.com

SECTION 2: HAZARD IDENTIFICATION

Non-hazardous product as specified in OSHA Regulation 29 CFR 1910.1200.
Non-hazardous product as specified in Canadian Regulation SOR/88-66.
Non-hazardous product as specified in Regulation (EC) 1272/2008.

SECTION 3: COMPOSITION AND COMPONENT INFORMATION

Component:	EC No:	CAS No:	Hazard Class:	Phrases:	Concentration:
Water	231-791-2	7732-18-5	-	-	> 95%
Other components, disclosure not required according to Regulation (EC) No. 1907/2006	-	-	-	-	< 5%

SECTION 4: FIRST AID MEASURES

After Inhalation: Remove to fresh air. Call a physician if breathing becomes difficult.

After Skin Contact: Wash affected area with water and soap.

After Eye Contact: Rinse out with plenty of water for at least 15 minutes. If pain persists, summon medical advice.

After Swallowing: Wash out mouth with plenty of water, provided person is conscious. Obtain medical attention if feeling unwell.

General Information: Not available

SECTION 5: FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:
Water Spray, Foam, Dry Powder, Carbon Dioxide

Special Risks:
Non-combustible. Development of hazardous combustion gases or vapors possible in the event of fire.

Special Protective Equipment:
Do not stay in dangerous zone without suitable chemical protection clothing and self-contained breathing apparatus.

Additional Information:
Contain escaping vapors with water.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions:

None

Environmental Precautions:

None

Additional Notes:

None

SECTION 7: HANDLING AND STORAGE

Handling:

No restrictions

Storage:

Keep container closed and protected from direct sunlight. Store at room temperature (+15°C to +25°C).

SECTION 8: EXPOSURE CONTROL/PERSONAL PROTECTION

Engineering:

Maintain general industrial hygiene practice.

Personal Protective Equipment:

As appropriate to quantity handled.

Respiratory Protection:	***Protective Gloves:***	***Eye Protection:***
Required when vapors/aerosols are generated.	Rubber or plastic	Goggles or face mask

Industrial Hygiene:

Change contaminated clothing. Wash hands after working with substance.

SECTION 9: PHYSICAL/CHEMICAL PROPERTIES

Appearance:	Colorless or violet liquid	***Odor:***	Odorless	***Density at 20°C:***	1.0 g/cm³
Melting Point:	NA	***Boiling Point:***	~ 100°C	***Solubility:***	Soluble
pH at 20°C:	10.01 at 25°C	***Explosion Limit:***	NA	***Flash Point:***	NA
Thermal Decomp.:	NA				

SECTION 10: STABILITY AND REACTIVITY

Conditions to be Avoided:

Heating

Hazardous Decomposition Products:

In the event of fire: See section 5.

Hazardous Polymerization:

Will not occur.

Substances to be Avoided:

The generally known reaction partners of water

Further Information:

Not available

SECTION 11: TOXICOLOGICAL INFORMATION

Product Toxicity

Quantitative data on the toxicity of this product is not available.

Potential Health Effects:

Further Data: Hazardous properties cannot be excluded, but are relatively unlikely because of the low concentration of the dissolved substances, when the product is handled appropriately. The product should be handled with the usual care when dealing with chemicals.

Component Toxicity

Acute Toxicity:

Not Available

Chronic Toxicity:

Not Available

Additional Data:

Not Available

SECTION 12: ECOLOGICAL INFORMATION

Quantitative data on the ecological effect of this product is not available.

Further Data: No ecological problems are to be expected when the product is handled and used with due care and attention.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal: Can be safely disposed of as ordinary refuse.

SECTION 14: TRANSPORTATION INFORMATION

Land:	***Sea:***	***Air:***
Not subject to transport regulations	Not subject to transport regulations	Not subject to transport regulations

SECTION 15: REGULATORY INFORMATION

Complies with European Regulations (EC) No. 1907/2006 and No. 1272/2008.
Complies with OSHA Regulation 29 CFR 1910.1200.
Complies with Canadian Regulation SOR/88-66.
All chemical substances in this product are listed on the TSCA Inventory.

SECTION 16: OTHER INFORMATION

Text of phrases under Section 3

NA

Revision Information

Revision Date:	2016-02-17
Supersedes edition of:	2013-04-01
Reason for revision:	Section 3, 15 updated
Legend	NA: Not Applicable ND: Not Determined

THE INFORMATION CONTAINED HEREIN IS BASED ON THE PRESENT STATE OF OUR KNOWLEDGE. IT CHARACTERIZES THE PRODUCT WITH REGARD TO THE APPROPRIATE SAFETY PRECAUTIONS. IT DOES NOT REPRESENT A GUARANTEE OF THE PROPERTIES OF THE PRODUCT.

SAFETY DATA SHEET
(SDS)

Creation Date 24-Aug-2009 **Revision Date** 04 AUG-2015 **Revision Number** 01

1. Identification

Product Name	**Hydrochloric Acid Solution, OPTIMA GRADE**

Cat No. : **A466**

Synonyms Muriatic acid; Hydrogen chloride, HCl

Recommended Use Laboratory chemical. Used as an Environmental preservative and pH adjustment.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
C & G Containers
152 Easy Street
Lafayette, LA 70506
337-237-7123

Emergency Telephone Number
CHEMTRECÒ, Inside the USA: 800-424-9300
CHEMTRECÒ, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

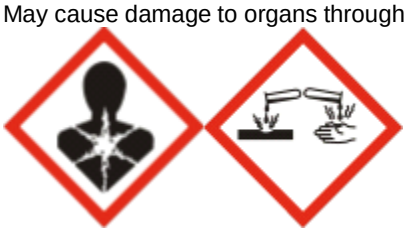
Corrosive to metals	Category 1
Skin Corrosion/irritation	Category 1 B
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver.	

Label Elements

Signal Word
Danger

Hazard Statements
May be corrosive to metals

Causes severe skin burns and eye damage
May cause respiratory irritation
May cause damage to organs through prolonged or repeated exposure



Precautionary Statements
Prevention
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Keep only in original container
Response
Immediately call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
Spills
Absorb spillage to prevent material damage
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Store in corrosive resistant polypropylene container with a resistant inliner
Store in a dry place
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition / information on ingredients

Component	CAS-No	Percent
Water	7732-18-5	83-85
Hydrochloric acid	7647-01-0	15-17

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Immediate medical attention is required.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms/effects Causes burns by all exposure routes. . Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Corrosive Material. Causes burns by all exposure routes. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products
Hydrogen chloride gas
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
3	0	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Do not get in eyes, on skin, or on clothing.

Environmental Precautions Should not be released into the environment. See Section 12 for additional ecological information.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment. Do not breathe vapors or spray mist. Do not get in eyes, on skin, or on clothing. Do not ingest.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Hydrochloric acid	Ceiling: 2 ppm	Ceiling: 5 ppm Ceiling: 7 mg/m³ (Vacated) Ceiling: 5 ppm (Vacated) Ceiling: 7 mg/m³	IDLH: 50 ppm Ceiling: 5 ppm Ceiling: 7 mg/m³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Hydrochloric acid	Ceiling: 5 ppm Ceiling: 7.5 mg/m³	Ceiling: 5 ppm Ceiling: 7 mg/m³	CEV: 2 ppm

Legend

ACGIH *- American Conference of Governmental Industrial Hygienists*
OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health*

Engineering Measures Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	pungent
Odor Threshold	No information available
pH	< 1
Melting Point/Range	-35 °C / -31 °F
Boiling Point/Range	57 °C / 135 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	125 mbar @ 20 °C
Vapor Density	1.27 (Air = 1.0)
Relative Density	1.18
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	1.8 mPa.s @ 15°C
Molecular Formula	HCl.H2O
Molecular Weight	36.46

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat.

Incompatible Materials Metals, Strong oxidizing agents, sodium hypochlorite, Amines, Bases, Fluorine, Cyanides, alkaline

Hazardous Decomposition Products Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions Contact with metals may evolve flammable hydrogen gas.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Dermal LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Vapor LC50 Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Hydrochloric acid	238 - 277 mg/kg (Rat)	5010 mg/kg (Rabbit)	1.68 mg/L (Rat) 1 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Causes burns by all exposure routes

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Hydrochloric acid	7647-01-0	Group 3	Not listed	Not listed	Not listed	Not listed

IARC: (International Agency for Research on Cancer)

IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

Mutagenic Effects Mutagenic effects have occurred in experimental animals.

Reproductive Effects Experiments have shown reproductive toxicity effects on laboratory animals.

Developmental Effects Developmental effects have occurred in experimental animals.

Teratogenicity Teratogenic effects have occurred in experimental animals.

STOT - single exposure Respiratory system

STOT - repeated exposure Kidney Liver

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Endocrine Disruptor Information No information available

Other Adverse Effects See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Hydrochloric acid	-	282 mg/L LC50 96 h	-	-

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN1789
Proper Shipping Name HYDROCHLORIC ACID
Hazard Class 8
Packing Group II

TDG

UN-No UN1789
Proper Shipping Name HYDROCHLORIC ACID
Hazard Class 8
Packing Group II

IATA

UN-No UN1789
Proper Shipping Name Hydrochloric acid
Hazard Class 8
Packing Group II

IMDG/IMO

UN-No UN1789
Proper Shipping Name Hydrochloric acid
Hazard Class 8
Packing Group II

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Water	X	X	-	231-791-2	-		X	-	X	X	X
Hydrochloric acid	X	X	-	231-595-7	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Hydrochloric acid	7647-01-0	35-38	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Hydrochloric acid	X	5000 lb	-	-

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Hydrochloric acid	X		-

OSHA Occupational Safety and Health Administration
Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Hydrochloric acid	-	TQ: 5000 lb

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Hydrochloric acid	5000 lb	5000 lb

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Hydrochloric acid	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product contains the following DHS chemicals:

Component	DHS Chemical Facility Anti-Terrorism Standard
Hydrochloric acid	0 lb STQ (anhydrous); 11250 lb STQ (37% concentration or greater)

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class

D1A Very toxic materials
D2B Toxic materials
E Corrosive material



16. Other information

Prepared By

Regulatory Affairs
Thermo Fisher Scientific and C & G Containers, Inc.
Email: EMSDS.RA@thermofisher.com

Creation Date 24-Aug-2009
CG Revision Date 04-Aug-2015
FS Revision Date 28-October-2014

Revision Summary

This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

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

End of SDS

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 06/11/2015 Reviewed on 06/11/2015

* 1 Identification

· **Product identifier**

· **Trade name: Precision Calibration Gas Mixture**
· **Product number:** G-4415
· **Relevant identified uses of the substance or mixture and uses advised against**
Used for calibration of gas measuring devices. Not suitable for human consumption.
· **Product description** Calibration gas mixture consisting of Isobutylene, Oxygen and Nitrogen.

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Gasco Affiliates, LLC
320 Scarlett Blvd.
Oldsmar, Fl 34677

TELEPHONE NUMBER: (800) 910-0051
FAX NUMBER: (866) 755-8920
E-MAIL: info@gascogas.com
· **Emergency telephone number:**
Inside the US: 1-800-424-9300 (CHEMTREC, 24 hours)
Outside the US: 1-703-527-3887 (CHEMTREC, 24 hours)

* 2 Hazard(s) identification

· **Classification of the substance or mixture**


GHS04 Gas cylinder

Press. Gas H280 Contains gas under pressure; may explode if heated.

· **Label elements**
· **GHS label elements**
The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms**


GHS04

· **Signal word** Warning

· **Hazard-determining components of labeling:**
Nitrogen
Isobutylene
· **Hazard statements**
Contains gas under pressure; may explode if heated.
· **Precautionary statements**
Protect from sunlight. Store in a well-ventilated place.
· **Unknown acute toxicity:**
99 percent of the mixture consists of ingredient(s) of unknown toxicity.

(Contd. on page 2)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 06/11/2015 Reviewed on 06/11/2015

Trade name: Precision Calibration Gas Mixture

· **Classification system:**
· **NFPA ratings (scale 0 - 4)**



Health = 2
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**



Health = 2
Fire = 0
Reactivity = 0

· **Hazard(s) not otherwise classified (HNOC):** None known

* 3 Composition/information on ingredients

· **Chemical characterization: Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous Components:**

CAS: 7727-37-9 RTECS: QW 9700000	Nitrogen Press. Gas, H280; Simple Asphyxiant	78 - 81.99995%
CAS: 7782-44-7	Oxygen Oxid. Gas 1, H270; Press. Gas, H280	18 - 21%
CAS: 115-11-7 RTECS: UD 0890000	Isobutylene Flam. Gas 1, H220; Flam. Liq. 1, H224; Press. Gas, H280	0.00005 - 1%

* 4 First-aid measures

· **Description of first aid measures**
· **After inhalation:**
Generally the product does not irritate with inhalation.
Supply fresh air. If required, provide artificial respiration. Consult doctor if symptoms persist.
In case of unconsciousness, place patient securely on side position for transportation.
· **After skin contact:**
Generally the product does not irritate the skin.
In cases of contact with liquified material, frostbite may occur. Immerse frostbite in cool-warm water and seek medical attention.
· **After eye contact:**
Not anticipated under normal use.
If irritation occurs thoroughly wash the exposed area and discontinue use. Seek medical attention if any adverse effect occurs.
· **After swallowing:** Not a normal route of entry.
· **Information for doctor:**
· **Most important symptoms and effects, both acute and delayed:** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

* 5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:**
Use fire fighting measures that suit the environment.
Use water spray to cool fire-exposed containers.

(Contd. on page 3)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 06/11/2015 Reviewed on 06/11/2015

Trade name: Precision Calibration Gas Mixture

· **Special hazards arising from the substance or mixture**
Closed containers may explode when exposed to extreme heat.
If incinerated, product will release the following toxic fumes: Oxides of Carbon and Nitrogen (NOx).
· **Advice for firefighters**
This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.
· **Protective equipment:**
As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes.

* 6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Treat any fumes as toxic.
In a confined area, NIOSH approved respiratory protection may be required.
· **Environmental precautions:** Inform authorities in case of gas release.
· **Methods and material for containment and cleaning up:**
Dispose contaminated material as waste according to section 13.
Ensure adequate ventilation.
Dispose of the collected material according to regulations.
· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

* 7 Handling and storage

· **Handling:**
· **Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms due to the potential for oxygen deficiency (simple asphyxiation). Do not attempt to adjust, repair or in any other way modify the cylinders containing this gas mixture. If there is a malfunction or another type of operational problem, contact nearest distributor immediately.
· **Information about protection against explosions and fires:**
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C, i.e. electric lights. Do not pierce or burn, even after use.
Keep protective respiratory device available.
Do not cut, grind or weld on container that contains or contained product.
Do not spray on a naked flame or any incandescent material.

· **Conditions for safe storage, including any incompatibilities**
Store away from strong acids, strong oxidizing agents, phosphorous, organic materials, halogens and powdered metals.
· **Storage:**
· **Requirements to be met by storerooms and receptacles:**
Store in a cool location.
Cylinders should be firmly secured to prevent falling or being knocked over. Cylinders must be protected from the environment, and preferably kept at room temperature. Cylinders should be stored in dry, well-ventilated areas, away from sources of heat, ignition, and direct sunlight. Protect cylinders against physical damage. Full and empty cylinders should be segregated. Use a "first-on, first-out" inventory system to prevent full containers from being stored for long periods of time.

(Contd. on page 4)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 06/11/2015 Reviewed on 06/11/2015

Trade name: Precision Calibration Gas Mixture

· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** Store in cool, dry conditions in well sealed receptacles.
· **Specific end use(s)** No further relevant information available.

*
8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see section 7.

· **Control parameters**
All ventilation should be designed in accordance with OSHA standard (29 CFR 1910.94). Use mechanical (general) ventilation for storage areas. Use appropriate ventilation as required to keep Exposure Limits in Air below TLV & PEL limits.

· **Components with occupational exposure limits:**	
7727-37-9 Nitrogen	
TLV	withdrawn TLV, see App. F; simple asphyxiant
115-11-7 Isobutylene	
TLV	Long-term value: 574 mg/m³, 250 ppm

· **Additional information:** The lists that were valid during the creation of this SDS were used as basis.

· **Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Wash hands before breaks and at the end of work.
· **Breathing equipment:**
Not necessary if room is well-ventilated.
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure, use respiratory protective device that is independent of circulating air.
· **Protection of hands:** Not required.
· **Eye protection:** Not necessary under normal conditions.

*
9 Physical and chemical properties

· **Information on basic physical and chemical properties**
· **General Information**
· **Appearance:**
Form: Gaseous
Color: Clear, colorless
· **Odor:** Odorless
· **Odor threshold:** Not determined.

· **pH-value:** Not determined.

· **Change in condition**
Melting point/Melting range: Not determined.
Boiling point/Boiling range: Not determined.

· **Flash point:** Not applicable.

· **Flammability (solid, gaseous):** Not determined.

· **Ignition temperature:**

Decomposition temperature: Not determined.

· **Auto igniting:** Product is not self-igniting.

(Contd. on page 5)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 06/11/2015 Reviewed on 06/11/2015

Trade name: Precision Calibration Gas Mixture

· **Danger of explosion:** Not determined.

· **Explosion limits:**
Lower: Not determined.
Upper: Not determined.

· **Vapor pressure:** Not determined.

· **Density:**
Relative density Not determined.
Vapor density Not determined.
Evaporation rate Not applicable.

· **Solubility in / Miscibility with**
Water: Not miscible or difficult to mix.

· **Partition coefficient (n-octanol/water):** Not determined.

· **Viscosity:**
Dynamic: Not determined.
Kinematic: Not determined.

· **Solvent content:**
Organic solvents: 0.0 %
· **Other information** No further relevant information available.

* 10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability** Stable under normal conditions.
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known.
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:**
Strong acids, strong oxidizing agents, phosphorous, organic materials, halogens and powdered metals.
· **Hazardous decomposition products:** Carbon Oxides and Nitrogen Oxides (NOx).

* 11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**		
115-11-7 Isobutylene		
Inhalative	LC50/4 h	620 mg/l (rat)

· **Primary irritant effect:**
· **on the skin:** No irritating effect.
· **on the eye:** No irritating effect.
· **Additional toxicological information:**
The product shows the following dangers according to internally approved calculation methods for preparations:
Harmful

· **Carcinogenic categories**
· **IARC (International Agency for Research on Cancer)**
Group 1 - Carcinogenic to humans
Group 2A - Probably carcinogenic to humans
Group 2B - Possibly carcinogenic to humans

(Contd. on page 6)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 06/11/2015 Reviewed on 06/11/2015

Trade name: Precision Calibration Gas Mixture

Group 3 - Not classifiable as to its carcinogenicity to humans
Group 4 - Probably not carcinogenic to humans

None of the ingredients are listed.

· **NTP (National Toxicology Program)**

None of the ingredients are listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**

None of the ingredients are listed.

* 12 Ecological information

· **Toxicity** The hazards for the aquatic environment are unknown.
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:** Generally not hazardous for water.
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

* 13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:**
Release all residual gas pressure in a well ventilated area. Verify the cylinder is completely empty (0 PSIG).
Remove or cover any hazard labels. Return empty cylinder for recycling.
NOTE: Check with the local easte authority before placing any gas cylinder into waste container for pickup.
GASCO encourages the consumer to return all cylinders.
· **Waste disposal key:**
The U.S. EPA has not published waste disposal numbers for this product's components.

· **Uncleaned packagings:**
· **Recommendation:** Return cylinder and unused product to supplier.

* 14 Transport information

· **UN-Number**
· **DOT, ADR, IMDG, IATA** UN1956
· **UN proper shipping name**
· **DOT** Compressed gas, n.o.s.
· **ADR** UN1956 Compressed gas, n.o.s.
· **IMDG, IATA** COMPRESSED GAS, N.O.S.
· **Transport hazard class(es)**

· **DOT**



· **Class** Non-Regulated Material

(Contd. on page 7)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 06/11/2015 Reviewed on 06/11/2015

Trade name: Precision Calibration Gas Mixture

· **Label**	2.2
· **ADR**	
	
· **Class**	2.2 1A
· **Label**	2.2
· **IMDG, IATA**	
	
· **Class**	2.2
· **Label**	2.2
· **Packing group**	
· **DOT, ADR, IMDG, IATA**	Non-Regulated Material
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Not applicable.
· **Danger code (Kemler):**	20
· **EMS Number:**	F-C,S-V
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **Quantity limitations**	On passenger aircraft/rail: 75 kg On cargo aircraft only: 150 kg
· **ADR**	
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· **IMDG**	
· **Limited quantities (LQ)**	120 ml
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 1000 ml
· **UN "Model Regulation":**	UN1956, Compressed gas, n.o.s., 2.2

* 15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Sara**

· **Section 355 (extremely hazardous substances):**
None of the ingredients are listed.

· **Section 313 (Specific toxic chemical listings):**
None of the ingredients are listed.

(Contd. on page 8)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 06/11/2015 Reviewed on 06/11/2015

Trade name: Precision Calibration Gas Mixture

· **TSCA (Toxic Substances Control Act):**
All ingredients are listed.

· **California Proposition 65**

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

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

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

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

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**
None of the ingredients are listed.

· **TLV (Threshold Limit Value established by ACGIH)**
None of the ingredients are listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
None of the ingredients are listed.

· **GHS label elements**
The product is classified and labeled according to the Globally Harmonized System (GHS).

· **Hazard pictograms**



GHS04

· **Signal word** Warning

· **Hazard-determining components of labeling:**
Nitrogen
Isobutylene

· **Hazard statements**
Contains gas under pressure; may explode if heated.

· **Precautionary statements**
Protect from sunlight. Store in a well-ventilated place.

· **National regulations:**
The product is subject to be classified according with the latest version of the regulations on hazardous substances.

· **State Right to Know**

CAS: 7727-37-9 RTECS: QW 9700000	Nitrogen Press. Gas, H280; Simple Asphyxiant	79 - 81.99995%
CAS: 7782-44-7	Oxygen Oxid. Gas 1, H270; Press. Gas, H280	18 - 21%
CAS: 115-11-7 RTECS: UD 0890000	Isobutylene Flam. Gas 1, H220; Flam. Liq. 1, H224; Press. Gas, H280	0.00005 - 1%

(Contd. on page 9)

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 06/11/2015 *Reviewed on 06/11/2015*

Trade name: Precision Calibration Gas Mixture

All ingredients are listed.

· ***Chemical safety assessment:*** A Chemical Safety Assessment has not been carried out.

*
16 Other information

· ***Relevant phrases***

Gasco Affiliates, LLC, makes not express or implied warranties, guarantees or representations regarding the product of the information herein, including but not limited to any implied warranty or merchantability or fitness for use. Gasco Affilitates, LLC shall not be liable for any personal injury, property or other damages of any nature, whether compensatory, consequential, exemplary, or otherwise, resulting from any publication, use of reliance upon the information herein.

· ***Date of preparation / last revision*** 06/11/2015 / -

· ***Abbreviations and acronyms:***

ADR: The European Agreement concerning the International Carriage of Dangerous Goods by Road
ADN: The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
Flam. Gas 1: Flammable gases, Hazard Category 1
Oxid. Gas 1: Oxidising Gases, Hazard Category 1
Press. Gas: Gases under pressure: Compressed gas
Flam. Liq. 1: Flammable liquids, Hazard Category 1

· **** Data compared to the previous version altered.***

SDS created by MSDS Authoring Services www.msdsauthoring.com +1-877-204-9106

Safety Data Sheet

1. IDENTIFICATION:

Product Name: ProCal Turbidity Calibration Standards
CAS Number: Mixture
Catalog Numbers: 39071 39820 39825 39828 39830 39845 39855 39887 39927 39928 39938 39939 39950 39953 39957 52070 52080 52090 52100 52110 52120 52180 52190 52200 52210 52220 52230 52240 52250 52300 52310 52320 52330 52340 52350 52360 52370 52380 52382 52384 52386 52430 52440 52450 52460 52470 52480 52530 52540 52550 52560 52570 52580 53000 53040 53050 53060 53070 53080 53090 53100 53110 53120 53130 53140 53160 53170 53180 53200 53210 53220 53230 53250 53260 53270 53280 53340 53350 53370 32483S 34381S 70853 30860 52000 52010 52090 52170 52290 52520 53380 52590
Product Use: Analytical \ Laboratory Reagent
Manufacturer: HF Scientific, Inc
Address: 3170 Metro Parkway Fort Myers, Fl 33916

General Information: 888-203-7248
Transportation Emergency Number: CHEMTREC® 24 hr US 800-424-9300
CHEMTREC® 24 hr International 703-527-3887

2. HAZARDS IDENTIFICATION

GHS Classification

Health	Environmental	Physical
Acute Toxicity: None Eye Corrosion: Category 2B Skin Corrosion: Category 3	Aquatic Toxicity: None	Flammable Liquid: No

GHS Label

Pictogram: None	Signal Word: WARNING
Hazard Statements Causes mild skin irritation Causes eye irritation	**Precautionary Statements** If skin irritation occurs, get medical advice/attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention. Wash hands after handling

3. COMPOSITION / INFORMATION ON INGREDIENTS

Component	Cas Number	Weight %
Deionized Water	7732-18-5	99.0
Styrene Divinylbenzene Co-Polymer Beads	9003-70-7	0.97
Antimicrobial	Mixture	0.02
Octylphenoxypolyethoxyethanol nonionic surfactant	Mixture	0.01

4. FIRST AID MEASURES

Eye Contact: Immediately Flush with Excess Water for 15 Minutes
Skin Contact: Immediately Flush with Excess Water for 15 Minutes. Remove Contaminated Clothing.
Inhalation: Remove to Fresh Air
Ingestion: Give Large Quantities of Water. Call Physician.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media: Foam or Dry Chemical
Fire Fighting Procedures: Wear self contained breathing apparatus for fire fighting if necessary.
Unusual Fire and Exposure Hazards: None
Combustion Products: None
NFPA Classification HEALTH: 0 FLAMMABLE: 0 REACTIVITY:0

6. ACCIDENTAL RELEASE MEASURES

Wear Proper Personal Protective Equipment. See Section 8 for Additional Information. Remove Liquid with Absorbent Material and Seal in a Bag or Container for Disposal. Wash Spill Area Once Pickup is Complete.

7. HANDLING AND STORAGE

Handling: Wear Safety Glasses, Latex or Nitrile Gloves, and Lab Coat or Apron. Avoid Contact with Skin and Eyes. Do Not Ingest.
Storage: Store at Room Temperature. **Do not Freeze**.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits: N/A
Engineering Controls: N/A
Personal Protective Equipment:
Eyes: Safety Glasses
Skin: Latex or Nitrile Gloves and Lab Coat or Apron

9. PHYSICAL AND CHEMICAL PROPERTIES

Flashpoint: N/A
Autoignition Temperature: N/A
Boiliong Point: 100ºC, 212ºC
Melting Point: N/A
Vapor Pressure: 760 mm Hg

Vapor Density: N/A
% Solubility in Water: 100%

Pour Point: N/A
Molecular Formula: Mixture
Odor / Appearance: Odorless, clear to white liquid (depending on standard value)

Lower Flammability Limit: N/A
Upper Flammability Limit: N/A
Specific Gravity: 1.0
% Volatile: N/A
Evaporation Rate (Water=1): N/A
Viscosity: N/A
Octanol / Water Partition Coefficient: N/A
pH: Neutral (6.5-7.5)
Molecular Weight: Mixture

10. STABILITY AND REACTIVITY

Stability / Incompatibility: Product Stable Under General Use and Storage Conditions.
Hazardous Reactions / Decomposition Products: Hazardous polymerization will not occur

11. TOXICOLOGICAL INFORMATION

Symptoms of Overexposure: Irritation of the skin and eyes
Acute Effects: May cause skin, eye irritation
Eye Contact: May cause eye irritation
Skin Conatct: May cause skin irritation
Inhalation: N/A
Ingestion: N/A
Target Organs Effects: Skin and Eyes
Chronic Effects: N/A
Medical Conditions Aggravated by Exposure: Pre-existing skin and
Acute Toxicity Values: N/A

12. ECOLOGICAL INFORMATION

No Ecological Data Available

13. DISPOSAL CONSIDERATIONS

Dispose of in a manner consistent with Federal, State and Local Regulations.

14. TRANSPORT INFORMATION

US DOT (United States Department of Transportation): Not Regulated
IATA (International Air Transport Association): Not Regulated
IMO (International Maritime Organization): Not Regulated

15. REGULATORY INFORMATION

CERCLA: No
SARA/Title III: No
TSCA Inventory: Yes
Cal. Proposition 65: No
WHMIS: No
DSL: No
NDSL: No

16. OTHER INFORMATION

THE ABOVE INFORMATION IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST INFORMATION CURRENTLY AVAILABLE TO US. ALL PRODUCTS ARE OFFERED IN ACCORDANCE WITH THE MANUFACTURER'S CURRENT PRODUCTION SPECIFICATIONS AND ARE INTENDED SOLELY FOR USE IN ANALYTICAL TESTING. THE MANUFACTURER SHALL IN NO EVENT BE LIABLE FOR ANY INJURY, LOSS OR DAMAGE RESULTING FROM THE HANDLING, USE OR MISUSE OF THESE PRODUCTS.

0559 Rev. 17 September 25, 2014

Honeywell

SAFETY DATA SHEET

1. Identification

Product identifier	**Eyesaline Eyewash or Sterile Eyesaline**
Other means of identification	
Product code	32-000440-0000, 32-000451-0000, 32-000457-0000, 32-000497-0043, 32-000498-0043, 32-000452-0000, 32-000494-0043, 32-000445-0000, 32-000454-0000-H5, 32-000454-0000, 32-000454-0036, 32-000460-0000-H5, 32-000460-0000, 32-000460-0036, 32-000460-0052, 32-000465-0000, 32-000465-0052, 32-000455-0000-H5, 32-000455-0000, 32-000455-0036, 32-000461-0000, 32-000461-0036, 32-000461-0052, 32-000462-0000-H5, 32-000462-0000, 32-000462-0036, 32-000462-0052, 32-000456-0000, 32-000449-0043, 32-000446-0043
Recommended use	Emergency eyewash.
Recommended restrictions	None known.
Manufacturer/Importer/Supplier/Distributor information	
Company name:	Honeywell Safety Products USA, Inc
Address:	825 East Highway 151 Platteville, WI 53818 USA
Telephone:	800 873 5242
Contact Person	hsptechsupport@honeywell.com
E-mail:	msds@chemtrec.com
Emergency telephone number:	+1-703-741-5500 for USA/Canada

2. Hazard(s) identification

Physical hazards	Not classified.
Health hazards	Not classified.
OSHA defined hazards	Not classified.
Label elements	
Hazard symbol	None.
Signal word	None.
Hazard statement	The mixture does not meet the criteria for classification.
Precautionary statement	
Prevention	Observe good industrial hygiene practices.
Response	Wash hands after handling.
Storage	Store away from incompatible materials.
Disposal	Dispose of waste and residues in accordance with local authority requirements.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

3. Composition/information on ingredients

Mixtures

The manufacturer lists no ingredients as hazardous to health according to OSHA 29 CFR 1910.1200.

4. First-aid measures

Inhalation	If symptomatic, move to fresh air. Get medical attention if symptoms persist.
Skin contact	Wash skin with soap and water. Get medical attention promptly if symptoms occur after washing.
Eye contact	Remove contact lenses. Get medical attention promptly if symptoms occur after flushing.
Ingestion	Seek medical advice.

Most important symptoms/effects, acute and delayed	No specific symptoms noted.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

5. Fire-fighting measures

Suitable extinguishing media	Use fire-extinguishing media appropriate for surrounding materials.
Unsuitable extinguishing media	No restrictions known.
Specific hazards arising from the chemical	None.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	None.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. For industrial use, wear appropriate personal protective equipment (See Section 8).
Methods and materials for containment and cleaning up	Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Treat discharge into drains, water courses or onto the ground according to applicable regulations.

7. Handling and storage

Precautions for safe handling	Observe good industrial hygiene practices. Avoid inhalation of vapors and contact with skin and eyes.
Conditions for safe storage, including any incompatibilities	Keep at temperature not exceeding 43°C / 110°F. Do not allow material to freeze. Keep container closed. Store away from incompatible materials.

8. Exposure controls/personal protection

Occupational exposure limits	No exposure limits noted for ingredient(s).
Biological limit values	No biological exposure limits noted for the ingredient(s).
Exposure guidelines	No exposure standards allocated.
Appropriate engineering controls	Not normally needed.

Individual protection measures, such as personal protective equipment

Eye/face protection	None under normal conditions.
Skin protection	
Hand protection	Chemical resistant gloves are recommended.
Other	None under normal working conditions.
Respiratory protection	Not normally needed.
Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	Colorless liquid.
Physical state	Liquid.
Form	Liquid.
Color	Colorless.
Odor	No discernable odor.
Odor threshold	Not available.
pH	6.9 - 7.4
Melting point/freezing point	Not available.
Initial boiling point and boiling range	200 °F (93.3 °C)
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Vapor pressure	760 mm Hg
Vapor density	Not available.
Relative density	1
Solubility(ies)	
Solubility (water)	Completely soluble in water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials. Freezing. Elevated temperatures.
Incompatible materials	None.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Under normal conditions of intended use, this material is not expected to be an inhalation hazard.
Skin contact	Prolonged or repeated contact may dry skin and cause irritation.
Eye contact	May cause temporary eye irritation.
Ingestion	No harmful effects expected in amounts likely to be ingested by accident.
Symptoms related to the physical, chemical and toxicological characteristics	No specific symptoms noted.

Information on toxicological effects

Acute toxicity	Not expected to be acutely toxic.
Skin corrosion/irritation	Not classified.
Serious eye damage/eye irritation	Not classified.

Respiratory or skin sensitization

Respiratory sensitization	Not classified.
Skin sensitization	Not a skin sensitizer.
Germ cell mutagenicity	Not classified.
Carcinogenicity	Not classified.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Reproductive toxicity	Not classified.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not classified.
Chronic effects	Not classified.
Further information	No other specific acute or chronic health impact noted.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	No data available.
Bioaccumulative potential	The product is not expected to bioaccumulate.
Mobility in soil	The product is completely soluble in water. Expected to be mobile in soil.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose in accordance with all applicable regulations. Do not allow runoff to sewer, waterway or ground.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company. Waste codes should be assigned by the user based on the application for which the product was used.
Waste from residues / unused products	Dispose of in accordance with local regulations.
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

15. Regulatory information

US federal regulations This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Toxic Substances Control Act (TSCA) All components of the mixture on the TSCA 8(b) inventory are designated “active”.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Not regulated.

US. New Jersey Worker and Community Right-to-Know Act

Not listed.

US. Pennsylvania Worker and Community Right-to-Know Law

Not listed.

US. Rhode Island RTK

Not regulated.

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes

Country(s) or region	Inventory name	On inventory (yes/no)*
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

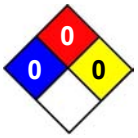
Issue date 02-July-2015

Revision date 21-October-2019

Version # 03

Further information The classification for health and environmental hazards is derived by a combination of calculation methods and test data, if available.

NFPA ratings



References EPA: Acquire database
ACGIH
ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices
HSDB® - Hazardous Substances Data Bank
IARC Monographs. Overall Evaluation of Carcinogenicity
National Toxicology Program (NTP) Report on Carcinogens
NLM: Hazardous Substances Data Base
US. IARC Monographs on Occupational Exposures to Chemical Agents
ESIS (European chemical Substances Information System)

Disclaimer This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

SAFETY DATA SHEET
Commercial ABC Dry Chemical (Fire Extinguishing Agent, Pressurized and Non-pressurized)

1. IDENTIFICATION

Product Name	Commercial ABC Dry Chemical (Fire Extinguishing Agent, Pressurized and Non-pressurized)
Other Names	Multi-Purpose, Ammonium Phosphate, Monoammonium Phosphate
Recommended use of the chemical and restrictions on use	
Identified uses	Fire Extinguishing Agent
Restrictions on use	Consult applicable fire protection codes
Company Identification	Badger Fire Protection 8767 Seminole Trail, Suite 202 Ruckersville, VA 22968 USA
Customer Information Number	(434)-964-3200
Emergency Telephone Number	
CHEMTREC Number	(800) 424-9300 (703) 527-3887 (International)
Issue Date	December 10, 2019
Supersedes Date	August 27, 2019

Safety Data Sheet prepared in accordance with OSHA's Hazard Communication Standard (29 CFR 1910.1200, the Canadian Hazardous Products Regulations (HPR) and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

2. HAZARD IDENTIFICATION

This SDS covers the product listed above as sold in pressurized and non-pressurized containers. GHS classifications for both forms are listed below.

GHS Classification – Pressurized

Hazard Classification
Gas under pressure – Compressed gas

Label Elements
Hazard Symbols



Signal Word: Warning

Hazard Statements
Contents under pressure; may explode if heated.

2. HAZARD IDENTIFICATION

Precautionary Statements
Prevention
None
Response
None
Storage
Protect from sunlight.
Sore in well-ventilated place.
Disposal
None

GHS Classification: Non - pressurized

Hazard Classification
This product is classified as not hazardous in accordance with the Globally Harmonized System of Classification and Labelling (GHS).

Label Elements
Hazard Symbols
None

Signal Word: None

Hazard Statements
None

Precautionary Statements
Prevention
None
Response
None
Storage
None
Disposal
None

Other Hazards

This product may contain small quantities of quartz (crystalline silica) as an impurity. Prolonged exposure to respirable crystalline silica dust at concentrations exceeding the occupational exposure limits may increase the risk of developing a disabling lung disease known as silicosis. IARC found limited evidence for pulmonary carcinogenicity of crystalline silica in humans.

Specific Concentration Limits
The values listed below represent the percentages of ingredients of unknown toxicity.

Acute oral toxicity	< 10%
Acute dermal toxicity	< 10%
Acute inhalation toxicity	< 10%
Acute aquatic toxicity	< 10%

3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is a mixture.

Component	CAS Number	Concentration*
Calcium Carbonate	471-34-1	10 – 30%
Mica	12001-26-2	0.5 – 1.5%
Kaolin Clay	1332-58-7	0.5 – 1.5%
Non-hazardous ingredients		
Monoammonium Phosphate	7722-76-1	45 – 70%
Ammonium Sulfate	7783-20-2	10 – 30%

Note: Pressurized product uses nitrogen or compressed air as the expellant.

*Exact concentration withheld as trade secret.

4. FIRST- AID MEASURES

Description of necessary first-aid measures
Eyes
Immediately flood the eye with plenty of water for at least 15 minutes, holding the eye open. Obtain medical attention if soreness or redness persists.
Skin
Wash skin thoroughly with soap and water. Obtain medical attention if irritation persists.
Ingestion
Dilute by drinking large quantities of water and obtain medical attention.
Inhalation
Move victim to fresh air. Obtain medical attention immediately for any breathing difficulty.

Most important symptoms/effects, acute and delayed
Aside from the information found under Description of necessary first aid measures (above) and Indication of immediate medical attention and special treatment needed, no additional symptoms and effects are anticipated.

Indication of immediate medical attention and special treatment needed
Notes to Physicians
Treat symptomatically.

5. FIRE - FIGHTING MEASURES

Suitable Extinguishing Media
This preparation is used as an extinguishing agent and therefore is not a problem when trying to control a fire. Use extinguishing agent appropriate to other materials involved. Keep pressurized containers and surroundings cool with water spray as they may rupture or burst in the heat of a fire.

Specific hazards arising from the chemical
Pressurized containers may explode in heat of fire.

Special Protective Actions for Fire-Fighters
Wear full protective clothing and self-contained breathing apparatus as appropriate for specific fire conditions.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Wear appropriate protective clothing. Prevent skin and eye contact. Remove leaking container to a safe place. Ventilate the area.

Environmental Precautions
Prevent large quantities of the material from entering drains or watercourses.

Methods and materials for containment and cleaning up
Sweep up or vacuum and transfer into suitable containers for recovery or disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Wear appropriate protective clothing. Prevent skin and eye contact.

Conditions for safe storage
Pressurized containers should be properly stored and secured to prevent falling or being knocked over. Do not drag, slide or roll pressurized containers. Do not drop pressurized containers or permit them to strike against each other. Never apply flame or localized heat directly to any part of the pressurized or plastic container. Store pressurized and plastic containers away from high heat sources. Storage area should be:
- cool - dry - well ventilated - under cover - out of direct sunlight

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
Exposure limits are listed below, if they exist.

Calcium Carbonate
OSHA PEL: 15 mg/m3 TWA, total dust
5 mg/m3 TWA, respirable fraction

Mica
ACGIH TLV: 3 mg/m^3 TWA, measured as respirable fraction of the aerosol.
OSHA PEL**:** 20 mppcf, <1% crystalline silica

Kaolin
ACGIH TLV: 2 mg/m^3 TWA, for particulate matter containing no asbestos and <1% Crystalline silica
OSHA PEL: 15 mg/m^3 TWA, total dust
5 mg/m^3 TWA, respirable fraction

Particulates not otherwise classified /regulated
OSHA PEL: 50 mppcf or 15 mg/m^3 TWA, total dust
15 mppcf or 5 mg/m^3 TWA, respirable fraction

Appropriate engineering controls
Use with adequate ventilation. If this product is used in a pressurized system, there should be local procedures for the selection, training, inspection and maintenance of this equipment. When used in large volumes, use local exhaust ventilation.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Individual protection measures
Respiratory Protection
Not normally required. Use dust mask where dustiness is prevalent, or TLV is exceeded. In oxygen deficient atmospheres, use a self contained breathing apparatus, as an air purifying respirator will not provide protection.
Skin Protection
Gloves
Eye/Face Protection
Chemical goggles or safety glasses with side shields.
Body Protection
Normal work wear.

9. PHYSICAL AND CHEMICAL PROPERTIES

Non- Pressurized

Appearance	
Physical State	Solid (powder)
Color	Pale Yellow
Odor	Odorless
Odor Threshold	No data available
pH	Not applicable
Specific Gravity	No data available
Boiling Range/Point (°C/F)	Not applicable
Melting Point (°C/F)	No data available
Flash Point (PMCC) (°C/F)	Not flammable
Vapor Pressure	No data available
Evaporation Rate (BuAc=1)	No data available
Solubility in Water	No data available
Vapor Density (Air = 1)	Not applicable
VOC (g/l)	None
VOC (%)	None
Partition coefficient (n-octanol/water)	No data available
Viscosity	No data available
Auto-ignition Temperature	No data available
Decomposition Temperature	No data available
Upper explosive limit	No data available
Lower explosive limit	No data available
Flammability (solid, gas)	No data available

Expellant - Nitrogen

Appearance	
Physical State	Compressed gas
Color	Colorless
Odor	None
Odor Threshold	No data available
pH	Not applicable
Specific Gravity	0.075 lb/ft^3 @70^{o}F as vapor
Boiling Range/Point (°C/F)	-196^{o}C/-321 ^{o}F
Melting Point (°C/F)	-210˚C/-346˚F
Flash Point (PMCC) (°C/F)	Not flammable

9. PHYSICAL AND CHEMICAL PROPERTIES

Vapor Pressure	No data available
Evaporation Rate (BuAc=1)	Not applicable
Solubility in Water	0.02 g/L
Vapor Density (Air = 1)	0.97
VOC (g/l)	Not applicable
VOC (%)	Not applicable
Partition coefficient (n-octanol/water)	No data available
Viscosity	Not applicable
Auto-ignition Temperature	No data available
Decomposition Temperature	No data available
Upper explosive limit	Not explosive
Lower explosive limit	Not explosive
Flammability (solid, gas)	Not flammable

10. STABILITY AND REACTIVITY

Reactivity
Pressurized containers may rupture or explode if exposed to heat.

Chemical Stability
Stable under normal conditions.

Possibility of hazardous reactions
Hazardous polymerization will not occur.

Conditions to Avoid
Exposure to direct sunlight - contact with incompatible materials

Incompatible Materials
Strong oxidizing agents - strong acids - sodium hypochlorite

Hazardous Decomposition Products
Oxides of carbon - ammonia - oxides of phosphorus - nitrogen oxides

11. TOXICOLOGICAL INFORMATION

Acute Toxicity
Mica:
Oral LD50 (Rat) >2000 mg/kg
Kaolin (clay):
Oral LD50 (Rat) >5000 mg/kg
Dermal LD50 (Rabbit) >5000mg/kg
Nitrogen
Simple asphyxiant

Specific Target Organ Toxicity (STOT) – single exposure
Nitrogen: Exposure to nitrogen gas at high concentrations can cause suffocation by reducing oxygen available for breathing. Breathing very high concentrations can cause dizziness, shortness of breath, unconsciousness or asphyxiation.

11. TOXICOLOGICAL INFORMATION

Specific Target Organ Toxicity (STOT) – repeat exposure
No relevant studies identified.

Serious Eye damage/Irritation
Mica: Not irritating (rabbit)

Skin Corrosion/Irritation
Mica: Not irritating (rabbit)

Respiratory or Skin Sensitization
No relevant studies identified.

Carcinogenicity
This product may contain small quantities of quartz (crystalline silica) as an impurity. Prolonged exposure to respirable crystalline silica dust at concentrations exceeding the occupational exposure limits may increase the risk of developing a disabling lung disease known as silicosis. IARC has classified Silica Dust, Crystalline, in the form of quartz or cristobalite as 1 (carcinogenic to humans).

Germ Cell Mutagenicity
No relevant studies identified.

Reproductive Toxicity
No relevant studies identified.

Aspiration Hazard
Not an aspiration hazard.

12. ECOLOGICAL INFORMATION

Ecotoxicity
No relevant studies identified.

Mobility in soil
No relevant studies identified.

Persistence/Degradability
No relevant studies identified.

Bioaccumulative Potential
No relevant studies identified.

Other adverse effects
No relevant studies identified.

13. DISPOSAL CONSIDERATIONS

Disposal Methods
Dispose of container in accordance with all applicable local and national regulations.

14. TRANSPORT INFORMATION

Safety Data Sheet information is intended to address a specific material and not various forms or states of containment.

Special Precautions for Shipping:

Individuals must be certified as Hazardous Material Shipper for all transportation modes.
Pressurized Fire Extinguishers are considered a hazardous material by the US Department of Transportation and Transport Canada.

DOT CFR 172.101 Data	Fire extinguishers, 2.2, UN1044
UN Proper Shipping Name	Fire extinguishers
UN Class	(2.2)
UN Number	UN1044
UN Packaging Group	Not applicable
Classification for AIR Transportation (IATA)	Consult current IATA Regulations prior to shipping by air.
Classification for Water Transport IMDG	Consult current IMDG Regulations prior to shipping by water.

When shipping via ground, portable fire extinguishers pressurized to less than 241 psi and of less than 1100 cubic inches in size meet the requirements of “Limited Quantity” as referenced in 49 CFR 173.309 (2010). There is no limited quantity designation for fire extinguishers when shipped by air or water.

This section is believed to be accurate at the time of preparation. It is not intended to be a complete statement or summary of the applicable laws, rules, or hazardous material regulations, and is subject to change. Users have the responsibility to confirm compliance with all laws, rules, and hazardous material regulations in effect at the time of shipping.

15. REGULATORY INFORMATION

United States TSCA Inventory
This product contains ingredients that are listed on or exempt from listing on the EPA Toxic Substance Control Act Chemical Substance Inventory.

Canada DSL Inventory
All ingredients in this product are listed on the Domestic Substance List (DSL) or the Non-Domestic Substance List (NDSL) or are exempt from listing.

SARA Title III Sect. 311/312 Categorization: Pressurized
Gas under pressure
SARA Title III Sect. 311/312 Categorization: Non-pressurized
None

SARA Title III Sect. 313
This product does not contain any chemicals that are listed in Section 313 at or above de minimis concentrations.

16. OTHER INFORMATION

NFPA Ratings
NFPA Code for Health - 1
NFPA Code for Flammability - 0
NFPA Code for Reactivity - 0
NFPA Code for Special Hazards - None

Legend
ACGIH: American Conference of Governmental Industrial Hygienists
CAS#: Chemical Abstracts Service Number
EC50: Effect Concentration 50%
IARC: International Agency for Research on Cancer
LC50: Lethal Concentration 50%
LD50: Lethal Dose 50%
N/A: Denotes no applicable information found or available
OSHA: Occupational Safety and Health Administration
PEL: Permissible Exposure Limit
STEL: Short Term Exposure Limit
TLV: Threshold Limit Value
TSCA: Toxic Substance Control Act

Revision Date: December 10, 2019
Replaces: August 27, 2019
Changes made: Update to Sections 3, 8 and 9.

Information Source and References
This SDS is prepared by Hazard Communication Specialists based on information provided by internal company references.

Prepared By: EnviroNet LLC.

The information and recommendations presented in this SDS are based on sources believed to be accurate. Badger Fire Protection assumes no liability for the accuracy or completeness of this information. It is the user's responsibility to determine the suitability of the material for their particular purposes. In particular, we make NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, with respect to such information, and we assume no liability resulting from its use. Users should ensure that any use or disposal of the material is in accordance with applicable Federal, State, and local laws and regulations.

The Clorox Company

SAFETY DATA SHEET

1. Identification

Product identifier **Clorox Disinfectant Wipes - Fresh Scent**

Other means of identification EPA 5813-79

Document Number: US001094

Recommended use Disinfectant

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name The Clorox Company

Address 1221 Broadway
Oakland, CA 94612
United States

Telephone 1-510-271-7000

E-mail Not available.

Emergency phone number Medical Emergency: 1-800-446-1014
Transportation Emergency: 1-800-424-9300 (Chemtrec)

2. Hazards Identification

Physical hazards Not classified.

Health hazards Not classified.

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Hazard symbol None.

Signal word None.

Hazard statement The mixture does not meet the criteria for classification.

Precautionary statement

Prevention Observe good industrial hygiene practices.

Response Wash hands after handling.

Storage Store away from incompatible materials.

Disposal Dispose of container in accordance with local, regional, national and international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information This SDS is designed for workplace employees, emergency personnel and for other conditions and situations where there is greater potential for large-scale or prolonged exposure. This SDS is not applicable for consumer use of our products. For consumer use, all precautionary and first aid language is provided on the product label in accordance with the applicable government regulations.

3. Composition/Information on Ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
n-Alkyl (C12, 68%; C14, 32%) Dimethyl Ethylbenzyl Ammonium Chloride		85409-23-0	0.184
n-Alkyl (C14, 60%; C16, 30%; C12, 5%; C18, 5%) Dimethyl Benzyl Ammonium Chloride		53516-76-0	0.184

All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Composition comments US GHS: The exact percentage (concentration) of composition has been withheld as a trade secret in accordance with paragraph (i) of §1910.1200.

4. First Aid Measures

Inhalation	If breathed in, move person into fresh air.
Skin contact	If on skin, rinse well with water.
Eye contact	IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses if present, after the first 5 minutes, then, continue rinsing eye. Call a poison control center or doctor for treatment advice.
Ingestion	If swallowed, call a Poison Control Center or doctor immediately. DO NOT induce vomiting.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Symptoms may be delayed. Have the product container or label with you when calling a poison control center, doctor, or going for treatment. For further information, call (800) 227-1860
General information	If you feel unwell, seek medical advice (show the label where possible). Show this safety data sheet to the doctor in attendance. Avoid contact with eyes and skin. KEEP OUT OF REACH OF CHILDREN AND PETS.

5. Fire Fighting Measures

Suitable extinguishing media	Treat for surrounding material.
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Prevent entry into waterways, sewer, basements or confined areas. Pick up and discard towelette. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Do not discharge into lakes, streams, ponds or public waters.

7. Handling and Storage

Precautions for safe handling	Avoid contact with eyes and skin. Provide adequate ventilation. Wear appropriate personal protective equipment. Wash thoroughly after handling. Use good industrial hygiene practices in handling this material. When using do not eat or drink.
Conditions for safe storage, including any incompatibilities	Do not use or store near heat or open flame. Store away from incompatible materials (see Section 10 of the SDS). KEEP OUT OF REACH OF CHILDREN.

8. Exposure Controls/Personal Protection

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection	Not normally required under normal use conditions.
Skin protection	
Hand protection	Not normally required when used as directed. For prolonged use, wear rubber gloves.
Other	Wear appropriate chemical resistant clothing. As required by employer code.

Respiratory protection	Where exposure guideline levels may be exceeded, use an approved NIOSH respirator. Respirator should be selected by and used under the direction of a trained health and safety professional following requirements found in OSHA's respirator standard (29 CFR 1910.134), CAN/CSA-Z94.4 and ANSI's standard for respiratory protection (Z88.2).
Thermal hazards	Not applicable.
General hygiene considerations	Wash hands before breaks and immediately after handling the product. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. When using do not eat or drink.

9. Physical and Chemical Properties

Appearance	Clear
Physical state	Liquid.
Form	Liquid saturated on wipe.
Color	clear liquid on a wipe
Odor	Fruity, Apple, Floral
Odor threshold	Not available.
pH	6 - 9 (Liquid)
Melting point/freezing point	Not available.
Initial boiling point and boiling range	Not available.
Pour point	Not available.
Specific gravity	Not available.
Partition coefficient (n-octanol/water)	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	1 (Liquid)
Solubility(ies)	Wipe is not soluble
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

10. Stability and Reactivity

Reactivity	This product may react with strong oxidizing agents.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Chemical stability	Material is stable under normal conditions.
Conditions to avoid	Do not mix with other chemicals.
Incompatible materials	Oxidizers. Acids.
Hazardous decomposition products	May include and are not limited to: Oxides of carbon. Oxides of nitrogen. Ammonia. Chlorine gas.

11. Toxicological Information

Information on likely routes of exposure

Inhalation	No adverse effects due to inhalation are expected. Excessive intentional inhalation may cause respiratory tract irritation.
Skin contact	Not expected to be a primary skin irritant.

Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	May cause stomach distress, nausea or vomiting.
Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity See below.

Components	**Species**	**Test Results**
n-Alkyl (C12, 68%; C14, 32%) Dimethyl Ethylbenzyl Ammonium Chloride (CAS 85409-23-0)		
Acute		
Dermal		
LD50	Rabbit	2300 mg/kg, ECHA
Inhalation		
LC50	Not available	
Oral		
LD50	Rat	344 mg/kg, ECHA

Skin corrosion/irritation	Not expected to be a primary skin irritant.
Exposure minutes	Not available.
Erythema value	Not available.
Oedema value	Not available.
Serious eye damage/eye irritation	Direct contact with eyes may cause temporary irritation.
Corneal opacity value	Not available.
Iris lesion value	Not available.
Conjunctival reddening value	Not available.
Conjunctival oedema value	Not available.
Recover days	Not available.
Respiratory or skin sensitization	
Respiratory sensitization	Not available.
Skin sensitization	Not available.
Germ cell mutagenicity	Not available.

Carcinogenicity

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not available.
Specific target organ toxicity - repeated exposure	Not available.
Aspiration hazard	Not an aspiration hazard.
Chronic effects	Not available.
Further information	Not available.

12. Ecological Information

Ecotoxicity	Not available.
Persistence and degradability	Not available.
Bioaccumulative potential	Not available.
Mobility in soil	Not available.
Mobility in general	Not available.
Other adverse effects	Not available.

13. Disposal Considerations

Disposal instructions Review federal, provincial, and local government requirements prior to disposal. Dispose of wipe in trash after use. Do not flush.

Waste from residues / unused products Not available.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport Information

General Canada: TDG Proof of Classification:
Classification Method: Classified as per Part 2, Sections 2.1 – 2.8 of the Transportation of Dangerous Goods Regulations. If applicable, the technical name and the classification of the product will appear below.

Canada: TDG: Not regulated as dangerous goods.

US: DOT: Not regulated as dangerous goods.

IMDG: Not regulated as dangerous goods.

IATA: Not regulated as dangerous goods.

15. Regulatory Information

US federal regulations This product is NOT known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

This chemical is a pesticide product registered by the United States Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS), and for workplace labels of non-pesticide chemicals. The hazard information required on the pesticide label is reproduced below. The pesticide label also includes other important information, including directions for use.

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

EPA 5813-79

PRECAUTIONARY STATEMENTS: HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION: Causes moderate eye irritation. Avoid contact with eyes or clothing. Wash thoroughly with soap and water after handling.

PHYSICAL OR CHEMICAL HAZARDS: Do not use or store near heat or open flame.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance No

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)	Not regulated.
Food and Drug Administration (FDA)	Not regulated.

US state regulations See below

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

California Proposition 65

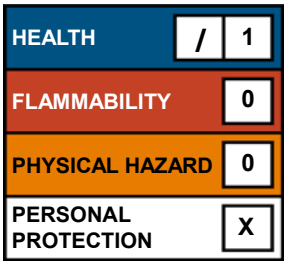
This product is not subject to warning labeling under the California Proposition 65 regulation.

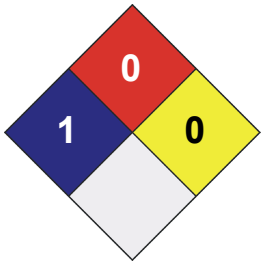
Country(s) or region	Inventory name	On inventory (yes/no)*
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s)

16. Other Information

LEGEND	
Severe	4
Serious	3
Moderate	2
Slight	1
Minimal	0





Disclaimer The information in the safety data sheet was written by Dell Tech Laboratories Ltd. (www.delltech.com) based on the best knowledge and experience currently available. Information contained herein was obtained from sources considered technically accurate and reliable. While every effort has been made to ensure full disclosure of product hazards, in some cases data is not available and is so stated. Since conditions of actual product use are beyond control of the supplier, it is assumed that users of this material have been fully trained according to the requirements of all applicable legislation and regulatory instruments. No warranty, expressed or implied, is made and supplier will not be liable for any losses, injuries or consequential damages which may result from the use of or reliance on any information contained in this document.

Issue date 26-July-2021

Version # 01

Further information Not available.

Other information For an updated SDS, please contact the supplier/manufacturer listed on the first page of the document.

Item: Not available

Reference Item: 174096.001

Prepared by: The Clorox Company, 4900 Johnson Drive, Pleasanton, CA 94588, 925-368-6000

APPENDIX F – COMMUNITY AIR MONITORING PLAN

DRAFT

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX G – SITE MANAGEMENT FORM

DRAFT

NATIONAL GRID
FORMER SCHOLES STREET HOLDER STATION SITE
BROOKLYN, NEW YORK
SITE NO. 224067

SITE-WIDE INSPECTION FORM

Site Addresses: 154 Bogart Street, 338 Scholes Street, and 350 Scholes Street, Brooklyn, King County, New York.

Date and Time of Inspection: _____

Inspector (Name, Title, and Affiliation): _____

Weather Conditions: _____

Describe repairs, maintenance, or corrective actions implemented since previous inspection: _____

_____

_____

_____

_____

ATTACH PHOTOGRAPHS OF AREAS OR ITEMS INSTALLED, REPAIRED, OR REPLACED

General Site Conditions:

	Acceptable	Unacceptable
Pavement and Sidewalks	_____	_____
Building and/or Foundation Cover	_____	_____
Vegetative Cover (if applicable)	_____	_____

DRAFT

Site Cover System:

Any signs/evidence of ground-intrusive activities (e.g., excavating, trenching, etc.), soil disturbance regardless of quantity/extent, erosion, settlement, or if applicable, bare or sparsely-vegetated areas?

☐ No ☐ Yes; describe: _____

ATTACH PHOTOGRAPHS OF AREAS OF DISTURBANCE

Any signs/evidence of use of the Site in a manner inconsistent with the previous Site uses?

☐ No ☐ Yes; describe: _____

ATTACH PHOTOGRAPHS OF AREAS OF NON-COMPLIANCE

Describe any repairs, maintenance, or corrective actions required to correct observed deficiencies: _____

ATTACH PHOTOGRAPHS OF DEFICIENT AREAS OR ITEMS OBSERVED DURING THE INSPECTION

Inspector's Signature:

Signature: _____ Date: _____

DRAFT

APPENDIX H – NYSDEC CORRESPONDENCE

DRAFT

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau C
625 Broadway, 11th Floor, Albany, NY 12233-7014
P: (518) 402-9662 I F: (518) 402-9679
www.dec.ny.gov

December 31, 2019

Donald Campbell
Project Manager
Site Investigation and Remediation
National Grid
2887 Maspeth Avenue
Brooklyn, NY 11211

Re: Environmental Easement for Former K-Scholes Street Station Site ("Site")
Site ID No.: 224067
Brooklyn, Kings County

Dear Mr. Campbell:

The above referenced Site requires an Environmental Easement as part of the remediation process. Information on finalizing remedial projects may be found on the Department's website at http://www.dec.ny.gov/chemical/48236.html. There are several items which constitute the New York State Department of Environmental Conservation's standard Environmental Easement package. These items include the following:

a) Title requirements;
b) Survey requirements;
c) Attorney/Applicant Checklist and Certification; and
d) Notice form.

Please note that the requirements for completing an environmental easement have recently been significantly reduced. Information on these items can be found on the Department's website page at the following links:

Title Requirements - http://www.dec.ny.gov/chemical/48231.html

Survey Requirements - http://www.dec.ny.gov/chemical/48242.html

Easement Checklist - http://www.dec.ny.gov/chemical/65118.html

Please work with your attorney to compile the package and submit it within 60 days of the date of this letter. Upon receipt of these documents the Department will prepare the Environmental Easement and transmit it to you for signature. Any questions regarding the legal requirements should be addressed to **Bradford Burns, Senior Attorney,** Office of General Counsel, at 518-402-9188 or by email: bradford.burns@dec.ny.gov. When the package has been completed with site-specific information, a hard copy must be submitted in its entirety to:

Bradford Burns, Esq.
New York State Department of Environmental Conservation
Office of General Counsel
625 Broadway
Albany, NY 12233-1500

An electronic copy of the package should be forwarded to:

Bradford Burns, Esq.
bradford.burns@dec.ny.gov.

Scott Deyette
scott.deyette@dec.ny.gov

Please be advised that failure to include all the necessary documentation/information required in the Environmental Easement package will result in a delay of Department review and approval of the Easement.

If you have any questions concerning the technical aspects of this matter, please contact me at (518) 402-9794.

Sincerely,



Scott Deyette
Chief, Inspection Unit
Remedial Bureau C

ec: J. Brown
B. Burns
J. Andaloro