NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
STATE SUPERFUND PROGRAM
ECL § 27-1301 *et seq.*

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In the Matter a Remedial Program for

ORDER ON CONSENT AND ADMINISTRATIVE SETTLEMENT
Index No. R8-20200903-106

DEC Site Name: **3148 Van Etten Road**
DEC Site No.: 851061
Site Address: 3148 Van Etten Road
Corning, NY 14830

Hereinafter referred to as
"Van Etten Road Property"

by: **Corning Incorporated**

Hereinafter referred to as "Respondent"

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1. A. The New York State Department of Environmental Conservation ("Department") is responsible for inactive hazardous waste disposal site remedial programs pursuant to Article 27, Title 13 of the Environmental Conservation Law ("ECL") and Part 375 of Title 6 of the Official Compilation of Codes, Rules and Regulations ("6 NYCRR") and may issue orders consistent with the authority granted to the Commissioner by such statute.

B. The Department is responsible for carrying out the policy of the State of New York to conserve, improve and protect its natural resources and environment and control water, land, and air pollution consistent with the authority granted to the Department and the Commissioner by Article 1, Title 3 of the ECL.

C. This Order is issued pursuant to the Department's authority under, *inter alia,* ECL Article 27, Title 13 and ECL 3-0301, and, subject to Paragraph 3, resolves any alleged liability to the State as provided at 6 NYCRR 375-1.5(b)(5).

2. The Real Property (as defined below) is not currently listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York State.

3. Respondent has entered into this Order without (i) any admission or finding of liability, fault, wrongdoing, or violation of any law, regulation, permit, order, requirement, or standard of care of any kind whatsoever; (ii) any acknowledgment that there has been a release or threatened release of hazardous waste at or from the Real Property; and/or

(iii) any acknowledgment that a release or threatened release of hazardous waste at or from the Real Property constitutes a significant threat to the public health or environment.

4. Solely with regard to the matters set forth below, Respondent hereby waives any right to a hearing as may be provided by law, consents to enter into this Order, and agrees to be bound by its terms. Respondent consents to and agrees not to contest the authority or jurisdiction of the Department to issue or enforce this Order, and agrees not to contest the validity of this Order or its terms or the validity of data submitted to the Department by Respondent pursuant to this Order.

NOW, having considered this matter and being duly advised, **IT IS ORDERED THAT**:

I. Real Property

The real property subject to this Order, which has been assigned number 851061, consists of the surveyed property boundaries of the tax parcel: 300.00-01-044.100 (the "Real Property"). A metes and bounds, as well a depiction of an approximate boundary, of the Real Property is attached as Exhibit "A". The Parties to this Order acknowledge that Respondent does not currently own or have control over the Real Property. Absent written agreement by the Respondent, the Department will not expand the Real Property subject to this Order. Nor will the Department join the Real Property subject to this Order with any other property proposed for listing or listed in the Registry of Inactive Hazardous Waste Disposal Sites, while this Order is effective.

II. Initial Work

A. Respondent has only consented to implementation of the Department-approved Van Etten Road Property Characterization Work Plan (which Work Plan and approval letter are attached as Exhibit "B") to identify potential environmental conditions at the Real Property. The Van Etten Road Property Characterization Work shall be commenced within thirty (30) days after the effective date of this Order and in accordance with the schedule set forth in the approved Van Etten Road Characterization Work Plan. For purposes of this Initial Work, and submission of the Van Etten Road Property Characterization Report, the Department accepts Respondent's consultant, Integral Engineering, P.C., as an approved Environmental Professional.

B. Thirty (30) days after the effective date of this Order, Respondent shall submit to the Department a Records Search Report pursuant to attached Exhibit "C". Respondent is not required to disclose attorney-client communications or materials prepared pursuant to privilege.

C. Respondent shall implement the Department-approved Citizen Participation Plan which is attached hereto as Exhibit "D".

D. Respondent shall be required to use best efforts to obtain all access necessary to perform Respondent's obligations under this Order. If, despite Respondent's best efforts, any access cannot be obtained, Respondent shall promptly notify the Department and include a summary of the steps taken. Respondent shall not be deemed in violation of this Order or applicable law based solely on its inability to obtain access to the Real Property despite best efforts, and the Department may, as it deems appropriate and within its authority, assist Respondent. In such event, the Department reserves all of its rights to take additional action outside the terms of the Order to obtain access to the Real Property.

E. This Order shall terminate upon the Department's acceptance of the Respondent's Van Etten Road Property Characterization Report. Notwithstanding the foregoing, during or at the conclusion of the Initial Work Respondent may propose an Interim Remedial Measure Work Plan. If Respondent elects to conduct work under an Interim Remedial Measure Work Plan and it is ongoing when the Van Etten Road Property Characterization Report is accepted as complete, this Order shall not terminate until completion of such interim remedial measure.

III. Payment of State Costs

Invoices shall be sent to Respondent at the following address:

Corning Incorporated
Attn: Karen L. Douglas
Sr. Managing Counsel II, Litigation, Environmental
One Riverfront Plaza (MP-HQ-E2-10)
Corning, NY 14831

In addition to the requirement to pay future state costs as set forth in Paragraph VIII within forty-five (45) Days after the effective date of this Consent Order, Respondent shall pay to the Department reimbursement for past State Costs incurred on or after December 1, 2013 (which is acknowledged to be prior to the effective date of this Consent Order) provided that the Department has provided an invoice substantiating its State Costs within fifteen (15) Days after the effective date of this Consent Order.

IV. Communications

A. All written communications required by this Consent Order shall be transmitted by United States Postal Service, by private courier service, by hand delivery, or by electronic mail.

1. Communication from Respondent shall be sent to:

(1 hard copy (unbound for work plans) & 1 electronic copy)
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233
Attn: Samantha Salotto
samantha.salotto@dec.ny.gov

Christine Vooris (electronic copy only)
New York State Department of Health
Bureau of Environmental Exposure Investigation
Empire State Plaza
Corning Tower Room 1787
Albany, New York 12237
christine.vooris@dec.ny.gov

Dudley D. Loew, Esq. (correspondence only)
New York State Department of Environmental Conservation
Office of General Counsel
6274 East Avon Lima Road
Avon, New York 14414
dudley.loew@dec.ny.gov

2. Communication from the Department to Respondent shall be sent to:

Corning Incorporated
Attn: Karen L. Douglas
Sr. Managing Counsel II, Litigation, Environmental
One Riverfront Plaza (MP-HQ-E2-10)
Corning, NY 14831

B. The Department and Respondent reserve the right to designate additional or different addressees for communication on written notice to the other. Additionally, the Department reserves the right to request that the Respondent provide more than one paper copy of any work plan or report.

C. Each party shall notify the other within ninety (90) days after any change in the addresses listed in this paragraph.

V. Miscellaneous

A. Appendix A - “Standard Clauses for All New York State State Superfund Orders” is attached to and hereby made a part of this Order as if set forth fully herein. For

purposes of this Order, the term “Site” as used in Appendix A shall be deemed to mean “Real Property” as defined in Paragraph I above.

B. In the event of a conflict between the terms of this Order (including any and all attachments thereto and amendments thereof) and the terms of Appendix A, the terms of this Order shall control.

C. The effective date of this Order is the 10th day after it is signed by the Commissioner or the Commissioner’s designee.

D. The terms of this Order, including its attachments, shall constitute the complete and entire agreement between the Department and Respondent concerning the implementation of the activities required by this Order. No term, condition, understanding, or agreement purporting to modify or vary any term of this Order shall be binding unless made in writing and subscribed by the party to be bound. No informal advice, guidance, suggestion, or comment by the Department shall be construed as relieving Respondent of Respondent’s obligation to obtain such formal approvals as may be required by this Order. In the event of a conflict between the terms of this Order and any Work Plan submitted pursuant to this Order, the terms of this Order shall control over the terms of the Work Plan(s). Respondent consents to and agrees not to contest the authority and jurisdiction of the Department to enter into or enforce this Order.

E. Paragraph I, II, III, V, VI, X, XI, XII, XIV, XVI.E and XVI.F of Appendix A do not apply to this Order.

VI. Development, Performance and Reporting of Work Plans

A. Work Plan Requirements

All activities at the Real Property shall be conducted pursuant to one or more Department-approved work plans (“Work Plan” or “Work Plans”) and this Order and all activities shall be consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300, as required under CERCLA, 42 U.S.C. § 9600 *et seq*. The Work Plan(s) under this Order shall address the Real Property and shall be developed and implemented in accordance with 6 NYCRR § 375-1.6(a) and 375-6. All Department-approved Work Plans shall be incorporated into and become enforceable parts of this Order. Upon approval of a Work Plan by the Department, Respondent shall implement such Work Plan in accordance with the schedule contained therein. Nothing in this Subparagraph shall mandate that any particular Work Plan be submitted.

The Work Plans shall be captioned as follows:

1. The Van Etten Road Property Characterization (“SC”) Work Plan: a Work Plan which provides for the identification of the presence of any hazardous waste disposal at the Real Property;

2. "IRM Work Plan" if the Respondent elects to propose an interim remedial measure;

3. "Site Management Plan" if the Work Plan provides for the identification and implementation of institutional and/or engineering controls as well as any necessary monitoring and/or operation and maintenance of the remedy; or

4. "Supplemental" if additional work plans other than those set forth in II.A. of this Order are proposed by Respondent to be prepared and implemented.

B. Submission/Implementation of Work Plans

1. Respondent may opt to propose one or more additional or supplemental Work Plans (including one or more IRM Work Plans) at any time, which the Department shall review for appropriateness and technical sufficiency.

2. Any proposed Work Plan shall be submitted for the Department's review and approval and shall include, at a minimum, a chronological description of the anticipated activities, a schedule for performance of those activities, and sufficient detail to allow the Department to evaluate that Work Plan.

   i. The Department shall notify Respondent in writing if the Department determines that any element of a Department-approved Work Plan needs to be modified in order to achieve the objectives of the Work Plan as set forth in this Order. Upon receipt of such notification, Respondent shall, subject to dispute resolution pursuant to Paragraph XV in Appendix A, modify the Work Plan.

   ii. The Department may request, subject to dispute resolution pursuant to Paragraph XV in Appendix A, that Respondent submit additional or supplemental Van Etten Road Property Characterization Work Plans within thirty (30) Days after the Department’s written request.

3. If Respondent proposes an IRM Work Plan, and such IRM Work Plan requires an environmental easement and a Site Management Plan,

the environmental easement and Site Management Plan shall be submitted in accordance with the schedule set forth in the IRM Work Plan. If an environmental easement is required under the IRM Work Plan, Respondent shall use best efforts to obtain an environmental easement on the Real Property. If, despite Respondent's best efforts, an environmental easement cannot be obtained, Respondent shall promptly notify the Department and include a summary of the steps taken. Respondent shall not be deemed in violation of this Order or applicable law based solely on its inability to obtain an environmental easement on the Real Property despite best efforts, and the Department may, as it deems appropriate and within its authority, assist Respondent. In such event, the Department reserves all of its rights to take additional action outside the terms of the Order to obtain an environmental easement on the Real Property.

4. During all field activities conducted under a Department-approved Work Plan, Respondent shall have at the Real Property a representative who is qualified to supervise the activities undertaken in accordance with the provisions of 6 NYCRR 375-1.6(a)(3).

C. Submission of Final Reports and Periodic Reports

1. In accordance with the schedule contained in a Work Plan, Respondent shall submit a final Van Etten Road Property Characterization Report.

2. If Respondent proposes an IRM, any final report or final engineering report that includes construction activities, shall include "as built" drawings showing any changes made as part of the IRM.

3. If Respondent proposes an IRM, and in the event that a construction completion report for the Real Property requires management of the Real Property, Respondent shall submit an initial periodic report by in accordance with the schedule in the Van Etten Road Property Site Management Plan and thereafter in accordance with a schedule determined by the Department. Such periodic report shall be signed by a Professional Engineer or by such other qualified environmental professional as the Department may find acceptable and shall contain a certification as provided at 6 NYCRR 375-1.8(h)(3). Respondent may petition the Department for a determination that the institutional and/or engineering controls may be terminated. Such petition must be supported by a statement by a Professional Engineer that such controls are no longer necessary for the protection of public health and the environment. The Department shall not unreasonably withhold its approval of such petition.

D. Institutional/Engineering Control Certification

In the event that Respondent proposes any IRM for the Real Property that requires institutional or engineering controls, Respondent shall submit a written certification in accordance with 6 NYCRR 375-1.8(h)(3) and 375-3.8(h)(2).

E. Review of Submittals

1. The Department shall make a good faith effort to review and respond in writing to each submittal Respondent makes pursuant to this Order within the Department-approved schedule. The Department's response shall include, in accordance with 6 NYCRR 375-1.6(d), an approval, modification request, or disapproval of the submittal, in whole or in part.

    i. Upon the Department's written approval of a Work Plan, such Department-approved Work Plan shall be deemed to be incorporated into and made a part of this Order and shall be implemented in accordance with the schedule contained therein.

    ii. If the Department modifies or requests modifications to a submittal, it shall specify the reasons for such modification(s). Within fifteen (15) Days after the date of the Department's written notice that Respondent's submittal has been disapproved, Respondent shall notify the Department of its election in accordance with 6 NYCRR 375-1.6(d)(3). If Respondent elects to modify or accept the Department's modifications to the submittal, Respondent shall make a revised submittal that incorporates all of the Department's modifications to the first submittal in accordance with the time period set forth in 6 NYCRR 375-1.6(d)(3). In the event that Respondent's revised submittal is disapproved, the Department shall set forth its reasons for such disapproval in writing and Respondent shall be in violation of this Order unless it invokes dispute resolution pursuant to Paragraph XV in Appendix A and its position prevails. Failure to make an election or failure to comply with the election is a violation of this Order.

    iii. If the Department disapproves a submittal, it shall specify the reasons for its disapproval. Within fifteen (15) Days after the date of the Department's written notice that Respondent's

submittal has been disapproved, Respondent shall notify the Department of its election in accordance with 6 NYCRR 375-1.6(d)(4). If Respondent elects to modify the submittal, Respondent shall make a revised submittal that addresses all of the Department's stated reasons for disapproving the first submittal in accordance with the time period set forth in 6 NYCRR 375-1.6(d)(4). In the event that Respondent's revised submittal is disapproved, the Department shall set forth its reasons for such disapproval in writing and Respondent shall be in violation of this Order unless it invokes dispute resolution pursuant to Paragraph XV in Appendix A and its position prevails. Failure to make an election or failure to comply with the election is a violation of this Order.

2. Within thirty (30) Days after the Department's approval of a final report, Respondent shall submit such final report, as well as all data gathered and drawings and submittals made pursuant to such Work Plan, in an electronic format acceptable to the Department. If any document cannot be converted into electronic format, Respondent shall submit such document in an alternative format acceptable to the Department.

VII. Entry Upon the Real Property

A. Respondent shall use best efforts, upon reasonable notice under the circumstances presented, to obtain permission from owners of property within the Real Property to consent to entry upon the Real Property by any duly designated officer or employee of the Department or any State agency having jurisdiction with respect to matters addressed pursuant to this Order, and by any agent, consultant, contractor, or other person so authorized by the Commissioner, all of whom shall abide by the health and safety rules in effect for the Real Property, for inspecting, sampling, copying records related to the subject matter of this Order, testing, and any other activities necessary to ensure Respondent's compliance with this Order. Upon request, Respondent shall (i) provide the Department with suitable work space near the Real Property, including access to a telephone, to the extent available, and (ii) permit the Department full access to all non-privileged records relating to matters addressed by this Order. Raw data once validated is not considered privileged and that portion of any privileged document containing raw data must be provided to the Department. In the event Respondent is unable to obtain any authorization from third-party property owners necessary to perform its obligations under this Order, the Department may, consistent with its legal authority, assist in obtaining such authorizations.

B. The Department shall have the right to take its own samples and scientific measurements and the Department and Respondent shall have the right to obtain split samples, duplicate samples, or both, of all substances and materials sampled. The Department shall make the results of any such sampling and scientific measurements available to Respondent.

VIII. Payment of State Costs

A. Within forty-five (45) days after receipt of an itemized invoice from the Department, Respondent shall pay to the Department a sum of money which shall represent reimbursement for State Costs as provided by 6 NYCRR 375-1.5 (b)(3)(i). Failure to timely pay any invoice will be subject to late payment charge and interest at a rate of 9% from the date the payment is due until the date the payment is made.

B. Costs shall be documented as provided by 6 NYCRR 375-1.5(b)(3). The Department shall not be required to provide any other documentation of costs, provided however, that the Department's records shall be available consistent with, and in accordance with, Article 6 of the Public Officers Law.

C. Each such payment shall be made payable to the New York State Department of Environmental Conservation and shall be sent to:

Director, Bureau of Program Management
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7012

D. The Department shall provide written notification to the Respondent of any change in the foregoing addresses.

E. If Respondent objects to any invoiced costs under this Order, the provisions of 6 NYCRR 375-1.5 (b)(3)(v) and (vi) shall apply. Objections shall be sent to the Department as provided under subparagraph VIII.C above.

F. In the event of non-payment of any invoice within the 45 days provided herein, the Department may seek enforcement of this provision pursuant to Paragraph IV in Appendix A or the Department may commence an enforcement action for non-compliance with ECL 27-1423 and ECL 71-4003.

IX. Public Notice

Public Notice shall be provided in accordance with the Department-approved Citizen Participation Plan and the Department-approved Van Etten Road Property Characterization Work Plan.

DATED: April 26, 2022

BASIL SEGGOS
COMMISSIONER
NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

By: Susan Edwards
_____
Susan Edwards, P.E., Acting Director
Division of Environmental Remediation

CONSENT BY RESPONDENT

Respondent hereby consents to the issuing and entering of this Consent Order, waives Respondent's right to a hearing herein as provided by law, and agrees to be bound by this Consent Order.

Corning Incorporated

By: JOHN F. NOVOTNY

Title: DIRECTOR - GLOBAL ENVIRONMENT AND SUSTAINABILITY

Date: 04/18/2022

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

On the 18th day of APRIL in the year 2022, before me, the undersigned, personally appeared JOHN F. NOVOTNY *(full name)* personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her capacity, and that by his/her signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Acknowledgment by a corporation, in New York State:

On the 18th day of APRIL in the year 2022, before me, the undersigned, personally appeared JOHN F. NOVOTNY *(full name)* personally known to me who, being duly sworn, did depose and say that he/she/they reside at HP-ME-03-01; F9A CORNING NY 14831 *(full mailing address)* and that he/she/they is (are) the DIRECTOR - GLOBAL ENVIRONMENT AND SUSTAINABILITY *(president or other officer or director or attorney in fact duly appointed)* Corning Incorporated, the corporation described in and which executed the above instrument; and that he/she/they signed his/her/their name(s) thereto by the authority of the board of directors of said corporation.

Vanessa R. Westlake - 4/18/2022
Notary Public, State of New York

Vanessa R Westlake
STATE OF NEW YORK
NOTARY PUBLIC
Qualified in Steuben County
01WE6427226
MY COMMISSION EXPIRES 12/27/2025

EXHIBIT "A"

APPENDIX "A"

STANDARD CLAUSES FOR ALL NEW YORK STATE STATE SUPERFUND ORDERS

APPENDIX A

STANDARD CLAUSES FOR ALL NEW YORK STATE SUPERFUND ADMINISTRATIVE ORDERS

The parties to the State Superfund Order (hereinafter "Order") agree to be bound by the following clauses which are hereby made a part of the Order. The word "Respondent" herein refers to any party to the Order, other than the New York State Department of Environmental Conservation (hereinafter "Department").

I. Citizen Participation Plan

Within twenty (20) days after the Department places the site on the registry, Respondent shall submit for review and approval a written citizen participation plan prepared in accordance with the requirements of ECL §27-1417 and 6 NYCRR sections 375-1.10 and 375-3.10. Upon approval, the Citizen Participation Plan shall be deemed to be incorporated into and made a part of this Order.

II. Initial Submittal

Within thirty (30) days after the effective date of this Order, Respondent shall submit to the Department a Records Search Report prepared in accordance with Exhibit “B” attached to the Order. The Records Search Report can be limited if the Department notifies Respondent that prior submissions satisfy specific items required for the Records Search Report.

III. Development, Performance, and Reporting of Work Plans

A. Work Plan Requirements

All activities at the Site that comprise any element of an Inactive Hazardous Waste Disposal Site Remedial Program shall be conducted pursuant to one or more Department-approved work plans (“Work Plan” or “Work Plans”) and this Order and all activities shall be consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300, as required under CERCLA, 42 U.S.C. § 9600 *et seq*. The Work Plan(s) under this Order shall address both on-Site and off-Site conditions and shall be developed and implemented in accordance with 6 NYCRR § 375-1.6(a), 375-3.6, and 375-6. All Department-approved Work Plans shall be incorporated into and become enforceable parts of this Order. Upon approval of a Work Plan by the Department, Respondent shall implement such Work Plan in accordance with the schedule contained therein. Nothing in this Subparagraph shall mandate that any particular Work Plan be submitted.

The Work Plans shall be captioned as follows:

1. Site Characterization (“SC”) Work Plan: a Work Plan which provides for the identification of the presence of any hazardous waste disposal at the Site;

2. Remedial Investigation/Feasibility Study (“RI/FS”) Work Plan: a Work Plan which provides for the investigation of the nature and extent of contamination within the boundaries of the Site and emanating from such Site and a study of remedial alternatives to address such on-site and off-site contamination;

3. Remedial Design/Remedial Action (“RD/RA”) Work Plan: a Work Plan which provides for the development and implementation of final plans and specifications for implementing the remedial alternative set forth in the ROD;

4. "IRM Work Plan" if the Work Plan provides for an interim remedial measure;

5. "Site Management Plan" if the Work Plan provides for the identification and implementation of institutional and/or engineering controls as well as any necessary monitoring and/or operation and maintenance of the remedy; or

6. "Supplemental" if additional work plans other than those set forth in II.A.1-5 are required to be prepared and implemented.

B. Submission/Implementation of Work Plans

1. Respondent may opt to propose one or more additional or supplemental Work Plans (including one or more IRM Work Plans) at any time, which the Department shall review for appropriateness and technical sufficiency.

2. Any proposed Work Plan shall be submitted for the Department's review and approval and shall include, at a minimum, a chronological description of the anticipated activities, a schedule for performance of those activities, and sufficient detail to allow the Department to evaluate that Work Plan.

i. The Department shall notify Respondent in writing if the Department determines that any element of a Department-approved Work Plan needs to be modified in order to achieve the objectives of the Work Plan as set forth in Subparagraph III.A or to ensure that the Remedial Program otherwise protects human health and the environment. Upon receipt of such notification, Respondent shall, subject to dispute resolution pursuant to Paragraph XV, modify the Work Plan.

ii. The Department may request, subject to dispute resolution pursuant to Paragraph XV, that Respondent submit additional or supplemental Work Plans for the Site to complete the current remedial phase within thirty (30) Days after the Department's written request.

3. A Site Management Plan, if necessary, shall be submitted in accordance with the schedule set forth in the IRM Work Plan or Remedial Work Plan.

4. During all field activities conducted under a Department-approved Work Plan, Respondent shall have on-Site a representative who is qualified to supervise the activities undertaken in accordance with the provisions of 6 NYCRR 375-1.6(a)(3).

5. A Professional Engineer licensed and registered in New York State must stamp and sign all Work Plans other than SC or RI/FS Work Plans.

C. Submission of Final Reports and Periodic Reports

1. In accordance with the schedule contained in a Work Plan, Respondent shall submit a final report as provided at 6 NYCRR 375-1.6(b) and a final engineering report as provided at 6 NYCRR 375-1.6(c).

2. Any final report or final engineering report that includes construction activities shall include "as built" drawings showing any changes made to the remedial design or the IRM.

3. In the event that the final engineering report for the Site requires Site management, Respondent shall submit an initial periodic report by in accordance with the schedule in the Site Management Plan and thereafter in accordance with a schedule determined by the Department. Such periodic report shall be signed by a Professional Engineer or by such other qualified environmental professional as the Department may find acceptable and shall contain a certification as provided at 6 NYCRR 375-1.8(h)(3). Respondent may petition the Department for a determination that the institutional and/or engineering controls may be terminated. Such petition must be supported by a statement by a Professional Engineer that such controls are no longer necessary for the protection of public health and the environment. The Department shall not unreasonably withhold its approval of such petition.

4. Within sixty (60) days of the Department's approval of a Final Report, Respondent shall submit such additional Work Plans as is required by the Department in its approval letter of such Final Report. Failure to submit any additional Work Plans within such period shall be a violation of this Order.

D. Review of Submittals

1. The Department shall make a good faith effort to review and respond in writing to each submittal Respondent makes pursuant to this Order within sixty (60) Days. The Department's response shall include, in accordance with 6 NYCRR 375-1.6(d), an approval, modification request, or disapproval of the submittal, in whole or in part.

i. Upon the Department's written approval of a Work Plan, such Department-approved Work Plan shall be deemed to be

incorporated into and made a part of this Order and shall be implemented in accordance with the schedule contained therein.

ii. If the Department modifies or requests modifications to a submittal, it shall specify the reasons for such modification(s). Within fifteen (15) Days after the date of the Department's written notice that Respondent's submittal has been disapproved, Respondent shall notify the Department of its election in accordance with 6 NYCRR 375-1.6(d)(3). If Respondent elects to modify or accept the Department's modifications to the submittal, Respondent shall make a revised submittal that incorporates all of the Department's modifications to the first submittal in accordance with the time period set forth in 6 NYCRR 375-1.6(d)(3). In the event that Respondent's revised submittal is disapproved, the Department shall set forth its reasons for such disapproval in writing and Respondent shall be in violation of this Order unless it invokes dispute resolution pursuant to Paragraph XV and its position prevails. Failure to make an election or failure to comply with the election is a violation of this Order.

iii. If the Department disapproves a submittal, it shall specify the reasons for its disapproval. Within fifteen (15) Days after the date of the Department's written notice that Respondent's submittal has been disapproved, Respondent shall notify the Department of its election in accordance with 6 NYCRR 375-1.6(d)(4). If Respondent elects to modify the submittal, Respondent shall make a revised submittal that addresses all of the Department's stated reasons for disapproving the first submittal in accordance with the time period set forth in 6 NYCRR 375-1.6(d)(4). In the event that Respondent's revised submittal is disapproved, the Department shall set forth its reasons for such disapproval in writing and Respondent shall be in violation of this Order unless it invokes dispute resolution pursuant to Paragraph XV and its position prevails. Failure to make an election or failure to comply with the election is a violation of this Order.

2. Within thirty (30) Days after the Department's approval of a final report, Respondent shall submit such final report, as well as all data gathered and drawings and submittals made pursuant to such Work Plan, in an electronic format acceptable to the Department. If any document cannot be converted into electronic format, Respondent shall submit such document in an alternative format acceptable to the Department.

E. Department's Issuance of a ROD

1. Respondent shall cooperate with the Department and provide reasonable assistance, consistent with the Citizen Participation Plan, in soliciting public comment on the proposed remedial action plan ("PRAP"), if any. After the close of the public comment period, the Department shall select a final remedial alternative for the Site in a ROD. Nothing in this Order shall be construed to abridge any rights of Respondent, as provided by law, to judicially challenge the Department's ROD.

2. Respondent shall have 60 days from the date of the Department's issuance of the ROD to notify the Department in writing whether it will implement the remedial activities required by such ROD. If the Respondent elects not to implement the required remedial activities, then this order shall terminate in accordance with Paragraph XIV.A. Failure to make an election or failure to comply with the election is a violation of this Order.

F. Institutional/Engineering Control Certification

In the event that the remedy for the Site, if any, or any Work Plan for the Site, requires institutional or engineering controls, Respondent shall submit a written certification in accordance with 6 NYCRR 375-1.8(h)(3) and 375-3.8(h)(2).

IV. Penalties

A. 1. Respondent's failure to comply with any term of this Order constitutes a violation of this Order, the ECL, and 6 NYCRR 375-2.11(a)(4). Nothing herein abridges Respondent's right to contest any allegation that it has failed to comply with this Order.

2. Payment of any penalties shall not in any way alter Respondent's obligations under this Order.

B. 1. Respondent shall not suffer any penalty or be subject to any proceeding or action

in the event it cannot comply with any requirement of this Order as a result of any Force Majeure Event as provided at 6 NYCRR 375-1.5(b)(4). Respondent must use best efforts to anticipate the potential Force Majeure Event, best efforts to address any such event as it is occurring, and best efforts following the Force Majeure Event to minimize delay to the greatest extent possible. "Force Majeure" does not include Respondent's economic inability to comply with any obligation, the failure of Respondent to make complete and timely application for any required approval or permit, and non-attainment of the goals, standards, and requirements of this Order.

2. Respondent shall notify the Department in writing within five (5) Days of the onset of any Force Majeure Event. Failure to give such notice within such five (5) Day period constitutes a waiver of any claim that a delay is not subject to penalties. Respondent shall be deemed to know of any circumstance which it, any entity controlled by it, or its contractors knew or should have known.

3. Respondent shall have the burden of proving by a preponderance of the evidence that (i) the delay or anticipated delay has been or will be caused by a Force Majeure Event; (ii) the duration of the delay or the extension sought is warranted under the circumstances; (iii) best efforts were exercised to avoid and mitigate the effects of the delay; and (iv) Respondent complied with the requirements of Subparagraph IV.B.2 regarding timely notification.

4. If the Department agrees that the delay or anticipated delay is attributable to a Force Majeure Event, the time for performance of the obligations that are affected by the Force Majeure Event shall be extended for a period of time equivalent to the time lost because of the Force majeure event, in accordance with 375-1.5(4).

5. If the Department rejects Respondent's assertion that an event provides a defense to non-compliance with this Order pursuant to Subparagraph IV.B, Respondent shall be in violation of this Order unless it invokes dispute resolution pursuant to Paragraph XV and Respondent's position prevails.

V. Entry upon Site

A. Respondent hereby consents, upon reasonable notice under the circumstances presented, to entry upon the Site (or areas in the vicinity of the Site which may be under the control of Respondent) by any duly designated officer or employee of the Department or any State agency having jurisdiction with respect to matters addressed pursuant to this Order, and by any agent, consultant, contractor, or other person so authorized by the Commissioner, all of whom shall abide by the health and safety rules in effect for the Site, for inspecting, sampling, copying records related to the contamination at the Site, testing, and any other activities necessary to ensure Respondent's compliance with this Order. Upon request, Respondent shall (i) provide the Department with suitable work space at the Site, including access to a telephone, to the extent available, and (ii) permit the Department full access to all non-privileged records relating to matters addressed by this Order. Raw data is not considered privileged and that portion of any privileged document containing raw data must be provided to the Department. In the event Respondent is unable to obtain any authorization from third-party property owners necessary to perform its obligations under this Order, the Department may, consistent with its legal authority, assist in obtaining such authorizations.

B. The Department shall have the right to take its own samples and scientific measurements and the Department and Respondent shall each have the right to obtain split samples, duplicate samples, or both, of all substances and materials sampled. The Department shall make the results of any such sampling and scientific measurements available to Respondent.

VI. Payment of State Costs

A. Within forty-five (45) days after receipt of an itemized invoice from the Department, Respondent shall pay to the Department a sum of money which shall represent reimbursement for State Costs as provided by 6 NYCRR 375-1.5 (b)(3)(i). Failure to timely pay any invoice will be subject to late payment charge and interest at a rate of 9% from the date the

payment is due until the date the payment is made.

B. Costs shall be documented as provided by 6 NYCRR 375-1.5(b)(3). The Department shall not be required to provide any other documentation of costs, provided however, that the Department's records shall be available consistent with, and in accordance with, Article 6 of the Public Officers Law.

C. Each such payment shall be made payable to the "Commissioner of NYSDEC" and shall be sent to:

Director, Bureau of Program Management
Division of Environmental Remediation
New York State Department of
Environmental Conservation
625 Broadway
Albany, New York 12233-7012

D. The Department shall provide written notification to the Respondent of any change in the foregoing addresses.

E. If Respondent objects to any invoiced costs under this Order, the provisions of 6 NYCRR 375-1.5 (b)(3)(v) and (vi) shall apply. Objections shall be sent to the Department as provided under subparagraph VI.C above.

F. In the event of non-payment of any invoice within the 45 days provided herein, the Department may seek enforcement of this provision pursuant to Paragraph IV or the Department may commence an enforcement action for non-compliance with ECL '27-1423 and ECL 71-4003.

VII. Release and Covenant Not to Sue

Upon the Department's issuance of a Certificate of Completion as provided at 6 NYCRR 375-1.9 and 375-2.9, Respondent shall obtain the benefits conferred by such provisions, subject to the terms and conditions described therein.

VIII. Reservation of Rights

A. Except as provided at 6 NYCRR 375-1.9 and 375-2.9, nothing contained in this Order shall be construed as barring, diminishing, adjudicating, or in any way affecting any of the Department's rights or authorities, including, but not limited to, the right to require performance of further investigations and/or response action(s), to recover natural resource damages, and/or to exercise any summary abatement powers with respect to any person, including Respondent.

B. Except as otherwise provided in this Order, Respondent specifically reserves all rights and defenses under applicable law respecting any Departmental assertion of remedial liability and/or natural resource damages against Respondent, and further reserves all rights respecting the enforcement of this Order, including the rights to notice, to be heard, to appeal, and to any other due process. The existence of this Order or Respondent's compliance with it shall not be construed as an admission of liability, fault, wrongdoing, or breach of standard of care by Respondent, and shall not give rise to any presumption of law or finding of fact, or create any rights, or grant any cause of action, which shall inure to the benefit of any third party. Further, Respondent reserves such rights as it may have to seek and obtain contribution, indemnification, and/or any other form of recovery from its insurers and from other potentially responsible parties or their insurers for past or future response and/or cleanup costs or such other costs or damages arising from the contamination at the Site as may be provided by law, including but not limited to rights of contribution under section 113(f)(3)(B) of CERCLA, 42 U.S.C. § 9613(f)(3)(B).

IX. Indemnification

Respondent shall indemnify and hold the Department, the State of New York, the Trustee of the State's natural resources, and their representatives and employees harmless as provided by 6 NYCRR 375-2.5(a)(3)(i).

X. Notice of Transfer

If Respondent proposes to transfer by sale or lease the whole or any part of Respondent's interest in the Site, or becomes aware of such transfer, Respondent shall, not fewer than forty-five (45) Days before the date of transfer, or within forty-five (45) Days after becoming aware of such conveyance, notify the Department in writing of the identity of the transferee and of the nature and proposed or actual date of the conveyance, and shall notify the transferee in

writing, with a copy to the Department, of the applicability of this Order. However, such obligation shall not extend to a conveyance by means of a corporate reorganization or merger or the granting of any rights under any mortgage, deed, trust, assignment, judgment, lien, pledge, security agreement, lease, or any other right accruing to a person not affiliated with Respondent to secure the repayment of money or the performance of a duty or obligation.

XI. Change of Use

Applicant shall notify the Department at least sixty (60) days in advance of any change of use, as defined in 6 NYCRR 375-2.2(a), which is proposed for the Site, in accordance with the provisions of 6 NYCRR 375-1.11(d). In the event the Department determines that the proposed change of use is prohibited, the Department shall notify Applicant of such determination within forty-five (45) days of receipt of such notice.

XII. Environmental Easement

A. If a Record of Decision for the Site relies upon one or more institutional and/or engineering controls, Respondent (or the owner of the Site) shall submit to the Department for approval an Environmental Easement to run with the land in favor of the State which complies with the requirements of ECL Article 71, Title 36, and 6 NYCRR 375-1.8(h)(2). Upon acceptance of the Environmental Easement by the State, Respondent shall comply with the requirements of 6 NYCRR 375-1.8(h)(2).

B. If the ROD provides for no action other than implementation of one or more institutional controls, Respondent shall cause an environmental easement to be recorded under the provisions of Subparagraph XII.A.

C. If Respondent does not cause such environmental easement to be recorded in accordance with 6 NYCRR 375-1.8(h)(2), Respondent will not be entitled to the benefits conferred by 6 NYCRR 375-1.9 and 375-2.9 and the Department may file an Environmental Notice on the site.

XIII. Progress Reports

Respondent shall submit a written progress report of its actions under this Order to the parties identified in Subparagraph IV.A.1 of the Order by the 10th day of each month commencing with the month subsequent to the approval of the first Work Plan and ending with the Termination date as set forth in Paragraph XIV, unless a different frequency is set forth in a Work Plan. Such reports shall, at a minimum, include: all actions relative to the Site during the previous reporting period and those anticipated for the next reporting period; all approved activity modifications (changes of work scope and/or schedule); all results of sampling and tests and all other data received or generated by or on behalf of Respondent in connection with this Site, whether under this Order or otherwise, in the previous reporting period, including quality assurance/quality control information; information regarding percentage of completion; unresolved delays encountered or anticipated that may affect the future schedule and efforts made to mitigate such delays; and information regarding activities undertaken in support of the Citizen Participation Plan during the previous reporting period and those anticipated for the next reporting period.

XIV. Termination of Order

A. This Order will terminate upon the earlier of the following events:

1. Respondent's election in accordance with Paragraph III.E.2 not to implement the remedial activities required pursuant to the ROD. In the event of termination in accordance with this Subparagraph, this Order shall terminate effective the 5th Day after the Department's receipt of the written notification, provided, however, that if there are one or more Work Plan(s) for which a final report has not been approved at the time of Respondent's notification of its election not to implement the remedial activities in accordance with the ROD, Respondent shall complete the activities required by such previously approved Work Plan(s) consistent with the schedules contained therein. Thereafter, this Order shall terminate effective the 5th Day after the Department's approval of the final report for all previously approved Work Plans; or

2. The Department's written determination that Respondent has completed

all phases of the Remedial Program (including Site Management), in which event the termination shall be effective on the 5th Day after the date of the Department's letter stating that all phases of the remedial program have been completed.

B. Notwithstanding the foregoing, the provisions contained in Paragraphs VI and IX shall survive the termination of this Order and any violation of such surviving Paragraphs shall be a violation of this Order, the ECL, and 6 NYCRR 375-2.11(a)(4), subjecting Respondent to penalties as provided under Paragraph IV so long as such obligations accrued on or prior to the Termination Date.

C. If the Order is terminated pursuant to Subparagraph XIV.A.1, neither this Order nor its termination shall affect any liability of Respondent for remediation of the Site and/or for payment of State Costs, including implementation of removal and remedial actions, interest, enforcement, and any and all other response costs as defined under CERCLA, nor shall it affect any defenses to such liability that may be asserted by Respondent. Respondent shall also ensure that it does not leave the Site in a condition, from the perspective of human health and environmental protection, worse than that which existed before any activities under this Order were commenced. Further, the Department's efforts in obtaining and overseeing compliance with this Order shall constitute reasonable efforts under law to obtain a voluntary commitment from Respondent for any further activities to be undertaken as part of a Remedial Program for the Site.

XV. Dispute Resolution

A. In the event disputes arise under this Order, Respondent may, within fifteen (15) Days after Respondent knew or should have known of the facts which are the basis of the dispute, initiate dispute resolution in accordance with the provisions of 6 NYCRR 375-1.5(b)(2).

B. All cost incurred by the Department associated with dispute resolution are State costs subject to reimbursement pursuant to this Order.

C. Nothing contained in this Order shall be construed to authorize Respondent to invoke dispute resolution with respect to the remedy selected by the Department in the ROD or any element of such remedy, nor to impair any right of Respondent to seek judicial review of the Department's selection of any remedy.

XVI. Miscellaneous

A. Respondent agrees to comply with and be bound by the provisions of 6 NYCRR Subparts 375-1 and 375-2; the provisions of such Subparts that are referenced herein are referenced for clarity and convenience only and the failure of this Order to specifically reference any particular regulatory provision is not intended to imply that such provision is not applicable to activities performed under this Order.

B. The Department may exempt Respondent from the requirement to obtain any state or local permit or other authorization for any activity conducted pursuant to this Order in accordance with 6 NYCRR 375-1.12(b), (c), and (d).

C. 1. Respondent shall use best efforts to obtain all Site access, permits, easements, approvals, institutional controls, and/or authorizations necessary to perform Respondent's obligations under this Order, including all Department-approved Work Plans and the schedules contained therein. If, despite Respondent's best efforts, any access, permits, easements, approvals, institutional controls, or authorizations cannot be obtained, Respondent shall promptly notify the Department and include a summary of the steps taken. The Department may, as it deems appropriate and within its authority, assist Respondent in obtaining same.

2. If an interest in property is needed to implement an institutional control required by a Work Plan and such interest cannot be obtained, the Department may require Respondent to modify the Work Plan pursuant to 6 NYCRR 375-1.6(d)(3) to reflect changes necessitated by Respondent's inability to obtain such interest.

D. The paragraph headings set forth in this Order are included for convenience of reference only and shall be disregarded in the construction and interpretation of any provisions of this Order.

E. 1. The terms of this Order shall constitute the complete and entire agreement between the Department and Respondent concerning the implementation of the activities required by this Order. No term, condition, understanding, or agreement purporting to modify or vary any term of this Order shall be binding unless made in writing and subscribed by the party to be bound. No informal advice, guidance, suggestion, or comment by the Department shall be construed as relieving Respondent of Respondent's obligation to obtain such formal approvals as may be required by this Order. In the event of a conflict between the terms of this Order and any Work Plan submitted pursuant to this Order, the terms of this Order shall control over the terms of the Work Plan(s). Respondent consents to and agrees not to contest the authority and jurisdiction of the Department to enter into or enforce this Order.

2. i. Except as set forth herein, if Respondent desires that any provision of this Order be changed, Respondent shall make timely written application to the Commissioner with copies to the parties listed in Subparagraph IV.A.1.

ii. If Respondent seeks to modify an approved Work Plan, a written request shall be made to the Department's project manager, with copies to the parties listed in Subparagraph IV.A.1.

iii. Requests for a change to a time frame set forth in this Order shall be made in writing to the Department's project attorney and project manager; such requests shall not be unreasonably denied and a written response to such requests shall be sent to Respondent promptly.

F. 1. If there are multiple parties signing this Order, the term "Respondent" shall be read in the plural, the obligations of each such party under this Order are joint and several, and the insolvency of or failure by any Respondent to implement any obligations under this Order shall not affect the obligations of the remaining Respondent(s) under this Order.

2. If Respondent is a partnership, the obligations of all general partners (including limited partners who act as general partners) under this Order are joint and several and the insolvency or failure of any general partner to implement any obligations under this Order shall not affect the obligations of the remaining partner(s) under this Order.

3. Notwithstanding the foregoing Subparagraphs XVI.F.1 and 2, if multiple parties sign this Order as Respondents but not all of the signing parties elect to implement a Work Plan, all Respondents are jointly and severally liable for each and every obligation under this Order through the completion of activities in such Work Plan that all such parties consented to; thereafter, only those Respondents electing to perform additional work shall be jointly and severally liable under this Order for the obligations and activities under such additional Work Plan(s). The parties electing not to implement the additional Work Plan(s) shall have no obligations under this Order relative to the activities set forth in such Work Plan(s). Further, only those Respondents electing to implement such additional Work Plan(s) shall be eligible to receive the release and covenant not to sue referenced in Paragraph VII.

G. Respondent shall be entitled to receive contribution protection and/or to seek contribution to the extent authorized by ECL 27-1421(6) and 6 NYCRR 375-1.5(b)(5).

H. Unless otherwise expressly provided herein, terms used in this Order which are defined in ECL Article 27 or in regulations promulgated thereunder shall have the meaning assigned to them under said statute or regulations.

I. Respondent's obligations under this Order represent payment for or reimbursement of response costs, and shall not be deemed to constitute any type of fine or penalty.

J. Respondent and Respondent's successors and assigns shall be bound by this Order. Any change in ownership or corporate status of Respondent shall in no way alter Respondent's responsibilities under this Order.

K. This Order may be executed for the convenience of the parties hereto, individually or in combination, in one or more counterparts, each of which shall be deemed to have the

status of an executed original and all of which shall together constitute one and the same.

Exhibit A

N:\GIS\Projects\EF1032_VanEttenRoad_CtWorking_Maps\Consent_Order\Figure_1_Site_Location.mxd 4/5/2022 10:03:00 AM

integral engineering p.c.
31 West 34th Street, Suite 7196
New York, NY 10018
www.integral-corp.com

Figure 1.
Site Location Map
3184 Van Etten Road Property Site Characterization
Corning, NY

Exhibit B

FINAL

3148 VAN ETTEN ROAD PROPERTY CHARACTERIZATION WORK PLAN

Site # 851061

Prepared for:

Corning Incorporated
Corning, New York

Prepared by:

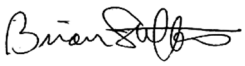
MICHAEL BAKER INTERNATIONAL
Moon Township, Pennsylvania

Michael Baker
INTERNATIONAL

May 28, 2021

CERTIFICATION

I, Brian Steffes, P.G., certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Characterization Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).



May 28, 2021

Signature

Date

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ATTACHMENTS

Attachment A Health and Safety Plan

Attachment B Standard Operating Procedures

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Attachment D Quality Assurance Project Plan

Attachment E Historical Aerial Photographs

1.0 INTRODUCTION

Michael Baker International (Michael Baker) has prepared this 3148 Van Etten Road Property Work Plan (Work Plan) for the evaluation activities to be conducted at the 3148 Van Etten Road Property (the Property) located at 3148 Van Etten Road, Town of Corning, Steuben County, New York (see Figure 1).

1.1 Regulatory Background

The Property has been classified as a NYSDEC State Superfund program Class P (potential) site. Corning Incorporated will enter into an Order on Consent and Administrative Settlement (Index No. R8-20200903-106) to implement this Work Plan. This Work Plan has been prepared on the behalf of Corning Incorporated at the request of the New York State Department of Environmental Conservation (NYSDEC).

1.2 Purpose

The purpose of the Work Plan is to evaluate the Property. As part of the due diligence process, Michael Baker has reviewed available historical records to establish a physical history of the Property and to identify areas where material may have been placed. The records examination included a review of historical aerial photographs and Property tax and transfer records. The records review and resulting assessment supports the planned evaluation approach. However, the evaluation approach may be modified based on the results of the site visit and interviews; modifications to the evaluation approach will be confirmed with NYSDEC. The Work Plan includes a summary of the initial historical records review and a plan for evaluation activities based on the preliminary results of the historical records review. The evaluation activities are designed to characterize the identified materials on the potentially affected portion of the Property (Area of Evaluation) and evaluate whether surface water bodies and/or wetland areas exist within 100 feet of the Area of Evaluation and within the Property boundary. This information will provide data necessary to understand whether additional characterization activities are necessary.

1.3 Document Organization

The following sections of the Work Plan describe the proposed evaluation activities, including but not limited to:

- Boundary Survey;
- Surface and shallow subsurface soil sampling;
- Groundwater monitoring well installation and groundwater sampling;
- Surface water evaluation;
- Wetlands delineation; and
- Reporting.

The remainder of this Work Plan is organized as follows:

- Background (Section 2);

- Environmental Setting (Section 3);
- Site Characterization Activities (Section 4);
- Project Management (Section 5);
- References (Section 6).

A Health and Safety Plan (HASP; Attachment A), Standard Operating Procedures (SOPs; Attachment B), Community Air Monitoring Plan (CAMP; Attachment C), Quality Assurance Project Plan (QAPP; Attachment D) and historical aerial photographs (Attachment E) are included in the attachments to this Work Plan.

2.0 BACKGROUND

The evaluation area is located at 3148 Van Etten Road, Town of Corning, Steuben County, New York 14830. The Property is listed on Tax Maps as Parcel # 300.000-0001-044.1000000 and identified as comprising 2.3 acres. The Property includes an occupied house built in 1910.

NYSDEC has provided photographs taken at the Property depicting apparent glass and potential demolition-type debris. As discussed further in Section 2.2, the aerial photos identify an area of apparent disturbance within the Property boundary to the south of the house and east of the road.

In order to evaluate the potential for material placement and development history of the Property, historical aerial photographs were reviewed. Historical land use was reviewed, as well as previous Property ownership. A summary of the findings of these reviews is presented in the following subsections.

2.1 Area History

The Property is approximately 1.5 miles northeast of the City of Corning. A review of available title records indicated that the Property was never owned by Corning Incorporated. Records indicate that the Property was historically owned by multiple families as a residence and possibly used for agricultural purposes.

Aerial photographs were reviewed. As detailed in the next section, the aerials reveal that the Property has been occupied by a house on a small rural road surrounded by woodlands since before 1938 and an area of potential disturbance is visible in aerial photographs beginning in 1970, with no substantive change to the potential area of disturbance after 1976.

2.2 Aerial Photograph Review

Aerial photographs were reviewed from the years 1938, 1942, 1952, 1955, 1968, 1970, 1973, 1976, 1979, 1986, 1991, 2001, 2002, 2012 and 2016 and are presented chronologically in Attachment E.

The earliest aerial photo (1938) shows a house on the Property and open and cultivated fields to the north, east and southeast of the house. A small orchard can be seen on the hill. No changes were discerned in the 1942 photo. The photos from 1952 through 1968 show relatively insignificant changes, although there is some reduction in cultivation apparent on the fields to the east and southeast.

Historical aerial photographs indicate an area of disturbance beginning sometime after March 3, 1968 and before May 21, 1970, when the first area of potential disturbance (light-colored ground surface suggesting disturbance) becomes visible. In the May 21, 1970 photo, a light-colored area south of the house becomes visible. The light-colored area appears to be confined to a roughly circular area of the Property to the south of the house. The light-colored area appears to extend up to the road that abuts the Property. The 1973 photo is too unfocussed to discern any changes. The 1976 photo shows the light-colored area still visible but essentially unchanged in area. The area appeared darker in the 1979 photo, possibly indicating reestablishment of vegetation over the area. Although the 1979 photo shows a light-colored area north of the property, considering the photo's scale and resolution it is not possible to ascertain whether this is related to material placement or some other innocuous activity (e.g., gardening). The 1986 through 2016 photos show no significant changes to the Property other than the fields east and southeast of the house reverting to woodlands (it should be noted that the 1986 and 1991 photos are too unfocussed to draw any conclusions). The light-colored area is less discernable in 2002.

This light-colored area first visible in the May 21, 1970 photo appears to correlate with the area identified by NYSDEC (see Figure 2). No differences, other than a gradual, partial growth of vegetation over the light-colored areas, are noted in aerial photos after 1976.

3.0 ENVIRONMENTAL SETTING

The following sections detail land use, topography and drainage, geology, hydrology and ecological setting.

3.1 Land Use

The Property comprises 2.3 acres and is zoned for single family residential use. A two-story single-family house, currently occupied, with a detached garage appears to be located on the Property. The house is surrounded by a lawn, trees and shrubs. Woodlands surround the Property.

3.2 Topography and Drainage

The Property appears from aerials and photographs to be midway up Denmark Hill in a narrow, south facing valley that enters the Narrows Creek valley. The walls of the valley to the east and west of the Property are extremely steep and rise approximately 200 feet above the Property to the east and over 300 feet above the Property to the west. The Property elevation is approximately 1,140 feet above sea level (ASL), whereas Narrows Creek near the intersection of Van Etten Road and College Avenue (shown on Figure 1 as County Road 45) is approximately 1,010 feet ASL. The NYSDEC Environmental Resource Mapper website appears to show a small unnamed tributary to Narrows Creek running through the Property parallel to Van Etten Road. However, this tributary is not identified in the USGA topographic base map used for Figure 1.

3.3 Geology

3.3.1 Regional Geology

Narrows Creek is a second order stream contained within the Chemung River Basin. The Chemung River Basin lies mostly in southwestern New York and partly in northcentral Pennsylvania. The axis of the basin generally trends northwest to southeast where it is intersected by northeast-southwest trending glaciated tributary valleys. The Chemung River Basin eventually empties into the Susquehanna River, just south of Waverly, New York, in Pennsylvania (USGS 2005). Exposed Upper Devonian shale and siltstone of the Gardeau and West Hill Formations are seen along the local hill slopes; these materials comprise the bedrock underlying the property (USGS 2005).

Subsequent glaciation, erosion and deposition regimes in the Pleistocene ensued and glaciofluvial-derived sand and gravel were in place as valley fill near the Town of Corning and other topographic lows.

3.4 Hydrogeology

It is currently unknown if a potable domestic well exists at the Property. Given the topographic relief in the south direction, groundwater at the Property is assumed to flow south towards Narrows Creek.

3.5 Ecological Setting

The Property is an isolated single-family residence surrounded by woodlands and some former agricultural fields that have since reverted to woodlands.

4.0 SITE CHARACTERIZATION ACTIVITIES

The following sections detail the area of characterization, general field characterization and analytical methods and quality control. The initial characterization activities, as described in this work plan, adequately address the data quality objectives for characterization of the Property. Test pits are not included as part of this investigation. Test pits will be considered, as needed, based on the results of the soil boring program.

4.1 Area of Characterization

The characterization activities for the Property will focus on the area identified in the review of aerial photos as described in Section 2.2 with additional sample locations distributed throughout the Property. The sample locations were placed in essentially a grid pattern covering the entire property (although one location was adjusted north due to the house) with three additional sample locations within the area of disturbance. The proposed soil sampling locations for the Property are shown on Figure 3.

Note that certain pre-investigation activities including a site walk and subsurface utility mark out have not yet been performed. Therefore, the conceptual sample locations proposed in this work plan may change based on the results of that work and field conditions and at a minimum will be confirmed verbally with NYSDEC prior to sampling. Further details including proposed sample type, frequency, depth, and quality assurance and quality control (QA/QC) samples are presented in Table 2 in the QAPP (Attachment D).

4.2 General Field Characterization and Analytical Methods

The following subsections describe the characterization activities and analytical methods to be performed. During the initial site walk, observations regarding potential exposure pathways, including but not limited to presence of gardens, exposed soils, worn vegetation, and current occupancy status will be evaluated and documented in the Site Characterization Report.

4.2.1 Access

The Property is not owned by Corning Incorporated and as such a written access agreement will be obtained prior to initiation of field activities. Field work will be coordinated with the Property Owner.

4.2.2 Property Survey

The metes and bounds of the Property, as recorded with the County and State, will be surveyed prior to the initiation of work. The Property boundaries will be surveyed by a professional land surveyor licensed in the State of New York.

4.2.3 Utility Clearance

Prior to initiating field work Michael Baker will contact Dig Safely New York (811) at least two full working days (not including the day of call) prior to soil sampling. If potential conflicts are identified sampling locations will be moved and at a minimum will be confirmed verbally with NYSDEC prior to sampling.

4.2.4 Sample Nomenclature

Each sample will be assigned a unique sample identification number. Sample number will be assigned sequentially in the field. These identification numbers will be tracked from collection through laboratory analysis and into the final report.

Surface soil sample: SS-01-(0-2), where a specific depth range (in inches below surface) is indicated by the portion of the identifier in parenthesis.

Shallow soil samples: SHL-01-(0-6, 6-12, 12-24), where a specific depth range (in inches below surface) is identified in parenthesis.

Soil boring samples: SB-01-(x-x) where a specific depth range (in feet below surface) is identified in parenthesis.

Monitoring well samples: MW-01-mmddyyyy

QA/QC: Sample designation for QA/QC samples will vary by type see SOP F302 (Attachment B) for details on QA/QC labeling.

Additionally, each sample will be labeled with the following information:

- Project Number
- Sampling Date and Time
- Sample Identification Number or Name
- Preservatives, if any
- Samplers Initials
- Analysis to be conducted.

4.2.5 Soil Screening

Sample material collected during characterization activities will be visually inspected and a photo-ionization detector (PID) will be used to screen the sample for potential presence of organic vapors. Prior to use, the PID will be calibrated and the background concentration in ambient air will be measured. To screen the sample, a portion will be placed in a plastic resealable bag or container and agitated. The organic vapor concentration in the headspace within the bags will then be measured.

Visual observations including material characteristics, staining, changes in makeup, irregular material, ash, brick, and/or glass and the PID readings will be documented photographically, on boring logs and in field data sheets. Specifics regarding chemical analysis and sampling can be found in the correspondence sampling sections and QA/QC.

4.2.6 Surface Soil Sampling

Nine (9) discrete surface soil samples plus one duplicate surface soil sample, will be collected from the locations shown on Figure 3. In general, SOP F102, Surface Soil Sampling (Attachment B) will be used for surface soil sampling – please refer to the SOP for field sampling method details. The surface soil sampling program will be performed with the objective of collecting representative samples to assess the relevant soil characteristics.

Samples will be collected from beneath the grass root zone from 0-2 inches.

Surface soil samples will be analyzed for:

- Target Analyte List (TAL) Metals
- Cyanide
- Semi-volatile Organic Compounds (SVOCs)

Twenty percent of the samples will also be analyzed for:

- Volatile Organic Compounds (VOCs)
- Polychlorinated Biphenyls (PCBs)
- Total Petroleum Hydrocarbons (TPH)
- Pesticides/Herbicides
- Toxicity Characteristic Leaching Procedure (TCLP) Metals and Mercury
- 1,4-Dioxane
- Perfluorinated Compounds (PFAS) (sampling will follow Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC's Part 375 Remedial Programs [January 2021]).

Samples analyzed for these constituents will be focused on visually impacted intervals (i.e., intervals containing ash, brick and/or glass) or intervals with elevated PID readings but will still be collected in the absence of visual impacts or elevated PID readings.

Samples will be analyzed for the compounds on the 6 NYCRR Part 375-6.8(a) Unrestricted Use table.

4.2.7 Shallow Soil Sampling

Twenty-seven (27) discreet shallow soil samples plus two duplicate samples, will be collected using direct-push (e.g., GeoProbe®) from the locations shown on Figure 3. The soil borings will be advanced until native soil is encountered. Soil cores will be logged and screened with the PID, as described in Section 4.2.5. In general, SOP F103, Shallow Soil Sampling (Attachment B) will be used to guide shallow soil

sampling – please refer to the SOP for field sampling method details. The objective will be to collect an appropriate number of representative samples to asses relevant soil characteristics.

Shallow soil samples will be collected from 2-6, 6-12, 12-24 inches.

Shallow soil samples will be analyzed for:

- TAL Metals
- Cyanide
- SVOCs

Twenty percent of the samples will also be analyzed for:

- VOCs
- PCBs
- TPH
- Pesticides/Herbicides
- TCLP Metals and Mercury
- 1,4-Dioxane
- PFAS (PFAS sampling will follow Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC's Part 375 Remedial Programs [January 2021]).

Samples analyzed for these constituents will be focused on visually impacted intervals (i.e., intervals containing ash, brick and/or glass) or intervals with elevated PID readings but will still be collected in the absence of visual impacts or elevated PID readings. A direct-push rig will be used to collect shallow soil samples following procedures described in the next section. As described above, utility clearances will be performed in advance of the intrusive subsurface work.

Samples will be analyzed for the compounds on the 6 NYCRR Part 375-6.8(a) Unrestricted Use table.

4.2.8 Soil Boring Sampling

Nine soil borings will be advanced using hollow-stem auger techniques at the locations shown on Figure 3. Borings will be advanced until native soil is encountered. Three of the borings (for monitoring well installations) will be advanced approximately seven feet below the top of the first identified groundwater-bearing zone. The three soil borings will be used to install groundwater monitoring wells (see Section 4.2.9). In general, SOP F103 (Attachment B) will be used to guide soil boring sampling with particular detail paid to the determination of the emplaced versus native material. Soil borings will be logged in accordance with SOP F101 (Attachment B). Please refer to the SOPs (Attachment B) for additional field sampling details that may not be detailed below.

Lithology encountered in the soil borings will be described by an experienced geologist, using the visual - manual procedures of ASTM International Standard D2488-09a (ASTM 2009) for guidance, which are based on the Unified Soil Classification System.

A continuous core of soil will be collected every two feet at each boring locations using split-spoon samplers and standard penetration tests (SPT) for lithologic logging and sample collection. Material will be collected and logged continuously through each boring. The recovered material will be screened for the presence of VOCs using a PID by placing it in a resealable bag or jar, agitating the sample and, after several minutes, introducing the PID probe into the headspace area of the bag. The PID readings will be recorded on the lithologic log prepared for each boring.

Soil samples will be collected for laboratory analysis from the borings from the split-spoon sampler. At the boring locations, surface soil and shallow soil samples also will be collected as described above. A soil sample will be collected from deeper in the boring (i.e., between two feet and four feet deep) at visually impacted layers of ash, brick and/or glass, if present, or intervals with elevated PID readings. Native soil will be observed and logged and a soil sample will be collected from each boring from within the native soil layer. All samples will be collected in laboratory-supplied and-cleaned containers. Samples for VOC analysis will be preserved using USEPA Method 5035 (USEPA 1996) and placed in appropriate containers provided by the laboratory. The samples will be labelled and placed in an ice-cooled chest for transport under chain-of-custody procedures to the analytical laboratory.

Soil boring and native soil samples collected from the borings will be analyzed for:

- TAL Metals
- Cyanide
- SVOCs

Twenty percent of the samples will also be analyzed for:

- SVOCs
- PCBs
- TPH
- Pesticides/Herbicides
- TCLP Metals and Mercury
- PFAS.

Work will be conducted in general accordance with the standard procedures identified and followed under DER-10 and 6 NYCRR Part 375, as well as SOPs (Attachment B). PFAS sampling and analysis procedures will conform to the guidelines provided in Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC's Part 375 Remedial Programs (January 2021), which is included in Attachment B.

4.2.9 Groundwater Sampling

A groundwater investigation will be conducted at the Property. Three monitoring wells (one upgradient and two downgradient) will be installed at the locations shown on Figure 3 to estimate groundwater flow direction. The procedures presented are general and will ultimately be determined based on field conditions including but not limited to the availability of groundwater and the locations of the wells in order to minimize intrusion of parcel land use.

Groundwater monitoring wells will be installed using hollow-stem auger drilling techniques. At the drilling location, the hollow-stem augers will be extended from ground surface to approximately 10 feet below the water table. Final well depths will be determined in the field based upon the estimated depth to water table as evident from the soil core. Soil cores will be collected with a split-spoon at two-foot intervals during drilling for physical description and will be screened for VOCs with a PID.

Upon reaching the final depth, the well components will be placed within the augers. Well components, are anticipated to consist of 10 feet of two-inch diameter, 0.010-inch slot polyvinyl chloride (PVC) screen and the appropriate length of PVC riser piping. Following placement of the well components in the hollow-stem augers, a filter pack consisting of clean quartz sand will be placed from the bottom of the well screen to approximately two feet above the top of the well screen. A hydrated bentonite seal (approximately two-feet thick) will then be placed above the filter pack. The remainder of the annular space above the bentonite seal will be backfilled with a cement/bentonite grout mixture to ground surface using a tremie rod. Each well will be completed flush to ground within a water-tight well box. Locks will be placed on all wells.

After each new monitoring well is installed, it will be developed using a submersible pump to surge and pump the well until the purged groundwater is relatively clear (10 Nephelometric Turbidity Units [NTU] or less), as practical. New monitoring wells will be allowed to set for at least 24 hours prior to development. Following well development, the new monitoring wells will be located horizontally and vertically (top of casing and ground surface) by a surveyor licensed in the State of New York. IDW (i.e., development water) from this investigation will be collected and contained in sealed containers (e.g., drums or other appropriate containers) and staged at the site within secondary containment pending proper disposal.

A groundwater sample for laboratory analysis will be collected from the new monitoring wells. Monitoring well sampling will be performed no sooner than two weeks from completion of new well development. Monitoring well samples will be collected utilizing low-flow, low turbidity sampling procedures. Additional information regarding sampling techniques is included in the SOPs, which are provided in Appendix B.

Prior to collection of groundwater samples for analysis, one round of water level measurements will be collected from all monitoring wells that will be installed on the Property. A clean electronic water-level indicator will be lowered into each well to determine depth to water, and the top of casing elevation will be used to calculate groundwater level elevation above mean sea level.

Groundwater samples collected from the monitoring wells will be analyzed for:

- TAL Metals
- Cyanide

- VOCs
- SVOCs
- TPH
- PCBs
- Pesticides/Herbicides
- PFAS

Work will be conducted in general accordance with the standard procedures identified and followed under DER-10 and 6 NYCRR Part 375, as well as SOPs (Attachment B). PFAS sampling and analysis procedures will conform to the guidelines provided in Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC's Part 375 Remedial Programs (January 2021), which is included in Attachment B.

4.2.10 Stream Identification & Wetland Delineation

Prior to field work, a desktop study will be conducted in accordance with the NYSDEC Freshwater Wetlands Delineation Manual (NYSDEC 1995) and with the United States Army Corps of Engineers (USACE) standards using New York State Freshwater Wetlands Map, USGS topographic map, hydric soil maps of the United States (NRCS), and aerial photographs, along with a review of any available site-specific information. Areas with a high likelihood for aquatic resources (streams and wetlands) will be noted for further investigation during the wetland delineation.

Regardless of the findings of the desktop study, Michael Baker will conduct an onsite inspection in accordance with the NYSDEC Freshwater Wetlands Delineation Manual, USACE Wetlands Delineation Manual, and the USACE Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0). The entire study area will be systematically evaluated for wetland indicators within the three major wetland criteria (hydrophytic vegetation, hydric soils, and wetland hydrology). USACE requires indicators to be met for an area to be considered a wetland; however, atypical situations (i.e., those which may be heavily altered or disturbed) may be present. These areas will be evaluated, and notes taken, to justify whether these areas are, or are not, wetlands. Additionally, photographs will be taken at each sample point, waterbody, or other unique features, with additional overview photos taken of upland habitat and areas surrounding the wetlands to document the site conditions.

A complete report detailing all wetlands and streams located within the project study area will be provided, along with photos, maps and field data sheets. The stream evaluation and wetland delineation will be surveyed with a handheld GPS and all data collected will be detailed in GIS. The stream evaluation and wetlands delineation is detailed further in SOP F106.

4.2.11 Air Monitoring

CAMP requirements will be implemented for the activities pursuant to this Work Plan in order to present information and data that document conditions and to ensure that impacts (if identified) are mitigated immediately. Air monitoring will be conducted in accordance with the CAMP (Attachment C) and will be

performed and reported in accordance with NYSDEC's DER-10, Technical Guidance for Site Investigation and Remediation document. Data will be provided to the regulatory agency either weekly or daily in the event action levels are exceeded and protective actions undertaken.

4.2.12 Quality Assurance and Quality Control

Field quality control samples will be to assess sample variability and to verify that cross-contamination between samples has not occurred during sampling. If quality control problems are encountered, corrective actions (if appropriate) will be implemented to meet the project data quality specifications. The quality control samples that will be collected in the field and analyzed by the analytical laboratory are detailed in the QAPP (Attachment D).

4.2.13 Investigative Derived Waste

Soil and water investigative derived waste (IDW) will be handled in accordance with DER-10 Section 3.3(e). Drill cuttings and other soil and water generated during investigation activities (including personal protective equipment) will be collected and containerized in sealed containers (e.g., drums or other appropriate containers) daily. The filled containers will be staged in a secondary containment area at a staging area approved by NYSDEC pending proper disposal. The IDW will be properly disposed by Corning Incorporated in accordance with applicable requirements.

Non-dedicated sampling and monitoring equipment will be decontaminated by washing with phosphate-free detergent (Alconox) and rinsing with PFAS-free distilled water, or through other manufacturer approved decontamination methods. Drilling equipment (drill rods and macrocore samplers) will be decontaminated by washing with a steam cleaner/pressure washer. All rinse water, well development water, and purge water will be containerized and properly disposed by Corning Incorporated in accordance with applicable requirements.

5.0 PROJECT MANAGEMENT

Upon approval of this Work Plan by NYSDEC, Corning Incorporated anticipates implementing the characterization activities described herein as shown on Figure 4.

5.1 Documentation

The following subsections describe the field logs, photo logs, field reports, data management and reporting tasks to be undertaken.

5.1.1 Field Logs

Field logbooks must be used to document all daily activities during field sampling events. The name(s) of the person(s) making a field measurement and the field equipment used to make that measurement will be recorded in the field logbook and in the field forms used during the sampling event. Equipment maintenance and calibration records will be kept in logbooks and field records so that the procedures are traceable. Modifications, decisions, or corrective actions to the characterization design and procedures identified in the SOPs will be discussed with and approved by the Michael Baker Project or technical Manager prior to field implementation and will be clearly documented in the field logbook.

SOP F303 Field Logbook (Attachment B) will be followed in addition to procedures described above.

5.1.2 Photo Log

Photographs of characterization activities will be taken throughout the field work. Photographs will document equipment used, soil being logged, and samples collected and provide visual evidence of emplaced material, native material, irregular material, construction and demolition debris and impacted material that may have been observed.

SOP F303 Field Logbook, Section 5.3 Photographs (Attachment B) will be followed in addition to procedures described above.

5.1.3 Field Reports

A daily work activity report will be prepared summarizing the work activities performed each day. At the completion of the work, all materials will be furnished to Corning Incorporated. During the characterization activities, a weekly progress report will be prepared and submitted to NYSDEC including supporting documentation, which may include photographs.

5.1.4 Data Management

Data for this project will be generated in the field and at the laboratory. The final repository for all sample information will be a project database. Procedures to be used to transfer data from the point of generation to the database are described in the QAPP (Attachment D).

The Data Deliverable will be prepared in accordance with the Guidance for Data Deliverables and the Development of Data Usability Summary Reports summarized in Appendix 2B of DER-10. A DEC Analytical Services Protocol Category B Data Deliverable will be prepared, and a Data Usability Summary Report describing full data validation will be provided as a project deliverable.

5.1.5 Reporting

Michael Baker will prepare a report summarizing the characterization work performed for NYSDEC review. The report will be pursuant to DER-10 Section 3.13 and include:

- Summary of field and laboratory analytical methods
- Field observations
- Tabulated soil sample analytical results
- Results of data validation
- Evaluation of chemical analysis results compared to applicable cleanup objectives/regulatory criteria
- Figures with sampling locations
- Conceptual model of impacted soil and/or material emplacement
- Recommendations for further action, if any.

5.2 Health and Safety Plan

An investigation-specific HASP, including COVID-19-related procedures, is included as Attachment A. A copy of the HASP will be retained at the investigation area at all times field work is being conducted and personnel must have read and understood it prior to engaging in work at the Property.

5.3 Area Controls

To reduce the potential for sampling activities at the Property to generate fugitive dust emissions, the following practices will be used as needed during sampling activities:

- Vehicles will be kept off the Property to the extent possible, but if required to be on the Property, vehicle speeds will be kept to below approximately 5 miles per hour
- Mist or spray water will be used, if needed.
- Activities will be controlled to minimize dust generation.

See CAMP (Attachment C) for additional details on controls for particulates.

6.0 REFERENCES

ASTM. 2009. Standard Practice for Description and Identification of Soils (Visual-Manual Procedure): ASTM D2488-09a. ASTM International, West Conshohocken, PA.

Cowardin et al. (1979). Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31. Reprinted 1992. U. S. Fish and Wildlife Service, Washington, DC.

NYSDEC. 2010. ER-10 – Technical Guidance for Site Investigation and Remediation. New York State Department of Environmental Conservation, Division of Environmental Remediation. Updated May 3, 2010.

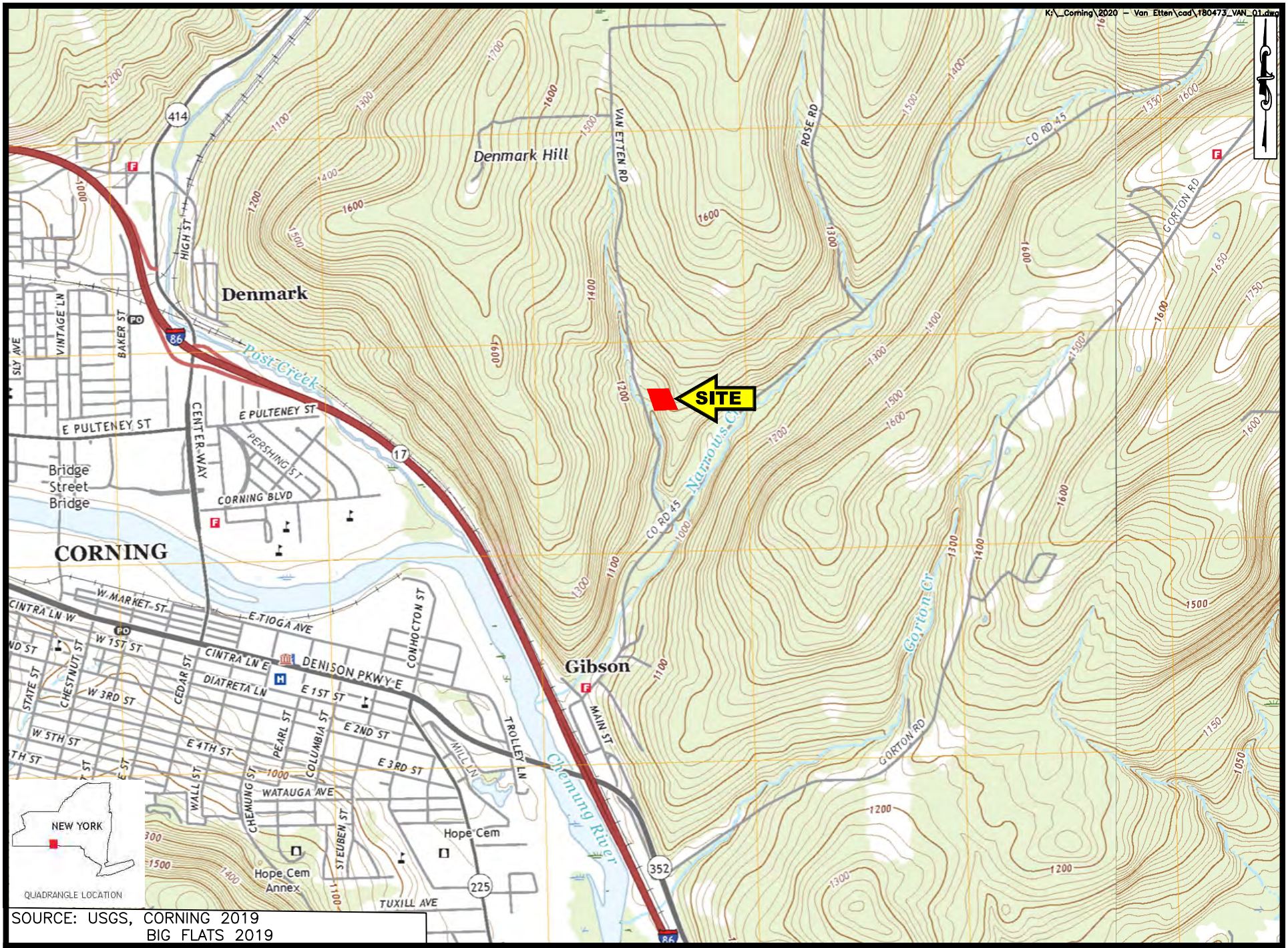
USGS. 2005. New York geologic map data. Available at: http://mrdata.usgs.gov/geology/state/state.php?state=NY. U. S. Geological Survey, Reston, VA.

NYSDEC. 2021. Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC's Part 375 Remedial Programs. New York State Department of Environmental Conservation. January 2021.

NYSDEC. 1995. Freshwater Wetlands Delineation Manual. New York State Department of Environmental Conservation. Albany, NY.

Michael Baker
INTERNATIONAL

FIGURES



SOURCE: USGS, CORNING 2019
BIG FLATS 2019

SCALE:	0 1000 2000	DATE:	SEPTEMBER 2020
S.O. NO.:	180473	FILE:	180473_VAN_01
DSN/DWN:	BES/RR	CHK:	BES

Michael Baker INTERNATIONAL
MICHAEL BAKER INTERNATIONAL
MOON TOWNSHIP, PENNSYLVANIA

FIGURE 1
LOCATION MAP
VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION
CORNING, NY

SCALE: 0 60 FEET
S.O. NO.: 180473
DSN/DWN: BES/RRR
DATE: SEPTEMBER 2020
FILE: 180473_VAN_02
CHK: BES

Michael Baker INTERNATIONAL
MICHAEL BAKER INTERNATIONAL
MOON TOWNSHIP, PENNSYLVANIA

FIGURE 2
FEATURES MAP
VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION
CORNING, NY

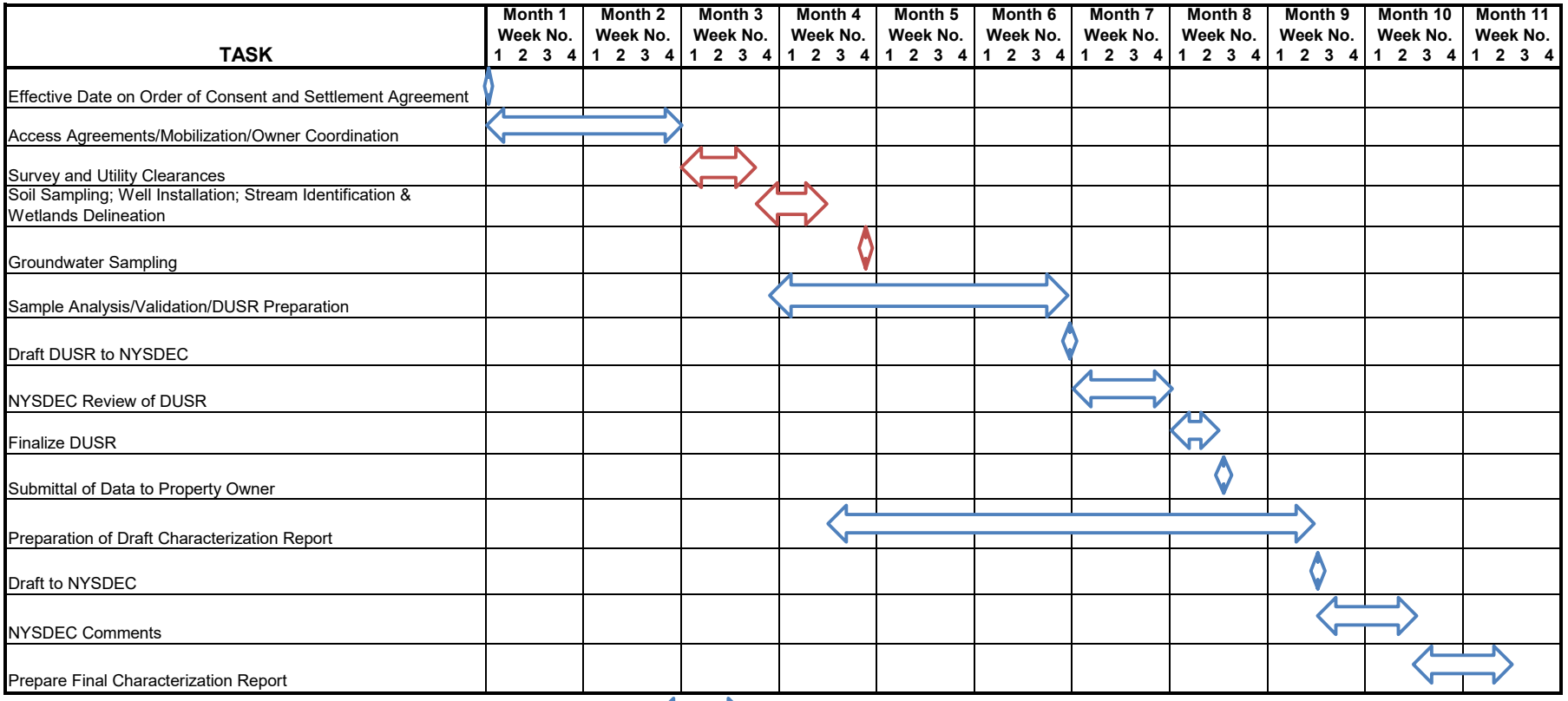
SCALE: 0 60 FEET
S.O. NO.: 180473
DSN/DWN: BES/RRR
DATE: DECEMBER 2020
FILE: 180473_VAN_06
CHK: BES

Michael Baker INTERNATIONAL
MICHAEL BAKER INTERNATIONAL
MOON TOWNSHIP, PENNSYLVANIA

FIGURE 3
SAMPLE LOCATION MAP
VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION
CORNING, NY

Figure 4
Proposed Project Schedule

3148 Van Etten Road Property
Corning, New York



NOTES:
DUSR - Data Useability Summary Report
NYSDEC - New York Department of Environmental Conservation

Office Task

Field Task

Michael Baker
INTERNATIONAL

ATTACHMENT A

Health and Safety Plan (HASP)

FINAL

3148 VAN ETTEN ROAD PROPERTY CHARACTERIZATION WORK PLAN

Site # 851061

Health and Safety Plan

Prepared for:

Corning Incorporated
Corning, New York

Prepared by:

MICHAEL BAKER INTERNATIONAL
Moon Township, Pennsylvania

Michael Baker
INTERNATIONAL

May 28, 2021

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Attachment B – Site Personnel Log
Attachment C – Safety Data Sheets
Attachment D – COVID-19 Mitigation Plan

1.0 INTRODUCTION

This Health and Safety Plan (HASP) was prepared to define the requirements and designate protocols to be followed during the characterization field activities that will be conducted at the 3148 Van Etten Road Property located at 3148 Van Etten Road in Corning, New York.

This HASP has been prepared in accordance with the Occupational Safety & Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) standards, 29 CFR 1910.120 and 29 CFR 1926.65 and with OSHA General Industry and Construction Standards.

The provisions of this HASP are applicable to Michael Baker International (Michael Baker) employees and contractors who will work on or visit the site for this project. This HASP will be reviewed by all site personnel prior to conducting activities involved with the investigation at the site. All personnel will sign an agreement to comply with the requirements of the HASP.

1.1 Site Description

The evaluation area is located at 3148 Van Etten Road, Town of Corning, Steuben County, New York 14830. The Property is listed on Tax Maps as Parcel # 300.000-0001-044.1000000 and identified as comprising 2.3 acres. The Property includes an occupied house built in 1910.

The Property is approximately 1.5 miles northeast of the City of Corning. Since before 1938 the Property has been occupied by a house on a small rural road surrounded by woodlands. The land on top of the hill to the east of the Property was used for agricultural fields until sometime in the 1960's, when they reverted to woodland. By 1970, a light-colored material became apparent on the Property in a small area just south of the house; no access road could be discerned from the photo. By 1976, the light-colored area was slightly expanded.

NYSDEC provided photographs taken at the Property depicting apparent glass and potential demolition-type debris. Historic aerial photos of the Property identify an area of potential disturbance within the Property boundary to the south of the house and east of the road.

1.2 Project Description and Scope

Characterization activities are being implemented on the Property. The scope of work is intended to gather sufficient data to:

- Characterize the material observed by NYSDEC.
- Evaluate the potential presence of wetlands on the Property in the vicinity of the area of apparent disturbance.
- Evaluate the potential presence of surface water on the Property in the vicinity of the area of apparent disturbance.
- Conduct a property survey.

Anticipated On-Site Work Dates: Field activities will commence approximately two weeks following receipt of access from the property owner. It is anticipated that the field activities will be completed within one month (including surveying).

Potential Hazards: The material has not been identified or sampled, but NYSDEC indicated it may contain glass. If so, metals may be present.

Other potential chemical hazards include field instrument calibration gas (isobutylene) from the photoionization detector (PID) used for field screening soils, and preservatives for analytical sample shipment (HCl, H_2SO_4, etc.).

Physical hazards include the possible glass shards, thermal stress; slip, trip, and fall hazards; underground utilities and biological vectors.

See Section 3.0 for a more detailed description of the anticipated chemical and physical hazards.

Anticipated Weather Conditions: It is currently unknown when the field activities would commence. Therefore, thermal stress procedures for both heat exposure and cold stress are included.

1.3 Safety Planning

During the development of this HASP, consideration was given to current standards as defined by the United States Environmental Protection Agency (EPA), OSHA, the American Conference of Governmental Industrial Hygienists (ACGIH), and the National Institute for Occupational Safety and Health (NIOSH). In addition, consideration was given to the health effects for potential site contaminants, and the potential for exposure to unknown substances. Specifically, the following reference sources were consulted:

- *Sax's Dangerous Properties of Industrial Materials*
- *US EPA HASP*
- *OSHA standards for General Industry and Construction (29 CFR 1910 and 29 CFR 1926)*
- *OSHA/NIOSH/EPA/USCG Occupational Health and Safety Guidelines*
- *NIOSH Pocket Guide to Chemical Hazards (2007)*
- *ACGIH Threshold Limit Values (2012)*
- *Genium Publishing Corp, Genium's Reference Collection, MSDS's*
- *Patty's Industrial Hygiene and Toxicology*
- *Merck Index*

This site-specific HASP includes the following subjects:

- Health and safety organization
- Hazard evaluation
- Personal protective equipment
- Exposure monitoring
- Site control
- Decontamination procedures
- Communication procedures
- Medical surveillance requirements
- Training requirements
- Emergency procedures
- HASP review and modification
- HASP approval

2.0 HEALTH AND SAFETY ORGANIZATION

The following personnel are designated to carry out the stated job functions for both on-site and off-site activities. (NOTE: One person may carry out more than one job function.)

Project Manager:	Mr. Brian Steffes, P.G.
Field Team Leader:	Mr. David Gaviglia
Site Health and Safety Officer:	Mr. David Gaviglia
Field Team Members:	To be determined
On-site Contractors:	Surveyor – to be determined

Project Manager - The Michael Baker Project Manager has the responsibility to ensure that the elements of the Property Characterization are implemented in a safe and healthy manner in accordance with this HASP. The Project Manager has the authority to suspend field activities if employees are in danger of injury or exposure to harmful agents. In addition, the Project Manager is responsible for:

- Designating a Site Health and Safety Officer (SHSO) and other site personnel whom will assure compliance with this HASP.
- Assisting the SHSO with development of this HASP.
- Reviewing and approving the information presented in this HASP.

Site Health and Safety Officer - The SHSO will be responsible for continually evaluating safety on the site and ensuring adherence to the HASP. The SHSO shall also inform all site personnel of the contents of this HASP. The SHSO has authority to modify the existing HASP procedures as conditions warrant. The SHSO will also be responsible for (as necessary) the preparation of daily reports which include the day's events from a health and safety standpoint, for documentation of measurements taken for health and safety purposes, and for reporting accidents and other relevant health and safety. The SHSO also has the immediate authority to suspend field activities if the health or safety of site personnel is endangered, and to audit the subcontractor training, fit testing, and medical surveillance records to verify compliance. The SHSO will also (as necessary):

- Conduct safety toolbox meetings
- Document monitoring/sampling activities
- Report accidents and other relevant health and safety issues
- Assure that monitoring equipment is properly calibrated and properly operated
- Assure compliance with the Michael Baker Standard Operating Procedures (SOPs)

- Manage health and safety equipment, including instruments, respirators, personnel protective equipment (PPE), etc., that is used during field activities

- Confirm emergency response provisions, as necessary, emergency medical care, etc., prior to or during site mobilization activities

- Monitor conditions during field activities to ensure compliance with the HASP and evaluate if more stringent procedures or a higher level of PPE should be implemented and informing the Project Manager.

- Document, as necessary, pertinent information such as accident investigation and reporting, a record of site conditions, personnel involved in field activities, and any other relevant health and safety issues. This information will become part of the official site records.

- Act as the Emergency Coordinator.

Field Team Members will be responsible for:

- Familiarity with the HASP.

- Complying with the contents of the HASP.

- Attending training sessions to review the HASP and staying informed of additional safety and health information.

- Being alert to identified and unidentified hazards and reporting unidentified hazards to the SHSO and Project Manager, as soon as possible.

- Offering suggestions, ideas, or recommendations that may improve or enhance site safety.

- Conducting site activities in an orderly and appropriate manner.

- Reporting accidents/injuries, however minor, to the SHSO as soon as possible.

Subcontractors are responsible for:

- Complying with Michael Baker's HASP as it relates to their work activities.

- Complying with the site-specific and facility specific Plans.

- Complying with all OSHA regulations relevant to their work.

- Obtaining the appropriate training, fit testing, and medical surveillance requirements under 29 CFR 1910.120, 1926.65, and 1910.134 and providing copies of this documentation to the SHSO prior to or during site mobilization.

- Having a competent safety monitor on site.

- Complying with the medical surveillance and training requirements as outlined in Sections 8.0 and 9.0, respectively, and providing their own PPE that meets or exceeds the level of protection as outlined in this HASP.

3.0 HAZARD EVALUATION

Potential health and safety hazards are summarized in this section. The objective of health and safety planning is to prevent injury and illness, and to meet the requirements of the OSHA General Industry standards (29 CFR 1910) and Construction Industry Standards (29 CFR 1926). The SHSO is tasked to continually observe site activities, and to identify potential health and safety concerns not described in this HASP. In addition, all site workers shall use the buddy system. The buddy system is a means of organizing employees into work groups in such a manner that each employee of the work group is designated to be observed by at least one other employee in the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

3.1 Hazard Analysis by Task

Potential hazards according to task are summarized in Table 3-1, Potential Hazards by Task.

TABLE 3-1
POTENTIAL HAZARDS BY TASK*

Tasks	Chemical Exposure	Noise	Sharp Objects	Falling and Flying Objects	Slip, Trip, and Fall	Overhead/ Under-ground Utilities(1)	Hazardous Flora and Fauna	Fire/ Explosion	Heat Stress	Cold Stress
Site Survey	M	L	L	L	M	L	M	L	M	M
Mobilization/ Demob.	L	L	L	L	M	L	M	L	M	M
Soil Sampling	M	M	M	L	M	L	L	L	M	M
Groundwater Sampling	M	L	L	L	M	L	M	L	M	M
Wetland/Stream Evaluation	M	L	L	L	H	L	M	L	M	M

Notes:

L = Indicates that the presence and/or risk of the potential hazard for that task is low

M = Indicates that the presence and/or risk of the potential hazard for that task is moderate

H = Indicates that the presence and/or risk of the potential hazard for that task is high

(1) = Clearance of underground utilities shall be obtained prior to soil sampling activities

* These ratings are based on information prior to commencement of on-site activities. If additional information or site conditions warrant changes to these ratings, the site SHSO shall make appropriate changes in the field following concurrence with the Project Manager and the PHSO.

3.2 Chemical Hazards

Although their presence is unknown, potential chemical hazards observed at similar facilities and which may be encountered on the site include those identified in Table 3-2. Table 3-2 contains the 8-hour Time Weighted Average (TWA), OSHA Permissible Exposure Limit (PEL), NIOSH Recommended Exposure Limit (REL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV), or other exposure standards (i.e. Ceiling values, Short Term Exposure Limits (STEL), Immediately Dangerous to Life and Health (IDLH) values.

TABLE 3-2
CHEMICAL HAZARDS

Chemical	Media	Regulatory Exposure Limits
Arsenic	Surface Soil	PEL TWA – 0.01 mg/m^3
Cadmium	Surface Soil	PEL TWA – 5 mg/m^3
Lead	Surface Soil	PEL TWA – 0.05 mg/m^3
Nickel	Surface Soil	PEL TWA – 1 mg/m^3
Alconox	Decontamination Agent	TLV TWA (total dust) – 10 mg/m^3
Isobutylene	PID Calibration Gas	**No established exposure limits;** 10% LEL = 0.18% (1,800 ppm)

VOCs are not anticipated to be present at the site. Exposure to elevated concentrations of VOCs may cause irritation to the eyes, nose, throat, and respiratory tract and can be toxic to the central nervous system. In general, inhalation of VOCs can cause headache, nausea, difficulty in breathing, loss of consciousness, or death. Monitoring for these compounds will be conducted using a photoionization detector (PID). Monitoring procedures for VOCs are described in Section 5.0.

Direct contact with decontamination agents (Alconox) can cause irritation of the eyes and skin.

3.3 Physical Hazards

Common physical hazards anticipated at the project site include:

- Glass Cullet (sharp)
- Cold Stress
- Heat Stress
- Slips, Trips, and Falls
- Underground Utilities
- Hazardous Flora and Fauna

3.3.1 Cold Stress

The following cold stress procedures are provided for buddy monitoring purposes. Site personnel must realize that monitoring the physical condition of fellow personnel wearing PPE in Modified Level D and Level C will be more difficult.

3.3.1.1 Prevention

To prevent conditions from occurring, have personnel:

- Dress in a minimum of three layers.
- A skin layer to absorb moisture and keep skin dry
- An insulating layer
- An outer layer of nylon wind-breaking material or chemical-protective layer
- Avoid touching cold surfaces (especially metal) with bare skin, minimize exposed skin surfaces.
- Keep active, use warm and dry shelter areas during rest cycles, use wind breaks whenever possible.
- Maintain body fluids by consuming warm, sweet, caffeine-free, nonalcoholic drinks.
- Avoid alcohol and medications that interfere with normal body regulation or reduce tolerance to cold.

3.3.1.2 Caring for Cold-Related Illness

The need to seek medical attention and the urgency to seek medical attention depends on the symptoms and the severity of the symptoms displayed by the affected individual. If the latent conditions of hypothermia or frostbite are noted or suspected, medical attention must be sought IMMEDIATELY to prevent permanent injury or death.

The following lists the general guidelines to care for cold-related injuries:

- Start by treating any life-threatening problems.
- Call the local emergency number for help or transport the victim to the nearest hospital.
- Move the victim to a warm place, if possible.
- Remove any wet clothing and dry the victim.

- Warm the victim slowly by wrapping in blankets or putting on dry clothing.

DO NOT:

- Rub the frostbitten part.
- Use ice, snow, or anything cold on the frostbitten area.
- Use heat lamps or hot water bottles to rewarm the frostbitten area.
- Place the frostbitten area near a hot stove.

3.3.1.3 Monitoring

In cold weather, monitor the outdoor temperature and wind speed to determine wind chill conditions, with work periods adjusted accordingly. The following table details the wind chill effects and relative danger of combined cold and wind conditions. It is important to note that the wearing of PPE in cold environments may introduce the possibility of heat stress; therefore, symptoms of heat stress also should be considered during monitoring.

WIND CHILL CHART(1)

Temperature (ºF)

Wind (mph)	Calm	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	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
	50	26	19	12	4	-3	-20	-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 occurs in 15 minutes or less

Wind Chill (ºF) = $35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$

where: T = Air Temperature (ºF)

V = Wind Speed (mph)

(1) Source: National Weather Service, 11/01/01

3.3.2 Heat Stress

It is anticipated that heat exposure may be a concern when daily high temperatures in the summer may reach the 90s (degrees Fahrenheit). The following heat stress causes and symptoms are provided for buddy-monitoring:

- Heat rash results from continuous exposure to heat or humid air.

- Heat cramps result from heavy sweating and inadequate fluid intake. Symptoms include muscle spasms and pain in the hands, feet, and abdomen.

- Heat exhaustion occurs when body organs attempt to keep the body cool because of inadequate fluid intake and when personnel are not acclimated to the heat. Symptoms include pale, cool, moist skin; heavy sweating; and dizziness.

- Heat stroke is the most serious form of heat stress. It is a MEDICAL EMERGENCY. Symptoms are red, hot, dry skin; lack of perspiration; nausea; dizziness and confusion; strong rapid pulse rate; and coma.

The need to seek medical attention depends on the severity of the symptoms displayed by the affected individuals. If heat stroke is noted or suspected, medical attention must be sought IMMEDIATELY. Efforts should be taken to cool the body to prevent severe injury or death. Excessive cooling can cause hypothermia and should be avoided.

The following practices will be observed to reduce the potential for heat stress. This is especially important for personnel wearing semi-permeable or impermeable protective outerwear when there is an ambient air temperature greater than 16° C (61° F):

- Work-rest intervals
- Regular fluid intake
- Increased awareness of heat stress symptoms and buddy monitoring
- Self-monitoring of urine output quantities and color to prevent dehydration

Personnel will take breaks, as necessary, and water or electrolyte replacement drinks will be available in the support zone. Fluid intake should be increased during rest schedules to prevent dehydration. Drinking cool water is best. However, diluted electrolyte solutions (e.g., Gatorade) can be substituted for water. Alcoholic beverages will not be used for hydration.

The SHSO will monitor personnel for signs and symptoms of heat stress and will take appropriate actions if signs or symptoms are identified.

The following table includes the heat exposure screening criteria for acclimatized workers wearing long-sleeved shirt and pants. Exposures which exceed these screening criteria will receive further evaluation.

ACTION LEVEL FOR HEAT EXPOSURE

Work Rest Regimen	Work Load			
	Light	Moderate	Heavy	Very Heavy
75% to 100% work each hour	28°C (82°F)	25°C (77°F)	*	*
50% to 75% work each hour	28.5°C (83.3°F)	26°C (78.8°F)	24°C (75.2°F)	*
25% to 50% work each hour	29.5°C (85.1°F)	27°C (80.6°F)	25.5°C (77.9°F)	24.5°C (76.1°F)
0% to 25% work each hour	30°C (86°F)	29°C (84.2°F)	28°C (82.4°F)	27°C (80.6°F)

Notes: Temperatures are in degrees C, Wet Bulb Globe Temperature. Source: ACGIH Threshold Limit Values for Chemical Substances and Physical Agents, 2012, Page 206, Table 2.
* For very heavy work with less than 25% rest per hour, a detailed analysis or physiological monitoring should be used.

3.3.3 Explosion and/or Fire

In general, explosion and fire are possible from the ignition of trapped flammable vapors.

The Project Manager or SHSO will train site personnel in the proper use of portable fire extinguishing equipment. Site personnel should respond to fires as follows:

- Evacuate all personnel
- Call the fire department
- If the fire is small or confined, authorized personnel may attempt to fight the fire with portable fire extinguishers
- Provide information regarding site activities, hazards, and missing personnel to fire department personnel as needed

In the event of an explosion, all site personnel will evacuate the area. The fire department will be summoned to fight fires and to rescue personnel. Support will be provided as appropriate.

3.3.4 Environmental Sample Collection

Environmental samples will be collected in accordance with the Work Plan and SOPs (Attachment B of the Work Plan). Standard sample labeling, preservation, transportation, and chain-of-custody procedures will be followed. Hazards generally associated with soil sampling include:

- Contact (dermal and inhalation) with contaminants, potentially in high concentrations in sampling media

- Back strain and muscle fatigue due to lifting techniques
- Contact with sample bottle preservatives
- Contact with cleaning solutions
- Cuts from broken glass
- Loud noises

Sample collection will be conducted using Modified Level D personal protective equipment (work clothes, safety glasses, hard hat, steel-toed boots, hearing protection) to minimize the potential for dermal exposure.

Periodic monitoring of the breathing space will be conducted during sample collection activities using the same PID as designated for soil field screening operations.

Proper lifting techniques will be employed to minimize back strain.

3.3.5 Underground and Overhead Utilities

Michael Baker shall make notification to the Dig Safely, New York one-call utility locating service a minimum of two working days (not including the day of call) and not more than 10 days prior to breaking ground. If underground utilities are identified, the ground surface above the utility lines will be physically marked with spray paint or flags of the appropriate color, as outlined below. No intrusive work will occur within 24-inches of marked underground utilities.

The generally accepted uniform color code for underground utilities is:

- Red - Electric power lines, cables, conduit and lighting cables
- Yellow - Gas, oil, steam, petroleum, or gaseous materials
- Orange - Communication, alarm or signal lines, cables or conduits
- Blue - Water, irrigation, and slurry lines
- Green - Sewers and drain lines
- White - Proposed excavation or boring

The location of all overhead power sources should also be assessed.

4.0 PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS BY TASK

4.1 Levels of Protection

Levels of protection are outlined in Table 4-1:

TABLE 4-1
LEVELS OF PROTECTION

Job Task	Level of Protection	Criterion
Soil Sample Collection	Modified Level D	PID ≤ 5 ppm above background
Groundwater Sample Collection	Level D	PID ≤ 5 ppm above background
Wetland and Stream Evaluation/ Sie Survey	Level D	NA

Personal protective ensembles are described below. The ensembles apply to the Exclusion Zone only.

Level D

- Normal work clothes or coveralls with high visibility vests
- Safety glasses with side shields or goggles (ANSI approved)
- Work shoes/boots
- Work gloves if necessary

Modified Level D

- Tyvek coveralls with high visibility vests
- Steel toe work shoes/boots (ANSI approved)
- Hard hat (ANSI approved)
- Nitrile or other chemical resistant gloves
- Safety glasses with side shields or goggles (ANSI approved)
- Hearing protection if necessary (e.g., drilling)

Level C

- Tyvek coveralls with high visibility vests
- Half face air purifying respirator with organic vapor cartridges
- Steel toe work shoes/boots (ANSI approved)
- Hard hat (ANSI approved)
- Nitrile or other chemical resistant gloves
- Safety glasses with side shields or goggles (ANSI approved)

Changes to the specified levels of protection shall be at the direction of the SHSO and the project manager. The level of protection provided by the personal protective equipment (PPE) shall be upgraded or downgraded based upon a change in site conditions or findings of investigations. Other indicators of the need for reassessment may include the following:

- Commencement of a new work phase, such as the start of work in a different portion of the site
- Change in job tasks during a work phase
- Change of season or weather
- Contaminants other than those previously identified are encountered
- Change in ambient levels of contaminants
- Change in work scope that affects the degree of contact with contaminants

5.0 EXPOSURE MONITORING

5.1 Exposure Limits

Exposure limits are presented in Table 3-2, and the health effects are summarized following the table. These exposure limits are applicable to all project activities. OSHA Permissible Exposure Limits (PELs) and Action Levels (ALs), NIOSH Recommended Exposure Levels (RELs), and ACGIH Threshold Limit Values (TLVs) are based on 8-hour time weighted average exposures. Short term exposure limits (STELs), ceiling values, or unusual work shift exposure limits are based on various exposure durations. Site worker exposures will be controlled to levels below the PEL or TLV.

5.2 General Monitoring Procedures

This section covers personal air monitoring for field personnel. A community air monitoring plan is included as Attachment C to the Work Plan.

The following air monitoring instruments will be used during project activities:

- PID with 10.6 electron volt (eV) lamp
- Dust monitor (PM10)

5.2.1 Photoionization Detectors

VOCs will be monitored using the PID.

An initial site survey will be conducted using the instruments prior to the commencement of any work and each time a sample is collected at a new location. Additional scans may be performed as follows:

- At an early indication of potential contamination and/or safety concerns
- Within the "breathing zone" of on-site personnel to assess if a change in the level of personal protective equipment is required
- Downwind from the sampling activities to assess if there is off-site migration of any contaminants.

During the above activities, monitoring will be performed at the discretion of the SHSO. The PID shall be calibrated at the beginning of each day with an isobutylene reference standard and when the instrument produces suspect readings. All calibration procedures shall be documented and shall include date; time; instrument make, model, and serial number; calibration gas type and concentration; and the name of the individual calibrating the instrument.

If at any time the PID reading in the breathing zone of site personnel ranges from 5.1 to 50 ppm above background for more than one continuous minute, all work will cease, and site personnel will upgrade to Level C protection. Work may continue after the PPE upgrade has occurred.

If at any time the PID reading in the breathing zone of site personnel exceeds 50 ppm above background for more than one continuous minute, all work will cease, the area will be evacuated, access to the area will be restricted, and the Project Manager will be consulted. **NYSDEC and NYSDOH must also be notified immediately.** A tabulated summary of the air monitoring requirements and action levels is presented in Table 5-1.

Air monitoring for the substances listed under "other" in Table 3.2 will not be conducted. These substances will be used infrequently and in a controlled manner that is unlikely to result in exposures in excess of the PELs.

5.2.2 Dust Monitors

The principal particle size of concern at the investigation area is PM10. Air monitoring will be conducted with a MiniRam or equivalent device, which is capable of detecting PM10 in air.

The dust meter will be field checked (zeroed) daily in accordance with the manufacturer's specifications, which are provided in the operation manual. Record field check data in the field logbook.

5.3 Action Levels

The following is a summary of personal air monitoring to be conducted at the investigation area.

TABLE 5-1
AIR MONITORING ACTION LEVELS

Potential Contaminants of Concern	Air Monitoring Instrument	Reading/PPE Level/Action	
		Reading*	**PPE Level/Action**
VOCs	PID	PID < 5 ppm	Modified Level D
		PID 5.1-50 ppm	Level C
		PID > 50 ppm	Cease Operations, evacuate and restrict access to area, consult with Project Manager, notify NYSDEC and NYSDOH immediately
Dust	MiniRam	$\leq$ 50 mg/m^3	Continue working
		> 50 mg/m^3 (at sampling location or perimeter and sustained for 5 minutes)	Implement additional dust control measures
		> 150 mg/m^3 (at sampling location or perimeter and sustained for 5 minutes)	Operations will cease until adequate control measures are identified and implemented, notify NYSDEC and NYSDOH immediately

***** Reading above background for at least one continuous minute

Air monitoring will be conducted at least every 30 minutes, or more frequently if odors are observed by the field crew. Maintenance and calibration and field checks of all air monitoring equipment will be performed in accordance with manufacturer recommendations. Further details regarding community air monitoring are provided in the community air monitoring plan (Attachment C to the Work Plan).

6.0 SITE CONTROL

The Site Manager is designated to coordinate access control and security at the site. Perimeters will be established, as necessary, according to the Site Boundary procedures described in Section 6.2.

A site control program is used to control the activities and movement of people and equipment at hazardous waste sites in order to minimize the potential for worker exposure to hazardous substances. The requirements of 29 CFR 1910.120 and 1926.65 require that an appropriate site control program be developed prior to the implementation of response operations. Since the majority of the work will be conducted within a remote access area, site control requirements may be modified at the discretion of the Site Manager.

6.1 Work Zones and Site Office

The purpose of establishing work zones is to:

- Reduce the accidental spread of hazardous substances by workers or equipment from the contaminated areas to the clean areas

- Confine work activities to the appropriate areas, thereby minimizing the likelihood of accidental exposure

- Facilitate the location and evacuation of personnel in case of an emergency

6.2 Site Boundaries

Control boundaries between the Exclusion Zones or (the contaminated areas), the Contamination Reduction Zone (CRZ), and the Support Zone (clean area) will be designated as follows:

- Exclusion Zone: Areas where contamination is known or suspected to occur and the greatest potential for exposure exists. Exclusion Zones will be established around the backhoe and drill rig / Geoprobe. Construction barrier tape or some other movable barrier may be used to delineate the Exclusion Zone if the potential for breathing zone impact is imminent. The tape or barrier, if used, will be placed around the equipment at a distance of at least 20 feet in all directions.

- Hotline: The boundary between the Exclusion Zone and the CRZ. The hotline separates the area of contamination from the rest of the site. The Hotline may be marked with barrier tape or some other barrier. During site operations, the boundary may be modified and adjusted as more information becomes available.

- CRZ: The area between the Exclusion Zone and Support Zone (located upwind of the site activities). A CRZ is required for all activities conducted in Modified Level D and higher levels of personal protective equipment. All entry into and exit from the Exclusion Zones shall be through the CRZ.

- Contamination Control Line: The boundary between the CRZs and the Support Zone.

- Support Zone: Designated clean area of the site.

Eating, drinking, smoking, chewing gum or tobacco, and application of cosmetics are prohibited in the Exclusion Zone and the CRZ.

Bottled drinking water will be supplied. Due to the short duration of the field activities, portable toilets will not be provided. Personnel will be allowed to leave the site (after removal of potentially contaminated clothing) for restroom breaks as needed.

All containers of hazardous materials received on-site will be inspected to ensure that they are clearly labeled as to the contents; that the appropriate hazard warnings are included on the container; and that the name and address of the manufacturer is listed. Safety Data Sheets (SDSs) must accompany each type of hazardous material. Copies of SDSs shall be provided to the SHSO or Site Manager and shall be maintained with the HASP. All secondary containers will be labeled with either an extra copy of the original manufacturer's label or generic labels which have a block for identity and blocks for the hazard warnings.

7.0 DECONTAMINATION PROCEDURES

7.1 Site Decontamination

Personnel and equipment leaving the Exclusion Zone shall be thoroughly decontaminated as necessary. The following protocols shall be used for the decontamination station in the Contaminant Reduction Zone according to the level of protection as follows:

Level C

1. Equipment drop
2. Hard hat and safety glasses removal
3. Nitrile glove removal and disposal
4. Respirator removal
5. Hand and face wash
6. Respirator cleaning and sanitation

Modified Level D

1. Equipment drop
2. Hard hat and safety glasses removal
3. Nitrile glove removal and disposal
4. Hand and face wash

The following decontamination equipment is required, and will be provided at the decontamination (Decon) station:

- Plastic garbage bags for used PPE
- Personal wash and rinse station (to include soap, tap/spring water, and disposable towels)
- Respirator wash and rinse station (Level C only)

7.2 Emergency Decontamination

Emergency decontamination will include the following stations:

Level C

1. Equipment drop
2. Hard hat and safety goggles removal
3. Glove removal
4. Respirator removal

Modified Level D

1. Equipment drop
2. Hard hat and safety glasses removal
3. Glove removal

If circumstances dictate that contaminated clothing cannot be removed, wrap injured personnel with clean garments, blankets, etc., to avoid contaminating other personnel and transportation equipment. Notify the medical facility that injured personnel have not undergone decontamination.

7.3 Monitoring Instrumentation Decontamination

Instruments taken out of the Exclusion Zone will be decontaminated to ensure that any contaminants will not be brought out of the Exclusion Zone, if the instrument has come into contact with contaminated media. If decontamination is required, the exterior surfaces of the instrument will be wet wiped before the instrument is brought out of the Exclusion Zone.

8.0 MEDICAL SURVEILLANCE REQUIREMENTS

An essential requirement of health and safety planning for hazardous waste site operations is to ensure that project personnel, who might be exposed to materials having potentially adverse health effects, have been medically examined according to their potential exposures, and are medically certified to work on the site and wear personal protective equipment, including respirators. The medical surveillance program must be implemented to establish a medical baseline and to monitor for any symptoms of over-exposure for individuals who participate in site surveys, remedial investigations (RIs), feasibility studies (FSs), and construction phases at hazardous waste sites. The medical surveillance program is intended to determine the individual's ability for performing on-site work, including wearing respiratory protection.

Each individual will receive a medical examination by, or under the direct supervision of, a licensed occupational physician. Standard examination parameters typically include height, weight, vision, temperature, and blood pressure. Medical and occupational histories will also be taken. Other tests that could be conducted, according to the potential exposure and contaminants on-site, include chest X-rays, electrocardiograms (EKGs), pulmonary function tests (PFTs), urine tests, and blood tests.

9.0 TRAINING REQUIREMENTS

9.1 General Worker Training

OSHA requires that personnel who will work on-site are trained according to the requirements of 29 CFR 1910.120 and 29 CFR 1926.65. Initial training must include 40-hours of classroom work and hands-on field demonstrations. Key points of this training include respirator training, risk assessment, toxicology, chemical reactivity, use of monitoring equipment, downrange work procedures, site safety procedures, levels of personal protection, protective clothing, decontamination, and practical field exercises conducted for personal protection levels A, B, and C.

In addition to the initial training, personnel must attend an annual 8-hour refresher course. The purpose of the refresher course is to ensure that personnel retain the basic knowledge necessary for safe hazardous waste site operations, and to demonstrate proper site health and safety procedures.

9.2 Supervisor Training

Supervisory personnel must attend an 8-hour supervisory training session in addition to the basic 40-hour training described above. The supervisory training is required to ensure that supervisors have the knowledge necessary to understand and implement the elements of the HASP. This training provides instruction in the management aspects of health and safety at hazardous waste sites. The SHSO will be qualified as a supervisor.

9.3 Site Specific Training

Each Michael Baker employee will certify that he/she has reviewed this HASP, and that he/she understands the health and safety precautions to be taken by signing the Site Personnel Log. The Health and Safety Training Records are included on the Site Personnel Log as part of Attachment B. The SHSO will either brief individuals on the contents of this HASP or provide a copy of this HASP for review and be available to answer questions.

Site specific training may consist of an initial health and safety briefing on the following information:

- Names of individuals responsible for site health and safety and methods of communicating safety and health concerns
- Roles and responsibilities of site personnel
- Site-specific health and safety hazards
- Use of PPE
- Work practices by which employees can minimize risk
- The proper and safe use of equipment on site
- Recognition of symptoms and signs of exposure to hazardous materials

- Site control measures
- Decontamination procedures
- Emergency procedures
- Hazardous chemicals brought onto the site, associated hazards, safe handling procedures, and the PPE to be used

10.0 EMERGENCY PROCEDURES

10.1 Responsibilities

The SHSO has the responsibility for ensuring that the provisions of this HASP are adequate and implemented in the field. Changing field conditions may require decisions to be made concerning adequate protection procedures. **The SHSO is also responsible for conducting site inspections on a regular basis to ensure the continuing effectiveness of this HASP.**

The SHSO shall act as the Emergency Coordinator and will be responsible for field implementation of these Emergency Procedures. The Emergency Coordinator is responsible for reacting (not responding) to emergencies. As the Emergency Coordinator, specific duties will include:

- Familiarizing all on-site personnel with the emergency procedures and the emergency coordinators authority
- Identifying the nearest telephone in the event of an emergency
- Communicating site emergency procedures and requirements to all Michael Baker personnel
- Specifying a backup/alternate Emergency Coordinator
- Controlling activities of Michael Baker site personnel and contacting emergency response personnel
- Familiarity with site personnel trained in emergency first aid and Cardiopulmonary Resuscitation (CPR)

All on-site personnel, whether involved in emergency procedures or not, will be notified of their responsibilities by the Emergency Coordinator in an emergency. They will be familiar with the emergency procedures and the Emergency Coordinator's authority.

10.2 Pre-Emergency Planning

During mobilization activities, Michael Baker will contact applicable local emergency response personnel; the information discussed may include:

- A description of site activities
- Anticipated site hazards
- Hazardous chemicals/materials brought on site
- Expected length of time on site
- Specific requirements the emergency response facilities may require

- Confirmation of emergency phone numbers
- Security measures that must be followed by site personnel

10.3 Communication Procedures

Personnel working in any established Exclusion Zone will remain in continual communication with the SHSO or will conduct activities within sight of the SHSO, or his/her representative. Verbal (voice) communication will be the primary method of communication. Two-way radios, visual signals, and/or an air horn may also be used.

Verbal instruction will be the primary signal used to alert all personnel that there is an emergency. If an air horn is used, one long or continuous air horn blast will be used to alert all personnel that there is an emergency. Unless otherwise directed, all personnel will leave the Exclusion Zone. A cellular phone will be used to contact emergency service personnel, if necessary.

When voice communications are not feasible or appropriate, the following standard hand signals will be used:

- Hand gripping throat: Can't breathe
- Grip partner's wrist or both hands around waist: Leave area immediately
- Hands on top of head: Need assistance
- Thumbs up: OK, I am all right, I understand
- Thumbs down: No, negative

If an air horn is used, the following audible signals will be used as appropriate:

- 1 Long or continuous blast: Emergency
- 1 Short blast: Attention: stop and gather at a predetermined point
- 2 Short blasts: All's clear

If voice communication and hand signals are not feasible, the SHSO will identify the site activities that can continue without communication, if any.

Coordination between on-site personnel is the responsibility of the SHSO. The best means for securing the lines of communication will be determined prior to start-up by on-site project personnel. The SHSO will have a cellular phone on site for immediate communication/access to emergency response agencies.

10.4 Assembly Area

In the event of an emergency, personnel will be instructed to meet at a predetermined location. At this location, emergency needs will be provided, such as:

- First aid for injured personnel
- Decontamination material
- Communications

10.5 Emergency Medical Care - Hospital Directions

The closest hospital to the site is Guthrie Corning Hospital, 1 Guthrie Drive, Corning, NY 14830. It is located approximately five miles from the site. Directions to the hospital are as follows:

- Go south on Van Etten Road to College Avenue
- Turn left on College Avenue, go 0.5 mi to Main Street and turn left
- Go 0.6 mi to East Corning Road (Rte 352)
- Turn right on East Corning Road (Rte 352), go approximately 2 miles
- Hospital is on the left

The following emergency equipment must be available on site:

- Emergency eyewash station
- Soap, tap/spring water, and towels to wash, rinse, and dry exposed skin.
- First aid kit compliant with ANSI Z308.1-1998, Minimum Requirements for Workplace First Aid Kits
- Fire extinguishers (Type A, B, C)

10.6 Emergency Phone Numbers

A list of emergency phone numbers is presented in Table 10-1 on following page:

TABLE 10-1
EMERGENCY PHONE NUMBERS

Agency/Facility	Phone Number	Contact
Hospital	607-937-7200	Response Operator
Ambulance	911	Response Operator
Police	911	Response Operator
Fire	911	Response Operator
EPA National Response Center	(800) 424-8802	Response Operator
Project Manager (Michael Baker)	(412) 398-0191	Brian Steffes
Site Health and Safety Officer (Michael Baker)	(724) 462-5697	David Gaviglia
Field Team Leader (Michael Baker)	(724) 462-5697	David Gaviglia

10.7 General Emergency Procedures

The SHSO shall be notified of any on-site emergencies and shall be responsible for ensuring that the appropriate procedures are followed. The Site Manager is responsible for providing or obtaining immediate medical attention for medical emergencies. The following standard emergency procedures will be used by on-site personnel.

Personnel Injury in the Exclusion Zone: Upon notification of an injury in the Exclusion Zone, all site personnel shall assemble at the location designated by the Site Manager. The SHSO (or the senior individual certified in First-Aid and CPR) will evaluate the nature of the injury and ensure that injured personnel are decontaminated according to Section 7.2. If injuries are not serious or life threatening, affected personnel may be transported by other site personnel to the local medical facility, if necessary. Emergency medical response personnel will be contacted in the event of serious or multiple injuries. Medical personnel will be provided with all available information regarding the nature of the incident, chemicals involved, etc. Instances requiring treatment beyond "First Aid" will be reported to the Project Manager within 24 hours.

Fire/Explosion: Upon notification of a fire or explosion on-site, all site personnel shall assemble at the location designated by the SHSO. The fire department shall be summoned, and all personnel shall be moved to a safe distance from the involved area according to procedures identified above. Upon the arrival of the fire department, the SHSO will advise the fire commander of the location, nature, and identification of the hazardous materials on-site. If it is safe to do so, site personnel may fight a small localized fire with on-site fire extinguishing equipment, and/or remove or isolate flammable or other hazardous materials which might contribute to the fire.

PPE Failure: If site workers experience failure or alteration of PPE that adversely affects protection, they shall immediately exit the area. Re-entry shall not be permitted until the equipment has been repaired or replaced, and the SHSO has determined that the appropriate PPE level has been restored.

Other Equipment Failure: If any other equipment on site fails to operate properly, the SHSO shall be notified, and he (they) shall determine the effect of the failure on continuing operations safely. If the failure adversely affects the safety of site workers, or prevents the completion of project tasks safely, all personnel shall exit the area until the situation has been evaluated and appropriate corrective actions have been taken.

In all situations, when an on-site emergency results in evacuation of the area, personnel shall not re-enter until the following conditions have been met:

- The conditions resulting in the emergency have been corrected
- The hazards have been re-assessed, and adjustments in PPE have been specified as needed
- This HASP has been reviewed and amended as needed
- Site personnel have been briefed on changes to this HASP

10.8 General First-Aid Procedures

The following first-aid procedures will be used initially in response to exposure to chemicals, or if the site worker demonstrates difficulty:

- Eye Exposure: Remove contact lenses (if applicable). If solid or liquid material gets into eyes, wash the eyes immediately with potable water for a minimum of 15 minutes. Be sure that the injured person keeps his/her eyes open to flush under his/her eye lids as well as flush his/her eyes directly. Seek medical attention immediately after the eye wash.
- Skin Exposure: If solid or liquid material gets onto the skin, wash the affected area immediately with soap and water. If the material penetrated protective clothing, remove and dispose of the protective clothing prior to washing. Seek medical attention if dermatitis is evident or if the material can be absorbed through intact skin.
- Ingestion: If solid or liquid material is ingested, immediately notify the medical treatment facility. Do not induce vomiting unless directed to do so by a physician. Seek medical attention immediately.
- Respiratory Difficulty: If the site worker experiences difficulty breathing, move the affected person to fresh air. Administer artificial respiration if necessary. Seek medical attention immediately.

Injured or affected personnel will be decontaminated as described in Section 7.2. If decontamination is not possible or feasible, the injured person will be transported to the medical treatment facility

wrapped in clean garments or blankets. The transport vehicle will be protected with polyethylene sheeting, and the medical treatment facility officials will be notified that a potentially contaminated casualty is in transit. The SHSO will assist the medical officials by preparing them to receive the casualty, by giving advice in appropriate protective equipment and procedures, and by assisting in clean-up after treatment is completed.

10.9 Injury Reporting

A Michael Baker Incident Reporting and Investigation Form will be completed for all injuries and/or near misses. The Project Manager, SHSO, and employee are to complete the form. Invoices for work related injuries are to be sent to the address below and noted "work related injury":

Michael Baker International, Inc.
Attn: Benefits Coordinator
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

Avoid using group medical insurance cards. Questions may be directed to (412) 269-4667.

10.10 Severe Weather

All activities shall cease in the event of an electrical storm. All workers shall seek an indoor shelter (e.g., car, truck).

10.11 Medical Training

First-aid and/or CPR will be provided by qualified, certified individuals. The SHSO and at least one other Michael Baker employee will be qualified in first aid and CPR. More definitive medical care will be provided by the medical facility designated for emergency medical care.

10.12 Spill Response Plan

In the unlikely event of a spill of decontamination solutions, the spilled material shall be contained as soon as possible, and any excess liquids shall be collected. Procedures to recover soils or other surfaces that were affected by the spilled decontamination solution shall be determined following a review of its potential to cause contamination (i.e., through sampling residual decontamination solution or other knowledge). Subcontractors bringing equipment onsite will be required to provide a spill response plan for accidental discharge of equipment or investigation fluids.

11.0 HEALTH AND SAFETY PLAN (HASP) REVIEW AND MODIFICATION

This HASP is a "living document". It is intended to reflect the anticipated site conditions during the Characterization and the best professional judgement of Michael Baker's health and safety professionals, Project Manager, and other contributing individuals. When the SHSO observes health and safety situations that have not been addressed in this HASP, or the planning appears to be inadequate, the SHSO shall notify the Project Manager for guidance. Best health and safety judgement will be used on site until the problem is resolved and the HASP amended. Amendments will be provided to the Project Manager and the SHSO.

All site personnel will have read this HASP, will have been briefed by the SHSO on its contents, and will be familiar with its provisions. Acceptance and understanding of this HASP will be documented by site personnel by completion and signature on the attached Appendix B.

12.0 HASP APPROVAL

This HASP has been reviewed by the following Michael Baker personnel prior to field activities.

Mr. Brian Steffes
Project Manager

_____
(Signature)

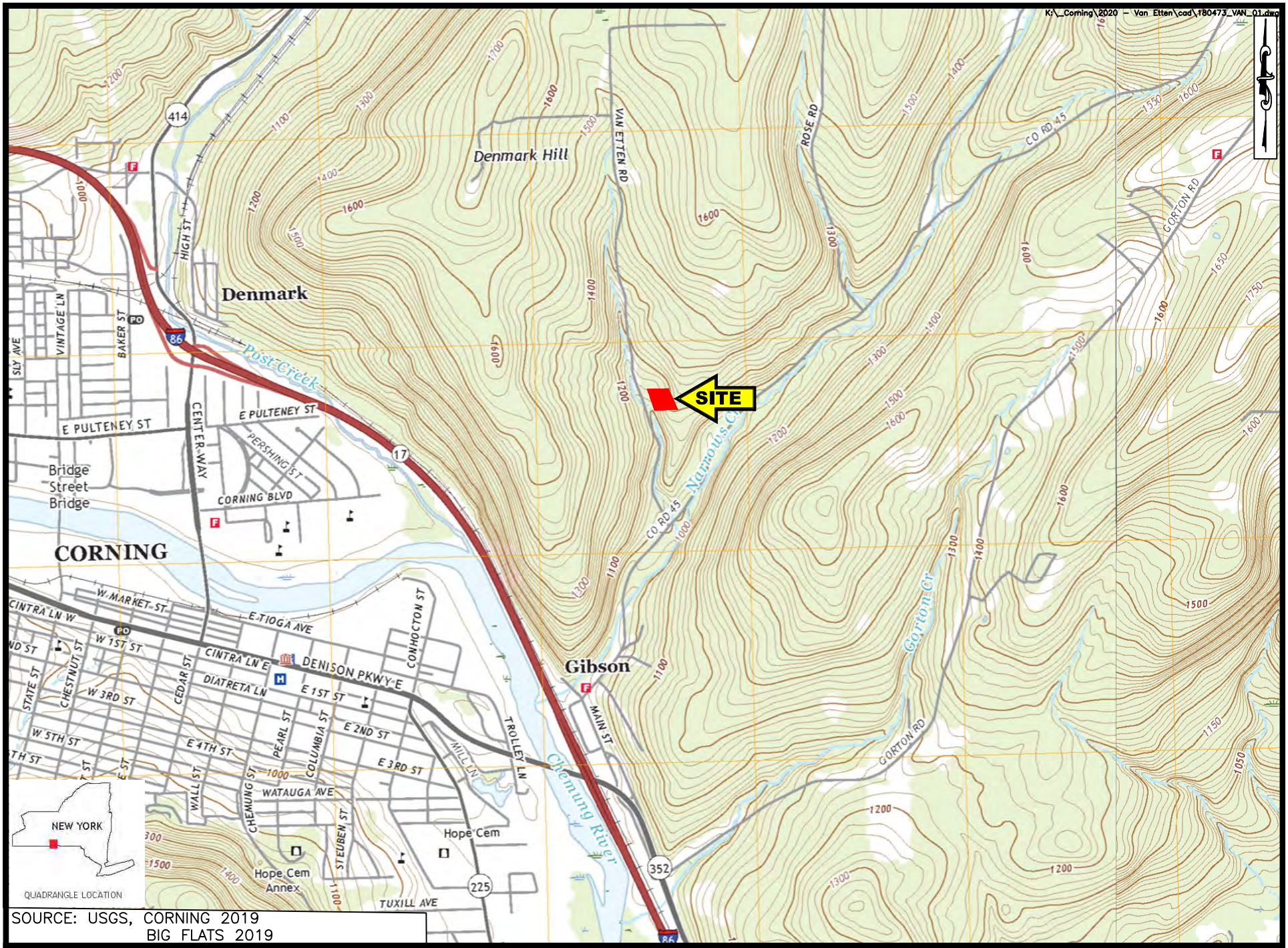
Mr. David Gaviglia
Field Operations Leader
Site Health and Safety Officer

_____
(Signature)

Michael Baker
INTERNATIONAL

ATTACHMENT A

Route to the Hospital

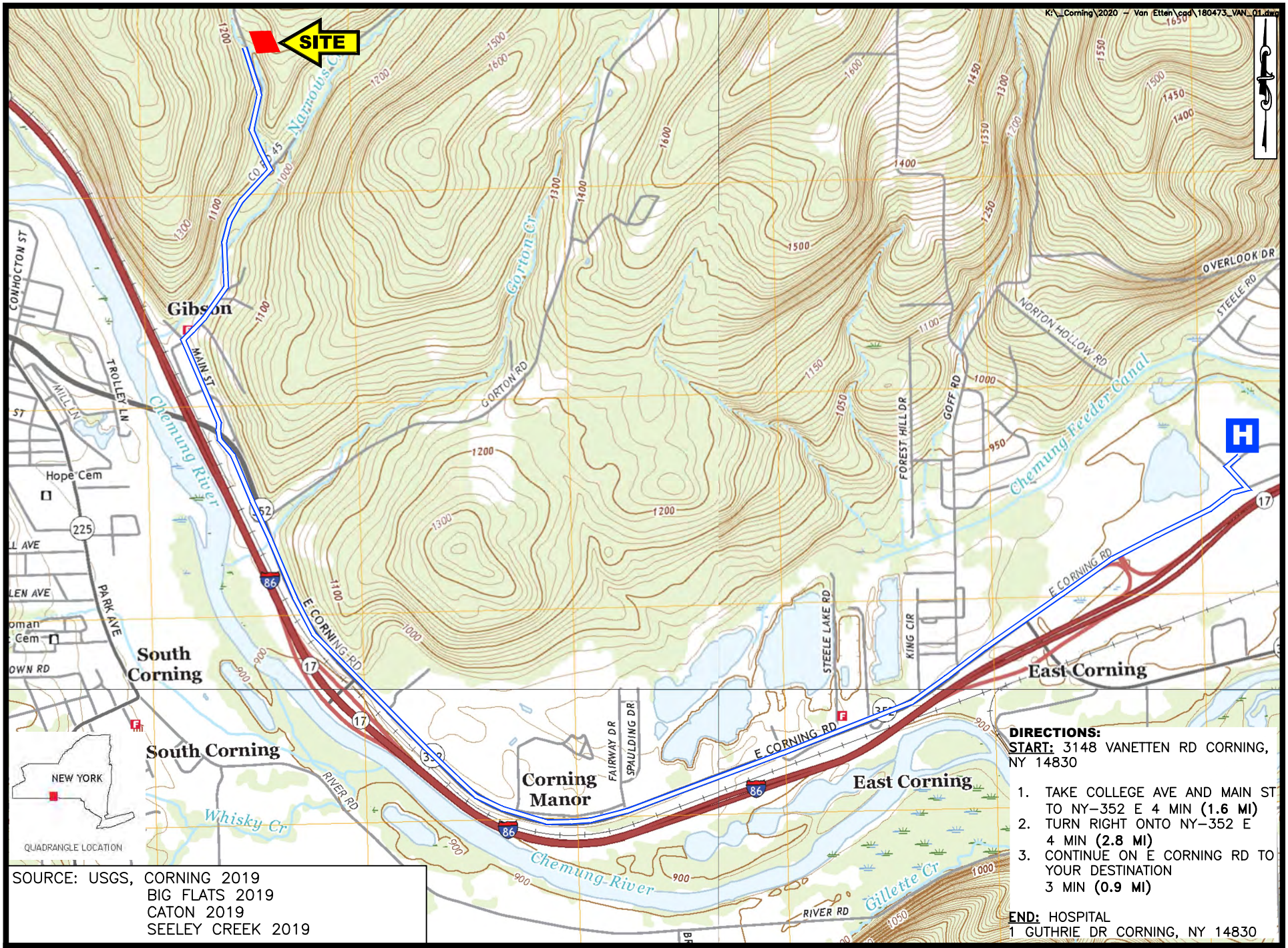


SOURCE: USGS, CORNING 2019
BIG FLATS 2019

SCALE: 0 1000 2000
S.O. NO.: 180473
DSN/DWN: BES/RR
DATE: SEPTEMBER 2020
FILE: 180473_VAN_01
CHK: BES

Michael Baker INTERNATIONAL
MICHAEL BAKER INTERNATIONAL
MOON TOWNSHIP, PENNSYLVANIA

FIGURE 1
SITE LOCATION MAP
VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION
CORNING, NY



SOURCE: USGS, CORNING 2019
BIG FLATS 2019
CATON 2019
SEELEY CREEK 2019

DIRECTIONS:

START: 3148 VANETTEN RD CORNING, NY 14830

1. TAKE COLLEGE AVE AND MAIN ST TO NY-352 E 4 MIN **(1.6 MI)**
2. TURN RIGHT ONTO NY-352 E 4 MIN **(2.8 MI)**
3. CONTINUE ON E CORNING RD TO YOUR DESTINATION 3 MIN **(0.9 MI)**

END: HOSPITAL
1 GUTHRIE DR CORNING, NY 14830

SCALE:	0 1000 2000	DATE:	SEPTEMBER 2020
S.O. NO.:	180473	FILE:	180473_VAN_01
DSN/DWN:	BES/RR	CHK:	BES

Michael Baker INTERNATIONAL
MICHAEL BAKER INTERNATIONAL
MOON TOWNSHIP, PENNSYLVANIA

HOSPITAL ROUTE MAP
VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION
CORNING, NY

Michael Baker
INTERNATIONAL

ATTACHMENT B

Site Personnel Log

DECLARATION OF HEALTH AND SAFETY PLAN REVIEW

All site personnel indicated below have reviewed and are familiar with this HASP developed for the Van Etten Road Property in Corning, New York.

(Name-Print)	(Company)
(Signature)	(Date/Time)
(Name-Print)	(Company)
(Signature)	(Date/Time)
(Name-Print)	(Company)
(Signature)	(Date/Time)
(Name-Print)	(Company)
(Signature)	(Date/Time)
(Name-Print)	(Company)
(Signature)	(Date/Time)

Michael Baker
INTERNATIONAL

ATTACHMENT C

Safety Data Sheets

ALCONOX MSDS

Section 1 : MANUFACTURER INFORMATION

Product name: Alconox

Supplier: Same as manufacturer.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Supplier MSDS date: 2009/04/20

D.O.T. Classification: Not regulated.

Section 2 : HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE
497-19-8	7-13	SODIUM CARBONATE	NOT AVAILABLE	4090 MG/KG RAT ORAL 6600 MG/KG MOUSE ORAL	2300 MG/M3/2H RAT INHALATION 1200 MG/M3/2H MOUSE INHALATION
7722-88-5	10-30	TETRASODIUM PYROPHOSPHATE	5 MG/M3	4000 MG/KG RAT ORAL 2980 MG/KG MOUSE ORAL	NOT AVAILABLE
7758-29-4	10-30	SODIUM PHOSPHATE	NOT AVAILABLE	3120 MG/KG RAT ORAL 3100 MG/KG MOUSE ORAL >4640 MG/KG RABBIT DERMAL	NOT AVAILABLE

Section 2A : ADDITIONAL INGREDIENT INFORMATION

Note: (supplier).
CAS# 497-19-8: LD50 4020 mg/kg - rat oral.
CAS# 7758-29-4: LD50 3100 mg/kg - rat oral.

Section 3 : PHYSICAL / CHEMICAL CHARACTERISTICS

Physical state: Solid

Appearance & odor: Almost odourless.
White granular powder.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): Not applicable.

Vapour density (air=1): Not applicable.

By weight: Not available.

Evaporation rate (butyl acetate = 1): Not applicable.

Boiling point (°C): Not applicable.

Freezing point (°C): Not applicable.

pH: (1% aqueous solution).
9.5

Specific gravity @ 20 °C: (water = 1).
0.85 - 1.10

Solubility in water (%): 100 - > 10% w/w

Coefficient of water\oil dist.: Not available.

VOC: None

Section 4 : FIRE AND EXPLOSION HAZARD DATA

Flammability: Not flammable.

Conditions of flammability: Surrounding fire.

Extinguishing media: Carbon dioxide, dry chemical, foam.
Water
Water fog.

Special procedures: Self-contained breathing apparatus required.
Firefighters should wear the usual protective gear.

Auto-ignition temperature: Not available.

Flash point (°C), method: None

Lower flammability limit (% vol): Not applicable.

Upper flammability limit (% vol): Not applicable.

Not available.

Sensitivity to mechanical impact: Not applicable.

Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.

Rate of burning: Not available.

Explosive power: None

Section 5 : REACTIVITY DATA

Chemical stability: Stable under normal conditions.

Conditions of instability: None known.

Hazardous polymerization: Will not occur.

Incompatible substances: Strong acids.
Strong oxidizers.

Hazardous decomposition products: See hazardous combustion products.

Section 6 : HEALTH HAZARD DATA

Route of entry: Skin contact, eye contact, inhalation and ingestion.

Effects of Acute Exposure

Eye contact: May cause irritation.

Skin contact: Prolonged contact may cause irritation.

Inhalation: Airborne particles may cause irritation.

Ingestion: May cause vomiting and diarrhea.
May cause abdominal pain.
May cause gastric distress.

Effects of chronic exposure: Contains an ingredient which may be corrosive.

LD50 of product, species & route: > 5000 mg/kg rat oral.

LC50 of product, species & route: Not available for mixture, see the ingredients section.

Exposure limit of material: Not available for mixture, see the ingredients section.

Sensitization to product: Not available.

Carcinogenic effects: Not listed as a carcinogen.

Reproductive effects: Not available.

Teratogenicity: Not available.

Mutagenicity: Not available.

Synergistic materials: Not available.

Medical conditions aggravated by exposure: Not available.

First Aid

Skin contact: Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.

Eye contact:
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

Inhalation: Remove victim to fresh air.
Seek medical attention if symptoms persist.

Ingestion: Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.
Do not induce vomiting, seek immediate medical attention.

Section 7 : PRECAUTIONS FOR SAFE HANDLING AND USE

Leak/Spill: Contain the spill.
Recover uncontaminated material for re-use.
Wear appropriate protective equipment.
Contaminated material should be swept or shoveled into appropriate waste container for disposal.

Waste disposal: In accordance with municipal, provincial and federal regulations.

Handling procedures and equipment: Protect against physical damage.
Avoid breathing dust.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Launder contaminated clothing prior to reuse.

Storage requirements: Keep containers closed when not in use.
Store away from strong acids or oxidizers.
Store in a cool, dry and well ventilated area.

Section 8 : CONTROL MEASURES

Precautionary Measures

Gloves/Type:

Neoprene or rubber gloves.

Respiratory/Type:

If exposure limit is exceeded, wear a NIOSH approved respirator.

Eye/Type:

Safety glasses with side-shields.

Footwear/Type: Safety shoes per local regulations.

Clothing/Type: As required to prevent skin contact.

Other/Type: Eye wash capability should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

LIQUINOX MSDS

Section 1 : PRODUCT AND COMPANY IDENTIFICATION

Chemical family: Detergent.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Supplier: Same as manufacturer.

Product name: Liquinox

Section 2 : INGREDIENT INFORMATION

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/K MOUS ORAL	NOT AVAILABLE

Section 3 : HAZARD IDENTIFICATION

Route of entry: Skin contact, eye contact, inhalation and ingestion.

Effects of acute exposure

Eye contact: May cause irritation.

Skin contact: Prolonged and repeated contact may cause irritation.

Inhalation: May cause headache and nausea.

Ingestion: May cause vomiting and diarrhea.
May cause gastric distress.

Effects of chronic exposure: See effects of acute exposure

Section 4 : FIRST AID MEASURES

Skin contact: Remove contaminated clothing.
Wash thoroughly with soap and water.
Seek medical attention if irritation persists.

Eye contact: Check for and remove contact lenses.
Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.

Inhalation: Remove victim to fresh air.
If irritation persists, seek medical attention.

Ingestion: Do not induce vomiting, seek medical attention.
Dilute with two glasses of water.
Never give anything by mouth to an unconscious person.

Section 5 : FIRE FIGHTING MEASURES

Flammability: Not flammable.

Conditions of flammability: Surrounding fire.

Extinguishing media: Carbon dioxide, dry chemical, foam.
Water
Water fog.

Special procedures: Self-contained breathing apparatus required.
Firefighters should wear the usual protective gear.
Use water spray to cool fire exposed containers.

Auto-ignition temperature: Not available.

Flash point (°C), method: None

Lower flammability limit (% vol): Not applicable.

Upper flammability limit (% vol): Not applicable

Explosion Data

Sensitivity to static discharge: Not available.

Sensitivity to mechanical impact: Not available.

Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.

Rate of burning: Not available.

Explosive power: Containers may rupture if exposed to heat or fire.

Section 6 : ACCIDENTAL RELEASE MEASURES

Leak/Spill: Contain the spill.
Prevent entry into drains, sewers, and other waterways.
Wear appropriate protective equipment.
Small amounts may be flushed to sewer with water.
Soak up with an absorbent material.
Place in appropriate container for disposal.
Notify the appropriate authorities as required.

Section 7 : HANDLING AND STORAGE

Handling procedures and equipment: Protect against physical damage.
Avoid breathing vapors/mists.
Wear personal protective equipment appropriate to task.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Avoid extreme temperatures.
Launder contaminated clothing prior to reuse.

Storage requirements: Store away from incompatible materials.
Keep containers closed when not in use.

Section 8 : EXPOSURE CONTROLS / PERSONAL PROTECTION

Precautionary Measures

Gloves/Type:

Wear appropriate gloves

Respiratory/Type: None required under normal use.

Eye/Type:

Safety glasses recommended

Footwear/Type: Safety shoes per local regulations.

Clothing/Type: As required to prevent skin contact.

Other/Type: Eye wash facility should be in close proximity.
Emergency shower should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

Exposure limit of material: Not available.

Section 9 : PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Liquid.

Appearance & odor: Odourless.
Pale yellow.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): @ 20°C (68°F).
17

Vapour density (air=1): >1

Volatiles (%)

By volume: Not available.

Evaporation rate (butyl acetate = 1): < 1.

Boiling point (°C): 100 (212F)

Freezing point (°C): Not available.

pH: 8.5

Specific gravity @ 20 °C: (water = 1).
1.083

Solubility in water (%): Complete.

Coefficient of water\oil dist.: Not available.

VOC: None

Chemical family: Detergent.

Section 10 : STABILITY AND REACTIVITY

Chemical stability: Product is stable under normal handling and storage conditions.

Conditions of instability: Extreme temperatures

Hazardous polymerization: Will not occur.

Incompatible substances: Strong acids.
Strong oxidizing agents.

Hazardous decomposition products: See hazardous combustion products.

Section 11 : TOXICOLOGICAL INFORMATION

LD50 of product, species & route: > 5000 mg/kg rat oral.

LC50 of product, species & route: Not available.

Sensitization to product: Not available.

Carcinogenic effects: Not listed as a carcinogen.

Reproductive effects: Not available.

Teratogenicity: Not available.

Mutagenicity: Not available.

Synergistic materials: Not available.

Section 12 : ECOLOGICAL INFORMATION

Environmental toxicity: No data at this time.

Environmental fate: No data at this time.

Section 13 : DISPOSAL CONSIDERATIONS

Waste disposal: In accordance with local and federal regulations.

Section 14 : TRANSPORT INFORMATION

D.O.T. CLASSIFICATION: Not regulated.

Special shipping information: Not regulated.

Section 15 : REGULATORY INFORMATION

Canadian Regulatory Information

WHMIS classification: Not controlled.

DSL status: Not available

USA Regulatory Information

SARA hazard catagories sections 311/312: Immediate (Acute) Health Hazard: No.
Delayed (Chronic) Health Hazard: No.
Fire Hazard: No.
Sudden Release of Pressure: No.
Reactive: No.

SARA Section 313: None

TSCA inventory: All components of this product are listed on the TSCA inventory.

NFPA

Health Hazard: 1

Flammability: 0

Reactivity: 0

HMIS

Health Hazard: 1

Flammability: 0

Physical hazard: 0

PPE: A

Section 16 : OTHER INFORMATION

Supplier MSDS date: 2006/07/14

Data prepared by: Global Safety Management
3340 Peachtree Road, #1800
Atlanta, GA 30326

Phone: 877-683-7460
Fax: (877) 683-7462

Web: www.globalsafetynet.com
Email: info@globalsafetynet.com.

General note: This material safety data sheet was prepared from information obtained from various sources, including product suppliers and the Canadian Center for Occupational Health and Safety.

Scott Specialty Gases

AIR LIQUIDE

Material Safety Data Sheets
MSDS No: 115-11-7
Date: 07/23/2008

SUPPLIER ADDRESS: 6141 Easton Road, Bldg. 1
PO Box 310
Plumsteadville, PA 18949-0310

EMERGENCY PHONE NUMBER: (215) 766-8861

1. CHEMICAL PRODUCT

PRODUCT NAME: ISO-BUTYLENE

SYNONYMS: Isobutene, 2-Methylpropene

2. COMPOSITION, INFORMATION ON INGREDIENTS

				Exposure Limits (PPM)			
Ingredient Name	Formula	CAS #	Concentration	ACGIH TLV	OSHA PEL	MAC	Other STEL
ISO-BUTYLENE	C4H8	115-11-7	99+%	250	NE	NE	NE

Note: NE = NONE ESTABLISHED S/A = SIMPLE ASPHYXIANT

3. HAZARD INDENTIFICATION

* * * EMERGENCY OVERVIEW * * *
Flammable liquid and gas under pressure
Can form explosive mixtures with air.
May cause frostbite.

POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY: Inhalation

ACUTE EFFECTS: Inhalation may cause asphyxiation due to dilution of available oxygen in the air.Symptoms include rapid respiration, muscular incoordination, fatigue, nausea, vomiting, unconsciousness, and death.Liquid may cause frostbite.

CHRONIC EFFECTS: None known

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None known

OTHER EFFECTS OF OVEREXPORSURE: None

CARCINOGENICITY (US ONLY):

NTP - No
IARC MONOGRAPHS - No
OSHA REGULATED - No

4. FIRST AID MEASURES

INHALATION: Immediately remove victim to fresh air.If breathing has stopped, give artificial respiration.If breathing is difficult, give oxygen.

EYE CONTACT: None

SKIN CONTACT If frostbite occurs, flush affected areas with lukewarm water.

INGESTION: None

IN EVENT OF EXPOSURE, CONSULT A PHYSICIAN

NOTE TO PHYSICIAN: None

5. FIRE FIGHTING MEASURES

FLASH POINT: -76 deg.C

AUTOIGNITION TEMPERATURE: 465 deg.C

FLAMMABLE LIMITS: Vol.%

LOWER: 1.8
UPPER: 9.6

EXTINGUISHING MEDIA. Carbon dioxide, foam, or dry chemical.

SPECIAL FIRE FIGHTING INSTRUCTION AND EQUIPMENT: Wear self-contained breathing apparatus and full protective clothing.Flammable, high pressure liquid and gas.Keep fire exposed cylinders cool with water spray Move cylinders away from fire if this can be done safely.

HAZARDOUS COMBUSTION PRODUCTS: Toxic carbon monoxide may be given off during combustion.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors may travel a considerable distance to the source of ignition and flash back.May form explosive mixture in air.Cylinder rupture may occur under fire conditions.

6. ACCIDENTAL RELEASE MEASURES

CLEAN UP PROCEDURES: Evacuate and ventilate area.Remove leaking cylinder to exhaust hood or safe outdoor area.Shut off source if possible and remove source of heat.Allow gas to dissipate.

SPECIALIZED EQUIPMENT: None

7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING: Secure cylinder when using to protect from falling.Use suitable hand truck to move cylinders.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store in well ventilated areas.Keep valve protection cap on cylinders when not in use.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to maintain concentrations below flammable limits and to avoid asphyxiation.

EYE / FACE PROTECTION: Safety glasses

SKIN PROTECTION Protective gloves to prevent contact with cold equipment.

RESPIRATORY PROTECTION: In case of leakage, use self-contained breathing apparatus.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless

ODOR: Unpleasant

PHYSICAL PRESSURE: Gas

VAPOR PRESSURE: @21 1 deg.C: 39 psig

VAPOR DENSITY (AIR=1): 1 98

BOILING POINT (C): -6.9

SOLUBILITY IN WATER: Insoluble

SPECIFIC GRAVITY (H2O=1): Gas

EVAPORATION RATE: Gas

ODOR THRESHOLD: N/Av

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal storage conditions.

CONDITIONS TO AVOID: Storage in poorly ventilated areas.Storage near a heat source.

MATERIALS TO AVOID: Oxidizing agents.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION: Toxic carbon monoxide.

11. TOXICOLOGICAL INFORMATION

LETHAL CONCENTRATION (LC50): 500,000 ppm, Rat 1 hour.

LETHAL DOSE 50 (LD50): N/Ap

TERATOGENICITY: N/Ap

REPRODUCTIVE EFFECTS: N/Ap

MUTAGENICITY: N/Ap

12. ECOLOGICAL INFORMATION

No adverse ecological effects are expected.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Dispose of non-refillable cylinders in accordance with federal, state and local regulations. Allow gas to vent slowly to atmosphere in an unconfined area or exhaust hood. If the cylinders are the refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.Empty cylinders will contain hazardous residue.

14. TRANSPORT INFORMATION

CONCENTRATION: 99+%

DOT DESCRIPTION (US ONLY):

PROPER SHIPPING NAME: Isobutylene, liquefied
HAZARD CLASS: 2.1 (flammable)
INDENTIFICATION NUMBER: UN1055
REPORTABLE QUANTITIES: None
LABELING: FLAMMABLE GAS

ADR / RID (EU Only): Class 2, 2F

SPECIAL PRECAUTIONS: Cylinders should be transported in a secure upright position in a well ventilated truck.

15. REGULATORY INFORMATION

OSHA. Process Safety Management: Material is not listed in appendix A of 29 CFR 1910.119 as highly hazardous chemical.

TSCA. Material is listed in TSCA inventory.

SARA. The threshold planning quantity for material is 10,000 lbs.

EU NUMBER: 204-066-3

NUMBER IN ANNEX 1 OF DIR 67/548: Material is listed in annex 1

EU CLASSIFICATION: N/Av

R: 13

S: 9-16-33

16. OTHER INFORMATION

OTHER PRECAUTIONS: Protect containers from physical damage. Do not deface cylinders or labels. Cylinders should be refilled by qualified producers of compressed gas. Shipment of a compressed gas cylinder which has not been filled by the owner or with his written consent is a violation of federal law (49 CFR).

ABBREVIATIONS: N/Ap - Not Applicable N/Av - Not Available SA - Simple Asphyxiant NE - None Established

Michael Baker
INTERNATIONAL

ATTACHMENT D

COVID-19 Mitigation Plan

Michael Baker INTERNATIONAL 80 YEARS Making a Difference

"…the strength of the Pack is the Wolf, and the strength of the Wolf is the Pack…"

MICHAEL BAKER INTERNATIONAL

COVID-19 MITIGATION PLAN FOR FIELD PROJECTS

REVISION TABLE

Edition	**Revision**	**Date**	**Summary of Changes**	**Approval**
1	0	03/25/20	Initial issuance	MJG
2	0	04/13/20	Document modified to incorporate the latest COVID-19 guidance and direction.	MJG
3	0	4/23/20	Document modified to incorporate the latest COVID-19 guidance and direction.	MJG
3	1	4/29/20	- Addition of COVID-19 Mitigation Plan Disclaimer - Modification of Compliance of this Plan - Addition of Pandemic Safety Officer - Modification to the use of face shields and Tyvek Suits - Correction to Attachment A	MJG
3	2	6/8/20	- Addition of Table of Contents - Negative Test statements on Pgs. 17, 18 & 20 - Travel to a CDC Risk 3 Areas statements on Pgs. 18 & 20 - Revision to Attachment A	MJG
3	3	7/14/20	- Addition of Travel Guidelines for Returning To Work on Pgs. 20-21 - Elimination of CDC Risk 3 Area statements - Revisions to Attachment A	MJG
3	4	8/14/20	- Revision Documentation Table moved to Pg. 2 - Table of Contents renumbered - Elimination of list of U.S. states that are Designated Hot Spots on Pgs. 20-21 - Addition of link to Designated Hot Spots Pg. 21 - Page number references adjusted on Attachment A. - Edit to Question #4 of Attachment A.	MJG

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INTRODUCTION TO PLAN

This Plan outlines procedures and guidelines for field employees of Michael Baker to follow in effort to stay safe from and mitigate the spread of the COVID-19 virus while performing routine tasks on all project sites. This Plan is not intended to replace or modify the CDC Guidelines, applicable OSHA requirements, or orders of applicable governmental authorities, including individual state orders. This Plan applies to all Michael Baker Field Personnel and is to be included in the Health and Safety Plan as an Appendix. Ask your manager should you have any questions regarding whether or not this plan applies to you.

COVID-19 MITIGATION PLAN DISCLAIMER

This Plan has been developed as a part of a cohesive strategy to mitigate the spread of the Novel Coronavirus (COVID-19). It is a collection of guidelines and best practices for individuals to follow and adhere to as a part of an overall mitigation approach. The Plan does not constitute an acceptance of additional responsibility for safety of the jobsite, which is controlled by the series of contracts that govern this project. By maintaining this Plan, Michael Baker is not guaranteeing or representing that a job-site exposure to COVID-19 will not occur – such a guarantee or representation would not be possible given the currently understood nature of the Novel Coronavirus that can be carried by asymptomatic individuals. As such, although Michael Baker is adopting this Plan as a part of its mitigation strategy, it disclaims responsibility for the spread of COVID-19 on the jobsite.

NON-COMPLIANCE OF THIS PLAN

This COVID-19 Mitigation Plan is to be followed by all Michael Baker employees on any project sites, along with our subcontractors, our clients, and our visitors (collectively referred to as "Michael Baker Team Members" or "Team Members").

The following guidelines will be followed when non-compliance with this Mitigation Plan is discovered on the project:

1) All Michael Baker Team Members must report all non-compliance with this Mitigation Plan, when detected, to the Designated Michael Baker Representative.
2) Designated Michael Baker Representative will document all detected non-compliance and report it to the Project Manager.
3) Designated Michael Baker Representative will review this Mitigation Plan with all Team Members who are found to be in non-compliance with the Mitigation Plan and will emphasize the specific protocols and procedures that the given Team Member was detected to be in non-compliance with.
4) Any Michael Baker Team Member who continues to be detected in non-compliance with this Mitigation Plan will be subject to disciplinary action, up to removal from the project.

Designated Michael Baker Representative

All projects will have a Designated Michael Baker Representative who is responsible for implementing and administering this COVID-19 Mitigation Plan.

Designated Michael Baker Representative for this project:

Name: _____ Title: _____

Pandemic Safety Officer

Name: Matthew Guard, CSP, ASP
Title: Corporate Health and Safety Director
Contact Number: Office: (412) 375-3005 Cell: (724) 777-3048

SAFETY PROTOCOLS TO COMBAT COVID-19 ON PROJECT SITES

In a further effort to guide Michael Baker field employees and Michael Baker Team Members from the possible spread of the COVID-19 virus on job sites, the following protocols and procedures have been developed and must be followed in addition to the CDC and OSHA guidelines.

Training/Communication of Plan to Michael Baker Team Members

- The protocols of this COVID-19 Mitigation Plan will be relayed to all Michael Baker employees of this project daily, and whenever there are updates/revisions to the plan.
- All subcontractors and visitors will be trained on all protocols of the plan when they begin work on the site, each day, and whenever there have been any updates/revisions to the plan. Subcontractors will be treated as Michael Baker Team Members and will be a part of the Daily Meetings.

Daily Meetings

Pre-shift meetings will take place daily, during which COVID-19 virus updates will be relayed and processes discussed. The Designated Michael Baker Representative will be responsible for holding the Daily Meeting.

1) Meetings will be conducted by the Designated Michael Baker Representative from the project trailer/office.
2) Project trailer/office will contain only critical personnel. Follow current CDC guidelines.
3) The balance of the team will assemble outside the trailer/office accessing the meeting via phone, while maintaining Social Distancing guidelines.
4) All updates regarding COVID-19 will be communicated to the project team.
5) All safety pre-cautions in place to combat COVID-19 on project site will be reviewed (ex: Infection Mitigation/Social Distancing Guidelines, Equipment Management, PPE, etc.).
6) All designated contaminated waste trash cans, on-site water basins, on-site hand sanitizer dispensers will be identified.
7) Designated Michael Baker Representative will review checklist (See Attachment A) with individual Team Members, via phone, to ensure that all have personal working equipment (iPads, Laptops, Tape Measures, Writing Utensils, Other Materials).
8) Designated Michael Baker Representative will review checklist (See Attachment A) with individual Team Members, via phone, to ensure that all have all required Personal Protective Equipment (PPE), *INCLUDING HAND SANITIZER AND DISINFECTANT WIPES,* with them on-site. Ensure that all PPE has been inspected and is safe for use.
9) Any Team Member without the required PPE (*when available)* will be removed from project site and will not be permitted to return until all required PPE (*if available)* has been gathered and brought to project site.
10) Designated Michael Baker Representative will review COVID-19 Questionnaire (See Attachment A) with each Team Member individually, via phone. Any Team Member that answers "yes" to any of the questions on the questionnaire, must follow the applicable protocols

identified in this plan. Please reference the Return To Work Protocols (found on Pgs. 20-21) for when a Team Member can return to work.

- *The COVID-19 Questionnaire (Attachment A) is both Mandatory and Confidential. Refer to* ***ATTACHMENT B*** *of this Mitigation Plan for guidelines on dealing with employees that refuse to complete the COVID-19 Questionnaire, along with maintaining the confidentiality of the document.*

- **Use this link to find other means of Disinfectants for combatting COVID-19:**

  https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2

Designated Trash Receptacle

There will be at least one Designated Trash Receptacle on-site to which all potentially contaminated materials must be discarded.

1) Designated Trash Receptacle will be located near job trailer/office and marked accordingly.
2) Designated Trash Receptacle will be lined and used solely for used and potentially contaminated disinfectant wipes, paper towels, protective gloves, tissues, surgical masks, etc.
3) All discarded materials must be in a tied trash bag prior to being deposited into Designated Trash Receptacle.
4) Ensure that lid is placed on Designated Trash Receptacle after use.
5) Designated Trash Receptacle will be emptied and cleaned daily by Michael Baker employee.

Infection Mitigation/Social Distancing Guidelines

1) All Team Members on-site must maintain 6' of distance between one another.
   - An on-site leader must periodically observe Team Members to ensure that this practice is followed.
2) Frequent and thorough hand washing with soap and warm water in on-site water basin.
   - Wipe handles of water basin with disinfectant wipe after use.
   - Discard disinfectant wipe into Designated Trash Receptacle.
3) Ensure that there are multiple hand sanitizer dispensers (which contain at least 60% alcohol) on site.
4) Ensure that there are disinfectant wipes on-site.
5) Apply hand-sanitizer frequently *and always after completing each task*.
   - Wipe pump dispenser of hand sanitizer with disinfectant wipe after use.
   - Discard disinfectant wipe into Designated Trash Receptacle.
6) Team Members must avoid touching their face.
7) Team Members must avoid all contact greetings (i.e. handshaking).
8) Wipe down all equipment used by multiple individuals after each use with disinfectant wipes (ex: iPads, Laptops, Desks, Tape Measures, Other Miscellaneous Equipment, workstations).
   - Discard disinfectant wipe into Designated Trash Receptacle.
9) Team Members on project sites are not permitted to share any used instruments. This includes: Cell phones, iPads, Laptops, vehicles, workstations.

10) Do not use common water cooler. Provide individual water bottles/Gatorade/etc. or instruct individual to bring their own.
11) Team Members must practice proper respiratory etiquette, and cover all coughs, sneezes, etc.

https://www.cdc.gov/healthywater/hygiene/etiquette/coughing_sneezing.html

- After using respiratory etiquette, Team Members must thoroughly wash their hands with soap and warm water in the on-site water basin and then must apply hand sanitizer to their hands. https://www.cdc.gov/healthywater/hygiene/hand/handwashing.html
- Team Members must then wipe handles of water basin and pump of hand sanitizer with disinfectant wipe.
- Team Members must discard used disinfectant wipe into Designated Trash Receptacle.

Equipment Management

1) All Team Member equipment (iPad, Laptop, Cell Phone, Writing Utensils, Tape Measures, other miscellaneous equipment) must always be in possession of designated user or within the confines of user's fleet or personal vehicle.
2) No Team Member equipment is to be shared for *any reason*.
3) All Team Member equipment AND universal equipment (ex. Field trailer desks, handles, chairs, SDS Binders, manuals, etc.) must be wiped down with disinfectant wipes after each use.
4) Used disinfectant wipes must be discarded into trash bags and then placed into Designated Trash Receptacle.
5) All Team Members must use protective gloves when utilizing any universal project manuals.
6) Used protective gloves must be discarded into trash bags and then placed into Designated Trash Receptacle.

Fleet/Rental/Personal Vehicles

- See Attachments C and/or D for procedures.
  - *Personal vehicles being utilized for work-related purposes will be directed to follow the Corporate Fleet Vehicles: COVID-19 Cleaning Process* ***(Attachment C)***.

Hotel/Travel

- See Attachment E for procedures.

Lunch Procedures

To help prevent contracting the virus, all food must be consumed within the confines of Team Member's fleet vehicle/rental/personal vehicle. NO COMMUNAL FOOD SHALL BE PERMITTED ON THE JOBSITE UNTIL FURTHER NOTICE (i.e., donuts, pizza, buffets, etc.).

1) Follow procedures of Attachments C and/or D.
2) After consumption of lunch, wipe down steering wheel, dashboard, gear shift, all controls with disinfectant wipes before and after use of vehicle.
3) Used disinfectant wipe should be discarded into trash bag within vehicle.

4) Trash bag must be discarded into Designated Trash Receptacle.

Personal Protective Equipment (PPE)

1) Wear protective masks (preferably N95*, but cloth mask at a minimum) ***at all times***.

   * Any Michael Baker employee looking for a reasonable accommodation to any requirements contained in this Mitigation Plan should contact their Human Resources Business Partner, along with the Health & Safety Department.

   ** It is a recommended practice to wear **face shields**, in addition to **N95** protective masks, when forced to work within 6' of another worker.*

   See Attachment F for Proper Donning & Doffing of Protective Masks.

   - All used masks must be discarded into designated trash can *when no longer practical for use*.
   - If provided, clean face shields with disinfectant wipes before and after each use.
   - Used disinfectant wipe should be discarded into trash bag, and then into Designated Trash Receptacle.

2) If weather permits, wear full-body Tyvek suit on project site when forced to work within 6' of another worker.
   - Used full-body Tyvek suits should be discarded into trash bag, and then into Designated Trash Receptacle.
3) Wear protective gloves on project site *as much as possible*.
   - All used gloves must be discarded into Designated Trash Receptacle.
4) Wear long-sleeve shirts on-site for extra protection against skin absorption.
5) All personnel on-site must be in possession of their own PPE (ex: Hard Hats, Safety Glasses, Hi-Visibility Vests, etc.) at all times.
6) Team Members *MUST NOT* share any Personal Protective Equipment with other personnel.

Material Deliveries/Paper Transfer

1) Anyone arriving on-site for deliveries or other purposes must be made aware of the COVID-19 Mitigation Plan in place.
2) One Michael Baker employee is to collect all delivery tickets or other paper documents when they arrive.
3) Gloves will be worn whenever paper documents must be handled.
4) Place all paper documents into a sealable container or bag and quarantine for a minimum of 24 hours.
5) Michael Baker employee in charge of obtaining paper documents will communicate all information from documents to Designated Michael Baker Representative in charge of Project.
6) When signatures are necessary, all on-site personnel must use their own writing utensil.

Field Office Cleaning

***The following guidelines are to be followed if/when Michael Baker is working out of a Field Office on-site.**

1) Michael Baker employee cleans all work surfaces, doorknobs, light switches and other commonly accessed surfaces with disinfectant wipes.
   - Discard disinfectant wipes into trash bag.
   - Discard trash bag into Designated Trash Receptacle.
2) Maintain a record of cleaning dates/times **(See Attachment G).**
3) Personnel is not to have any materials (paper products, equipment, books, etc.) in the Field Office when cleaning is being performed, to avoid contact.
4) Ask Owner to approve an owner directed change relating to increasing the frequency of the professional cleaning of the Field Office.

SAFETY PROTOCOLS TO COMBAT COVID-19 ON PROJECT SITES (Limited or Unavailable PPE due to Supply Restrictions)

In a further effort to guide Michael Baker field employees and Michael Baker Team Members from the possible spread of the COVID-19 virus on job sites with limited or unavailable PPE, the following protocols and procedures have been developed and must be followed in addition to the CDC and OSHA guidelines.

Training/Communication of Plan to Michael Baker Team Members

- The protocols of this COVID-19 Mitigation Plan will be relayed to all Michael Baker employees of this project daily, and whenever there are updates/revisions to the plan.
- All subcontractors and visitors will be trained on all protocols of the plan when they begin work on the site, each day, and whenever there have been any updates/revisions to the plan. Subcontractors will be treated as Michael Baker Team Members and will be a part of the Daily Meetings.

Daily Meetings

Pre-shift meetings will take place daily, during which COVID-19 updates will be relayed and processes discussed. The Designated Michael Baker Representative will be responsible for holding the Daily Meeting.

1) Meetings will be conducted outside the project trailer/office with Team Members maintaining 6' of distance between one another.
2) All updates regarding COVID-19 will be communicated to the project team.
3) All safety pre-cautions in place to combat COVID-19 on project site will be reviewed (ex. Infection Mitigation/Social Distancing Guidelines, Equipment Management, PPE, etc.)
4) All designated contaminated waste trash cans, on-site water basins, on-site hand sanitizer dispensers will be identified.
5) Designated Michael Baker Representative will review checklist (See Attachment A) with individual Team Members to ensure that all have personal working equipment (iPads, Laptops, Tape Measures, Writing Utensils, Other Materials).
6) Designated Michael Baker Representative will review checklist with individual Team Members to determine what PPE (INCLUDING HAND SANITIZER AND DISINFECTANT WIPES) is available to them on site. Ensure that all PPE has been inspected and is safe for use. Based on limited PPE, or if certain PPE is unavailable, the leader will instruct the Team Members on the required alternatives to perform their work as listed in the sections below.
7) Designated Michael Baker Representative will review COVID-19 Questionnaire (See Attachment A), via phone, with each Team Member individually. Any Team Member that answers "yes" to any questions on the questionnaire must follow the applicable protocols identified in this plan. Please reference the Return To Work Protocols (found on Pgs. 20-21) for when a Team Member can return to work.

   - *The COVID-19 Questionnaire (Attachment A) is both Mandatory and Confidential. Refer to* ***ATTACHMENT B*** *of this Mitigation Plan for guidelines on dealing with employees that*

refuse to complete the COVID-19 Questionnaire, along with maintaining the confidentiality of the document.

Designated Trash Receptacle

There will be at least one Designated Trash Receptacle on-site to which all potentially contaminated materials must be discarded.

1) Designated Trash Receptacle will be located near job trailer/office and marked accordingly.
2) Designated Trash Receptacle will be lined and used solely for used and potentially contaminated disinfectant wipes, paper towels, protective gloves, tissues, surgical masks, etc.
3) All discarded materials must be in a tied trash bag prior to being deposited into Designated Trash Receptacle.
4) Ensure that lid is placed on Designated Trash Receptacle after use.
5) Designated Trash Receptacle will be emptied and cleaned daily by Michael Baker employee.

Infection Mitigation/Social Distancing Guidelines

1) All Team Members on-site must maintain 6' of distance between one another.
   - An on-site leader must periodically observe Team Members to ensure that this practice is followed.
2) Frequent and thorough hand washing with soap and warm water in on-site water basin.
   - Wipe handles of water basin with disinfectant wipe after use. **If wipes are unavailable, please utilize a solution of bleach and warm water*.**

     **** CDC recommends 1/3 cup bleach per 1-gallon water, or 4 teaspoons per 1-quart water.***

   - Discard disinfectant wipe into designated trash receptacle.
3) Ensure that there are multiple hand sanitizer dispensers (which contain at least 60% alcohol) on site. **If unavailable, direct personnel to hand washing area. Increase quantity of soap availability.**
4) Apply hand sanitizer frequently *and always after completing each task*.
   - Wipe pump dispenser of hand sanitizer with disinfectant wipe (if available) after use.
   - Discard disinfectant wipe into Designated Trash Receptacle.
5) Team Members must avoid touching their face.
6) Team Members must avoid all contact greetings (i.e. handshakes).
7) Wipe down all equipment that are used by multiple Team Members after each use with disinfectant wipes (ex: iPads, Laptops, Desks, Tape Measures, Other Miscellaneous Equipment, workstations). **If wipes are unavailable, please utilize a solution of bleach and warm water* (See # 2 above)**.
8) Team Members on project sites are not permitted to share any used instruments. This includes: Cell phones, iPads, Laptops, vehicles, workstations.
9) Do not use common water cooler. Provide individual water bottles/Gatorade/etc. or instruct individual to bring their own.

10) Team Members must practice proper respiratory etiquette, and cover all coughs, sneezes, etc.

https://www.cdc.gov/healthywater/hygiene/etiquette/coughing_sneezing.html

- After using respiratory etiquette, Team Members must thoroughly wash their hands with soap and warm water in the on-site water basin and then must apply hand sanitizer to their hands.

  https://www.cdc.gov/healthywater/hygiene/hand/handwashing.html

- Team Members must then wipe handles of water basin and pump of hand sanitizer with disinfectant wipe. **If wipes are unavailable, please utilize a solution of bleach and warm water* (See #2 above).**
- Team Members must discard used disinfectant wipe into Designated Trash Receptacle.

Equipment Management

1) All Team Member equipment (iPad, Laptop, Cell Phone, Writing Utensils, Tape Measures, other miscellaneous equipment) must always be in possession of designated user or within the confines of user's fleet or personal vehicle.
2) No Team Member equipment is to be shared for *any reason*.
3) All Team Member equipment AND universal equipment (ex. Field trailer desks, handles, chairs, SDS Binders, manuals, etc.) must be wiped down with disinfectant wipes after each use. **If wipes are unavailable, please utilize a solution of bleach and warm water*.**

   **** CDC recommends 1/3 cup bleach per 1-gallon water, or 4 teaspoons per 1-quart water.***

4) Used disinfectant wipes must be discarded into trash bags and then placed into Designated Trash Receptacle.
5) All Team Members must use protective gloves when utilizing any universal project manuals.
6) Used protective gloves must be discarded into trash bags and then placed into Designated Trash Receptacle.

Fleet/Rental/Personal Vehicles

- See Attachments C and/or D for procedures.
  - *Personal vehicles being utilized on a project for work-related purposes will be directed to follow the Corporate Fleet Vehicles: COVID-19 Cleaning Process* ***(Attachment C)****.*

Hotel/Travel

- See Attachment E for procedures.

Lunch Procedures

To help prevent contracting the virus, all food must be consumed within the confines of Team Member's fleet/rental/personal vehicle. NO COMMUNAL FOOD SHALL BE PERMITTED ON THE JOBSITE UNTIL FURTHER NOTICE (i.e., donuts, pizza, buffets, etc.).

1) Follow procedures of Attachments C and/or D.
2) After consumption of lunch, wipe down steering wheel, dashboard, gear shift, all controls with disinfectant wipes before and after use of vehicle. **If wipes are unavailable, please utilize a solution of bleach and warm water*.**

   **** CDC recommends 1/3 cup bleach per 1-gallon water, or 4 teaspoons per 1-quart water.***

3) Used disinfectant wipe should be discarded into trash bag within vehicle.
4) Trash bag must be discarded into Designated Trash Receptacle.

Limited or Unavailable PPE Due to Supply Restrictions

1) Wear cloth masks, at a minimum, on project at all times (*Bandanas or scarfs are permitted when no other cloth options are available*).

   - Cloth masks should be able to be routinely laundered and machine-dried, so that they are not damaged or altered in any way.

2) Continue to perform social distancing with all work tasks, keep a minimum of 6' between people.
3) When tasks require visual inspection, make all attempts to maintain social distancing (i.e.: utilize binoculars, zoom lens on mobile phone or video recorder).
4) When tasks require up close inspection, plan with contractor workers prior to task to have them back away from the area to maintain social distancing. Conduct the task as required without coming into contact or touching any items. Leave the area when complete and maintain social distancing.
5) When Team Member is removed from the area, they are to inform the contractor workers to continue their work as needed.

Material Deliveries/Paper Transfer

1) Anyone arriving on-site for deliveries or other purposes must be made aware of the COVID-19 Mitigation Plan in place.
2) One Michael Baker employee is to collect all delivery tickets or other paper documents when they arrive.
3) Gloves (*any type*) will be worn whenever paper documents must be handled.
4) Place all paper documents into a sealable container or bag and quarantine for a minimum of 24 hours.
5) Michael Baker employee in charge of obtaining paper documents will communicate all information from documents to Designated Michael Baker Representative in charge of Project.
6) When signatures are necessary, all on-site personnel must use their own writing utensil.

Field Office Cleaning

***The following guidelines are to be followed if/when Michael Baker is working out of a field office on-site.**

1) Michael Baker employee cleans all work surfaces, doorknobs, light switches and commonly accessed surfaces with disinfectant wipe.
   - Discard disinfectant wipe into trash bag.
   - Discard trash bag into Designated Trash Receptacle other.

   If wipes are unavailable, please utilize a solution of bleach and warm water*.

   **** CDC recommends 1/3 cup bleach per 1-gallon water, or 4 teaspoons per 1-quart water.***

2) Maintain a record of cleaning dates/times (**See Attachment G**).
3) Personnel is not to have any materials (paper products, equipment, etc.) in the Field Office when cleaning is being performed, to avoid contact.
4) Ask Owner to approve an owner directed change relating to increasing the frequency of the professional cleaning of the Field Office.

SAFETY PROTOCOLS IF COVID-19 IS DETECTED ON A FIELD PROJECT

***Personal Responsibilities**:

1) Any Team Member that tests Positive for COVID-19 ***MUST NOTIFY*** Designated Project Representative, and **NOT** report to work.
2) Any Team Member that comes in close contact with someone that tests Positive for COVID-19 or comes in close contact with someone who has exhibited COVID-19 symptoms (outside of the job site) ***MUST NOTIFY*** Designated Project Representative.
   - Close contact means the person was within 6 feet of the person for more than 10 minutes.
3) Any Team Member who is feeling ill, especially with COVID-19-like symptoms, ***MUST NOTIFY*** Designated Project Representative and **NOT** report to work.
   - Team Members should seek medical attention if they have or develop symptoms, especially a fever, dry cough, or shortness of breath.
   - Team Members that develop Emergency Warning Signs for COVID-19 should seek **medical attention immediately.** Emergency Warning Signs include: Trouble breathing, persistent pain or pressure in the chest, new confusion or inability to arouse, bluish lips or face.

If we know or have reason to believe that a Team Member has tested POSITIVE for COVID-19:

1) Inform everyone on the project of the situation while maintaining confidentiality of the individual, i.e. do not disclose the name of the individual that tested positive.
2) Contact Human Resources Business Partner to inform of situation.
3) Close the project and field office immediately, and do not re-open until it has been deep cleaned. Wait at least 24-hours before conducting deep cleaning.
4) In addition to the field office, deep clean vehicles, and any other potentially contaminated areas of project.
5) Designated Michael Baker Representative should investigate any additional potential exposure of COVID-19 to personnel and project areas and identify and deep clean these project areas while maintaining confidentiality of the Team Member.
6) With regard to the personnel investigation, the Designated Michael Baker Representative should identify every Team Member that came into close contact with the infected individual over the 48 hours before the infected individual's symptoms manifested.
   - Close contact means that the Team Member was within 6 feet of the infected individual for more than 10 minutes.
7) Once Designated Michael Baker Representative has identified all Team Members that have had close contact with the infected individual, the Designated Michael Baker Representative must inform these Team Members of their close contact (with the "Identified Team Member").
8) If the Identified Team Member remains asymptomatic, the Identified Team Member (*just as all other asymptomatic Team Members*), can continue to report to the jobsite once it reopens. However, now that there has been an exposure on the jobsite, the Designated Michael Baker Representative must follow these established precautions:
   a. Prior to starting work every morning and before entering the project site, all Team Members must have their temperature taken for a 14-day period.
   b. The Team Members can only enter the jobsite if their temperature is less than 100.4°F.

c. The Team Members must continue to wear facemasks at all times.
d. The Team Members should continue to maintain 6 feet of distance and practice social distancing.
e. The Team Members must disinfect all areas or surfaces they touch during the workday.

9) After the deep clean has occurred, all Team Members may return to the project site (assuming they are not exhibiting symptoms and have followed all precautionary protocols listed in this document prior to this point).

If we know or have reason to believe that a Team Member is or has been in close contact with a COVID-19 patient, or someone with COVID-19 symptoms *(Fever or Chills, Cough, Shortness of Breath or Difficulty Breathing, Fatigue, Muscle or Body Aches, Headache, New Loss of Taste or Smell, Sore Throat, Congestion or Runny Nose, Nausea or Vomiting, Diarrhea)* (on the project team or outside of the project team) but does not have symptoms themselves:

1) If the Team Member remains asymptomatic, the Team Member *(just as all other asymptomatic Team Members)* can continue to report to the jobsite, but the potentially exposed Team Member must follow these established precautions.
   a. Prior to starting work every morning, the Team Member must have his/her temperature taken for a 14-day period
   b. The Team Member can only enter the jobsite if the his/her temperature is less than 100.4°F.
   c. The Team Member must wear a facemask at all times.
   d. The Team Member should maintain 6 feet of distance and practice social distancing.
   e. The Team Member must disinfect all areas or surfaces he/she touches during the workday.
2) If the identified Team Member becomes symptomatic during the workday, he/she should be sent home immediately and all steps recommended for a Team Member exhibiting COVID-19-like symptoms should be followed.
3) If the identified Team Member becomes symptomatic during his non-working hours, he/she should not report to work, seek medical treatment, and follow all steps recommended for a Team Member exhibiting COVID-19-like symptoms.

*If the COVID-19 symptomatic person that the Michael Baker Team Member has been in contact with tests negative for COVID-19, the above protocols may cease.

If a Team Member is exhibiting COVID-19-like symptoms *(Fever or Chills, Cough, Shortness of Breath or Difficulty Breathing, Fatigue, Muscle or Body Aches, Headache, New Loss of Taste or Smell, Sore Throat, Congestion or Runny Nose, Nausea or Vomiting, Diarrhea)*

1) Direct Team Member to stay home based on potential infection.
   - If Team Member is already on project, isolate Team Member from all other Team Members, and then send them home.
2) Encourage Team Member to seek medical attention.
3) Inform everyone on the project that a Team Member has exhibited COVID-19-like symptoms while maintaining confidentiality of the Team Member.
4) Contact Human Resources Business Partner to inform of situation.

5) Close the project and field office for deep cleaning and do not re-open until it has been deep cleaned. Wait at least 24 hours before deep cleaning.
6) Designated Michael Baker Representative should investigate any additional potential exposure of COVID-19 to personnel and project areas and identify and deep clean these areas while maintaining confidentiality of the symptomatic Team Member.
7) With regard to the personnel investigation, the Designated Michael Baker Representative should identify every Team Member that came into close contact with the symptomatic individual over the 48 hours before the infected individual's symptoms manifested.
   - Close contact means that the Team Member was within 6 feet of the infected individual for more than 10 minutes.
8) Once Designated Michael Baker Representative has identified all Team Members that have had close contact with the symptomatic Team Member, the Designated Michael Baker Representative must inform these Team Members of their close contact (with the "Identified Individual").
9) If the Identified Team Member remains asymptomatic, the Identified Team Member (*just as all other asymptomatic Team Members*), can continue to report to the jobsite once it reopens. However, now that there has been a probable exposure on the jobsite, the Designated Michael Baker Representative must now adhere to the following precautions:
   a. Prior to starting work every morning, all Team Members must have their temperature taken for a 14-day period.
   b. The Team Members can only enter the jobsite if their temperature is less than 100.4°F.
   c. The Team Members must continue to wear a facemask at all times.
   d. The Team Member should continue to maintain 6 feet of distance and practice social distancing.
   e. The Team Members must disinfect all areas or surfaces he/she touches during the workday.
10) After the deep clean has occurred, all Team Members may return to the project site (assuming they are not exhibiting symptoms and have followed all precautionary protocols listed in this document prior to this point).

*If Team Member tests negative for COVID-19, the above protocols may cease.

RETURN TO WORK PROTOCOLS

Team Members who have tested POSITIVE for COVID-19 may return to the project under the following guidelines:

If NOT tested to determine if still contagious:

- They have had no fever for at least 72 hours (that is three full days of no fever without the use medicine that reduces fevers)
  AND
- Other symptoms have improved (ex: cough or shortness of breath have improved)
  AND
- At least 7 days have passed since your symptoms first appeared
  AND
- On the day Team Member intends to report to the jobsite, Team Member's temperature is less than 100.4°F when taken at the project site.

If tested using an FDA Emergency Use Authorization approved test to determine if still contagious:

- Resolution of fever (without the use medicine that reduces fevers)
  AND
- Improvement of respiratory symptoms (ex: cough and/or shortness of breath)
  AND
- Negative results from at least two consecutive nasopharyngeal swab specimens collected less than 24 hours apart (total of two negative specimens)
  AND
- On the day Team Member intends to report to the jobsite, Team Member's temperature is less than 100.4°F when taken at the project site.

Team Members who have been in close contact with a COVID-19 patient, or in close contact with someone with COVID-19 symptoms *(Fever or Chills, Cough, Shortness of Breath or Difficulty Breathing, Fatigue, Muscle or Body Aches, Headache, New Loss of Taste or Smell, Sore Throat, Congestion or Runny Nose, Nausea or Vomiting, Diarrhea)* (on the project team or outside of the project team) but does not have symptoms themselves must now follow these precautions:

- Prior to starting work every morning, the Identified Team Member must have his temperature taken for a 14-day period prior to entering the project site.
- The identified employee can only enter the jobsite if his/her temperature is less than 100.4°F.
- The Team Member, like all other Team Members on the jobsite, must wear a facemask.
- The Team Member, like all other Team Members on the jobsite, should maintain six feet of distance and practice social distancing.
- The Team Member should disinfect all areas or surfaces he/she touches during the workday.
- If the Team Member becomes symptomatic, the Team Member must follow steps recommended for a Team Member exhibiting COVID-19-like symptoms.

*If Team Member AND COVID-19 symptomatic person they have been in contact both test negative for COVID-19, they may return to work right away, and the above protocols may cease.

Team Members who have exhibited COVID-19-like symptoms *(Fever or Chills, Cough, Shortness of Breath or Difficulty Breathing, Fatigue, Muscle or Body Aches, Headache, New Loss of Taste or Smell, Sore Throat, Congestion or Runny Nose, Nausea or Vomiting, Diarrhea)* may return to the project under the following guidelines:

- They have had no fever or signs of a fever for at least 72 hours (that is three full days of no fever without the use medicine that reduces fevers)
  AND
- No other COVID-19-like symptoms are exhibited by the Team Member.
  AND
- They have produced a doctor's note confirming their general health (do not require a specific note related to COVID-19).
  AND
- On the day Team Member intends to report to the jobsite, the Team Member's temperature is less than 100.4°F when taken at the project site.

*If Team Member tests negative for COVID-19, they may return to work right away.

<u>Travel Guidelines for Returning To Work</u>:

- As it relates to personal air travel within the last 14 days, employees traveling by air – to any international or domestic location – or internationally (any form of travel) must self-quarantine for 14 days upon their return.
- Any employee with an immediate family or household member returning from air travel – international or domestic – or any other form of international travel must self-quarantine for 14 days from the date of the traveler's return.
- With regards to personal car travel within the last 14 days, employees traveling by car to any of the following Michael Baker designated hot-spots must self-quarantine for 14 days upon their return or obtain a negative COVID-19 test result before reporting to work ***(Excludes Michael Baker Business Travel)***:
  - Click on the link for most current COVID-19 hot spots as identified by Michael Baker: **Designated Hot Spots**

Attachment A - COVID-19 Mitigation Plan for Field Projects

Questionnaire / Checklist

To stay safe from and mitigate the spread of the COVID-19 virus while performing routine tasks on all project sites, this screening questionnaire/checklist will be completed daily. It is essential that the Designated Michael Baker Representative review and complete this questionnaire in its entirety with all Team Members on the project. If a Team Member is sent home based on the answers to the questions below, the Designated Michael Baker Representative must notify the HR Business Partner.

Team Member Name (Print):	Personal Phone Number:
Project Name:	

	COVID-19 Questionnaire
1	Have you experienced any COVID-19-like symptoms *(Fever or Chills, Cough, Shortness of Breath or Difficulty Breathing, Fatigue, Muscle or Body Aches, Headache, New Loss of Taste or Smell, Sore Throat, Congestion or Runny Nose, Nausea or Vomiting, Diarrhea)* within the last 14-days? ☐ Yes ☐ No **If "Yes," and not returning to the project site after quarantine/illness, Team Member will be sent home and will not be permitted to return until Return To Work Protocols (found on Pgs. 20-21) for their specific criteria are met.**
2	Have any members of your household experienced any COVID-19-like symptoms *(Fever or Chills, Cough, Shortness of Breath or Difficulty Breathing, Fatigue, Muscle or Body Aches, Headache, New Loss of Taste or Smell, Sore Throat, Congestion or Runny Nose, Nausea or Vomiting, Diarrhea)* within the last 14-days? ☐ Yes ☐ No **If "Yes," and not returning to the project site after a quarantine, Team Member will be directed to follow the applicable recommendations related to a COVID-19 exposure and Return To Work Protocols (found on Pgs. 20-21).**
3	Have you or any members of your household been exposed to COVID-19 in the last 14-days? **If any members of your household are employed in the Healthcare industry, you should only answer "Yes" to this question if something out of the ordinary happened. For example, if your household member was contacted by their employer and informed of an unexpected exposure – a patient they treated later tested positive for COVID-19 – or an outbreak at their facility occurred. Those are just examples, please use your judgment and common sense in assessing whether you should be reporting to the job site.* ☐ Yes ☐ No **If "Yes," and not returning to the project site after a quarantine, Team Member will be directed to follow the applicable recommendations related to a COVID-19 exposure and Return To Work Protocols (found on Pgs. 20-21).**

4	Have you or any members of your household returned from travel to any international or domestic location by air, OR returned by vehicle from any of the Michael Baker designated hot- spots (found on Pg. 21) within the last 14 days? ***(Excludes Michael Baker Business Travel)*** ☐ Yes ☐ No **If "Yes," Team Member must self-quarantine for 14 days upon return from any air travel OR obtain a negative COVID-19 test result before reporting to work (*ONLY if returning from travel by car)*.** **Also, if "Yes," list the country or domestic area traveled to by air, or Michael Baker designated hot spot area (see Pg. 21) traveled to by car, and dates of travel:**
5	Have you or any members of your household been in close contact with anyone who has recently returned from travel to any international or domestic location by air, OR returned by vehicle from any of the Michael Baker designated hot- spots (found on Pg. 21) within the last 14 days? ☐ Yes ☐ No **If "Yes," Team Member must self-quarantine for 14 days upon return from any air travel OR obtain a negative COVID-19 test result before reporting to work (*ONLY if returning from travel by car)*.** **Also, if "Yes," list the country or domestic area traveled to by air, or Michael Baker designated hot spot area (see Pg. 21) traveled to by car, and dates of travel:**
6	Are you returning to this project after being off due to testing positive for COVID-19 or previously exhibiting COVID-19-like symptoms *(Fever or Chills, Cough, Shortness of Breath or Difficulty Breathing, Fatigue, Muscle or Body Aches, Headache, New Loss of Taste or Smell, Sore Throat, Congestion or Runny Nose, Nausea or Vomiting, Diarrhea)*? ☐ Yes ☐ No **If "Yes," Document Team Member's reported temperature here *(if answered "Yes") on the first day back to work*:** ***If Team Member's temperature is ≥ 100.4° F, they are not permitted to begin work and must be sent back home immediately and follow the Safety and Return To Work Protocols (found on Pgs. 20-21) that their condition warrants.***
7	If there had been a probable or confirmed case of COVID-19 on the jobsite – i.e. Team Member at the project site tested positive or a Team Member exhibited symptoms of COVID-19 – then all Team Members must report temperature for a 14-day period. ***Team Member temperature (if applicable)*:** ***If Team Member's temperature is ≥ 100.4° F, they are not permitted to begin work and must be sent home immediately and follow the Safety and Return To Work Protocols (found on Pgs. 20-21) that their condition warrants.***
8	Have you been exposed to a COVID-19 Patient or someone with COVID-19-like symptoms outside of the project site? ☐ Yes ☐ No **If "Yes," Document that individual Team Member's temperature for a period of 14-days:** ***If Team Member's temperature is ≥ 100.4° F, they are not permitted to begin work and must be sent home immediately and follow the Safety and Return To Work Protocols (found on Pgs. 20-21) that their condition warrants.***

Personal Protective Equipment (PPE) / Other Working Equipment Checklist If "No" is checked based on PPE not available or in limited quantity, Team Member is to refer to the Safety Protocols for Limited or Unavailable PPE due to Supply Restrictions	
1	Hand Sanitizer? ☐ Yes ☐ No
2	Disinfectant wipes? ☐ Yes ☐ No
3	Bleach Solution (If Questions 1 & 2 are both checked "No")? ☐ Yes ☐ No ☐ N/A
4	Protective Mask (N95 mask preferred, but cloth mask acceptable) or Face Shield? ☐ Yes ☐ No
5	Full-body Tyvek suit? ☐ Yes ☐ No
6	Protective gloves (vinyl/nitrile)? ☐ Yes ☐ No
7	Long-sleeve shirt? ☐ Yes ☐ No
8	Hard Hat? ☐ Yes ☐ No
9	Safety Glasses? ☐ Yes ☐ No
10	Hi-Visibility Safety Vest? ☐ Yes ☐ No
11	iPad? ☐ Yes ☐ No ☐ N/A
12	Laptop? ☐ Yes ☐ No ☐ N/A
13	Tape Measure? ☐ Yes ☐ No ☐ N/A
14	Writing Utensils? ☐ Yes ☐ No ☐ N/A
15	Other Materials that may be shared by others? ☐ Yes ☐ No ☐ N/A

I understand and have been instructed not to share any items with any fellow Team Members under any circumstance.

Team Member Signature:_____ Date:_____

Attachment B - DESIGNATED MICHAEL BAKER REPRESENTATIVE GUIDANCE FOR COVID-19 QUESTIONNAIRE:

Under the existing circumstances relating to the current COVID-19 pandemic, Michael Baker wants to protect all Team Members reporting to jobsites. The COVID-19 Questionnaire assists Michael Baker in mitigating the spread of COVID-19. However, Michael Baker also realizes that the COVID-19 Questionnaire contains confidential medical information and, thus, will treat it as a confidential document.

Daily Meetings:

As detailed in the Mitigation Plan, all projects must select and have a Designated Michael Baker Representative, who is responsible for orchestrating daily meetings during which COVID-19 virus updates will be relayed and processes will be discussed.

Questionnaire:

To mitigate the spread of COVID-19 on jobsites where Michael Baker personnel are present, as part of the daily meetings, the Designated Michael Baker Representative will individually call each Team Member to review the COVID-19 Questionnaire, marking down each Team Member's answers to the questions, including the Designated Michael Baker Representative's own answers to the COVID-19 Questionnaire.

In addition to following the instructions in the COVID-19 Questionnaire, there are specified times when the Designated Michael Baker Representative must take a Michael Baker Team Member's temperature and record the temperature on the COVID-19 Questionnaire:

- Quarantined Team Member returning to the jobsite:
  - A Team member that tested positive for COVID-19 must have his/her temperature taken on the day of his/her return to the jobsite after the required quarantine; and,
  - A Team Member that has exhibited symptoms of COVID-19 must have his/her temperature taken on the day of his/her return to the jobsite after the required quarantine.
- Team Member exposed to a COVID-19 patient or an individual with COVID-19:
  - A Team Member that came into close contact (within six feet for more than ten minutes) to a COVID-19 patient or to an individual exhibiting symptoms of COVID-19 must have his/her temperature taken for a 14-day period.
- Jobsite exposed to COVID-19 patient or individual with COVID-19-like symptoms:
  - If a Team Member tests positive for COVID-19, all Team Members must have their temperature taken at the start of each workday for a 14-day period; and,
  - If a Team Member exhibits symptoms for COVID-19, all Team Members must have their temperature taken at the start of each workday for a 14-day period.

The COVID-19 Questionnaire created in this process is a confidential medical record and needs to be secured and stored appropriately.

Storing the COVID-19 Questionnaire:

The Designated Michael Baker Representative must store the COVID-19 Questionnaire in a separate file from regular personnel files. The information must be safeguarded to the greatest extent possible. This means that the COVID-19 Questionnaire must be kept in a confidential location where others cannot access it. Similarly, if the COVID-19 Questionnaire is stored electronically, the Designated Michael Baker Representative must not store the information where others who are not authorized to view this information have access to it.

Employees obligation to answer the questionnaire and self-report his/her temperature.

Under the existing circumstances relating to the current COVID-19 pandemic and to mitigate the spread of COVID-19 on a jobsite, Michael Baker is allowed to ask an employee or team member if he/she is exhibiting symptoms of COVID-19. If an employee or team member does not want to answer those questions, that employee cannot report to the jobsite. The employees and team members should be reassured that Michael Baker is conducting this inquiry to ensure the safety of everyone in the workplace. If you are reluctant to provide medical information, please be reassured that Michael Baker will keep your information confidential in the manner set forth above is appropriate.

Attachment C – Corporate Fleet Vehicles: COVID-19 Cleaning Process

Please see below for guidelines on cleaning Michael Baker International's fleet vehicles, including:

- Assigned vehicles utilized for business by an individual employee who is assigned to that vehicle.
- Pool vehicles and specialty equipment (aerial lift trucks, vac units, LiDar) utilized for business use by multiple employees.

Cleaning Products:

- Personal hand sanitizer
- Sanitizing spray that won't damage vehicle upholstery
- Wipes
- Disposable Gloves

Safe Hygiene Procedures:

- **Personal Hygiene:** Wash hands regularly at every opportunity. It is recommended handwashing lasts for at least 20 seconds using soap and warm water. Cough or sneeze into a tissue or sleeve.

- **If You Feel Sick:** If you feel sick or have been in contact with others who have been sick, do not use a fleet vehicle and self-quarantine for at least 14 days. See a doctor as needed.

- **Vehicle and Equipment Cleaning:** At the beginning of each workday, wipe down frequently touched vehicle surfaces, such as the steering wheel, gear shifter, radio/entertainment center screen, armrest, power window buttons, and door handle surfaces, with a sanitizer and/or disinfectant. In addition, thoroughly clean the dashboard, as in most vehicles air circulation begins with the dashboard. This process should be repeated throughout the workday if multiple employees utilize the vehicle throughout the day. Drivers should sanitize equipment, such as handheld electronic devises, scanners, toolboxes, and cart handles used to haul equipment. *Note: Be aware that alcohol or ammonia-based cleaners may damage the interior dashboard and seats. Ammonia-based cleaners may damage in-cab touch screen terminal displays. Visit the Centers for Disease Control (CDC) website for more information about effective cleaners and disinfectants.*

- **Tools and Equipment:** Do not use other workers' phones, desk, office or other work tools and equipment. The same is true for tools used by survey techs. Clean and disinfect any tools that are shared among techs within a 72-hour period. Clean or disinfect tool belts and other gear prior to reuse using a cleaner or disinfectant following application instructions on the product label.

- **Transporting Crews:** If there are two or more passengers in a vehicle, continue to institute social distancing. Also, drive with the windows down if weather permits.

- **Disposable Gloves:** Use disposable gloves whenever available, especially when fueling the vehicle.

- **Refueling:** Wipe down the fuel pump handle and keypad prior to inputting your odometer and driver ID. If you don't have wipes, then consider using a paper towel to grab the fuel dispenser handle. Wipe down fuel cards, especially if it is a shared card. If a driver wears disposable gloves when refueling, be sure to dispose of them before re-entering the vehicle.

Attachment D - Vehicle Rental to Project Sites Protocol

Introduction

This plan outlines protocol for all employees of Michael Baker International who will be renting a vehicle for commuting to project sites in an effort to stay safe from and mitigate the spread of the COVID-19 virus. This protocol is not intended to replace or modify the CDC guidelines, applicable OSHA requirements, or orders of applicable governmental authorities, including individual state orders. View this as a supplement – additional ways to protect yourself from exposure to the virus. Also review information and updates from the rental company you are using regarding COVID-19. Employees must have approval by their Department Manager and the Office Executive prior to reserving a rental vehicle.

In addition to this protocol, the following policy and procedure must be reviewed and followed.

- Michael Baker International Travel Policy (Policy Number 10.1.01), Section 3, Item A (Guidelines), Item B (Ground Transportation);
- Corporate Fleet Vehicles: COVID-19 Cleaning Process

Ideal Cleaning Products for Rental Vehicles

- Personal hand sanitizer
- Sanitizing spray that won't damage vehicle upholstery
- Wipes
- Gloves

Prior to Renting a Vehicle

- Limit one to two occupants in a rental vehicle. Maintain "Social Distancing" as best as possible. If more than two occupants need to go to a project site, plan on multiple vehicle rentals.
- Ensure that the local rental company providing the vehicle is utilizing best practices in cleaning their vehicles and their employees delivering the vehicle.
- Acquire the keys and rental documentation wearing gloves. Disinfect the vehicle key with the sanitizing spray or wipe prior to use.

Safe Hygiene Procedures for Rental Vehicle Operators

1. Wash hands regularly at every opportunity. It is recommended handwashing lasts for at least 20 seconds using soap and warm water.
2. Wear gloves when fueling the vehicle.
3. If possible, do not touch handrails, handles, community surfaces, or other areas that are frequently touched by others. If it is necessary to touch these surfaces, be sure to wash or sanitize your hands as soon as possible or wear gloves.
4. Limit your exposure at gas stations, rest areas or restaurants.

5. If you have been in contact with others that have been sick or feel sick, do not use a rental vehicle and self-quarantine for at least 14 days. See a doctor if needed.
6. Clean commonly touched areas of the vehicle with sanitizing spray prior to use and after use. Areas that are commonly touched include the steering wheel, the turn signal, the door handles, climate control/radio switches, gear shifts, entertainment center screens, dashboard, door panel, cup holder, seat belt, seat buckles, seat buckle release, and any other surfaces that you touched.
7. In addition to commonly touched surfaces, please thoroughly clean the dashboard as in most vehicles air circulation begins with the dashboard.
8. Wear gloves while cleaning the vehicle.
9. When cleaning, allow the sanitizing spray to sit on the surface to be cleaned for at least four minutes prior to wiping.
10. If in the car with another occupant and the weather permits, drive with the windows down.

Arrival at Project Site

- If possible, park vehicle at a distance where you can maintain a distance of at least six feet from the door of another vehicle.
- Lock vehicle so no one can gain access into the vehicle.
- Always keep vehicle keys in your possession. Do not leave out where someone can contaminate.

Returning Rental Vehicle

- Use sanitizing spray on interior vehicle components as mentioned above prior to leaving vehicle.
- Disinfect outside door handle(s) used with sanitizing spray or wipes after shutting vehicle door.
- Disinfect the vehicle key with the sanitizing spray or wipe, place in envelope or plastic bag and place is designated area for rental company to pick up.
- Notify rental company that vehicle has returned and the location for pick up.

Attachment E - Hotel Guidelines During COVID-19

Introduction

This plan outlines the protocol for all employees of Michael Baker International who will be staying at a hotel during project site work to stay safe from and mitigate the spread of the COVID-19 virus. This protocol is not intended to replace or modify the CDC guidelines, applicable OSHA requirements, or orders of applicable governmental authorities. View this as a supplement – additional ways to protect yourself from exposure to the virus. Also, review information and updates from the hotel chain where you will be staying regarding COVID-19, as many hotels have incorporated additional measures and precautions to ensure the safety of their guests.

Note: Employees must have the approval of their Department Manager and Office Executive prior to making hotel reservations through the Corporate Travel Department.

In addition to this protocol, the following policy and procedure must be reviewed and followed.

- Michael Baker International Travel Policy (Policy Number 10.1.01), Section 3, Item A (Guidelines), Item B (Ground Transportation);
- Rental Vehicle COVID-19 Protocol (if renting a vehicle for work related purposes).

Ideal Products in Possession While Staying at a Hotel

- Personal hand sanitizer
- Wipes
- Gloves
- Facemask (Cloth at minimum)

Prior to a Hotel Stay

- Maintain "Social Distancing." Stay a minimum of six (6) feet from another person.
- Michael Baker's Travel Department will ensure that the hotel chain holding the reservation is utilizing best practices related to both room cleaning and employee hygiene safety measures in place for their employees.
- Minimize paper invoice/receipt transactions by having any documentation sent electronically (email, phone app, etc.).

Safe Hygiene Procedures During Hotel Stay

- Wash hands regularly at every opportunity. It is recommended that handwashing lasts for at least 20 seconds using soap and warm water.
- Wear gloves and a cloth mask when in common areas.

- If possible, do not touch handrails, handles, community surfaces or other areas that are frequently touched by others. If it is necessary to touch these surfaces, be sure to wash or sanitize your hands as soon as possible or wear gloves.
- Limit your exposure at hotel common areas including the hotel lobby, area restaurant or lounge, fitness center, business center, pool, hot tub and conference rooms.
- Avoid any food or drink that is self-serve. Utilize room service or take-out service, always.
- If you have been in contact with others that have been sick or feel sick, do not reserve a hotel room and self-quarantine for at least 14 days. See a doctor if needed.

Leaving the Hotel

- Ensure you have all your belongings packed prior to leaving your hotel room.
- Leave door access card or key in your hotel room prior to leaving or at a designated area for key/card return.
- Minimize waiting in common areas if social distancing isn't feasible.

Attachment F - Procedures for Donning and Doffing Protective Masks

Any Michael Baker employee looking for a reasonable accommodation to any requirements contained in this Mitigation Plan should contact their Human Resources Business Partner, along with the Health & Safety Department.

Donning Protective Mask:

- Prior to putting on mask, clean hands with soap and water or alcohol-based hand sanitizer.
- Place mask over nose and mouth with one hand.
- Use other hand to pull bottom strap over, or around your head until it rests under ears (*If mask contains two straps, ensure that one strap rests below your ears, while the other rests above your ears).*
    - If N95* or mask with metal nose clip: mold the metal nose clip around your nose to achieve a secure seal.
- Ensure there are no gaps between face and mask.

*N95 Masks

- Check the seal of mask each time you put on.
- Positive Pressure Seal Check:
    - Place both hands completely over the mask and exhale.
    - Mask should bulge slightly. If air leaks out, reposition and readjust metal nose clip.
- Negative Pressure Seal Check:
    - Place both hands completely over the mask and inhale.
    - Mask should collapse slightly. If air leaks in, reposition and readjust metal nose clip.
- Make a good-faith effort to comply with the Seal Checks each time you put on a N95 mask.
- * Annual fit tests of N95 filtering facemasks are temporarily suspended due to COVID-19 pandemic.

Should you touch your protective mask with your hands while it is being worn, *be sure to clean your hands with soap and water, or alcohol-based hand sanitizer*.

Doffing Protective Mask:

- DO NOT TOUCH THE FRONT OF THE MASK.
- Use hands to grab straps of mask from behind the head and pull over the top of the head.
- Pull mask away from face WITHOUT TOUCHING FRONT OF MASK.
- Place mask in safe, clean and dry area (if able to be re-used), such as a container, plastic baggie, or somewhere it will be safe from contamination.
- Clean hands with soap and water or an alcohol-based hand sanitizer.

Discarding Protective Mask:

- Discard protective masks when they become damaged, soiled, excessively damp, or if it becomes difficult to breathe through.

Try to limit the amount of times that you remove your protective mask throughout the course of the workday. Donning and doffing a protective mask more than 5 times will cause its durability to diminish and may no longer be effective as a means of protection.

Attachment G - FIELD OFFICE COVID-19 CLEANING LOG

Michael Baker Employee	Date	Start Time	End Time

Michael Baker
INTERNATIONAL

ATTACHMENT B

Standard Operating Procedures

FINAL

3148 VAN ETTEN ROAD PROPERTY CHARACTERIZATION WORK PLAN

Site #851061

Standard Operating Procedures

Prepared for:

Corning Incorporated
Corning, New York

Prepared by:

MICHAEL BAKER INTERNATIONAL
Moon Township, Pennsylvania

Michael Baker
INTERNATIONAL

May 28, 2021

SOP F101 BOREHOLE AND SAMPLE LOGGING

SOP F102 SURFACE SOIL SAMPLING

SOP F103 SHALLOW SOIL SAMPLING

SOP F104 MONITORING WELL INSTALLATION

SOP F105 LOW FLOW PURGING AND SAMPLING PROCEDURE FOR GROUNDWATER SAMPLING

SOP F106 STREAM IDENTIFICATION AND FRESHWATER WETLANDS

DELINEATION PROCEDURES

SOP F301 SAMPLE PRESERVATION AND HANDLING

SOP F302 CHAIN-OF-CUSTODY

SOP F303 FIELD LOGBOOK

SOP F304 QUALITY CONTROL SAMPLES

SOP F502 DECONTAMINATION OF SAMPLING AND MONITORING EQUIPMENT

GUIDELINES FOR SAMPLING AND ANALYSIS OF PFAS UNDER NYSDEC'S PART 375 REMEDIAL PROGRAM

PFAS SAMPLING CHECKLIST

FIELD EQUIPMENT OPERATION AND MAINTENANCE PROCEDURES - BOREHOLE AND SAMPLE LOGGING

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BOREHOLE AND SAMPLE LOGGING

1.0 PURPOSE

This SOP provides general reference information and technical guidance on borehole and sample logging. Borehole logs provide information that is used in the determination of geological conditions, assessment of contaminant distribution, and the evaluation of remedial actions.

2.0 SCOPE

This SOP provides descriptions of the standard techniques for borehole and sample logging. These techniques shall be used to provide consistent descriptions of subsurface lithology for each boring that is logged. While experience is the only method to develop confidence and accuracy in the description of soil and rock, the field geologist/engineer may develop adequate classifications through careful, thorough observation and consistent application of the classification procedure.

3.0 DEFINITIONS

Soil classifications and terms are given in Sections 5.2 and 5.3. Rock classification and terms are presented in Section 5.4.

4.0 RESPONSIBILITIES

Project Manager - It is the responsibility of the Project Manager to ensure that field personnel responsible for borehole logging are familiar with these procedures. It also is the responsibility of the Project Manager to ensure that the drilling inspector correctly and completely fill out the appropriate documents (e.g., test boring logs, field logbooks, etc.).

Field Team Leader - The Field Team Leader is responsible for the overall supervision of the drilling and boring activities, and for ensuring that each borehole is completely logged by the responsible drilling inspector. The Field Team Leader also is responsible for ensuring that all drilling inspectors have been briefed on these procedures. The field team leader is responsible for providing copies of the test boring logs and field logbooks to the Project File via the Project Manager, unless otherwise specified by the Project Manager.

Drilling Inspector - The drilling inspector (site geologist) is responsible for the direct supervision of boring and sampling activities. It is the Drilling Inspector's responsibility to log each boring, document subsurface conditions, complete the appropriate forms, and direct the drilling crew (or drilling supervisor). Furthermore, the drilling inspector typically also is responsible for health and safety issues during on-site drilling and sampling activities.

5.0 PROCEDURES

The classification of soil and rock is one of the most important jobs of a drilling inspector or site geologist. It is imperative that the drilling inspector understand and accurately use the field classification system described in this SOP to maintain a consistent flow of information. This identification is based on both visual examination and manual tests. The results of the boring activities, including soil and rock classifications, shall be recorded on a Field Test Boring Record (Attachment A) and/or the field notebook.

5.1 Test Boring Record

Each boring shall be fully described in a Field Test Boring Record. The drilling inspector shall log the boring as it is being drilled by recording relevant data on the Boring Record. It may be more appropriate to record the boring information in a bound field logbook so that all boring logs recorded (by each drilling inspector) are located in one source. The use of a field logbook precludes the possibility of losing individual test boring log sheets. Furthermore, use of the field logbook allows for the recording of additional information (i.e., notes) for which space is not allocated on the Field Test Boring Record. Field Test Boring Records may then be transcribed from the field logbook. The Field Test Boring Records must be completely filled out prior to demobilization from the site. Because personnel other than the drilling inspector may be interpreting the boring records, the Field Test Boring Records must also be legible. Completed Field Test Boring Records shall be converted to report format using a Test Boring Record (excel format) or 'Log Draft' software.

The data that are to be included on the Test Boring Records, when applicable, are listed below:

1. Project name, location, and Project and Task Number.
2. Date(s).
3. Identifying number and location of the boring.
4. Soil classifications in accordance with the Unified Soil Classification System (USCS) (see Section 5.2 and Attachment B). These classifications will be noted in the field by the drilling inspector and revised, if necessary, based on laboratory analysis (if performed). Both field determined USCS and a detailed soil description shall be included on the Test Boring Record.
5. Depth, type, and number of samples taken (geologic and environmental).
6. The number of blows required for each 6-inch penetration of a split-spoon sampler (not applicable for direct-push technology). The percentage of sample recovered, hammer weight, and fall length.
7. Depth to water as first encountered during drilling operations, along with the method of determination. Any distinct water bearing zones (aquifers) shall also be delineated vertically, if possible.
8. Loss of drilling fluid (indicative of subsurface voids) and the interval over which it was observed.
9. Identification of equipment used, including model and type of drilling rig, size of split spoon samplers, auger types and sizes, etc.
10. Name of the drilling company and the driller.
11. Size and length of the casing used in each boring.
12. Observations of visual contamination (free product, odor, etc.). Observations also include any non-native materials identified, the presence of ash, brick and/or glass and any other observed fill materials.
13. Field instrument readings (i.e., photoionization detector, organic vapor analyzer).

As the boring is advanced, the inspector shall evaluate the samples and the cuttings to determine the location/depth of each stratigraphic unit. The descriptions should contain color, grain-size distribution, consistency, plasticity, moisture, etc., in addition to the USCS classification category (Section 5.3.7).

Each sample collected for chemical or geotechnical analysis shall be handled as described in SOP F102.

5.2 Soil Classification

The data shall be recorded on a Field Test Boring Record and/or in a field logbook. The method of deriving the classification should be described, or reference made to this SOP or other applicable manuals. Both the soil classification and the soil descriptions must be entered on the Field Test Boring Record. If required, the soil classification shall consist of the two-letter USCS classification (e.g., ML, CL, SM); the soil description shall be much more detailed.

Where required, soils will be classified according to the USCS. The USCS method of classification is detailed in Attachment B and identifies soil types on the basis of grain-size and liquid limits, and categorizes them through the use of two letters. Although some laboratory testing is required for full USCS classification, preliminary classifications may be made in the field. The generalized USCS classifications also aid in development of geologic cross sections at the conclusion of field activities.

Fine-grained soils are smaller than the No. 200 sieve and are of two types: silt (M) and clay (C). Some classification systems define size ranges for these soil particles, but for field classification purposes, they are identified by their respective behaviors. Organic material (O) is a common component of soil but has no size range; it is recognized by its composition (e.g., peat is designated by "Pt"). Coarse-grained soils are divided into sand (S) or gravel (G). The careful study of the USCS will aid in developing the competence and consistency necessary for the classification of soils.

The second letter of the two-letter USCS symbol provides information about the grain size distribution of granular soil, or the plasticity characteristics of fine-grained soils. These second letter modifiers are (P) poorly graded/well sorted, (W) well graded/poorly sorted, (C) clayey, (M) silty, (L) low plasticity, or (H) high plasticity.

5.3 Soil Descriptions

The Test Boring Records shall contain complete soil descriptions in addition to the two-letter USCS classification, if required. Soil descriptions include the following components: grain size identification with descriptive terms indicating the relative percentage of each grain size, color, consistency or relative density, moisture content, organic content, plasticity, and other pertinent observations such as visual contamination, PID measurements, etc. The use of Field Guides for Soil Analysis, Soil Texturing Flow Charts and Geotechnical Gauges is highly recommended for consistency of description narrative. Other tools useful for soil descriptions include a pocket knife or spatula, small hand lens, test tube with stopper (or jar with lid) and small bottle of dilute hydrochloric acid (HCL) – one part HCL added to three parts water. A summary of the soil description components is given in Attachment C.

5.3.1 Grain Size Identification

In nature, soils are comprised of varying size, shape, and combinations of the various grain types. The following terms are used to indicate soil grain size:

Size Description	Size Limits (Diameter)
Cobbles	3-inches to 12-inches
Coarse gravel	3/4-inches to 3-inches

Fine gravel	4.76 mm (# 4 sieve size) to 3/4-inches
Coarse sand	2 mm (# 10 sieve size) to 4.76 mm
Medium sand	0.42 mm (# 40 sieve size) to 2 mm
Fine sand	0.074 mm (# 200 sieve size) to 0.42 mm
Silt	0.002 mm to 0.074 mm
Clay	less than 0.002 mm

The proportion of each grain size (by weight percent) is indicated using the descriptive terms:

Trace	1 to 5 percent
Few	5 to 10 percent
Little	15 to 25 percent
Some	30 to 45 percent
And (or an adjective form of the grain size, i.e., sandy, silty, clayey)	35 to 50 percent

Some examples of soil grain size descriptions are:

- Silty fine sand: 50 to 65 percent fine sand and 35 to 50 percent silt.
- Medium to coarse sand, some silt: 65 to 90 percent medium to coarse sand, 30 to 45 percent silt.
- Fine sandy silt, trace clay: 50 to 65 percent silt, 35 to 50 percent fine sand, and 1 to 5 percent clay.

The soil type may be classified as non-cohesive, granular soils or as cohesive, fine-grained soils as discussed in Section 5.3.3. The grain shape of a soil usually does not need to be determined unless unusual or unique features are readily apparent.

5.3.2 Color

Soil colors shall be described utilizing a single color descriptor preceded, when necessary, by a modifier to denote variations in shade or color mixtures. A soil could therefore be referred to as "gray" or "light-gray" or "blue-gray." Since color can be utilized in correlating units between sampling locations, it is important for color descriptions to be consistent between borings.

Colors must be described while the sample is still moist. Soil samples shall be broken or split vertically to describe colors because sampling devices tend to smear the sample surface creating color variations between interior and exterior.

The term "mottled" shall be used to indicate soil irregularly marked with spots/smears/swirls of different colors. Soil color charts (e.g., Muncel) shall not be used unless specified by the Project Manager.

5.3.3 Relative Density and Consistency

To classify the relative density and/or consistency of a soil, the drilling inspector first shall identify the soil type. Granular soils contain predominantly sands and gravels. These types of soil are non-cohesive (a 6 mm diameter roll cannot be formed). Conversely, fine-grained soils (which contain predominantly silts and clays) are cohesive (a 6 mm diameter roll can be formed).

The density of non-cohesive, granular soils or the consistency of cohesive soils is classified according to standard penetration resistances obtained from split-spoon (split-barrel) sampling performed according to ASTM D-1586. Standard penetration resistance is the number of blows (pneumatic or hammer drops) required to drive a split-barrel sampler with a 2-inch outside diameter 6-inches into the material using a 140-pound hammer falling freely through 30-inches. In cases where geotechnical information is required, the standard penetration test is performed by driving the sampler through an 18-inch sample interval; the number of blows will then be recorded for each six-inch increment. The density designation of granular soils is obtained by adding the number of blows required to penetrate the last 12 inches of the sample interval (or the middle 12 inches if the spoon is driven 24 inches). It is important to note that if gravel and rock fragments are broken by the sampler, or if rock fragments are lodged in the tip, the resulting blow count will be erroneously high, reflecting a higher density than actually exists. This must be noted on the Field Test Boring Record and referenced to the sample number. In cases where soil sampling for environmental analytical analysis is required, 24-inch spoon barrels are typically used in order to obtain a sufficient quantity of sample for required analysis. As presented above, the second and third 6-inch increments will be used to calculate the relative density for a 24-inch sample interval.

The relative density designations for non-cohesive soils are:

Designation	Standard Penetration Resistance (Blows per Foot)
Very loose	Less than 4
Loose	4 to 10
Medium dense	10 to 29
Dense	30 to 49
Very dense	Greater than 50

The consistency of cohesive soils is also determined by blow counts as shown:

Designation	Standard Penetration Resistance (Blows per Foot)
Very Soft	< 2
Soft	2 to 4
Medium Stiff	4 to 8
Stiff	8 to 15
Very Stiff	15 to 30
Hard	Over 30

5.3.4 Moisture Content

Moisture content is estimated in the field according to three categories: dry, moist, and wet:

Designation	Moisture Content
Dry	Moisture Absent
Moist	Damp, No Visible Water
Wet	Visible Water

Little or no water should appear in dry soil. Wet soils appear to contain all the water they can possibly hold (i.e., saturated). Moist is in between. Laboratory analysis should be performed if it is necessary to accurately determine the natural water content.

5.3.5 Stratification

Stratification can only be determined after the sampler is opened. Typically, bedding thicknesses are described as follows:

Designation	Bedding Spacing
Indistinct	No bedding apparent
Laminated	Less than 0.5 cm
Thinly Bedded	0.5 cm to 3 cm
Bedded	3 cm to 30 cm
Thickly Bedded	>30 cm
Massive	Uniform

5.3.6 Texture/Fabric/Bedding

The texture/fabric/bedding of a soil shall be described, where appropriate. Texture is described as the relative angularity of the soil particles: rounded, subrounded, subangular, angular. Fabric shall be noted as to whether the particles are flat or bulky and whether there is a particular relation or orientation. The bedding structure also shall be noted (e.g., stratified, lensatic, non-stratified, heterogeneous, varved, etc.).

5.3.7 Summary of Soil Descriptions

In summary, soils shall be classified in a similar manner by each drilling inspector. The soil description shall include:

- Soil grain size with appropriate descriptors
- Color
- Relative density and/or consistency
- Moisture content
- Stratification
- Texture/fabric/bedding
- Other distinguishing features

These descriptors are evaluated and the soil classified according to the USCS. All information, measurements and observations shall be legibly recorded on a Field Test Boring Record. If the Log Draft program will be used to develop a digitized copy of the boring logs, the 'Description Builder' program within Log Draft will allow for consistency in geologic descriptions. This is done by "building" a geologic description of an encountered formation by choosing from a finite list of geologic properties as summarized in the bulletized list above.

5.4 Sedimentary Rock Classifications

Rocks are grouped into three main divisions: sedimentary, igneous, and metamorphic. Sedimentary rocks are the most predominant type exposed at the earth's surface. As such, this section will consider only classification of sedimentary rocks. Standard geologic references should be used for the complete classification of sedimentary, igneous and metamorphic rocks.

For the purpose of completing the Field Test Boring Record in the field, sedimentary rocks should be classified using the following hierarchy:

- Rock type
- Color
- Bedding thickness
- Hardness
- Fracturing
- Rock Quality Designation
- Weathering
- Other characteristics

5.4.1 Rock Type

There are numerous types of sedimentary rocks such as sandstone, shale, siltstone, claystone, conglomerate, limestone, dolomite, coal, etc. The drilling inspector should select the most appropriate rock type based on experience. Some of the references listed in Section 7.0 provide a more complete discussion of sedimentary rock types.

In addition to selecting a rock type, the drilling inspector should record the grain size (and composition of grains and cement, if apparent) on the Field Test Boring Record. The following designation should be used to describe grain size in sedimentary rocks:

Designation	Grain Size Diameter
Cobbles	Greater than 64 mm (2.5-inches)
Pebbles	4 mm (0.16-inches) to 64 mm
Granules	2 mm (0.08-inches) to 4 mm
Very Coarse Sand	1 mm to 2 mm
Coarse Sand	0.5 mm to 1 mm
Medium Sand	0.25 mm to 0.5 mm
Fine Sand	0.125 mm to 0.25 mm
Very Fine Sand	0.0625 mm to 0.125 mm
Silt	0.0039 mm to 0.0625 mm
Clay	Smaller than 0.0039 mm

For individual boundaries of grain size, a scale can be used for coarse-grained rocks. However, the division

between silt and clay likely will not be measurable in the field. This boundary shall be determined by use of a hand lens. If the grains cannot be seen with the unaided eye, but are distinguishable with a hand lens (5x magnification) the sample is silt. If the grains are not distinguishable with a hand lens, the sample is clay.

5.4.2 Color

The color of rock can be determined in a manner similar to that for soil samples. Rock cores or fragments shall be classified while wet, when possible. Rock color charts (e.g., Muncel color chart) shall not be used unless specified by the Project Manager.

5.4.3 Bedding Thickness

The bedding thickness designation for soils (Section 5.3.5) shall also be used for rock descriptions.

5.4.4 Hardness

The hardness of a rock is a function of the compaction, cementation, and mineralogical composition of the rock. A relative scale for sedimentary rock hardness follows:

- Very Soft - Very soft indicates that the rock is easily gouged by a knife, easily scratched by a fingernail, and/or easily broken by hand
- Soft - Soft indicates that the rock may be gouged by a knife, scratched by a fingernail, difficult to break by hand, and/or powders when hit by a hammer.
- Medium Hard - Medium hard indicates that the rock is easily scratched by a knife and/or is easily broken when hit by a hammer.
- Hard - Hard indicates that the rock is difficult to scratch with a knife but may be broken with a hammer.
- Very Hard - Very hard indicates that the rock is difficult to break with a hammer.

Note the difference in usage between the words "scratch" and "gouge." A scratch shall be considered a slight depression in the rock while a gouge is much deeper.

5.4.5 Fracturing

The degree of fracturing or brokenness of a rock is described by measuring the fractures or joint spacing. After eliminating drilling breaks (a.k.a., mechanical breaks), the average spacing is measured and is described by the following terms:

- Very Broken - Less than a 2-inch spacing between fractures
- Broken - A 2-inch to 1-foot spacing between fractures
- Blocky - A 1-foot to 3-foot spacing between fractures
- Massive - A 3-foot to 10-foot spacing between fractures

5.4.6 Rock Quality Designation

The structural integrity of the rock can be approximated by calculating the Rock Quality Designation (RQD) of cores recovered. The RQD is determined by adding the total lengths of all pieces exceeding four inches and dividing by the total length of core run:

$$RQD\ (\%) = r/l \times 100$$

Where:

r = Total length of all pieces of the lithologic unit being measured, which are greater than 4 inches, and have resulted from natural breaks. Natural breaks include slickenslides, joints, compaction slicks, bedding plane partings (not caused by drilling) friable zones, etc.

l = Total length of core run.

The results of the RQD calculations shall be recorded on the Field Test Boring Record and/or the Field Logbook.

5.4.7 Weathering

The degree of weathering is a significant parameter that is important in determining weathering profiles and also is useful in engineering designs. The following terms can be applied to distinguish the degree of weathering:

- Decomposed - Soft to very soft, bedding and fractures indistinct, no cementation.

- Highly weathered - very soft to soft, with medium hard relic rock fragments, little to moderate cementation. Vugs and openings in bedding and fracture planes, some of which may be filled.

- Weathered - Soft to medium hard. Good cementation, bedding and fractures are pronounced. Uniformly stained.

- Slightly weathered - Medium hard. Fractures pronounced, non-uniform staining, bedding distinct.

- Fresh - Medium hard to hard. No staining. Fractures may be present, bedding may or may not be distinct.

5.4.8 Other Characteristics

The following items should be included in rock description, where applicable:

- Description of contacts between rock units (sharp or gradational)
- Stratification
- Description of any filled cavities or fractures
- Cementation (calcareous, siliceous, hematitic, etc.)
- Description of joints and open fractures (with strike and dip, if possible)
- Observation of the presence of fossils

5.4.9 Additional Terms

The following terms also are used to further identify rocks:

- Seam - thin (12-inches or less), probably continuous layer.

- Some - Indicates significant (15 to 40 percent) amounts of an accessory material.

- Few - Indicates insignificant (0 to 15 percent) amounts of an accessory material.

- Interbedded - Indicates thin or very thin alternating seams of material occurring in approximately equal amounts.

- Interlayered - Indicates thick alternating seams of material occurring in approximately equal amounts.

6.0 QUALITY ASSURANCE RECORDS

Quality Assurance Records shall consist of completed Field Test Boring Records and Test Boring Records either hand written or in the Log Draft format.

7.0 REFERENCES

1. American Society for Testing and Materials, 2000. Standard Methods for Classification of Soils for Engineering Purposes. ASTM Method D2487-00, Annual Book of Standards, ASTM, Philadelphia, Pennsylvania.

2. American Society for Testing and Materials, 2000. Standard Practice for Description and Identification of Soils (Visual - Manual Procedure). ASTM Method D2488-00, Annual Book of Standards, ASTM, Philadelphia, Pennsylvania.

3. American Society for Testing and Materials, 1999. Standard Method for Penetration Test and Split-Barrel Sampling of Soils. ASTM Method D1586-99, Annual Book of Standards, ASTM, Philadelphia, Pennsylvania.

ATTACHMENT A

EXAMPLE TEST BORING RECORD

OBG Part of Ramboll | Michael Baker INTERNATIONAL

OBG|Baker Environmental Solutions Joint Venture

TEST BORING RECORD

PROJECT: _____

PROJECT NO.: _____ BORING NO.: _____

COORDINAT EAST: _____ NORTH: _____

ELEVATION: SURFACE: _____

Rig:	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)								
Length								
Type								
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston
N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source
ppm = parts per million

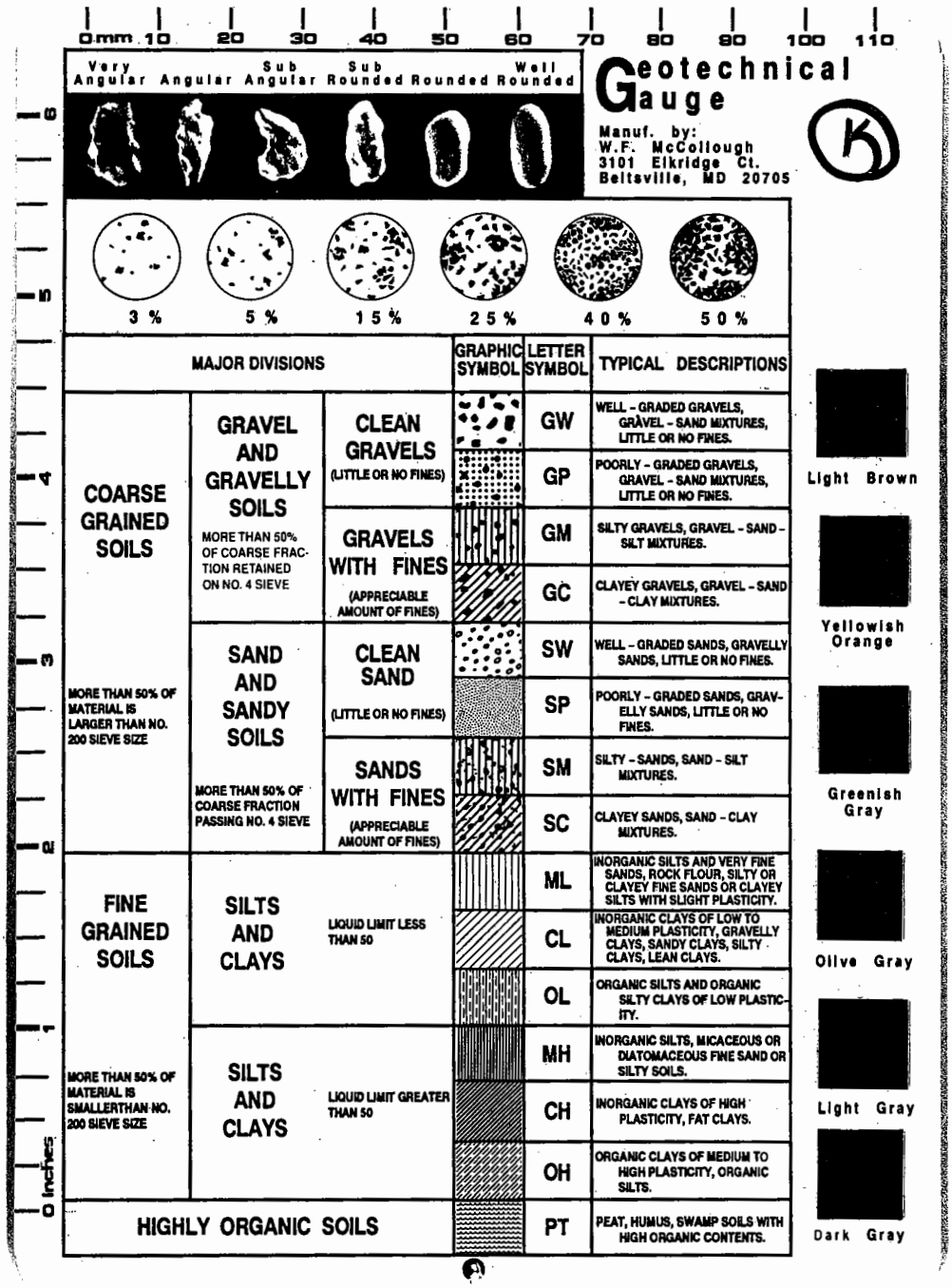
Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10						Match to Sheet 2	

DRILLING CO.: _____ BAKER REP.: _____

DRILLER: _____ BORING NO.: _____ SHEET 1 OF ___

ATTACHMENT B

UNIFIED SOIL CLASSIFICATION SYSTEM


0 mm 10 20 30 40 50 60 70 80 90 100 110
Very Angular
Angular
Sub Angular
Sub Rounded
Rounded
Well Rounded
Geotechnical Gauge
Manuf. by:
W.F. McCollough
3101 Elkridge Ct.
Beltsville, MD 20705
3 %
5 %
15 %
25 %
40 %
50 %
MAJOR DIVISIONS
GRAPHIC SYMBOL
LETTER SYMBOL
TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE
GRAVEL AND GRAVELLY SOILS
MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE
CLEAN GRAVELS
(LITTLE OR NO FINES)
GW
WELL - GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES.
GP
POORLY - GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES.
GRAVELS WITH FINES
(APPRECIABLE AMOUNT OF FINES)
GM
SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES.
GC
CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES.
SAND AND SANDY SOILS
MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE
CLEAN SAND
(LITTLE OR NO FINES)
SW
WELL - GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES.
SP
POORLY - GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES.
SANDS WITH FINES
(APPRECIABLE AMOUNT OF FINES)
SM
SILTY - SANDS, SAND - SILT MIXTURES.
SC
CLAYEY SANDS, SAND - CLAY MIXTURES.
FINE GRAINED SOILS
MORE THAN 50% OF MATERIAL IS SMALLERTHAN NO. 200 SIEVE SIZE
SILTS AND CLAYS
LIQUID LIMIT LESS THAN 50
ML
INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY.
CL
INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS.
OL
ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY.
SILTS AND CLAYS
LIQUID LIMIT GREATER THAN 50
MH
INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS.
CH
INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
OH
ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS.
HIGHLY ORGANIC SOILS
PT
PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS.
Light Brown
Yellowish Orange
Greenish Gray
Olive Gray
Light Gray
Dark Gray
0 Inches

UNIFIED SOIL CLASSIFICATION SYSTEM

FOR COMMON INORGANIC AND ORGANIC SEDIMENTS

Modified from ASTM D2488

STEP 1: IS SEDIMENT COARSE-GRAINED OR FINE-GRAINED?

STEP 2: DETERMINE SAND VS. GRAVEL RATIO

INCREASING GRAIN SIZE

SAND | GRAVEL

FINE | MEDIUM | COARSE | FINE | COARSE

STEP 3: *CONTINUE WITH "SAND" OR "GRAVEL" AND FOLLOW FLOW CHART TO ASSIGN A GROUP SYMBOL AND A GROUP NAME*

COARSE-GRAINED DEPOSITS

(>50% coarse-grained, <50% fine sediments)

			GROUP SYMBOL		GROUP NAME
GRAVEL (gravel > sand)	<5% fines	Well graded	GW	<15% sand	WELL GRADED GRAVEL
				>15% sand	WELL GRADED GRAVEL WITH SAND
		Poorly graded	GP	<15% sand	POORLY GRADED GRAVEL
				>15% sand	POORLY GRADED GRAVEL WITH SAND
	10% fines	Well graded	GW-GM	<15% sand	WELL GRADED GRAVEL WITH SILT
				>15% sand	WELL GRADED GRAVEL WITH SILT AND SAND
			GW-GC	<15% sand	WELL GRADED GRAVEL WITH CLAY
				>15% sand	WELL GRADED GRAVEL WITH CLAY AND SAND
		Poorly graded	GP-GM	<15% sand	POORLY GRADED GRAVEL WITH SILT
				>15% sand	POORLY GRADED GRAVEL WITH SILT AND SAND
			GP-GC	<15% sand	POORLY GRADED GRAVEL WITH CLAY
				>15% sand	POORLY GRADED GRAVEL WITH CLAY AND SAND
	>15% fines	non-plastic fines	GM	<15% sand	SILTY GRAVEL
				>15% sand	SILTY GRAVEL WITH SAND
		plastic fines	GC	<15% sand	CLAYEY GRAVEL
				>15% sand	CLAYEY GRAVEL WITH SAND
SAND (sand > gravel)	<5% fines	Well graded	SW	<15% gravel	WELL GRADED SAND
				>15% gravel	WELL GRADED SAND WITH GRAVEL
		Poorly graded	SP	<15% gravel	POORLY GRADED SAND
				>15% gravel	POORLY GRADED SAND WITH GRAVEL
	10% fines	Well graded	SW-SM	<15% gravel	WELL GRADED SAND WITH SILT
				>15% gravel	WELL GRADED SAND WITH SILT AND GRAVEL
			SW-SC	<15% gravel	WELL GRADED SAND WITH CLAY
				>15% gravel	WELL GRADED SAND WITH CLAY AND GRAVEL
		Poorly graded	SP-SM	<15% gravel	POORLY GRADED SAND WITH SILT
				>15% gravel	POORLY GRADED SAND WITH SILT AND GRAVEL
			SP-SC	<15% gravel	POORLY GRADED SAND WITH CLAY
				>15% gravel	POORLY GRADED SAND WITH CLAY AND GRAVEL
	>15% fines	non-plastic fines	SM	<15% gravel	SILTY SAND
				>15% gravel	SILTY SAND WITH GRAVEL
		plastic fines	SC	<15% gravel	CLAYEY SAND
				>15% gravel	CLAYEY SAND WITH GRAVEL

STEP 2: DETERMINE PLASTICITY AND ASSIGN USCS GROUP SYMBOL

INCREASING PLASTICITY

NON PLASTIC | LOW PLASTICITY | MEDIUM PLASTICITY | HIGH PLASTICITY

ML | CL | CH

STEP 3: *CONTINUE WITH GROUP SYMBOL AND FOLLOW FLOW CHART TO ASSIGN A GROUP NAME*

FINE-GRAINED DEPOSITS

(>50% fines, <50% coarse-grained sediments)

STEP 4: DOES ORGANIC CONTENT INFLUENCE SOIL PROPERTIES?

YES / NO

			GROUP NAME
ML	<30% Coarse Grained Sediments	<15% Coarse-Grained Sediment	SILT
		15-25% Coarse-Grained Sediment, % sand> % gravel	SILT WITH SAND
		15-25% Coarse-Grained Sediment, % sand< % gravel	SILT WITH GRAVEL
	>30% Coarse Grained Sediments, % sand> % of gravel	<15% gravel	SANDY SILT
		>15% gravel	SANDY SILT WITH GRAVEL
	>30% Coarse Grained Sediments, % sand< % gravel	<15% sand	GRAVELLY SILT
		>15% sand	GRAVELLY SILT WITH SAND
CL	<30% Coarse Grained Sediments	<15% Coarse-Grained Sediment	LEAN CLAY
		15-25% Coarse-Grained Sediment, % sand> % gravel	LEAN CLAY WITH SAND
		15-25% Coarse-Grained Sediment, % sand< % gravel	LEAN CLAY WITH GRAVEL
	>30% Coarse Grained Sediments, % sand> % of gravel	<15% gravel	SANDY LEAN CLAY
		>15% gravel	SANDY LEAN CLAY WITH GRAVEL
	>30% Coarse Grained Sediments, % sand< % gravel	<15% sand	GRAVELLY LEAN CLAY
		>15% sand	GRAVELLY LEAN CLAY WITH SAND
CH	<30% Coarse Grained Sediments	<15% Coarse-Grained Sediment	FAT CLAY
		15-25% Coarse-Grained Sediment, % sand> % gravel	FAT CLAY WITH SAND
		15-25% Coarse-Grained Sediment, % sand< % gravel	FAT CLAY WITH GRAVEL
	>30% Coarse Grained Sediments, % sand> % of gravel	<15% gravel	SANDY FAT CLAY
		>15% gravel	SANDY FAT CLAY WITH GRAVEL
	>30% Coarse Grained Sediments, % sand< % gravel	<15% sand	GRAVELLY FAT CLAY
		>15% sand	GRAVELLY FAT CLAY WITH SAND
OL / OH	<30% Coarse Grained Sediments	<15% Coarse-Grained Sediment	ORGANIC SOIL
		15-25% Coarse-Grained Sediment, % sand≥ % gravel	ORGANIC SOIL WITH SAND
		15-25% Coarse-Grained Sediment, % sand< % gravel	ORGANIC SOIL WITH GRAVEL
	>30% Coarse Grained Sediments, % sand≥ % of gravel	<15% gravel	SANDY ORGANIC SOIL
		≥15% gravel	SANDY ORGANIC SOIL WITH GRAVEL
	>30% Coarse Grained Sediments, % sand< % gravel	<15% sand	GRAVELLY ORGANIC SOIL
		≥15% sand	GRAVELLY ORGANIC SOIL WITH SAND

ATTACHMENT C

SOIL AND ROCK DESCRIPTION SUMMARY

USDA SOIL TEXTURING FIELD FLOW CHART

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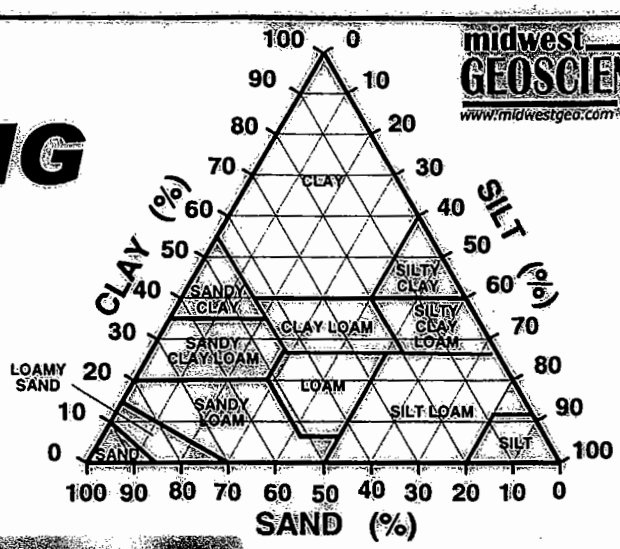


Remove any material larger than 2 mm in size and start with approximately 25g of sediment in palm. Add water dropwise and knead the soil to break down all aggregates. Stop adding water when soil is plastic and moldable.

Add dry sediment

Does soil hold together when squeezed? NO → Is soil too dry? NO → Is sediment too wet? NO → SAND

YES

Place ball of soil between thumb and forefinger, gently pushing the soil with the thumb, squeezing it upward into a ribbon. Form the ribbon with uniform thickness and width. Allow the ribbon to extend over the forefinger, breaking from its own weight.

Does the soil form a ribbon? NO → LOAMY SAND

Is the ribbon less than 2.5cm long before breaking? >2.5 CM? → Is the ribbon from 2.5 to 5.0cm long before breaking? >5.0 CM? → Is the ribbon greater than 5.0cm long before breaking?

Excessively wet a small pinch of soil in palm and rub with forefinger

Is soil very sandy? YES → SANDY LOAM	Does soil feel very gritty? YES → SANDY CLAY LOAM	Does soil feel very gritty? YES → SANDY CLAY
Is soil moderately sandy? YES → LOAM	Does soil feel slightly gritty? YES → SILTY CLAY LOAM	Does soil feel slightly gritty? YES → SILTY CLAY
Does sample have little or no sand? YES → SILT LOAM	Does soil feel smooth? YES → CLAY LOAM	Does soil feel smooth? YES → CLAY

TEXTURE MODIFIERS
Fragment Content % by Volume

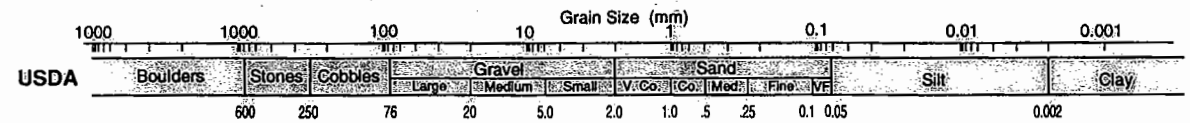
<15%	No modifier
15% to <35%	Add modifier
36% to <60%	Add "very" with modifier
60% to 90%	Add "extremely" with modifier
>90%	No modifier, use Size Class only

ROCK FRAGMENT MODIFIERS
Size Class & Quantity

Gravelly	>15% but <35% gravel
Fine Gravelly	>15% but <35% fine gravel
Medium Gravelly	>15% but <35% med. gravel
Large Gravelly	>15% but <35% large gravel
Very Gravelly	<35% but <60% gravel
Extremely Gravelly	>60% but <90% gravel
Cobbly	>15% but <35% cobbles
Very Cobbly	<35% but <60% cobbles
Extremely Cobbly	>60% but <90% cobbles
Stony	>15% but <35% stones
Very Stony	<35% but <60% stones
Extremely Stony	>60% but <90% stones
Bouldery	>15% but <35% boulders
Very Bouldery	<35% but <60% boulders
Extremely Bouldery	>60% but <90% boulders

COMPOSITIONAL TEXTURE MODIFIERS
Organic Class

Grassy	>15% grassy fibers
Herbaceous	>15% herbaceous fibers
Mossy	>15% moss fibers
Mucky	Minerals >10% but <17% fibers
Pealy	Minerals >10% but <17% fibers
Woody	>15% wood fragments or fiber



FIELD GUIDE FOR SOIL AND STRATIGRAPHIC ANALYSIS

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START HERE

DENSITY OR CONSISTENCY

COARSE GRAINED DEPOSITS	N-VALUE		FINE GRAINED DEPOSITS	N-VALUE	q_u (tsf)	
	0-4	► VERY LOOSE		0-2	<0.25	► VERY SOFT
	5-10	► LOOSE		3-4	0.25-0.50	► SOFT
	11-29	► MEDIUM DENSE		5-8	0.50-1.0	► MEDIUM
	30-49	► DENSE		9-15	1.0-2.0	► STIFF
	>50	► VERY DENSE		16-30	2.0-4.0	► VERY STIFF
				>30	>4.0	► HARD

COLOR
Use Standard Munsell Color Notation

IS THE COLOR A MATRIX COLOR?
- YES ► MATRIX COLOR — List in sequence, dominant first
- NO ► IS THE COLOR FROM A COATING OR CONCENTRATION?
  - YES ► COATING or CONCENTRATION — Note frequency, color, and size
  - NO ► MOTTLE — Note contrast, color, and size

CLASSIFICATION
Unified Soil Classification System - adopted ASTM D2488

COARSE-GRAINED DEPOSITS
>50% coarse-grained sediments, <50% fines

STEP 1: IS SEDIMENT COARSE-GRAINED OR FINE-GRAINED?

STEP 2: DETERMINE SAND VS. GRAVEL RATIO

INCREASING GRAIN SIZE

0.075 MM		5.0 MM		75 MM
SAND			GRAVEL	

0.075 MM	0.425 MM	2.0 MM	4.75 MM	19.0 MM	75 MM
FINE	MEDIUM	COARSE	FINE		COARSE

STEP 3: *CONTINUE WITH SAND OR GRAVEL ON FLOW CHART (REVERSE)*

FINE-GRAINED DEPOSITS
(organic and inorganic)
>50% fines, <50% coarse-grained sediments

STEP 2: DETERMINE PLASTICITY AND ASSIGN USCS GROUP SYMBOL

INCREASING PLASTICITY

NON PLASTIC	LOW PLASTICITY	MEDIUM PLASTICITY	HIGH PLASTICITY
ML	CL		CH

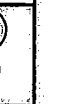
STEP 3: *CONTINUE WITH GROUP SYMBOL ON FLOW CHART (REVERSE)*

MOISTURE

MOISTURE ABSENT	► DRY
DAMP, NO VISIBLE WATER	► MOIST
VISIBLE WATER	► WET

PLASTICITY
(Use with CLASSIFICATION)

WILL NOT SUPPORT 6mm DIAMETER ROLL IF HELD ON END	► NON-PLASTIC
6mm DIA. ROLL CAN BE REPEATEDLY ROLLED AND SUPPORTS ITSELF, 4mm DIA. ROLL DOES NOT	► LOW PLASTICITY
4mm DIA. ROLL CAN BE REPEATEDLY ROLLED AND SUPPORTS ITSELF, 2mm DIA. ROLL DOES NOT	► MEDIUM PLASTICITY
2mm DIA. ROLL CAN BE REPEATEDLY ROLLED AND SUPPORTS ITSELF	► HIGH PLASTICITY



COHESIVENESS

6mm DIAMETER ROLL CANNOT BE FORMED	► NONCOHESIVE
6mm DIAMETER ROLL CAN BE FORMED	► COHESIVE

SEDIMENTARY STRUCTURE

UNIFORM BEDS >30cm	► MASSIVE
BEDS 3cm to 30cm	► THICKLY BEDDED
BEDS 0.5cm to 3cm	► BEDDED
BEDS <0.5cm	► THINLY BEDDED
	► LAMINATED

SECONDARY SOIL STRUCTURE (IN SOLUM ONLY)

Spheroidal peds or granules usually packed loosely	► GRANULAR
Irregular, roughly cubelike peds with planar faces (angular or subangular)	► BLOCKY
Flat and horizontal peds	► PLATY
Vertical, pillarlike peds with flat tops	► PRISMATIC
Vertical, pillarlike peds with curved tops (which are commonly "bleached")	► COLUMNAR

WEATHERING ZONE ABBREVIATION

MODIFIER SYMBOL (if present)		1st SYMBOL		2nd SYMBOL		LAST SYMBOL (if present)	
MOTTLED	► M	OXIDIZED	► O	LEACHED	► L	SECONDARY CARBONATE	► 2
JOINTED	► J	REDUCED	► R	UNLEACHED	► U		
		UNOXIDIZED	► U				

EXAMPLE: solum — OJL, MOJL, MOJL2, MOJU; MRJU, RJU, RU, UU

SECONDARY GRAIN SIZE INFORMATION

<5%	► TRACE	0.075mm to 0.425mm	(powdered sugar)	► FINE SAND	
6% to 15%	► LITTLE	0.425mm to 2.0mm	(sugar to table salt)	► MEDIUM-GRAINED SAND	
16% to 30%	► FEW	2.0mm to 4.75mm	(rocksalt)	► COARSE-GRAINED SAND	
31% to 45%	► SOME	4.75mm to 19.0mm	(pea to grape)	► FINE GRAVEL	
		19.0mm to 75.0mm	(grape to lemon)	► COARSE GRAVEL	

FOR GLACIAL DIAMICTONS ► CLAST FRACTION ► CLAST LITHOLOGY

DEPOSITIONAL ENVIRONMENT

VARIOUS DEPOSITIONAL ENVIRONMENTS (interpretation)
- ► EOLIAN (LOESS)
- ► FLUVIAL
- ► ALLUVIAL
- ► LACUSTRINE
- ► COASTAL
- ► RESEDIMENTED

GLACIAL DEPOSITIONAL PROCESSES
- ► SUBGLACIAL
- ► GLACIOFLUVIAL
- ► GLACIOLACUSTRINE
- ► RESEDIMENTED

GENERALIZED RESEDIMENTATION PROCESSES
- ► MASS SLUMP
- ► SEDIMENT FLOW
- ► COLLUVIUM

STRATIGRAPHIC NAME

USE FORMAL STATE GEOLOGICAL SURVEY NOMENCLATURE WHEN POSSIBLE;
IF NOT POSSIBLE, ASSIGN SITE-SPECIFIC UNIT NAME ACCORDING TO DEPOSITIONAL ENVIRONMENT / FACIES ASSEMBLAGE

STRATIGRAPHIC CONTACT

<2 cm	► SHARP (or ABRUPT for pedogenic alteration)
>2 cm (Note transition interval)	► GRADATIONAL

0110103

SOIL DESCRIPTION

GRAIN SIZE IDENTIFICATION

AME	SIZE LIMITS
Boulder	12" OR MORE
Cobbles	3" - 12"
Coarse Gravel	3/4" - 3"
Fine Gravel	4.76 mm (#4) - 3/4"
Coarse Sand	2 mm (#10) - 4.76 mm (#4)
Medium Sand	0.42 mm (#40) - 2 mm (#10)
Fine Sand	0.074 mm (#200)-0.42 mm (#40)
Silt	0.002 mm-0.074 mm (#200)
Clay	Less than 0.002 mm

RELATIVE DENSITY

NONCOHESIVE SOIL

TERM	SPT (Blows/ft)
Very Loose	Below 4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	OVER 50

COHESIVE SOILS

TERM	SPT (Blows/ft)
Very Soft	BELOW 2
Soft	2-4
Medium Stiff	4-8
Stiff	8-15
Very Stiff	15-30
Hard	OVER 30

MOISTURE	DESCRIPTIVE TERMS	
Dry	Trace	0-10%
Damp	Little	10-20%
Moist	Some	20-35%
Wet	And	35-50%

ROCK DESCRIPTIONS

HARDNESS

Very Soft -	Easily gouged by knife, easily scratched by fingernail, easily broken by hand
Soft -	Gouged by knife, scratched by fingernail, difficult to break by hand, powders with hammer
Medium Hard -	Easily scratched by knife, easily broken with hammer
Hard -	Difficult to scratch, breaks with hammer
Very Hard -	Difficult to break, rings when struck

WEATHERING

Decomposed -	Soft to Very soft, bedding and fractures indistinct, no cementation.
Highly Weathered -	Very soft to soft, with medium hard relict rock fragments: little to moderate cementation. Vugs, openings in bedding and fractures (may be filled).
Weathered -	Soft to medium hard. Good cementation, bedding and fractures are pronounced. Uniformly stained.
Slightly Weathered -	Medium hard. Fractures pronounced, non-uniform staining, bedding distinct.
Fresh -	Medium hard to hard. No staining. Fractures may be present. Bedding may or may not be indistinct.

BEDDING AND FRACTURES:

SPACING	BEDDING	FRACTURES
	Indistinct	
LESS THAN 1/2" (1 cm)	Laminated	Fissile
1/2" to 1" (1cm-3cm)	Very Thin	Very Close
1" TO 4" (3cm-10cm)	Thin	Close
4" TO 1' (10cm-30cm)	Moderate	Moderate
1' TO 3' (30 cm-1m)	Thick	Wide
3' TO 10' (1m-3m)	Massive	Very Wide

CONTACTS:

_____ = DEFINITE

__ __ __ = INDEFINITE

. . . . . = GRADATIONAL

SAMPLE TYPE

S = Split Spoon
T = Shelby Tube
R = Air Rotary
D = Denison
A = Auger
W = Wash (Roller Bit)
C = Core
P = Piston
N = No Sample Taken

ABBREVIATIONS

HS = Hollow Stem
NP = Non Plastic
-PL = Below the Plastic Limit
PL = At the Plastic Limit
+PL = Above the Plastic Limit
+LL = Above the Liquid Limit
SPT = Standard Penetration Test
RQD = Rock Quality Designation

ROCK SYMBOLS

- CONGLOMERATE
- BRECCIA
- SANDSTONE
- SILTSTONE
- SHALE
- CLAYSTONE
- LIMESTONE
- DOLOMITE
- COAL
- VOID
- UNDIFFERENTIATED

HARDNESS

V. SOFT - CORE RECOVERY <30%, EASILY GOUGED BY KNIFE OR SCREWDRIVER, EASILY SCRATCHED BY FINGERNAIL, EASILY BROKEN BY HAND

SOFT - CORE RECOVERY 30 - 75%, GOUGED BY KNIFE OR SCREWDRIVER, SCRATCHED BY FINGERNAIL, DIFFICULT TO BREAK BY HAND, POWDERS w/HAMMER

MED. HD. - CORE RECOVERY > 75%, EASILY SCRATCHED BY KNIFE OR SCREWDRIVER, EASILY BROKEN BY HAMMER

HD. - DIFFICULT TO SCRATCH, BREAKS w/HAMMER

V. HD. - DIFFICULT TO BREAK, RINGS WHEN STRUCK

SPACING	BEDDING	FRACTURES
	INDISTINCT	
LESS THAN ½" (1cm)	LAMINATED	FISSILE
½" To 1" (1cm–3cm)	VERY THIN	VERY CLOSE
1" To 4" (3cm–10cm)	THIN	CLOSE
4" To 1' (10cm–30cm)	MODERATE	MODERATE
1' To 3' (30cm–1m)	THICK	WIDE
3' To 10' (1m–3m)	MASSIVE	VERY WIDE

WEATHERING

DECOMPOSED - SOFT - V. SOFT, BEDDING AND FRACTURES INDISTINCT, NO CEMENTATION

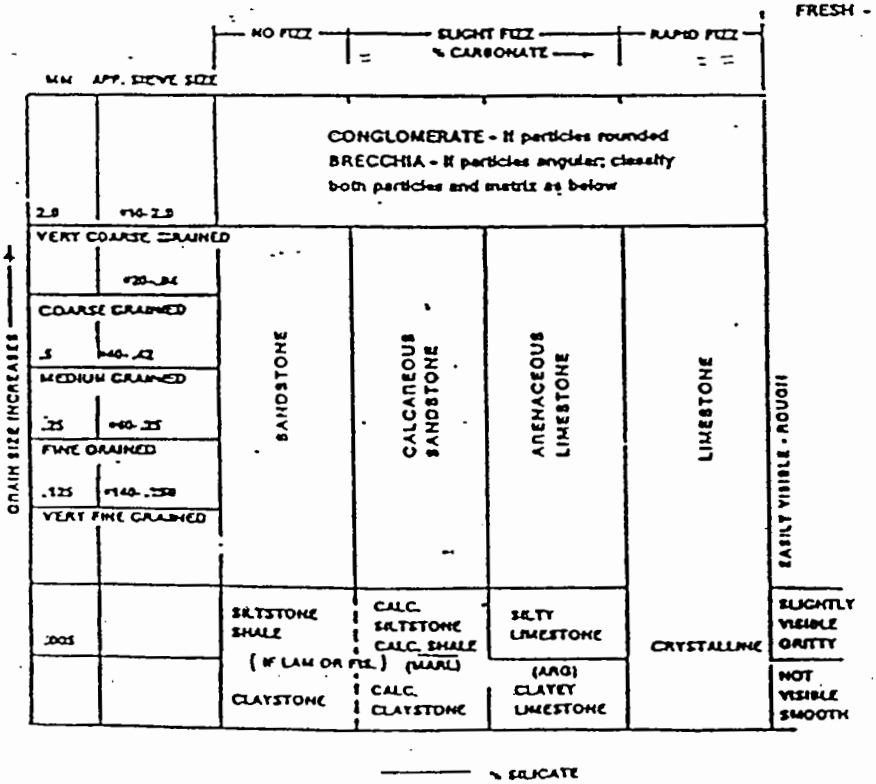
HL. WTHR. - V. SOFT - SOFT, w/MED. HD. RELICT ROCK FRAGMENTS; LITTLE TO MOD. CEMENTATION, VUGS, OPENINGS IN BEDDING AND FRACTURES (MAY BE CLAY OR CALC. FILLED)

WTHR. - SOFT TO MED. HD., GOOD CEMENTATION, BEDDING AND FRACTURES ARE PRONOUNCED, UNIFORMLY STAINED

SL. WTHR. - MED. HD., FRACTURES PRONOUNCED, NON-UNIFORM STAINING, BEDDING DISTINCT

FRESH - MED. HD. TO HD., NO STAINING, FRACTURES MAY BE PRESENT, BEDDING MAY OR MAY NOT BE DISTINCT

COMMON LOCAL SEDIMENTARY ROCK CLASSIFICATIONS



RQD = $\frac{L}{R}$ — NTYPE CORE ONLY

L = TOTAL LENGTH IN A RUN OF CORE PIECES LONGER THAN 4"

R = LENGTH OF THE RUN

ROCK DESCRIPTIONS

FIELD EQUIPMENT OPERATION AND MAINTENANCE PROCEDURES - SURFACE SOIL SAMPLING

Page 1 of 3
SOP Number: F102
Effective Date: 08/06

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1.0 PURPOSE
2.0 SCOPE AND APPLICATION
3.0 LOG FORM INFORMATION
4.0 PROCEDURES

SURFACE SOIL SAMPLING

1.0 PURPOSE

This SOP defines and standardizes the collection of surface soil samples (e.g., 0 to 2 in. below ground surface).

2.0 SCOPE AND APPLICATION

The SOP procedures listed below may be modified in the field upon the agreement of the lead sampler, field personnel and NYSDEC personnel/representatives, based on field conditions, after appropriate annotations have been made in the field logbook. If specialized sampling methods (e.g., TerraCore®) are to be used, refer to the manufacturer's recommended procedures. If methanol preservation is required, refer to Michael Baker's SOP on methanol preservation of soil samples. Record all pertinent information on Michael Baker's surface soil sampling field data form or field logbook.

3.0 EQUIPMENT AND SUPPLIES REQUIRED

- Decontaminated sampling tool (stainless-steel shovel, scoop, trowel, or spoon)
- Large stainless-steel mixing bowl and spoon
- Laboratory-supplied sample containers, insulated coolers, and ice
- Chain-of-custody forms, custody seals, sample labels
- Ziploc® bags
- Camera
- Tape measure
- Field logbook, surface soil field collection form, and pens
- Project-specific work plan and health and safety plan (HASP)
- All sampling equipment/materials will be certified PFAS and 1-4, dioxane free.

4.0 PROCEDURES

1. Locate the sample station as directed in the project specific work plan. Label containers with sample tags prior to filling in accordance with Michael Baker's SOP on sample labeling (SOP F301). If analytical testing will be performed for volatile organic compounds (VOCs), collect the VOC sample first (with a minimum of disturbance) by placing the sample into the container with a minimum amount of headspace and sealed tightly.

2. Don a new pair of nitrile gloves and expose the soil surface by clearing an approximately 1 ft2 area at the sampling location of any rocks, other solids material/debris, or organic

material greater than approximately 3 in. in size. Note any material removed from the sampling location in the field logbook and photo-document the location prior to sampling.

3. Using a decontaminated stainless-steel sampling tool, excavate soil to the depth specific in the work plan.

4. If required for analysis, first collect VOC samples (prior to any homogenization) from a discrete location, placing the samples in the appropriate containers. Label sample containers before filling in accordance with Michael Baker's SOP on sample labeling (SOP F301).

5. Place additional sample material in decontaminated plastic or stainless-steel mixing bowl.

6. Describe the soil in accordance with ASTM D2488-00 (see Michael Baker's SOP on field classification of soils, SOP F101).

7. Thoroughly mix and homogenize the sample using disposable equipment or a decontaminated stainless-steel spoon until the color and texture are consistent throughout.

8. If required for analysis, first collect samples for grain-size tests before any large rocks are removed from the homogenized soil.

9. Identify any rocks or other solid material/debris that are greater than 0.5 in. in diameter. Determine their percentage contribution to the homogenized soil volume, note it on the surface soil field collection form or in the field logbook, and then discard.

10. Remove samples of the homogenized soil from the mixing bowl with the decontaminated stainless-steel spoon and place in the appropriate size sample container. Do not touch the sample with your gloves. Fill the sample container with soil to just below the container lip and seal the container tightly. Label sample containers before filling in accordance with Michael Baker's SOP on sample labeling.

11. Mark the sampling location with a wire flag, wooden stake, metal rebar, or flagging, as appropriate.

12. Complete all pertinent field QA/QC documentation, logbooks, sample labels, and field data sheets. Record any deviations from the specified sampling procedures or any obstacles encountered.

13. Photograph sample location and document it in the logbook.

14. Decontaminate all sampling equipment according to Michael Baker's SOP on decontaminating equipment for soil sampling (SOP F502) and in accordance with the project-specific work plan.

FIELD EQUIPMENT OPERATION AND MAINTENANCE PROCEDURES - SHALLOW SOIL SAMPLING

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SOP Number: F103
Effective Date: 08/06

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2.0 EQUIPMENT AND SUPPLIES REQUIRED

3.0 HAND AUGER SAMPLER

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4.1 Open-Tip Sampler

4.2 Closed-Tip Sampler

4.3 General Sampling Procedures

4.4 Test Pit Excavations

SUBSURFACE SOIL SAMPLING

1.0 SCOPE AND APPLICATION

The following procedures are designed to be used to collect subsurface soil samples using a hand auger, direct-push drill rig, or test pit excavation. All underground utilities must be located and cleared prior to drilling or excavating. Soil samples should be collected from areas having lower levels of constituents of interest first, followed by stations with higher expected levels of constituents of interest.

Based on field conditions, the procedures listed below may be modified in the field upon agreement of the field team leader, project management and will be discussed and approved by NYSDEC personnel/ representatives prior to the sampling, after appropriate annotations have been made in the project-specific field logbook. If specialized sampling methods (e.g., Encore®) are to be used, refer to the manufacturer's recommended procedures. Record all pertinent information in the Michael Baker field logbook, subsurface soil field collection form or boring log (as appropriate).

2.0 EQUIPMENT AND SUPPLIES REQUIRED

- Subsurface sampling equipment (e.g., hand auger, direct-push drill rig [e.g., Geoprobe®], stainless-steel spade) (consult project-specific field sampling plan [FSP] for kin of equipment to be used for a specific field event)
- Large stainless-steel mixing bowl and spoon
- Laboratory-supplied sample containers, insulated coolers, and ice
- Chain-of-custody forms, custody seals, sample labels
- Resealable plastic bags (e.g., Ziploc®)
- Camera
- Tape measure
- Logging Table
- 6-mil visqueen and duct tape for covering the logging table
- Aluminum foil
- 55-gallon drums for decontamination waters and excess soil (separate drums for liquid and soil wastes) if required by the project-specific FSP
- Field logbook, subsurface soil field collection form, and/or soil boring forms, and pens
- Project-specific FSP and health and safety plan (HASP)
- Personal protective equipment (PPE) (safety glasses, steel-toed boots, nitrile gloves, and any other items required by the project-specific HASP)
- Photoionization detector (PID), if required by the project-specific FSP or HASP
- Global positioning system (GPS), if required by the project-specific FSP
- Decontamination equipment.

3.0 HAND AUGER SAMPLER

The following procedures are designed to be used during the general operation of a hand auger sampler. Hand augering is not proposed for the 3148 Van Etten property as other sampling methods will be considered first. However, if hand augering is considered necessary based on field conditions, hand augering for sample acquisition will be considered after discussion with NYSDEC personnel. The procedures listed below may be modified in the field upon agreement of the field team leader and drill operators, based on field conditions, after appropriate annotations have been made in the field logbook.

1. Locate the sample station as directed in the project-specific FSP. Place sample labels on the sample container prior to filling in accordance with Michael Baker's SOP on sample labeling (SOP F301).
2. Place plastic sheeting adjacent to the sampling location.
3. Advance the hand auger into subsurface soil.
4. Empty soil from the first interval (as specified in the project-specific FSP) from the hand auger into a decontaminated stainless-steel bowl and cover the bowl with aluminum foil. Continue advancing the hand auger until the next appropriate sample interval has been completed.
5. Screen the soil sample for volatile organic compounds (VOCs) using a PID if required by the project-specific FSP.
6. Photograph each interval with depth and location markers visible in the photograph, if application.
7. Log the soils in accordance with SOP F101 (*Field Classification of Soils*).
8. If VOC samples are required (see project-specific FSP), collect them prior to homogenizing (i.e., mixing) the sample. Collect the VOC sample (with a minimum of disturbance) by placing the sample into the container with no headspace and sealing it tightly. If an Encore® sampling device is specific in the project-specific FSP, follow the sample collection guidelines provided by the manufacturer.
9. (a) if the soil sample is to be a discrete sample (see project-specific FSP), collect soil form the hand auger using a decontaminated stainless-steel spoon and place the sample into a decontaminated stainless-steel bowl. Homogenize the soil to a consistent color and texture. (b) If additional sample volume is required to perform the analyses specified in the project-specific FSP, place multiple soil samples collected from nearby locations (it is important to keep the distance between multiple soil borings as close as possible; the maximum distance will be specified in the project-specific FSP) form the same depth interval into a composite sample in a single decontaminated stainless-steel bowl. When a sufficient volume of soil has been obtained, homogenize all of the soil in the bowl to a consistent color and texture using a decontaminated spoon.
10. Discard rocks or other solid material/debris, found in the homogenized soil that are greater than 0.5 in. in diameter after positively identifying them, determining their percentage contribution to the homogenized soil volume, and noting it in the field notebook.
11. Remove samples of the homogenized soil from the compositing bowl and place in the appropriate size container. Fill the sample container with soil to just below the container lip and seal the container tightly.
12. Decontaminate all sampling equipment in accordance with SOP F502 and the project specific FSP.
13. Repeat the process described above for all subsequent sample intervals.
14. Complete the appropriate field books, field data sheets, and quality assurance and quality control (QA/QC) documentation. Record any deviations from the specified sampling procedures or any obstacles encountered.
15. Backfill the borehole with remaining hand auger soil cuttings or place the cuttings in a properly labeled 55-gallon drum, as specified in the project-specific FSP. If soil cuttings are placed in a 55-gallon drum, backfill the borehole with bentonite hole plug pellets and hydrate the pellets with potable water.
16. Mark the sampling location with a wire flag, wooden stake, metal rebar, or flagging, as appropriate. Collect GPS coordinates of the sample location if specified in the project-specific FSP.

4.0 DIRECT-PUSH DRILL RIG

The following procedures are designed to be used during the general operation of direct-push drill rig (e.g., Geoprobe®). The procedures listed below may be modified in the field upon agreement of the field team leader and drill operators, based on field conditions, after appropriate annotations have been made in the field logbook. The direct-push drill rig will be operated by a licensed drilling contractor.

The direct-push drilling technique hydraulically pushes tools into the ground to collect soil samples. Direct-push drilling techniques can be used to collect soil samples to depths of 30-100 ft, depending on drilling conditions. In addition to soil sample collection, direct-push techniques can be used to collect soil gas samples, reconnoiter groundwater samples, and install small-diameter monitoring wells.

Soil samples can be collected using two types of Macrocore® samplers, open tip and closed tip. These samplers are typically either 4 ft long by 1.5 in. inside diameter (i.d.) or 5 ft long by 2.5 in. i.d. These samplers have a tubular design and utilize acetate liners to collect the soil samples. The following sections of this SOP describe how to collect soil samples using oper-tip and closed-tip Macrocore® samplers.

4.1 Open-Tip Sampler

The open-tip sampler is typically used in soils that are cohesive (e.g., stiff silts and clays), where the soil boring is stable and stays open when the sampler and rods are removed from the ground.

1. Ensure all underground utilities are cleared prior to initiating drilling activities.
2. Position the direct-push drill rig over the sample station and remove any surface material that will interfere with sampling. Note in the field logbook any surface material that is removed prior to sampling.
3. Determine the interval to be sampled and install a new clean liner into the open tip Macrocore® sampler.
4. Push the sampler to the bottom of the appropriate sample interval.
5. Retract the rods and Macrocore® sampler.
6. After the Macrocore® sampler has been brought to the surface, remove the liner from the sampler, cap both ends of the liner, and inspect it.
7. After the soil sample is judged to be acceptable, label the sample liner with the station identifier, depth interval, and soil orientation (i.e., arrow pointing toward uppermost soil interval).
8. Place the capped sample liner on a new piece of aluminum foil on the logging table and split the liner open with a hook or utility knife. Process the sample in accordance with the "General Sampling Procedures" listed below.
9. Repeat Steps 2-8 for each subsequent sample interval.

4.2 Closed-Tip Sampler

The closed-tip sampler is typically used to collect soil samples that are noncohesive (e.g., sandy materials), where the soil boring is unstable and collapse when the rods and sampler are removed from the ground.

1. Ensure all underground utilities are cleared prior to initiating drilling activities.

2. Position the direct-push drill rig over the sample station and remove any surface material that will interfere with sampling. Note in the field logbook any surface material removed prior to sampling.
3. Determine the interval to be sampled and install a drive point and new clear liner into the closed-tip Macrocore® sampler.
4. Push the rods and sampler to the top of the appropriate sample interval.
5. Retract the rods to release the drive point.
6. Push the sampler to the bottom of the appropriate sample interval.
7. Retract the rods and Macrocore® sampler.
8. Once the soil sample has been brought to the surface, remove the liner from the sampler, cap both ends of the liner, and inspect it.
9. After the soil sample is judged to be acceptable, label the sample liner with the station identifier, depth interval, and soil orientation (i.e., arrow pointing toward uppermost soil interval).
10. Place the capped sample liner on a new piece of aluminum foil on the logging table and split the liner open with a hook or utility knife. Process the sample in accordance with the "General Sampling Procedures" listed below.
11. Repeat Steps 2-10 for each additional sample interval.

4.3 General Sampling Procedures

1. After the liner has been split open, screen the soil sample for VOCs using a PID if required by the project-specific FSP.
2. Log the soils in accordance with SOP F101 (Field Classification of Soils).
3. Photograph each section of the soil boring with appropriate orientation, depth, and location markers visible in the photograph, if specified in the project-specific FSP.
4. If VOC samples are required (see project-specific FSP), collect them prior to sample removal from the liner. Collect the VOC sample (with a minimum of disturbance) by placing the sample into the container with no headspace and seal it tightly. If an Encore® sampling device is specified in the project-specific FSP, follow the sample collection guidelines provided by the manufacturer.
5. Remove the soil from the liner using a decontaminated stainless-steel spoon and place the soil in a decontaminated compositing bowl and thoroughly mix and homogenize the sample using a decontaminated spoon until the color and texture are consistent throughout.
6. Discard rocks or other solid material/debris found in the homogenized soil that are greater than 0.5 in. in diameter after positively identifying them, determining their percentage contribution to the homogenized soil volume, and noting it in the field notebook.
7. Remove samples of the homogenized soil from the compositing bowl and place in the appropriate size sample container. Fill the sample container with soil to just below the container lip, and seal the container tightly.
8. Repeat the process described above for subsequent sample intervals.
9. Complete the appropriate field books, field data sheets, and QA/QC documentation. Record any deviations from the specified sampling procedures or any obstacles encountered.

11. Backfill the borehole with remaining direct-push sampler cuttings or place the cuttings in a properly labeled 55-gallon drum, as specified in the project-specific FSP. If soil cuttings are placed in a 55-gallon drum, backfill the borehole with bentonite grout (mixed to the manufacturer's specifications) or bentonite hole plug pellets and hydrate the pellets with potable water.
12. Mark the sampling location with a wire flag, wooden stake, metal rebar, or flagging, as appropriate. Collect GPS coordinates of the sample location if specified in the project-specified FSP.
13. Decontaminate all sampling equipment in accordance with SOP F502 and the project-specific FSP.

4.4 Test Pit Excavations

The following procedures are to be used during the excavation of pits with construction equipment (i.e., backhoe or track-hoe) prior to soil sampling operations. Adhere to all requirements of the site-specific HASP for this specific activity. The procedures listed below may be modified in the field upon agreement of the field team leader and project management, based on field and site conditions, after appropriate annotations have been made in the field logbook.

1. Locate the sample station as directed in the project-specific FSP. Ensure all underground utilities have been cleared prior to initiating excavation activities. Place sample labels on all sample containers prior to filling in accordance with Michael Baker's SOP for sample labeling (SOP F301).
2. Select the appropriate orientation for the excavation, basing it on the judgment of the field team leader, backhoe operator, and onsite conditions. Sampling personnel MUST remain in visual contact with the backhoe operator at all times, and out of possible "pinch zones" or areas where heavy equipment may move or swing.
3. Place plastic sheeting from the edge of the proposed excavation leading away for a sufficient distance of the proposed temporary stockpile location so that the excavated soil does not slough back into the pit.
4. Begin pit excavation.
5. Continue excavation of the pit to the required depth. If pit entry is necessary, this depth will not exceed 4 ft from the ground surface. Never enter a trench or pit it conditions are unstable. Excavate the proper pit exit trenches, shoring, and sloping to prevent accidental burial of sampling crew, and to meet or exceed all OSHA Construction Standard (1926, Attachment 201-2) for entrance by sampling personnel. If pit entry is not necessary for sampling activities, pit depth can exceed 4 ft below ground surface. Instruct the backhoe operator to scrape material evenly along an exposed face to collect (to the extent practicable) a representative sample of the soil across the entire face in the bucket. Collect soil samples from the middle of the backhoe bucket.
6. Screen the soil sample for VOCs using a PID if required by the project-specific FSP.
7. Photograph each interval with depth and site markers visible in the photograph, if applicable.
8. Log the test pit soils in accordance with SOP F101 (*Field Classification of Soils*).
9. If VOC samples are required (see project-specific FSP), collect them prior to homogenizing (i.e., mixing) the sample. Collect the VOC sample (with a minimum of disturbance) by placing the sample into the container with no headspace and seal it tightly. If an Encore®

sampling device is specified in the project-specific FSP, follow the sample collection guidelines provided by the manufacturer.

10. Collect soil using a decontaminated stainless-steel spoon or disposable sampling tool (depending on project-specific requirements; see FSP), which has been evenly removed from the face of the trench wall or from the bucket, and place the sample into a decontaminated stainless-steel bowl. Homogenized the soil to a consistent color and texture.
11. Discard rocks found in the homogenized soil that are greater than 0.5 in. in diameter after positively identifying them, determining their percentage contribution to the homogenized soil volume, and noting it in the field notebook.
12. Remove samples of the homogenized soil from the compositing bowl and place them in the appropriate site sample container. Fill the sample container with soil to just below the container lip and seal it tightly.
13. Decontaminate all sampling equipment in accordance with SOP F502 and the project-specific FSP.
14. Repeat the process described above for all subsequent sample intervals.

15. Complete all pertinent field logbooks, field data sheets, and QA/QC documentation. Record any deviations from the specified sampling procedures or any obstacles encountered.
16. Mark the sampling location with a wire flag, wooden stake, metal rebar, or flagging, as appropriate. Collect GPS coordinates of the sample location if specified in the project-specific FSP. Photograph sample location and document in the logbook.
17. Backfill the test pit with the excavated soils. Depending on historical site data (see project-specific FSP), the plastic sheeting will either be disposed of as garbage or it will be drummed and sent to the appropriate disposal facility.

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MONITORING WELL INSTALLATION

1.0 PURPOSE

The purpose of this procedure is to provide general guidance and reference material regarding the installation of monitoring wells at various sites.

2.0 SCOPE

This SOP describes the methods of installing a groundwater monitoring well and creating a Monitoring Well Installation Record. This SOP does not discuss drilling, soil sampling, borehole logging or related activities. These other activities are discussed in SOPs F101, F102 and F101 entitled Borehole and Sample Logging, Surface Soil Sampling and Shallow Soil Sampling, respectively.

3.0 DEFINITIONS

Monitoring Well - A monitoring well is a well which is properly screened, cased, and sealed to intercept a discrete zone of the subsurface, and is capable of providing a groundwater level and sample representative of the zone being monitored.

Piezometer - A piezometer is a pipe or tube inserted into an aquifer or other water-bearing zone, open to water flow at the bottom, open to the atmosphere at the top, and used to measure water level elevations. Piezometers are not used for the collection of groundwater quality samples or aquifer characteristic data other than water level elevations.

Drive Point - A monitoring well which includes a screen casing and hardened point fabricated from stainless steel that is driven into the soil to complete the well. The drive point can also be installed by hand augering to try to formulate a sand pack around the screen.

4.0 RESPONSIBILITIES

Project Manager - It is the responsibility of the Project Manager to ensure that field personnel installing monitoring wells are familiar with these procedures. The Project Manager also is responsible for ensuring that all appropriate documents (e.g., test boring logs, monitoring well construction logs, etc.) have been correctly and completely filled out by the drilling inspector.

Field Team Leader - The Field Team Leader is responsible for the overall supervision of all drilling, boring and well installation activities, and for ensuring that the well is completely and correctly installed and logged. The Field Team Leader also is responsible for ensuring that all drilling inspectors have been briefed on these procedures. The Field Team Leader is responsible to provide copies of the well construction logs and field logbooks to the Project File via the Project Manager on a weekly basis, unless otherwise specified by the Project Manager.

Drilling Inspector (Site Geologist) - The Drilling Inspector or Site Geologist is responsible for the direct supervision of drilling and well installation activities, and typically also is responsible for health and safety issues. It is the Drilling Inspector's responsibility to record details of the well installation, document subsurface conditions, complete the appropriate forms, supervise the drilling crew (or drilling supervisor), and record quantities of the drillers billable labor and materials.

5.0 PROCEDURES

The objectives for the use of each monitoring well and of the entire array of wells must be clearly defined before the monitoring system is designed. Within the monitoring system, different monitoring wells may serve different purposes and, therefore, may require different types of construction. During all phases of the well design (both office and field), attention must be given to clearly documenting the basis for design decisions, the details of well construction, and the materials used.

The objectives for installing monitoring wells may include:

- Determining groundwater flow directions and velocities.
- Sampling or monitoring for groundwater contamination.
- Determining aquifer characteristics (e.g., hydraulic conductivity).
- Facilitating site remediation via injection or recovery.

In cases where only the groundwater flow direction or velocity needs to be determined, cluster piezometers or wells (i.e., wells completed to different depths in different boreholes at one data collection station) may be used. For groundwater quality monitoring or aquifer characteristic determination, monitoring wells or cluster / nested wells should be used. In areas that are inaccessible to drill rigs (i.e., unstable surface soils), driven wells (drive points) may be used.

Placement of monitoring wells should be performed after a preliminary estimation of groundwater flow direction. Typically, site visits, topographic mapping, regional/local hydrogeologic information, previously installed piezometers or monitoring wells, and/or information supplied by local drilling companies will provide information for placement of the wells. Flexibility should be maintained, so that well locations may be modified during the field investigation to account for site conditions (e.g., underground utilities). The elevation and horizontal location of all monitoring wells should be determined through a site survey upon completion of well installation.

5.1 Well Installation

The methods discussed in this section are applicable to shallow, small diameter monitoring wells. Project-specific modifications to these methods should be documented in the Work Plan. These modifications may include larger diameter shallow wells, extraction wells, deep monitoring wells requiring surface casing and other specially constructed well types.

Upon completion of each boring, monitoring wells will be constructed using 2-inch inside diameter (I.D.) screen and riser typically composed of Schedule 40 PVC, threaded, flush-joint riser (casing) with a #10 slot (0.010-inch diameter), threaded, flush-joint PVC screen. A larger or smaller diameter screen may be used to accommodate site-specific geologic conditions. A PVC threaded end cap will be installed at the bottom of each screen to act as a settling cup for fine grained material (e.g., silt) that may pass through the filter pack and screen.

An appropriate length of well screen should be installed in each boring. The length of screen typically varies from 5 to 20 feet depending on site-specific conditions. The screen should be installed such that at least 2 feet of screen is above the water table and the remainder of the screen extends below the water surface. Should very shallow water table conditions be encountered or if the focus is on a specific thin water-bearing zone, the screened interval may be reduced.

The annular space between the well screen and the open borehole (annular space) is to be backfilled with a well-sorted (uniform size) quartz sand as the hollow-stem augers are being withdrawn from the borehole. The sand size used in well construction will be appropriate for the formation monitored by the well. Sand should carefully be placed from the bottom of the borehole to approximately 2 feet above the top of the screened interval. A lesser distance above the top of the screened interval may be packed with sand if the well is shallow to allow enough vertical distance for placement of the sealing materials and protective casing.

A sodium bentonite seal at least 2-foot thick should be place above the sand pack (if distance up to ground surface allows). The bentonite seal should be hydrated with potable water if it lies above the water table. For deeper wells, a bentonite slurry may be more appropriate than pellets or chips due to problems with bridging in the annular space.

The annular space above the bentonite seal will be backfilled with a cement-bentonite grout. The grout will be tremied into the annular space if greater than 20 feet deep. If the annular space is less than 20 feet deep, the grout may be poured directly into the annular space. Casing and/or augers will continually be removed as the grout is incrementally installed around the well.

The depth intervals of all backfill materials should be measured with a weighted measuring tape to the nearest 0.1foot and recorded on the Field Well Construction Record and/or in a field logbook.

5.2 Surface Completion

There are several methods for surface completion of monitoring wells. Two typical methods are presented below.

The first method considers wells completed above grade (stick-up casing). The aboveground section of the PVC riser pipe will be protected by installation of a 4- to 6-inch diameter, 5-foot long steel casing (with locking cap and lock) anchored into either concrete or cement grout. The bottom of the surface casing will be placed at a minimum of 2-1/2, but not more than 3-1/2 feet below the ground surface. For very shallow wells, a steel casing of less than five feet in length may be used, as space permits. The protective steel casing should not fully penetrate the bentonite seal. A concrete apron (typically a 2’ x 2’ pad) should be constructed around the steel casing, as applicable. Furthermore, in areas of potential damage, protective bollards may also be installed at the corners of the concrete pad to mitigate potential damage to the well casing itself.

The second method considers flush-mounted wells, typically installed where a stick-up installation would present a traffic hazard. The monitoring well should be completed at the surface using a "flush" manhole-type cover. The well should be completed by construction of a concrete apron (typically 2’ x 2’). The concrete should be crowned to meet the finished grade of the surrounding pavement, as required. If appropriate, the vault around the buried wellhead will have a water drain to the surrounding soil and a watertight cover.

5.3 Well Development

There are two stages of well development; initial and sampling. Sampling development (i.e., purging) is described in SOP F105, Groundwater Sample Acquisition. Initial development takes place after the completion materials have stabilized, as the last part of well construction. The purposes of the initial development are to stabilize and increase the permeability of the filter pack around the well screen, to restore the permeability of the formation which may have been reduced by the drilling operations, and to remove fine-grained materials that may have entered the well or filter pack during installation. The selection of the well development method typically is based on drilling methods, well construction and installation details, and the characteristics of the aquifer. Any equipment that is introduced into the well during development should be decontaminated in accordance with the SOP F502, entitled "Decontamination of Drilling Rigs and Monitoring Well Materials."

Well development should not be initiated until a minimum of 24 hours has elapsed subsequent to well completion. This time period will allow the cement grout to set. However, if the entire grout column within the annulus does not contact the aquifer (including confined conditions), the well may be developed soon after construction completion. Wells typically are developed using bailers, pumps, or surging with a surge block or air. The appropriate method should be specified in the work plans.

In general, wells should be developed until groundwater runs relatively clear of fine-grained materials. Typical limits placed on well development may include any one of the following:

- Clarity of water based on visual determination.
- A minimum pumping time period (typically one hour for shallow wells 10 to 30 feet deep).
- A minimum borehole volume (typically three to five borehole volumes) or until the well goes dry a minimum number of times (typically two).
- Stability of specific conductance, turbidity, and temperature measurements (typically less than 10 percent change between three successive measurements).

In addition, a volume equal to any water added during drilling should be removed above and beyond the requirements specified above.

Well development limits should be specified in project-specific plans. A record of the well development also should be completed to document the development process.

Usually, a minimum period of one week should elapse between the end of initial development and the first sampling event for a well. This equilibration period allows groundwater unaffected by the installation of the well to occupy the vicinity of the screened interval. However, this stabilization period may be adjusted based upon project-specific requirements.

5.4 Contaminated Materials Handling

SOP F503, entitled "Handling of Site Investigation Derived Waste," discusses the procedures to be used for the handling of auger cuttings, decontamination water, steam pad water, and development and purge water. Specific handling procedures should be delineated in the Sampling and Analysis Plan or Work Plan. In general, all site investigation-derived wastes (IDW), e.g., auger cuttings, decontamination water, steam pad water, and development and purge water, should be containerized unless otherwise specified in the Work Plan. The disposition of these wastes should be determined after receipt of the appropriate analytical results.

5.5 Well Construction Records

The Drilling Inspector will complete Well Construction Records for each monitoring well installed.

The following items should be recorded on the Field Well Construction Record and the field logbook, as appropriate:

- Project name and location.
- Project and Task number.
- Date and weather.
- Well identification number
- Drilling company and driller.
- Pay items including amount of screen and riser pipe used, amounts of cement, bentonite and sand used, and other well construction items.
- Well casing, augers, and borehole diameters.
- Elevations of (and depth to) top of steel casing, PVC casing, bottom of well, top of filter pack, top of bentonite seal, top of screen (elevations calculated post field from survey results).

6.0 QUALITY ASSURANCE RECORDS

The Well Construction Record is the principle quality assurance record generated from well installation activities. Additionally, a Well Development Record should also be completed, as well as pertinent comments in the field logbook.

7.0 REFERENCES

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FIELD EQUIPMENT OPERATION AND MAINTENANCE PROCEDURES - LOW FLOW PURGING AND SAMPLING PROCEDURE FOR GROUNDWATER SAMPLING

SOP Number: F105
Effective Date: 08/06

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**LOW FLOW PURGING AND SAMPLING PROCEDURE
FOR GROUNDWATER SAMPLING**

1.0 PURPOSE

The purpose of this guideline is to provide general reference information on the sampling of groundwater wells. The methods and equipment described are for the collection of water samples from the saturated zone of the subsurface utilizing low flow purging techniques.

2.0 SCOPE

This guideline provides information on proper sampling equipment and techniques for groundwater sampling. Review of the information contained herein will facilitate planning of the field sampling effort by describing standard low flow purging and sampling techniques. The procedures described should be followed whenever applicable, noting that site-specific conditions or project-specific plans may require adjustments in methods.

These procedures provide overall technical guidance for collecting groundwater samples that are indicative of mobile organic and inorganic loads at ambient flow conditions (both the dissolved fraction and the fraction associated with mobile particulates).

The Standard Operating Procedure (SOP) emphasizes the need to minimize aquifer stress by minimizing drawdown within the well, and low pumping rates (typically less than 1 liter/min) in order to collect samples with minimal alterations to water chemistry. This SOP best suited for monitoring wells that can accept a submersible pump and have a screened interval (or open length) of 10 feet or less. However, this procedure can be used in a variety of well construction and ground-water yield situations. Samples thus obtained are suitable for analyses of groundwater contaminants (volatile and semi-volatile organic analytes, pesticides, PCBs, PFAS, metals and other inorganics), or other naturally occurring analytes. This procedure does not address the collection of samples from wells containing light or dense non-aqueous phase liquids (LNAPLs and DNAPLs, respectively).

The screened interval of the monitoring well should be located (both laterally and vertically) to intercept existing contaminant plume(s) or along flow paths of potential contaminant releases. It is presumed that the analytes of interest move (or potentially move) primarily through the more permeable zones within the screened interval.

Ideally, the pump intake should be located between the upper third of the saturated screen length portion and the mid-point of the saturated screen length (which should not exceed 10 feet).

Stabilization of indicator field parameters is used to indicate that conditions are suitable for sampling to begin. Achievement of turbidity levels of less than 5 NTU and stable drawdown of less than 0.3 feet, while desirable, are not mandatory. Sample collection may still take place provided the remaining criteria in this procedure are met. If after one hour (or three well volumes, whichever is sooner) of purging, indicator field parameters have not stabilized, discontinue purging, collect samples and provide full explanation of attempts to achieve stabilization.

3.0 DEFINITIONS

None.

4.0 RESPONSIBILITIES

Project Manager - The Project Manager is responsible for ensuring that project-specific plans are in accordance with these procedures, where applicable, or that other, approved procedures are developed. The Project Manager is responsible for development of documentation of procedures which deviate from those presented herein.

Field Team Leader - The Field Team Leader is responsible for selecting and detailing the specific groundwater sampling techniques and equipment to be used and documenting these in accordance with the Work Plan. It is the responsibility of the Field Team Leader to ensure that these procedures are implemented in the field and that personnel performing sampling activities have been briefed and trained to execute these procedures.

Sampling Personnel - It is the responsibility of the field sampling personnel to follow these procedures, or to follow documented, project-specific procedures as directed by the Field Team Leader and the Project Manager. The sampling personnel are responsible for the proper acquisition of groundwater samples.

5.0 PROCEDURES

To be useful and accurate, a groundwater sample must be representative of the particular zone being sampled. The physical, chemical, and bacteriological integrity of the sample must be maintained from the time of sampling to the time of testing in order to minimize any changes in water quality parameters.

5.1 Sampling

The sampling approach should be developed prior to initiation of the field work and should consist of the following:

1. Background and objectives of sampling.

2. Brief description of area (i.e., access to wells, etc.) and fate of accumulated investigation derived waste (IDW).

3. Identification of sampling locations, with map or sketch, and applicable well construction data (well size, depth, screened interval, reference elevation). A GPS unit may be used as necessary.

4. Sampling equipment to be used (See Section 5.2)

5. Intended number and types of samples.

6. Sample preservation and quality control (e.g., rate of duplication samples) requirements.

7. Other information, such as the necessity for a warrant or permission of entry, requirement for split samples, access problems, etc.

5.2 Equipment

All down well components (pumps, tubing, water level meter, etc.) will be certified PFAS-free in accordance with the guidance provided in Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Program (January 2021).

1) Extraction device - Adjustable rate, submersible pumps are preferred (for example, centrifugal or bladder pump constructed of stainless steel or other suitable material).

2) Tubing - A high-grade PVC, polypropylene or polyethylene tubing is typically used when collecting samples for both organic and inorganic analyses. Teflon or Teflon-lined polyethylene tubing will not be used.

   A small diameter tubing such as 1/4- inch or 3/8-inch (inner diameter) tubing is preferred. This smaller diameter will help ensure the tubing remains liquid filled when operating at very low pumping rates.

3) Water level measuring device(s) - The water level meter should be graduated to 0.01-foot accuracy.

4) Flow measurement supplies - These can include a graduated cylinder, calibrated bucket, etc., and a stopwatch).

5) Interface probe, (if LNAPLs or DNAPLs are suspected).

6) Power source - If a gasoline generator is used, it must be located downwind (recommended minimum of at least 30 feet from the well) so that the exhaust does not contaminate the samples.

7). Indicator field parameter monitoring instruments - as needed. Multi-parameter instruments typically include the following parameters: pH, Eh, dissolved oxygen (DO), turbidity, specific conductance, and temperature. The use of a flow-through-cell is strongly recommended (required in some USEPA regions) when measuring all the listed parameters, except turbidity.

   Standards solutions to perform field calibration of instruments are required.

8) Decontamination supplies - Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for non-disposable sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification

9) Field Logbook - Including other appropriate forms (i.e., well purging forms, sampling forms, etc,).

10) Sample Bottles - with sample tags or labels.

11) Sample preservation supplies (typically included in the bottles shipped from the laboratory).

12) Site-specific data - Well construction data, site map, previous field sampling data from last sampling event, if available.

13) Well Keys - or the location of well keys and name of the site contact.

14) Site-specific Quality Assurance Project Plan and Work Plan.

15) Health and Safety Monitoring Equipment - Including PID or FID instrument (if appropriate) to detect VOCs, Draeger tubes, Particulate meters, etc. The project HASP should be consulted to ensure that the proper equipment is used in the field.

5.3 Sampling Methods

The collection of a groundwater sample includes the following steps:

1. Open the well cap. Be cautious, as rising groundwater can compress the atmosphere in the riser pipe, especially in flush-mount wells. Loosening the cap can cause sudden release of the compressed vapor, causing a projectile force on the cap. Use volatile organic detection equipment (PID or OVA) on the escaping gases at the well head to determine the need for respiratory protection. This task is usually performed by the Field Team Leader, Health and Safety Officer, or another designee.

   It should be noted that if the well has a flush mounted well casing and there is standing water within the flush mount annulus, this water will first have to be removed prior to opening the water-tight, expandable, lockable inner well cap. This will mitigate the potential of standing water within the flush mount from draining into the well.

2. Using decontaminated equipment (after proper respiratory protection has been donned, if necessary), measure the total depth (to 0.1 ft.) and water level (to 0.01 ft.) and record these data in the field logbook. Care should be taken to minimize water column disturbance. All measurements must be taken from the established referenced point. If the well casing does not have a reference point (usually a V-cut or indelible mark in the well casing), make one. Describe its location and record the date in the field logbook. If the well cap "popped off" when removing, allow adequate time for the water level within the casing to stabilize to the hydrostatic level/condition.

3. If necessary, lay out a sheet of clean polyethylene for monitoring and sampling equipment. Lower the pump or tubing slowly (to minimize disturbance) into the well so that the intake is at the desired depth as designated in the Work Plan. Measure the water level again before purging begins. If possible, keep the pump or tubing intake at least two feet above the bottom of the well to minimize mobilization of particulates that may be present in the bottom of the well.

4. Begin water removal. Start the pump at its lowest pump rate (i.e., speed) and then slowly increase the pumping rate until groundwater starts to discharge from the tubing. Check the water level in the well. Adjust the pumping rate until there is little or no water level drawdown (ideally less than 0.3 feet). If the minimal drawdown that can be achieved exceeds 0.3 feet but remains stable, continue purging until indicator field parameters stabilize. Collect the purged water as necessary and dispose of it as specified in the Work Plan in an acceptable manner.

5. Measure the rate of discharge approximately every three to five minutes (or as appropriate) during purging. Be sure to record any pumping rate adjustments (both time each adjustment is made and the resulting flow rate). A bucket and stopwatch are most commonly used. Record the method of discharge measurement.

   Pumping rates should be reduced to the minimum capabilities of the pump (for example, 0.1 - 0.4 L/min) to ensure stabilization of the indicator parameters. Ideally adjustments should be made in the first fifteen minutes of pumping in order to help minimize purging time. During the initial stages of pumping, drawdown may exceed the 0.3 feet target and then "recover" as pump flow adjustments are made. Purge volume calculations should utilize stabilized drawdown value, not the initial drawdown. Do not allow the water level to fall to the pump intake level. The final purge volume should be greater than the stabilized drawdown volume plus the extraction tubing volume.

   Monitoring wells with low recharge rates may require the use of special pumps capable of attaining very low pumping rates (bladder, peristaltic). If the well is essentially dewatered during purging activities, then the well should be sampled as soon as the water level has recovered sufficiently to provide the necessary sample volume needed for all anticipated samples. During the recovery period the pump intake should not be moved. Samples may then be collected even though the indicator field parameters have not stabilized.

6. Record measurements of specific conductance, temperature, pH, and turbidity during purging every three to five minutes (or less frequently, if appropriate). All measurements, except turbidity, must be obtained using a flow-through cell. Monitoring probes must be submerged in water at all times. Additional monitoring parameters may be specified in the Work Plan. Note: during the early phase of purging emphasis should be placed on minimizing drawdown and stabilizing the pumping stress and recording those adjustments.

7. Purging is considered complete and sampling may begin when all the above indicator field parameters have stabilized. Generally, stabilization is considered to be achieved when three consecutive readings, taken at three (3) to five (5) minute intervals, are within the following limits:

   - pH (± 0.1 unit)
   - Turbidity (10% for values greater than 1 NTU)
   - Specific Conductance (3%)
   - DO (10%)
   - ORP/Eh (± 10 millivolts).

8. Add preservative to sample bottles, if required (see QAPP) and label each sample bottle accordingly.

9. Collect water samples. Water samples for laboratory analyses must be collected before water has passed through the flow-through-cell. During purging and sampling, the pump tubing should remain filled with water to minimize possible changes in water chemistry.

   VOC samples should be collected first and directly into pre-preserved sample containers. Fill all sample containers by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence. After capping, turn the bottle over and tap it to check for bubbles. If any bubbles are present, unscrew the cap, tap the vial to allow the bubble(s) to rise to the top of the vial, and 'top off' the remaining void in the vial. Subsequently, screw the cap back on the vial and recheck for air bubbles. **NOTE: DO NOT EMPTY OUT THE ENTIRE VIAL AND REFILL IF BUBBLES ARE PRESENT. THIS REMOVES THE PRESERVATIVE (HCl) PLACED IN THE BOTTLE BY THE LABORATORY.** If the elimination of bubbles from the vial is not possible after several attempts, it may be that a defective septum is present and another new sample vial should be used in its place. Another possible cause of bubbles is high alkaline content in the groundwater. If known prior to sampling, coordination efforts should be made with the laboratory to possibly perform the analyses on an expedited turnaround time as the sample will be collected and shipped without a preservative (HCl).

   Fill the remaining sample containers in order of decreasing volatility (semi-volatiles next, then pesticides, PCBs, inorganics, etc.).

   If determination of filtered metal concentrations is a sampling objective, collect filtered water samples using the same low flow procedures. The use of an in-line filter (0.45 micron is commonly used) is required. Preserve filtered water sample immediately (typically HNO_3 for aqueous metals samples). Note: filtered water samples are not an acceptable substitute for unfiltered samples when the monitoring objective is to obtain chemical concentrations of total contaminant concentrations in groundwater for human health risk calculations.

10. Replace the well cap.

11. Pack and preserve (ice) the samples for shipping. Attach custody seals to the shipping container. Make sure that Chain-of-Custody forms (and Sample Analysis Request forms, as applicable) are properly filled out and enclosed or attached with a copy retained for internal records.

12. Decontaminate all non-disposable sampling equipment (See Section 5.8).

5.4 Sample Containers

For most aqueous samples and analytical parameters, either glass or plastic containers are satisfactory. Container requirements should follow those given in the project-specific QAPP.

5.5 Preservation of Samples and Sample Volume Requirements

Sample preservation techniques and volume requirements depend on the type and concentration of the contaminant and on the type of analysis to be performed. Sample volume and preservation requirements should follow those given in the project-specific QAPP.

5.6 Handling and Transporting Samples

After collection, samples should be handled as little as possible. If ice is used to preserve the samples, it should be double-bagged and steps taken to ensure that the melted ice does not cause sample containers to be submerged, and thus possibly become cross-contaminated. Furthermore, often laboratories provide large plastic bags to hold all sample bottles in a give cooler to avoid the melted ice from contacting the actual sample containers. Samples should be secured in the ice chest to prevent movement of sample containers and possible breakage. Confirm that a temperature blank is placed in each cooler prior to shipment to the laboratory. Sample packing and transportation requirements are described in SOP F301.

5.7 Sample Holding Times

Holding times (i.e., allowed time between sample collection and extraction/analysis) for routine samples are provided in the project-specific QAPP.

5.8 Decontamination

All non-disposable sampling equipment must be decontaminated prior to use in the first well and following sampling of each subsequent well. Pumps are not to be removed between purging and sampling operations. The pump and tubing (including support cable and electrical wires which are in contact with the well) will be decontaminated utilizing the procedure listed below.

The decontaminating solutions can be pumped from either buckets or short PVC casing sections through the pump or the pump can be disassembled and flushed with the decontaminating solutions. It is recommended that detergent (Alconox) be used sparingly in the decontamination process and water flushing steps be extended to ensure that any sediment trapped in the pump is removed. The pump exterior and electrical wires must be rinsed with the decontaminating solutions as well. The procedure is as follows:

Flush the equipment/pump with PFAS-free water. Flush with non-phosphate detergent (Alconox) solution. Flush with PFAS-free water to remove all of the detergent solution.

6.0 QUALITY ASSURANCE RECORDS

Quality assurance records will be maintained for each sample that is collected. The following information will be recorded in the Field Logbook, as applicable:

- Sample identification (site name, location, project number; sample name/number and location; sample type and matrix; sample bottle type; time and date; sampler's identity)

- Sample source and source description
- Field observations and measurements (appearance; volatile screening; well depth; static water level (including date and time); field chemistry; QA/QC data for field instruments; sampling method; pumping rates; drawdown; volume of water pumped prior to sampling; weather conditions)
- Sample disposition (preservatives added; lab sent to; date and time)
- Additional remarks, as appropriate, including any problems encountered should be highlighted. Description of all sampling equipment used, including trade names, model number, diameters, material composition, etc.

Proper chain-of-custody procedures play a crucial role in data gathering. SOP F302 describes the requirements for correctly completing a chain-of-custody form. Chain-of-custody forms are considered quality assurance records and are legally-binding documents.

7.0 REFERENCES

American Society of Testing and Materials. 1987. Standard Guide for Sampling Groundwater Monitoring Wells. Method D4448-85A, Annual Book of Standards, ASTM, Philadelphia, Pennsylvania.

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STREAM IDENTIFICATION AND FRESHWATER WETLANDS DELINEATION PROCEDURES

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STREAM IDENTIFICATION AND FRESHWATER WETLANDS DELINEATION

1.0 SCOPE AND APPLICATION

New York State's freshwater wetlands are protected under Article 24 of the Environmental Conservation Law, where the Department of Environmental Conservation and the Adirondack Park Agency "preserve, protect and conserve freshwater wetlands and the benefits derived therefrom, to prevent the despoliation and destruction of freshwater wetlands, and to regulate use and development of such wetlands to secure the natural benefits of freshwater wetlands, consistent with the general welfare and beneficial economic, social and agricultural development of the state [§24-0103]." The following procedures are designed to be used to delineate wetlands in New York State.

2.0 DESKTOP STUDY

Prior to field work, Michael Baker International (Michael Baker) will conduct a desktop study in accordance with the New York State Department of Environmental Conservation (NYSDEC) Freshwater Wetlands and Delineation Manual and United States Army Corps of Engineers (USACE) standards. The following data sources will be utilized:

- New York State Freshwater Wetlands Map and United States Geological Survey (USGS) topographic map (if available) will be utilized to determine if the area to be delineated contains, or is adjacent to, the boundary of a mapped wetland (i.e. within approximately 500 feet).

- Soil data from the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) and available GIS layers will be reviewed to identify soils with major and minor hydric components within the project area, to help identify potential wetlands.

- Aerial imagery will be reviewed to assess the project area for readily visible signs of wetlands such as drainage patterns, water staining, standing/open water, and other waterways such as streams and ditches.

- Lidar and topographic data will be reviewed to identify areas within the study site's topography with potential for low-lying wetlands, stream channels, roadside ditches, swales, and gullies.

- Review available site-specific information including: (1) USACE district offices (data for major waterbodies and for site-specific areas from planning and design documents) (2) USGS (stream and tidal gauge data) (3) State, county and local agencies (flood data) (4) NRCS state offices (small watershed projects data) (5) Private developers or landowners (site-specific hydrologic data, which may include water table or groundwater well data)

3.0 ONSITE INVESTIGATION

Regardless of the findings of the desktop study, Michael Baker will conduct an inspection of the entire study area, including a 100-foot buffer, in accordance with the NYSDEC Freshwater Wetlands and Delineation Manual, USACE Wetlands Delineation Manual, and the USACE *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*. The entire study area will be systematically evaluated for wetland indicators within the three major wetland

criteria (hydrophytic vegetation, hydric soils, and wetland hydrology). USACE requires indicators to be met for an area to be considered a wetland; however, atypical situations (i.e., those which may be heavily altered or disturbed) may be present. These areas will be evaluated, and notes taken, to justify whether these areas are, or are not, wetlands. Additionally, photographs will be taken at each sample point, waterbody, or other unique features, with additional overview photos taken of upland habitat and areas surrounding the wetlands to document the site conditions.

A description of each wetland assessment criterion and how they will be evaluated is provided below.

- Hydrophytic Vegetation: Vegetative cover of the entire project study area will be assessed. Tree, shrub/sapling, herb, and woody vines identified to species will be recorded in the appropriate strata. Vegetation will also be assessed for signs of over-watering such as stress or adaptations such as tussocking, enlarged lenticels, buttressing, or aerial roots, which USACE recognizes as an indicator of plants adapting to waterlogged conditions. A percentage of cover will be assigned for each species. The indicator status of each plant species will be determined by using the USACE National Wetland Plants List data base and compared against the New York Natural Heritage Program listing for any Federally or State protected plant species. The vegetation list will then be examined to determine if the plant community meets regulatory criteria as hydrophytic, or if the area is upland/mesophytic. All species identified at sample points will be documented on the appropriate USACE and/or State wetland data forms. Following the vegetation assessment and documentation, the coverage percentage of plant communities observed will assist in determining the Cowardin classification.

- Hydrology: The wetland delineation will utilize aerial photography, topography, and proximity to nearby waterbodies to identify areas displaying surface saturation and/or complete inundation. Where the wetland boundary is not easily identified by the vegetative cover, hydrology will be a useful indicator to determine whether wetland criteria is met. The sample point will be assessed for all applicable primary and secondary hydrologic indicators defined by USACE. All indicators identified at sample points will be documented on the appropriate USACE and/or State wetland data forms. If an area meets all three criteria required to be classified as a wetland, the hydrologic assessment and documentation will assist in determining the Cowardin classification.

- Hydric Soils: Areas supporting hydrophytic vegetation, and/or containing wetland hydrologic properties, will be common indicators for further soil evaluation of the area. Numerous soil samples will be taken in wetlands and upland areas to aid in identifying the accuracy of the wetland boundary and document site conditions. Unless restricted, soil will be dug to a depth of 16 inches and any hydric soil indicators listed within the NYSDEC Freshwater Wetlands Delineation Manual and appropriate USACE regional supplement will be documented. Information regarding soil texture, hue, value, chroma, anaerobic properties, and stratification will also be recorded. A Munsell Soil Color Book will be utilized to document chroma and value of the soil matrix and any redoximorphic features. This data will be recorded in the field and documented on applicable state, and USACE regional supplement, data forms.

While field conditions change across regions, landscapes, properties, and even individual wetland complexes, Michael Baker will adapt their delineation methods to accurately identify and document wetland boundaries. Areas meeting state and USACE criteria and exhibiting the three wetland ecosystem characteristics will be identified as a wetland. Atypical scenarios involving disturbance or alteration will be

assessed on a case-by-case basis and supporting evidence on whether an area is or is not a wetland will be documented. Photos of both upland and wetland ecosystems will be captured to document site conditions.

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ATTACHMENT A -- REQUIRED CONTAINER, PRESERVATION TECHNIQUES, AND HOLDING TIMES

ATTACHMENT B -- SAMPLE SHIPPING PROCEDURES

SAMPLE PRESERVATION AND HANDLING

1.0 PURPOSE

This SOP describes the appropriate containers for samples of particular matrices, and the steps necessary to preserve those samples when shipped off site for chemical analysis. It also identifies the qualifications for individuals responsible for the transportation of hazardous materials and samples and the regulations set forth by the Department of Transportation regarding the same.

2.0 SCOPE

Some chemicals react with sample containers made of certain materials; for example, trace metals adsorb more strongly to glass than to plastic, while many organic chemicals may dissolve various types of plastic containers. Therefore, it is critical to select the correct container in order to maintain the integrity of the sample prior to analysis.

Many water and soil samples are unstable and may change in chemical character during shipment. Therefore, preservation of the sample may be necessary when the time interval between field collection and laboratory analysis is long enough to produce changes in either the concentration or the physical condition of the constituent(s). While complete and irreversible preservation of samples is not possible, preservation does retard the chemical and biological changes that may occur after the sample is collected.

Preservation techniques are usually limited to pH control, chemical addition(s), and refrigeration/freezing. Their purposes are to (1) retard biological activity, (2) retard hydrolysis of chemical compounds/complexes, (3) reduce constituent volatility, and (4) reduce adsorption effects.

Typical sample container and preservation requirements are provided in Attachment A of this SOP. Note that sample container requirements (e.g., volume, amber glass, etc.) may vary by laboratory.

The U.S. Department of Transportation, Code of Federal Regulations (CFR) Title 49 establishes regulations for all materials offered for transportation. The transportation of environmental samples for analysis is regulated by Code of Federal Regulations Title 40 (Protection of the Environment), along with 49 CFR Part 172 Subpart H. The transportation of chemicals used as preservatives and samples identified as hazardous (as defined by 49 CFR Part 171.8) are regulated by 49 CFR Part 172.

3.0 DEFINITIONS

HCl - Hydrochloric Acid

H_2SO_4- Sulfuric Acid

HNO_3 - Nitric Acid

NaOH - Sodium Hydroxide

Normality (N) - Concentration of a solution expressed as equivalents per liter, where an equivalent is the amount of a substance containing one mole of replaceable hydrogen or its equivalent. Thus, a one molar

solution of HCl, containing one mole of H, is "one-normal," while a one molar solution of H_2SO_4 containing two moles of H, is "two-normal."

4.0 RESPONSIBILITIES

Project Manager - The Project Manager is responsible for ensuring that project-specific plans are in accordance with these procedures, where applicable, or that other, approved procedures are developed. The Project Manager is responsible for development of documentation of procedures which deviate from those presented herein. The Project Manager is also responsible for proper certification of individuals responsible for transportation of samples of hazardous substances.

Field Team Leader - It is the responsibility of the Field Team Leader to ensure that these procedures are implemented in the field and to ensure that personnel performing sampling activities have been briefed and trained to execute these procedures. The Field Team Leader is responsible to ensure all samples and/or hazardous substances are properly identified, labeled, and packaged prior to transportation.

Sampling Personnel - It is the responsibility of the field sampling personnel to initiate sample preservation and handling. It is also the responsibility of the field sampling personnel to understand and adhere to the requirements for proper transportation and handling of samples and/or hazardous substances.

5.0 PROCEDURES

The following procedures discuss sample containerization and preservation techniques that are to be followed when collecting environmental samples for laboratory analysis.

5.1 Sample Containers

For most samples and analytical parameters, either glass or plastic containers are satisfactory. In general, if the analyte(s) to be measured is organic in nature, the container should be made of glass. If the analyte(s) is inorganic, then glass or plastic containers may be used. Containers should be kept out of direct sunlight (to minimize biological or photo-oxidation/photolysis of constituents) until they reach the analytical laboratory. The sample container should have approximately five to ten percent air space ("ullage") to allow for expansion/vaporization if the sample is heated during transport (one liter of water at 4 degrees Celsius expands by 15 milliliters if heated to 130 deg. F/55 deg. C).

Conversely, head space for bottles designated for volatile organic analyses should not have allowance for head space. For liquids, typically 40 ml vials equipped with a Teflon-lined septum are used for sample collection. The septum allows for minimization of headspace when the cap for the completely-filled vial is screwed into place. For soil samples that will be tested for volatile organic compounds (VOCs), samples are typically collected using EnCore™ samplers in accordance with SW-846 Method 5035.

The analytical laboratory should provide sample containers that have been certified clean according to USEPA procedures. Shipping containers for samples, consisting of sturdy ice chests, are typically provided by the laboratory.

Once opened, the sample container must be used at once for collection of a particular sample. Unused, but opened, containers are to be considered contaminated and must be discarded. Because of the potential for introduction of contamination, they cannot be resealed and saved for later use. Likewise, any unused

containers which appear contaminated upon receipt, or which are found to have loose caps or missing liners (if required for the container) should be discarded.

General sample container, preservative, and holding time requirements are listed in Attachment A. However, these items should be corroborated with the contracted laboratory to confirm it meets their requirements for quality control.

5.2 Preservation Techniques

The preservation techniques to be used for various analytes are listed in Attachment A. Reagents required for sample preservation will either be added to the sample containers by the laboratory prior to their shipment to the field or added in the field using laboratory-supplied preservatives. Some of the more commonly used sample preservation techniques include storage of samples at a temperature of 4 degrees Celsius, acidification of water samples, and storage of samples in dark (i.e. amber) containers to prevent the samples from being exposed to light.

Most samples (except metals) should be stored at a temperature of 4 deg. Celsius. Additional preservation techniques should be applied to water samples as follows:

- Water samples to be analyzed for volatile organics should be acidified (pH<2).
- Water samples to be analyzed for semivolatile organics should be collected in dark containers.
- Water samples to be analyzed for pesticides/PCBs should be collected in dark containers.
- Water samples to be analyzed for inorganic compounds should be acidified (pH<2).

These preservation techniques generally apply to samples of low-level contamination. The preservation techniques utilized for samples may vary. However, unless documented otherwise in the project plans, all samples should be considered low concentration. All samples preserved with chemicals should be clearly identified by indicating on the sample label and the chain-of-custody that the sample is preserved. Furthermore, if the sample is anticipated to exhibit a high concentration of contaminants, it should also be noted on the chain-of-custody to allow for dilution before analysis.

5.3 Sample Holding Times

The elapsed time between sample collection and initiation of laboratory analyses is considered the holding time and must be within a prescribed time frame for each individual analysis to be performed. Sample holding times for routine sample collection are provided in Attachment A. These holding times should be corroborated with the laboratory prior to sample initiation.

6.0 SAMPLE HANDLING AND TRANSPORTATION

After collection, the outside of all sample containers should be wiped clean with a damp paper towel; however, sample handling should be minimized. Personnel should use extreme care to ensure that samples are not contaminated. When the samples are placed in the cooler, personnel should ensure that melted ice cannot cause sample containers to become submerged, as this may result in sample cross-contamination and loss of sample labels. To help prevent loss of labels, clear packing tape may be placed over the labels. Additionally, sample container may also be placed inside sealable plastic bags (zipper-type bags) to mitigate melted ice water coming in contact with the sample container and sample label.

Samples may be hand delivered to the laboratory or they may be shipped by common carrier. Relevant regulations for the storage and shipping of samples are contained in 40 CFR 261.4(d). Shipment of dangerous goods by air cargo is also regulated by the United Nations/International Civil Aviation Organization (UN/ICAO). The Dangerous Goods Regulations promulgated by the International Air Transport Association (IATA) meet or exceed DOT and UN/ICAO requirements and should be used for shipment of dangerous goods via air cargo. Standard procedures for shipping environmental samples are given in Attachment B.

7.0 REFERENCES

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Protection of the Environment, Code of Federal Regulation, Title 40, Parts 260 to 299.

Transportation, Code of Federal Regulation, Title 49, Parts 100 to 177.

ATTACHMENT A

REQUIRED CONTAINER, PRESERVATION TECHNIQUES AND HOLDING TIMES

TABLE 1

SUMMARY OF ANALYTICAL METHODS, CONTAINERS, PRESERVATION, AND HOLDING TIMES

3148 VAN ETTEN ROAD PROPERTY
CORNING, NEW YORK

SOLID SAMPLES			
Analysis/Method	Container	Preservation	Holding Time
VOCs SW846 8260	5 grams, glass vial w/ reagent water (Terracore kit), plus moisture jar	4°C	14 days if samples received at lab within 48 hrs and frozen to <-7°C.
SVOCs inc 1,4-Dioxane SW846 8270	10 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	14 days to extraction; 40 days from extraction to analysis
TAL ICP Metals SW846 6010	10 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	180 days
Mercury SW846 7471	10 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	28 days
PCBs SW846 8280	30 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	14 days to extraction; 40 days from extraction to analysis
Cyanide SW846 9012B	10 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	14 days
TCLP Metals SW846 1311 & 6010	100 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	180 days to extraction; 180 days from extraction to analysis
TCLP Mercury SW846 1311 & 7470	100 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	28 days to extraction; 28 days from extraction to analysis
Pesticides/Herbicides SW846 8081/8151	10 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	14 days to extraction; 40 days from extraction to analysis
TPH EPA 1664 (SGT HEM)	10 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	28 days
PFAS EPA 537.1M	4-ounce HDPE or polypropylene containers with HDPE or polypropylene lid	4°C	14 days to extraction; 28 days from extraction to analysis

TABLE 1

SUMMARY OF ANALYTICAL METHODS, CONTAINERS, PRESERVATION, AND HOLDING TIMES

3148 VAN ETTEN ROAD PROPERTY
CORNING, NEW YORK

GROUNDWATER SAMPLES			
VOCs SW846 8260	3-40 mL, Glass w/ Teflon®-lined septum	HCL, 4°C	14 days
SVOCs inc 1,4-Dioxane SW846 8270/8270 SIM	2-250 mL, Glass w/ Teflon®-lined cap (amber)	4°C	7 days to extraction; 40 days from extraction to analysis
TAL ICP Metals SW846 6010	250 mL, Polyethylene or Glass	HNO_3, 4°C	180 days
Mercury SW846 7470	550 mL, Polyethylene or Glass	HNO_3, 4°C	28 days
PCBs SW846 8280	2-250 mL, Glass w/ Teflon®-lined cap (amber)	4°C	7 days to extraction; 40 days from extraction to analysis
Cyanide SW846 9012	1-250 mL, HDPE	NaOH, 4°C	14 days
Pesticides/Herbicides SW846 8081/8151	2-1 L, Glass w/ Teflon®-lined cap (amber)	4°C	7 days to extraction; 40 days from extraction to analysis
TPH EPA 1664 (SGT HEM)	2-1 L, Glass w/ Teflon®-lined cap (amber)	HCL, 4°C	28 days
PFAS EPA 537.1M	HDPE or polypropylene containers with HDPE or polypropylene lid	4°C	14 days to extraction; 28 days from extraction to analysis

Notes:
HDPE – High Density Polyethylene
ICP – Inductively Coupled Plasma
PCBs - Polychlorinated Biphenyls
PFAS – Perfluorinated compounds
SVOCs – Semi-volatile Organic Compounds
TAL - Target Analyte List
TCL - Target Contaminant List
TCLP - Toxicity Characteristic Leaching Procedure
TPH – Total Petroleum Hydrocarbons
VOCs – Volatile Organic Compounds

ATTACHMENT B

SAMPLE SHIPPING PROCEDURES

ATTACHMENT B

SAMPLE SHIPPING PROCEDURES

Introduction

Samples collected during field investigations or in response to a hazardous materials incident must be classified by the project leader, prior to shipping by air, as either environmental or hazardous substances. The guidance for complying with U.S. DOT regulations in shipping environmental laboratory samples is given in the "National Guidance Package for Compliance with Department of Transportation Regulations in the Shipment of Environmental Laboratory Samples."

Pertinent regulations for the shipping of environmental samples are given in 40 CFR 261.4(d). Samples collected from process wastewater streams, drums, bulk storage tanks, soil, sediment, or water samples from areas suspected of being highly contaminated may require shipment as dangerous goods/hazardous substance. Regulations for packing, marking, labeling, and shipping of dangerous goods by air transport are promulgated by the United Nations International Civil Aviation Organization (UN/ICAO), which is equivalent to IATA.

Individuals responsible for transportation of environmental samples or dangerous goods/hazardous substances must be tested and certified by their employer. This is required by 49 CFR Part 172 Subpart H Docket HM-126 to assure the required qualifications for individuals offering materials for transportation.

Environmental samples should be packed prior to shipment by commercial air carrier using the following procedures:

1. Select a sturdy cooler in good repair. Secure and tape the drain plug (inside and outside) with fiber or duct tape. Line the cooler with a large heavy-duty plastic bag. This practice keeps the inside of the cooler clean and minimizes cleanup at the laboratory after samples are removed.

2. Allow sufficient headspace (ullage) in all bottles (except VOAs) to compensate for any pressure and temperature changes (approximately 10 percent of the volume of the container).

3. Be sure the lids on all bottles are tight (will not leak). For some projects, custody seals are also applied to sample container lids. The reason for this practice is two-fold: to maintain integrity of samples and keep the lid on the container should the lid loosen during shipment. Check with the appropriate project procedures prior to field work. In many cases, the laboratory manager of the analytical lot to be used on a particular project can also provide this information.

4. Wrap all glass containers in bubblewrap or other suitable packing material prior to placing in plastic bags.

5. Place all bottles in separate and appropriately sized polyethylene bags and seal the bags with tape (preferably plastic strapping tape, unless the bag is a zipper-type bag).

8. Put ice that has been placed in properly sealed, double-bagged, heavy duty polyethylene bags on top of, and between, the samples (if room allows). Fill all remaining space between the bottles with packing material. Fold and securely fasten the top of the large heavy-duty plastic bag with tape (preferably fiberglass or duct).

9. Place the Chain-of-Custody Record and the Request for Analysis Form (if applicable) into a plastic bag, tape the bag to the inner side of the cooler lid, and then close the cooler and securely tape (preferably with fiber tape) the top of the cooler. Wrap the tape three to four times around each side of the cooler unit. Chain-of-custody seals (if required) should be affixed to the top and sides of the cooler within the securing tape so that the cooler cannot be opened without breaking the seal.

10. Label according to 40 CFR 261.4(d). The shipping containers should be marked "THIS END UP," and arrow labels which indicate the proper upward position of the container should be affixed to the container. A label containing the name and address of the shipper and laboratory should be placed on the outside of the container. It is good practice to secure this label with clear plastic tape to prevent removal during shipment by blurring of important information should the label become wet. The commercial carrier is not required to sign the COC record as long as the custody seals remain intact and the COC record stays in the cooler. The only other documentation required is the completed air bill, which is secured to the top of the shipping container. Please note several coolers/shipping containers may be shipped under one air bill. However, each cooler must be labeled as "Cooler 1 of 3, Cooler 2 of 3, etc.", prior to shipping. Additionally, it is good practice to label each COC form to correspond to each cooler (i.e., 1 of 3, 2 of 3, etc.).

FIELD EQUIPMENT OPERATION AND MAINTENANCE PROCEDURES - CHAIN-OF-CUSTODY

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ATTACHMENT A -- EXAMPLE CLIENT (SAMPLE) LABEL
ATTACHMENT B -- EXAMPLE CHAIN-OF-CUSTODY RECORD

CHAIN-OF-CUSTODY

1.0 PURPOSE

The purpose of this SOP is to provide information on chain-of-custody procedures to be used to document sample handling.

2.0 SCOPE

This procedure describes the steps necessary for transferring samples through the use of Chain-of-Custody Records. A Chain-of-Custody Record is required, without exception, for the tracking and recording of samples collected for on-site or off-site analysis (chemical or geotechnical) during program activities (except wellhead samples taken for measurement of field parameters). Use of the Chain-of-Custody Record Form creates an accurate written record that can be used to trace the possession and handling of the sample from the moment of its collection through analysis. This procedure identifies the necessary custody records and describes their completion. This procedure does not take precedence over region-specific or site-specific requirements for chain-of-custody.

3.0 DEFINITIONS

Chain-of-Custody Record Form - A Chain-of-Custody Record Form is a printed two-part form that accompanies a sample or group of samples as custody of the sample(s) is transferred from one custodian to another custodian. One copy of the form must be retained in the project file. An example of a Chain-of-Custody Record Form is presented in Attachment B.

Custodian - The person responsible for the custody of samples at a particular time, until custody is transferred to another person (and so documented), who then becomes custodian. A sample is under one=s custody if:

- It is in one's actual possession.
- It is in one's view, after being in one's physical possession.
- It was in one's physical possession and then he/she locked it up to prevent tampering.
- It is in a designated and identified secure area.

Sample - A sample is physical evidence collected from a facility or the environment, which is representative of conditions at the point and time that it was collected.

4.0 RESPONSIBILITIES

Project Manager - The Project Manager is responsible for ensuring that project-specific plans are in accordance with these procedures, where applicable, or that other, approved procedures are developed. The Project Manager is responsible for development of documentation of procedures which deviate from those presented herein. The Project Manager is responsible for ensuring that chain-of-custody procedures are implemented. The Project Manager also is responsible for determining that custody procedures have been met by the analytical laboratory.

Field Team Leader - The Field Team Leader is responsible for determining that chain-of-custody procedures are implemented up to and including release to the shipper or laboratory. It is the responsibility of the Field

Team Leader to ensure that these procedures are implemented in the field and to ensure that personnel performing sampling activities have been briefed and trained to execute these procedures.

Sampling Personnel - It is the responsibility of the field sampling personnel to initiate chain-of-custody procedures, and maintain custody of samples until they are relinquished to another custodian, the sample shipper, or to a common carrier.

5.0 PROCEDURES

The term "chain-of-custody" refers to procedures which ensure that evidence presented in a court of law is valid. The chain-of-custody procedures track the evidence from the time and place it is first obtained to the courtroom, as well as providing security for the evidence as it is moved and/or passed from the custody of one individual to another.

Chain-of-custody procedures, record keeping, and documentation are an important part of the management control of samples. Regulatory agencies must be able to provide the chain-of-possession and custody of any samples that are offered for evidence, or that form the basis of analytical test results introduced as evidence. Written procedures must be available and followed whenever evidence samples are collected, transferred, stored, analyzed, or destroyed.

5.1 Sample Identification

The method of identification of a sample depends on the type of measurement or analysis performed. When in-situ measurements are made, the data are recorded directly in bound logbooks or other field data records with identifying information.

Information which shall be recorded in the field logbook (or other suitable form), when in-situ measurements or samples for laboratory analysis are collected, includes:

- Field Sampler(s)
- Project and Task Number
- Project Sample Number
- Sample location or sampling station number
- Date and time of sample collection and/or measurement
- Field observations
- Equipment used to collect samples and measurements
- Calibration data for equipment used

Measurements and observations should be recorded using waterproof ink.

5.1.1 Sample Label

Samples, other than in-situ measurements, are removed and transported from the sample location to a laboratory or other location for analysis. Before removal, however, a sample is often divided into portions, depending upon the analyses to be performed. Each portion is preserved in accordance with the Work Plan. Each sample container is identified by a sample label (see Attachment A). Sample labels are provided, along with sample containers, by the analytical laboratory. The information recorded on the sample label includes (at a minimum):

- Project Name or Project Number.
- Station Location - The unique sample number identifying this sample.

Additional information on the sample label may also include:

- Date - A six-digit number indicating the day, month, and year of sample collection (e.g., 12/21/85).
- Time - A four-digit number indicating the 24-hour time of collection (for example: 0954 is 9:54 a.m., and 1629 is 4:29 p.m.).
- Medium - Water, soil, sediment, sludge, waste, etc.
- Sample Type - Grab or composite.
- Preservation - Type and quantity of preservation added.
- Analysis - VOA, BNAs, PCBs, pesticides, metals, cyanide, other.
- Sampled By - Printed name of the sampler.
- Remarks - Any pertinent additional information.

Using only the work assignment number of the sample label maintains the anonymity of sites. This may be necessary, even to the extent of preventing the laboratory performing the analysis from knowing the identity of the site (e.g., if the laboratory is part of an organization that has performed previous work on the site).

5.2 Chain-of-Custody Procedures

After collection, separation, identification, and preservation, the sample is maintained under chain-of-custody procedures until it is in the custody of the analytical laboratory and has been stored or disposed.

5.2.1 Field Custody Procedures

- Samples are collected as described in the site Work Plan. Care must be taken to record precisely the sample location and to ensure that the sample number on the label matches the Chain-of-Custody Record exactly.
- The person undertaking the actual sampling in the field is responsible for the care and custody of the samples collected until they are properly transferred or dispatched.

- Sample labels shall be completed for each sample, using waterproof ink unless prohibited by weather conditions, e.g., a logbook notation would explain that a pencil was used to fill out the sample label if the pen would not function in freezing weather.

5.2.2 Transfer of Custody and Shipment

Samples are accompanied by a Chain-of-Custody Record Form. When transferring the possession of samples, the individual(s) relinquishing and receiving will sign, date, and note the time on the Record. This Record documents sample custody transfer from the sampler, often through another person, to the analyst in the laboratory. The Chain-of-Custody Record is filled out as given below.

- Enter header information (Project and Task number, samplers, and project name).
- Enter sample specific information (sample number, media, sample analysis required and analytical method, grab or composite, number and type of sample containers, and date/time sample was collected).
- Sign, date, and enter the time under "Relinquished by" entry.
- Have the person receiving the sample sign the "Received by" entry. If shipping samples by a common carrier, print the carrier to be used in this space (i.e., Federal Express).
- If a carrier is used, enter the airbill number under "Remarks," in the bottom right corner.
- Place the original (top, signed copy) of the Chain-of-Custody Record Form in a plastic zipper-type bag or other appropriate sample shipping package. Retain the copy with field records.
- Sign and date the custody seal, a 1- by 3-inch white paper label with black lettering and an adhesive backing. Attachment C is an example of a custody seal. The custody seal is part of the chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field. Custody seals shall be provided by the analytical laboratory.
- Place the seal across the shipping container opening so that it would be broken if the container was to be opened.
- Complete other carrier-required shipping papers.

The custody record is completed using waterproof ink. Any corrections are made by drawing a line through and initialing and dating the change, then entering the correct information. Erasures are not permitted.

Common carriers will usually not accept responsibility for handling Chain-of-Custody Record Forms; this necessitates packing the record in the shipping container (enclosed with other documentation in a plastic zipper-type bag). As long as custody forms are sealed inside the shipping container and the custody seals are intact, commercial carriers are not required to sign the custody form.

The laboratory representative who accepts the incoming sample shipment signs and dates the Chain-of-Custody Record, completing the sample transfer process. It is then the laboratory's responsibility to maintain internal logbooks and custody records throughout sample preparation and analysis.

6.0 QUALITY ASSURANCE RECORDS

Once samples have been packaged and shipped, the COC copy and airbill receipt becomes part of the Quality Assurance Record.

7.0 REFERENCES

1. USEPA. User's Guide to the Contract Laboratory Program. Office of Emergency and Remedial Response, Washington, D.C. (EPA/540/P-91/002), January 1991.

ATTACHMENT A

EXAMPLE CLIENT (SAMPLE) LABEL

CLIENT LABEL

Client:_____ Date: _____

Site: _____ Time: _____

Sample ID:_____

Analysis: _____

Signature: _____

QUA-8022 (1098)

ATTACHMENT B

EXAMPLE CHAIN-OF-CUSTODY RECORD

Baker

Michael Baker Jr., Inc.
Airside Office Park
100 Airside Drive
Moon Township, PA 15108
412-269-6300
412-375-3996 (fax)

CHAIN OF CUSTODY RECORD

Lab and BOA No.: _____
Delivery Order No.: _____
Project No.: _____
Project Name: _____
Field Team: _____
SEND RESULTS TO: _____

Sample Number	Date	Time	Sample Location	Matrix Type (1) GB (2)	Matrix Type (1) COM (2)	Analytical Methods	Type of Container(s) (3)	Number of Container(s)	Remarks

General Comments

Relinquished by: _____ Date: _____ Time: _____
Received by: _____ Date: _____ Time: _____
Shipped by: (*check one*) ☐ Hand ☐ Overnight ☐ Other: _____

Relinquished by: _____ Date: _____ Time: _____
Received by: _____ Date: _____ Time: _____
Shipped by: (*check one*) ☐ Hand ☐ Overnight ☐ Other: _____

Relinquished by: _____ Date: _____ Time: _____
Received by: _____ Date: _____ Time: _____
Shipped by: (*check one*) ☐ Hand ☐ Overnight ☐ Other: _____

Sample stored at 4 degrees C: ☐ Yes ☐ No
Chain-of-custody seal on cooler: ☐ Yes (Number: _____) ☐ No
Analysis turnaround: ☐ Priority (Hours: _____) ☐ Regular
See Work Order ☐
See Analysis Request Form ☐
Sample Disposal: ☐ Return to Baker - archive until: _____ (*date*)
☐ Lab Disposal

NOTES:
(1) A - Air; GW - Groundwater; L - Leachate; S - Spring; SS - Surface Soil; SB - Subsurface soil; SW - Surface Water; W - Waste; WP - Wipe; WW - Wastewater
(2) GB - Grab; COM - Composite
(3) P - Plastic; G - Glass

White copy: **Return with analytical results**
Yellow copy: **Laboratory copy**
Pink copy: **Field copy**

Courier Name: _____
Courier Pickup Number: _____
File Name: _____

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FIELD LOGBOOK

1.0 PURPOSE

This SOP describes the process for maintaining a field logbook.

2.0 SCOPE

The field logbook is a document which records all major on-site activities conducted during a field project.

Recording in the field logbook is initiated upon arrival at the site. Entries are made every day that on-site activities take place. At least one field logbook shall be maintained per site.

The field logbook becomes part of the permanent site file. Because information contained in the field logbook may be admitted as evidence in legal proceedings, it is critical that this document is properly maintained and is legible.

3.0 DEFINITIONS

Field logbook - The field logbook is a bound notebook that typically has consecutively numbered pages.

4.0 RESPONSIBILITIES

The Field Team Leader is responsible for maintaining a master field logbook for the duration of on-site activities. Each member of the sampling crew is responsible for maintaining a complete and accurate record of site activities for the duration of the crew members participation in the project.

5.0 PROCEDURES

The following sections present some of the information that must be recorded in the field logbook. In general, a record of all events and activities, as well as other potentially important information, shall be recorded by each member of the field team.

5.1 Cover

The inside cover or title page of each field logbook shall contain the following information:

- Project number
- Project name and location
- Name of Field Team Leader
- Baker's address and telephone number (toll-free number preferably)
- Start date and end date (if more than one book used)
- If several logbooks are required, a sequential field logbook number

It is good practice to list important phone numbers and points of contact here. This may include the telephone number of the hotel where the field crew is residing as well as applicable cell phone number. The inclusion of this information may be invaluable if the field logbook is lost during field activities.

5.2 Daily Entries

Daily entries into the logbook may contain a variety of information. At the beginning of each day the following information should be recorded by each team member.

- Date
- Start time
- Weather
- All field personnel present (including subcontractor's arrival and departure time)
- All visitors present (arrival and departure time)
- Other pertinent information (e.g., planned activities, schedule changes, expected visitors, and equipment changes)

During the day, an ongoing record of all pertinent site activities should be written in the logbook. The master logbook kept by the field team leader need not duplicate that recorded in other field logbooks, but should summarize the information in other books and, where appropriate, reference the page numbers of other logbooks where detailed information pertaining to a subject may be found.

Specific information that should be recorded in the logbook may include, but not be limited to, the following:

- Equipment used, equipment numbers, calibration, field servicing
- Field measurements
- Sample numbers, media, bottle size, preservatives, collection methods, and time
- Test boring and monitoring well construction information, including boring/well number and location
- Sketches for each sample location including appropriate measurements if required
- Photograph log
- Drum log
- Other pertinent information
- Deviations from the Scope of Work (also documented date/time of approval by client, as applicable)

All entries should be made in indelible ink; all pages numbered sequentially; and the last page of each daily entry must be signed or initialed and dated by the responsible field personnel completing the log. No erasures are permitted. If an incorrect entry is made, the entry shall be crossed out with a single line, initialed, and dated.

5.3 Photographs

If photographs are permitted at the site, the record shall be maintained in the field logbook. When movies, slides or photographs are taken of any site location, they are numbered or cross-referenced to correspond to logbook entries. The name of the photographer, date, time, site location, site description, direction of view and weather conditions are entered in the logbook as the photographs are taken. Once processed, photographs shall be sequentially numbered and labeled corresponding to the field logbook entries.

6.0 QUALITY ASSURANCE RECORDS

Once on-site activities have been completed, the field logbook shall be considered a quality assurance record and stored in the project files at Baker's respective office.

7.0 REFERENCES

U.S. EPA, Region IV, 2020. Quality System and Technical Procedures for LSASD Field Branches, USEPA, Region 4, LSASD, Athens, Georgia.

U.S. EPA, 2013. Field Branches Quality System and Technical Procedures, Logbooks, USEPA, Region 4, SESDPROC-010-R4, Athens, Georgia.

FIELD EQUIPMENT OPERATION AND MAINTENANCE PROCEDURES - QUALITY CONTROL SAMPLES

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7.0 REFERENCES

QUALITY CONTROL SAMPLES

1.0 PURPOSE

The SOP describes the type and quantity of Quality Control (QC) samples to be collected for most field sampling operations.

2.0 SCOPE

QC samples are those samples (usually collected in the field) that are sent to the laboratory along with the environmental samples in order to evaluate site conditions and laboratory precision and accuracy. Evaluation of the results from the QC samples allows for the quality of the data to be assessed. There are five different type of QC samples: trip blanks, equipment rinsate blanks, field blanks, duplicates and matrix spike/matrix spike duplicate (MS/MSD) samples. The first three types of QC samples are used to assess field conditions during sampling and/or transport of the environmental samples. The latter two types of QC samples are used by the laboratory to help assess precision and accuracy. (The laboratory also has other internal samples and procedures to assess precision and accuracy.)

Depending on the level of data quality required by the project, different amounts of QC samples are collected and are described in detail below.

3.0 DEFINITIONS

Trip Blanks: Trip blanks are 40 ml Volatile Organic Compound (VOC) vials of ASTM Type II water that are typically filled at the laboratory, transported to the sampling site, and returned to the laboratory with environmental Volatile Organic Analysis (VOA) samples. Trip blanks are not opened in the field. However, in some instances, the trip blanks are generated in the field by the sampler with the water used to generate the trip blanks typically provided by the laboratory.

Equipment Rinsate Blanks: Equipment rinsate blanks are samples of ASTM Type II water (provided by the laboratory), deionized, or distilled water passed over decontaminated sampling equipment. They are used as a measure of the effectiveness of the decontamination procedure. The rinsate is analyzed for the same parameters as the environmental samples collected from the piece of equipment.

Field Blanks: Field blanks are samples of source water used for decontamination, steam cleaning, and/or the equipment rinsate blank. Typically, there is one field blank collected for each source of water used per sampling event. The field blank is analyzed for all the parameters tested during the sampling event. If store-bought deionized or distilled water is used for the equipment rinsate blank, the analysis of the field blank of the same water source should be completed to document the quality of the water being used.

Duplicates: Duplicates are collected to help assess laboratory reproducibility (precision). Solid matrix samples are homogenized before being split, except for VOCs, which are not homogenized because of potential volatile loss. Liquid matrix samples are collected simultaneously. For both solid and liquid matrices, double the normal volume is required. The same analyses are completed on the duplicate as on the environmental sample. Duplicate samples are typically collected in areas of known contaminant impact.

MS/MSD: MS/MSD samples are used by the laboratory (but collected in the field) to help determine both precision and accuracy of analysis. For liquid matrices, triple the volume of sample is required (that is, one

volume for the environmental sample, one volume for the MS sample, and one volume for the MSD sample). For solid matrices, additional volume is usually not required (although this will depend upon the laboratory). MS/MSD samples are typically collected in areas with little or no contamination.

4.0 RESPONSIBILITIES

The Project Manager is responsible for estimating the number of QC samples required for any sampling event. The procedures for determining the number is described in Section 5.0 below. Also, the project manager may specify the locations of interest where duplicate or matrix spike samples are to be collected.

The Field Team Leader is responsible for making sure that the sampling team(s) are collecting the required number of QC samples.

The Field Team member(s) are responsible for understanding the rationale and methods for QC sample collection and for coordinating QC sample collection as appropriate.

5.0 PROCEDURES

The procedures for QC sample collection and the frequency at which each type of sample should be collected is described below.

5.1 Trip Blanks

Trip blanks (typically two 40 ml vials) are sent to the laboratory in each cooler which contains samples for volatile organic analyses. The trip blank should also be kept in the field, with the volatile samples, during the period of sample collection. Analyses of the trip blank may determine if the empty sample containers were contaminated prior to transport / sampling , or if the collected environmental samples may have been compromised during shipment from the site to the laboratory.

5.2 Equipment Rinsates

Equipment rinsates are collected by pouring analyte-free water (typically provided by the laboratory) over decontaminated sampling equipment and collecting the rinsate for analysis. If two (or more) different types of non-disposable equipment are used to collect samples, then two separate rinsate samples should be collected. The rinsate blank is used to qualify data. Equipment Rinsate samples can be collected at a variety of frequencies depending on the project objectives and budget. Typical frequencies are as follows:

- None (for projects that are using dedicated or disposable equipment)
- One at the beginning of the project and one at the end of the project
- One for every 20 samples utilizing non-disposable sampling equipment
- One for every 10 samples utilizing non-disposable sampling equipment
- One per day, per piece of non-disposable equipment

5.3 Field Blanks

One field blank per source of water used for decontamination per sampling event is collected for all the parameters analyzed during that sampling event. Typical frequencies for field blanks are:

- One sample from each source of water used for decontamination or preparing equipment rinsate samples
- At a frequency consistent with the rate of equipment rinsate samples

The field blank is collected by opening up the water source at the sampling locations and pouring the water directly into the appropriate sample bottles. Analysis of the sample will indicate whether contamination was introduced into the samples during the collection process.

5.4 Duplicates

Field duplicates will be collected at the frequency specified in the work plan. The samples are split as described above and in other SOPs related to sample collection procedures. Field duplicates are primarily used to check the precision and consistency of the sampling procedures and as a check of laboratory accuracy.

5.5 MS/MSD

MS/MSD samples are collected in the same manner as for a duplicate sample, except that triple the volume is required for analysis (for liquids). Generally, no additional volume is required by the laboratory for solid samples (however, this should be confirmed with the laboratory beforehand). Typically, the frequency of collection is one MS/MSD pair (or two additional sample volumes) for each 20 environmental samples collected of similar matrix (e.g. groundwater, surface water, soil).

6.0 SAMPLE COLLECTION RECORDS AND EVALUATION

Records of collection of QC samples are kept in the field logbooks and on the Chain-of-Custody forms. Evaluation of the results from the QC samples is performed by the laboratory and through data validation for the MS/MSD samples. Results of the other QC samples are compared to analytical results from the sampling event to determine if any field procedures, or sample transportation/handling may have adversely affected the concentrations found in the environmental samples.

7.0 REFERENCES

Hazardous Waste Remedial Actions Program, 1990. Requirements for Quality Control of Analytical Data. DOE/HWP!65/R1, US Department of Energy, Oak Ridge, Tennessee.

Naval Energy and Environmental Support Activity, 1998. Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program. NEESA 20.2!047B, Port Hueneme, California.

USEPA, 1988. User's Guide to the Contract Laboratory Program. 9240.0!1, Office of Emergency and Remedial Response, Washington, D.C.

USEPA, 1990. Quality Assurance/Quality Control Guidance for Removal Activities ! Sampling QA/QC Plan and Data Validation Procedures (Interim Final). EPA/540/G!90/004, Office of Emergency and Remedial Response, Washington, D.C.

U.S. EPA, 2020. Quality System and Technical Procedures for LSASD Field Branches, USEPA, Region 4, LSASD, Athens, Georgia.

U.S. EPA, 2017. Field Branches Quality System and Technical Procedures, Field Sampling Quality Control, USEPA, Region 4, SESDPROC-011-R5, Athens, Georgia.

FIELD EQUIPMENT OPERATION AND MAINTENANCE PROCEDURES - DECONTAMINATION OF SAMPLING AND MONITORING EQUIPMENT

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DECONTAMINATION OF SAMPLING AND MONITORING EQUIPMENT

1.0 PURPOSE

The purpose of this SOP is to provide a general methodology and protocol, and to reference information for the proper decontamination of field chemical sampling and analytical equipment.

2.0 SCOPE

This procedure applies to all non-disposable sampling equipment including, but not limited to, split-barrel soil samplers (split-spoons), direct push samplers (e.g., Geoprobe), bailers, beakers, trowels, filtering apparatus, and pumps. This procedure should be consulted when decontamination procedures are being developed as part of project-specific plans. Additionally, current USEPA regional procedures and decontamination guidance as well as state guidance should be reviewed.

3.0 DEFINITIONS

Decontamination - Decontamination is the process of removing or neutralizing contaminants and/or media (e.g., soil) which may have accumulated on non-disposable field equipment. This process reduces or eliminates transfer of contaminants to clean areas, prevents mixing of incompatible substances, and minimizes the likelihood of sample cross-contamination.

4.0 RESPONSIBILITIES

Project Manager - It is the responsibility of the Project Manager to ensure that project-specific plans are in accordance with these procedures. Documentation should be developed for areas where project plans deviate from these procedures.

Field Team Leader - It is the responsibility of the Field Team Leader to ensure that these procedures are implemented in the field. The Field Team Leader is responsible for ensuring field personnel performing decontamination activities have been briefed and trained to execute these procedures. The Field Team Leader should notify the Project Manager immediately if there appears to be any discrepancies between procedures proposed in this SOP versus project-specific procedures proposed in the associated scope of work (e.g., work plan, sampling and analysis plan, etc.). In addition, if high concentration acids and/or solvents are being shipped or transported to the site, appropriate packing and shipping protocols must be in place (e.g., FedEx Dangerous Goods Airbill).

Sampling Personnel - It is the responsibility of field sampling personnel to follow these procedures, or to follow documented, project-specific procedures as directed by the Field Team Leader.

5.0 PROCEDURES

In order to ensure that chemical analysis results reflect actual concentrations present at sampling locations, sampling equipment must be properly decontaminated prior to the field effort, during the sampling program (i.e., between sampling locations) and at the conclusion of the sampling program prior to demobilizing from the site. This will minimize the potential for cross-contamination between sampling locations and the transfer of contamination off site.

Generally, all equipment used for investigative activities will arrive on site in clean condition. With the exception of certified laboratory-cleaned equipment, all sampling, testing, or measuring equipment that comes in contact with potentially sampled medium (soil, concrete, groundwater) will be decontaminated prior to use, unless it arrives prepackaged from the manufacturer.

Preferably, sampling equipment should be dedicated or disposable for each sampling location. If this is not possible or cost effective, non-disposable sampling equipment must be decontaminated between sample locations. Sampling personnel also should use disposable gloves and change them between sample locations.

5.1 Sampling Equipment Decontamination Procedures

Soil, sediment, groundwater, and concrete non-disposable sampling equipment including, but not limited to, trowels, beakers, dredges, bailers, spoons, chisels, etc., that will come in contact with the sampling medium (with the exception of downhole pumps and transducers used in well sampling and aquifer testing) shall be decontaminated.

Decontamination wastes will be collected, containerized, and properly disposed unless otherwise directed in the associated work plan or sampling and analysis plan. The ultimate fate of the waste fluids (and solids, as applicable) will be at the discretion of the Field Team Leader.

Non-disposable sampling equipment that contacts the sample media will be washed with a 1,4-dioxane-free detergent solution (such as Alconox or Liquinox) and rinsed with potable water.

5.2 Field Analytical Equipment Decontamination

Field analytical equipment which may come in direct contact with the sample or sample media, including, but not limited to, water level meters, water/product level meters, pH or specific ion probes, specific conductivity probes, thermometers, and/or borehole geophysical probes must be decontaminated before and after use, according to the procedures outlined in Section 5.1, unless manufacturers instructions indicate otherwise. Probes that contact water samples not used for laboratory analyses may be rinsed with distilled water (e.g., groundwater in well casing prior to purging, beaker of water for field meter analysis, flow through cell, etc.). Probes which make no direct contact (e.g., PID or OVA probes) will be wiped clean with clean paper towels or an alcohol-saturated cloth, as necessary.

6.0 QUALITY ASSURANCE RECORDS

Decontamination procedures are monitored through the collection of equipment rinsate samples and field blanks. Collection of these samples shall be specified in the project-specific Work Plan, Sampling and Analysis, and/or Quality Assurance Project Plans. Documentation recorded in the field logbook also shall serve as a quality assurance record. Furthermore, the specific manufacturer and lot number of the decontamination fluid (e.g., distilled water, methanol, etc.) also should be recorded in the field logbook if known.

7.0 REFERENCES

U. S. EPA Office of Waste Program Enforcement. RCRA Ground Water Monitoring Technical Enforcement Guidance Document (TEGD). OSWER Directive 9950.1. 1986.

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Department of Environmental Conservation

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

Under NYSDEC's Part 375 Remedial Programs

January 2021

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ERRATA SHEET for

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) Under NYSDEC's Part 375 Remedial Programs Issued January 17, 2020

Citation and Page Number	Current Text	Corrected Text	Date
Title of Appendix I, page 32	Appendix H	Appendix I	2/25/2020
Document Cover, page 1	Guidelines for Sampling and Analysis of PFAS	Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs	9/15/2020
Routine Analysis, page 9	"However, laboratories analyzing environmental samples…PFOA and PFOS in drinking water by EPA Method 537, 537.1 or ISO 25101."	"However, laboratories analyzing environmental samples…PFOA and PFOS in drinking water by EPA Method 537, 537.1, ISO 25101, or Method 533."	9/15/2020
Additional Analysis, page 9, new paragraph regarding soil parameters	None	"In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (EPA Method 9060), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils."	9/15/2020
Data Assessment and Application to Site Cleanup Page 10	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFAS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Target levels for cleanup of PFAS in other media, including biota and sediment, have not yet been established by the DEC.	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Water Sample Results Page 10	PFAS should be further assessed and considered as a potential contaminant of concern in groundwater or surface water (…) If PFAS are identified as a contaminant of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water (…) If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	9/15/2020
Soil Sample Results, page 10	"The extent of soil contamination for purposes of delineation and remedy selection should be determined by having certain soil samples tested by Synthetic Precipitation Leaching Procedure (SPLP) and the leachate analyzed for PFAS. Soil exhibiting SPLP results above 70 ppt for either PFOA or PFOS (individually or combined) are to be evaluated during the cleanup phase."	"Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values. " [Interim SCO Table] "PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP. As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf. "	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Testing for Imported Soil Page 11	Soil imported to a site for use in a soil cap, soil cover, or as backfill is to be tested for PFAS in general conformance with DER-10, Section 5.4(e) for the PFAS Analyte List (Appendix F) using the analytical procedures discussed below and the criteria in DER-10 associated with SVOCs. If PFOA or PFOS is detected in any sample at or above 1 µg/kg, then soil should be tested by SPLP and the leachate analyzed for PFAS. If the SPLP results exceed 10 ppt for either PFOA or PFOS (individually) then the source of backfill should be rejected, unless a site-specific exemption is provided by DER. SPLP leachate criteria is based on the Maximum Contaminant Levels proposed for drinking water by New York State's Department of Health, this value may be updated based on future Federal or State promulgated regulatory standards. Remedial parties have the option of analyzing samples concurrently for both PFAS in soil and in the SPLP leachate to minimize project delays. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable. PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Footnotes	None	[1] TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances. [2] The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the soil cleanup objective for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	9/15/2020
Additional Analysis, page 9	In cases… soil parameters, such as Total Organic Carbon (EPA Method 9060), soil…	In cases… soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil…	1/8/2021
Appendix A, General Guidelines, fourth bullet	List the ELAP-approved lab(s) to be used for analysis of samples	List the ELAP- certified lab(s) to be used for analysis of samples	1/8/2021
Appendix E, Laboratory Analysis and Containers	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by ISO Method 25101.	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101	1/8/2021

Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs

Objective

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) performs or oversees sampling of environmental media and subsequent analysis of PFAS as part of remedial programs implemented under 6 NYCRR Part 375. To ensure consistency in sampling, analysis, reporting, and assessment of PFAS, DER has developed this document which summarizes currently accepted procedures and updates previous DER technical guidance pertaining to PFAS.

Applicability

All work plans submitted to DEC pursuant to one of the remedial programs under Part 375 shall include PFAS sampling and analysis procedures that conform to the guidelines provided herein.

As part of a site investigation or remedial action compliance program, whenever samples of potentially affected media are collected and analyzed for the standard Target Analyte List/Target Compound List (TAL/TCL), PFAS analysis should also be performed. Potentially affected media can include soil, groundwater, surface water, and sediment. Based upon the potential for biota to be affected, biota sampling and analysis for PFAS may also be warranted as determined pursuant to a Fish and Wildlife Impact Analysis. Soil vapor sampling for PFAS is not required.

Field Sampling Procedures

DER-10 specifies technical guidance applicable to DER's remedial programs. Given the prevalence and use of PFAS, DER has developed "best management practices" specific to sampling for PFAS. As specified in DER-10 Chapter 2, quality assurance procedures are to be submitted with investigation work plans. Typically, these procedures are incorporated into a work plan, or submitted as a stand-alone document (e.g., a Quality Assurance Project Plan). Quality assurance guidelines for PFAS are listed in Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS.

Field sampling for PFAS performed under DER remedial programs should follow the appropriate procedures outlined for soils, sediments or other solids (Appendix B), non-potable groundwater (Appendix C), surface water (Appendix D), public or private water supply wells (Appendix E), and fish tissue (Appendix F).

QA/QC samples (e.g. duplicates, MS/MSD) should be collected as specified in DER-10, Section 2.3(c). For sampling equipment coming in contact with aqueous samples only, rinsate or equipment blanks should be collected. Equipment blanks should be collected at a minimum frequency of one per day per site or one per twenty samples, whichever is more frequent.

Analysis and Reporting

As of October 2020, the United States Environmental Protection Agency (EPA) does not have a validated method for analysis of PFAS for media commonly analyzed under DER remedial programs (non-potable waters, solids). DER has developed the following guidelines to ensure consistency in analysis and reporting of PFAS.

The investigation work plan should describe analysis and reporting procedures, including laboratory analytical procedures for the methods discussed below. As specified in DER-10 Section 2.2, laboratories should provide a full Category B deliverable. In addition, a Data Usability Summary Report (DUSR) should be prepared by an independent, third party data validator. Electronic data submissions should meet the requirements provided at: https://www.dec.ny.gov/chemical/62440.html.

DER has developed a *PFAS Analyte List* (Appendix F) for remedial programs to understand the nature of contamination at sites. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. If lab and/or matrix specific issues are encountered for any analytes, the DER project manager, in consultation with the DER chemist, will make case-by-case decisions as to whether certain analytes may be temporarily or permanently discontinued from analysis at each site. As with other contaminants that are analyzed for at a site, the *PFAS Analyte List* may be refined for future sampling events based on investigative findings.

Routine Analysis

Currently, New York State Department of Health's Environmental Laboratory Approval Program (ELAP) does not offer certification for PFAS in matrices other than finished drinking water. However, laboratories analyzing environmental samples for PFAS (e.g., soil, sediments, and groundwater) under DER's Part 375 remedial programs need to hold ELAP certification for PFOA and PFOS in drinking water by EPA Method 537, 537.1, ISO 25101, or Method 533. Laboratories should adhere to the guidelines and criteria set forth in the DER's laboratory guidelines for PFAS in non-potable water and solids (Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids). Data review guidelines were developed by DER to ensure data comparability and usability (Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids).

LC-MS/MS analysis for PFAS using methodologies based on EPA Method 537.1 is the procedure to use for environmental samples. Isotope dilution techniques should be utilized for the analysis of PFAS in all media. Reporting limits for PFOA and PFOS in aqueous samples should not exceed 2 ng/L. Reporting limits for PFOA and PFOS in solid samples should not exceed 0.5 µg/kg. Reporting limits for all other PFAS in aqueous and solid media should be as close to these limits as possible. If laboratories indicate that they are not able to achieve these reporting limits for the entire *PFAS Analyte List*, site-specific decisions regarding acceptance of elevated reporting limits for specific PFAS can be made by the DER project manager in consultation with the DER chemist.

Additional Analysis

Additional laboratory methods for analysis of PFAS may be warranted at a site, such as the Synthetic Precipitation Leaching Procedure (SPLP) and Total Oxidizable Precursor Assay (TOP Assay).

In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils.

SPLP is a technique used to determine the mobility of chemicals in liquids, soils and wastes, and may be useful in determining the need for addressing PFAS-containing material as part of the remedy. SPLP by EPA Method 1312 should be used unless otherwise specified by the DER project manager in consultation with the DER chemist.

Impacted materials can be made up of PFAS that are not analyzable by routine analytical methodology. A TOP Assay can be utilized to conceptualize the amount and type of oxidizable PFAS which could be liberated in the environment, which approximates the maximum concentration of perfluoroalkyl substances that could be generated

if all polyfluoroalkyl substances were oxidized. For example, some polyfluoroalkyl substances may degrade or transform to form perfluoroalkyl substances (such as PFOA or PFOS), resulting in an increase in perfluoroalkyl substance concentrations as contaminated groundwater moves away from a source. The TOP Assay converts, through oxidation, polyfluoroalkyl substances (precursors) into perfluoroalkyl substances that can be detected by routine analytical methodology.[1]

Commercial laboratories have adopted methods which allow for the quantification of targeted PFAS in air and biota. The EPA's Office of Research and Development (ORD) is currently developing methods which allow for air emissions characterization of PFAS, including both targeted and non-targeted analysis of PFAS. Consult with the DER project manager and the DER chemist for assistance on analyzing biota/tissue and air samples.

Data Assessment and Application to Site Cleanup

Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.

Water Sample Results

PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water if PFOA or PFOS is detected in any water sample at or above 10 ng/L (ppt) and is determined to be attributable to the site, either by a comparison of upgradient and downgradient levels, or the presence of soil source areas, as defined below. In addition, further assessment of water may be warranted if either of the following screening levels are met:

a. any other individual PFAS (not PFOA or PFOS) is detected in water at or above 100 ng/L; or
b. total concentration of PFAS (including PFOA and PFOS) is detected in water at or above 500 ng/L

If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.

Soil Sample Results

Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values.

Guidance Values for Anticipated Site Use	PFOA (ppb)	PFOS (ppb)
Unrestricted	0.66	0.88
Residential	6.6	8.8
Restricted Residential	33	44
Commercial	500	440
Industrial	600	440
Protection of Groundwater[2]	1.1	3.7

[1] TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances.
[2] The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).

PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP.

As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf.

Testing for Imported Soil

Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable.

PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.

Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS

The following guidelines (general and PFAS-specific) can be used to assist with the development of a QAPP for projects within DER involving sampling and analysis of PFAS.

General Guidelines in Accordance with DER-10

- Document/work plan section title – Quality Assurance Project Plan
- Summarize project scope, goals, and objectives
- Provide project organization including names and resumes of the project manager, Quality Assurance Officer (QAO), field staff, and Data Validator
    - The QAO should not have another position on the project, such as project or task manager, that involves project productivity or profitability as a job performance criterion
- List the ELAP certified lab(s) to be used for analysis of samples
- Include a site map showing sample locations
- Provide detailed sampling procedures for each matrix
- Include Data Quality Usability Objectives
- List equipment decontamination procedures
- Include an "Analytical Methods/Quality Assurance Summary Table" specifying:
    - Matrix type
    - Number or frequency of samples to be collected per matrix
    - Number of field and trip blanks per matrix
    - Analytical parameters to be measured per matrix
    - Analytical methods to be used per matrix with minimum reporting limits
    - Number and type of matrix spike and matrix spike duplicate samples to be collected
    - Number and type of duplicate samples to be collected
    - Sample preservation to be used per analytical method and sample matrix
    - Sample container volume and type to be used per analytical method and sample matrix
    - Sample holding time to be used per analytical method and sample matrix
- Specify Category B laboratory data deliverables and preparation of a DUSR

Specific Guidelines for PFAS

- Include in the text that sampling for PFAS will take place
- Include in the text that PFAS will be analyzed by LC-MS/MS for PFAS using methodologies based on EPA Method 537.1
- Include the list of PFAS compounds to be analyzed (*PFAS Analyte List*)
- Include the laboratory SOP for PFAS analysis
- List the minimum method-achievable Reporting Limits for PFAS
    - Reporting Limits should be less than or equal to:
        - Aqueous – 2 ng/L (ppt)
        - Solids – 0.5 µg/kg (ppb)
- Include the laboratory Method Detection Limits for the PFAS compounds to be analyzed
- Laboratory should have ELAP certification for PFOA and PFOS in drinking water by EPA Method 537, 537.1, EPA Method 533, or ISO 25101
- Include detailed sampling procedures
    - Precautions to be taken
    - Pump and equipment types
    - Decontamination procedures
    - Approved materials only to be used
- Specify that regular ice only will be used for sample shipment
- Specify that equipment blanks should be collected at a minimum frequency of 1 per day per site for each matrix

Appendix B - Sampling Protocols for PFAS in Soils, Sediments and Solids

General

The objective of this protocol is to give general guidelines for the collection of soil, sediment and other solid samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Containers

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in to contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel spoon
- stainless steel bowl
- steel hand auger or shovel without any coatings

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Sampling is often conducted in areas where a vegetative turf has been established. In these cases, a pre-cleaned trowel or shovel should be used to carefully remove the turf so that it may be replaced at the conclusion of sampling. Surface soil samples (e.g. 0 to 6 inches below surface) should then be collected using a pre-cleaned, stainless steel spoon. Shallow subsurface soil samples (e.g. 6 to ~36 inches below surface) may be collected by digging a hole using a pre-cleaned hand auger or shovel. When the desired subsurface depth is reached, a pre-cleaned hand auger or spoon shall be used to obtain the sample.

When the sample is obtained, it should be deposited into a stainless steel bowl for mixing prior to filling the sample containers. The soil should be placed directly into the bowl and mixed thoroughly by rolling the material into the middle until the material is homogenized. At this point the material within the bowl can be placed into the laboratory provided container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A soil log or sample log shall document the location of the sample/borehole, depth of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix C - Sampling Protocols for PFAS in Monitoring Wells

General

The objective of this protocol is to give general guidelines for the collection of groundwater samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including plumbers tape and sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel inertia pump with HDPE tubing
- peristaltic pump equipped with HDPE tubing and silicone tubing
- stainless steel bailer with stainless steel ball
- bladder pump (identified as PFAS-free) with HDPE tubing

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Monitoring wells should be purged in accordance with the sampling procedure (standard/volume purge or low flow purge) identified in the site work plan, which will determine the appropriate time to collect the sample. If sampling using standard purge techniques, additional purging may be needed to reduce turbidity levels, so samples contain a limited amount of sediment within the sample containers. Sample containers that contain sediment may cause issues at the laboratory, which may result in elevated reporting limits and other issues during the sample preparation that can compromise data usability. Sampling personnel should don new nitrile gloves prior to sample collection due to the potential to contact PFAS containing items (not related to the sampling equipment) during the purging activities.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Additional equipment blank samples may be collected to assess other equipment that is utilized at the monitoring well
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A purge log shall document the location of the sample, sampling equipment, groundwater parameters, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix D - Sampling Protocols for PFAS in Surface Water

General

The objective of this protocol is to give general guidelines for the collection of surface water samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel cup

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Where conditions permit, (e.g. creek or pond) sampling devices (e.g. stainless steel cup) should be rinsed with site medium to be sampled prior to collection of the sample. At this point the sample can be collected and poured into the sample container.

If site conditions permit, samples can be collected directly into the laboratory container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A sample log shall document the location of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix E - Sampling Protocols for PFAS in Private Water Supply Wells

General

The objective of this protocol is to give general guidelines for the collection of water samples from private water supply wells (with a functioning pump) for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101. The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials (e.g. plumbers tape), including sample bottle cap liners with a PTFE layer.

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Locate and assess the pressure tank and determine if any filter units are present within the building. Establish the sample location as close to the well pump as possible, which is typically the spigot at the pressure tank. Ensure sampling equipment is kept clean during sampling as access to the pressure tank spigot, which is likely located close to the ground, may be obstructed and may hinder sample collection.

Prior to sampling, a faucet downstream of the pressure tank (e.g., washroom sink) should be run until the well pump comes on and a decrease in water temperature is noted which indicates that the water is coming from the well. If the homeowner is amenable, staff should run the water longer to purge the well (15+ minutes) to provide a sample representative of the water in the formation rather than standing water in the well and piping system including the pressure tank. At this point a new pair of nitrile gloves should be donned and the sample can be collected from the sample point at the pressure tank.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- If equipment was used, collect one equipment blank per day per site and a minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers.
- A field reagent blank (FRB) should be collected at a rate of one per 20 samples. The lab will provide a FRB bottle containing PFAS free water and one empty FRB bottle. In the field, pour the water from the one bottle into the empty FRB bottle and label appropriately.
- Request appropriate data deliverable (Category B) and an electronic data deliverable
- For sampling events where multiple private wells (homes or sites) are to be sampled per day, it is acceptable to collect QC samples at a rate of one per 20 across multiple sites or days.

Documentation

A sample log shall document the location of the private well, sample point location, owner contact information, sampling equipment, purge duration, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate and available (e.g. well construction, pump type and location, yield, installation date). Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appendix F - Sampling Protocols for PFAS in Fish

This appendix contains a copy of the latest guidelines developed by the Division of Fish and Wildlife (DFW) entitled “General Fish Handling Procedures for Contaminant Analysis” (Ver. 8).

Procedure Name: General Fish Handling Procedures for Contaminant Analysis

Number: FW-005

Purpose: This procedure describes data collection, fish processing and delivery of fish collected for contaminant monitoring. It contains the chain of custody and collection record forms that should be used for the collections.

Organization: Environmental Monitoring Section
Bureau of Ecosystem Health
Division of Fish and Wildlife (DFW)
New York State Department of Environmental Conservation (NYSDEC)
625 Broadway
Albany, New York 12233-4756

Version: 8

Previous Version Date: 21 March 2018

Summary of Changes to this Version: Updated bureau name to Bureau of Ecosystem Health. Added direction to list the names of all field crew on the collection record. Minor formatting changes on chain of custody and collection records.

Originator or Revised by: Wayne Richter, Jesse Becker

Date: 26 April 2019

Quality Assurance Officer and Approval Date: Jesse Becker, 26 April 2019

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

GENERAL FISH HANDLING PROCEDURES FOR CONTAMINANT ANALYSES

A. Original copies of all continuity of evidence (i.e., Chain of Custody) and collection record forms must accompany delivery of fish to the lab. A copy shall be directed to the Project Leader or as appropriate, Wayne Richter. All necessary forms will be supplied by the Bureau of Ecosystem Health. Because some samples may be used in legal cases, it is critical that each section is filled out completely. Each Chain of Custody form has three main sections:

   1. The top box is to be filled out **and signed** by the person responsible for the fish collection (e.g., crew leader, field biologist, researcher). This person is responsible for delivery of the samples to DEC facilities or personnel (e.g., regional office or biologist).

   2. The second section is to be filled out **and signed** by the person responsible for the collections while being stored at DEC, before delivery to the analytical lab. This may be the same person as in (1), but it is still required that they complete the section. Also important is the **range of identification numbers** (i.e., tag numbers) included in the sample batch.

   3. Finally, the bottom box is to record any transfers between DEC personnel and facilities. Each subsequent transfer should be **identified, signed, and dated**, until laboratory personnel take possession of the fish.

B. The following data are required on each **Fish Collection Record** form:

   1. Project and Site Name.

   2. DEC Region.

   3. All personnel (and affiliation) involved in the collection.

   4. Method of collection (gill net, hook and line, etc.)

   5. Preservation Method.

C. The following data are to be taken on each fish collected and recorded on the **Fish Collection Record** form:

   1. Tag number - Each specimen is to be individually jaw tagged at time of collection with a unique number. Make sure the tag is turned out so that the number can be read without opening the bag. Use tags in sequential order. For small fish or composite samples place the tag inside the bag with the samples. The Bureau of Ecosystem Health can supply the tags.

   2. Species identification (please be explicit enough to enable assigning genus and species). Group fish by species when processing.

   3. Date collected.

   4. Sample location (waterway and nearest prominent identifiable landmark).

   5. Total length (nearest mm or smallest sub-unit on measuring instrument) and weight (nearest g or

smallest sub-unit of weight on weighing instrument). Take all measures as soon as possible with calibrated, protected instruments (e.g. from wind and upsets) and prior to freezing.

6. Sex - fish may be cut enough to allow sexing or other internal investigation, but do not eviscerate. Make any incision on the right side of the belly flap or exactly down the midline so that a left-side fillet can be removed.

D. General data collection recommendations:

1. It is helpful to use an ID or tag number that will be unique. It is best to use metal striped bass or other uniquely numbered metal tags. If uniquely numbered tags are unavailable, values based on the region, water body and year are likely to be unique: for example, R7CAY11001 for Region 7, Cayuga Lake, 2011, fish 1. If the fish are just numbered 1 through 20, we have to give them new numbers for our database, making it more difficult to trace your fish to their analytical results and creating an additional possibility for errors.

2. Process and record fish of the same species sequentially. Recording mistakes are less likely when all fish from a species are processed together. Starting with the bigger fish species helps avoid missing an individual.

3. If using Bureau of Ecosystem Health supplied tags or other numbered tags, use tags in sequence so that fish are recorded with sequential Tag Numbers. This makes data entry and login at the lab and use of the data in the future easier and reduces keypunch errors.

4. Record length and weight as soon as possible after collection and before freezing. Other data are recorded in the field upon collection. An age determination of each fish is optional, but if done, it is recorded in the appropriate "Age" column.

5. For composite samples of small fish, record the number of fish in the composite in the Remarks column. Record the length and weight of each individual in a composite. All fish in a composite sample should be of the same species and members of a composite should be visually matched for size.

6. Please submit photocopies of topographic maps or good quality navigation charts indicating sampling locations. GPS coordinates can be entered in the Location column of the collection record form in addition to or instead for providing a map. These records are of immense help to us (and hopefully you) in providing documented location records which are not dependent on memory and/or the same collection crew. In addition, they may be helpful for contaminant source trackdown and remediation/control efforts of the Department.

7. When recording data on fish measurements, it will help to ensure correct data recording for the data recorder to call back the numbers to the person making the measurements.

E. Each fish is to be placed in its own individual plastic bag. For small fish to be analyzed as a composite, put all of the fish for one composite in the same bag but use a separate bag for each composite. It is important to individually bag the fish to avoid difficulties or cross contamination when processing the fish for chemical analysis. Be sure to include the fish's tag number inside the bag, preferably attached to the fish with the tag number turned out so it can be read. Tie or otherwise secure the bag closed. **The Bureau of Ecosystem Health will supply the bags.** If necessary, food grade bags may be procured from a suitable vendor (e.g., grocery store). It is preferable to redundantly label each bag with a manila tag tied between the knot and the body of the bag. This tag should be labeled with the project name, collection location, tag number, collection date, and fish species. If scales are collected, the scale envelope should be labeled with

the same information.

F. Groups of fish, by species, are to be placed in one large plastic bag per sampling location. **The Bureau of Ecosystem Health will supply the larger bags.** Tie or otherwise secure the bag closed. Label the site bag with a manila tag tied between the knot and the body of the bag. The tag should contain: project, collection location, collection date, species and **tag number ranges**. Having this information on the manila tag enables lab staff to know what is in the bag without opening it.

G. Do not eviscerate, fillet or otherwise dissect the fish unless specifically asked to. If evisceration or dissection is specified, the fish must be cut along the exact midline or on the right side so that the left side fillet can be removed intact at the laboratory. If filleting is specified, the procedure for taking a standard fillet (SOP PREPLAB 4) must be followed, including removing scales.

H. Special procedures for PFAS: Unlike legacy contaminants such as PCBs, which are rarely found in day to day life, PFAS are widely used and frequently encountered. Practices that avoid sample contamination are therefore necessary. While no standard practices have been established for fish, procedures for water quality sampling can provide guidance. The following practices should be used for collections when fish are to be analyzed for PFAS:

No materials containing Teflon.
No Post-it notes.
No ice packs; only water ice or dry ice.
Any gloves worn must be powder free nitrile.
No Gore-Tex or similar materials (Gore-Tex is a PFC with PFOA used in its manufacture).
No stain repellent or waterproof treated clothing; these are likely to contain PFCs.
Avoid plastic materials, other than HDPE, including clipboards and waterproof notebooks.
Wash hands after handling any food containers or packages as these may contain PFCs.
Keep pre-wrapped food containers and wrappers isolated from fish handling.
Wear clothing washed at least six times since purchase.
Wear clothing washed without fabric softener.
Staff should avoid cosmetics, moisturizers, hand creams and similar products on the day of sampling as many of these products contain PFCs (Fujii et al. 2013). Sunscreen or insect repellent should not contain ingredients with “fluor” in their name. Apply any sunscreen or insect repellent well downwind from all materials. Hands must be washed after touching any of these products.

I. All fish must be kept at a temperature <45° F (<8° C) immediately following data processing. As soon as possible, freeze at -20° C ± 5° C. Due to occasional freezer failures, daily freezer temperature logs are required. The freezer should be locked or otherwise secured to maintain chain of custody.

J. In most cases, samples should be delivered to the Analytical Services Unit at the Hale Creek field station. Coordinate delivery with field station staff and send copies of the collection records, continuity of evidence forms and freezer temperature logs to the field station. For samples to be analyzed elsewhere, non-routine collections or other questions, contact Wayne Richter, Bureau of Ecosystem Health, NYSDEC, 625 Broadway, Albany, New York 12233-4756, 518-402-8974, or the project leader about sample transfer. Samples will then be directed to the analytical facility and personnel noted on specific project descriptions.

K. A recommended equipment list is at the end of this document.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF FISH AND WILDLIFE
FISH COLLECTION RECORD

Project and Site Name _____ DEC Region _____

Collections made by (include all crew) _____

Sampling Method: □Electrofishing □Gill netting □Trap netting □Trawling □Seining □Angling □Other _____

Preservation Method: □Freezing □Other _____ Notes (SWFDB survey number): _____

FOR LAB USE ONLY- LAB ENTRY NO.	COLLECTION OR TAG NO.	SPECIES	DATE TAKEN	LOCATION	AGE	SEX &/OR REPROD. CONDIT	LENGTH ( )	WEIGHT ( )	REMARKS

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
CHAIN OF CUSTODY

I, _____, of _____ collected the
(Print Name) (Print Business Address)

following on _____, 20____ from _____
(Date) (Water Body)

in the vicinity of _____
(Landmark, Village, Road, etc.)

Town of _____, in _____ County.

Item(s) _____

_____

Said sample(s) were in my possession and handled according to standard procedures provided to me prior to collection. The sample(s) were placed in the custody of a representative of the New York State Department of Environmental Conservation on _____, 20_____.

_____ _____
Signature Date

I, _____, received the above mentioned sample(s) on the date specified and assigned identification number(s) _____ to the sample(s). I have recorded pertinent data for the sample(s) on the attached collection records. The sample(s) remained in my custody until subsequently transferred, prepared or shipped at times and on dates as attested to below.

_____ _____
Signature Date

SECOND RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
THIRD RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
FOURTH RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
RECEIVED IN LABORATORY BY (Print Name)	TIME & DATE	REMARKS
SIGNATURE	UNIT	
LOGGED IN BY (Print Name)	TIME & DATE	ACCESSION NUMBERS
SIGNATURE	UNIT	

richter: revised 21 April 2014; becker: 23 March 2017, 26 April, 2019

NOTICE OF WARRANTY

By signature to the chain of custody (reverse), the signatory warrants that the information provided is truthful and accurate to the best of his/her ability. The signatory affirms that he/she is willing to testify to those facts provided and the circumstances surrounding the same. Nothing in this warranty or chain of custody negates responsibility nor liability of the signatories for the truthfulness and accuracy of the statements provided.

HANDLING INSTRUCTIONS

On day of collection, collector(s) name(s), address(es), date, geographic location of capture (attach a copy of topographic map or navigation chart), species, number kept of each species, and description of capture vicinity (proper noun, if possible) along with name of Town and County must be indicated on reverse.

Retain organisms in manila tagged plastic bags to avoid mixing capture locations. Note appropriate information on each bag tag.

Keep samples as cool as possible. Put on ice if fish cannot be frozen within 12 hours. If fish are held more than 24 hours without freezing, they will not be retained or analyzed.

Initial recipient (either DEC or designated agent) of samples from collector(s) is responsible for obtaining and recording information on the collection record forms which will accompany the chain of custody. This person will seal the container using packing tape and writing his signature, the time and the date across the tape onto the container with indelible marker. Any time a seal is broken, for whatever purpose, the incident must be recorded on the Chain of Custody (reason, time, and date) in the purpose of transfer block. Container then is resealed using new tape and rewriting signature, with time and date.

EQUIPMENT LIST

Scale or balance of appropriate capacity for the fish to be collected.

Fish measuring board.

Plastic bags of an appropriate size for the fish to be collected and for site bags.

Individually numbered metal tags for fish.

Manila tags to label bags.

Small envelops, approximately 2” x 3.5”, if fish scales are to be collected.

Knife for removing scales.

Chain of custody and fish collection forms.

Clipboard.

Pens or markers.

Paper towels.

Dish soap and brush.

Bucket.

Cooler.

Ice.

Duct tape.

Appendix G – PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonates	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluoroalkyl carboxylates	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUA/PFUdA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTriA/PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTA/PFTeDA	376-06-7
Fluorinated Telomer Sulfonates	6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2
	8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4
Perfluorooctane-sulfonamides	Perfluroroctanesulfonamide	FOSA	754-91-6
Perfluorooctane-sulfonamidoacetic acids	N-methyl perfluorooctanesulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethyl perfluorooctanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6

Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) developed the following guidelines for laboratories analyzing environmental samples for PFAS under DER programs. If laboratories cannot adhere to the following guidelines, they should contact DER's Quality Assurance Officer, Dana Barbarossa, at dana.barbarossa@dec.ny.gov prior to analysis of samples.

Isotope Dilution

Isotope dilution techniques should be utilized for the analysis of PFAS in all media.

Extraction

For water samples, the entire sample bottle should be extracted, and the sample bottle rinsed with appropriate solvent to remove any residual PFAS.

For samples with high particulates, the samples should be handled in one of the following ways:

1. Spike the entire sample bottle with isotope dilution analytes (IDAs) prior to any sample manipulation. The sample can be passed through the SPE and if it clogs, record the volume that passed through.
2. If the sample contains too much sediment to attempt passing it through the SPE cartridge, the sample should be spiked with isotope dilution analytes, centrifuged and decanted.
3. If higher reporting limits are acceptable for the project, the sample can be diluted by taking a representative aliquot of the sample. If isotope dilution analytes will be diluted out of the sample, they can be added after the dilution. The sample should be homogenized prior to taking an aliquot.

If alternate sample extraction procedures are used, please contact the DER remedial program chemist prior to employing. Any deviations in sample preparation procedures should be clearly noted in the case narrative.

Signal to Noise Ratio

For all target analyte ions used for quantification, signal to noise ratio should be 3:1 or greater.

Blanks

There should be no detections in the method blanks above the reporting limits.

Ion Transitions

The ion transitions listed below should be used for the following PFAS:

PFOA	413 > 369
PFOS	499 > 80
PFHxS	399 > 80
PFBS	299 > 80
6:2 FTS	427 > 407
8:2 FTS	527 > 507
N-EtFOSAA	584 > 419
N-MeFOSAA	570 > 419

Branched and Linear Isomers

Standards containing both branched and linear isomers should be used when standards are commercially available. Currently, quantitative standards are available for PFHxS, PFOS, NMeFOSAA, and NEtFOSAA. As more standards become available, they should be incorporated in to the method. All isomer peaks present in the standard should be integrated and the areas summed. Samples should be integrated in the same manner as the standards.

Since a quantitative standard does not exist for branched isomers of PFOA, the instrument should be calibrated using just the linear isomer and a technical (qualitative) PFOA standard should be used to identify the retention time of the branched PFOA isomers in the sample. The total response of PFOA branched and linear isomers should be integrated in the samples and quantitated using the calibration curve of the linear standard.

Secondary Ion Transition Monitoring

Quantifier and qualifier ions should be monitored for all target analytes (PFBA and PFPeA are exceptions). The ratio of quantifier ion response to qualifier ion response should be calculated for each target analyte and the ratio compared to standards. Lab derived criteria should be used to determine if the ratios are acceptable.

Reporting

Detections below the reporting limit should be reported and qualified with a J qualifier.

The acid form of PFAS analytes should be reported. If the salt form of the PFAS was used as a stock standard, the measured mass should be corrected to report the acid form of the analyte.

Appendix I - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

These guidelines are intended to be used for the validation of PFAS analytical results for projects within the Division of Environmental Remediation (DER) as well as aid in the preparation of a data usability summary report. Data reviewers should understand the methodology and techniques utilized in the analysis. Consultation with the end user of the data may be necessary to assist in determining data usability based on the data quality objectives in the Quality Assurance Project Plan. A familiarity with the laboratory's Standard Operating Procedure may also be needed to fully evaluate the data. If you have any questions, please contact DER's Quality Assurance Officer, Dana Barbarossa, at dana.barbarossa@dec.ny.gov.

Preservation and Holding Time

Samples should be preserved with ice to a temperature of less than 6°C upon arrival at the lab. The holding time is 14 days to extraction for aqueous and solid samples. The time from extraction to analysis for aqueous samples is 28 days and 40 days for solids.

Temperature greatly exceeds 6ºC upon arrival at the lab*	Use professional judgement to qualify detects and non-detects as estimated or rejected
Holding time exceeding 28 days to extraction	Use professional judgement to qualify detects and non-detects as estimated or rejected if holding time is grossly exceeded

*Samples that are delivered to the lab immediately after sampling may not meet the thermal preservation guidelines. Samples are considered acceptable if they arrive on ice or an attempt to chill the samples is observed.

Initial Calibration

The initial calibration should contain a minimum of five standards for linear fit and six standards for a quadratic fit. The relative standard deviation (RSD) for a quadratic fit calibration should be less than 20%. Linear fit calibration curves should have an R^2 value greater than 0.990.

The low-level calibration standard should be within 50% - 150% of the true value, and the mid-level calibration standard within 70% - 130% of the true value.

%RSD >20%	J flag detects and UJ non detects
R^2 >0.990	J flag detects and UJ non detects
Low-level calibration check <50% or >150%	J flag detects and UJ non detects
Mid-level calibration check <70% or >130%	J flag detects and UJ non detects

Initial Calibration Verification

An initial calibration verification (ICV) standard should be from a second source (if available). The ICV should be at the same concentration as the mid-level standard of the calibration curve.

ICV recovery <70% or >130%	J flag detects and non-detects

Continuing Calibration Verification

Continuing calibration verification (CCV) checks should be analyzed at a frequency of one per ten field samples. If CCV recovery is very low, where detection of the analyte could be in question, ensure a low level CCV was analyzed and use to determine data quality.

CCV recovery <70 or >130%	J flag results

Blanks

There should be no detections in the method blanks above the reporting limits. Equipment blanks, field blanks, rinse blanks etc. should be evaluated in the same manner as method blanks. Use the most contaminated blank to evaluate the sample results.

Blank Result	Sample Result	Qualification
Any detection	<Reporting limit	Qualify as ND at reporting limit
Any detection	>Reporting Limit and >10x the blank result	No qualification
>Reporting limit	>Reporting limit and <10x blank result	J+ biased high

Field Duplicates

A blind field duplicate should be collected at rate of one per twenty samples. The relative percent difference (RPD) should be less than 30% for analyte concentrations greater than two times the reporting limit. Use the higher result for final reporting.

RPD >30%	Apply J qualifier to parent sample

Lab Control Spike

Lab control spikes should be analyzed with each extraction batch or one for every twenty samples. In the absence of lab derived criteria, use 70% - 130% recovery criteria to evaluate the data.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects

Matrix Spike/Matrix Spike Duplicate

One matrix spike and matrix spike duplicate should be collected at a rate of one per twenty samples. Use professional judgement to reject results based on out of control MS/MSD recoveries.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only
RPD >30%	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only

Extracted Internal Standards (Isotope Dilution Analytes)

Problematic analytes (e.g. PFBA, PFPeA, fluorotelomer sulfonates) can have wider recoveries without qualification. Qualify corresponding native compounds with a J flag if outside of the range.

Recovery <50% or >150%	Apply J qualifier
Recovery <25% or >150% for poor responding analytes	Apply J qualifier
Isotope Dilution Analyte (IDA) Recovery <10%	Reject results

Secondary Ion Transition Monitoring

Quantifier and qualifier ions should be monitored for all target analytes (PFBA and PFPeA are exceptions). The ratio of quantifier ion response to qualifier ion response should be calculated from the standards for each target analyte. Lab derived criteria should be used to determine if the ratios are acceptable. If the ratios fall outside of the laboratory criteria, qualify results as an estimated maximum concentration.

Signal to Noise Ratio

The signal to noise ratio for the quantifier ion should be at least 3:1. If the ratio is less than 3:1, the peak is discernable from the baseline noise and symmetrical, the result can be reported. If the peak appears to be baseline noise and/or the shape is irregular, qualify the result as tentatively identified.

Branched and Linear Isomers

Observed branched isomers in the sample that do not have a qualitative or quantitative standard should be noted and the analyte should be qualified as biased low in the final data review summary report. Note: The branched isomer peak should also be present in the secondary ion transition.

Reporting Limits

If project-specific reporting limits were not met, please indicate that in the report along with the reason (e.g. over dilution, dilution for non-target analytes, high sediment in aqueous samples).

Peak Integrations

Target analyte peaks should be integrated properly and consistently when compared to standards. Ensure branched isomer peaks are included for PFAS where standards are available. Inconsistencies should be brought to the attention of the laboratory or identified in the data review summary report.

PFAS Sampling Checklist

Date: _____

Weather (*temp./precipitation*): _____ Site Name: _____

Field Clothing and PPE:

- ☐ No clothing or boots containing Gore-Tex™
- ☐ All safety boots made from polyurethane and PVC
- ☐ No materials containing Tyvek®
- ☐ Field crew has not used fabric softener on clothing
- ☐ Field crew has not used cosmetics, moisturizers, hand cream, or other related products this morning
- ☐ Field crew has not applied unauthorized sunscreen or insect repellant

Field Equipment:

- ☐ No Teflon® or LDPE containing materials on-site
- ☐ All sample materials made from stainless steel, HDPE, acetate, silicon, or polypropylene
- ☐ No waterproof field books on-site
- ☐ No plastic clipboards, binders, or spiral hard cover notebooks on-site
- ☐ Coolers filled with regular ice only. No chemical (blue) ice packs in possession

Sample Containers:

- ☐ All sample containers made of HDPE or polypropylene
- ☐ Caps are unlined and made of HDPE or polypropylene

Wet Weather (as applicable):

- ☐ Wet weather gear made of polyurethane and PVC only

Equipment Decontamination:

- ☐ "PFC-free" water on-site for decontamination of sample equipment. No other water sources to be used.
- ☐ Alconox and Liquinox to be used as decontamination materials

Food Considerations:

- ☐ No food or drink on-site with exception of bottled water and/or hydration drinks (i.e., Gatorade and Powerade) that is available for consumption only in the staging area

If any applicable boxes cannot be checked, the Field Lead shall describe the noncompliance issues below and work with field personnel to address noncompliance issues prior to commencement of that day's work. Corrective action shall include removal of noncompliance items from the site or removal of worker offsite until in compliance.

Describe the noncompliance issues (include personnel not in compliance) and action/outcome of noncompliance:

_____

_____

_____

Field Lead Name: _____

Field Lead Signature: _____ Time: _____

PFAS Sampling – Prohibited and Acceptable Items

Prohibited	Acceptable
Field Equipment	
Teflon® containing materials	High-density polyethylene (HDPE) materials
Low density polyethylene (LDPE) materials	Acetate Liners
	Silicon Tubing
Waterproof field books	Loose paper (non-waterproof)
Plastic clipboards, binders, or spiral hard cover notebooks	Aluminum field clipboards or with Masonite
Chemical (blue) ice packs	Regular ice
Field Clothing and PPE	
New cotton clothing or synthetic water resistant, waterproof, or stain-treated clothing, clothing containing Gore-Tex™	Well-laundered clothing made of natural fibers (preferable cotton)
Clothing laundered using fabric softener	No fabric softener
Boots containing Gore-Tex™	Boots made with polyurethane and PVC
Tyvek®	Cotton clothing
No cosmetics, moisturizers, hand cream, or other related products as part of personal cleaning/showering routine on the morning of sampling	**Sunscreens** - Alba Organics Natural Sunscreen, Yes To Cucumbers, Aubrey Organics, Jason Natural Sun Block, Kiss my face, Baby sunscreens that are "free" or "natural" **Insect Repellents** - Jason Natural Quit Bugging Me, Repel Lemon Eucalyptus Insect repellant, Herbal Armor, California Baby Natural Bug Spray, BabyGanics **Sunscreen and insect repellant -** Avon Skin So Soft Bug Guard Plus – SPF 30 Lotion
Sample Containers	
LDPE or glass containers	HDPE or polypropylene
Teflon-lined caps	Unlined polypropylene caps
Rain Events	
Waterproof or resistant rain gear	Gazebo tent that is only touched or moved prior to and following sampling activities
Equipment Decontamination	
Decon 90®	Alconox® and/or Liquinox®
Water from an on-site well	Potable water from municipal drinking water supply
Food Considerations	
All food and drink, with exceptions noted on right	Bottled water and hydration fluids (i.e, Gatorade® and Powerade®) to be brought and consumed only in the staging areas

Michael Baker
INTERNATIONAL

ATTACHMENT C

Community Air Monitoring Plan

FINAL

3148 VAN ETTEN ROAD PROPERTY CHARACTERIZATION WORK PLAN

Site # 851061

Community Air Monitoring Plan

Prepared for:

Corning Incorporated
Corning, New York

Prepared by:

MICHAEL BAKER INTERNATIONAL
Moon Township, Pennsylvania

Michael Baker
INTERNATIONAL

May 28, 2021

APPENDIX C
DRAFT COMMUNITY AIR MONITORING PLAN

PURPOSE

This community air monitoring plan (CAMP) has been prepared by Michael Baker International (Michael Baker) on behalf of Corning Incorporated to detail the dust control and air monitoring procedures to be performed during characterization activities at the 3148 Van Etten Road Property (Evaluation Area). The Evaluation Area is located at 3148 Van Etten Road in Corning, New York. This CAMP is included as Appendix C, supplementing the 3148 Van Etten Road Property Characterization Work Plan (Work Plan).

As described in the Work Plan, characterization activities are planned at the Evaluation Area, including the sampling of soil.

METHODS AND MITIGATION

Perimeter air monitoring generally will be conducted at two stations. One upwind and one downwind station will be established in the vicinity of characterization activities that have the potential to disturb and mobilize soil particulate matter and/or volatile organic compounds (VOCs). These are theoretical "stations" and may either be personnel with a mobile dust monitor and photoionization detector (PID) collecting data at a specified interval, or semi-permanent but mobile fixture. The upwind and downwind locations will be modified as conditions warrant and placed in an area representative of air quality conditions. At least one of the monitors will be placed between the building on the property and the sampling location. These efforts will be separate from any personal air monitoring efforts that may be performed as part of the HASP outlined in Attachment A, Section 5.0 Exposure Monitoring.

Work will be generally conducted from Monday through Friday during business hours, 8 a.m. to 5 p.m. No visible dust will leave the work area, and the measures described below will ensure the safety of personnel and the community.

Since the work involves soil sampling with only spoons or direct-pish technology, dust generation is expected to be minimal and easy to control. Water may be used for dust suppression where circumstances arise warranting such measures. Windy conditions, increased vehicle traffic, and subsurface characterization activities can cause increased suspension of particulate matter. Temporary stop work orders may be issued if conditions warrant.

Particulate monitoring is the measurement of fine particles that can include dust, smoke, and other particulate matter with a diameter less than or equal to 10 microns, also known as PM_{10}. Air monitoring will be performed during activities that have the potential to disturb the subsurface and suspend particles. To accurately measure PM_{10}, a device such as miniRAM™, dataRAM™, sidePAK™, or equivalent will be used. The selected equipment will perform within the range of specifications outlined in the New York State Department of Environmental Conversation (NYSDEC) DER-10 *Technical Guidance for Site Investigation and Remediation* (NYSDEC 2010).

CALIBRATION

Calibration of monitoring equipment will be performed on a daily basis prior to the start of intrusive work activities. Calibration data will be documented appropriately.

DOCUMENTATION

Data collection during monitoring will be used to provide personnel with real-time information about air quality and enable prompt mitigation actions to be undertaken if certain action levels are exceeded (outlined below in the "Action Levels" section). Data will be logged on appropriate field forms approximately every 30 minutes, or more frequently as conditions warrant during the monitoring program. Data will be provided to the regulatory agency either weekly or daily in the event action levels are exceeded and protective actions undertaken. Exceedances will be reported to NYSDEC and the New York State Department of Health (NYSDOH) the same day of the exceedance (or the next business day if the exceedance was recorded after hours) along with the reason for the exceedance, what was done to correct it, and whether the correction action was effective. Reporting associated with daily CAMP activities will be conducted in accordance with NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC 2010)[1].

ACTION LEVELS

The following action levels are base on NYSDEC recommendations. Any exceedance of these action levels is an indicator that excessive PM^{10} or VOC migration may be taking place and will prompt immediate mitigation activities.

Concentration as Measured at Downwind Location	Duration	Action
100 µg/m^3 greater than background (upwind location) (PM_{10})	15 minutes sustained	Implement engineering control(s)
150 µg/m^3 greater than background (upwind location) (PM10)	Instantaneous	Stop work and reevaluate engineering control(s)
5 parts per million (ppm) above background (VOCs)	15-minute average	Halt activities and continue monitoring. Resume activities if level drops.
Greater than 5 but less than 25 ppm above background (VOCs)	15-minutes average	Halt activities, identify vapor source, take corrective actions, and continue monitoring. Resumes activities when level drops.
Greater than 25 ppm above background (VOCs)	Instantaneous	Shut down work.

The Michael Baker safety officer and other personnel have the ability to stop work at any time if conditions warrant such actions. The Michael Baker corporate health and safety manager and/or Michael Baker project manager may be consulted for feedback on mitigation actions as appropriate. The Michael Baker corporate health and safety manager and Michael Baker project manager will be informed of adverse conditions where mitigation is necessary in order to provide feedback and improvement to process.

[1]NYSDEC. 2010. DER-10, Technical Guidance for Site Investigation and Remediation. New York State Department of Environmental Conservation, Division of Environmental Remediation. Updated May 3, 2010.

PROXIMITY TO RECEPTORS

To the extent possible, intrusive investigative work will not be conducted within 20 feet of potential receptors. In the event that work areas are within 20 ft of potentially exposed populations or occupied structures, the continuous monitoring locations will reflect the nearest potentially exposed individuals and the locations of ventilation system intakes for nearby structures.

If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring will occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels. Background readings in the occupied spaces will take prior to commencement of planned work within 20 feet of occupied spaces. Any unusual background readings will be discussed with NYSDOH prior to commencement of the work.

If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 $\mu g/m^3$, work activities will be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 $\mu g/m^3$ or less at the monitoring point.

Michael Baker
INTERNATIONAL

ATTACHMENT D

Quality Assurance Program Plan

FINAL

3148 VAN ETTEN ROAD PROPERTY CHARACTERIZATION WORK PLAN

Site # 851061

Quality Assurance Project Plan

Prepared for:

Corning Incorporated
Corning, New York

Prepared by:

MICHAEL BAKER INTERNATIONAL
Moon Township, Pennsylvania

Michael Baker
INTERNATIONAL

May 28, 2021

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Figure 1 Sample Location Map

1.0 QUALITY ASSURANCE PROJECT PLAN

This Quality Assurance Project Plan (QAPP) describes quality assurance and quality control (QA/QC) procedures that will be used to ensure the 3148 Van Etten Road Property Characterization data results are defensible and useable for their intended purpose. The purpose of the QAPP is to provide confidence in the project data results through a system of quality control performance checks of field data entry, laboratory analysis and laboratory data reporting, and appropriate corrective actions to achieve compliance with established performance and data quality criteria. This QAPP is Attachment D to the 3148 Van Etten Road Property Characterization Work Plan (Work Plan). This QAPP follows standard EPA Guidance for the preparation of QAPPs (USEPA 2002a), and includes the following information:

- Project Description
- Organization and Responsibility
- Data Quality Objectives
- Sampling Procedures
- Sample Custody Procedures and Frequency
- Analytical Procedures
- Data Reduction/QC, Validation and Reporting
- Preventive and Action Procedures
- Corrective Action Procedures
- Quality Assurance Reports

1.1 Project Description

The objective of this investigation is to evaluate an area of potential disturbance on the Property and characterize the nature of such potential disturbance and its potential impacts on surrounding soil, groundwater, surface water and sediment in the vicinity of such material. The information and chemical data collected will be evaluated to determine the potential risks to human and ecological receptors.

1.2 Organization and Responsibility

The Michael Baker International (Michael Baker) project management organization is designed to provide a line of functional responsibility and authority supported by a management control structure and independent quality assurance review. This control structure provides for:

- Clearly identified lines of communication and coordination

- Project budget and schedule monitoring
- Key technical resources management
- Financial management and progress reports
- Quality Control

Key personnel for quality assurance throughout the duration of this investigation are:

- Michael Baker Principal-in-Charge – Carl Jeffreys is the Principal-in-Charge and has overall responsibility for senior technical review and oversight of field activities, ensuring appropriate design, and implementation of characterization to meet project objectives.
- Michael Baker Project Manager – Brian Steffes is the PM. He will work closely with other team members and serve as the primary point of contact to ensure coordination between NYSDEC and the Michael Baker team.
- Michael Baker Field Manager – Davis Gaviglia is responsible for overseeing the planning and coordination of field activities and for all aspects of sample collection activities to ensure that appropriate sampling, quality assurance and documentation procedures are used. Field team leaders will be assigned individual tasks, as appropriate. The field manager will report to Michael Baker's PM.
- Michael Baker Quality Assurance Chemist – Shannon Horn is responsible for providing overall quality assurance support for the field activities and for coordinating with the analytical laboratory(s) to ensure that QAPP requirements are followed. Ms. Horn is responsible for coordinating the validation of laboratory data, communicating data quality issues to the data users, and working with data users and the project manager to address any data limitations. Ms. Horn is also responsible for coordinating with the laboratory and tracking the laboratory's progress, verifying that the laboratory has implemented the requirements of the QAPP, addressing quality assurance issues related to the laboratory analyses, ensuring that the laboratory capacity is sufficient to undertake the required analyses in a timely manner, and addressing scheduling issues related to the laboratory analyses. Ms. Horn will report directly to Michael Baker's project manager and will work closely Michael Baker's Field Manager to ensure the project objectives of the QAPP are met.
- Michael Baker Database Administrator – Shannon Horn will have primary responsibility for data management and database maintenance and development. Ms. Horn will be responsible for overseeing and/or conducting the following activities: establishing storage formats and procedures appropriate for all data collected during the field activities, working with the field crew, laboratory and data validator to ensure all data entries are correct and complete and are delivered in the correct format, maintaining the integrity and completeness of the data base, and providing data summaries to the data users in the required formats for interpretation and reporting.

- Michael Baker Corporate Health and Safety Manager – Matthew Guard is Michael Baker's corporate health and safety manager and will be responsible for oversight of the health and safety program that will be implemented during field activities.

- Michael Baker Safety Officer – David Gaviglia will serve as the point of contact for safety and health concerns and will be responsible for the implementation and compliance of the health and safety plan (HASP) by all Michael Baker staff.

- Laboratory Project Manager – TBD.

- Laboratory Quality Manager – TBD.

2.0 DATA QUALITY OBJECTIVES

2.1 Data Needs/Uses

The generation of field data through the sampling and analysis efforts described in Section 4.0 of the work plan is intended to characterize the emplaced materials. The number and types of field quality control samples planned for this investigation are presented in Table 1. A sample location map is provided as Figure 1.

2.2 Data Quality Objectives

Data quality objectives (DQOs) are qualitative or quantitative statements developed by the users to specify the quality of data needed from a particular data collection activity to support specific uses. DQOs consider analytical method precision, accuracy, representativeness, completeness and comparability. These are often referred to as PARCC. Definitions for PARCC parameters presented below.

2.2.1 Precision

Precision is a measure of agreement among individual measurements of the same property obtained under similar conditions. Precision is assessed by calculating the relative percent different (RPD) of "spiked" samples or replicate sample analyses according to the following equation:

$$RPD = \frac{R1 - R2}{(R1 + R2)/2} \times 100$$

where: R1 = Result 1
R2 = Result 2

Field duplicate samples and MSD samples will be analyzed at the frequency described in Table 2 to assess field and laboratory precision. Overall precision will be measured during the data validation process by the RPD between each sample (or spike) and the corresponding duplicate (or duplicate spike). The results will be checked against the measurement performance criteria specified in Table 3

2.2.2 Accuracy

Accuracy is a measure of the closeness of an individual measurement to the true value. Accuracy is measured by calculating the percent recovery (R) of known levels of spike compounds as follows:

$$R = \frac{\textit{analytical value of spike sample}}{\textit{theoretical value of spiked sample}} = 100$$

Accuracy in the laboratory will be assessed through the use of laboratory method blanks and instrument blanks. Additionally, accuracy in the laboratory will be assessed through comparison of spiked sample results with a known or calculated value which is expressed as %R. Laboratory accuracy will be assessed via comparison of the calculated %R values with the measurement performance criteria specified in Table 3.

2.2.3 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system, expressed as a percentage of the number of valid measurements that should have been collected. It is calculated as follows:

$$Completeness(\%) = \frac{number\ of\ valid\ samples\ reported}{total\ number\ of\ samples\ analyzed} = 100$$

The ideal objective for completeness is 100% (i.e. every sample planned to be collected is collected; every sample submitted for analysis yields valid data). However, samples can be rendered unusable during shipping or preparation (e.g. bottles broken or extracts accidentally destroyed), errors can be introduced during analysis (e.g. loss of instrument sensitivity, introduction of ambient laboratory contamination), or strong matrix effects can become apparent (e.g. extremely low matrix spike recovery). These instances result in data that do not meet quality control criteria.

For project completeness, 90 to 95% of all sample data for a given analyte must represent valid measurements. Any sample collection activity or analyte group that does not achieve the completeness goal may be considered a potential data gap. The need for further investigation and/or re-sampling will be determined on a case-by-case basis depending on whether data can be extrapolated from adjacent sample locations and whether the data are needed based on the results from adjacent sample locations.

2.2.4 Representativeness

Representativeness is the degree to which data accurately and precisely represent a characteristic population, a process control, or an environmental condition. Appropriate sampling procedures and the collection of blank samples will be implemented so that the samples are representative of the environmental matrices from which they were obtained. The sampling procedures are described in detail in Section 4.0 of the work plan.

2.2.5 Comparability

Comparability refers to the degree to which one data set can be compared to another. Appropriate sampling and analytical procedures will be specified so that the analytical results for samples of similar matrices may be compared.

3.0 SAMPLING PROCEDURES

Field sample collection procedures are stated in Section 4.0 of the work plan. Sample containers and preservatives will be obtained directly from the analytical laboratory. All sample containers will be certified as clean by the laboratory, and a certificate of analysis will be supplied with each lot ordered. These certificates will be kept on file by the supplier or laboratory, and a record of the bottle lot numbers and preservatives used in the field will be made in the field sampling log; bottle lots and preservatives will be traceable to the field sample numbers. Table 1 presents a summary of containers and analysis for the soil and water samples.

Prior to the Property characterization activities, the Michael Baker Field Manager will ensure that the field personnel understand the purpose, objectives and scope of the event. Topics of review and discussion with the team may include schedules, responsibilities, sampling locations, types of samples to be collected (both field samples and QC samples), number of samples and sample volumes to be collected, sample identification numbering schemes, preservation requirements, parameter(s) to be analyzed, sampling procedures, equipment decontamination procedures, and chain-of-custody requirements. The Field Manager will ensure that field personnel also have access to a copy of the Work Plan including the SOPs. Field activities must be conducted in accordance with the health and safety procedures described in the HASP.

3.1 Pre-Sampling Activities

Sampling equipment (i.e., drill rigs and supporting equipment, bailers, pumps and trowels) will be decontaminated prior to arrival or cleaned and decontaminated in accordance with the SOP (Appendix B of the Work Plan).

3.2 Drilling Procedures

Criteria for selecting soil boring(s), monitoring well(s), and soil sampling locations (i.e., drilling locations) are based on the specific objectives for the property, as described in Section 4 of the Work Plan. As described in Section 4, final selection of drilling locations will depend on securing all necessary clearances, written agreement for access, permits and approvals. Dig Safely NY will be called at least two working days (not including the day of the call) to place a location request prior to the field work.

Cores to be visually logged and samples to be collected for physical or chemical analysis will be collected and handled according to the procedures described in the Work Plan. Field screening instrument calibrations will be conducted according to the procedures present in this QAPP.

3.3 Soil Sampling Procedures

Soil samples will be collected at the Property in accordance with the Work Plan. Soil borings will be advanced via Geoprobe® or hollow-stem auger and shallow surface soil samples may be collected using a scoop/trowel. Additional details regarding the locations of the samples are described in the Work Plan (see Section 4).

The soil sampling procedure is described in the Work Plan and contains of the following elements:

- Locations will be cleared by an underground utility survey (as needed).

- Soils will be visually logged and screened with photoionization detector (PID).
- Specific sampling intervals will be documented in the project field notebook and/or designated field sheets.
- Soil samples will be identified by location, sample type, sample location, QC type, and depth/location.
- Samples will be placed in an ice-filled cooler for shipment to the laboratory (as needed) depending on the laboratory method requirements.

The potential list for analysis of soil samples, including the soil sample container volume, type, hold times, and associated preservation method are summarized in Table 1.

Per- and polyfluoroalkyl substances (PFAS) sampling and analysis procedures will conform to the guidelines provided in Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC's Part 375 Remedial Programs (January 2021). Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. No sampling equipment components or sample containers should come in to contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer. Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification. PFAS sampling is often conducted in areas where a vegetative turf has been established. In these cases, a pre-cleaned trowel or shovel should be used to carefully remove the turf so that it may be replaced at the conclusion of sampling. Surface soil samples (e.g. 0 to 2 inches below surface) should then be collected using a pre-cleaned, stainless steel spoon. Shallow subsurface soil samples (e.g. 6 to ~36 inches below surface) will be collected using direct-push methods. When the sample is obtained, it should be deposited into a stainless-steel bowl for mixing prior to filling the sample containers. VOC samples will be collected before homogenization/mixing occurs. The soil should be placed directly into the bowl and mixed thoroughly by rolling the material into the middle until the material is homogenized. At this point the material within the bowl can be placed into the laboratory provided container.

3.4 Groundwater Sampling Procedures

The Work Plan includes a groundwater investigation program. The groundwater investigation program will include the installation of groundwater monitoring wells. Additional details regarding groundwater investigation approach is included in the Work Plan (See Section 4).

A groundwater sampling procedure would contain the following elements:

- Locations will be cleared by a utility survey (as needed).
- Groundwater wells will be installed approximately seven feet below the water table.
- Total well depth measurements and groundwater level measurements will be recorded.
- Groundwater wells will be purged and sampled in accordance with the SOP.
- Samples will be identified by location, sample type, sample location, and QC type.
- Samples will be placed in an ice-filled cooler for shipment to the laboratory (as needed) depending on the laboratory method requirements

For PFAS groundwater samples, a list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions:

- stainless steel inertia pump with HDPE tubing
- peristaltic pump equipped with HDPE tubing and silicone tubing
- stainless steel bailer with stainless steel ball
- bladder pump (identified as PFAS-free) with HDPE tubing

Sampling personnel should don new nitrile gloves prior to sample collection due to the potential to contact PFAS containing items (not related to the sampling equipment) during the purging activities.

The potential list of analysis for groundwater samples, including the sample container volume, type, hold times, and associated preservation method are summarized in Table 1.

4.0 SAMPLE CUSTODY PROCEDURES AND FREQUENCY

Each sample will be given a unique designation, which will be recorded in the field logbook, on the chain of custody record, on the sample tag, and the label affixed to the sample container. The sample designation format is presented in Section 4.2.4 of the work plan.

Sample labeling, custody or legal seals, field tracking, field logbooks and chain-of-custody procedures are standard and are described in SOPs F302 and F303 (Attachment B).

5.0 ANALYTICAL PROCEDURES

General procedures for field analysis and laboratory analyses provided below.

5.1 Laboratory Analysis

Table 1 lists the analytical methods, containers, preservation and holding times for samples that will be collected during the investigation. Table 4 lists the parameters, reporting limits and method detection limits for the project as required by the NYSDEC's QAPP Guidance dated October 2019 and Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC's Part 375 Remedial Programs (January 2021).

5.2 Field Quality Control Samples

Field quality control samples will be used to assess sample variability and evaluate potential sources of contamination. The types of quality control samples that will be collected for the field activities are described in this section. If quality control problems are encountered, they will be brought to the attention of Michael Baker's quality assurance chemist. Corrective actions, if appropriate, will be implemented to meet the project's data quality indicators.

Field quality control samples for soil will be field duplicate samples, field blanks, equipment rinsate blanks and temperature blanks. The frequency of collection of the field quality control samples is outlined in Table 2. The following quality control samples will be collected in the field and analyzed by the analytical laboratory:

- Field duplicate samples will be collected and analyzed to assess the variability associated with sample processing and laboratory variability. Blind field split samples will be collected at a minimum frequency of one per twenty soil samples. Samples will be assigned unique numbers and will not be identified as field splits to the laboratory.

- Equipment rinsate blanks will be collected to help identify possible contamination from the sampling environment or from the sampling equipment. All equipment rinsate blank samples will be clearly noted in the field logbook (e.g., sample identifier, equipment type, date and time of collection, and analysis). Minimum of one equipment blank (rinsate) will be collected for each kind of sampling equipment used for chemical analysis. A rinsate blank will be collected at every twenty locations per type of equipment used. One equipment rinsate blank will be collected for each individual analysis. PFAS-free water will be used for equipment blanks for PFAS analysis.

- Deionized water (field) blanks are prepared in the field to evaluate potential background concentrations present in laboratory-grade deionized water used for equipment rinsate blank. Field blanks will be collected at a minimum frequency of one per day. PFAS-free water will be used for field blanks for PFAS analysis.

- Temperature blanks will be used by the laboratory to verify the temperature of the samples upon receipt at the testing laboratory. A temperature blank will be included with each cooler

shipped to the testing laboratory.

5.3 Laboratory Quality Control

Extensive and detailed requirements for laboratory quality control procedures are provided in the EPA method protocols that will be used for this project (Table 1). Every method protocol includes descriptions of quality control procedures, and many incorporate additional quality control requirements by reference to separate quality control chapters in the protocols. Quality control requirements include control limits and requirements for corrective action in many cases. Quality control procedures will be completed by the laboratory, as required in each protocol and as indicated in this QAPP.

For chemical analyses, the frequency of analysis for laboratory control samples, matrix spike samples, matrix spike duplicates or laboratory duplicates, and method blanks will be one for every twenty samples or one extraction per batch, whichever is more frequent. Internal standards and/or surrogates will be added to every field sample and quality control sample, as required by the analytical methods. Calibration procedures will be completed at the frequency specified in each method description. As required by EPA SW-846 methods, performance-based control limits have been established by the laboratory (USEPA 2014). These and all other control limits specified in the method descriptions will be used by the laboratory to establish the acceptability of the data or the need for reanalysis of the sample.

6.0 DATA REDUCTION, VALIDATION, AND REPORTING

Data reduction, validation and reporting will ensure that all documents produced as part of the investigation can be accounted for upon project completion. Accountable documents include field logbooks, correspondence, COC records, data packages, photographs, computer disks, and validation reports. The Michael Baker Project Manager will be responsible for maintaining a project file in which all accountable documents will be inventoried.

Data generated in the field and laboratory will be verified and validated according to criteria and procedures described in this section. Data quality and usability will be evaluated, and a discussion will be included in a Data Usability Summary Report (DUSR). The data validation report will summarize all significant data quality issues for the sampling event and will be attached to the project characterization report.

In order to assess usability, the following three components will be evaluated in the DUSR: analytical data quality (i.e. the data validation results), field sampling, and DQOs.

Analytical Data Quality

As part of the evaluation of analytical data quality, the following will be assessed:

- Data validation results
- Impact of rejected data on the data set
- Analytical reporting limits (i.e. whether they meet the DQOs)
- Data quality indicators (e.g. completeness, precision, accuracy, etc.)

Field Sampling

As part of the evaluation of field sampling, the number of field QA/QC samples (i.e. trip blanks, equipment rinsates, field blanks, duplicates, and MS/MSDs) will be assessed to determine if the appropriate quantity was collected. Additionally, the QA/QC blank sample results will be evaluated as to whether any contaminant was detected in the blanks and their potential impact on the data.

Data Quality Objectives (DQOs)

As part of the evaluation of DQOs, the RPD of duplicates (field duplicates and MS/MSD samples) will be evaluated to determine if they meet the goals set for this project. Additionally, percent completeness will be evaluated to determine if it meets the goal set for this project.

6.1 Field Data Procedures

Sample collection will be documented in bound field logbooks in which all information pertinent to sample collection will be entered in indelible ink. Appropriate information will be entered to reconstruct the sampling event, including: site name at the top of each page, names of field personnel and visitors on site, sample identification, brief description of sample, data and time of collection, sampling methodology, sampling remarks and observations, field measurements, conditions and observations, description of activities, QA/QC samples collected, list of photographs taken, sketch of site conditions, and sampler's initials and date at the bottom of each page.

6.2 Laboratory Data Procedures

The following procedures summarize the practices that will be routinely used by laboratory staff for data reduction, validation, and reporting. Numerical analyses, including manual calculations, will be documented and subjected to QC review. Records of analyses must be legible and complete enough to permit reconstruction of the work by a qualified individual other than the originator.

6.2.1 Laboratory Data Validation

All laboratory data deliverable packages will be reviewed for completeness, adherence to holding times, comparison with chain-of-custody, etc. Laboratory data package reviews may include the following activities:

- Review of laboratory supplied data package for completeness.
- Review of chain-of-custody documents to verify sample identities.
- Review of sample log-in documents to identify any potential problems with custody seals, container integrity, sample preservation, labeling, etc.
- Review of sample analysis methods and holding times.
- Review of field blank and trip blank data to identify any potential problems with sampling devices contamination, sample container contamination, preservative contamination, laboratory reagent water contamination, or cross-contamination between samples during transport.
- Review of method preparation blank data to determine the presence of any sources of contamination in the analytical process, where applicable.
- Review of MS/MSD data to evaluate the potential for matrix effects as a measure of analytical accuracy and sample homogeneity as a measure of analytical precision. MS/MSD data will be compared to laboratory acceptance criteria for the maximum relative percent difference (RPD), where applicable.
- Review of laboratory control sample and laboratory control sample duplicate (LCS/LCSD) data as a measure of analytical accuracy and as a measure of analytical accuracy, where applicable. LCS/LCSB data will be compared to laboratory acceptance criteria for the maximum RPD to evaluate analytical precision.
- Review of laboratory control sample reference manual (LCSRM) data as a measure of analytical accuracy, where applicable. LCSRM data will be compared to the certified acceptable ranges of analytical values.
- Review of sample and sample duplicate data as a measure of sample homogeneity and as a measure of analytical precision.
- Review of surrogate recovery data to assess analytical performance, where applicable. Surrogate recoveries will be compared to laboratory acceptance criteria to determine if they are within or outside of acceptable limits.
- Determine completeness as a percentage of measurements made which are judged to be valid measurements compared to the total number of measurements planned, where applicable.
- Review data summary sheets and qualifiers for consistency with raw data and qualifier definitions.
- Data will be reviewed and evaluated based upon method specifications and qualifiers are applied using the USEPA Region 2 modifications to the USEPA National Functional Guidelines and Region 2 SOPs as they apply to the analytical methods employed; how the data will be qualified based upon

this review since laboratory qualifiers may be different than validation qualifiers.

The data will evaluated for conformance to method specifications, laboratory statistical control limits, and qualifiers will be applied using USEPA Region 2 SOPs and the validation criteria set forth in the USEPA Contract Laboratory Program (CLP) National Functional Guidelines (NFGs) for Organic Superfund Methods Data Review, EPA-540-R-2017-002, January 2017 and USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review, EPA-540-R-2017-001, January 2017, as they apply to the analytical methods employed. The USEPA Region 2 SOPs are regional modifications to the NFGs and are available online at http://www.epa.gov/quality/region-2-quality-assurance-guidance-and-standard-operating-procedures

Field duplicate RPD review and applicable control limits were taken from the USEPA Region I Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses, December 1996 and USEPA Region I Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, June 1988.

USEPA-defined data qualifiers will supersede laboratory flags and qualifiers. A data validation report will be prepared by the Project Chemist that details the validation findings for each sample delivery group. The data validation report will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain-of-custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.

For each of the organic analytical methods, the following parameters will be assessed:

- Holding times
- Instrument tuning
- Instrument calibrations
- Blank results
- System monitoring compounds or surrogate recovery compounds (as applicable)
- Internal standard recovery results
- MS and MSD results
- Field duplicate results
- Target compound identification
- Result calculations
- Pesticide cleanup (if applicable)
- Compound quantitation and reported detection limits
- System performance
- Results verification

For each of the inorganic compounds, the following will be assessed:

- Holding times
- Calibrations
- Blank results
- Interference check sample
- Laboratory check samples

- Duplicates
- Matrix Spike(s)
- Furnace atomic absorption analysis QC
- ICP serial dilutions
- Results verification and reported detection limits
- Result calculations

Data verification and/or validation will be performed by a qualified scientist, and a DUSR will be prepared in accordance with DER-10 Appendix 2B. This DUSR will be prepared by a scientist capable of conducting a full data validation. The DUSR will provide the assessment included in the initial data review discussed above, with further related QA/QC information consideration, enabling evaluation of the analytical data's usability and quality as per DER-10 Appendix 2B requirements.

The data validation/review process will be documented through DUSRs and submission of the analytical data packages and DUSRs to the NYSDEC. Final and validated/reviewed analytical data, including applicable qualifiers will be summarized in tables for associated project summary reports.

6.2.2 Analytical Data Package Requirements

The Data Deliverable will be prepared in accordance with the Guidance for Data Deliverables and the Development of Data Usability Summary Reports summarized in Appendix 2B of DER-10. A DEC Analytical Services Protocol Category B Data Deliverable will be prepared, and a DUSR describing full data validation will be provided by the Michael Baker Quality Assurance Chemist as a project deliverable.

An electronic data deliverable (EDD) and hard copy of the analytical data will be submitted to Michael Baker. Analytical data will need to be submitted to the NYSDEC to be stored in the agency's Environmental Information Management System (EIMS). EQuIS database software is utilized in order to store data in the EIMS. A completed NYSDEC EQuIS EDD consists of several data tables combined in an EDD file. Guidance on Environmental Data Submission as provided by the NYSDEC (NYSDEC, 2018) will be utilized to ensure that the appropriate procedural and formatting requirements (version 4) are adhered to for creating and submitting EQuIS EDDs.

For each analytical method run, the laboratory will report all required analytes for each sample as a detected concentration or as nondetected at the specific limits of quantitation. In addition, applicable method detection limits and instrument detection limits will be required for every analysis. Each analytical method run will be clearly identified as belonging to a specific analytical batch. All samples must be reported with dates of collection, preparation and analysis. The laboratory will also report dilution factors for each sample.

A complete set of quality control results, including calibration data, will be reported for each analytical batch. All required method QC will be performed on project samples. The quality control samples required and their frequency are identified in Section 5.2. A standard 21-calendar-day turnaround time (for complete data packages) from sample receipt at the laboratory to data receipt will be needed for all samples. The laboratories will hold and make available all project raw data for a minimum period of 7 years after samples have been analyzed.

6.3 Independent (Third Party) Data Validation

Review of all pertinent analytical data will be performed by an independent third-party data validator that meets the requirements specified in DER-10. When the subcontracted third-party validator has been selected, their resume will be submitted to NYSDEC.

The data validator will verify that all necessary paperwork (e.g., COCs, traffic reports, analytical reports, and laboratory personnel signatures) and deliverables are present. This review will include a detailed review and interpretation of all data generated by the laboratory for appropriate deliverables.

The data will evaluated for conformance to method specifications and laboratory statistical control limits, and qualifiers will be applied using USEPA Region 2 SOPs and Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC's Part 375 Remedial Programs (January 2021).

7.0 PREVENTIVE ACTION PROCEDURES

7.1 Field Equipment

Field equipment for this project includes a photoionization detector (PID) and a MinRam or similar dust meter. Health and safety monitoring equipment is identified in the site Health and Safety Plan (HASP). Specific preventative maintenance procedures recommended by the manufacturer will be followed for field equipment.

Field instruments will be checked and calibrated by Michael Baker before they are carried to the field. These instruments will be checked and calibrated daily before and after use. In addition, the calibration will be checked anytime the equipment is turned off during the day and anytime there is a questionable response from the equipment. Calibration will be documented in a field notebook.

7.2 Laboratory Instruments

A routine preventative maintenance program is conducted by all laboratories to minimize the occurrence of instrument failure and other system malfunctions. Section supervisors and/or analysts (organic, inorganic) perform routine scheduled maintenance, and coordinate with the vendor for the repair of all instruments. All laboratory instruments are maintained in accordance with manufacturer's specifications and the requirements of the specific method employed. This maintenance is carried out on a regular, scheduled basis, and is documented in the laboratory instrument service logbook for each instrument. Emergency repair or scheduled manufacturers maintenance is provided under a repair and maintenance contract with factory representatives.

8.0 CORRECTIVE ACTION PROCEDURES

A corrective action protocol that is both technically effective and administratively compatible to ensure accurate and timely correction of non-conformance is imperative.

8.1 Field Procedures

For the field activities, the field operations leader (FOL) is responsible for all site activities. In this role, he may be required to adjust the field program to accommodate site-specific needs. If it becomes necessary to modify the program, then he will consult the Michael Baker PM regarding an appropriate corrective action. Agreed upon corrective actions for the program will be documented in the field notes.

8.2 Laboratory Procedures

Nonconformance is any event, which is beyond the limits established for laboratory performance such as, data which fall outside accepted bounds for accuracy and precision, due to improper equipment calibration/maintenance or improper data verification. Any activity in the laboratory which affects data quality can result in a nonconformance.

Nonconformance associated with the statistical analysis and review of data are straightforward to identify. The Laboratory QA Coordinator will be responsible for the assessment of QC sample information. The project manager will be notified of any nonconformances.

Corrective actions will be designed to correct the associated problems and to minimize the possibility of their recurrence. Examples of corrective actions are modifying nonconforming procedures; tagging, repairing, or replacing deficient equipment; training or replacing unqualified personnel; reanalyzing affected samples; marking rejected data, and reissuing affected reports.

9.0 QUALITY ASSURANCE REPORTS

The Michael Baker Project Manager will be responsible for assessing the performance of measurement systems and data quality related to the field investigation. A written record will be maintained of the results of laboratory QC reports and other periodic assessments of measurement, data accuracy, precision, and completeness; performance and system audits; and any significant QO problems and recommended solutions. A QA/QC assessment will be performed any time a significant problem is identified.

The Michael Baker Project Manager will keep in contact with NYSDEC through daily reports during the field effort as well as through weekly progress reports.

10.0 REFERENCES

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USEPA, 2008. SOP HW-46 Revision 1. EPA Method 1668, Revision A. Chlorinated Biphenyl Cogeners by HRGC/HRMS. Hazardous Waste Support Section. Washington, DC. September 2008.

TABLES

TABLE 1

SUMMARY OF ANALYTICAL METHODS, CONTAINERS, PRESERVATION, AND HOLDING TIMES

3148 VAN ETTEN ROAD PROPERTY
CORNING, NEW YORK

SOLID SAMPLES			
Analysis/Method	Container	Preservation	Holding Time
VOCs SW846 8260	5 grams, glass vial w/ reagent water (Terracore kit), plus moisture jar	4°C	14 days if samples received at lab within 48 hrs and frozen to <-7°C.
SVOCs inc 1,4-Dioxane SW846 8270	10 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	14 days to extraction; 40 days from extraction to analysis
TAL ICP Metals SW846 6010	10 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	180 days
Mercury SW846 7471	10 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	28 days
PCBs SW846 8280	30 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	14 days to extraction; 40 days from extraction to analysis
Cyanide SW846 9012B	10 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	14 days
TCLP Metals SW846 1311 & 6010	100 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	180 days to extraction; 180 days from extraction to analysis
TCLP Mercury SW846 1311 & 7470	100 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	28 days to extraction; 28 days from extraction to analysis
Pesticides/Herbicides SW846 8081/8151	10 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	14 days to extraction; 40 days from extraction to analysis
TPH EPA 1664 (SGT HEM)	10 grams, Wide-mouth glass w/ Fluoropolymer Resin/Teflon®-lined lid	4°C	28 days
PFAS EPA 537.1M	4-ounce HDPE or polypropylene containers with HDPE or polypropylene lid	4°C	14 days to extraction; 28 days from extraction to analysis

TABLE 1

SUMMARY OF ANALYTICAL METHODS, CONTAINERS, PRESERVATION, AND HOLDING TIMES

3148 VAN ETTEN ROAD PROPERTY
CORNING, NEW YORK

GROUNDWATER SAMPLES			
VOCs SW846 8260	3-40 mL, Glass w/ Teflon®-lined septum	HCL, 4°C	14 days
SVOCs inc 1,4-Dioxane SW846 8270/8270 SIM	2-250 mL, Glass w/ Teflon®-lined cap (amber)	4°C	7 days to extraction; 40 days from extraction to analysis
TAL ICP Metals SW846 6010	250 mL, Polyethylene or Glass	HNO_3, 4°C	180 days
Mercury SW846 7470	550 mL, Polyethylene or Glass	HNO_3, 4°C	28 days
PCBs SW846 8280	2-250 mL, Glass w/ Teflon®-lined cap (amber)	4°C	7 days to extraction; 40 days from extraction to analysis
Cyanide SW846 9012	1-250 mL, HDPE	NaOH, 4°C	14 days
Pesticides/Herbicides SW846 8081/8151	2-1 L, Glass w/ Teflon®-lined cap (amber)	4°C	7 days to extraction; 40 days from extraction to analysis
TPH EPA 1664 (SGT HEM)	2-1 L, Glass w/ Teflon®-lined cap (amber)	HCL, 4°C	28 days
PFAS EPA 537.1M	HDPE or polypropylene containers with HDPE or polypropylene lid	4°C	14 days to extraction; 28 days from extraction to analysis

Notes:
HDPE – High Density Polyethylene
ICP – Inductively Coupled Plasma
PCBs - Polychlorinated Biphenyls
PFAS – Perfluorinated compounds
SVOCs – Semi-volatile Organic Compounds
TAL - Target Analyte List
TCL - Target Contaminant List
TCLP - Toxicity Characteristic Leaching Procedure
TPH – Total Petroleum Hydrocarbons
VOCs – Volatile Organic Compounds

TABLE 2
SAMPLE LOCATIONS, ANALYSIS AND QUALITY CONTROL SAMPLES

3148 VAN ETTEN ROAD PROPERTY
CORNING, NEW YORK

Tax Parcel	Sample Type	Estimated No. of Samples Per Location	Sample Interval	Number of Locations	Analysis	No. of Primary Samples	Field Duplicate Samples	Trip Blanks	Equipment Rinsate Blanks	Field Blanks	MS/MSD
300.000-0001-044.1000000	Surface Soil	One discrete	0 - 2"	9	TAL Metals	9	1		1	1 per day	1
					Cyanide	9	1		1		1
					SVOCs	9	1		1		1
					PCBs	2	1		1		1
					Pesticides/Herbicides	2	1		1		1
					TPH	2	1		1		1
					PFAS	2	1		1		1
					VOCs	2	1		1		1
	Shallow Soil	One discrete	2 - 6 " 6 - 12" 12 - 24" 24 - 48"	9	TAL Metals	36	2		1		1
					Cyanide	36	2		1		1
					SVOCs	36	2		1		1
					PCBs	7	1		1		1
					Pesticides/Herbicides	7	1		1		1
					TPH	7	1		1		1
					PFAS	7	1		1		1
					VOCs	7	1		1		1
	Native Soil	One discrete	From native soil	9	TAL Metals	9	1		1		1
					Cyanide	9	1		1		1
					SVOCs	9	1		1		1
					PCBs	2	1		1		1
					Pesticides/Herbicides	2	1		1		1
					TPH	2	1		1		1
					PFAS	2	1		1		1
					VOCs	2	1		1		1
	Groundwater	One discrete	Wells	3	TAL Metals	3	1		1		1
					Cyanide	3	1		1		1
					SVOCs	3	1		1		1
					PCBs	3	1		1		1
					Pesticides/Herbicides	3	1		1		1
					TPH	3	1		1		1
					PFAS	3	1		1		1
					VOCs	3	1	1	1		1

NOTES:

MS/MSD - Matrix Spike/Matrix Spike Duplicate
PCBs - Polychlorinated Biphenyls
PFAs - Per- and Polyfluorinated substances
TAL - Target Analyte List
TAL Metals - Ag, Al, As, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, Pb, Sb, Se, Ti, V, Zn
TCLP - Toxicity Characteristic Leaching Procedure
TPH - Total Petroleum Hydrocarbons

TABLE 3
MEASUREMENT PERFORMANCE CRITERIA

3148 VAN ETTEN ROAD PROPERTY
CORNING, NEW YORK

Data Quality Indicator (DQI)	Analytical Group	QC Sample or Measurement Performance Activity	Measurement Performance Criteria
Overall Precision	TAL Metals, Cyanide, VOCs, SVOCs (including 1,4-Dioxane), PCBs, TPH, Pesticides/Herbicides, PFAS, TPH	Field Duplicates	To be provided once laboratory is selected
Analytical Precision (laboratory)		Laboratory Control Sample Duplicates	Analyte-specific (To be provided once laboratory is selected)
Analytical Accuracy/Bias (laboratory)		Laboratory Control Samples	
Analytical Accuracy/Bias (matrix interference)		Matrix Spike Duplicates	
Overall accuracy/bias (contamination)		Equipment Blanks	No target analyte concentrations ≥ RL
		Field Blanks	
	VOCs	Trip Blanks	

Notes:

PCB - Polychlorinated Biphenyl
PFAS - Polyfluoroalkyl Substances
RL - Reporting Limit
SVOC - Semivolatile Organic Compound
TAL - Target Analyte List
TPH - Total Petroleum Hydrocarbon
VOC - Volatile Organic Compound

TABLE 4
REPORTING LIMITS AND METHOD DETECTION LIMITS
3148 VAN ETTEN ROAD PROPERTY
CORNING, NEW YORK

	Soil		Water	
	RL	**MDL**	**RL**	**MDL**
TAL Metals [Method SW846 6010]	**mg/Kg**		**mg/L**	
Aluminum	10	4.4	0.2	0.06
Antimony	15	0.4	0.02	0.00679
Arsenic	2	0.4	0.015	0.00555
Barium	0.5	0.11	0.002	0.0007
Beryllium	0.2	0.028	0.02	0.004
Cadmium	0.2	0.03	0.002	0.0005
Calcium	50	3.3	0.5	0.1
Chromium	0.5	0.2	0.004	0.001
Cobalt	0.5	0.05	0.004	0.00063
Copper	1	0.21	0.01	0.0016
Iron	10	1.1	0.05	0.0193
Lead	1	0.24	0.01	0.003
Magnesium	20	0.927	0.2	0.0434
Manganese	0.2	0.032	0.003	0.0004
Nickel	5	0.23	0.01	0.00126
Potassium	30	20	0.5	0.1
Selenium	4	0.4	0.025	0.0087
Silver	0.6	0.2	0.006	0.0017
Sodium	140	13	1	0.324
Thallium	6	0.3	0.02	0.0102
Vanadium	0.5	0.11	0.005	0.0015
Zinc	2	0.153	0.01	0.0015
Mercury [Method SW846 7471B/7470A]	**mg/Kg**		**mg/L**	
Mercury	0.02	0.0081	0.0002	0.00012
Cyanide (Method SW846 9012A)	**mg/Kg**		**mg/L**	
Cyanide	0.5	0.19	0.01	0.006
Semi-Volatile Organic Compounds (SVOCs) [Method SW846 8270]	**ug/Kg**		**ug/L**	
Biphenyl	170	28.2	5	0.653
bis (2-chloroisopropyl) ether	170	34	5	0.93
1,4-Dioxane	100	55	--	--
2,4,5-Trichlorophenol	170	46	5	0.49
2,4,6-Trichlorophenol	170	34	5	0.61
2,4-Dichlorophenol	170	18	5	0.63
2,4-Dimethylphenol	170	72.7	5	0.91
2,4-Dinitrophenol	1660	784	10	2.37
2,4-Dinitrotoluene	170	35	5	1.04
2,6-Dinitrotoluene	170	20	5	0.88
2-Chloronaphthalene	170	28	5	0.61
2-Chlorophenol	170	31	5	0.74
2-Methylphenol	170	20	5	0.88
2-Methylnaphthalene	170	34	5	1.29
2-Nitroaniline	330	25	10	0.65
2-Nitrophenol	170	48	5	0.59
3,3'-Dichlorobenzidine	330	200	5	1.04
3-Nitroaniline	330	47	10	0.82
4,6-Dinitro-2-methylphenol	330	170	10	2.2
4-Bromophenyl phenyl ether	170	24	5	1.02
4-Chloro-3-methylphenol	170	42	5	0.76

TABLE 4
REPORTING LIMITS AND METHOD DETECTION LIMITS
3148 VAN ETTEN ROAD PROPERTY
CORNING, NEW YORK

	Soil		Water	
	RL	**MDL**	**RL**	**MDL**
Semi-Volatile Organic Compounds (SVOCs) [Method SW846 8270]	**ug/Kg**		**ug/L**	
4-Chloroaniline	170	42	5	0.73
4-Chlorophenyl phenyl ether	170	21	5	0.96
4-Methylphenol	330	20	10	0.87
4-Nitroaniline	330	89	10	0.48
4-Nitrophenol	330	159	10	4.65
Acenaphthene	170	25	5	0.88
Acenaphthylene	170	22	5	0.65
Acetophenone	170	23	5	1.04
Anthracene	170	42	5	0.57
Atrazine	170	59	5	0.77
Benzaldehyde	170	135	5	0.86
Benzo[a]anthracene	170	27.6	5	0.55
Benzo[a]pyrene	170	25	5	0.47
Benzo[b]fluoranthene	170	27	5	0.44
Benzo[g,h,i]perylene	170	19	5	0.75
Benzo[k]fluoranthene	170	22	5	0.73
Bis(2-chloroethoxy)methane	170	36	5	0.69
Bis(2-chloroethyl)ether	170	22	5	0.4
Bis(2-ethylhexyl) phthalate	170	58	5	2.2
Butyl benzyl phthalate	170	28	5	1
Caprolactam	170	51	5	2.2
Carbazole	170	20	5	0.85
Chrysene	170	38	5	0.67
Dibenz(a,h)anthracene	170	30	5	0.42
Di-n-butyl phthalate	170	29	10	0.85
Di-n-octyl phthalate	170	20	5	1
Dibenzofuran	170	20	10	0.98
Diethyl phthalate	170	22	5	0.82
Dimethyl phthalate	170	20	5	0.69
Fluoranthene	170	18	5	0.72
Fluorene	170	20	5	0.8
Hexachlorobenzene	170	23	5	0.51
Hexachlorobutadiene	170	25	5	0.76
Hexachlorocyclopentadiene	170	23	5	0.61
Hexachloroethane	170	22	5	0.59
Indeno[1,2,3-cd]pyrene	170	22	5	0.47
Isophorone	170	36	5	0.67
N-Nitrosodi-n-propylamine	170	29	5	0.8
N-Nitrosodiphenylamine	170	138	5	0.51
Naphthalene	170	22	5	0.83
Nitrobenzene	170	30	5	0.74
Pentachlorophenol	330	170	10	2.2
Phenanthrene	170	25	5	0.65
Phenol	170	26	5	0.41
Pyrene	170	20	5	0.83
Semi-Volatile Organic Compounds (SVOCs) [Method SW846 8270] SIM	**ug/Kg**		**ug/L**	
1,4-Dioxane	0.5	0.5	0.2	0.1

TABLE 4
REPORTING LIMITS AND METHOD DETECTION LIMITS
3148 VAN ETTEN ROAD PROPERTY
CORNING, NEW YORK

	Soil		Water	
	RL	**MDL**	**RL**	**MDL**
Volatile Organic Compounds (VOCs) [Method SW846 8260 per DER-10]	**ug/Kg**		**ug/L**	
1,1,1-Trichloroethane	5	0.363	1	0.82
1,1-Dichloroethane	5	0.61	1	0.38
1,1-Dichloroethene	5	0.612	1	0.29
1,2,4-Trimethylbenzene	1	0.34	1	0.23
1,2-Dichlorobenzene	5	0.391	1	0.79
1,2-Dichloroethane	5	0.251	1	0.21
1,2-Dichloroethene (cis)	1	0.22	1	0.81
1,2-Dichloroethene (trans)	1	0.39	1	0.9
1,3-Dichlorobenzene	5	0.257	1	0.78
1,3,5-Trimethylbenzene	1	0.13	1	0.75
1,4-Dichlorobenzene	5	0.7	1	0.84
2-Butanone (MEK)	25	1.83	10	1.32
Acetone	25	4.21	10	3
Benzene	5	0.245	1	0.41
Butylbenzene	1	0.21	1	0.64
Carbon tetrachloride	5	0.484	1	0.27
Chlorobenzene	5	0.66	1	0.75
Chloroform	5	0.309	1	0.34
Ethylbenzene	5	0.345	1	0.74
Methyl tert-butyl ether	5	0.491	1	0.16
Methylene Chloride	5	2.3	1	0.44
n-Propylbenzene	1	0.18	1	0.69
sec-Butylbenzene	1	0.17	1	0.75
Tetrachloroethene	5	0.671	1	0.36
Tert-Butylbenzene	1	0.34	1	0.81
Toluene	5	0.378	1	0.51
Trichloroethene	5	1.1	1	0.46
Vinyl chloride	5	0.61	1	0.9
Xylenes, Total	10	0.84	2	0.66
Total Petroleum Hydrocarbons (TPHs) [Method 1664 (SGT HEM)]	**mg/Kg**		**mg/L**	
TPH	100	40	5	0.54
Polychlorinated Biphenyls (PCBs) [Method SW846 8082]	**mg/Kg**		**ug/L**	
PCB-1016	0.0167	0.00326	0.5	0.176
PCB-1221	0.0167	0.00326	0.5	0.176
PCB-1232	0.0167	0.00326	0.5	0.176
PCB-1242	0.0167	0.00326	0.5	0.176
PCB-1248	0.0167	0.00326	0.5	0.176
PCB-1254	0.0167	0.00782	0.5	0.25
PCB-1260	0.0167	0.00782	0.5	0.25
Total PCBs	0.25	0.117	0.5	0.25
Pesticides [Method SW846 8081 & Method SW846 8151 per-DER10]	**ug/Kg**		**ug/L**	
2,4,5-TP Acid (Silvex)	17	11.4	2	0.36
4,4'-DDD	6.7	0.88	0.05	0.0092
4,4'-DDE	6.7	0.97	0.05	0.0116
4,4'-DDT	6.7	0.69	0.05	0.011
Aldrin	6.7	0.81	0.05	0.0081
Alpha-BHC	2	0.61	0.05	0.0077
Chlordane (alpha)	6.7	1.09	0.05	0.0148

TABLE 4
REPORTING LIMITS AND METHOD DETECTION LIMITS
3148 VAN ETTEN ROAD PROPERTY
CORNING, NEW YORK

	Soil		Water	
	RL	**MDL**	**RL**	**MDL**
Pesticides [Method SW846 8081 & Method SW846 8151 per-DER10]	**ug/Kg**		**ug/L**	
Beta-BHC	2	0.65	0.05	0.0248
Delta-BHC	2	0.73	0.05	0.01
Dieldrin	2	0.87	0.05	0.0098
Endosulfan I	6.7	0.93	0.05	0.011
Endosulfan II	6.7	1.05	0.05	0.012
Endosulfan sulfate	6.7	0.78	0.05	0.0157
Endrin	6.7	0.85	0.05	0.0138
gamma-BHC (Lindane)	2	0.6	0.05	0.008
Heptachlor	6.7	0.86	0.05	0.0085
Per- and Polyfluoralkyl Substances (PFAS) [Method 537.1]	**ug/Kg**		**ng/L**	
6:2 FTS	2	0.15	20	2
8:2 FTS	2	0.25	20	2
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2	0.37	20	1.9
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2	0.39	20	3.1
Perfluorobutanesulfonic acid (PFBS)	0.2	0.025	2	0.2
Perfluorobutanoic acid (PFBA)	0.2	0.028	2	0.35
Perfluorodecanesulfonic acid (PFDS)	0.2	0.039	2	0.32
Perfluorodecanoic acid (PFDA)	0.2	0.022	2	0.31
Perfluorododecanoic acid (PFDoA)	0.2	0.067	2	0.55
Perfluoroheptanesulfonic Acid (PFHpS)	0.2	0.035	2	0.19
Perfluoroheptanoic acid (PFHpA)	0.2	0.029	2	0.25
Perfluorohexanesulfonic acid (PFHxS)	0.2	0.031	2	0.17
Perfluorohexanoic acid (PFHxA)	0.2	0.042	2	0.58
Perfluorononanoic acid (PFNA)	0.2	0.036	2	0.27
Perfluorooctanesulfonamide (FOSA)	0.2	0.082	2	0.35
Perfluorooctanesulfonic acid (PFOS)	0.5	0.2	2	0.54
Perfluorooctanoic acid (PFOA)	0.2	0.086	2	0.85
Perfluoropentanoic acid (PFPeA)	0.2	0.077	2	0.49
Perfluorotetradecanoic acid (PFTeA)	0.2	0.054	2	0.29
Perfluorotridecanoic acid (PFTriA)	0.2	0.051	2	1.3
Perfluoroundecanoic acid (PFUnA)	0.2	0.036	2	1.1

NOTES:

Listed limits are the highest current MDL and RL inclusive of Eurofins TestAmerica Buffalo and Edison laboratories for standard analytical testing.
MDL - Method Detection Limit
mg/Kg - milligram per kilogram
mg/L- milligram per liter
ng/L- nanogram per liter
RL - Reporting Limit
ug/Kg - microgram per kilogram
ug/L - microgram per liter

Michael Baker
INTERNATIONAL

FIGURES

SCALE: 0 60 FEET
S.O. NO.: 180473
DSN/DWN: BES/RRR
DATE: JANUARY 2021
FILE: 180473_VAN_07
CHK: BES

Michael Baker INTERNATIONAL
MICHAEL BAKER INTERNATIONAL
MOON TOWNSHIP, PENNSYLVANIA

FIGURE 1
SAMPLE LOCATION MAP
VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION
CORNING, NY

Michael Baker
INTERNATIONAL

ATTACHMENT E

Historic Aerial Photographs

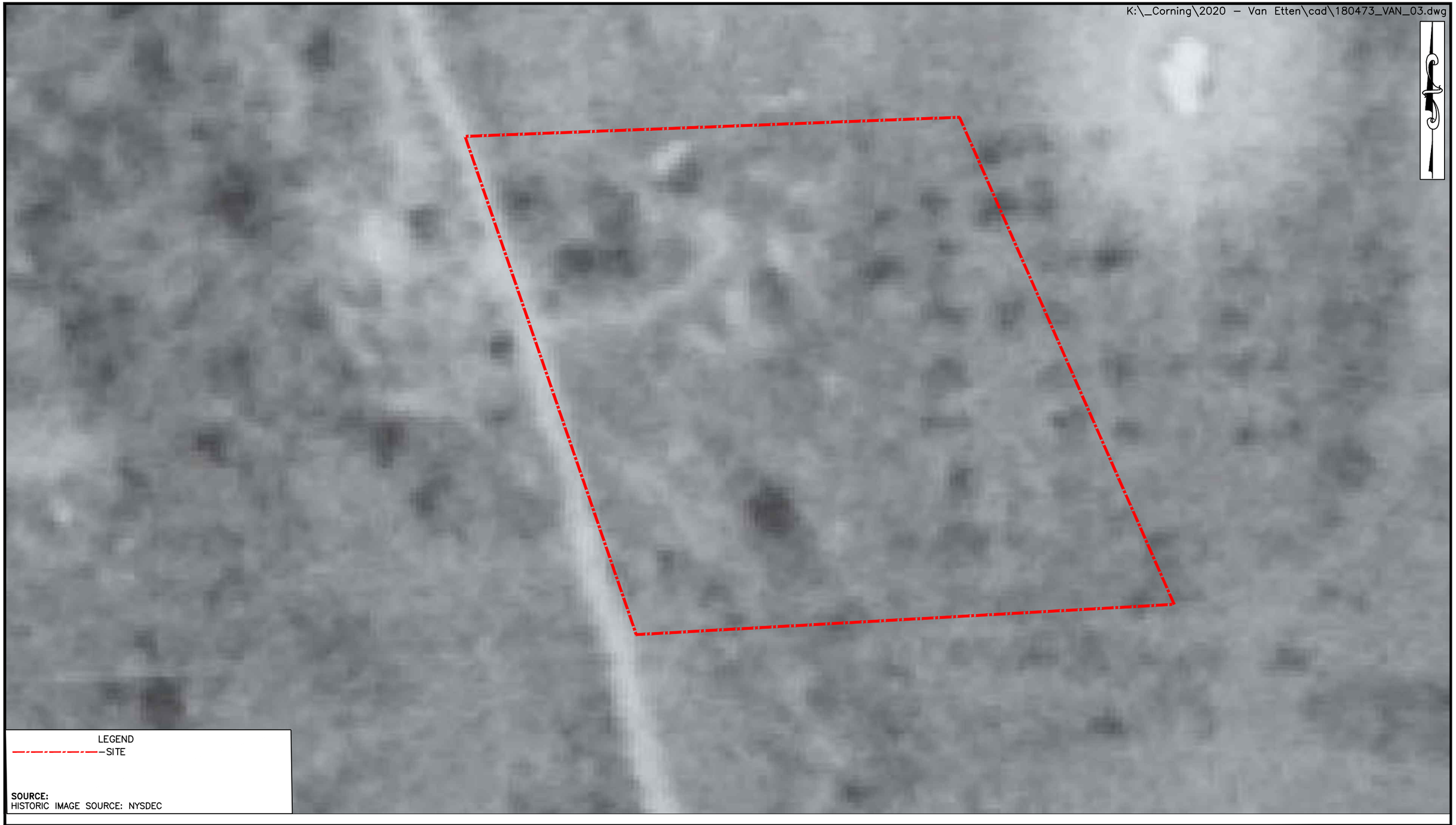
K:_Corning\2020 – Van Etten\cad\180473_VAN_03.dwg

LEGEND
—·—·—·— SITE

SOURCE:
HISTORIC IMAGE SOURCE: NYSDEC

SCALE: 0 60	DATE: SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA	1938–08–05 AERIAL VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
S.O. NO.: 180473	FILE: 180473_VAN_03		
DSN/DWN: BES/RRR	CHK: BES		

K:_Corning\2020 – Van Etten\cad\180473_VAN_03.dwg



LEGEND
– SITE

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HISTORIC IMAGE SOURCE: NYSDEC

SCALE: 0 60	DATE: SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA	1942–05–11 AERIAL VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
S.O. NO.: 180473	FILE: 180473_VAN_03		
DSN/DWN: BES/RRR	CHK: BES		

K:_Corning\2020 – Van Etten\cad\180473_VAN_03.dwg

LEGEND
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SOURCE:
HISTORIC IMAGE SOURCE: NYSDEC

SCALE: 0 60	DATE: SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA	1952–04–16 AERIAL VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
S.O. NO.: 180473	FILE: 180473_VAN_03		
DSN/DWN: BES/RRR	CHK: BES		

K:_Corning\2020 – Van Etten\cad\180473_VAN_03.dwg

LEGEND
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SOURCE:
HISTORIC IMAGE SOURCE: NYSDEC

SCALE: 0 60	DATE: SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA	1955–06–11 AERIAL VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
S.O. NO.: 180473	FILE: 180473_VAN_03		
DSN/DWN: BES/RRR	CHK: BES		

K:_Corning\2020 – Van Etten\cad\180473_VAN_03.dwg

LEGEND
SITE

SOURCE:
HISTORIC IMAGE SOURCE: NYSDEC

SCALE: 0 60	DATE: SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA	1968–03–03_AERIAL VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
S.O. NO.: 180473	FILE: 180473_VAN_03		
DSN/DWN: BES/RRR	CHK: BES		

K:_Corning\2020 – Van Etten\cad\180473_VAN_03.dwg

LEGEND
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SOURCE:
HISTORIC IMAGE SOURCE: NYSDEC

SCALE: 0 200 FEET	**DATE:** SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA	1970–05–21 AERIAL 200_SCALE VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
S.O. NO.: 180473	**FILE:** 180473_VAN_03		
DSN/DWN: BES/RRR	**CHK:** BES		

K:_Corning\2020 – Van Etten\cad\180473_VAN_03.dwg

LEGEND
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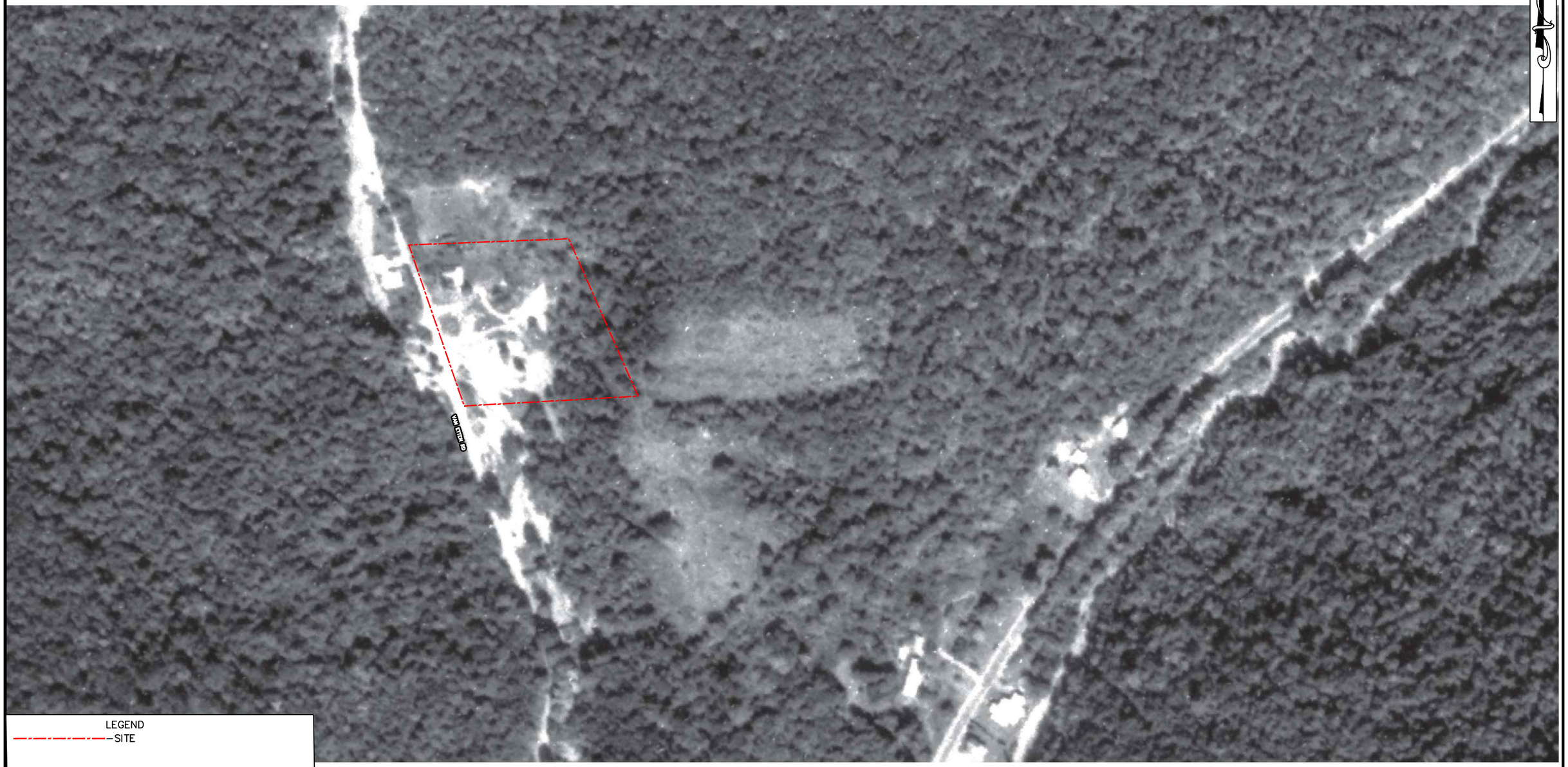
SOURCE:
HISTORIC IMAGE SOURCE: NYSDEC

SCALE: 0 200 FEET	**DATE:** SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA	1973–05–07 AERIAL 200 SCALE VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
S.O. NO.: 180473	**FILE:** 180473_VAN_03		
DSN/DWN: BES/RRR	**CHK:** BES		

K:_Corning\2020 – Van Etten\cad\180473_VAN_04.dwg



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SOURCE:
HISTORIC IMAGE SOURCE: NYSDEC

SCALE: 0 200 FEET	DATE: SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA	1976–09–25 AERIAL 200 SCALE VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
S.O. NO.: 180473	FILE: 180473_VAN_04		
DSN/DWN: BES/RRR	CHK: BES		

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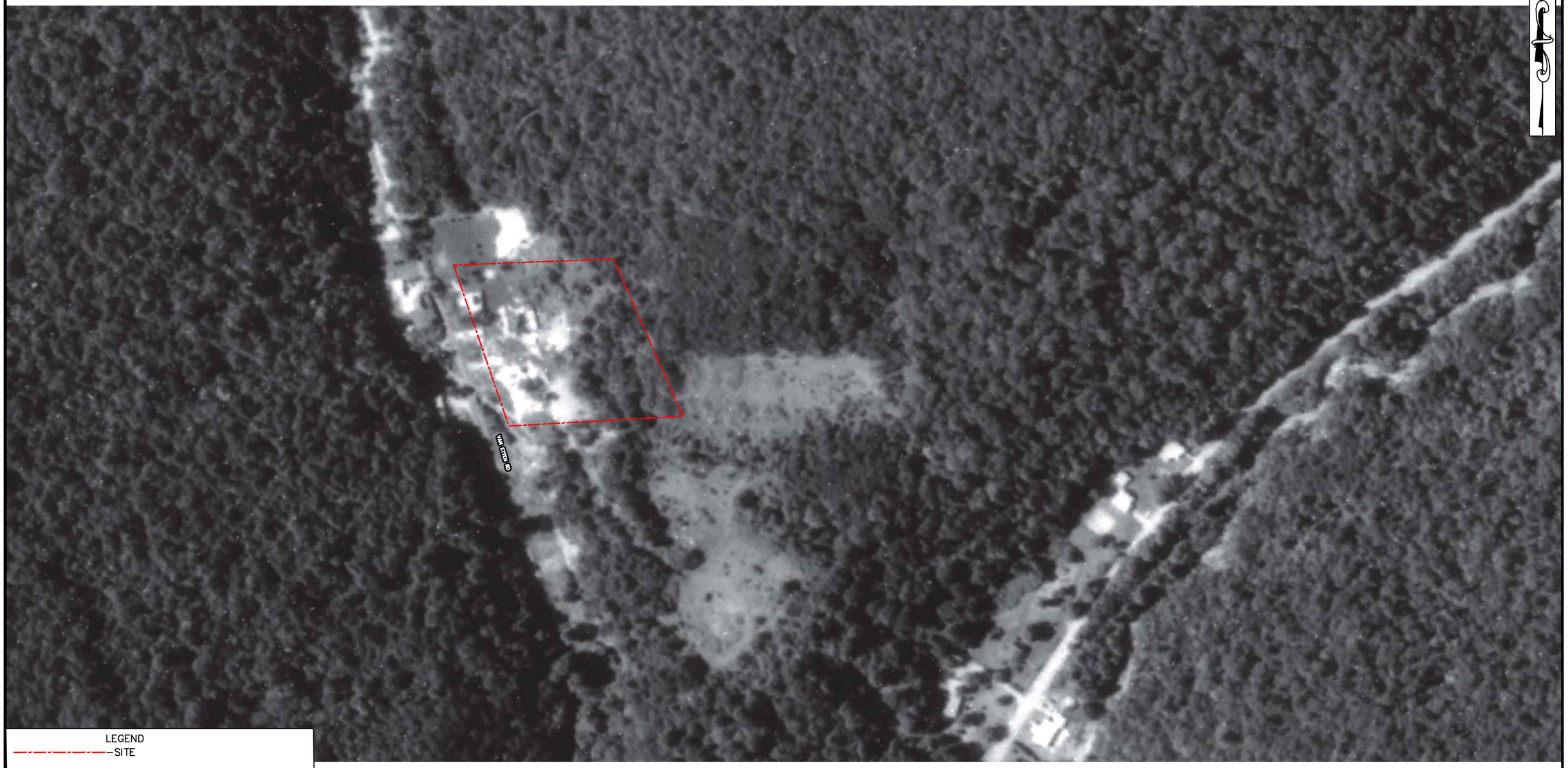

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SOURCE:
HISTORIC IMAGE SOURCE: NYSDEC

SCALE: 0 200 FEET	DATE: SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA	1979–06–14 AERIAL 200 SCALE VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
S.O. NO.: 180473	FILE: 180473_VAN_04		
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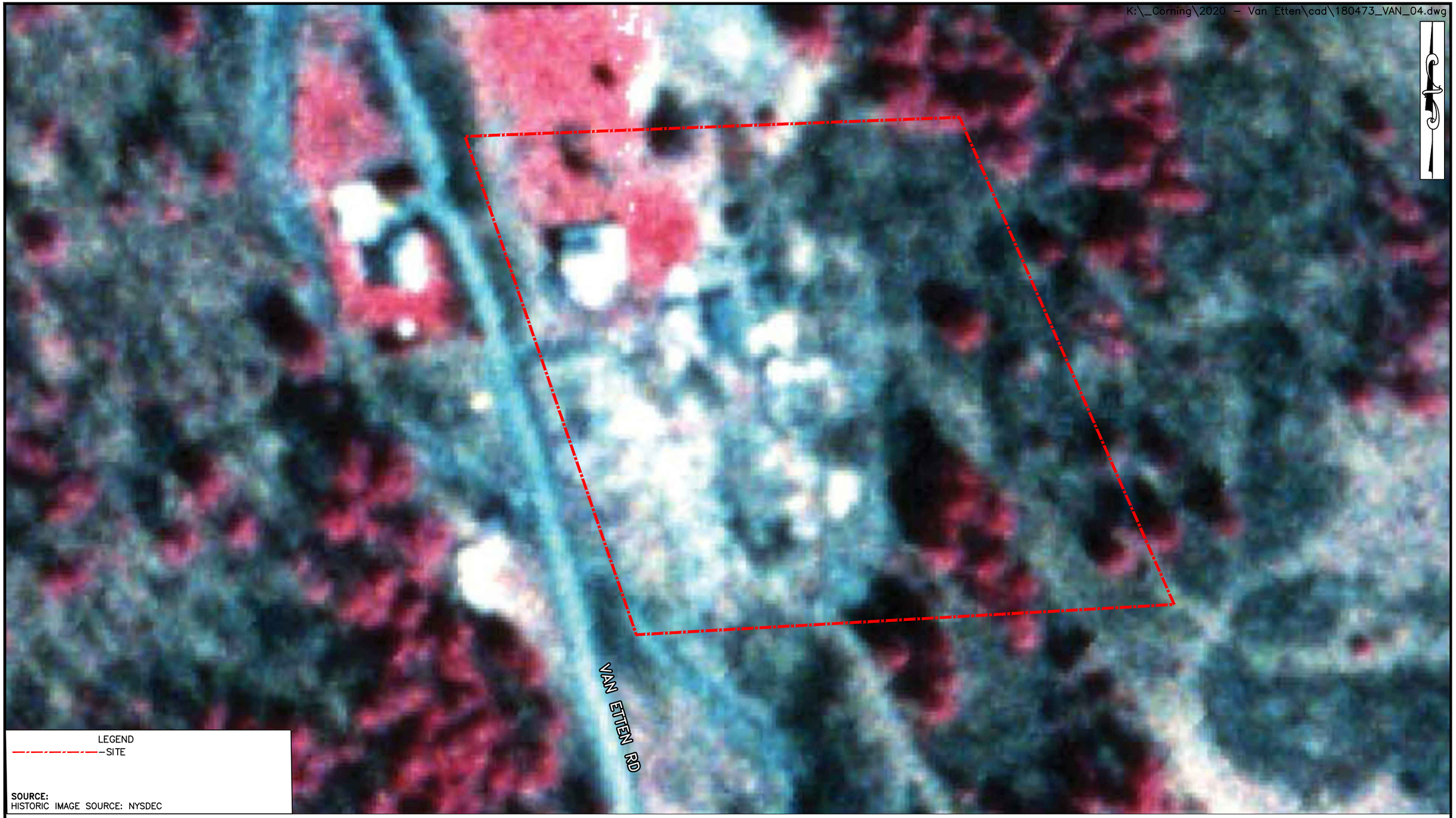
K:_Corning\2020 – Van Etten\cad\180473_VAN_04.dwg



LEGEND
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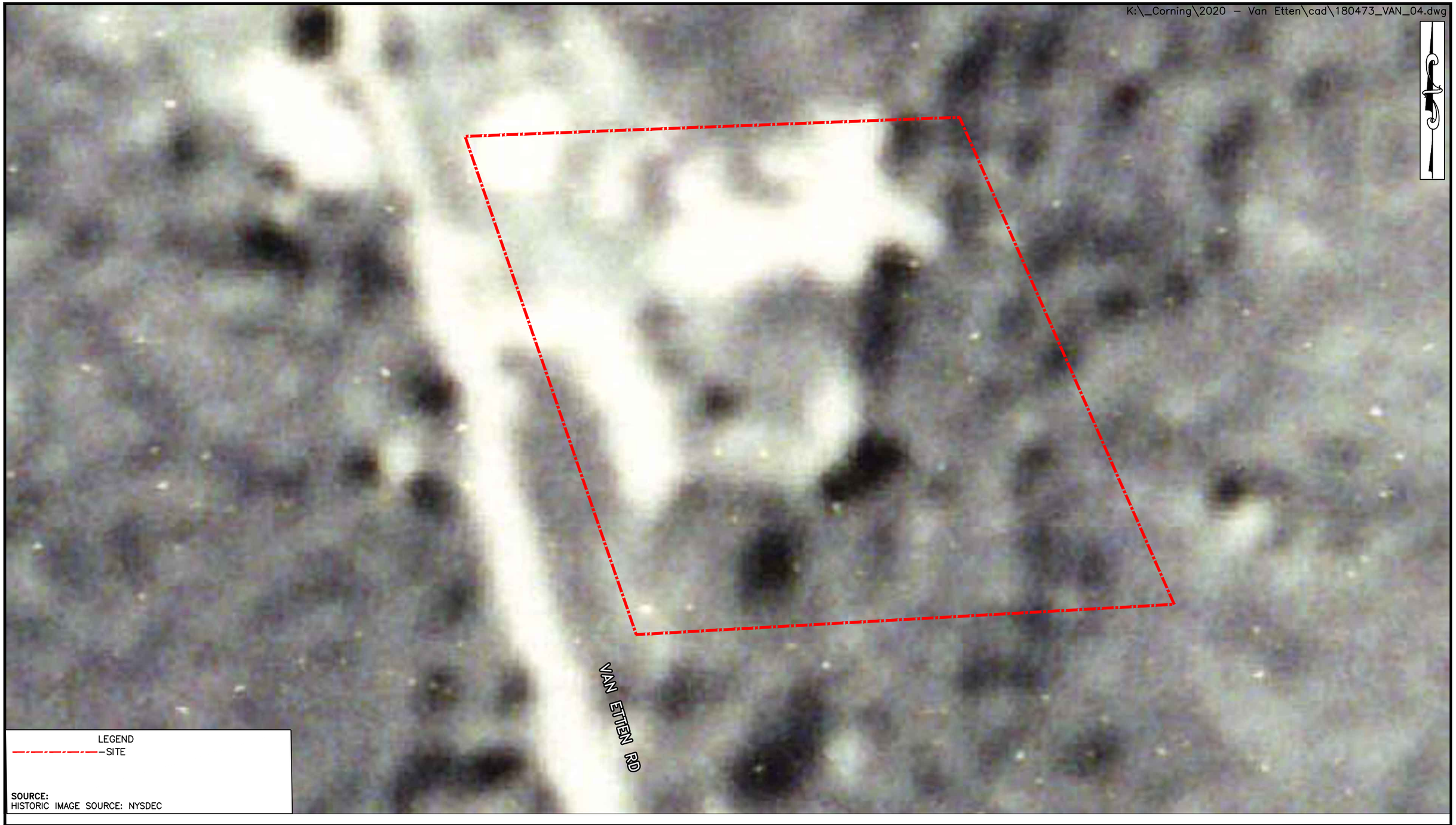
SOURCE:
HISTORIC IMAGE SOURCE: NYSDEC

SCALE: 0 60	**DATE:** SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA	1986–04–15 AERIAL VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
S.O. NO.: 180473	**FILE:** 180473_VAN_04		
DSN/DWN: BES/RRR	**CHK:** BES		

K:_Corning\2020 – Van Etten\cad\180473_VAN_04.dwg



LEGEND
SITE

SOURCE:
HISTORIC IMAGE SOURCE: NYSDEC

SCALE: 0 60	DATE: SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA
S.O. NO.: 180473	FILE: 180473_VAN_04	1991–09–22 AERIAL VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
DSN/DWN: BES/RRR	CHK: BES	

K:_Corning\2020 - Van Etten\cad\180473_VAN_04.dwg

LEGEND
SITE

SOURCE:
HISTORIC IMAGE SOURCE: NYSDEC

SCALE: 0 60	DATE: SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA	2001-04-01 AERIAL VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
S.O. NO.: 180473	FILE: 180473_VAN_04		
DSN/DWN: BES/RRR	CHK: BES		

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SOURCE:
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SCALE: 0 60	DATE: SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA	2002-04-01 AERIAL VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
S.O. NO.: 180473	FILE: 180473_VAN_04		
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SOURCE:
HISTORIC IMAGE SOURCE: NYSDEC

SCALE: 0 60	**DATE:** SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA	2012-04-19 AERIAL VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
S.O. NO.: 180473	**FILE:** 180473_VAN_04		
DSN/DWN: BES/RRR	**CHK:** BES		

K:_Corning\2020 – Van Etten\cad\180473_VAN_03.dwg

LEGEND
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SOURCE:
NYS Digital Ortho–imagery Program (NYSDOP) Issue_Identification: 2016 imagery in Steuben County

SCALE: 0 60	DATE: SEPTEMBER 2020	Michael Baker INTERNATIONAL MICHAEL BAKER INTERNATIONAL MOON TOWNSHIP, PENNSYLVANIA	2016–03–27 AERIAL VAN ETTEN ROAD PROPERTY SITE CHARACTERIZATION CORNING, NY
S.O. NO.: 180473	FILE: 180473_VAN_03		
DSN/DWN: BES/RRR	CHK: BES		

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau E
625 Broadway, 12th Floor, Albany, NY 12233-7017
P: (518) 402-9813 I F: (518) 402-9819
www.dec.ny.gov

March 8, 2022

Greg Haack, PE
Corning Incorporated
1 Museum Way
HP-ME-03-03
Corning, NY 14831

Subject: 3148 Van Etten Road Property Characterization Work Plan,
Site No. 851061

Dear Mr. Haack,

The New York State Department of Environmental Conservation (NYSDEC) is providing the following clarifications in regard to the 3148 Van Etten Road Property Characterization Work Plan (Work Plan) submitted on April 23, 2021 and accepted on May 4, 2021.

Work is to be conducted in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

The purpose of the Site Characterization Work Plan is to determine whether the site poses little or no threat to public health and the environment or if it poses a threat and whether the threat requires further investigation.

A Site Characterization investigation is intended to determine whether any of the conditions identified by DER-10, Chapter 3, Section 3.1, Subdivision (a) can be attributed to disposal on the site identified by the site records search and if the site is a contaminated site requiring further investigation and remediation.

Per DER-10, Chapter 3, Section 3.1, Subdivision (b), Subparagraph 6, if a surface water body or wetland is present on the site, or sediments are present on a site where disposal may have occurred and contaminant concentrations are identified above the applicable surface water or sediment soil cleanup guidance (SCGs), DER will consider items set forth in Subparagraph 2.ii in assessing the need for further investigation or other action.

Prior to implementing any modifications to the approved work plan. the proposed modification will be submitted to NYSDEC for review and approval. Implementation shall not be performed until NYSDEC approval is provided.

CAMP data is required to be submitted to the regulatory agencies weekly and in the event action levels are exceeded, within the 12 hours of the exceedance along with a statement of how the exceedance was remedied.

Prior to the start of work a schedule will be provided to the NYSDEC for review and approval. Following approval, the schedule will be maintained, and proposed revisions submitted to the NYSDEC for review and approval on a weekly basis. The schedule should include details for all activities, including timelines and target dates for the start, field activities and submission of all reports.

The Soil Cleanup Objections (SCOs) for this site are Residential based on the current and anticipated future use and the evaluation of chemical analysis results should be compared to those SCOs as well as Unrestricted Use SCOs.

Following the Site Characterization activities, it is required that the property be restored to pre-investigation conditions and obtain acceptance from the property owner.

In the finalized Work Plan that will be attached to the Order on Consent, the watermark “Settlement Confidential Inadmissible in This or any Other Proceeding” must be removed. As a reminder, the finalized Work Plan must also include a signed certification page.

This letter should accompany the initial acceptance letter from the Department dated May 4, 2021.

Sincerely,

Samantha Salotto, PE
Remedial Section A, Remedial Bureau E
Division of Environmental Remediation

ec: M. Cruden, NYSDEC
D. Loew, NYSDEC
J. Robinson, NYSDOH
M. Doroski, NYSDOH
J. Deming, NYSDOH
M. Vetter, Parsons
J. Novotny, Corning Incorporated
K. Douglas, Corning Incorporated

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau E
625 Broadway, 12th Floor, Albany, NY 12233-7017
P: (518) 402-9813 I F: (518) 402-9819
www.dec.ny.gov

May 4, 2021

Mr. Greg Haack, PE
Sr. Facilities Engineer
Capital Projects and Facilities Engineering
Corning Incorporated
Corning, New York 14831

Subject: Site No. 851061, 3148 Van Etten Road Property, Site Characterization Work Plan Acceptance Letter

Dear Mr. Haack,

The New York State Department of Environmental Conservation (NYSDEC) in consultation with The New York State Department of Health (NYSDOH) has reviewed the revised Site Characterization Work Plan (Work Plan) for the 3148 Van Etten Road site dated April 23, 2021 and find it acceptable.

Corning Incorporated should work with NYSDEC's Office of General Counsel to coordinate the finalization of the document as an attachment to the Consent on Order. The final Work Plan must include a signed certification page.

For any technical questions or concerns, please direct them to me at (518) 402-9903 or via email at samantha.salotto@dec.ny.gov.

Sincerely,

Samantha Salotto, PE
Assistant Engineer (Environmental)
Division of Environmental Remediation

Ec: M. Cruden, NYSDEC
D. Loew, NYSDEC
J. Robinson, NYSDOH
M. Vetter, Parsons
B. Steffes, Michael Baker International
C. Jeffreys, Michael Baker International

Exhibit C

EXHIBIT "C"

RECORDS SEARCH REPORT

1. Detail all environmental data and information within Respondent's or Respondent's agents' or consultants' possession or control regarding environmental conditions at or emanating from The Van Etten Road Property.

2. A comprehensive list of all existing relevant reports with titles, authors, and subject matter, as well as a description of the results of all previous investigations of The Van Etten Road Property, including all available topographic and property surveys, engineering studies, and aerial photographs.

3. A concise summary of information held by Respondent and Respondent's attorneys and consultants with respect to:

(i) a history and description of The Van Etten Road Property, including the nature of operations;

(ii) the types, quantities, physical state, locations, methods, and dates of disposal or release of hazardous waste at or emanating from The Van Etten Road Property;

(iii) a description of current The Van Etten Road Property security (i.e. fencing, posting, etc.); and

(iii) the names and addresses of all persons responsible for disposal of hazardous waste, including the dates of such disposal and any proof linking each such person responsible with the hazardous wastes identified.

4. The Respondent shall have no obligation hereunder to provide information to the Department which it already has in its possession or which the Department was responsible for developing, or to provide privileged information to the Department. Except for information the Department was responsible for developing or privileged information, the Respondent shall identify the information which it believes the Department already has in its possession.

Exhibit D

The Van Etten Road Property Citizen Participation Plan

NYSDEC Index No. R8-20200903-106

Corning, New York

April, 2022

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Appendix B Document Repositories

Appendix C List of Available Documents

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Appendix E Glossary

Appendix F The Van Etten Road Property Map

1.0 Introduction and Overview

This document presents the Citizen Participation (CP) Plan for The Van Etten Road Property located in the Town of Corning, New York, Tax Map ID: 300.000-0001-044.1000000 (the "Real Property"). The Real Property is depicted on the map attached as Appendix "F".

In April 2022, Corning Incorporated and the New York State Department of Environmental Conservation (NYSDEC) entered into an Order on Consent and Administrative Settlement (Order) to investigate the Real Property, including conducting *The Van Etten Road Property Characterization Work Plan* (the Work Plan; Michael Baker 2021), which is attached to, and incorporated into, the Order.

The Order also requires the development of a CP Plan for the Real Property, in accordance with New York Environmental Conservation Law (ECL) §27-1417 and Title 6 of the New York Codes Rules and Resolutions (6 NYCRR) sections 375-1.10 and 375-3.10. Corning is committed to informing and involving the public during the course of the remedial work to be conducted under the Order, and will work with the NYSDEC and the New York State Department of Health (NYSDOH) to accomplish this goal. This CP Plan describes the minimum CP activities to be conducted during the environmental study; additional community outreach may also occur based on NYSDEC requirements or community feedback.

2.0 Background and Project Description

The NYSDEC classified the Real Property as a State Superfund Program Classification P (potential) site.

2.1 The Van Etten Road Property History

The Van Etten Road Property is located at 3148 Van Etten Road, Corning, Steuben County, New York 14830. The Property is listed on Tax Maps as Parcel #300.000-0001-044.1000000 and identified as comprising 2.3 acres. The Property includes an occupied house built in 1910.

The Van Etten Road Property is approximately 1.5 miles northeast of the City of Corning. A review of available title records indicated that the Property was never owned by Corning Incorporated. Records indicate that the Property was historically owned by multiple families as a residence and possibly used for agricultural purposes.

NYSDEC has provided photographs taken at the Property depicting apparent glass and potential demolition-type debris. Aerial photographs were reviewed and reveal that the Property has been occupied by a house on a small rural road surrounded by woodlands since before 1938 and an area of potential disturbance is visible in aerial photographs beginning in 1970, with no substantive change to the potential area of disturbance after 1976.

2.2 Project Description

Corning Incorporated has retained an experienced expert technical consultant, Michael Baker International, to implement an environmental study of the Real Property in accordance with the NYSDEC-approved Work Plan (Michael Baker, 2021). The study will assess the nature and extent of fill material that may be encountered within the Real Property and evaluate potential exposure pathways completing soil borings in areas where this fill may be identified with a thorough visual inspection and reporting of the materials encountered; collecting surface and subsurface soil samples for analytical testing; and installing and sampling groundwater monitoring wells. After the sampling is complete, Corning Incorporated will report the findings and work with the NYSDEC, NYSDOH, and the property owner to determine whether any further action is necessary.

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3.0 Citizen Participation (CP) Activities

This section describes the CP program for the Real Property. The program meets the requirements set forth in NYSDEC Program Policy No. 23, the Citizen Participation Handbook for Remedial Programs. The program will be implemented by Corning Incorporated, with oversight and input from the NYSDEC and NYSDOH. The following paragraphs describe the required or suggested minimum CP activities for the project; additional CP activities may be considered based on community feedback.

3.1 Document Repository

A document repository is a file of documents pertaining to the Real Property and the associated citizen participation programs, which is made available for public review. The file is typically maintained in a nearby public building to provide access at times and a location convenient to the public.

For the Real Property, document repositories will be established, and will include the following documents, as available:

- Consent Order
- CP Plan
- Fact Sheets
- The Van Etten Road Characterization Work Plan
- Other materials (e.g., information sheets, notices, etc.)

Two repositories will be established for the Real Property: (1) the Southeast Steuben County Library, and (2) the NYSDEC Regional Office. The addresses for these repositories are listed in Appendix B.

3.2 Mailing List

A key element of the CP Plan is a mailing list of stakeholders, the community, and interested citizens in an area. Direct mailings of information allow people to review the information provided at their convenience (i.e., rather than in a public forum). These mailings also facilitate the distribution of information to everyone who needs or wants information about the project.

Events requiring a fact sheet be sent to the mailing list include but are not limited to finalization of the Site Characterization Work Plan, completion of the Site Characterization Report, finalization of an Interim Remedial Measure Work Plan (if applicable), and completion of an Interim Remedial Measure Report (if applicable).

A mailing list has been established for the Real Property (referred to as the Project Contact List), which is composed of two components:

- The owner of the Real Property, and
- Other interested parties.

The contact information for interested parties (second bullet) is provided in Appendix D; property owner contact information is maintained confidentially in project files. Corning Incorporated will maintain and update the mailing list information regularly throughout the project.

3.3 Points of Contact

Several points of contact have been established for the project. The public is encouraged to contact any of the project staff listed below.

Technical Information:
Samantha Salotto
NYS Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233
Phone: (518) 402-9903
Email: Samantha.Salotto@dec.ny.gov

The Van Etten Road Property -Related Health Information:
Christine N. Vooris – Bureau Director
Center for Environmental Health
New York State Department of Health
Empire State Plaza, Corning Tower Room
Albany, NY 12237
Phone: (518) 402-7860
Email: Christine.Vooris@health.ny.gov

Citizen Participation:
Andrea Pedrick
Public Participation Specialist
NYS Department of Environmental Conservation
Region 8
6274 East Avon-Lima Road
Avon, NY 14414
Phone: (585) 226-5363
Fax: (585) 226-9458
Email: andrea.pedrick@dec.ny.gov

3.4 Print Media (Fact Sheets)

Printed communications materials, such as fact sheets, newsletters or brochures, are one of several citizen participation tools used to provide information to the community about a project. Fact sheets are typically two to four pages in length, and portray a specific topic of interest in community-friendly (non-technical) terms. Pictures and graphics are used as much as possible to enhance the fact sheet and more simply communicate key information.

The NYSDEC will prepare Fact Sheets at certain key milestones of the project in accordance with NYSDEC Program Policy No. 23 (the *Citizen Participation Handbook for Remedial Programs).* In addition, Corning Incorporated will prepare additional informative newsletters and/or fact sheets and periodically distribute these materials to interested individuals and organizations. For example, Corning Incorporated newsletters/fact sheets may contain articles on the status of the environmental project, listings of recently issued documents, names of individuals to contact for more information, and descriptions of study techniques or technologies or project milestones. The newsletters/fact sheets will be used to increase community awareness and knowledge of the project and its status. All fact sheets will be reviewed and approved by the NYSDEC before being distributed to entities on the Real Property contact list.

3.5 Websites

In today's society, providing information on the Internet is an effective means of communication. Most community members have some access to the Internet (at home, at work, or at a public library), and this can be an important communications vehicle for consolidated, accurate, and up-to-date information and visuals.

NYSDEC will establish a website for the project and will announce the address via a fact sheet. An existing website with information regarding environmental cleanup in Corning can be found here: https://www.dec.ny.gov/chemical/97180.html.

3.6 Summaries of Technical Reports

In addition to technical reports placed in the document repositories, a summary (in the form of a fact sheet) will be provided after each technical report has been finalized to communicate the facts about the project in simple terms to enhance understanding. It is important that technical information is articulated with a realistic and understandable view of the work being done and the potential risks or exposures involved. It is, however, also important that the community be able to understand the issues in lay terms.

3.7 Public Notices

As required by NYSDEC Program Policy*,* formal public notices will be published to inform stakeholders and community members of certain milestones or events concerning the project. These notices will be placed in a local newspaper of general circulation, and will appear in a prominent position in the paper with adequate time for the community to plan participation.

3.8 Public Comment Periods and Comment Responses

If requested by the NYSDEC, the public will be given an opportunity to comment on certain project documents and to receive comment responses from the NYSDEC. Under NYSDEC program policy, the public would typically be allowed 30 days to comment on a particular document.

Formal comment response documents would be prepared by the NYSDEC, and provided to the public. In this manner, the public will obtain direct feedback on their comments, and will understand how the comments are being incorporated into final decisions being made regarding the project.

3.9 Meetings

Public or town meetings and/or availability sessions will be held as appropriate (e.g., to announce major milestones during the project), or as requested by the NYSDEC or the community. Such meetings will include (as appropriate) posters, exhibits, and displays that give audience members graphic representations of project activities, findings, or program schedules. These materials will provide perspective to the community with respect to the study.

Public meetings will be held in a convenient and central location to the community. Meeting times and locations would be determined with input from local community leaders, and will be announced in local newspapers and/or a mailing to the community.

3.10 Media Notification

Media releases will be developed at key milestones of the program and distributed to local newspapers and other media outlets that may express interest. Media contacts are listed in Appendix D. Media briefings can also be arranged if media representatives have the need for additional background information on the project.

3.11 Elected State and Federal and Local Officials Briefings

Briefings to state and federal elected officials and local officials will be scheduled as needed or requested to communicate significant events during the project. Such briefings will keep these leaders involved and informed as to the progress of activities on the project. These briefings will also give officials the opportunity to ask questions or resolve any concerns.

3.12 Revise the CP Plan

During the course of implementing the CP Plan, Corning Incorporated and the NYSDEC may identify additional community needs, issues, or concerns regarding the Real Property that are not currently addressed in this CP Plan. As such, the CP Plan will be updated as needed, or at least every three years.

4.0 References

The Van Etten Road Property Characterization Work Plan, (Michael Baker, May 2021)

Appendix A

Project Contacts

For additional information about the program, the public is encouraged to contact any of the project staff listed below.

Technical Information:

Samantha Salotto
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233
Phone: (518) 402-9903
Email: Samantha.Salotto@dec.ny.gov

The Van Etten Road Property -Related Health Information:

Melissa Doroski
Center for Environmental Health
New York State Department of Health
Empire State Plaza, Corning Tower Room
Albany, NY 12237
Phone: (518) 402-7860
Email: Melissa.Doroski@health.ny.gov

Citizen Participation:

Andrea Pedrick
Public Participation Specialist, Office of Communication Services
NYS Department of Environmental Conservation
Region 8
6274 East Avon-Lima Road
Avon, NY 14414
Phone: (585) 226-5366
Fax: (585) 226-9458
Email: andrea.pedrick@dec.ny.gov

Appendix B

Document Repositories

Two document repositories have been established to provide the public with convenient access to important project documents and other information. This information will include reports, data and information gathered and developed during the course of the assessment and evaluation of conditions surrounding the Real Property. These repositories can be found at the following locations:

Southeast Steuben County Library

300 Nasser Civic Center Plaza
Corning, NY, 14830
Phone: (607) 936-3713
Contact: (reference librarian) for an appointment

Hours:		
	Monday	9:00am-6:00 pm
	Tuesday	9:00am-8:00pm
	Wednesday	9:00am-6:00pm
	Thursday	9:00am-8:00pm
	Friday	9:00am-6:00pm

NYSDEC Region 8 Office

6274 Avon-Lima Rd. (Rtes. 5 and 20)
Avon, NY 14414-9516
Contact: Regional Public Participation Specialist
at (585) 226-5324 for an appointment
Hours: Monday through Friday 8:30am-4:45pm

Appendix C

List of Available Documents

According to the NYSDEC, the following documents are available at the document repositories listed in Appendix B of this CPP:

- Order on Consent and Settlement Agreement DEC No. R8-20200903-106, dated April 2022
- The Van Etten Road Property Characterization Work Plan, (Michael Baker, May 2021)
- Citizen Participation Plan, dated April 2022

Within the initial months of the project, Corning Incorporated will also provide copies of the following documents for the document repositories:

- Fact Sheets prepared and distributed to the Project Contact List

Additional documents not listed above will be placed in the designated repositories as the program for the Real Property develops.

Appendix D

Project Contact List

The following contact list has been developed to help keep the community informed about and involved in the project activities relating to The Van Etten Road Property. The list includes local, regional and state officials; local media; civic, business, and environmental organizations; and others. The Project Contact List will be reviewed periodically and updated as appropriate.

Note: The property owner is maintained confidentially in project files, not in a CP Plan or repositories.

Environmental Groups

Friends of the Chemung River Watershed
111 N. Main St.
Elmira, N.Y. 14901

Media

Shawn Vargo, News Editor
The Leader
34 West Pulteney St.
Corning, N.Y., 14830

Kevin Hogan, Executive Editor
Star-Gazette
201 Baldwin St., P.O. Box
Elmira, N.Y., 14902

News Director
WETM-TV
101 East Water Street
Elmira, N.Y., 14901

News Director
WENY-TV
474 Old Ithaca Road
Horseheads, N.Y., 14845

News Director
YNN
815 Erie Blvd. East
Syracuse, N.Y., 13210

Associated Press
Albany Bureau
P.O. Box 11010
Albany, N.Y., 12211

Local Officials

Town of Corning

Kimberly Feehan, Town Supervisor
Town of Corning
20 South Maple Street
Corning, New York 14830

Mike Brenning, Deputy Supervisor Councilman
Town of Corning
20 South Maple Street
Corning, New York 14830

Councilwoman Jennifer Mullen
Town of Corning
20 South Maple Street
Corning, New York 14830

Councilman Stuart Sammis
Town of Corning
20 South Maple Street
Corning, New York 14830

Councilman Lon Fiscus
Town of Corning
20 South Maple Street
Corning, New York 14830

Susan A. Edwards, Town Clerk
Town of Corning
20 South Maple Street
Corning, New York 14830

Wayne Bennett, Planning Board Chairman
Town of Corning
20 South Maple Street
Corning, New York 14830

Michael Pambianchi, Zoning Board
Town of Corning
20 South Maple Street
Corning, New York 14830

John MacMahaon, Zoning Board
Town of Corning
20 South Maple Street
Corning, New York 14830

Phillip Zarnoch, Zoning Board
Town of Corning
20 South Maple Street
Corning, New York 14830

Steuben County Officials

Steven Maio, Esq.
Steuben County Legislature
3 East Pulteney Square
Bath, N.Y., 14810

Honorable Hilda T. Lando
Steuben County Legislature
3 East Pulteney Square
Bath, N.Y., 14810

Scott J. Van Etten, Chairman
Steuben County Legislature
3 East Pulteney Square
Bath, N.Y., 14810

Robin K. Lattimer, Vice Chairman
Steuben County Legislature
3 East Pulteney Square
Bath, N.Y., 14810

Jack Wheeler, County Manager
Steuben County Office Building
3 East Pulteney Square
Bath, N.Y., 14810

Judith M. Hunter, Clerk Steuben County
County Clerk's Building
3 East Pulteney Square
Bath, N.Y., 14810

Matthew Sousa, Planning Director
Steuben County Planning Department
3 East Pulteney Square
Bath, N.Y., 14810

Todd Housel, Deputy Commissioner
Steuben Public Works Department
3 East Pulteney Square
Bath, N.Y., 14810

Darlene Smith, Director
Public Health and Nursing Services
3 East Pulteney Square
Bath, N.Y., 14810

Wendy Jordan, Director
Real Property Tax Service Agency
3 East Pulteney Square
Bath, N.Y., 14810

State Officials

Dudley Loew, Esq.
Regional Attorney
New York State Department of Environmental Conservation, Region 8
6274 East Avon-Lima Road
Avon, N.Y., 14414

Timothy Walsh
Regional Director
New York State Department of Environmental Conservation, Region 8
6274 East Avon-Lima Road
Avon, N.Y., 14414

David Pratt, P.E.
Remediation Engineer
New York State Department of Environmental Conservation, Region 8
Division of Environmental Remediation
6274 East Avon-Lima Road
Avon, N.Y., 14414

Michael Cruden
Bureau Director
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, NY 12233

Andrea Pedrick
Public Participation Specialist, Office of Communication Services
New York State Department of Environmental Conservation
6274 East Avon-Lima Road
Avon, NY 14414
Phone: (585) 226-5363
Fax: (585) 226-9458
Email: andrea.pedrick@dec.ny.gov

Christine N. Vooris
Bureau Director
Center for Environmental Health
New York State Department of Health
Empire State Plaza, Corning Tower Room
Albany, NY 12237

Justin Deming
Center for Environmental Health
New York State Department of Health
Empire State Plaza, Corning Tower
Albany, NY 12237

Melissa Doroski
Center for Environmental Health
New York State Department of Health
Empire State Plaza, Corning Tower
Albany, NY 12237

State Elected Officials

Senator Thomas F. O'Mara
333 East Water St., 3rd Floor, Suite 301
Elmira, N.Y., 14901

Assemblyman Philip A. Palmesano
105 E. Steuben St.
Bath, N.Y., 14810

Federal Elected Officials

Honorable Charles Schumer
United States Senate
322 Hart Senate Office Building
Washington D.C., 20510

Honorable Kirsten Gillibrand
United States Senate
478 Russell
Washington, D.C., 20510

Congressman Tom Reed
United States House of Representatives
2263 Rayburn House Office Building
Washington, D.C., 20515

Property Owner List – To Be Maintained Confidentially

Property Owners to the East

Odyssey 1968 LLC
3143 Van Etten Road
Corning. NY 14830

Property Owners to the West

Odyssey 1968 LLC
3143 Van Etten Road
Corning. NY 14830

Property Owners to the North

R P Steele Developers Inc.
3168 Van Etten Road
Corning, NY

Property Owners to the South

Odyssey 1968 LLC
3143 Van Etten Road
Corning. NY 14830

Appendix E

Glossary

Term	Definition
Availability Session	A scheduled gathering of project staff and members of the public in a casual setting, without a formal presentation or agenda but usually focusing on a specific aspect of an environmental study.
Citizen Participation	A program of planning and activities to encourage communication among people affected by or interested in the project and the government agencies and other parties responsible for an environmental study.
Citizen Participation Plan	A Citizen Participation Plan describes the citizen participation activities that will be conducted during a specific project's environmental study.
Comment Period	A period for the public to review and comment about various documents. For example, a 30-day comment period after submittal of remedial investigation of feasibility report is provided when NYSDEC determines it to be necessary.
Consent Order	A legal and enforceable agreement negotiated between NYSDEC and a potential responsible party. The order sets forth agreed upon terms by which the potential responsible party will undertake an environmental study and pay for the NYSDEC's costs to oversee the study. The Consent Order includes a schedule for implementing the agreed scope of the study.
Document Repository	A document repository is a file of documents pertaining to the environmental study of a study area and the associated citizen participation programs, which is made available for public review. The file is typically maintained in a nearby public building to provide access at times and a location convenient to the public.
Fact Sheet	A written discussion about part or all of an environmental project, prepared by NYSDEC or the potential responsible party and provided to the public. A fact sheet may focus on: a particular element of a project; opportunities for public involvement; availability of a report or other information, or announcement of a **public meeting** or **comment period**. A fact sheet may be mailed to all or part of a project's contact list, distributed at meetings, placed in a **document repository** and/or sent on an "as requested" basis.
New York State Department of Health	Agency within the executive branch of New York State government which: performs health-related inspections at suspected hazardous waste sites; conducts health assessments to determine potential risk from environmental exposure; reviews risk assessments ; conducts health-related community outreach around sites; and reviews remedial actions to assure that public health concerns are adequately addressed.
NYSDEC Project Manager	An NYSDEC staff member (usually an engineer, geologist or hydro geologist) responsible for the day-to-day administration of an environmental project. The Project Manager works with legal, health,

Term	Definition
	citizen participation and other staff to accomplish project-related goals and objectives.
Public Meeting	A scheduled gathering of NYSDEC staff and potential responsible party staff with the public to give and receive information, ask questions and discuss concerns about a study area. Staff from multiple NYSDEC divisions and legal NYSDOH often also attend. A public meeting, unlike an **availability session**, generally features a formal presentation and a detailed agenda.

Appendix F

The Van Etten Road Property Map

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integral engineering p.c.
31 West 34th Street, Suite 7196
New York, NY 10018
www.integral-corp.com

Figure 1.
Site Location Map
3184 Van Etten Road Property Site Characterization
Corning, NY