SUPPLEMENTAL SITE CHARACTERIZATION WORK PLAN

QUEENSBURY LANDFILL
RIDGE ROAD
QUEENSBURY, WARREN COUNTY, NEW YORK 12801
NYSDEC SITE NO. 557005

Prepared for:

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233

Prepared by:

TRC Engineers, Inc.
3 Corporate Drive, Suite 202
Clifton Park, New York 12065

TRC Project No. 453202.0000.0000

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Acronyms and Abbreviations

AMSL	Above Mean Sea Level
ASP	Analytical Services Protocol
bgs	Below Ground Surface
BTEX	Sum of Benzene, Toluene, Ethylbenzene, and Xylene
C&D	Construction and Demolition debris
CAMP	Community Air Monitoring Plan
CHA	CHA Consulting, Inc. of Albany, New York
Class GA Values	NYSDEC Technical and Operational Guidance Series 1.1.1 Class GA Values
cm/sec	Centimeters Per Second
CSIA	Compound Specific Isotope Analysis
cu yds	Cubic Yards
DER	Division of Environmental Remediation
DER-10	NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation
DG	Dunn Geoscience Corporation of Latham, New York
DUSRs	Data Usability Summary Reports
DMM	Division of Materials Management
EDDs	Electronic Data Deliverables
ELAP	Environmental Laboratory Approval Program
EM/RF	Electro-Magnetic/Radio Frequency
ESA	Environmental Site Assessment
FAP	Field Activities Plan
GPR	Ground Penetrating Radar
GSR	Green and Sustainable Remediation
HASP	Health and Safety Plan
HDPE	High-Density Polyethylene
ILI	NYSDEC Inactive Landfill Initiative
MS/MSD	Matrix Spike/Matrix Spike Duplicate
ng/L	Nanograms Per Liter
NTUs	Nephelometric Turbidity Units
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PAHs	Polycyclic Aromatic Hydrocarbons
Parsons	Parsons of Syracuse, New York
PCBs	Polychlorinated Biphenyls
PFAS	Per- and Polyfluoroalkyl Substances

Acronyms and Abbreviations (cont.)

PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PPE	Personal Protective Equipment
PLS	Professional Land Surveyor
PVC	Poly-Vinyl Chloride
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
Ramboll	Ramboll of Syracuse, New York
RCRA	Resource Conservation and Recovery Act
RIHWDS	New York State Registry of Inactive Hazardous Waste Disposal Sites
ROW	Right of Way
SC	Site Characterization
SCGs	Standards, Criteria, and Guidance
SOW	Scope of Work
SSHASP	Site-specific HASP
SVOCs	Semi-Volatile Organic Compounds
TAL	Target Analyte List
TCL	Target Compound List
TOGS	Technical and Operational Guidance Series 1.1.1
TRC	TRC Engineers, Inc.
ug/L	Micrograms Per Liter
URS	URS Consultants of Buffalo, New York
USCS	Unified Soil Classification System
USDA	United Stated Department of Agriculture
USGS	United States Geological Survey
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WA	Work Assignment
Wehran	Wehran Engineering of Middletown, New York
Work Plan	Site Characterization Work Plan

1.0 Introduction

TRC Engineers, Inc. (TRC) has prepared this Supplemental Site Characterization (SC) Work Plan (Work Plan) to describe the investigation activities to be performed south of the Queensbury Landfill (the Site), which is located on Ridge Road, Queensbury, Warren County, New York. The Site is designated by the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER) as Site No. 557005 under its Inactive Hazardous Waste Disposal Site Program (New York State Superfund Program). TRC will complete the proposed Supplemental SC activities in accordance with the July 9, 2021, NYSDEC DER Work Assignment (WA) Approval Letter for Standby Engineering Services Contract No. D009812 for a Site Characterization, the November 29, 2021 and May 31, 2023, NYSDEC-approved Scopes of Work (SOWs), and NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation (DER-10).

Under the NYSDEC Inactive Landfill Initiative (ILI) Program and in January 2020, NYSDEC's Division of Materials Management (DMM) performed groundwater sampling at the Queensbury Landfill and found detections of 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS), specifically perfluorooctanoic acid (PFOA). While groundwater at the Site is not used for drinking purposes, these findings led to a recommendation by the New York State Department of Health (NYSDOH) to sample off-Site private drinking water. As a result and in March 2021, the NYSDEC designated the Site as a potential inactive hazardous waste disposal site, which prompted a Site Characterization investigation.

The purpose of the Supplemental SC activities described in this Work Plan is to expand upon prior investigations by further defining the nature and extent of potential contamination and to provide an expanded knowledge of environmental conditions (e.g., soil and groundwater) off-Site and downgradient of the Queensbury Landfill. Specifically, the downgradient Harris Mud Pond Mine, neighborhood of Jenkinsville, and Ridge Jenkinsville Recreational Park are the target areas for this Supplemental SC.

As presented in **Figure 1**, the Queensbury Landfill is surrounded by three additional landfills and several active sand and gravel mines, some or all which may be considered a contributing upgradient source should downgradient impacts be identified during this Supplemental SC. As such, brief descriptions related to origins, reported waste disposal, historical operations/activities, regulatory actions, current use, as well as development history for the Site and surrounding areas presented in this Work Plan.

2.0 Site Description and History

2.1 Site Location and Setting

The Site is situated within a mixed residential and commercial area in the Town of Queensbury, Warren County, New York approximately five miles southeast of Lake George Village. The Queensbury Landfill is bordered to the north by the O'Connor Bank Mine (Mine ID No. 50037), Torrington Pit Mine (Mine ID No. 50001), Ridge Road, and forested land; to the east by the Finch Pruyn Paper Landfill (NYSDEC Site No. 557002); to the south by the Jenkinsville Pit Mine (Mine ID No. 50296), Harris Mud Pond (Mine ID No. 50453), Mud Pond, and residential properties; and, to the west by the Ciba-Geigy Landfill NYSDEC Site No. 557004), Jenkinsville Road, the McLaughlin Landfill (Solid Waste ID No. 57D01), and the McLaughlin Pit Mine (Mine ID No. 50074). A United States Geological Survey (USGS) 7.5-minute topographic map showing the Site location and surrounding land features is provided on **Figure 1**. The Site layout, including bordering properties, is presented on **Figure 2**.

The Site is an irregularly shaped parcel approximately 50-acres in size and identified on the Warren County Tax Map as parcel numbers 279.-1-14.1 and 279.-1-13. The Site is currently owned by the Town of Queensbury and can be accessed via Ridge Road to the northwest.

Approximately 100-feet southeast of the Queensbury Landfill is Mud Pond, a surface water body/wetland area previously reported to be 12 acres in size. An unnamed tributary drains Mud Pond to the south then southeast. Approximately 1/2-mile downstream, the tributary joins Halfway Creek. Approximately 2,000 feet south of the Site is the residential neighborhood of Jenkinsville and Ridge Jenkinsville Recreational Park.

2.2 Site Geology and Hydrogeology

As reported in the *April 1992 Phase II Environmental Site Assessment* (ESA), completed by URS Consultants of Buffalo, New York (URS) on behalf of the NYSDEC, and confirmed through the United States Department of Agriculture (USDA) Web Soil Survey, surface soils at and in the vicinity of the Site are characterized as the Hinckley, Oakville, and Plainfield series. These surface soil types are developed as glacial deposits, are generally deep, well to excessively drained, and have hydraulic conductivities of 6 to 20 inches/hour (4.2×10^{-3} to 1.4×10^{-2} centimeters per second (cm/sec)). Soils encountered during the installation of monitoring wells during the *April 1992 Phase II ESA* consisted of sand, gravel, and cobbles to the terminal depth of each boring ranging from 22 to 180 feet below ground surface (bgs).

Bedrock beneath the Site has not been identified due to the thick overburden, however the *April 1992 Phase II ESA* reported that the area is underlain by the Cambria-Ordovician Beekmantown

Group, a late Cambrian to lower-middle Ordovician geologic group consisting of undifferentiated dolomitic sandstones and limestones.

The water-bearing unit of interest underlying the Site is an unconfined sand and gravel aquifer within a kame terrace. A deep bedrock aquifer underlying the sand and gravel overburden also exists, but the degree of hydraulic connection between the two units is not known. Based on slug test data collected on monitoring wells installed during the *April 1992 Phase II ESA*, hydraulic conductivity of overburden groundwater ranged approximately from 10^{-5} to 10^{-3} cm/sec.

2.3 Topography and Site Drainage

Ground surface elevations at the Queensbury Landfill range from approximately 500 to 400 feet above mean sea level (AMSL). Steep relief is present at the Site due to historical infilling. Elevation in the Site's vicinity decreases and flattens to the south towards the Jenkinsville residential neighborhood to elevations between 360 to 320 feet AMSL.

Site surface water flow is primarily to the south, however generally flows the direction of facility sloping. Due to its lower elevation, Mud Pond appears to receive surface water runoff from the Queensbury Landfill. During TRC's Site visit activities, rip rap surface water drainage swales were identified on the Site in an east-west orientation.

2.4 Site Features and Use

The Queensbury Landfill is a municipally owned and operated solid waste disposal facility. Currently, the Town of Queensbury operates a transfer station the northwest portion of the Site along Ridge Road, accepting household waste from the surrounding area. The Site is listed as property class LC-10A – Limited Commercial within a land conservation district type. There is a monitoring well network (identified as MW-1 through MW-5, installed during the *April 1992 Phase II ESA*, and E-1, E-2, E-3, and DO-1, installed during prior investigations), as well as three elevated leachate collection manholes located southeast and downgradient of the landfill cap.

The Queensbury Landfill currently implements a post-closure monitoring program consisting of routine groundwater sampling, surface water sampling, and Site inspections in accordance with 6 New York Codes, Rules, and Regulations (NYCRR) Part 360.

2.5 Off-Site Features and Use

The Queensbury Landfill is surrounded by several other landfills and mining pits which, due to their proximity, may be relevant to soil and groundwater environmental conditions as well as possible downgradient receptors (i.e., Jenkinsville residential neighborhood). The following is a

summary of information obtained from the *April 1992 Phase II ESA,* other documents made available to TRC, as well as researched historical aerial photography. Information from prior reporting has been incorporated in this Work Plan by reference. Procured historical aerial photographs (years 1942, 1947, 1960, 194, 1979, 1986, 1995, 2006, 2008, 2009, 2011, 2013, 2015, 2017, 2019, and 2021), as referenced below, can be found in **Appendix A**.

2.5.1 Ciba-Geigy Landfill

The Ciba-Geigy Landfill, located southwest of (and adjacent to) the Queensbury Landfill, is a closed and privately owned/operated seven acre hazardous waste landfill, on land leased from the Town of Queensbury. The Ciba-Geigy Landfill began as a gravel pit before accepting hazardous paint sludge from the former Ciba-Geigy – Hercules wastewater treatment plant located in Queensbury, New York. Like the Queensbury Landfill, the Ciba-Geigy Landfill has steep topographic relief due to historical infilling. Based on a review of aerial photography, landfilling is visibly apparent at the facility by 1979.

Currently, the Ciba-Geigy Landfill has a double bentonite liner and was capped and closed in the fall of 1990. An extensive monitoring well network has since been installed at the Landfill during its years of operation, all of which are within the facility's chain link fence enclosure and accessed via Jenkinsville Road. A leachate container is present, which collects leachate from a centralized location on the Landfill, as well as a truck run-off station.

In April 2010, a corporate reorganization resulted in a transfer of substantially all assets and liabilities of Ciba Corporation to its parent company, BASF Corporation. BASF Corporation has therefore become the owner and operator of the facility.

The Ciba-Geigy Landfill (and BASF) currently implements a post-closure monitoring program consisting of routine groundwater sampling and facility inspections in accordance with 6NYCRR Part 360.In addition, the facility has been assigned NYSDEC Site No. 557004 and is currently classified as C, which means the NYSDEC has determined that remediation has been satisfactorily completed under a remedial program.

2.5.2 McLaughlin Landfill

The McLaughlin Construction and Demolition Debris (C&D) Landfill, located southwest of the Site, is a municipally owned and operated closed landfill. The 8.5-acre inactive Landfill began as a gravel pit before accepting C&D waste from approximately 1992 to 1999. Following landfilling operations, the facility was issued a Consent Order by the NYSDEC and was closed and capped with a geomembrane and soil cover system under final closure and operation plans. The Landfill has steep topographic relief due to historical infilling of the former gravel pit.

Currently, the McLaughlin Landfill utilizes five monitoring wells (MW-1 through MW-5), installed as part of the NYSDEC's ILI Program in 2019. The McLaughlin Landfill is not fenced and is accessed via Jenkinsville Road. The McLaughlin Landfill has been assigned a NYSDEC solid waste identification no. 57D01.

2.5.3 Finch-Pruyn Paper Landfill

The Finch-Pruyn Paper Landfill, located east/northeast of the Site, is a privately-owned and operated closed landfill that encompasses approximately 40-acres of a larger 186-acre parcel, also owned by Finch-Pruyn Paper. The Landfill was active from approximately 1977 to 1997, and reportedly received only dewatered paper mill sludge. During the summers of 1998 and 1999, the Landfill was closed and capped with a geomembrane and soil cover system.

There are currently eight perimeter monitoring wells (MW-1, MW-2, MW-3AR, MW-4D, MW-4E, MW-A, MW-B, and MW-C) five of which are sampled on a routine basis (MW-1, MW-2, MW-3AR, MW-4D, and MW-4E). The Finch-Pruyn Paper Landfill is gated on its north side and accessed by Route 149.

The Finch-Pruyn Paper Landfill currently implements a post-closure monitoring program consisting of routine groundwater sampling, gas monitoring, and facility inspections in accordance with 6 NYCRR Part 360. In addition, the Landfill has been assigned NYSDEC Site No. 557002 and currently classified as N, which indicates the NYSDEC does not require any further action at the time of designation.

2.5.4 Mud Pond

Approximately 100-feet southeast and downgradient of the Queensbury Landfill is Mud Pond, a NYSDEC Class A waterbody. According to the NYSDEC Environmental Resource Mapper online platform, Mud Pond is approximately 15.59-acres in size and its northern portion, which abuts the Queensbury Landfill, is a freshwater emergent wetland approximately 2.43-acres in size. Based on observations made by TRC personnel during previous Site visits, Mud Pond is used for recreational purposes and accessed by residential properties located south of Mud Pond Road, by a dirt trail leading north from Mud Pond Road.

Mud Pond is visible in all available historical aerial photography (1942 through 2021) and appears to be unchanged in both size and shape.

2.5.5 Vicinity Gravel Mines

Seven sand and gravel mines exist in the vicinity of the Site. Each mine is identified in **Figure 2** and based on a review of aerial photographs, was developed during different time periods. The mines and their apparent origin are described below:

- O'Connor Bank Mine (Mine ID No. 50037) – Located north of the Site and consisted of forested lands from 1942 through 1964. Sometime between 1964 to 1979, mining activities commenced and reached their current day footprint by 2008.
- Torrington Pine Mine (Mine ID No. 50001) – Located north of the Site and consisted of forested lands from 1942 through 1960. Sometime between 1960 to 1964, mining activities commenced and reached their current day footprint by 1995.
- Washington County Mine (Mine ID No. 50504) – Located northeast of the Site and consisted of forested lands from 1942 through 1986. Sometime between 1986 to 1994, mining activities commenced and reached their current day footprint by the latter date.
- Jenkinsville Pit (Mine ID No. 50296) – Located south of the Site, is identified on the earliest available aerial (1942) and appears to reach its current day footprint by 1986.
- Harris Mud Pond Mine (Mine ID No. 50453) – Located southeast of the Site and consisted of forested lands from 1942 through 1964. Sometime between 1964 to 1979, mining activities commenced and reached their current day footprint by 2006. Mining activities have since resumed starting in 2023.
- McLaughlin Pit (Mine ID No. 50074) – Located southwest of the Site and consisted of forested land from 1942 through 2009. Sometime between 2009 to 2011, mining activities commenced and reached their current day footprint by the latter date.
- Ridge Road Pit #1 (Mine ID No. 50232), located west of the Site, consists of forested lands from 1942 through 1960. Sometime between 1960 to 1964, mining activities commenced and reached their current day footprint by 1979.

2.5.6 Residential Neighborhood and Recreational Park

Located approximately 1,200 feet south of the Site is the residential community of Jenkinsville and the Ridge Jenkinsville Recreational Park. Based on TRC's understanding, the residential homes within the neighborhood and the Park are connected to their own private water wells and no public municipal water supplies the area. Historically, the Jenkinsville neighborhood and Park consisted of agricultural land from 1942 through 1964. Residences are first visible in the 1979 aerial photograph and reached their modern-day extents by 1995. The Ridge Jenkinsville Park was developed and is first visible in the 1995 aerial photograph.

2.6 Site History / Past Use

The Queensbury Landfill is a former gravel pit which operated from the late 1940s through 1993, when landfill operations ceased. The Landfill was subsequently closed and capped with a geomembrane and soil cover system in 1995. While in operation, the facility accepted a daily limit of between 250 to 350 compacted cubic yards (cu yds) and 100 uncompacted cu yds of non-hazardous residential and commercial waste, respectively. As stated in the *April 1992 Phase II ESA*, the facility's NYSDEC Operating Permit expired on December 26, 1982.

Based on information provided in the *April 1992 Phase II ESA*, most of the landfill area is unlined. In early 1979, in an apparent effort to reduce the high permeability of its soil, a four to six acre bowl shaped area, upslope from the former leachate contaminant berm, was constructed and lined with an experimental mixture of Site soil and Finch-Pruyn paper sludge. The liner proved to be ineffective and may have been a source of heavy metals and phenolic impacts at the Site. The location and limits of this experimental area could not be verified by TRC.

A rudimentary leachate collection system, consisting of a leachate containment berm and leachate collection manholes, was constructed near Mud Pond in 1979, but no leachate treatment or recycling program was implemented. The system's adequacy has been addressed in several historical NYSDEC records, as numerous leachate seeps were observed and evidence of leachate breaching the containment berm toward Mud Pond was apparent. The frequency and duration of these events were not known at the time, as reported in the *April 1992 Phase II ESA*.

It was alleged that prior to 1976, the Landfill received heavy metal sludges (purportedly received from former Hercules, Inc. in Glens Falls) and polychlorinated biphenyl (PCB) capacitors (purportedly received from General Electric Co. in Hudson Falls). Based on these allegations, in December 1983, the facility was listed as a Class 2a site on the New York State Registry of Inactive Hazardous Waste Disposal Sites (RIHWDS). In 1983, a Class 2a designation was a temporary classification, assigned to sites that had inadequate or insufficient data for inclusion in any other classification.

From October to November 1990, URS conducted Phase II ESA activities including monitoring well installations, groundwater sampling, Mud Pond surface water and sediment sampling, leachate sampling, and homeowner private well sampling. In summary, the *April 1992 Phase II ESA* determined that contaminants observed in the various samples collected from the Landfill were consistent with samples collected from other municipal waste landfills and there was no evidence to indicate that disposal of hazardous wastes had occurred at the Site. Additionally, and although there had been allegations of hazardous waste disposal at the facility, no documentation was uncovered at that time to substantiate those claims.

Per an *April 1992 Phase II ESA* recommendation, the Site was delisted and referred to the NYSDEC Division of Solid Waste – Bureau of Facility Management (now DMM) for proper closure.

2.7 Previous Investigations and Sampling

As stated in **Section 2.2**, the Queensbury Landfill is surrounded by several landfills which, due to their proximity, may be relevant to soil and groundwater environmental conditions both on- and off-Site. As such, this section presents a summary of previous investigation and sampling information for the Site and the three vicinity Landfills (Ciba-Geigy, McLaughlin, and Finch-Pruyn Paper Landfills), as available to TRC.

2.7.1 Queensbury Landfill

2.7.1.1 NYSDEC RCRA – Open Dump Inventory Ground-Water Quality Investigation (Dunn Geoscience Corporation, 1981)

In July 1979, the NYSDEC retained Dunn Geoscience Corporation of Latham, New York (DG) to investigate the effect of several landfills on groundwater quality across the state. In June 1980 at the Queensbury Landfill, two monitoring wells (DO-1 and DO-2) were installed downgradient of the Site under DG supervision using an air-rotary drill rig. Following groundwater sampling of the two monitoring wells, metals, including total chromium, mercury, and lead were detected at concentrations exceeding applicable SCGs. Additional sampling conducted by DG in April 1981 confirmed the elevated concentrations.

2.7.1.2 Engineering Investigations at Inactive Hazardous Waste Sites in the State of New York – Phase I Investigation (Wehran Engineering, P.C., April 1986)

In April 1986, Wehran Engineering of Middletown, New York (Wehran) conducted a Phase I ESA and determined, based on prior reporting and a review of historical activities, that a Phase II was warranted. Wehran's Phase II Work Plan advised obtaining additional data from Mud Pond, regional water supply sources, leachate sampling, and proposed the installation of three additional soil borings with monitoring wells.

2.7.1.3 Investigations at Inactive Hazardous Waste Sites in the State of New York – Phase II Investigation, Queensbury Landfill (URS Consultants, Inc., April 1992)

From October to November 1990, URS conducted Phase II ESA activities at the Site which included the installation of five monitoring wells (MW-1 through MW-5), where MW-1 was located upgradient and MW-2 through MW-5 were located downgradient. Eight groundwater samples (five from new and three from existing monitoring wells (E-1, E-2, and E-3)), two leachate samples, a Mud Pond sediment sample, and a Mud Pond surface water sample were collected and submitted for laboratory analysis of Target Compound List (TCL) volatile organic compounds

(VOCs), TCL semi-volatile organic compounds (SVOCs), herbicides, pesticides, PCBs, Target Analyte List (TAL) metals, and cyanide.

Groundwater results indicated that the Queensbury Landfill had impacted the quality of the local aquifer. Elevated concentrations of metals including iron, manganese, magnesium, silver, sodium, potassium, and vanadium, were detected in each monitoring well except for well E-1. It was also noted that PCBs, SVOCs, and arsenic were not detected in any of the monitoring wells. In addition, some lab artifact solvents, including methylene chloride, were detected in MW-3 and MW-4.

The Mud Pond surface water sample contained 10 of the 23 metals analyzed, with iron, beryllium, and manganese detected above NYSDEC Class A Guidance Values. The surface water sample did not contain detections for SVOCs, VOCs, or PCBs, except for methylene chloride. The Mud Pond sediment sample contained 18 of the 23 analyzed metals; however, only iron exceeded its SCG. URS attributed the elevated metal concentration to the presence of igneous rock fragments within the local overburden. In addition, URS concluded that the elevated iron concentration raised the plausibility that the Finch-Pruyn Paper Landfill influenced the environmental quality of surface water and sediment of Mud Pond.

In both leachate samples, elevated concentrations of metals (aluminum, arsenic, barium, calcium, cobalt, copper, iron, lead, magnesium, manganese, potassium, sodium, and zinc) relative to the upgradient well MW-1 concentrations were detected. Benzene, toluene, ethylbenzene, and xylene (collectively BTEX) compounds were also detected in one of the leachate samples. URS noted that although this suggested the Queensbury Landfill had contributed to downgradient groundwater impacts; the detected concentrations were low and not atypical of municipal waste landfill leachate. Based on United States Environmental Protection Agency (USEPA) reporting at the time, URS recommended that the Site be delisted for proper closure based on those results.

2.7.1.4 Inactive Landfill Initiative – Field Activities Summary Report (Ramboll, July 2020)

As part of the NYSDEC's ILI Program in January 2020, Ramboll of Syracuse, New York (Ramboll) sampled monitoring wells MW-1 though MW-5 for 6 NYCRR Part 360 leachate indicators, TAL metals, polycyclic aromatic hydrocarbons (PAHs), 1,4-dioxane, PFAS, and VOCs. The results indicated that 1,4-dioxane was detected in three of the five sampled wells (MW-2, MW-3, and MW-4), with the highest concentration at MW-3. PFOA and/or perfluorooctanesulfonic acid (PFOS) were detected in all five sampled locations.

2.7.2 Ciba-Geigy Landfill

According to the USEPA, the hazardous waste sludge contained in the Ciba-Geigy Landfill primarily consisted of metal hydroxides. Historical groundwater quality data from the landfill monitoring well network indicated the presence of barium, cadmium, chromium, copper, cyanide, and lead in the groundwater near the landfill. Further investigation concluded that the lead and most other metal contamination was due to deteriorating well casings. After the well casings were replaced, only cyanide and barium concentrations were found to exceed NYS SCGs. Concentrations of both contaminants continued to decrease to levels below NYS SCGs following closure in 1990. No other previous pertinent investigation and/or sampling information was available for TRC review.

2.7.3 McLaughlin Landfill

Under the NYSDEC's ILI Program and from May to June 2021, Parsons of Syracuse, New York (Parsons) completed field activities, summarized in the *September 2021 Field Activities Summary Report*. Field activities included the installation and sampling of five monitoring wells (MW-1 through MW-5). Monitoring wells MW-2 and MW-3 were not sampled due to an insufficient volume of water. Groundwater samples were submitted for analysis of Part 360 leachate indicators, TAL metals, PAHs, 1,4-dioxane, PFAS, and VOCs. Analytical results indicated that 1,4-dioxane was detected in each of the five sampled wells, with the highest concentration reportedly at MW-5. PFOA and/or PFOS were detected in MW-1 and MW-5.

2.7.4 Finch-Pruyn Paper Landfill

As part of monitoring activities that began in 1990, CHA Consulting, Inc. of Albany, New York (CHA) was retained by Finch Paper, LLC in 2020 to complete annual groundwater monitoring of the five site monitoring wells in accordance with Part 360. As reported in CHA's *2020 Annual Water Quality Assessment and Gas Monitoring Report,* groundwater analytical results were slightly elevated in downgradient wells MW-4D, MW-4E, MW-3AR. However, dissolved solids, total recoverable phenols, iron, manganese, and sodium were the only analytes that exceeded NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Class GA Values (Class GA Values). Based on the analytical results, CHA determined that indicators of landfill leachate in groundwater were not present.

3.0 General Information

3.1 Project Organization

TRC will implement the SC with oversight from the NYSDEC using qualified TRC personnel and several NYSDEC-approved subcontractors. Contact information for designated representatives is provided below:

Contact information for the Town of Queensbury:

John Strough, Town Supervisor
Town of Queensbury
742 Bay Road
Queensbury, New York 12804
(518) 761-8229

Steven Lovering, Director of Parks & Recreation
Town of Queensbury
742 Bay Road
Queensbury, New York 12804
(518) 761-8216

Contact information for the NYSDEC:

Anthony Bollasina, P.G., Professional Geologist
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau D, Section D
625 Broadway
Albany, New York 12233
(518) 402-2754
Anthony.Bollasina@dec.ny.gov

Contact information for the New York State Department of Health (NYSDOH):

Wendy Kuehner, P.E.
New York State Department Health
Bureau of Environmental Exposure Investigation

Empire State Plaza – Corning Tower, Room 1787
Albany, New York 12237
(518) 402-7882
Wendy.Kuehner@health.ny.gov

Contact information for TRC:

David Glass, P.E., P.G., Principal in Charge
TRC Engineers, Inc.
1430 Broadway, 10th Floor
New York, New York 10018
(212) 221-7822
DGlass@trccompanies.com

James Magda, P.G., Program Manager
TRC Engineers, Inc
215 Greenfield Parkway, Suite 102
Liverpool, New York 13088
(315) 671-4049
JMagda@trccompanies.com

Justin King, Project Manager
TRC Engineers, Inc
3 Corporate Drive, Suite 202
Clifton Park, New York 12065
(518) 348-1190
JKing@trccompanies.com

NYSDEC-approved TRC subcontractors:

- On The Mark Utility Locating Services, Inc. – Utility Locating Services
- Cascade Drilling, L.P. – Drilling Services
- Precision Industrial Maintenance, Inc. – Investigation Derived Waste (IDW) Disposal Services
- Grasshopper Gardens, Inc. – Landscaping Services
- Susan M. Anacker, PLS, PLLC – Land Surveying Services

- Eurofins TestAmerica – Laboratory Analytical Services
- University of Waterloo – Laboratory Analytical Services

3.2 Notifications and Permits

3.2.1 NYSDEC

TRC will provide NYSDEC 15 days advanced notice prior to the start of work pertaining to this Work Plan.

3.2.2 Property Owner(s)

The NYSDEC will provide any property owner(s) 5 to 10 business days' notice of the commencement of any subsurface intrusive activities within proximity to their respective parcels.

3.2.3 Town of Queensbury

TRC/NYSDEC applied for an received an approved exaction permit to install monitoring wells in Town Right of Way (ROW) at four locations (Old Cronin Rd., Azure Drive, and Rainbow Trail).

3.2.4 Warren County

Based on a review of Warren County requirements and discussions with the NYSDEC, no notices or permits are required for implementation of this Work Plan.

3.2.5 New York State

The NYSDEC will provide all necessary inter-agency notices that are required and/or appropriate prior to the start of work pertaining to this Work Plan.

3.2.6 Federal

Based on a review of Federal requirements, no notices or permits are required for implementation of this Work Plan.

3.3 Governing Documents

3.3.1 General

As noted previously in **Section 1.0**, the Supplemental SC activities discussed in this Work Plan will be conducted in accordance with the July 9, 2021, NYSDEC DER WA Approval Letter for Standby Engineering Services Contract No. D009812 for a Site Characterization, and the November 29, 2021 and May 31, 2023, NYSDEC-approved SOWs.

Investigation activities, including sample collection and laboratory analysis, will be completed in accordance with the Standby Engineering Services Contract, DER-10, and other pertinent generic governing documents included in Standby Engineering Services Contract No. D009812, namely TRC's generic Health and Safety Plan (HASP), Community Air Monitoring Plan (CAMP), Field Activities Plan (FAP), and Quality Assurance Project Plan (QAPP).

3.3.2 Site-Specific Health and Safety Plan

A Site-specific HASP (SSHASP) has been prepared for the activities to be performed under this Work Plan based on the generic HASP and Site-specific HASP template for Standby Engineering Services Contract No. D009812. The SSHASP is provided in **Appendix B**.

3.3.3 Community Air Monitoring Plan

A CAMP will be implemented (as appropriate) during ground intrusive activities in accordance with the NYSDOH generic CAMP and HASPs. The CAMP will include real-time monitoring for VOCs and particulates (i.e., dust) at one upwind and one downwind perimeter location during intrusive activities only. The CAMP will be implemented by the TRC scientist/engineer overseeing investigation activities.

3.3.4 EQuIS EDDs and Data Usability Summary Reports

The laboratory analyses summarized in **Table 1** will be performed by the laboratories identified above in **Section 3.3**.

Quality control samples consisting of one field duplicate and one matrix spike/matrix spike duplicate (MS/MSD) sample will be collected in accordance with TRC's Generic QAPP (i.e., at a frequency of one MS/MSD sample per 20 matrix samples). Equipment blanks will be collected in accordance with TRC's Generic QAPP utilizing water provided and certified by the subcontract laboratory as to not contain PFAS. Where applicable and appropriate, the laboratories will provide NYSDEC Analytical Services Protocol (ASP) Category B data deliverable packages, and Data Usability Summary Reports (DUSRs) will be prepared by TRC or a TRC subcontractor. Electronic Data Deliverables (EDDs) in EQuIS format will be submitted to NYSDEC and the results will be presented in the SC Report.

4.0 Supplemental Site Characterization Activities

The following SOW describes the investigation activities, with the objective of further defining the nature and extent of potential off-Site contamination south of the Site, and preparation of a SC Report. On August 10, 2023, TRC personnel conducted a Site visit/inspection with the NYSDEC Project Manager to examine the physical features, topography, utilities, proposed monitoring well locations, and access to the Site and surrounding properties. The subcontractors selected to perform the activities outlined below are identified above in **Section 3.1**.

4.1 Monitoring Well Installations

4.1.1 Utility Clearance

Under this subtask, in addition to the public utility mark outs, a private utility locating survey will be completed to locate potential underground utilities around the proposed monitoring well locations shown on **Figure 3**. The private utility locating survey will be completed prior to ground disturbance work. On The Mark Utility Locating Services, Inc. will survey each area using, at a minimum, both Ground Penetrating Radar (GPR) and Electro-Magnetic/Radio Frequency (EM/RF) Pipe, Cable, and Box locaters within an approximate 15-foot radius around each proposed investigation location. Positively identified subsurface utilities/structures/anomalies will be clearly marked on the ground surface with spray paint and/or pin flags.

TRC will discuss any required monitoring well repositioning, due to identified subsurface utilities/structures/anomalies, with the NYSDEC Project Manager prior to installation. It is anticipated that minor offsets (15 feet or less) will not require prior notification/approval.

4.1.2 Overburden Monitoring Well Installations

Ten overburden monitoring wells will be installed using sonic drilling methods, in the locations shown on **Figure 3**. A 6X8 sonic sampling system will be advanced to the apparent groundwater depth (estimated between 150 to 200 feet bgs) or top of bedrock, whichever is encountered first. Soil samples will be collected in 10-foot intervals from ground surface to the termination depth using 10-foot plastic sleeves to confirm geology/lithology. Soil samples will be screened using a photoionization detector (PID), inspected for indications of contamination (e.g., staining, odors, etc.), and characterized using Modified Burmister and/or Unified Soil Classification System (USCS) methods. Geologic descriptions of the soil and field screening results will be recorded. At each location, the soil interval encountered directly above the soil-groundwater interface will be submitted for laboratory analysis of TCL VOCs, PFAS (40 compound list), and 1,4-dioxane by USEPA Methods 8260, draft 1633, and 8270E LL, respectively.

Overburden monitoring wells will be constructed using 2-inch diameter poly-vinyl chloride (PVC) riser and 15 feet of 0.01-slot PVC screen, inserted through the 8-inch diameter sonic sampling system override casing. At each location, the well screen will be set approximately 10 feet below and 5 feet above the apparent groundwater table. The annulus between the well and borehole wall will be backfilled with No. 1 sand to 3 feet above the well screen. Following the filter sand, a minimum 3-foot-thick hydrated bentonite seal will be installed. The remaining annulus will be filled with a cement/bentonite grout to approximately 1-foot bgs, as conditions allow.

Where completed in asphalt pavement or landscaped areas, overburden monitoring wells will be completed with flush mount manholes within a concrete pad. Where completed in vegetated areas (i.e., not landscaped or regularly maintained), monitoring wells will be completed above ground surface within an approximately 3-foot-high steel standpipe, set in a concrete pad.

4.1.3 Bedrock Monitoring Well Installations

Up to two bedrock monitoring wells will be installed using a combination of sonic and bedrock coring drilling methods in the locations shown on **Figure 3**. Six-inch diameter boreholes will be installed at each bedrock monitoring well location using a 7X8 sonic system and advanced approximately 5 feet into bedrock. An approximate 5-inch diameter steel casing will be installed to stabilize the overburden and allow completion of the bedrock borehole. Soil samples will be collected in 10-foot intervals from ground surface to the termination depth using 10-foot plastic sleeves to confirm geology/lithology. Soil samples will be screened using a PID, inspected for indications of contamination (e.g., staining, odors, etc.) and characterized using Modified Burmister and/or USCS methods. Geologic descriptions of the soil and field screening results will be recorded. At each location, two soil samples will be submitted for laboratory analysis: the sample collected directly above the soil-groundwater interface and the sample collected directly above the overburden-bedrock interface. All soil samples will be submitted for laboratory analysis of TCL VOCs, PFAS (40 compound list), and 1,4-dioxane by USEPA Methods 8260, draft 1633, and 8270E LL, respectively.

The steel casing will be grouted into place prior to further advancement of the bedrock borehole to limit potential for leakage around the casing. Following the curing period (approximately 24 hours), bedrock will be cored via a large diameter PQ core bit to a depth of 50 feet or to the first major water bearing fracture, whichever is encountered first. Bedrock monitoring wells will be constructed within the cored bedrock hole using a 2-inch diameter PVC riser and 5 to 10 feet of 0.01-slot screen, inserted through the 5-inch diameter steel casing. At each location, the well screen will be set at a depth straddling the apparent water bearing fracture(s). The annulus between the well and borehole wall will be backfilled with No. 0 sand to 3 feet above the well screen. Following the filter sand, a minimum 3-foot-thick hydrated bentonite seal will be installed.

The remaining annulus will be filled with a cement/bentonite grout to approximately 1-foot bgs, as conditions allow.

Where completed in asphalt pavement or landscaped areas, monitoring wells will be completed with flush mount manholes within a concrete pad. Where completed in vegetated areas (i.e., not landscaped or regularly maintained), monitoring wells will be completed above ground surface within an approximately 3-foot-high steel standpipe, set in a concrete pad.

4.1.4 Monitoring Well Development

Following installation, the newly installed monitoring wells will be developed via an inertial lift pump, high-density polyethylene (HDPE) tubing, and equipment compatible with the recommendations for PFAS purging protocols. Development will be considered complete when either turbidity is below 50 nephelometric turbidity units (NTUs), the well purges dry, or 10 well volumes have been removed, whichever occurs first.

4.2 Groundwater Sampling

TRC will collect groundwater samples from the 12 newly installed wells via new HDPE bailers after purging a minimum of three well volumes. Care will be taken to reduce sample turbidity; and, if necessary, samples will be placed into larger containers, the fines will be allowed to settle out, and the water will be decanted into bottles prepared for laboratory analysis. Alternate groundwater sampling methods will be proposed if it is determined that total purge volumes will exceed 15 gallons. All groundwater samples will be submitted for laboratory analysis of TCL VOCs, PFAS (40 compound list), and 1,4-dioxane by USEPA Methods 8260, draft 1633, and 8270 SIM, respectively.

4.3 Hydraulic Conductivity/Long Term Groundwater Monitoring

After groundwater sampling activities, up to two slug tests will be performed on each newly installed monitoring well for the determination of hydraulic conductivity. In addition, up to five monitoring wells located on the Queensbury and McLaughlin landfills will be selected for hydraulic conductivity testing for comparison purposes.

Following slug testing, water level data loggers will be deployed in each newly installed monitoring well for long-term data collection for an approximate period of one month. Collected water level data will be used to evaluate the effect of local demand on groundwater flow, in addition to determining groundwater flow directions during static periods (i.e., approximate period between 2 AM and 4 AM). Data loggers will be retrieved from each monitoring well before initiation of Compound Specific Isotope Analysis (CSIA) sampling for 1,4-dioxane, as described below.

4.4 CSIA – 1,4-Dioxane

The results of the groundwater sampling task described above will be reviewed and assessed for applicability of CSIA sampling of 1,4-dioxane. CSIA sampling of monitoring wells will aid in identifying/differentiating potential source areas of the Site.

It is anticipated that off-Site monitoring wells containing concentrations of 1,4-dioxane greater than 0.5 micrograms per liter (ug/L) will be resampled. Collected samples will be submitted to the University of Waterloo, under contract with TRC, for CSIA of 1,4-dioxane, specifically δ13C (carbon) and δ2H (hydrogen) analytes. As the University laboratory is not Environmental Laboratory Approval Program (ELAP) certified, nor is there a USEPA Method for CSIA, quality assurance/quality control (QA/QC) samples will not be collected, and analytical results will not be validated.

In addition, TRC will collect CSIA 1,4-dioxane samples from four monitoring wells located at the Queensbury and Ciba-Geigy landfills (subject to access). Landfill monitoring wells anticipated to be sampled for CSIA of 1,4-dioxane include:

- Queensbury Landfill – MW-3
- Ciba-Geigy Landfill – MW-1, MW-3, and MW-4

4.5 Land Survey

The land survey will include the locations and elevations (ground surface, top of well casing, top of PVC well riser, and top of protective cover, as applicable) of the 12 newly installed off-Site monitoring wells. The ground surface and measuring point on each PVC well riser will be permanently marked by the professional land surveyor. A survey report, documenting the coordinates/elevations of the newly installed monitoring wells will be signed and sealed by a Professional Land Surveyor (PLS) licensed to practice in the State of New York, and provided in the SC Report.

4.6 Investigation Derived Waste Disposal

IDW is anticipated to include the following: decontamination fluids, well development and purge water, soil, bedrock drill cuttings/cores, and used personal protective equipment (PPE). Wash and rinse water used for equipment decontamination, development water and purge water will be containerized in an enclosed fractionation tank (20,000-gallon capacity). Drill cuttings and other solid wastes will be containerized in 20-cubic yard roll-off containers. Waste characterization sampling and analysis will be performed prior to off-Site disposal. PPE will be bagged as regular

refuse and disposed as solid waste, unless grossly contaminated. If any of this material is grossly contaminated, it will be drummed for off-Site disposal.

4.7 Site Characterization Report

The SC Report will be prepared in accordance with the applicable provisions of NYSDEC DER-10 and include the following:

- Background information for the Site.
- Applicable and available information for each landfill.
- Description of the characteristics of the area investigated, including physical features, topography, known Site history as reported by others, and hydrogeology.
- Description of field investigation activities performed under Tasks 2 and 4.
- Identification of applicable SCGs.
- Investigation, testing, and sampling results including a comparison to SCGs (as applicable).
- Data usability evaluation.
- Figures showing Site location, Site features, sample locations, groundwater surface elevations, contaminant distribution, etc.
- Conclusions regarding the significance of SC findings including an evaluation for reclassification/delisting and recommendations for additional investigation activities, as appropriate.
- Evaluation of CSIA of 1,4-dioxane analytical results for the identification of source area(s)
- Supporting documentation (photograph logs, groundwater sampling logs, boring logs, monitoring well construction logs, laboratory data packages, land surveys, etc.) as appendices.
- Project Green and Sustainable Remediation (GSR) metrics.

5.0 Schedule

Presented below is a tentative project schedule for implementation of each of the tasks described above. The schedule will be updated periodically and summarized in the regular monthly project progress reports during project implementation.

Task Description	Estimated Completion Date
Site Characterization Work Plan	August 2023
Subcontracting	August through September 2023
Site Characterization Activities	
UDig and Utility Locating Survey	Late September 2023
Overburden and Bedrock Monitoring Well Installations	October through November 2023
Monitoring Well Development	Late November 2023
Land Survey	
Groundwater Sampling	December 2023
Investigation Derived Waste Disposal	
Hydraulic Conductivity/Long Term Groundwater Monitoring	January through February 2024
CSIA – 1,4-Dioxane	March 2024
Site Characterization Report	June 2024

TABLE

Table 1
New York State Department of Environmental Conservation
Queensbury Landfill – Site No. 557005
WA No. D009812-21.1
Proposed Sampling and Analysis Plan

Task	Sample Type	Sample Matrix	Number of Samples for Analysis	TCL VOCs +10 TICs (USEPA Method 8260)	PFAS - 40 Compounds (USEPA Draft Method 1633)	1,4-Dioxane (USEPA Methods 8270 SIM or 8270E LL)	CSIA of 1,4-Dioxane (University of Waterloo Proprietary Method)[2]	Waste Characterization Parameters[3]
SITE CHARACTERIZATION SAMPLING AND ANALYSES								
Overburden and Bedrock Monitoring Well Installations	Soil[1]	Soil[1]	14	X	X	X		
	Blind Duplicate	Soil[1]	4					
	MS/MSD	Soil[1]	8					
	Equipment Blank	Water	12					
	Trip Blank	Water	6					
Groundwater Sampling	Groundwater	Groundwater	12	X	X	X		
	Blind Duplicate	Groundwater	1					
	MS/MSD	Groundwater	2					
	Equipment Blank	Water	1					
	Trip Blank	Water	1					
CSIA of 1,4-Dioxane	Groundwater	Groundwater	12				X	
Investigation-Derived Waste	IDW	Liquid IDW	Note 4		X	X		X
	IDW	Solid IDW	Note 4					

Notes:

[1] - Soil samples will be screened using a PID, inspected for indications of contamination (e.g., staining, odors, etc.). In the event elevated PID readings are encountered and/or there is visible staining, soil samples will be collected for laboratory analysis and analyzed for TCL VOC+10 TICs, PFAS, and 1,4-dioxane. It is assumed for purposes of this summary that one to two samples per borehole will be subject to laboratory analyses.

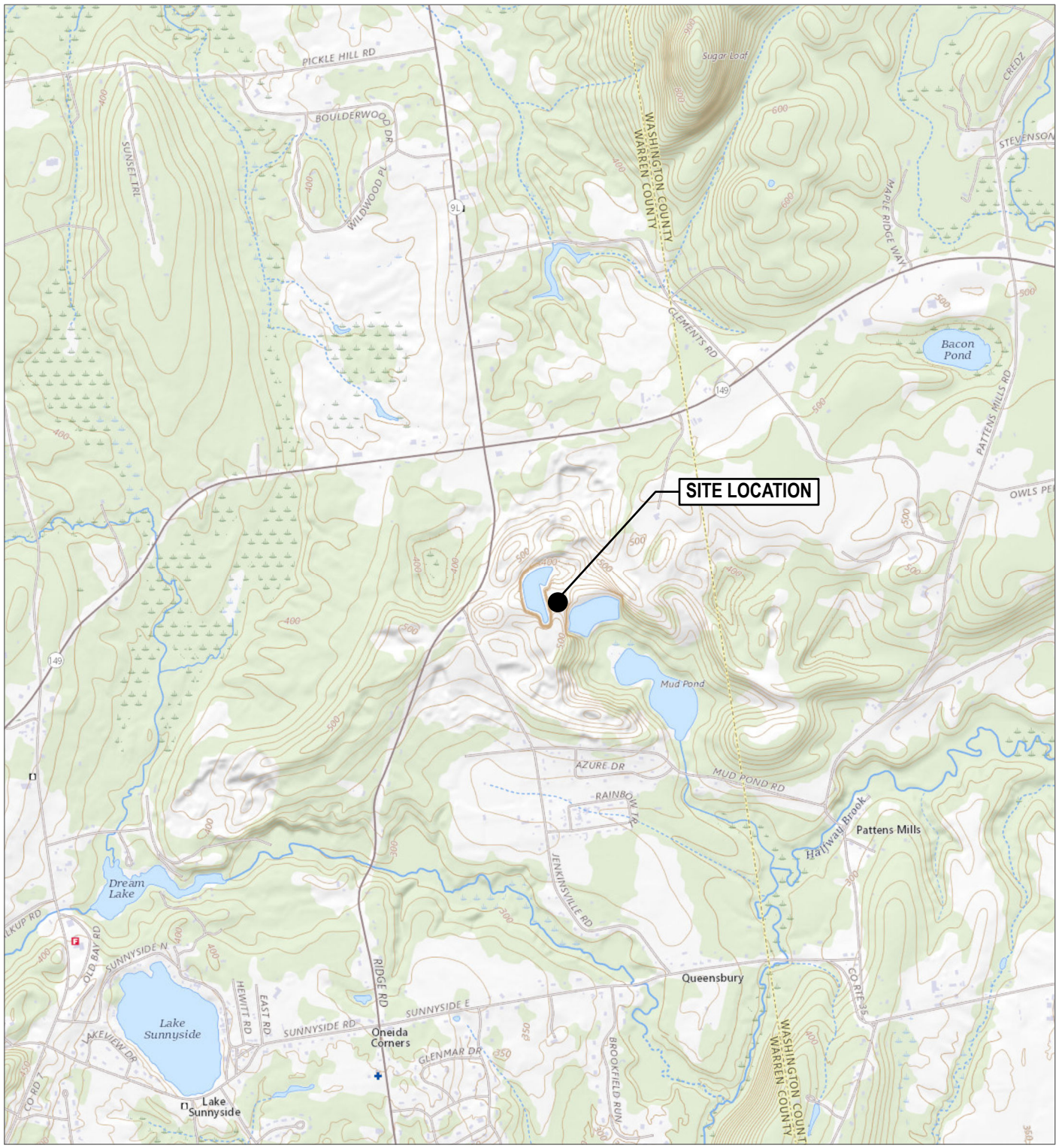
[2] - Monitoring wells containing concentrations of 1,4-dioxane greater than 0.5 micrograms per liter (ug/L) will be sampled for CSIA of 1,4-dioxane, specifically δ13C (carbon) and δ2H (hydrogen) analytes. As the University laboratory is not Environmental Laboratory Approval Program (ELAP) certified, nor is there a USEPA Method for CSIA, QA/QC samples will not be collected, and analytical results will not be validated.

[3] - Waste characterization parameters include: TCL VOCs, TCL SVOCs, TCL pesticides, TAL metals, PCBs, TPH DRO/GRO, ignitability, corrosivity, and reactivity. In addition, solid IDW will be analyzed for the full list of Resource Conservation and Recovery Act (RCRA) toxicity constituents by toxicity characteristic leaching procedure (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver), cyanide, and paint filter.

[4] - The number of liquid and solid IDW characterization samples will be determined based on final accumulated volumes, as well as the requirements of the receiving disposal facility.

CSIA : Compound Specific Isotope Analysis
IDW : Investigation-Derived Waste
MNA : Monitored Natural Attenuation
MS/MSD : Matrix Spike/Matrix Spike Duplicate
PCBs : Polychlorinated Biphenyls
PFAS : Per- and polyfluoroalkyl substances
QA/QC : Quality Assurance/Quality Control
SVOCs : Semivolatile Organic Compounds
TAL : Target Analyte List
TCL : Target Compound List
TICs : Tentatively Identified Compounds
TPH DRO/GRO : Total Petroleum Hydrocarbons Diesel- and Gasoline-Range Organics
USEPA : United States Environmental Protection Agency
VOCs : Volatile Organic Compounds

FIGURES



LEGEND

- SITE LOCATION

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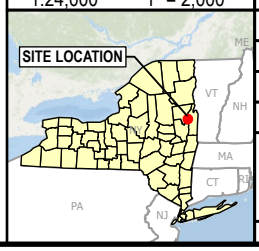
DATA SOURCES: TRC

N

0 1,000 2,000

FEET

1:24,000 1" = 2,000'



PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
QUEENSBURY LANDFILL - SITE NO. 557005
RIDGE ROAD
QUEENSBURY, NEW YORK 12801

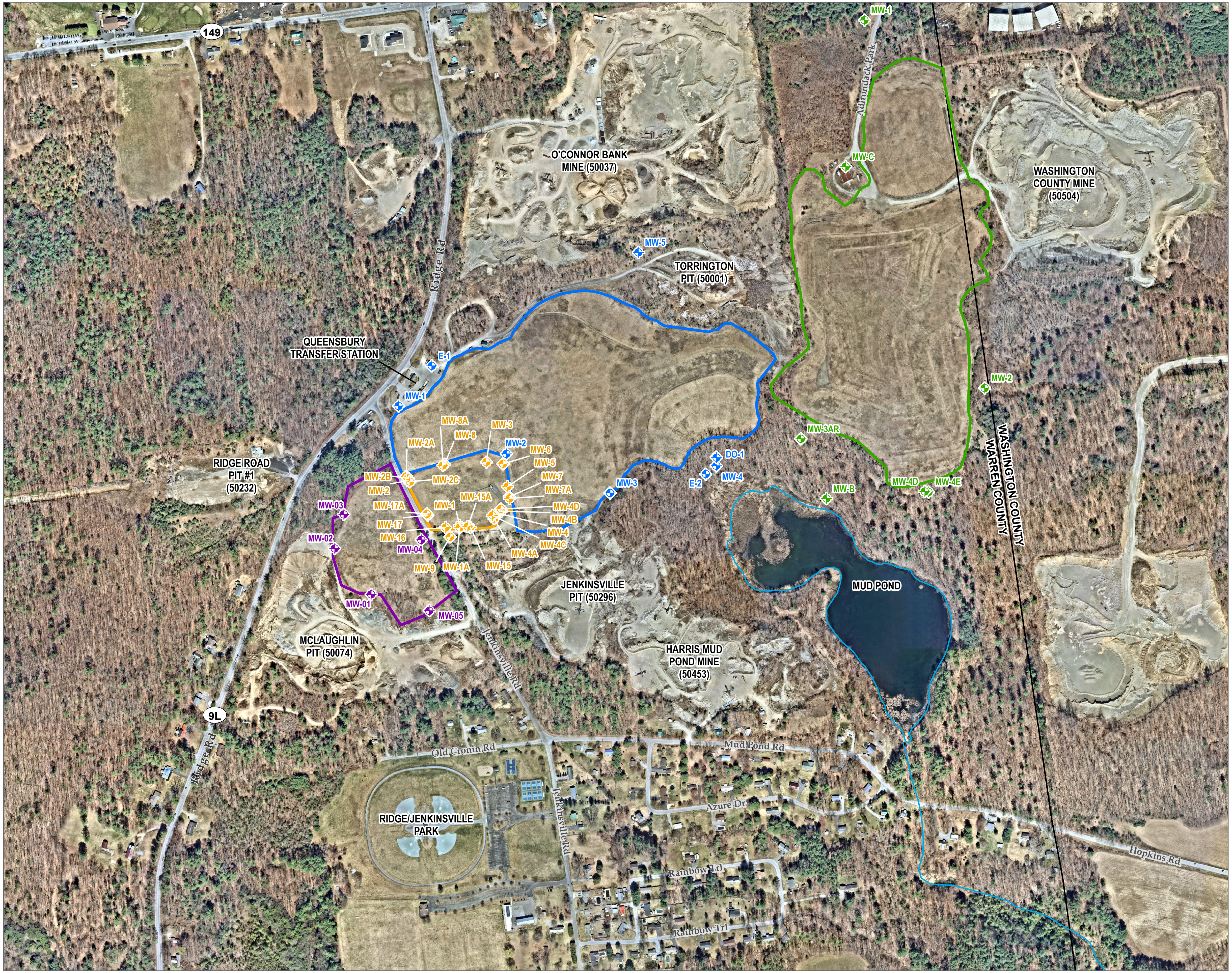
TITLE:

SITE LOCATION MAP

DRAWN BY:	L. LILL	PROJ. NO.:	453202.0000.0000
CHECKED BY:	T. SHANLEY		
APPROVED BY:	J. KING		**FIGURE 1**
DATE:	AUGUST 2023		

TRC
3 Corporate Drive
Suite 202
Clifton Park, NY 12065
Phone: 518.348.1190

FILE: SC_FIGS



LEGEND

- CIBA-GEIGY LANDFILL (NYSDEC SITE NO. 557004)
- QUEENSBURY LANDFILL (NYSDEC SITE NO. 557005)
- FINCH PAPER LANDFILL (NYSDEC SITE NO. 557002)
- MCLAUGHLIN LANDFILL (NYSDEC SOLID WASTE ID NO. 57D01)
- CIBA-GEIGY LANDFILL MONITORING WELL
- QUEENSBURY LANDFILL MONITORING WELL
- FINCH PAPER LANDFILL MONITORING WELL
- MCLAUGHLIN LANDFILL MONITORING WELL
- MUD POND
- NEW YORK STATE COUNTY LINE

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.

N

1:6,600
1" = 550'

BASE MAP: NEAR MAP IMAGERY DATED APRIL 30, 2022
DATA SOURCES: TRC, NYGIS
SHEET SIZE: 11X17L

0 275 550 FEET

PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
QUEENSBURY LANDFILL - SITE NO. 557005
RIDGE ROAD
QUEENSBURY, NEW YORK 12801

TITLE:
SITE LAYOUT MAP

DRAWN BY:	L. LILL	PROJ. NO.:	453202.0000.0000
CHECKED BY:	T. SHANLEY	**FIGURE 2**	
APPROVED BY:	J. KING		
DATE:	AUGUST 2023		

TRC
3 Corporate Drive
Suite 202
Clifton Park, NY 12065
Phone: 518.348.1190

FILE: sc_figs.aprx

Coordinate System: NAD 1983 StatePlane New York East FIPS 3101 Feet; Map Rotation: 0
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CIBA-GEIGY LANDFILL

QUEENSBURY LANDFILL

MCLAUGHLIN LANDFILL

JENKINSVILLE PIT (50296)

MUD POND

MCLAUGHLIN PIT (50074)

HARRIS MUD POND MINE (50453)

Old Cronin Rd

Jenkinsville Rd

Mud Pond Rd

Azure Dr

Rainbow Trl

RIDGE/JENKINSVILLE PARK

LEGEND

- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.

1:3,840
1" = 320'

BASE MAP: NEAR MAP IMAGERY DATED APRIL 30, 2022
DATA SOURCES: TRC
SHEET SIZE: 11X17L

0 160 320 FEET

PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
QUEENSBURY LANDFILL - SITE NO. 557005
RIDGE ROAD
QUEENSBURY, NEW YORK 12801

TITLE:
PROPOSED MONITORING WELL LOCATIONS

DRAWN BY:	L. LILL	PROJ. NO.:	453202.0000.0000
CHECKED BY:	T. SHANLEY		**FIGURE 3**
APPROVED BY:	J. KING		
DATE:	AUGUST 2023		

TRC
3 Corporate Drive
Suite 202
Clifton Park, NY 12065
Phone: 518.348.1190

FILE: sc_figs.aprx

Coordinate System: NAD 1983 StatePlane New York East FIPS 3101 Feet; Map Rotation: 0
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APPENDIX A

HISTORICAL AERIAL PHOTOGRAPHS

HISTORICAL AERIALS

Project Property: NYSDEC - Queensbury LF
NYSDEC - Queensbury LF
Queensbury NY
Project No: 453202.0000.0000, Phase 3
Requested By: TRC Environmental Corporation
Order No: 22092000428
Date Completed: September 22,2022

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

Date	Source	Scale	Comments
2021	United States Department of Agriculture	1" = 800'	
2019	United States Department of Agriculture	1" = 800'	
2017	United States Department of Agriculture	1" = 800'	
2015	United States Department of Agriculture	1" = 800'	
2013	United States Department of Agriculture	1" = 800'	
2011	United States Department of Agriculture	1" = 800'	
2009	United States Department of Agriculture	1" = 800'	
2008	United States Department of Agriculture	1" = 800'	
2006	United States Department of Agriculture	1" = 800'	
1995	United States Geological Survey	1" = 800'	
1986	United States Geological Survey	1" = 800'	
1979	United States Geological Survey	1" = 800'	
1964	United States Geological Survey	1" = 800'	
1960	United States Air Force	1" = 800'	Best Copy Available
1947	United States Geological Survey	1" = 800'	
1942	United States Geological Survey	1" = 800'	

Year: 2021
Source: USDA
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Approx Center: -73.61918289,43.38836664

Order No: 22092000428

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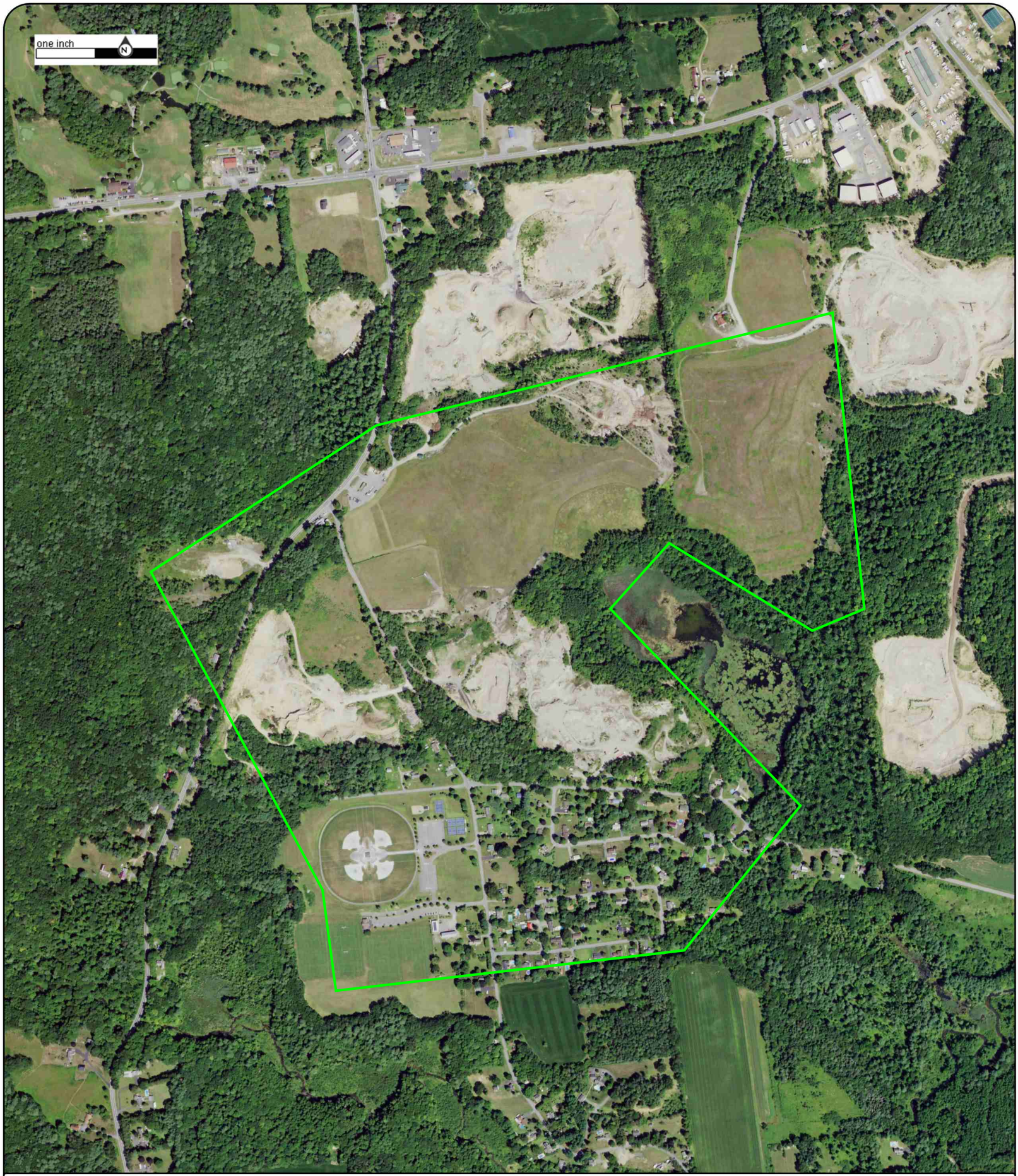

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Source: USDA
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Order No: 22092000428

ERIS

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Source: USDA
Scale: 1" = 800'
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Approx Center: -73.61918289,43.38836664

Order No: 22092000428

ERIS

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Scale: 1" = 800'
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Approx Center: -73.61918289,43.38836664

Order No: 22092000428

ERIS

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Scale: 1" = 800'
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Order No: 22092000428

ERIS

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Scale: 1" = 800'
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Approx Center: -73.61918289,43.38836664

Order No: 22092000428

ERIS

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Order No: 22092000428

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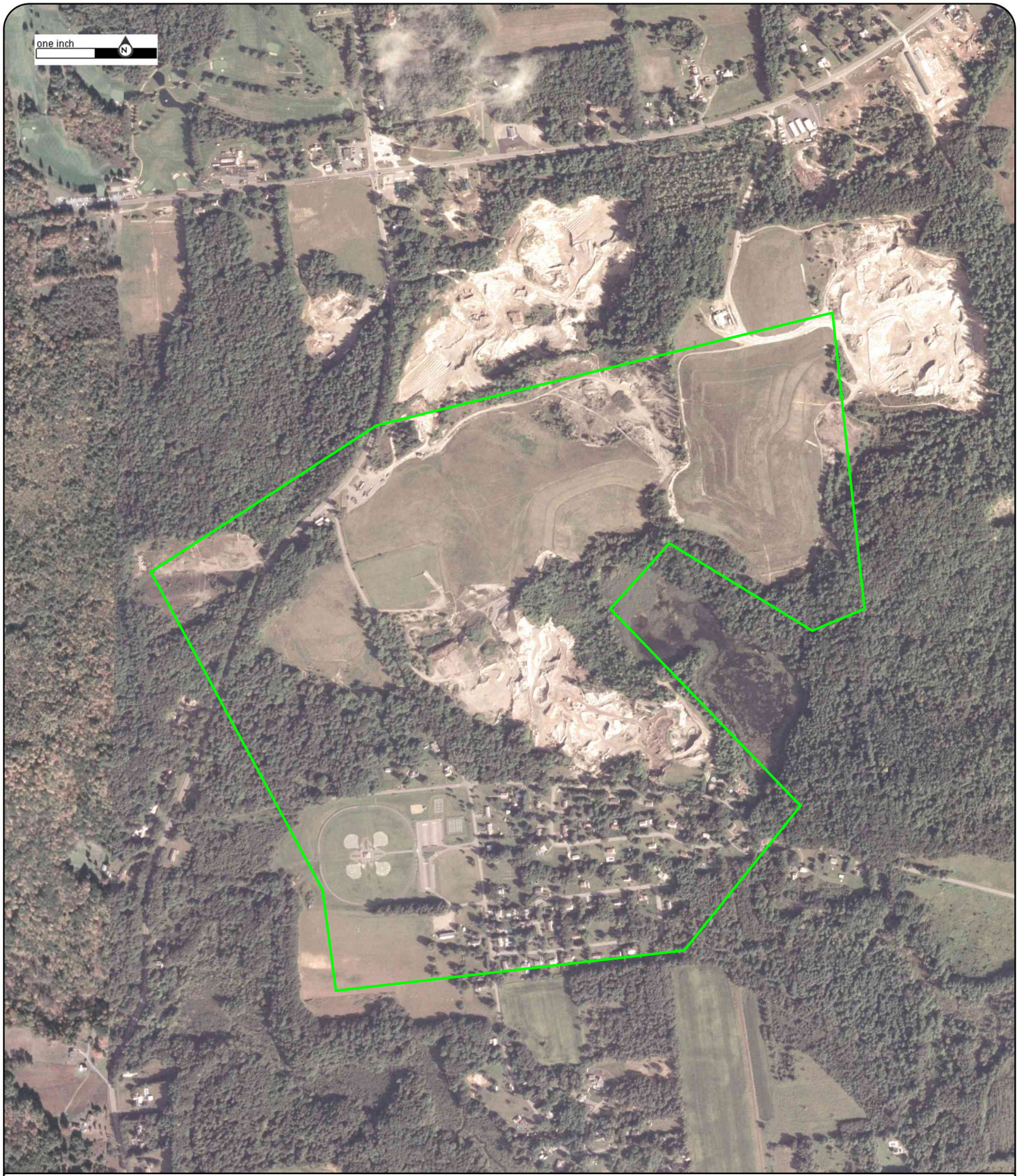

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ERIS

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Approx Center: -73.61918289,43.38836664

Order No: 22092000428

ERIS

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Scale: 1" = 800'
Comment:

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Approx Center: -73.61918289,43.38836664

Order No: 22092000428

ERIS

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Order No: 22092000428

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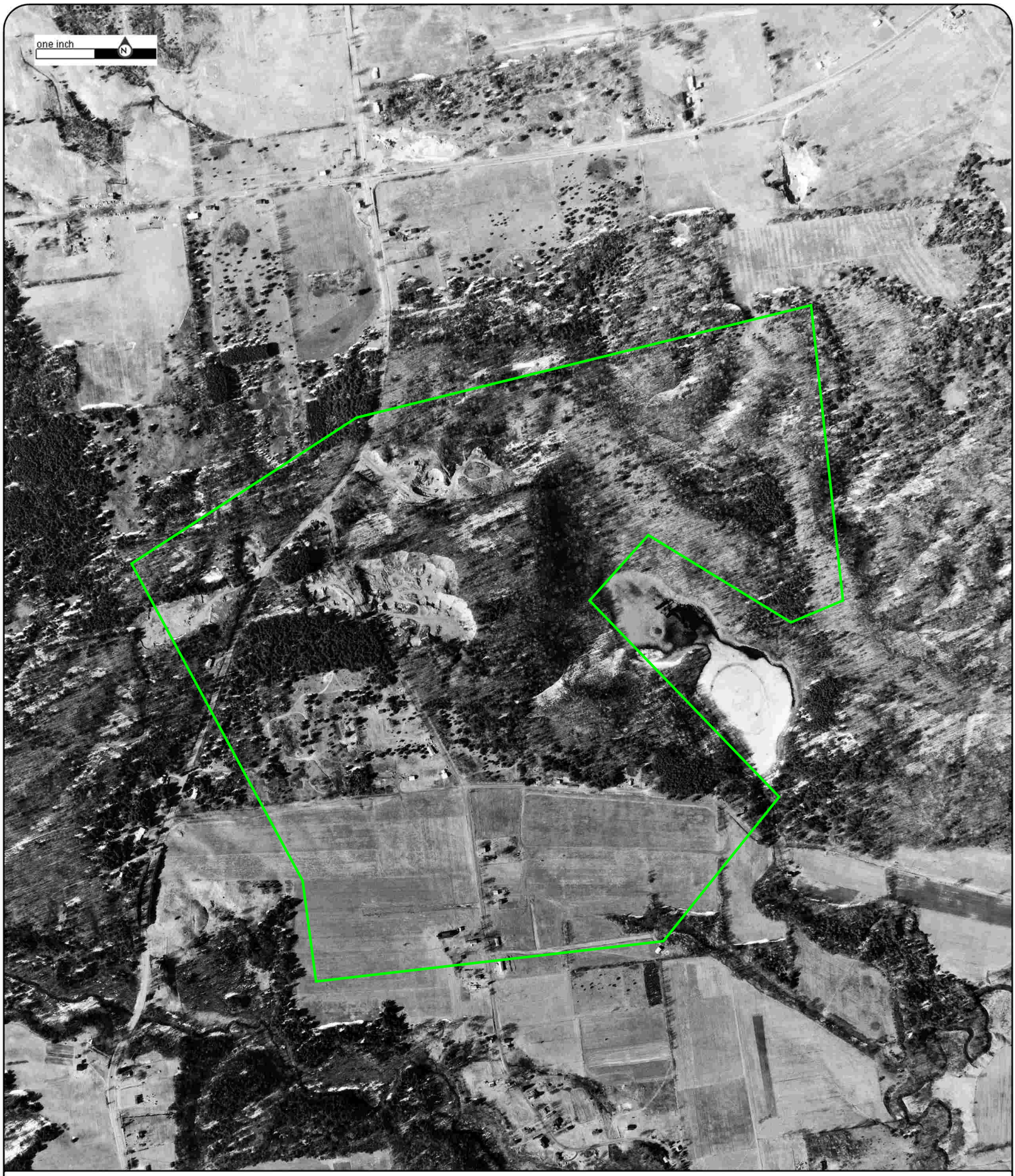

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Order No: 22092000428

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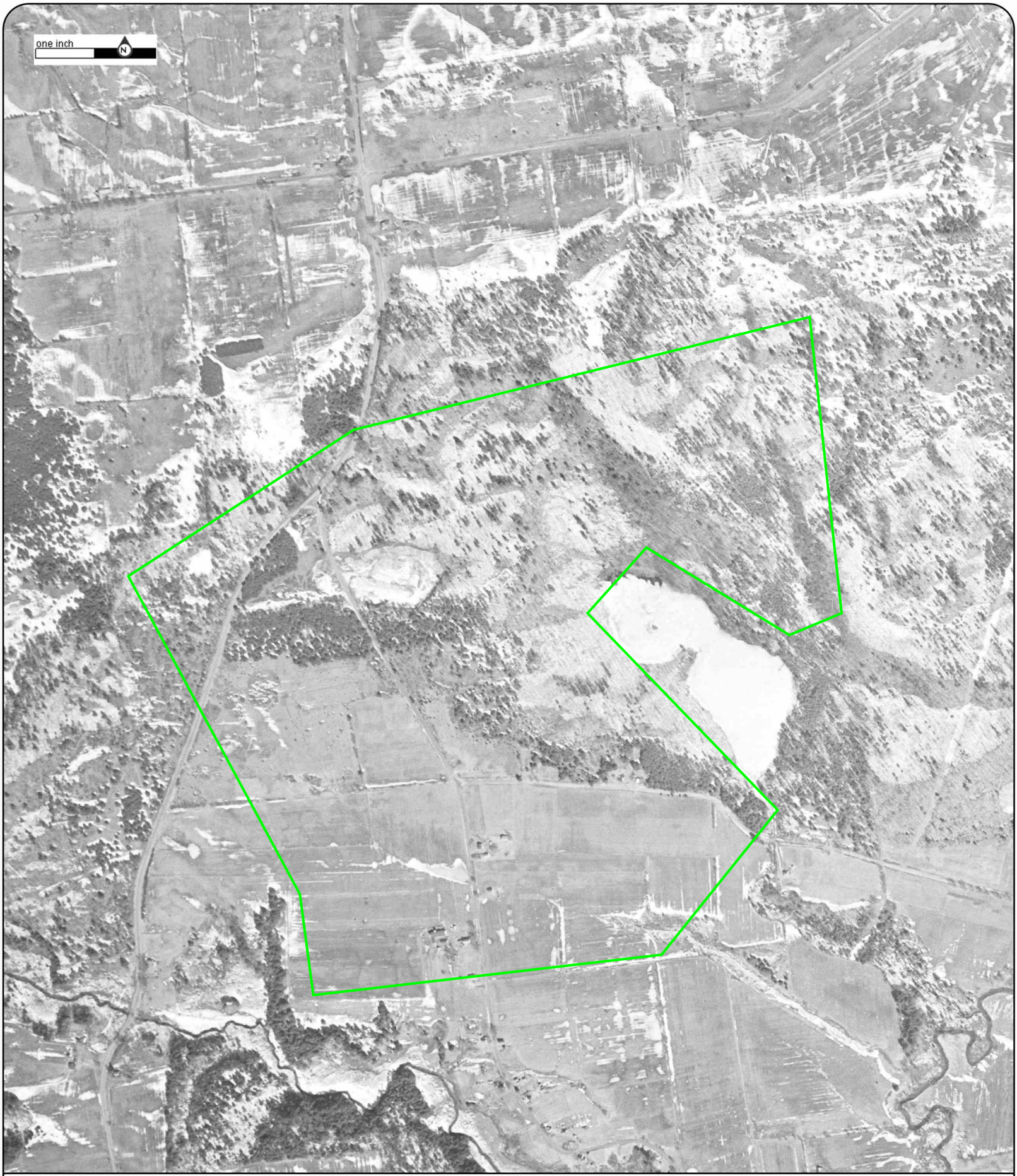
Approx Center: -73.61918289,43.38836664

Order No: 22092000428

ERIS



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Order No: 22092000428

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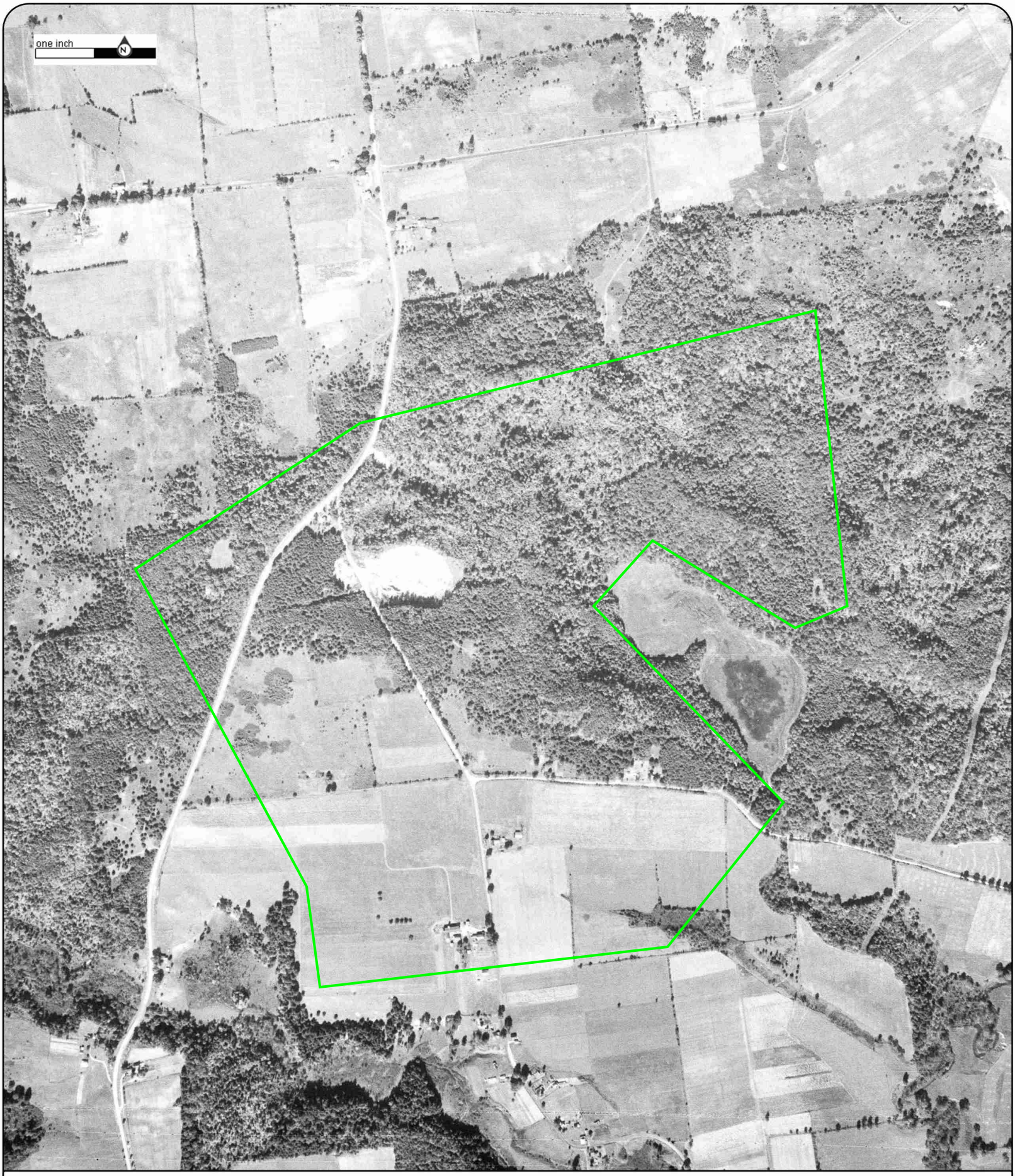

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Approx Center: -73.61918289,43.38836664

Order No: 22092000428

ERIS

APPENDIX B

SITE SPECIFIC HEALTH AND SAFETY PLAN

SITE-SPECIFIC HEALTH AND SAFETY PLAN

Queensbury Landfill
Ridge Road, Queensbury, NY 12801
NYSDEC Site No. 557005
Work Assignment No. D009812-21

Prepared for:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, NY 12233

Prepared by:
TRC Engineers, Inc.
3 Corporate Drive, Suite 202
Clifton Park, New York 12065

TRC Project No.: 453202.0000.0000

August 2023

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1. Site/Project Contact Information

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Site Information			
Site Name	**Site No.**	**Address**	
Queensbury Landfill	NYSDEC Site No. 557005	Ridge Road, Queensbury, NY 12801	
Client Contact			
Name	**Organization**	**Title**	**Primary Phone No.**
Anthony Bollasina	NYSDEC	Project Manager	(518) 402-2754
TRC Personnel and Project Role			
Name	**Role**	**Email**	**Primary Phone No.**
Michael Glenn	Health and Safety Officer (HSO)	mglenn@trccompanies.com	(949) 697-7418 (cell)
David Sullivan	Assistant HSO	dsullivan@trccompanies.com	(978) 758-2809 (cell)
James Magda	Contract Manager	jmagda@trccompanies.com	(315) 415-4315 (cell)
Justin King	Project Manager	jking@trccompanies.com	(518) 860-7656 (cell)
Patrick Rodman	Associate Project Manager	prodman@trccompanies.com	(518) 937-3213 (cell)
Jonathan Bone	Office Safety Coordinator (OSC)	jbone@trccompanies.com	(315) 436-0853 (cell)
Kelsey Baker	Field Staff	kbaker@trccompanies.com	(518) 222-1196 (cell)
Andrew Fishman	Field Staff	afishman@trccompanies.com	(518) 478-5210 (cell)
Rich DePolo	Field Staff	rdepolo@trccompanies.com	(838) 218-5279 (cell)
Subcontractor Information			
Company Name	**Service**	**Primary Contact**	**Primary Phone No.**
Eurofins TestAmerica	Laboratory Analytical Services	N/A	N/A
Cascade Drilling L.P.	Drilling Services	Donald Bond	(810) 877-7176
On The Mark Utility Locating Services	Utility Locating Services	Jaqualine Harrison	(585) 733-1748
Precision Industrial Maintenance	Investigation Derived Waste Management Services	Jeff Kaleta	(518) 346-5800
Susan M. Anacker PLS	Land Surveying Services	Susan Anacker	(315) 724-6800
Emergency Assistance			
Service	**Name**	**Emergency No.**	**Primary Phone No**
Ambulance	Bay Ridge EMS	911	(518) 743-9566
Early Incident Intervention	WorkCare	1-888-449-7787	Not applicable
Fire	North Queensbury Volunteer fire 7 Rescue	911	(518) 656-9614
Hospital	Glens Falls Hospital Medical Alert	911	(518) 409-8100
Police	Glens falls Police Department	911	(518) 761-3840
Poison Control Center	Upstate New York Poison Center	911	(800) 222-1222

Emergency Assistance			
Service	**Name**	**Emergency No.**	**Primary Phone No**
Spill	CHEMTREC	Not applicable	1-800-424-9300 (TRC No. CCN 671126)
Spill (Federal)	National Response Center	1-800-424-8802	Not applicable
Spill (State)	New York State Spill Hotline	1-800-457-7362	Not applicable

2. Medical Facility Identification and Directions

Nearest Hospital: Glens Falls Hospital Medical Alert
Hospital Address: 25 Willowbrook Rd, Queensbury, NY 12804
Hospital Telephone Number: (518) 409-8100
Directions to Hospital (see Map below):

YOUR TRIP TO:
Glens Falls Hospital

12 MIN | 6.8 MI

Est. fuel cost: $0.98

Trip time based on traffic conditions as of 1:03 PM on November 23, 2021. Current Traffic: Moderate

Print a full health report of your car with HUM vehicle diagnostics (800) 906-2501

1. Start out going **south** on Ridge Rd/NY-9L toward Town Dump Rd. Continue to follow NY-9L.

Then 6.68 miles — 6.68 total miles

2. Enter next roundabout and take the 3rd exit onto Glen St/US-9 S/NY-32.

Then 0.07 miles — 6.75 total miles

3. Turn **right** onto Park St.
Rocco's Italian-American Bistro is on the right.

If you reach Civic Center Plz you've gone a little too far.

Then 0.07 miles — 6.82 total miles

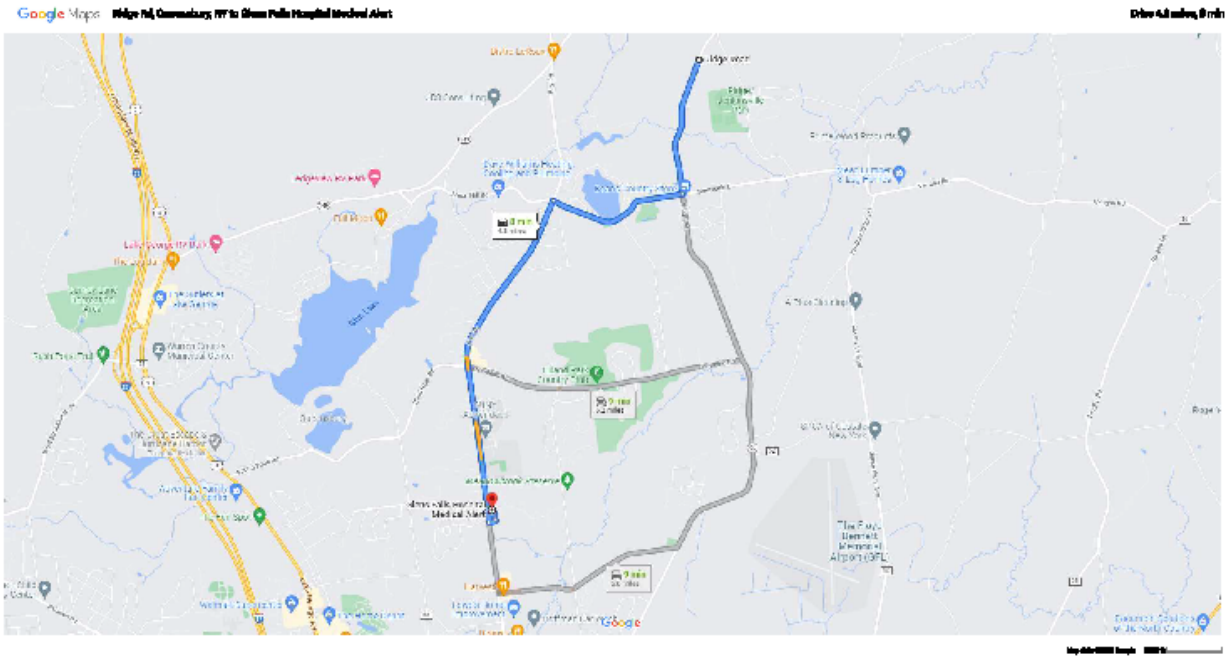
4. Glens Falls Hospital, 100 PARK ST.
Your destination is just past Elm St.

If you reach School St you've gone a little too far.

Map to Hospital:

Save to My Maps

11/23/21, 12:29 PM Ridge Rd, Queensbury, NY to Glens Falls Hospital Medical Alert - Google Maps



3. Utility Clearance

Dig Safely New York and non-member utilities will be notified at least 72 hours prior to commencing any ground intrusive work. Prior to the start of work, confirmation receipts will be reviewed, and utility mark-outs will be verified.

A private utility survey will be required to survey the proposed soil boring, monitoring well and test pit locations using at a minimum Ground Penetrating Radar (GPR) and Electro-Magnetic/Radio Frequency (EM/RF) Pipe, Cable and Box locator. The survey shall encompass an area extending in all directions at least 10 feet beyond each of the locations.

Any structure detected in the subsurface within 15 feet of the proposed soil boring, monitoring well and test pit locations will be identified on the ground surface with spray paint. Results of the utility survey will be reviewed in the field between TRC and the utility surveyor the same day the service is provided. Results will also be summarized in a brief utility survey report which shall be prepared by the utility surveyor and submitted to TRC.

Prior to the operation of any heavy equipment, the site shall be inspected for potential overhead hazards (e.g., wires, tree branches, etc.). A minimum clearance of 10 feet must be maintained between equipment and overhead utility lines. If contact is possible (i.e., equipment, drill rig, excavator, etc.) one or more of the following will be done: 1) Power sources will be disconnected by the utility; 2) Power sources will be shielded by the utility; 3) Object will get no closer than 10 feet to prevent arcing, unless site specific conditions or weather conditions warrant greater separation per best professional judgment, or as directed by utility representatives; and, 4) Evaluate the need for shielding and coordinate with local utility representatives.

4. Scope of Work Summary

The specific scope of work to be completed from the May 2023 amended Work Assignment (WA No. 21.1) includes the following:

- NYSDEC will coordinate and arrange access with all property owners.
- Investigation activities, including sample collection and analysis, will be completed in accordance with the Standby Engineering Services Contract, 6 NYCRR Part 375 Environmental Remediation Programs, NYSDEC DER-10, NYSDEC PFAS Guidance, HASP, FAP, and QAPP.
- Used PPE and disposable sampling equipment will be bagged as regular refuse and disposed of as solid waste, unless grossly contaminated. If any of this material is grossly contaminated, it will be drummed for off-site disposal.
- Environmental samples collected as part of this task will be submitted to a TRC standby laboratory for the following analyses:

  - TCL VOCs, plus 10 TICs by USEPA Method 8260
  - 1,4-Dioxane by USEPA Method 8270 SIM or 8270E LL (solid and aqueous)
  - PFAS by USEPA Draft Method 1633
- In addition to the sampling described below, quality control samples consisting of one field duplicate and one matrix spike/matrix spike duplicate (MS/MSD) sample will be collected in accordance with the QAPP (i.e., at a frequency of one MS/MDS sample per 20 matrix samples). Equipment blanks will be collected in accordance with the QAPP utilizing water provided and certified by the standby laboratory as to not contain PFAS.

Mobilization

Under this subtask, TRC will update the existing site-specific HASP, if necessary, prior to the field work activities. TRC will also prepare for the additional SC field activities and coordinate field work with the selected TRC subcontractors. TRC will confirm that the drilling subcontractor has contacted UDig NY and non-member utilities, received/reviewed utility confirmation receipts, and verified public utility mark-outs prior to intrusive work.

Utility Locating Survey

Under this subtask and in addition to the public utility mark outs, TRC will subcontract a private utility locating firm to locate potential underground utilities around the proposed monitoring well locations. The private utility locating survey will be completed prior to ground disturbing work. The utility locating surveyor will survey an approximately 15-foot radius around each proposed well location. Any subsurface utilities/structures/anomalies will be identified on the ground surface with spray paint and/or pin flags.

TRC will discuss any required monitoring well repositioning, due to identified subsurface utilities/structures/anomalies, with the NYSDEC PM prior to installation. It is anticipated that minor offsets (15 feet or less) will not require prior notification/approval.

Community Air Monitoring Plan

In accordance with the NYSDOH generic CAMP, TRC will complete air monitoring activities during ground intrusive activities. The CAMP will include real-time monitoring for VOCs and particulates (i.e., dust) each at one upwind and one downwind perimeter location.

Overburden Monitoring Well Installations

Up to 10 off-Site overburden monitoring wells will be installed using sonic drilling methods. A 6X8 sonic sampling system will be advanced to the apparent groundwater depth (estimated between 150 to 200 feet below the ground surface [bgs]) or top of bedrock, whichever is encountered first. Soil samples will be collected in 10-foot intervals from ground surface to the termination depth using 10-foot plastic sleeves to confirm geology/lithology. Soil samples will be screened using a photoionization detector (PID), inspected for indications of contamination (e.g., staining, odors, etc.) and characterized using Modified Burmister

and/or USCS methods. Geologic descriptions of the soil and field screening results will be recorded. At each location, the soil interval encountered directly above the soil-groundwater interface will be submitted for laboratory analysis.

Overburden monitoring wells will be constructed using 2-inch diameter poly-vinyl chloride (PVC) riser and 15 feet of 0.01-slot PVC screen, inserted through the 8-inch diameter sonic sampling system override casing. At each location, the bottom of the well screen will be set approximately 10 feet below and the top of the well screen will be set approximately 5 feet above the apparent groundwater table. The annulus between the well and borehole wall will be backfilled with No. 1 sand to 3 feet above the well screen. Following the filter sand, a minimum 3-foot-thick hydrated bentonite seal will be installed. The remaining annulus will be filled with a cement/bentonite grout to approximately 1-foot bgs, as conditions allow.

Where completed in asphalt pavement or landscaped areas, monitoring wells will be completed with flush mount manholes within a concrete pad. Where completed in vegetated areas (i.e., not landscaped or regularly maintained), monitoring wells will be completed above ground surface within an approximately 3-foot-high steel standpipe, set in a concrete pad.

Bedrock Monitoring Well Installations

Up to two off-Site bedrock monitoring wells will be installed using a combination of sonic and bedrock coring drilling methods. Six-inch diameter boreholes will be installed at each bedrock monitoring well location using a 7X8 sonic system and advanced approximately 5 feet into bedrock. An approximate 5-inch diameter steel casing will be installed to stabilize the overburden and allow completion of the bedrock borehole. Soil samples will be collected in 10-foot intervals from ground surface to the termination depth using 10-foot plastic sleeves to confirm geology/lithology. Soil samples will be screened using a PID, inspected for indications of contamination (e.g., staining, odors, etc.) and characterized using Modified Burmister and/or USCS methods. Geologic descriptions of the soil and field screening results will be recorded. At each location, two soil samples will be submitted for laboratory analysis: the sample collected directly above the soil-groundwater interface and the sample collected directly above the overburden-bedrock interface.

The steel casing will be grouted into place prior to further advancement of the bedrock borehole to limit potential for leakage around the casing. Following the curing period (approximately 24 hours), bedrock will be cored via a large diameter PQ core bit to a depth of 50 feet or to the first major water bearing fracture, whichever is encountered first. Bedrock monitoring wells will be constructed within the cored bedrock hole using a 2-inch diameter PVC riser and 5 to 10 feet of 0.01-slot screen, inserted through the 5-inch diameter steel casing. At each location, the well screen will be set at a depth straddling the apparent water bearing fracture(s). The annulus between the well and borehole wall will be backfilled with No. 0 sand to 3 feet above the well screen. Following the filter sand, a minimum 3-foot-thick hydrated bentonite seal will be installed. The remaining annulus will be filled with a cement/bentonite grout to approximately 1-foot bgs,

as conditions allow.

Where completed in asphalt pavement or landscaped areas, monitoring wells will be completed with flush mount manholes within a concrete pad. Where completed in vegetated areas (i.e., not landscaped or regularly maintained), monitoring wells will be completed above ground surface within an approximately 3-foot-high steel standpipe, set in a concrete pad.

Monitoring Well Development

Following installation, the newly installed monitoring wells will be developed via an inertial lift pump, HDPE tubing, and equipment compatible with the recommendations for PFAS purging protocols. Development will be considered complete when either turbidity is below 50 nephelometric turbidity units (NTUs), the well purges dry, or 10 well volumes have been removed, whichever occurs first.

Groundwater Sampling

TRC will collect groundwater samples from the 12 newly installed wells via new HDPE bailers after purging a minimum of 3 well volumes. Care will be taken to reduce sample turbidity; and, if necessary, samples will be placed into larger containers, the fines will be allowed to settle out, and the water will be decanted into bottles prepared for laboratory analysis. Alternate groundwater sampling methods will be proposed if it is determined that total purge volumes will exceed 15 gallons.

Hydraulic Conductivity/Long Term Groundwater Monitoring

After the groundwater sampling activities, up to two rising/falling head slug tests will be performed on each newly installed off-Site groundwater monitoring well for the determination of hydraulic conductivity. In addition, up to five monitoring wells located on the Queensbury and McLaughlin landfills will be selected for hydraulic conductivity testing.

Following slug testing, water level data loggers will be deployed in each newly installed monitoring well for long-term data collection for an approximate period of one month. Collected water level data will be used to evaluate the effect of local demand on groundwater flow, in addition to determining groundwater flow directions during a static period (i.e., approximate period between 2 AM and 4 AM). Data loggers will be retrieved from each monitoring well before initiation of Compound Specific Isotope Analysis (CSIA) sampling for1,4-dioxane, as described below.

CSIA – 1,4-Dioxane

The results of the groundwater sampling task described above will be reviewed and assessed for applicability of CSIA sampling of 1,4-dioxane. CSIA sampling of monitoring wells will aid in identifying/differentiating potential source areas of the Site.

It is anticipated that off-Site monitoring wells containing concentrations of 1,4-dioxane greater than 0.5

micrograms per liter (ug/L) will be resampled. Collected samples will be submitted to the University of Waterloo, under contract with TRC, for CSIA of 1,4-dioxane, specifically $\delta^{13}C$ (carbon) and $\delta^{2}H$ (hydrogen) analytes. As the University laboratory is not Environmental Laboratory Approval Program (ELAP) certified, nor is there a USEPA Method for CSIA, QA/QC samples will not be collected, and analytical results will not be validated.

In addition, TRC will collect CSIA 1,4-dioxane samples from four qualifying on-Site monitoring wells at the Queensbury and Ciba-Geigy landfills (subject to access).

Land Survey

The land survey will include the locations and elevations (ground surface, top of well casing, top of PVC well riser, and top of protective cover, as applicable) of the 12 newly installed off-Site monitoring wells. The ground surface and measuring point on each PVC well riser will be permanently marked by the professional land surveyor. A survey report, documenting the coordinates/elevations of the newly installed monitoring wells will be signed and sealed by a PLS licensed to practice in the State of New York, and provided in the SC Report.

IDW Disposal

IDW is anticipated to include the following: decontamination fluids, well development and purge water, soil and rock drill cuttings, and used PPE. Wash and rinse water used for equipment decontamination, development water and purge water will be containerized in an enclosed fractionation tank (10,000-gallon capacity). Drill cuttings and other solid wastes will be containerized in 20-cubic yard roll-off containers. Waste characterization sampling and analysis will be performed prior to off-Site disposal. PPE will be bagged as regular refuse and disposed as solid waste, unless grossly contaminated. If any of this material is grossly contaminated, it will be drummed for off-site disposal.

5. Hazard Assessment

This Health and Safety Plan (HASP) assumes that an ongoing hazard assessment process with the HSO (or his/her designee), Project Manager, OSC and field staff (including the On-Site HSO) will take place regularly (via meetings/teleconferences), supplemented by as needed communication on project safety needs, to ensure the project work is conducted at a high level of technical excellence both safely and efficiently. Where the on-going hazard assessment indicates the presence of hazards, tasks, or other activities that are not adequately covered by the HASP and supporting documentation and/or staff training levels, supplemental planning will be conducted and documented in a revised or higher-level HASP document and appropriately trained personnel assigned.

5.1 Chemical Hazards

The following contaminants are known and/or suspected to be present at the Site:

- 1,4-Dioxane
- PFAS.

TRC also anticipates the presence of the following chemicals in laboratory bottles used as sample preservatives: Sodium Hydroxide, Nitric Acid and Hydrochloric Acid. In addition, TRC anticipates the use of methyl alcohol (methanol) during decontamination procedures. Safety Data Sheets (SDS) for preservatives and decontamination products are provided in **Appendix A**. Sample bottles containing hazardous preservatives will be handled with care. Sample bottles will be checked for leaks and lids tightened. Cut resistant and chemical resistant gloves and safety glasses will be worn at all times when handling sample bottles (see Section 5.2 for information concerning edges and material handling).

Isobutylene may be used for brief periods each work day to calibrate a photoionization detector (PID). One hundred parts per million (ppm) isobutylene will be primarily contained in a Tedlar® bag. Any gas that is released to the air will quickly disperse and will not pose a threat to on-site workers. No further monitoring is required for isobutylene

5.2 Physical Hazards

Physical hazards that may be encountered at the site are outlined below. If hazards are identified by the ongoing hazard assessment process, which are not address by this HASP, work shall be stopped and the HSO (or his/her designee), Project Manager, OSC or On-Site OSC, as appropriate, shall be contacted to determine if additional safety procedures and programs should be employed at the site.

Dust – When conducting any ground disturbing activities, be cognizant that the dust has potential to contain hazardous chemicals and should not be inhaled. Whenever possible dust reduction by wetting shall be used. If dust is billowing, wetting the area, letting the dust settle, working from an upwind direction, and/or respirator with P100 cartridges (with proper fit test, training and medical monitoring) is recommended to reduce exposure.

Edges/Material Handling – Cut resistant gloves are required to be worn at all times while performing tasks that have the potential for hand injuries. A glove selection guideline is presented in **Appendix B**.

TRC has a policy of using guarded blades for cutting tasks, fixed blade open knives are not to be used for work under this scope of work unless a variance is approved by the ECR Safety Manager.

Hand Tools – Use only the appropriate tool for the task at hand. Use the tool(s) as designed, described, and

intended by the manufacturer. Hand tools will meet the manufacturer's safety standards. Hand tools will not be altered in any way. Makeshift tools will not be used. At a minimum, hand and eye protection will be used when working with hand tools (see glove selection guide provided herein). Wrenches, including adjustable, pipe, end and socket wrenches, will not be used when jaws are sprung to the point that slippage occurs. Impact tools such as drift pins, wedges and chisels, will be kept free of mushroom heads. Wooden handles will be free of splinters or cracks and secured tightly to the tool. At all times use appropriate hand protection when utilizing hand tools.

Heavy Equipment/Drill Rigs – Use caution around drill rigs, construction equipment, and open excavations. Ensure the equipment operator is aware of the location of on-site personnel at all times to avoid potential injuries (e.g., maintain eye contact with the equipment operator). A spotter should be used to direct the movement of heavy equipment. A swing zone should be established with cones behind any excavators to prevent injury during movement of equipment. Exercise caution and wear protective equipment as noted herein around the equipment to guard against crushing and pinching hazards. On-site personnel will maintain a distance (approximately 10 feet) from mechanical hazards associated with heavy equipment. All field team members working near or with equipment with emergency shut-off switches should be aware of the locations and situations when these switches should be used.

Hostile Individual(s) – Most personnel who are encountered during work will not be hostile, however if a hostile individual is encountered you should not confront them. You should back away and go to your vehicle or other safe location where you can isolate yourself from the hostile person(s). Once safe, if you are continuing to be harassed you should contact the local police for assistance. Contact the Project Manager or OSC once the situation is safe and under control.

Hunters/Firing Range, etc. – Be aware of surrounding activities that may involve hunting, firearms, etc. that may not be in your immediate area, but could be create an unsafe work environment.

Manual Lifting – Improper lifting can lead to a variety of injuries including back strains, muscle pulls and joint damage. It is important for all personnel to understand proper lifting techniques and to utilize safe lifting procedures when handling materials. Generally, no one person should lift more than 50 pounds without assistance. Mechanical means should be used whenever possible.

Noise – Hearing protection must be worn when noise levels exceed 85 dBA in the work area. If you need to raise your voice to be heard at the work site, then hearing protection should be worn. Hearing protection will be worn near drill rigs.

Power Tools – All power tools will be inspected regularly (at least on a daily basis) and used in accordance with the manufacturer's instructions and its capabilities. Electrical tools will not be used in flammable areas, unless they are approved for that purpose. Portable electric tools will be used only with a GFCI.

Proper hand, eye and hearing protection will be used when working with power tools and all appropriate safety guards must be in place. Personnel will be trained in the proper use of the specific tool. Any defective power tools will be immediately tagged and removed from service. Tools will be stored properly after use.

Pressurized Fluids/Gases – All compressed gases are hazardous due to the high pressures inside the cylinders. Even at a relatively low pressure, gas can flow rapidly from an open or leaking cylinder. Damaged cylinders can become projectiles resulting in severe injury and property damage. An unsecured or uncapped cylinder can become a cause of a major accident. Cylinders shall be secured when not in use, in transport, and as much as possible when in use.

Slips, Trips and Falls – Be aware of uneven ground and buried debris (e.g., metal, plastic, etc.) to avoid potential slip/trip/fall hazards, and use caution near open excavations. Maintain good housekeeping practices to minimize physical hazards.

Traffic Hazards – Driving to and from the site each day is considered a physical hazard. Directions and travel time to the site should be determined in advance (a.k.a. Journey Management Planning) and adequate time should be allocated to drive safely. The use of cellular phones is prohibited, and distracted driving should be avoided. Seatbelts shall be worn at all times while the vehicle is moving. Use caution around traffic flow. Ensure proper traffic control (e.g., signs, traffic cones, barriers, etc.) are in place prior to and throughout the work day where work takes place in or near traffic. Work personnel must wear ANSI-rated class 3 reflective traffic vests at all times. A site-specific traffic management plan describing procedures to be employed, including barriers, signage, etc., will be used for each drilling location.

Weather – Heat and cold stress are a potential concern for on-site workers. Take breaks as needed to cool down, replenish fluids and/or warm up. Please refer to **Appendix C** for the signs, symptoms and precautions for cold and heat stress. Work may occur during a time of year when thunderstorms are possible/likely. If thunder or lightning is noted by onsite personnel, work will cease until the storm passes (thunder and/or lightning ceases and is not observed over at least a 30-minute period). Personnel will seek shelter in buildings or vehicles.

Working Over/Near Water – All workers working over/near water will be required to wear a Type I, II, or III Personal Floatation Device (PFD). When continuous fall protection is used (without exception) to prevent employees from falling into the water, the drowning hazard has effectively been removed. Therefore, PFDs are not required when utilizing continuous fall protection.

5.3 Biological Hazards

Biological Waste – This includes feces, urine, needles/sharps and other materials which may contain biological matter from humans or animals. This material should be avoided and not handled in any way.

If biological waste impedes the planned scope of work the Project Manager or OSC should be contacted to discuss appropriate actions.

Blood-Borne Pathogens – Injuries received in the field may require assistance from a field team member with appropriate first aid/first responder training to perform first aid. Contact with blood and certain body fluids can contain pathogens that may be transmitted by contact with an open wound by the caregiver. The following precautions should be used when giving first aid:

- Use nitrile gloves to avoid contact with blood/fluids. Spent bandages and gloves used to perform first aid should be placed in a plastic bag and properly disposed.
- Blood/fluid should be cleaned from surfaces that may be contacted by other individuals.
- Use an appropriate barrier if required to perform rescue breathing.

Ticks - Ticks generally favor areas of high grass and dense vegetation so to the extent possible, these areas should be avoided. It is advisable when entering these areas to tuck pants into socks and to wear a light colored long sleeve shirt to help spot ticks before they bite. DEET-based insect repellents may be worn to repel ticks but hands should be washed thoroughly after use and DEET should not be sprayed directly onto the skin surface. Self-checks should be made frequently and at least at the end of the field day for ticks when working in or near vegetated areas.

If discovered, the tick should be removed with a pair of tweezers and saved in a sealed plastic bag. Sometimes, tick bites occur but the tick may not stay attached, followed by a rash developing in the area within a few days of the bite**. If bitten by a tick or a bulls-eye like rash develops, it is advisable to consult WorkCare**.

Spiders – Spiders typically seek cover in dark protected areas. Common areas where spiders may be encountered are heavy vegetation and trees. Spiders also are found in basements and enclosed spaces such as sheds, protective well covers, etc. Spider bites may cause swelling, pain and respiratory problems. Avoid dense vegetation, and use caution when sampling in dark poorly illuminated locations. If bitten, wash the area and use ice on the bite area to reduce swelling. If respiratory stress, significant pain or swelling is noted, or discoloration around the bite area occurs, seek immediate medical attention.

Stinging Insects – Like spiders, wasps and yellow jackets often nest in dense vegetation and in the ground, or in protective casings on monitoring wells and shielded gate locks. A sting from these insects can cause pain, swelling, and respiratory problems that may be life-threatening to certain individuals. If stung, remove stinger (if present) using tweezers, or similar, and wash the area and use ice on the sting area to reduce swelling. If respiratory stress, significant pain or swelling is noted, or discoloration around the sting area occurs, seek immediate medical attention.

Dogs and Wild Animals – Dogs often are not leashed and may be unfriendly. Bites from dogs and wild animals can cause infections or transmit disease. In general, it is best to not approach dogs even if they appear to be friendly, and wild animals should never be approached. If bitten, the area should be washed with soap and water. If the bite resulted in puncturing or tearing of the skin, the wound should be covered with a sterile dressing and medical attention should be sought immediately. A description of the dog should be noted and if possible, the dog's owner.

Plants – There are many types of plants which can cause irritation or allergic type reactions. Examples of some encountered on TRC sites include the following:

Poison Ivy **–** the trademarks of this plant are its solid green, pointed leaves that hang from the stem in groups of three. It grows as both a vine and a shrub. The look of poison ivy can change with the seasons. It produces yellow-green flowers in the spring and its green leaves can change to yellow and red in autumn.

Wild Parsnip/Giant Hogweed **–** Both plants are part of the carrot family and can grow up to 15 feet tall. They look similar to giant Queen Anne's lace with bristly stalks. Contact with the sap from the plant can cause phytophotodermatits or irritation (sometimes severe) when skin is exposed to sunlight.

Pandemic Preparedness – A "pandemic" refers to an epidemic that has spread over several countries or continents, usually impacting a large number of people. A pandemic has the potential to significantly impact routine services. A pandemic disease presents a serious health risk and could prevent TRC from performing project-related tasks. The risk to employee health and the business will vary based on the geographic area of the pandemic and the potential severity of the disease. Pandemic risk assessments will be performed by the TRC Corporate Safety team who will provide direction to field personnel.

TRC will follow health and travel precautions issued by the respective authorities. Employees should stay at home when sick or otherwise experience symptoms that are consistent with the pandemic disease. When at a project site, infection control measures should be enacted, which are essential components of pandemic

management and a component of public health measures. These essential measures include:

- Practice frequent hand washing. According to the CDC, washing hands with soap and water is the best way to get rid of germs in most situations. If soap and water are not readily available, you can use an alcohol-based hand sanitizer that contains at least 60 percent alcohol. You can tell if the sanitizer contains at least 60 percent alcohol by looking at the product label.
- Obtain immunizations recommended by healthcare providers to help avoid disease.
- Practice social distancing to increase the space between employee work areas and decreasing the possibility of contact by limiting large or close contact gatherings and avoid shaking hands.
- Frequently disinfect all areas that are likely to have frequent hand contact (like doorknobs, faucets, handrails, etc.).

5.4 Radiological Hazards

No radiological hazards are expected at the site. If any new condition is encountered during this activity, the HASP will be adjusted accordingly.

6. Personal Protection Monitoring

Personal Protection Monitoring Equipment and Use Recommendations: The following table outlines monitoring equipment needs and rationale. Note that an upgrade to a higher level of respiratory protection (C or higher) will warrant revision or addendum to this HASP and consultation with the TRC Corporate Safety team before work recommences.

Table 2: Monitoring Equipment Use Recommendations

Instrument	Use Code	Action Levels	Notes/Rationale
PID	C	5 ppmv*	Recommended for VOC screening to monitor airborne VOC concentrations in breathing zone levels. If PID readings are sustained above 5 ppmv in the breathing zone for at least 5 minutes, move to an upwind location for 15 minutes. After 15 minutes, measure again. If PID readings are still above 5 ppmv in the breathing zone, contact the Project Manager or OSC to evaluate suitable response actions. Any upgrade in respiratory protection will be coordinated with the TRC Corporate Safety team. Withdraw from area if PID readings exceed 50 ppmv.
TSI Dustrak™ (or equivalent)	C	> 150 µg/m3; 15 minute average**	Used where contaminants could adhere to fugitive dust, and where fugitive dust migration could potentially serve as a significant exposure pathway. Half-faced APR for particulates to be used intermittently/temporarily where dust control measures cannot maintain dust levels below action level. Use is optional for dust levels below the action level. Use of a half-face APR for dust does not require CIH approval where dust action level excursions are limited in duration, and where dust control measures will be implemented until below the action level. However, personnel must be medically qualified, fit tested for half-face APR use, and trained in the use of the APR.
O^2/LEL	C	19.5%	Recommended for landfill, lagoon, excavation, sewer, and anaerobic degradation site work. Required for confined space work.
H_2S Meter	C	1 ppm	Recommended for landfill, lagoon, excavation, sewer, and anaerobic degradation site work. Required for confined space work.
CO	C	25 ppm	½ of the PEL (PEL = 50 ppm)
CGI	C	10% LEL	Recommended safe level to prevent explosive conditions.
MINIRAM (or equivalent)	O		Supplement operation of Dustrak™ stations for work near sensitive receptors.
Radiation meters	N/A		Not known or anticipated to be a Contaminant of Concern.

Table 2: Monitoring Equipment Use Recommendations			
Instrument	**Use Code**	**Action Levels**	**Notes/Rationale**

Notes:
* Site/project specific action levels for VOCs may be established in consultation with the OSC.
** Above background upwind levels

PID – Photoionization detector	LEL – Lower Explosive Limit	O_2 – Oxygen
H_2S – Hydrogen Sulfide	CO – Carbon Monoxide	ppm – Parts per Million
CGI – Combustible Gas Indicator	VOC – Volatile organic compound	ppmv – Parts per Million Volume
APR – Air Purifying Respirator	CIH – Certified Industrial Hygienist	PEL – Permissible Exposure Limit
µg/m3 – micrograms per cubic meter		

Use Codes: R – Required, C – Condition specific, O – Optional, N/A – Not applicable

Personal Protection Monitoring Procedures: When necessary, the OHSO will measure organic vapor concentrations in the breathing zone using a PID. Fugitive dust emissions are not anticipated to be a concern. When required, air monitoring for dust will be performed using a combination of real-time dust monitoring upwind and downwind of the work area, and at a point near the closest receptor.

Personal Protection Exposure Limits: The following table summarizes anticipated concentrations and accepted exposure limits of chemicals potentially present within the work site.

Table 3: Summary of Exposure Limits – Known or Suspected Site Impacts		
Chemical of Concern	**Detected Concentration**	**OSHA PEL/ACGIH TLV**
Volatile Organic Compounds (VOCs)	Unknown	200 ppm (OSHA PEL for PCE) 200 ppm (OSHA PEL for TCE) 200 ppm (OSHA PEL for DCE)
Semi-volatile Organic Compounds (SVOCs)	Unknown	0.2 mg/m^3 (OSHA PEL for PAHs)
Polychlorinated Biphenyls (PCBs)	Unknown	1,000 $\mu g/m^3$ (OSHA PEL for PCBs containing 42% chlorine) 500 $\mu g/m^3$ (OSHA PEL for PCBs containing 54% chlorine)
Metals	Unknown	50 $\mu g/m^3$ (OSHA PEL for lead) 10 $\mu g/m^3$ (OSHA PEL for arsenic) 0.2 mg/m^3 (OSHA PEL for cadmium) 0.5 mg/m^3 (OSHA PEL for chromium) 0.2 mg/m^3 (OSHA PEL for selenium) 0.01 mg/m^3 (OSHA PEL for silver) 0.5 mg/m^3 (OSHA PEL for barium) 1.0 mg/m^3 (OSHA PEL for mercury)
PFAS (PFOS and PFOA)	Unknown	0.01 mg/m^3 (ACGIH TLV-TWA for skin notation)

Table 3: Summary of Exposure Limits – Known or Suspected Site Impacts		
Chemical of Concern	**Detected Concentration**	**OSHA PEL/ACGIH TLV**

Notes: Exposure and hazard data obtained from the NIOSH Pocket Guide to Chemical Hazards unless otherwise noted.

ppm – parts per million
OSHA – Occupational Safety and Health Administration
PCE – Tetrachloroethene
DCE – Dichloroethene
µg/m3 – micrograms per cubic meter
TLV – Threshold Limit Value
PEL – Permissible Exposure Limit
TCE – Trichloroethelene
PAHs – Polycyclic aromatic hydrocarbons

Table 4: Preservatives and Decontamination Products		
Chemical of Concern	**On-Site Usage and Potential Exposures**	**Control Method**
Hydrochloric Acid (HCl)	Less than 20 ml quantities used for sample preservation. Air phase exposure is expected to be minimal and incidental to sample containerization.	5 ppm (OSHA PEL)
Methyl Alcohol (methanol; MeOH)	Less than 20 ml quantities used for sample preservation. Air phase exposure is expected to be minimal and incidental to sample containerization.	200 ppm (OSHA PEL)
Nitric Acid (HNO_3)	Less than 20 ml quantities used for sample preservation. Air phase exposure is expected to be minimal and incidental to sample containerization.	5 mg/m3 (OSHA PEL)
Isobutylene	100 ppm gas for use during calibration of PID instruments.	No specific exposure limits for isobutylene (simple asphyxiant). Maintain oxygen levels above 19.5%. Before attaching regulator to cylinder, verify that the regulator is off. Before opening regulator, make sure that tubing connecting regulator to monitoring device/ Tedlar® bag is secure. To use a Tedlar® bag, put bag control valve in an open position and close after filling.

Table 4: Preservatives and Decontamination Products		
Chemical of Concern	**On-Site Usage and Potential Exposures**	**Control Method**
		Before disconnecting gas from the instrument and/or Tedlar® bag, verify the regulator is closed. Empty bag of contents after calibration in a downwind position and/or to avoid inadvertent inhalation.

Notes:

ppm – parts per million
ml – milliliters
PID – Photoionization Detector
OSHA – Occupational Safety and Health Administration
PEL – Permissible Exposure Limit

7. Personal Protective Equipment

TRC personnel will use Level D PPE as noted/modified below:

Table 5: Level D Personal Protective Equipment

Item	Rationale/Notes
Hardhat	American National Standards Institute/International Safety Equipment Association (ANSI/ISEA) Z89.1-2009 rated hard hats will be worn by personnel at all times when overhead hazards are present, including electrical.
Hearing protection	Hearing protection will be worn by all personnel exposed to at least 85 dB of sound during the workday. A good rule of thumb to use in determining whether background noise is 85 dB or higher is if you must shout to be understood by somebody about one arm-length away, that background noise is hazardous.
Safety boots (steel or composite toe and shank)	Electrical Hazard (EH) rated safety-toe safety boots will be worn by all personnel during project work described in this HASP.
Eye protection (safety glasses)	ANSI rated eye protection (Z87 or Z87+) is required to be worn at all times when onsite or when personnel are exposed to flying debris, chemical vapors or particulates. Chemical splash goggles will be worn for protection against chemical gases, vapors or particulates. Safety glasses will be worn for protection against flying objects.
Safety vest	ANSI Class 2 safety vest is required at all times when onsite. Utilize in areas in or near vehicular traffic of any kind on or off property.
Chemical Protective Clothing (CPC) and Gloves	CPC and gloves will be inspected according to TRC's Personal Protective Equipment Program. CPC will be chosen with assistance from the OSC according to the chemical hazards present. Gloves are to be changed between samples to avoid cross-contamination.
Cut resistant work gloves	As indicated herein, use Cut and Abrasion Resistance Level 2 to Level 4 gloves when necessary for hand protection during field tasks. See **Appendix B** for a Glove Selection Guide. ***Leather work gloves are expressly prohibited.***
Electrical Safety	8 cal/cm^2 Flame Resistant (FR) clothing
Face Coverings	Protect personnel from receiving or transmitting COVID-19.
Personal Floatation Device (PFD)	Type I, II, or III PFD is required to be worn at all times when working over/near water.

A basic first aid kit will be readily available on-site in the event of an emergency.

Fire extinguishers should be present within 50 feet of wherever more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are being used at the site, including operational

equipment. All personnel working on or around the equipment should know the location of and how to operate the fire extinguisher. Ensure the fire extinguisher is in working order by checking the manufacture and/or most recent inspection dates.

8. Personnel and Equipment Decontamination Plan

At minimum, personnel and equipment decontamination will include the following:

Equipment Decontamination: There is a possibility that site media contacted during work activities contain compounds described in **Table 3**. All equipment that comes in contact with media needs to be decontaminated before it is removed from the job site. To properly decontaminate equipment that comes in contact with media, the following procedure should be followed:

- Brush accumulated material off equipment that has come in contact with impacted media. The material shall be returned to the location from which it came or disposed of properly;
- Wipe parts of the equipment that came in contact with the media down with cloth, rags or heavy-duty paper towel damp with non-phosphate concentrated laboratory-grade soap (i.e. Alconox© or Liquinox©);
- Follow up with a wipe from a separate cloth, rags or heavy duty paper towel damp with potable water; and
- PPE and cloth, rags or heavy duty paper towels can be disposed of in the regular waste stream.
- If equipment becomes grossly impacted with site media, equipment shall be steam cleaned over a decontamination pad.

Personnel Decontamination: In general, contamination of personnel shall be prevented through the use of PPE. At minimum, nitrile gloves shall be worn during contact with impacted material or chemical in addition to other Level D PPE.

9. Required Personnel Training

TRC field personnel will have the training outlined below before on-site work activities:

Table 6: Project Training Requirements

(* required for all sites; but minimum recommended)
Check "A" if training required for everyone, and check "T" if training required for specific task or per notations.

A	T	Subject	Reference	
			29 CFR 1910	29 CFR 1926 or Other
☒	☐	HAZWOPER 40 hour*	1910.120	1926.65
☒	☐	3-Day HAZWOPER Supervised On-site*	1910.120	1926.65
☒	☐	8-Hour HAZWOPER Refresher*	1910.120	1926.65
☐	☒	8-Hour Supervisor HAZWOPER*	1910.120	1926.65
☐	☒	First Aid, CPR*,1	1910.151	1926.23,.50
☒	☐	Hazard Communication (HAZCOM)	1910.1200	1926.59
☐	☒	DOT/IATA Shipping Training	1910.1201	49 CFR 172.704
☐	☐			
☐	☐			
☐	☐			
Client-specific training:_____ ☐ Not Applicable ☐ Specify				
Client-specific training:_____ ☐ Not Applicable ☐ Specify				
Client-specific training:_____ ☐ Not Applicable ☐ Specify				

Note:
1 Per the TRC Health and Safety Policy and Procedure Manual, each TRC project will have at least one certified CPR/first aid trained person on site at all times. All Project Managers and anyone acting as the on-site Health and Safety Officer must be current in First Aid/CPR.

Project training requirements beyond those provided in the above table will require a HASP revision/upgrade or concurrence of the TRC Safety Director or ECR Safety Manager.

10. Medical Monitoring

Medical monitoring will apply routinely to all employees who are or may be exposed to hazardous substances or health hazards at or above the established permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year (40 CFR 1910.120[f][2][i]). Said TRC field personnel will have the medical surveillance outlined in the table below prior to commencing on-site work activities.

Table 7: Medical Surveillance Required			
*Baseline is minimum recommended.			
	29 CFR 1910	**29 CFR 1926 or Other**	**Notes**
☒ HAZWOPER Physical - Baseline*	1910.120	1926.65	
☒ HAZWOPER Physical – Annual	1910.120	1926.65	
☐ HAZWOPER Physical - Biennial*	1910.120	1926.65	
Client-specific drug testing[1]	☐ Not Applicable ☐ Specify		
Client-specific medical monitoring[1]	☐ Not Applicable ☐ Specify		
Site-specific medical monitoring:	☐ Not Applicable ☐ Specify		
Note: [1] Client required drug testing or medical monitoring should be coordinated through the Project Manager.			

TRC has a Drug and Alcohol-Free Workplace Policy (TRC Academy Course #900013753). TRC may require employees or subcontractors to be tested upon reasonable suspicion, following accidents or incidents during work activities, or during travel to or from a project site. Client policies may be stricter in regard to procedures following an accident. Project Managers must be aware of these and inform employees and subcontractors of any additional requirements.

11. General Safety Requirements

The general safety rules listed below apply to all TRC personnel present at the site.

- A tailgate health and safety meeting will be held with all field team members each day prior to the start of work, the start of a new shift, upon changing of work conditions or job task duties, or when new field team members arrive onsite.
- Adhere to all requirements of this HASP.
- Wear protective clothing appropriate for the designated level of protection and decontaminate before entering clean areas when applicable.
- Use safety equipment in accordance with OSHA guidance and labeling instructions.
- Maintain safety equipment in good condition and proper working order and make sure that the equipment is calibrated prior to use.
- Immediately report unsafe acts or conditions to the Project Manager and OSC.
- Eating, drinking, and smoking are prohibited on site, except in designated areas.
- Maintaining a position upwind from intrusive activities is encouraged.
- The emergency shutoff switch should be demonstrated to be working prior to initiating drilling.
- An adequately stocked first-aid kit will be maintained at the work site.

12. Tailgate Safety Meetings

- A tailgate safety meeting will be conducted daily prior to commencement of the work day, the start of a new shift, upon changing of work conditions or job task duties, or when new field team members arrive onsite (see checklist provided in **Appendix D**).
- Topics covered by the tailgate safety meeting will include, but not be limited to, scope of work and who will conduct each task, potential hazards, weather forecast, PPE, emergency procedures and the route to the medical facility, site conditions and features, and, communication guidelines related to stakeholder engagement and visitors.
- Safety meetings must also be held to address modifications to this HASP and any addenda prepared to supplement the HASP.
- Subcontractors and personnel present at the tailgate safety meeting shall be required to sign an acknowledgement form after each meeting.

13. Emergency/Contingency Plan

Before commencing any on-site operations, the TRC OHSO will advise all personnel of potential emergencies. Personnel will be advised on their roles in the event of an emergency, and the steps to take for a timely and controlled response.

Communication networks/chain of command – All on-site personnel will communicate any accident, injury or near miss to the TRC OHSO who will provide instruction on how to proceed further.

First Aid / Safety Equipment – First aid equipment should be readily available in the event of an emergency. First aid equipment should include a well-stocked first aid kit, fire extinguisher and emergency eye wash.

Evacuation Plans and Refuge Area – All personnel should safely remove themselves from danger in the event of an emergency and safely access the refuge area. The refuge area should be in an upwind location a safe distance from the work zone. The refuge area will be determined during the daily safety briefing.

Notifications of Fire, Police and Emergency Facilities – In the event of an emergency that cannot be controlled by on-site personnel, the appropriate emergency contact shall be notified. All personnel shall remove themselves from the area of danger and wait for the arrival of help in the predetermined refuge area.

Non-Emergency Medical Assistance – If an injury does occur and it is not life threatening, then the employee or employee's supervisor/project manager should contact WorkCare as soon as possible, but within the first hour after an injury. WorkCare information is proved in **Appendix E**. This information will help assist the injured employee by connecting them with instant access to a medically qualified professional in order to provide guidance on appropriate first aid measures and medications.

14. Stop Work

TRC personnel are all empowered, responsible, authorized and obliged to stop work at any time we feel that our safety or the safety of others is, or could be, compromised. When a stop work occurs the Project Manager and/or OSC should be contacted to discuss the reason for the stop work and the corrective action(s) needed to resume work safely. Work on an activity shall not continue until the unsafe condition has been corrected.

15. Safe Catches

A "Safe Catch" is a potential hazard or incident that has not resulted in any personal injury. Unsafe working conditions, unsafe employee behaviors, improper use of equipment or use of malfunctioning equipment have the potential to cause work related injuries. It is everyone's responsibility to report and/or correct these potential incidents immediately. Please complete the form provided in **Appendix F** as a means to report these "Safe Catch" situations and submit to your local OSC Representative and Mike Glenn, National Safety Director.

16. Observations

Note that the Project Manager and/or OSC may notify field staff that their site activities may be the subject of Safety Observation, an integral part of the continuous improvement safety culture promoted at TRC. If subject to an observation, please note the following:

- The Observation will tend to focus on the highest risk activity (as a general example, drilling in a public right-of-way).
- Follow-up observations may need to occur on previous observations, depending on prior data collected.
- The observer's preparation before visiting the site will be a review of the HASP, JSAs, client-specific requirements, etc., and a review of the work scope with the Project Manager to ensure the context of the work is well understood in advance.
- Review items may include PPE, body use and positioning, work environment, operating procedures, and tools and equipment.
- The observation should last between 30 and 60 minutes.

Both positive and negative observations are candidates for documentation and later discussion. The overarching goals are to identify and correct questionable practices and to identify and promote good, safe and efficient practices. It is a data gathering process that will allow TRC safety specialists to identify root causes for safety issues in both categories to better inform policy decisions.

17. Incident Reporting

In case of an incident, TRC personnel must report the incident immediately to their project manager/supervisor and/or OSC as well as the client's representative and follow the TRC Incident Response and Reporting Process (see **Appendix G -** In Case of Emergency and Incident Reporting). Required Incident Notification or Auto Incident Report forms must be completed within 24 hours following the incident. If neither is available, the incident shall be reported to the TRC Safety Director. Incident/injury/exposure information must be recorded per TRC policy and will be the basis of any incident investigations.

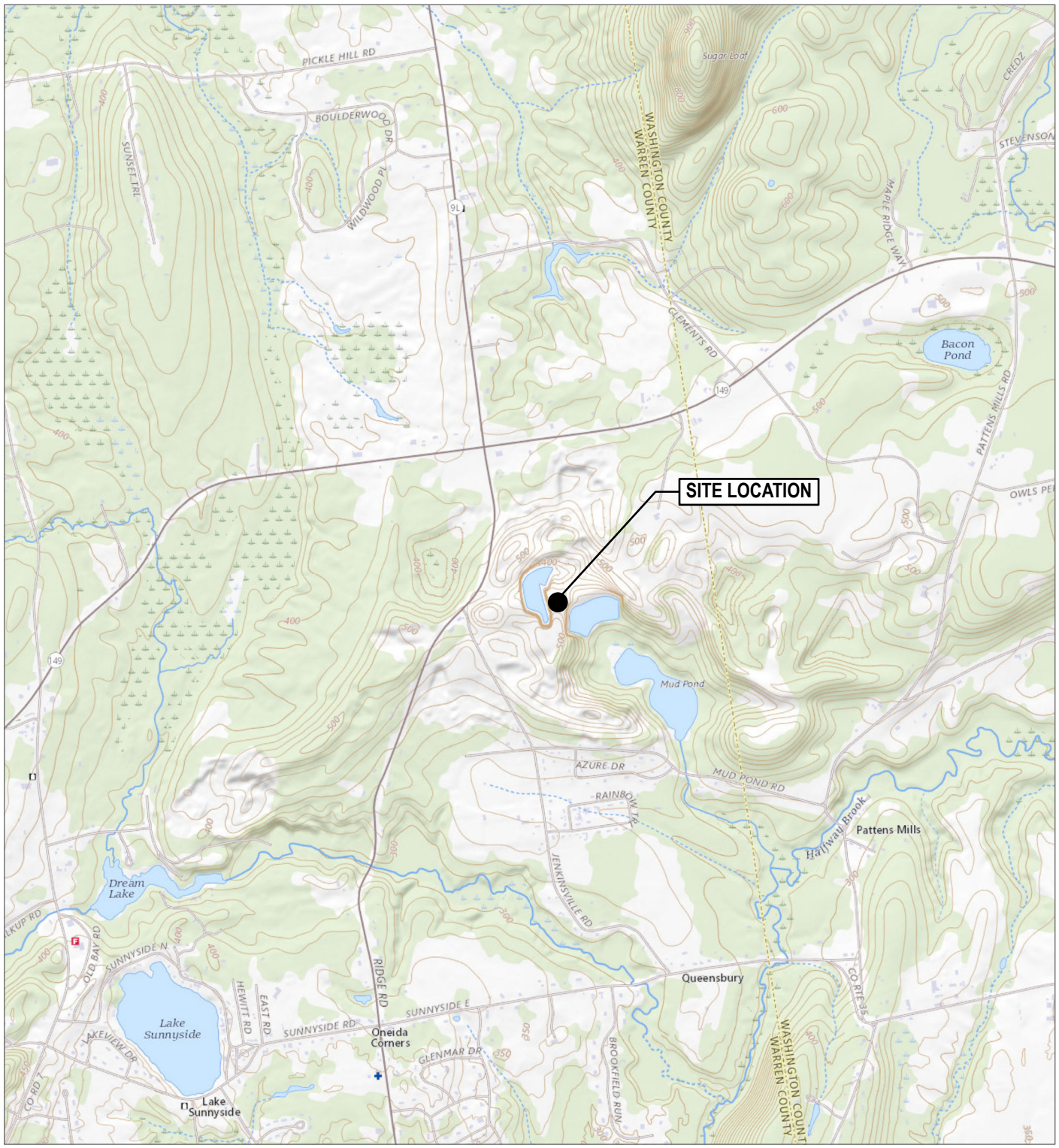
18. Job Safety Analysis

It is anticipated that the standard operating procedures (SOPs) detailed in the Generic Field Activities Plan (FAP) will be utilized for all work practices. If site specific activities require additional or alternate procedures, TRC will assess the task hazards and controls using separate job safety analysis forms (JSAs). Prior to use in the field, JSAs will be reviewed and approved by the TRC Project Manager and OSC. JSA forms can be found in **Appendix H**.

19. Acknowledgement

All TRC personnel operating under this HASP must read the HASP and sign the acknowledgment page in **Appendix I**.

Figure 1
Site Layout



LEGEND

- SITE LOCATION

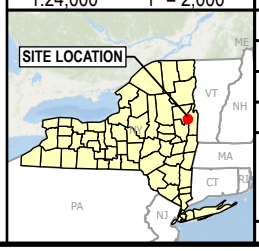
BASE MAP: USGS TOPOGRAPHIC MAP SERVICE
DATA SOURCES: TRC

N

0 1,000 2,000

FEET

1:24,000 1" = 2,000'



PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
QUEENSBURY LANDFILL - SITE NO. 557005
RIDGE ROAD
QUEENSBURY, NEW YORK 12801

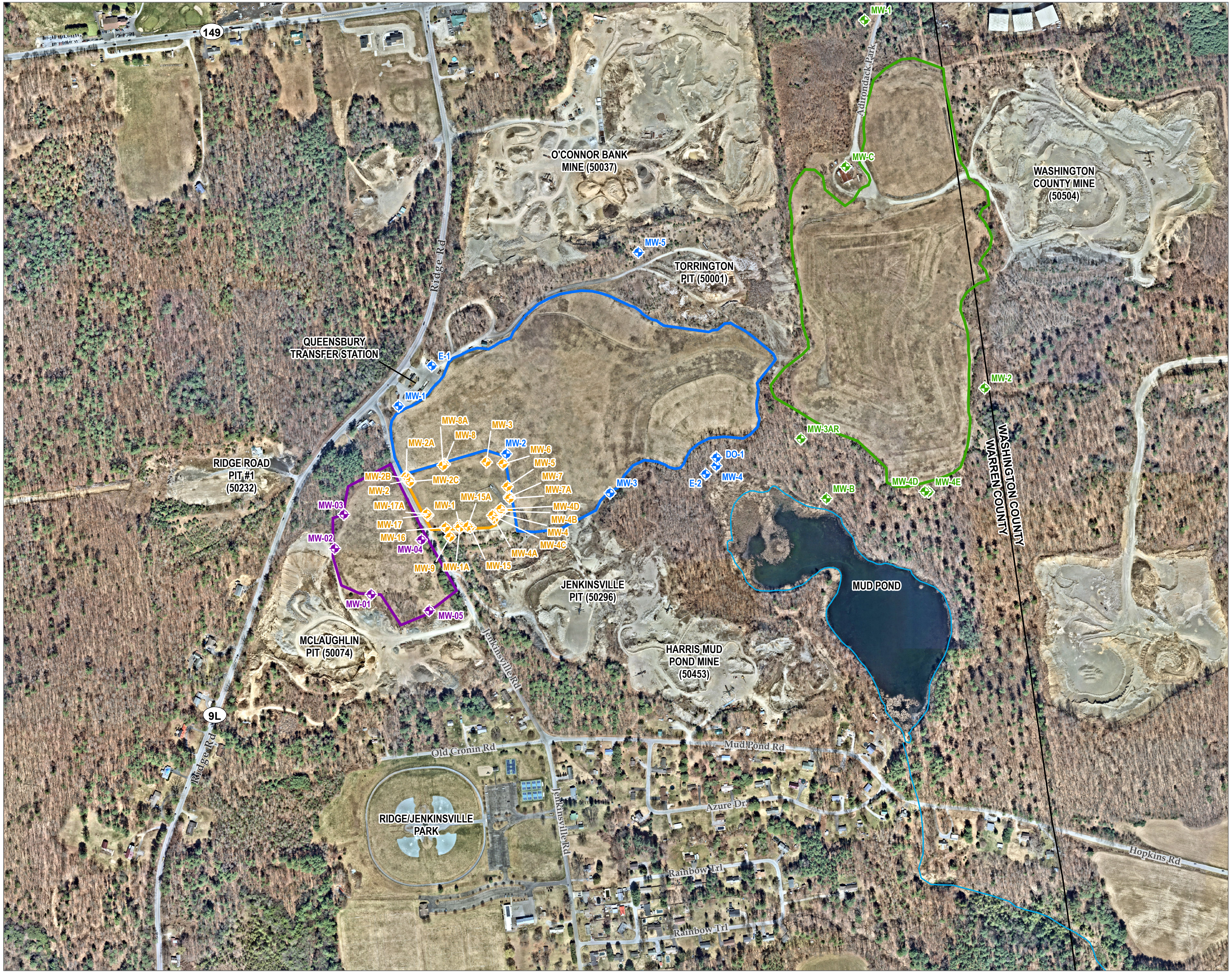
TITLE:

SITE LOCATION MAP

DRAWN BY:	L. LILL	PROJ. NO.:	453202.0000.0000
CHECKED BY:	T. SHANLEY		
APPROVED BY:	J. KING		**FIGURE 1**
DATE:	AUGUST 2023		

TRC
3 Corporate Drive
Suite 202
Clifton Park, NY 12065
Phone: 518.348.1190

FILE: SC_FIGS



LEGEND

- CIBA-GEIGY LANDFILL (NYSDEC SITE NO. 557004)
- QUEENSBURY LANDFILL (NYSDEC SITE NO. 557005)
- FINCH PAPER LANDFILL (NYSDEC SITE NO. 557002)
- MCLAUGHLIN LANDFILL (NYSDEC SOLID WASTE ID NO. 57D01)
- CIBA-GEIGY LANDFILL MONITORING WELL
- QUEENSBURY LANDFILL MONITORING WELL
- FINCH PAPER LANDFILL MONITORING WELL
- MCLAUGHLIN LANDFILL MONITORING WELL
- MUD POND
- NEW YORK STATE COUNTY LINE

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.

N

1:6,600
1" = 550'

BASE MAP: NEAR MAP IMAGERY DATED APRIL 30, 2022
DATA SOURCES: TRC, NYGIS
SHEET SIZE: 11X17L

0 275 550 FEET

PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
QUEENSBURY LANDFILL - SITE NO. 557005
RIDGE ROAD
QUEENSBURY, NEW YORK 12801

TITLE:

SITE LAYOUT MAP

DRAWN BY:	L. LILL	PROJ. NO.:	453202.0000.0000
CHECKED BY:	T. SHANLEY	**FIGURE 2**	
APPROVED BY:	J. KING		
DATE:	AUGUST 2023		

TRC

3 Corporate Drive
Suite 202
Clifton Park, NY 12065
Phone: 518.348.1190

FILE: sc_figs.aprx

Coordinate System: NAD 1983 StatePlane New York East FIPS 3101 Feet; Map Rotation: 0
-- Saved By: LLILL on 8/15/2023, 10:06:30 AM; File Path: T:\1-PROJECTS\NYSDEC\453202_QueensburyLF\2-APRX\sc_figs\sc_figs.aprx; Layout Name: Figure 2 - SiteLayout

CIBA-GEIGY LANDFILL

QUEENSBURY LANDFILL

MCLAUGHLIN LANDFILL

JENKINSVILLE PIT (50296)

MUD POND

MCLAUGHLIN PIT (50074)

HARRIS MUD POND MINE (50453)

Old Cronin Rd

Jenkinsville Rd

Mud Pond Rd

Azure Dr

Rainbow Trl

RIDGE/JENKINSVILLE PARK

LEGEND

- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL

NOTES:

1. LOCATIONS AND DIMENSIONS OF PHYSICAL FEATURES AND PROPERTY BOUNDARIES ARE APPROXIMATE.

1:3,840
1" = 320'

BASE MAP: NEAR MAP IMAGERY DATED APRIL 30, 2022
DATA SOURCES: TRC
SHEET SIZE: 11X17L

0 160 320 FEET

PROJECT:
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
QUEENSBURY LANDFILL - SITE NO. 557005
RIDGE ROAD
QUEENSBURY, NEW YORK 12801

TITLE:
PROPOSED MONITORING WELL LOCATIONS

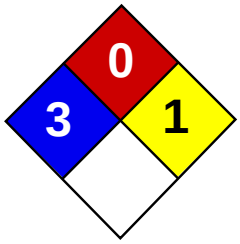
DRAWN BY:	L. LILL	PROJ. NO.:	453202.0000.0000
CHECKED BY:	T. SHANLEY		**FIGURE 3**
APPROVED BY:	J. KING		
DATE:	AUGUST 2023		

TRC
3 Corporate Drive
Suite 202
Clifton Park, NY 12065
Phone: 518.348.1190

FILE: sc_figs.aprx

Coordinate System: NAD 1983 StatePlane New York East FIPS 3101 Feet; Map Rotation: 0
Saved By J.LILL on 8/15/2023, 08:19:23 AM; File Path: T:\1-PROJECTS\NY\SCEC453202_Queensbury_R2-APRX\sc_figs\sc_figs.aprx; Layout Name: Figure 3 - Proposed Monitoring Well Locations

Appendix A
Safety Data Sheets



Material Safety Data Sheet
Hydrochloric acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Hydrochloric acid

Catalog Codes: SLH1462, SLH3154

CAS#: Mixture.

RTECS: MW4025000

TSCA: TSCA 8(b) inventory: Hydrochloric acid

CI#: Not applicable.

Synonym: Hydrochloric Acid; Muriatic Acid

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Hydrogen chloride	7647-01-0	20-38
Water	7732-18-5	62-80

Toxicological Data on Ingredients: Hydrogen chloride: GAS (LC50): Acute: 4701 ppm 0.5 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, . Slightly hazardous in case of inhalation (lung sensitizer). Non-corrosive for lungs. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid]. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth. Repeated or prolonged exposure to the substance can produce target

organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: of metals

Explosion Hazards in Presence of Various Substances: Non-explosive in presence of open flames and sparks, of shocks.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
Non combustible. Calcium carbide reacts with hydrogen chloride gas with incandescence. Uranium phosphide reacts with hydrochloric acid to release spontaneously flammable phosphine. Rubidium acetylene carbides burns with slightly warm hydrochloric acid. Lithium silicide in contact with hydrogen chloride becomes incandescent. When dilute hydrochloric acid is used, gas spontaneously flammable in air is evolved. Magnesium boride treated with concentrated hydrochloric acid produces spontaneously flammble gas. Cesium acetylene carbide burns hydrogen chloride gas. Cesium carbide ignites in contact with hydrochloric acid unless acid is dilute. Reacts with most metals to produce flammable Hydrodgen gas.

Special Remarks on Explosion Hazards:

Hydrogen chloride in contact with the following can cause an explosion, ignition on contact, or other violent/vigorous reaction: Acetic anhydride AgClO + CCl4 Alcohols + hydrogen cyanide, Aluminum Aluminum-titanium alloys (with HCl vapor), 2-Amino ethanol, Ammonium hydroxide, Calcium carbide Ca3P2 Chlorine + dinitroanilines (evolves gas), Chlorosulfonic acid Cesium carbide Cesium acetylene carbide, 1,1-Difluoroethylene Ethylene diamine Ethylene imine, Fluorine, HClO4 Hexalithium disilicide H2SO4 Metal acetylides or carbides, Magnesium boride, Mercuric sulfate, Oleum, Potassium permanganate, beta-Propiolactone Propylene oxide Rubidium carbide, Rubidium, acetylene carbide Sodium (with aqueous HCl), Sodium hydroxide Sodium tetraselenium, Sulfonic acid, Tetraselenium tetranitride, U3P4 , Vinyl acetate. Silver perchlorate with carbon tetrachloride in the presence of hydrochloric acid produces trichloromethyl perchlorate which detonates at 40 deg. C.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, organic materials, metals, alkalis, moisture. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
CEIL: 5 (ppm) from OSHA (PEL) [United States] CEIL: 7 (mg/m3) from OSHA (PEL) [United States] CEIL: 5 from NIOSH CEIL: 7 (mg/m3) from NIOSH TWA: 1 STEL: 5 (ppm) [United Kingdom (UK)] TWA: 2 STEL: 8 (mg/m3) [United Kingdom (UK)]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Pungent. Irritating (Strong.)

Taste: Not available.

Molecular Weight: Not applicable.

Color: Colorless to light yellow.

pH (1% soln/water): Acidic.

Boiling Point:
108.58 C @ 760 mm Hg (for 20.22% HCl in water) 83 C @ 760 mm Hg (for 31% HCl in water) 50.5 C (for 37% HCl in water)

Melting Point:
-62.25°C (-80°F) (20.69% HCl in water) -46.2 C (31.24% HCl in water) -25.4 C (39.17% HCl in water)

Critical Temperature: Not available.

Specific Gravity:
1.1- 1.19 (Water = 1) 1.10 (20%and 22% HCl solutions) 1.12 (24% HCl solution) 1.15 (29.57% HCl solution) 1.16 (32% HCl solution) 1.19 (37% and 38%HCl solutions)

Vapor Pressure: 16 kPa (@ 20°C) average

Vapor Density: 1.267 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.25 to 10 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility: Soluble in cold water, hot water, diethyl ether.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, water

Incompatibility with various substances:
Highly reactive with metals. Reactive with oxidizing agents, organic materials, alkalis, water.

Corrosivity:
Extremely corrosive in presence of aluminum, of copper, of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Reacts with water especially when water is added to the product. Absorption of gaseous hydrogen chloride on mercuric sulfate becomes violent @ 125 deg. C. Sodium reacts very violently with gaseous hydrogen chloride. Calcium phosphide and hydrochloric acid undergo very energetic reaction. It reacts with oxidizers releasing chlorine gas. Incompatible with, alkali metals, carbides, borides, metal oxides, vinyl acetate, acetylides, sulphides, phosphides, cyanides, carbonates. Reacts with most metals to produce flammable Hydrogen gas. Reacts violently (moderate reaction with heat of evolution) with water especially when water is added to the product. Isolate hydrogen chloride from heat, direct sunlight, alkalies (reacts vigorously), organic materials, and oxidizers (especially nitric acid and chlorates), amines, metals, copper and alloys (e.g. brass), hydroxides, zinc (galvanized materials), lithium silicide (incandescence), sulfuric acid(increase in temperature and pressure) Hydrogen chloride gas is emitted when this product is in contact with sulfuric acid. Adsorption of Hydrochloric Acid onto silicon dioxide results in exothmeric reaction. Hydrogen chloride causes aldehydes and epoxides to violently polymerize. Hydrogen chloride or Hydrochloric Acid in contact with the folloiwng can cause explosion or ignition on contact or

Special Remarks on Corrosivity:

Highly corrosive. Incompatible with copper and copper alloys. It attacks nearly all metals (mercury, gold, platinium, tantalum, silver, and certain alloys are exceptions). It is one of the most corrosive of the nonoxidizing acids in contact with copper alloys. No corrosivity data on zinc, steel. Severe Corrosive effect on brass and bronze

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
Acute oral toxicity (LD50): 900 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 1108 ppm, 1 hours [Mouse]. Acute toxicity of the vapor (LC50): 3124 ppm, 1 hours [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid]. May cause damage to the following organs: kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth.

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of ingestion, . Hazardous in case of eye contact (corrosive), of inhalation (lung corrosive).

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Doses (LDL/LCL) LDL [Man] -Route: Oral; 2857 ug/kg LCL [Human] - Route: Inhalation; Dose: 1300 ppm/30M LCL [Rabbit] - Route: Inhalation; Dose: 4413 ppm/30M

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects (fetoxicity). May affect genetic material.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Corrosive. Causes severe skin irritation and burns. Eyes: Corrosive. Causes severe eye irritation/conjuntivitis, burns, corneal necrosis. Inhalation: May be fatal if inhaled. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract. Inhalation of hydrochloric acid fumes produces nose, throat, and larryngeal burning, and irritation, pain and inflammation, coughing, sneezing, choking sensation, hoarseness, laryngeal spasms, upper respiratory tract edema, chest pains, as well has headache, and palpitations. Inhalation of high concentrations can result in corrosive burns, necrosis of bronchial epithelium, constriction of the larynx and bronchi, nasospetal perforation, glottal closure, occur, particularly if exposure is prolonged. May affect the liver. Ingestion: May be fatal if swallowed. Causes irritation and burning, ulceration, or perforation of the gastrointestinal tract and resultant peritonitis, gastric hemorrhage and infection. Can also cause nausea, vomitting (with "coffee ground" emesis), diarrhea, thirst, difficulty swallowing, salivation, chills, fever, uneasiness, shock, strictures and stenosis (esophogeal, gastric, pyloric). May affect behavior (excitement), the cardiovascular system (weak rapid pulse, tachycardia), respiration (shallow respiration), and urinary system (kidneys- renal failure, nephritis). Acute exposure via inhalation or ingestion can also cause erosion of tooth enamel. Chronic Potential Health Effects: dyspnea, bronchitis. Chemical pneumonitis and pulmonary edema can also

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Hydrochloric acid, solution UNNA: 1789 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Hydrochloric acid Illinois toxic substances disclosure to employee act: Hydrochloric acid Illinois chemical safety act: Hydrochloric acid New York release reporting list: Hydrochloric acid Rhode Island RTK hazardous substances: Hydrochloric acid Pennsylvania RTK: Hydrochloric acid Minnesota: Hydrochloric acid Massachusetts RTK: Hydrochloric acid Massachusetts spill list: Hydrochloric acid New Jersey: Hydrochloric acid New Jersey spill list: Hydrochloric acid Louisiana RTK reporting list: Hydrochloric acid Louisiana spill reporting: Hydrochloric acid California Director's List of Hazardous Substances: Hydrochloric acid TSCA 8(b) inventory: Hydrochloric acid TSCA 4(a) proposed test rules: Hydrochloric acid SARA 302/304/311/312 extremely hazardous substances: Hydrochloric acid SARA 313 toxic chemical notification and release reporting: Hydrochloric acid CERCLA: Hazardous substances.: Hydrochloric acid: 5000 lbs. (2268 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):
R34- Causes burns. R37- Irritating to respiratory system. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 1

Personal Protection:

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

Health: 3

Flammability: 0

Reactivity: 1

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

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Last Updated: 06/09/2012 12:00 PM

GASCO

MATERIAL SAFETY DATA SHEET - CALIBRATION CHECK GAS

PRODUCT NAME: ISOBUTYLENE (1 PPM – 0.9%) IN AIR

MSDS NO: 248 **Version:3** **Date: August, 2010**

1. Chemical Product and Company Identification

Gasco Affiliates, LLC
320 Scarlett Blvd.
Oldsmar, FL 34677

TELEPHONE NUMBER: (800) 910-0051 **24-HOUR EMERGENCY NUMBER: 1-800-424-9300**
FAX NUMBER: (866) 755-8920
E-MAIL: info@gascogas.com

PRODUCT NAME: ISOBUTYLENE (1 PPM – 0.9%) IN AIR
CHEMICAL NAME: Isobutylene in air
COMMON NAMES/ SYNONYMS: None
TDG (Canada) CLASSIFICATION: 2.2
WHIMIS CLASSIFICATION: A

2. COMPOSITION/ INFORMATION ON INGREDIENTS

INGREDIENT	%VOLUME	PEL-OSHA	TLV-ACGIH	LD_{50} or LC_{50} Route/Species
Isobutylene FORMULA: C_4H_8	0.0001-0.9	N/A	N/A	N/A
Air FORMULA: Mixture	99.0 to 99.9999	N/A	N/A	N/A

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Release of this product may produce oxygen-deficient atmospheres (especially in confined spaces or other poorly ventilated environments); individuals in such atmospheres may be asphyxiated. Isobutylene may cause drowsiness and other central nervous system effects in high concentrations; however, due to the low concentration of this gas mixture, this is unlikely to occur.

ROUTE OF ENTRY:

Skin Contact	Skin Absorption	Eye Contact	Inhalation	Ingestion
No	No	No	Yes	No

HEALTH EFFECTS:

Exposure Limits	Irritant	Sensitization	Reproductive Hazard	Mutagen
Yes	No	No	No	No

Carcinogenicity: --NTP: No IARC: No OSHA: No

EYE EFFECTS:
N/A.

SKIN EFFECTS:
N/A.

PRODUCT NAME: ISOBUTYLENE (1 PPM – 0.9%) IN AIR

INGESTION EFFECTS:
Ingestion unlikely. Gas at room temperature.

INHALATION EFFECTS:
Due to the small size of this cylinder, no unusual health effects from over-exposure are anticipated under normal routine use.

NFPA HAZARD CODES		HMIS HAZARD CODES		RATING SYSTEM
Health:	1	Health:	1	0= No Hazard
Flammability:	0	Flammability:	0	1= Slight Hazard
Reactivity:	0	Reactivity:	0	2= Moderate Hazard
				3= Serious Hazard
				4= Severe Hazard

4. FIRST AID MEASURES

EYES:
N/A

SKIN:
N/A

INGESTION:
Not required

INHALATION:
PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASED OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED THE SELF-CONTAINED BREATHING APPARATUS. Victims should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. If breathing has stopped administer artificial resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

5. FIRE-FIGHTING MEASURES

These containers hold gas under pressure, with no liquid phase. If involved in a major fire, they should be sprayed with water to avoid pressure increases, otherwise pressures will rise and ultimately they may distort or burst to release the contents. The gases will not add significantly to the fire, but containers or fragments may be projected considerable distances - thereby hampering fire fighting efforts.

6. ACCIDENTAL RELEASE MEASURES

In terms of weight, these containers hold very little contents, such that any accidental release by puncturing etc. will be of no practical concern.

7. HANDLING AND STORAGE

Suck back of water into the container must be prevented. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Use only in well-ventilated areas. Do not heat cylinder by any means to increase rate of product from the cylinder. Do not allow the temperature where cylinders are stored to exceed 130^{o}F (54^{o}C).

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Use adequate ventilation for extended use of gas.

PRODUCT NAME: ISOBUTYLENE (1 PPM – 0.9%) IN AIR

9. PHYSICAL AND CHEMICAL PROPERTIES

PARAMETER:	VALUE:
Physical state	: Gas
Evaporation point	: N/A
pH	: N/A
Odor and appearance	: Colorless, odorless gas

10. STABILITY AND REACTIVITY

Stable under normal conditions. Expected shelf life 48 months.

11. TOXICOLOGICAL INFORMATION

No toxicological damage caused by this product.

12. ECOLOGICAL INFORMATION

No ecological damage caused by this product.

13. DISPOSAL INFORMATION

Do not discharge into any place where its accumulation could be dangerous. Used containers are acceptable for disposal in the normal waste stream as long as the cylinder is empty and valve removed or cylinder wall is punctured; but GASCO encourages the consumer to return cylinders.

14. TRANSPORT INFORMATION

	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Compressed Gas N.O.S. (Isobutylene in Air)	Compressed Gas N.O.S. (Isobutylene in Air)
HAZARD CLASS:	2.2	2.2
IDENTIFICATION NUMBER:	UN1956	UN1956
SHIPPING LABEL:	NONFLAMMABLE GAS	NONFLAMMABLE GAS

15. REGULATORY INFORMATION

Isobutylene is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds.

16. OTHER INFORMATION

This MSDS has been prepared in accordance with the Chemicals (Hazard Information and Packaging for Supply (Amendment) Regulation 1996. The information is based on the best knowledge of GASCO, and its advisors and is given in good faith, but we cannot guarantee its accuracy, reliability or completeness and therefore disclaim any liability for loss or damage arising out of use of this data. Since conditions of use are outside the control of the Company and its advisors we disclaim any liability for loss or damage when the product is used for other purposes than it is intended.

MSDS/S010/248/ August, 2010

Safety Data Sheet

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

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

1 Identification of the substance/mixture and of the supplier

1.1 Product identifier

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

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

1.3 Details of the supplier of the Safety Data Sheet

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

Supplier

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

2 Hazards identification

2.1 Classification of the substance or mixture:

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

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

2.2 Label elements:

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

Hazard pictograms:

Signal word: Warning

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

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

Safety Data Sheet

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

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

Additional information: None.

Hazard description

Hazards Not Otherwise Classified (HNOC): None

Information concerning particular hazards for humans and environment:

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

Classification system:

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

3 Composition/information on ingredients

3.1 Chemical characterization : None

3.2 Description : None

3.3 Hazardous components (percentages by weight)

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

3.4 Additional Information : None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.

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

After skin contact:

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

After eye contact:

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

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

Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.

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

4.2 Most important symptoms and effects, both acute and delayed

None

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

No additional information.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

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

For safety reasons unsuitable extinguishing agents : None

5.2 Special hazards arising from the substance or mixture :

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

5.3 Advice for firefighters

Protective equipment:

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

5.4 Additional information :

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

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures :

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions :

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

6.3 Methods and material for containment and cleaning up :

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections : None

7 Handling and storage

7.1 Precautions for safe handling :

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

7.2 Conditions for safe storage, including any incompatibilities :

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

Safety Data Sheet

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

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

8 Exposure controls/personal protection

8.1 Control parameters :

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

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

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

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

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

8.2 Exposure controls

Appropriate engineering controls:

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

Respiratory protection:

Not needed under normal use conditions.

Protection of skin:

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

Eye protection:

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

General hygienic measures:

Wash hands before breaks and at the end of work.

Avoid contact with skin, eyes and clothing.

9 Physical and chemical properties

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

Safety Data Sheet

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

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

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

10 Stability and reactivity

10.1 Reactivity : None

10.2 Chemical stability : None

10.3 Possibility hazardous reactions : None

10.4 Conditions to avoid : None

10.5 Incompatible materials : None

10.6 Hazardous decomposition products : None

11 Toxicological information

11.1 Information on toxicological effects :

Acute Toxicity:

Oral:

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

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Sodium Alkylbenzene Sulfonate: Causes skin irritation. .

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation .

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

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

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

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

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

Safety Data Sheet

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

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

12.1 Toxicity:

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

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

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

Relevant Information:

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

14 Transport information

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

US DOT

Limited Quantity Exception: None

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

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

Safety Data Sheet

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

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

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

15 Regulatory information

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

North American

SARA

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

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

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

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

Proposition 65 (California):

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

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

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

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

Canadian

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

EU

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

Safety Data Sheet

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

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

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

Asia Pacific

Australia

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

China

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

Japan

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

Korea

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

New Zealand

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

Philippines

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

Taiwan

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

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

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

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

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

Manufacturer Statement:

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

Safety Data Sheet

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

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

1 Identification of the substance/mixture and of the supplier

1.1 Product identifier

Trade Name: Liquinox
Synonyms:
Product number: 1232-1, 1232, 1201-1, 1201, 1205, 1215, 1255

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

1.3 Details of the supplier of the Safety Data Sheet

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

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

2 Hazards identification

2.1 Classification of the substance or mixture:

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

Hazard-determining components of labeling:
Alcohol ethoxylate
Sodium alkylbenzene sulfonate
Sodium xylenesulphonate
Lauramine oxide

2.2 Label elements:

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

Hazard pictograms:

Signal word: Warning

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

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P332+P313 If skin irritation occurs: Get medical advice/attention.
P501 Dispose of contents and container as instructed in Section 13.

Additional information: None.

Hazard description

Safety Data Sheet

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

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

Hazards Not Otherwise Classified (HNOC): None

Information concerning particular hazards for humans and environment:

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

Classification system:

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

3 Composition/information on ingredients

3.1 Chemical characterization : None

3.2 Description : None

3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	Wt. %
CAS number: 68081-81-2	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	10-25
CAS number: 1300-72-7	Sodium Xylenesulphonate	Eye Irrit. 2; H319	2.5-10
CAS number: 84133-50-6	Alcohol Ethoxylate	Skin Irrit. 2 ; H315 Eye Dam. 1; H318	2.5-10
CAS number: 1643-20-5	Lauramine oxide	Skin Irrit. 2 ; H315 Eye Dam. 1; H318	1-2

3.4 Additional Information: None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.

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

After skin contact:

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

After eye contact:

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

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

Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.

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

4.2 Most important symptoms and effects, both acute and delayed

None

Safety Data Sheet

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

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

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

No additional information.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

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

For safety reasons unsuitable extinguishing agents : None

5.2 Special hazards arising from the substance or mixture :

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

5.3 Advice for firefighters

Protective equipment:

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

5.4 Additional information :

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

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures :

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions :

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

6.3 Methods and material for containment and cleaning up :

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections : None

7 Handling and storage

7.1 Precautions for safe handling :

Avoid breathing mist or vapor.
Do not eat, drink, smoke or use personal products when handling chemical substances.
Conditions for safe storage, including any incompatibilities:
Store closed upright and in a cool dry place, should be 15 - 30 deg C or 60 - 90 deg F.

7.2 Specific end use(s):

No additional information.

Safety Data Sheet

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

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

8 Exposure controls/personal protection

8.1 Control parameters :

No applicable occupational exposure limits

8.2 Exposure controls

Appropriate engineering controls:

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

Respiratory protection:

Not needed under normal conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance.

Eye protection:

Safety goggles or glasses, or appropriate eye protection.

General hygienic measures:

Wash hands before breaks and at the end of work.
Avoid contact with skin, eyes and clothing.

9 Physical and chemical properties

Appearance (physical state, color):	Pale yellow liquid	**Explosion limit lower:** **Explosion limit upper:**	Not determined or not available. Not determined or not available.
Odor:	Not determined or not available.	**Vapor pressure at 20°C:**	Not determined or not available.
Odor threshold:	Not determined or not available.	**Vapor density:**	Not determined or not available.
pH-value:	8.5 as is	**Relative density:**	Not determined or not available.
Melting/Freezing point:	Not determined or not available.	**Solubilities:**	Not determined or not available.
Boiling point/Boiling range:	Not determined or not available.	**Partition coefficient (n-octanol/water):**	Not determined or not available.
Flash point (closed cup):	Not determined or not available.	**Auto/Self-ignition temperature:**	Not determined or not available.
Evaporation rate:	Not determined or not available.	**Decomposition temperature:**	Not determined or not available.
Flammability (solid, gaseous):	Not determined or not available.	**Viscosity:**	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.

Safety Data Sheet

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

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox	
Density at 20°C:	Not determined or not available.

10 Stability and reactivity

10.1 Reactivity : None

10.2 Chemical stability : None

10.3 Possibility hazardous reactions : None

10.4 Conditions to avoid : None

10.5 Incompatible materials : None

10.6 Hazardous decomposition products : None

11 Toxicological information

11.1 Information on toxicological effects :

Acute Toxicity:

Oral:

: LD50 >5000 mg per kg Rat, Oral) - product .

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Alcohol Ethoxylate: May cause mild to moderate skin irritation.

Sodium Alkylbenzene Sulfonate: Causes skin irritation.

Lauramine oxide: Causes skin irritation.

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation.

Alcohol Ethoxylate: Causes moderate to severe eye irritation and conjunctivitis.

Sodium xylenesulphonate: Rabbit: irritating to eyes.

Lauramine oxide: Causes serious eye damage.

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

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

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

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.

Safety Data Sheet

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

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.4 mg/l, 48 hours.
Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Lauramine oxide: Fish, LC0 24.3 mg/l, 96h [Killifish (Cyprinodontidae)]
Lauramine oxide: Aquatic invertebrates, (LC50): 3.6 mg/l 96 hours [Daphnia (Daphnia)].
Lauramine oxide: Aquatic plants, EC50 Algae 0.31 mg/l 72 hours [Algae]
Alcohol Ethoxylate: Aquatic invertebrates, (LC50): 4.01 mg/l 48 hours [Daphnia (daphnia)].

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

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

Relevant Information:

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

14 Transport information

14.1 UN Number: None
ADR, ADN, DOT, IMDG, IATA

14.2 UN Proper shipping name: None
ADR, ADN, DOT, IMDG, IATA

14.3 Transport hazard classes:
ADR, ADN, DOT, IMDG, IATA

Class: None
Label: None
LTD. QTY: None

US DOT
Limited Quantity Exception: None

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

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

Safety Data Sheet

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

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

14.4 Packing group: ADR, ADN, DOT, IMDG, IATA	None
14.5 Environmental hazards :	None
14.6 Special precautions for user:	None
Danger code (Kemler):	None
EMS number:	None
Segregation groups:	None

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

14.8 Transport/Additional information:

Transport category:	None
Tunnel restriction code:	None
UN "Model Regulation":	None

15 Regulatory information

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

North American

SARA

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

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

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

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

Proposition 65 (California):

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

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

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

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

Canadian

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

EU

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

Germany MAK: Not classified.

Safety Data Sheet

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

Effective date: 05/17/2017 **Revision** : 05/17/2017

Trade Name: Liquinox

Asia Pacific

Australia

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

China

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

Japan

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

Korea

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

New Zealand

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

Philippines

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

Taiwan

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

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements:

H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:

P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P332+P313 If skin irritation occurs: Get medical advice/attention.
P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling,

use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

NFPA: 1-0-0

HMIS: 1-0-0

Appendix B
Glove Selection Guideline

APPENDIX B: GLOVE SELECTION GUIDELINE

HAZARD	EXAMPLE TASKS	ANSI CUT/ABRASION RATING*	REPRESENTATIVE GLOVE
Impact Hazards, Med/Heavy Duty Puncture Cut	Drilling/direct push activities. Construction. Heavy materials handling. Power tools. Air knifing. Excavation.	ANSI Cut and Abrasion Resistance **Level 5** **EN 388 4521**	Hexarmor®Chrome Hexarmor® GGT5 Hexarmor® L5 Hexarmor® SteelLeather III Ironclad® Kong Glove
Med/Heavy Duty Puncture Cut Oil/Solvent Resistant	Tasks where materials are treated with oil or solvents.	ANSI Cut and Abrasion Resistance **Level 3 - 4** **EN 388 4522**	Ansell Alpha-Tec ® Memphis® Ultra Tech Nitrile Cut & Splash Best® Neoprene 6780 Hexarmor™ TenX Threesixty
Medium Duty Cut/Puncture Gloves with Oily Surface Grip	Light materials handling, wet service	ANSI Cut and Abrasion Resistance **Level 3** **EN 388 44xx**	Best®Zorb-It Ultimate HV 4567 Ansell® Cut Protective Glove 97-505 Ansell HyFlex® 11-511 Ansell HyFlex® 11-624
Med/Heavy Duty Cut/Puncture	Light Materials Handling. System O&M. Use of Hand Tools. Hand Augering. Heavy Equipment Operator.	ANSI Cut and Abrasion Resistance **Level 2** **EN 388 33xx**	Perfect Fit® PF570 Hexarmor® Level Six 9010/9012 Ironclad® Cut Resistant Glove Ansell HyFlex® 11-511 Ansell HyFlex® 11-624 Ansell® Cut Protective Glove 97-505
Light Duty Cut/Puncture Abrasion Only	Handling soil and Groundwater Samples. Opening spoons. Well construction.	ANSI Cut and Abrasion Resistance **Level 2 - 4** **EN 388 21xx**	Memphis® Ninja Max N9676GL Memphis® UltraTech Dyneema 9676 Memphis® Ninja Ice (Cold Weather) Ansell HyFlex® 11-511 Ansell® Cut Protective Glove 97-505 Ansell® Powerflex 80-813 Ironclad™ Workforce
Light Duty Glove Cut/Abrasion (used under nitrile gloves)	Groundwater Sampling.	ANSI Cut and Abrasion Resistance **Level 2** **EN 388 21xx**	Ansell HyFlex® 11-500 Ansell HyFlex® 11-624 Ansell GoldKnit
* Reference to ANSI and EN 388 glove testing standards. Listed gloves meet the standards in the table, but are not the only gloves that meet the standard.			
This selection chart is not intended to address all chemical hazards. Gloves used for chemical protection shall provide cut/puncture resistance, or be used in tandem with cut/puncture protection. Nitrile gloves used for environmental sampling must be used in tandem with a cut/puncture resistant glove.			
Gloves available in high visibility colors have shown to be effective and are preferred.			

Appendix C
Heat and Cold Stress

COLD STRESS

Ambient air temperatures during site activities may create cold stress for on-site workers. Procedures for recognizing and avoiding cold stress must be followed. Cold stress can range from frostbite to hypothermia. The signs and symptoms of cold stress are listed below.

Frostbite is defined as the actual freezing of one or more layers of skin. In severe cases, organs and structures below the skin can become frozen. Usually, body areas exposed to the most cold, and least body warmth, are affected first. These areas include fingers, toes, ears, and the tip of your nose. Frostbite is characterized by pain and loss of dexterity in the affected limb. The tissue initially appears reddened, but may progress to white, blue, or black.

> **FIRST AID:** Bring the affected employee indoors and call the local emergency clinic. Rewarming of frostbitten parts is best left to a medical doctor in a controlled setting.

Hypothermia is the condition that occurs when the body's natural warming mechanisms (muscle activity and shivering) cannot counteract the loss of body heat to the environment. The onset of hypothermia is greatly hastened by being wet. Hypothermia is marked by severe, uncontrollable shivering. The patient will show signs of excessive fatigue, drowsiness, irritability, or euphoria. As hypothermia progresses, the patient will begin to lose consciousness, blood pressure will drop, shivering will cease, and the patient may slip into a coma and possibly die.

> **FIRST AID:** If these symptoms occur, remove the patient to a warm, dry place. If clothing is wet, remove and replace with dry clothing. Keep the patient warm, but not overheated. The patient should be gradually rewarmed to prevent shock. If the patient is conscious and alert, warm liquids should be provided. Coffee and other caffeinated liquids should be avoided because of diuretic and circulatory effects. Notify the emergency clinic if conditions worsen, the patient loses consciousness, or the patient has an altered mental status. Have the patient transported to an emergency facility.

General Precautions The reduction of adverse health effects from cold exposure can be achieved by adopting the following work practices.

- Provide adequate insulating clothing to maintain core temperature at 98.6° F if work is to be performed in air temperatures below 40° F. Wind chill cooling rates and the cooling power of air are critical factors. The higher the wind speed and the lower the air temperature in the work area, the greater the insulation value of the protective clothing should be.
- If the air temperature is 32° F or less, hands should be protected by mittens/gloves.
- If only light work is involved and if the clothing on the worker may become wet on the job site, the outer layer of clothing should be impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outer layer should be changed as it becomes wet. The outer garments should include provisions for easy ventilation in order to prevent wetting of the inner layer by sweat.
- If available clothing does not give adequate protection to prevent cold injury, work should be modified or suspended until adequate clothing is available, or until weather conditions improve.
- For prolonged work, heated shelters should be available. Workers should be encouraged to use these at regular intervals, with the frequency depending on the severity of the environmental exposure. When entering the shelter, the outer layer of clothing should be removed and the remainder of the clothing

loosened to permit heat evaporation, or a change of work clothing should be provided.

- Warm, sweet drinks, such as hot cocoa or soup, should be available at the work site to provide caloric intake and fluid volume. The intake of coffee should be limited because of diuretic and circulatory effects.
- The weight and bulk of cold-weather gear should be included in estimating the required work performance and weights to be lifted in the field.

Workers should be instructed in safety and health procedures regarding cold work environments as part of the pre-work safety meeting. The training program should include instruction in preventing, recognizing, and treating cold stress conditions.

Wind Chill Chart

Wind (mph) \ Temperature (°F)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	29	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes; 10 minutes; 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph) *Effective 11/01/01*

HEAT STRESS

There is a potential for heat stress from the use of protective clothing and climate conditions. One or more of the following procedures may be employed to alleviate potential heat stress problems in the event that site conditions warrant the use of personal protective equipment (PPE), or ambient temperatures exceed 85° F. Heat stress training must be emphasized during the daily safety meetings, and adequate supplies of potable water must be provided to workers each day.

General Precautions Provide plenty of liquids. To replace body fluids (water and electrolytes) lost because of sweating, use a 0.1 percent saltwater solution, more heavily salted foods, or commercial drink mixes. The commercial mixes may be preferable for those employees on a low sodium diet. Employees on low sodium diets, or other special diets, are advised to contact their personal physician for recommendations regarding appropriate electrolyte replacement fluids/beverages.

In extremely hot weather, conduct operations in early morning or evening and rotate shifts of workers wearing impervious clothing. Install mobile showers and/or hose-down facilities to reduce body temperature and cool protective clothing.

Ensure that adequate shelter is available for breaks to protect personnel against heat, which can decrease physical efficiency and increase the probability of accidents.

Acclimatization for workers not accustomed to working in elevated temperature environments will be considered and implemented as appropriate in accordance with American Conference of Governmental and Industrial Hygienists (ACGIH) Guidelines.

Heat Stress Monitoring

For monitoring the body's recuperative ability toward excess heat, one or more of the following techniques should be used as a screening mechanism. Monitoring of personnel wearing impervious clothing should commence when the ambient temperature is 70° F or above. Frequency of monitoring should increase as the ambient temperature increases or as slow recovery rates are indicated. When temperatures exceed 80° F, regardless of the use of Personal Protective Equipment (PPE), workers will be monitored for heat stress after every work period.

Good hygienic standards must be maintained by the employee to aid in the prevention of heat stress illnesses. At a minimum, frequent changes of clothing and daily showering should occur with clothing being allowed to dry during rest periods. Persons who notice skin problems should immediately inform their supervisor.

Heart rate (HR) should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats/minute. If the HR is higher, the next work period should be shortened by 25 percent. The HR is then measured again, once each minute for 2 minutes (a total of three measurements), after the initial rest period measurement. The HR should decrease by ten beats per minute between each measurement (a total reduction of 20 beats). If the HR does not decrease, the work period should be reduced by an additional 25 percent.

Body temperature can be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature (OT) at the beginning of the rest period should not exceed 99°F. If it is greater than 99°F, the next work period should be shortened by 25 percent. The OT should be measured again at the end of the rest period to make sure that it has dropped below 99° F.

Effects of Heat Street

If the body's physiological processes fail to maintain a normal body temperature because of excessive heat loading, a number of physical reactions can occur. The severity of these reactions ranges from mild (such as fatigue, irritability, anxiety, and decreased concentration, dexterity, or movement) to severe (fatal).

Heat-related illnesses include:

Heat rash (also known as prickly heat rash) is caused by continuous exposure to heat and humid air and aggravated by chafing clothes. Heat rash decreases the ability to tolerate heat as well as being a nuisance. Signs are not limited to, but may include, a red prickly rash.

FIRST AID: Employees exhibiting signs of heat rash will be directed to shower and change into clean, dry clothing.

Heat cramps are caused by profuse perspiration with inadequate fluid intake and electrolyte replacement (especially salts). Signs are muscle spasms and pain in the extremities and abdomen, and may occur several hours after work has stopped.

FIRST AID: Employees showing signs of heat cramps will be directed to lie in a cool, shady area, and drink cool fluids. If symptoms persist or worsen, the employee will be transported to an emergency facility.

Heat exhaustion is caused by increased stress on various organs to meet increased demands to cool the body. Signs are shallow breathing; pale, cool, moist skin; profuse sweating; dizziness and lassitude.

FIRST AID: Employees with signs of heat exhaustion will be brought to a cool, shady location and given fluids. After recovering, the employee will be dismissed for the day. If employee is unconscious, or conditions persist, the employee will be transported to a hospital.

Heat stroke is the most severe form of heat stress. The body must be cooled immediately to prevent severe injury and/or death. Signs and symptoms are red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; and/or coma.

FIRST AID: HEAT STROKE IS A MEDICAL EMERGENCY. Employees will be brought to a cool area, aggressively treated by removing constricting clothes and applying wet towels or ice packs, and transported without delay to an emergency facility.

Appendix D
Tailgate Meeting/Checklist

Daily Pre-Job Safety Briefing

Project Name: _____ Project Number: _____

Work Location: _____ Date: _____

Tasks Performed: _____ Time: _____ AM PM

Client Name: _____ Submitted By: _____

Weather: _____

Refuge Area: _____

First Aid/CPR Persons: _____

Potential Hazards: _____

For Emergencies Dial 911 **For Non-Emergencies Dial WorkCare (888) 449-7787**

Personal Protective Equipment Required

	Yes	*No*	*Specify*
Clothing	☐	☐	_____
FR, reflective vest, chemical, other (specify)			
Eye/Face	☐	☐	_____
Safety glasses, goggles, face shield, other (specify)			
Respirator	☐	☐	_____
1/2 face, full face, other (specify)			
Foot Protection	☐	☐	_____
Safety toe, EH rated, rubber boots, other (specify)			
Hand Protection	☐	☐	_____
Kevlar, chemical, EH, other (specify)			
Head Protection	☐	☐	_____
hard hat, electrical hazard, other (specify)			
Fall Protection	☐	☐	_____
body harness, lifelines, barricades, other (specify)			
Hearing Protection	☐	☐	_____
Other:			_____

Procedures/Programs Required	*Yes*	*No*
Confined Space	☐	☐
Hot Work	☐	☐
Signs/Barricades	☐	☐
LOTO/Energy Control	☐	☐
Scaffolds/Aerial Lifts	☐	☐
_____	☐	☐
_____	☐	☐
_____	☐	☐
_____	☐	☐
Employee Certification/Training Required		
HAZWOPWER	☐	☐
Asbestos Awareness	☐	☐
Asbestos Inspector	☐	☐
XRF Trained	☐	☐
_____	☐	☐
_____	☐	☐
_____	☐	☐

Additional Considerations

Work Procedures: ☐ Dig Safe
☐ Working clearances ☐ _____
☐ _____

People: ☐ Worker fatigue ☐ Other site activities
☐ Public safety ☐ Pedestrian control ☐ Experience
☐ Traffic control ☐ Other utilities
☐ _____

Tools/Equipment: ☐ Eye wash ☐ First Aid Kit
☐ Inspection of tools/equipment
☐ Specialized tools/equipment
☐ Correct tool/equipment for the job
☐ _____

Special Precautions: ☐ Environmental
☐ Condition of structures ☐ Weather conditions
☐ Lighting conditions ☐ Terrain ☐ Water bodies
☐ Adjacent structures
☐ _____

If Conditions CHANGE…Stop Work, Review and Revise the Plan!!

Daily Pre-Job Safety Briefing

Hazards Associated with the Job

☐ Hazardous Chemicals	☐ Heavy Equipment	☐ Slip/Trip and Falls	☐ Work in Active Rail ROW	☐ Confined space
☐ Biological Waste	☐ Hostile Individual(s)	☐ Traffic Hazards	☐ Work in Active Substation	☐ Hot Work
☐ Asbestos	☐ Ladder	☐ Trenches Excavations	☐ Animals/Insects	☐ Radioactive Materials
☐ Dust	☐ Lighting	☐ Utilities	☐ Plants	☐ Boom/Scissor Lift
☐ Edges/Material Handling	☐ Manual Lifting	☐ Water/Boat Safety	☐ _____	☐ _____
☐ Electricity	☐ Pressurized Fluids/Gases	☐ Weather (hot/cold)	☐ _____	☐ _____

List all hazards associated with this task	**Signature of Crew Members Present**	
	Print Name	Sign Name
Barriers to eliminate/control above hazards?		
Supervisor Signature:		

Post Task Safety Analysis

Did any injuries or incidents occur today? If yes, explain.

☐ Yes ☐ No

Was the injury or incident reported the safety department?

☐ Yes ☐ No ☐ N/A

What problems did you have with today's work assignment?

What can we do tomorrow to improve performance?

Appendix E
WorkCare Program Information

EARLY INCIDENT INTERVENTION®

Immediate Access to Medical Advice for Work Related Incidents

(888) 449-7787

INTRODUCTION

WorkCare, Inc. (WorkCare) and TRC have partnered together to promote Incident Intervention®, a resource designed to support company safety goals/targets—while reducing runaway-costs associated with workplace injuries and illnesses.

PURPOSE

Early Incident Intervention provides TRC employees with **IMMEDIATE** telephonic access to WorkCare clinicians at the time of a presumed, non-emergency workplace injury or illness. Clinicians provide expert guidance on the evaluation of symptoms, appropriate first aid, and the need for additional medical evaluation or treatment.

When utilizing this service within the first hour of an incident, known as the "Golden Hour," licensed medical staff can guide the case so that medical evaluation and treatment are rendered appropriately.

> ***"…helps the worker traverse the unpredictable terrain of work-related injuries and illness."***

PRINCIPLES OF EARLY INCIDENT INTERVENTION

- Utilizes principles of the "Golden Hour."
- Provides workers immediate clinician support at the time of an incident.
- Focuses on providing the right care, at the right time in the proper setting.

BENEFITS FOR EMPLOYEES

- Instant access to a medically qualified professional for evaluation of symptoms and possible outcomes.
- Professional guidance on appropriate first aid measures and medications.
- Professional advice regarding the need for additional medical evaluation or treatment.

BENEFITS FOR TRC

- Point of contact for emergency and non-emergency medical clinicians.
- Triages the incident to determine risk and urgency, delivering interventions that are consistent with medical guidelines for the specified injury and illness.
- Maintains communication with clinicians to ensure accurate and timely reporting.

Appendix F
Safe Catch Form

Safe Catch Report

A “Safe Catch” is a potential hazard or incident that has not resulted in any personal injury. Unsafe working conditions, unsafe employee behaviors, improper use of equipment or use of malfunctioning equipment have the potential to cause work related injuries. It is everyone’s responsibility to report and/or correct these potential incidents immediately. Please complete this form as a means to report these “Good Catch” situations and submit to your local OSC Representative and Mike Glenn, SVP/National Safety Director.

Complete ALL field entries:

Employee Name:		Date:	
Location:		Office:	
Project Number:		Practice:	

Conditions

Please check all appropriate conditions:

☐ Unsafe Act	☐ Unsafe Condition	☐ Unsafe Equipment	☐ Unsafe Use of Equipment

Description of Incident or Potential Hazard:

Task Performed at Time of Incident:

Causes (Primary and Contributing):

Corrective Action(s) Taken (remove the hazard, replace, repair, or retrain):

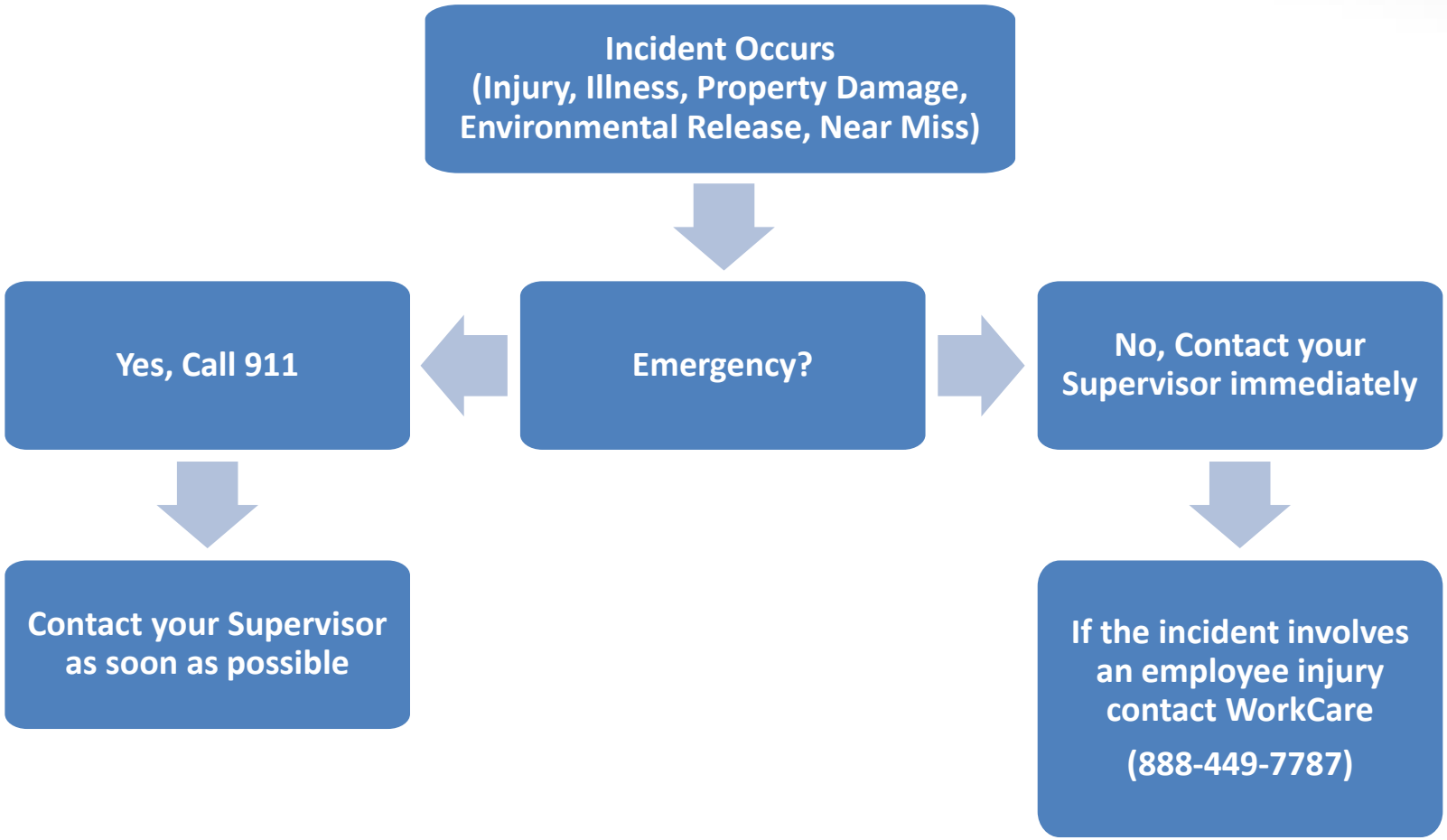
Employee Signature:		Date Completed:	

Our Mission: To reduce the frequency of incidents by applying local lessons learned globally.

If you have any questions about this report or would like additional information, please reference Compliance Program CP019 TRC Incident Response and Lessons Learned Program, located on TRCNET or contact Mike Glenn, SVP/National Safety Director at mglenn@trcsolutions.com.

Appendix G
In Case of Emergency and Incident Reporting

Incident Response Flow Chart - Employees



In Case of Injury at Work

1. If emergency care **is** needed, or if you are in a motor vehicle incident, call 9-1-1.

2. If emergency care **is not** needed, notify your supervisor **prior** to the initial contact with **WorkCare (888.449.7787).**

3. Supervisor must notify a Corporate Health and Safety Team Member.

Submit the appropriate form(s): TRC Incident Notification Report or TRC Auto Incident Report **within 24 hours** to Mike Glenn, VP, National Safety Director.

TRC
Results you can rely on

Appendix H
Job Safety Analysis Forms

Job Safety Analysis Template

COMPANY/ PROJECT NAME or ID/ LOCATION (City, State)	DATE PREPARED FOR HASP:	☐ NEW ☐ REVISED
TRC		
JSA WORK ACTIVITY (Description):	List of Contractor(s) and key work activity:	

SITE SPECIFIC JSA AUTHOR	POSITION / TITLE	DEPT	SIGNATURE

TRC HEALTH AND SAFETY MANAGEMENT	POSITION / TITLE	APPROVAL DATE

PERSONAL PROTECTION EQUIPMENT (PPE) QUICK SUMMARY
Required PPE (indicate with "R") vs. Must Have Available On-site (indicate "A")

___ REFLECTIVE VEST ____HARD HAT _____GLOVES: **ANSI Cut Level ____ Kevlar** ____SAFETY GLASSES _____GOGGLES _____FACE SHIELD	____ HEARING PROTECTION ___SAFETY SHOES: Protective Toe ____ 5pt.HARNESS / LANYARD PPE CLOTHING: ____Coveralls ___Tyvek Suit ____Nomex ___Other (specify):	RESPIRATORY PROTECTION: ☐ NA ____½ face Air Purifying Respirator (APR) ____Particulate Mask: ☐ PM100 ☐ PM95 ____ Cartridge: ☐ P100-Multigas ☐ _____ _____Full face ARP; specify cartridge type: ____ Air Supplied Respirator ____SCBA ____Air-line	Additional PPE: .

Always perform a Safety Assessment (Hazard Hunt): 1) prior to starting work; 2) when changing tasks; and 3) throughout the day. Focus on each new task, procedures, and skill sets to be used.

[1] JOB TASKS	[2] POTENTIAL HAZARDS	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
1)	a.	
	b.	

Always perform a Safety Assessment (Hazard Hunt): 1) prior to starting work; 2) when changing tasks; and 3) throughout the day. Focus on each new task, procedures, and skill sets to be used.		
[1] JOB TASKS	[2] POTENTIAL HAZARDS	[3] HAZARD CONTROLS (beyond wearing "Required" PPE)
2)		
3)		

Always perform a Safety Assessment (Hazard Hunt): 1) prior to starting work; 2) when changing tasks; and 3) throughout the day.		
[1] JOB TASKS	**[2] POTENTIAL HAZARDS**	**[3] HAZARD CONTROLS (beyond wearing "Required" PPE)**
3)		
4)		
	LOCATION(S) WHERE HAZARD IS TO BE EXPECTED	**[3] HAZARD CONTROLS (beyond wearing "Required" PPE)**
1.	a.	a.
2.	a.	a.
3.	a.	a.

Field Notes:

LIMITATION: As part of TRC's EHS Policy, a JSA is provided by TRC for its employees. The purpose of a JSA is NOT to identify all hazards associated with a task, but to identify key potential hazards to get TRC and other onsite personnel thinking about other potential safety hazards and mitigating actions for unsafe conditions and behavior during various works. TRC recognizes that JSA's may not cover every conceivable step or hazard that emerges during a job, so we've provided a "Field Change" section below to amend a JSA if required. The JSA does not supersede or replace any local, state or federal permit, regulation, statute or other entities policies and procedures but is simply a tool for enhancing the execution of safe work at a jobsite under TRC's supervision. Similarly, all subcontractors are required to provide their own JSA(s) for their specialty prior to performing any work for TRC or its customers in accordance with TRC's EHS Policy; however, any unsafe condition or hazard not covered in any JSA is ultimately the direct responsibility of the person or entity performing the work.

Appendix I
Acknowledgement

PERSONAL ACKNOWLEDGEMENT

A component of the HASP, designed to provide personnel safety during work activities described herein, requires that you receive training as described in the HASP prior to working at this site. Additionally, you are required to read and understand the HASP. When you have fulfilled these requirements, please sign and date this personal acknowledgement:

Name (Printed)	Signature	Date
Name (Printed)	Signature	Date
Name (Printed)	Signature	Date
Name (Printed)	Signature	Date
Name (Printed)	Signature	Date
Name (Printed)	Signature	Date
Name (Printed)	Signature	Date
Name (Printed)	Signature	Date
Name (Printed)	Signature	Date
Name (Printed)	Signature	Date