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Site Management Plan

Peter Cooper Markhams Superfund Site Dayton, New York

January 2009
Revised June 26, 2009

0021-003-401

Prepared By:

BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

726 Exchange Street, Suite 624, Buffalo, New York | phone: (716) 856-0599 | fax: (716) 856-0583

SITE MANAGEMENT PLAN

PETER COOPER MARKHAMS SUPERFUND SITE
DAYTON, NEW YORK

January 2009
Revised June 26, 2009

0021-003-401

Prepared by:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

1.0 INTRODUCTION

Benchmark Environmental Engineering and Science, PLLC (Benchmark) has prepared this Site Management Plan (SMP) for the Peter Cooper Markhams Superfund site (Site) in the Town of Dayton, Cattaraugus County, New York.

In February 2008, the cooperating potentially responsible parties (CPRPs) executed a Consent Decree outlining the terms and conditions under which they would perform remedial measures at the Site. A Remedial Design (RD) Report describing the scope of the planned remedial measures was subsequently prepared by Benchmark and approved by the USEPA on July 3, 2008. In general, the remedy involved consolidating the waste/fill piles into an area of approximately 5 acres then capping with a low-permeability soil cover, consistent with the requirements of 6 NYCRR Part 360, including seeding with a mixture to foster natural habitat. The RD Report provided for preparation of an SMP following remedial measures construction.

The purpose of the SMP is to provide for the proper management of all Site remedy and post-construction components, including institutional controls. The components of the SMP include:

- An Operation, Maintenance, and Monitoring (OM&M) Plan describing ongoing measures that will be undertaken in the post-remedial period to assure the continued effectiveness of the remedy. The OM&M Plan includes post-remedial groundwater monitoring to verify that groundwater quality does not degrade from conditions measured during the site Remedial Investigation, requirements for maintenance of the engineering controls (i.e., cover soils) installed as part of the Site remedy, and a 5-year review, per CERCLA, to confirm that the remedy continues to protect public health and the environment.

- A Soil/Fill Management Plan identifying procedures to be undertaken if future work or development activities on the Site uncover residual contamination, and protocols for handling excess soil generated from future work activities, if any.

- A description of the institutional controls (e.g., environmental easement) incorporated into the remedy, and the means by which verification that the institutional controls remain enforced and in-effect will take place.

Remedial measures were implemented from July 30 to October 23, 2008. The USEPA monitored the remedial actions to verify the work was performed in accordance with the approved RD Report. A post-construction Remedial Action (RA) Report is being prepared to document the remedial construction activities, including any deviations from the design.

2.0 SMP COMPONENTS

This SMP consists of the following three parts:

PART	TITLE
I	Operation, Monitoring, & Maintenance Plan
II	Soil/Fill Management Plan
III	Institutional Controls (Environmental Easements)

PART I

OPERATION, MONITORING & MAINTENANCE PLAN

SITE MANAGEMENT PLAN
PART I

OPERATION, MAINTENANCE & MONITORING (OM&M) PLAN

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OPERATION, MAINTENANCE & MONITORING PLAN
PETER COOPER MARKHAMS SUPERFUND SITE

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OPERATION, MAINTENANCE & MONITORING PLAN
PETER COOPER MARKHAMS SUPERFUND SITE

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1.0 INTRODUCTION

This Operation Maintenance & Monitoring (OM&M) Plan has been prepared to identify required monitoring and maintenance tasks for the constructed remedial measures at the Peter Cooper Markhams Superfund Site, located in the Town of Dayton, New York (see Figure 1). Specifically, this report presents operation and maintenance requirements for the final cover system and appurtenances, as well as groundwater, surface water, and gas monitoring requirements.

This Plan will be employed with other post-construction site management measures (i.e., soil/fill management and institutional controls certification) to assure the continued effectiveness of the remedy in protecting human health and the environment

1.1 Constructed Remedial Measures

The basis for the remedial approach and design are presented in detail in the January 2008 Remedial Design Report and associated Design Plans and Specifications (Ref. 1) prepared by Benchmark Environmental Engineering & Science, PLLC (Benchmark). The remedial measures constructed at the Site include:

- Preparing the Site by clearing and grubbing.
- Consolidating the waste/fill into an area of approximately 4 acres.
- Capping the consolidated wastes with a low-permeability soil cover followed by seeding to foster natural habitat.
- Installing a passive gas venting system.
- Decommissioning select groundwater monitoring wells and installing replacement well.
- Restoring the Site, including planting 50 trees outside the consolidation area.

Figure 2 illustrates the completed remedial measures. A brief description of the construction is presented below.

1.1.1 Site Preparation

Site preparation involved clearing, grubbing, and improving access required for the consolidation and covering work. To facilitate heavy equipment access to the site, the access drive extending from Bentley Road to the northwestern limit of the waste fill was re-established and shored with aggregate material. In addition to the access drive, clearing was performed in and around the area of waste consolidation to allow equipment access. Trees, shrubs, brush, and stumps within the work limits were removed, chipped, and disposed off-site to facilitate construction and post-closure maintenance work. Vegetation was stripped off the surface of the waste fill piles. The vegetative layer was disposed beneath the cover soils.

1.1.2 Waste Fill Consolidation and Grading

Waste/fill consolidation involved relocating the waste/fill piles presently located at various location across the center of the Site into a single waste/fill area. Following clearing, grubbing, and consolidation of waste fill, the sub-grade was uniformly graded to the lines and grades depicted on construction grading plans to promote surface water drainage. The resultant waste/fill consolidation area has a footprint of approximately 4 acres.

1.1.3 Cover System

The final cover system will provide for long-term minimization of leachate formation by limiting the infiltration of surface water during the post-closure period. The final cover system was constructed so that it functions with minimum maintenance, promotes drainage, and minimizes erosion. The cover system consists of a minimum 18-inch thick recompacted low permeability (1×10^{-6} cm/sec) soil barrier layer and 6 inches of topsoil. The cover system was seeded with a select mix of grasses designed to produce low-lying (1-2 foot) vegetative cover that should not require mowing. The outlying areas formerly covered by waste fill were seeded with a conservation mix to promote vegetative growth that will enhance foraging and habitat opportunity for indigenous wildlife.

1.1.4 Passive Gas Venting System

Passive gas venting wells were installed through the waste/fill to relieve gas buildup beneath the cover system. A total of 5 gas venting wells were installed. The

gas venting wells were constructed of 4-inch Schedule 40 PVC with 180 degree (gooseneck) risers and wire bird screens. Gas venting wells were installed a minimum of 5 feet into the waste and screened in an approximate 3-foot diameter annular space filled with washed backfill material. Waste material excavated during gas vent installation was disposed within the consolidation area subgrade.

1.1.5 Groundwater Monitoring Network

Groundwater monitoring will include both water quality and water level monitoring. Samples will be collected on a semi-annual (spring and fall) basis for the first two years of monitoring, and may be reduced to annually thereafter (with USEPA approval) if the data supports the reduction. The Post-Remedial Groundwater and Surface Water Monitoring Plan presented as Appendix A identifies groundwater and surface water sampling locations; collection procedures; analytical parameters and methodology; and data reporting and interpretation requirements that will be implemented following construction of the recommended remedial measures.

In general, groundwater monitoring will be performed at the following network locations, where the "S" identifier indicates a shallow overburden monitoring well:

- Upgradient monitoring well MW-9S.
- Perimeter downgradient monitoring wells MW-5S, MW-7S, and MW-8S.
- Downgradient Wetland F (surface water).
- Monitoring well MW-2SR (between Wetland B and waste/fill consolidation area), which was replaced during the remedial measures construction, will be sampled during the first semi-annual monitoring event. Based on the analytical results from this initial sampling event, the need for continued monitoring of well MW-2SR will be assessed. Similarly, monitoring wells MW-4S and MW-6S will be sampled during the first semi-annual monitoring event. Based on the analytical results from this initial sampling event, the need for continued monitoring at these wells will be assessed.

In addition, all of the above-referenced locations will be monitored for water elevation information to facilitate preparation of overburden isopotential maps.

2.0 POST-CONSTRUCTION ACTIVITIES

2.1 Program Responsibilities

Post-remedial construction activities at the Peter Cooper Markhams Site are the responsibility of the cooperating potentially responsible parties (CPRPs) who entered into a Consent Decree to complete the remedial measures. Benchmark will assist in performing monitoring and maintenance related to the Site, including routine cover system maintenance and repairs; environmental monitoring; and preparation of reports.

2.2 Site Contacts

As indicated above, post-remedial operations, maintenance, and monitoring requirements as well as corrective measures, if necessary, are the responsibility of the CPRPs. The United States Environmental Protection Agency (USEPA) will serve as the regulating agency for these efforts. The contact persons for these parties are listed below:

Representatives for CPRPs

Dr. Michael Joy
Lipman Biltekoff, LLP
333 International Drive
Williamsville, NY 14221

Mr. John Wittenborn
Kelley Drye & Warren, LLP
Washington Harbour, Suite 400
3050 K Street, NW
Washington, DC 20007-5108

USEPA

Ms. Sherrel Henry
Peter Cooper Markhams Superfund Site Project Coordinator
U.S. Environmental Protection Agency, Region II
Emergency and Remedial Response Division
290 Broadway - 20th Floor
New York, NY 10007-1866

2.3 Site Monitoring

The Post-Remedial Groundwater and Surface Water Monitoring Plan (Appendix A) will be used to detect changes in Site conditions following implementation of remedial measures. Groundwater monitoring will include both water quality and water level monitoring. Samples will be collected on a semi-annual (spring and fall) basis for the first two years of monitoring, and may be reduced to annually thereafter if the data supports the reduction. The Post-Remedial Groundwater and Surface Water Monitoring Plan identifies groundwater and surface water sampling locations; collection procedures; analytical parameters and methodology; and data reporting and interpretation requirements that will be implemented following construction of the recommended remedial measures.

2.4 Site Inspection

Inspection and maintenance of the Peter Cooper Markhams Site will be performed by Benchmark personnel experienced in the construction and inspection of remedial measures involving cover systems. During the first year of post-closure care and monitoring, the Site will be inspected by Benchmark after major rainfall events or, in the absence of major rainfall events, on a minimum of two occasions coincidental with groundwater monitoring events. For the purposes of these inspections, a major rainfall event refers to a 2-year, 6-hour storm with a rainfall accumulation of approximately 1.6 inches (Northeast Regional Climate Center). The Peter Cooper Markhams Site will be inspected for:

- Integrity of cover, including:
  - Erosion or settling of cap materials
  - Cracking/breaches in cover
  - Loss of slope
  - Pooling or ponding of surface water
  - Loss of vegetative cover
  - Presence of undesirable plant or animal species
- Visible debris, litter and waste from illegal dumping activities.
- Integrity of gas vents.
- Integrity of access roads and gate.

- Integrity of monitoring wells, including but not limited to working locks, adequate surface seals and protective casings, and sediment intrusion.
- Replacement tree condition for the first year following planting. This will include inspecting budding and leaf growth, checking for signs of disease, and inspecting for evidence of significant damage from weather or invasive species. Trees that do not blossom or are damaged to a point that they are not expected to properly mature will be replaced within the 1-year warranty period provided by the supplier.

Inspection findings will be recorded on the Post-Closure Field Inspection Report (see Appendix B). The results of the inspections will be transmitted to the USEPA Project Coordinator following review, and any problems recorded over the course of the year will be summarized in the annual groundwater monitoring report described in Appendix A. After the first two years of post-closure care and monitoring, Site inspections will be performed on an annual basis.

2.5 Routine Site Maintenance

A discussion of typical Site maintenance requirements is presented below.

2.5.1 Cover System Maintenance

Cover system maintenance will be performed over the 30-year post-closure care period. Routine maintenance will include hand or small equipment removal of woody growth on the cover system to prevent the development of deep rooted vegetation. This operation will be scheduled annually in the second (fall) annual event to avoid disturbance of potential ground-nesting wildlife.

The need for cover repairs due to minor erosion and/or settling will be determined each time the Site is inspected and mowed. Any signs of erosion, burrowing, or other Site maintenance problems will be corrected as soon as possible. All bare spots in the final cover vegetation will be reseeded and fertilized. Seed and fertilizer will be of the same general type and quality as originally specified (see Appendix C).

If erosion or settling indicates the need for cover soil repair, the same procedures and materials used during the original construction activities will be used.

2.5.2 Access Road and Gate

The access road to the Site will be maintained in passable condition by vehicles so that routine inspections and required maintenance activities on the consolidated waste fill area can be carried out. The gate will be inspected concurrent with the access road and will be repaired, if necessary, to assure working condition and discourage trespassing.

2.5.3 Gas Vent System

During the quarterly Site inspections, gas vents will be inspected for overall integrity, plugging, and damage. Plugged gas vents will be assessed to determine the source of the blockage and mitigated during the inspection as necessary. Damaged gas vents will be repaired or rebuilt to restore them to original design configuration. Any sign of stressed vegetation (i.e., yellowed, browned, or absent) either immediately around the gas vents or across the Site will be noted on the Post-Closure Inspection Report in Appendix B.

2.5.4 Groundwater Monitoring System

The integrity of all groundwater monitoring wells will be evaluated as part of routine groundwater monitoring events scheduled during post-closure. Monitoring well integrity, including but not limited to sediment intrusion, working locks, adequate surface seals, and protective casings, will be evaluated. In addition, the well riser will be inspected for cracks and damage. Well repair, if necessary, will be performed to restore the well to original construction conditions.

If it is determined through long-term monitoring that a well no longer provides adequate information pertinent to post-closure monitoring or a monitoring well requires replacement, a well decommissioning request will be drafted, submitted to the USEPA for approval, and implemented in accordance with Benchmark's standard operating procedures presented in the Post-Remedial Groundwater and Surface Water Monitoring Plan (see Appendix A). A procedure for new well installation will be submitted for replacement wells, if required.

2.6 Remedial Measures Performance Evaluation

The remedial measures performance evaluation will focus on the efficacy of the waste/fill consolidation and low-permeability cover system in reducing off-site groundwater contaminant loadings. As such, it is necessary to periodically confirm that the remedial measures are in fact preventing off-site migration of contaminant concentrations at an unacceptable level. This will be accomplished through a combination of: off-site (downgradient) groundwater monitoring southwest of the consolidated waste fill area and groundwater elevation monitoring. The Post-Remedial Groundwater and Surface Water Monitoring Plan for the Site, presented as Appendix A, describes the proposed monitoring approach in detail.

The performance evaluation will compare the off-site groundwater monitoring data to NYSDEC Class GA groundwater quality standards and guidance values, as well as historic and ongoing results, to check for concentration trends.

2.6.1 CERCLA 5-Year Review

In accordance with CERCLA requirements, the remedial measures will undergo a comprehensive review 5 years following completion of construction. The CERCLA 5-year review will include:

- Community Involvement and Notification: The USEPA will begin working with local community leaders during the initial planning stages of the 5-year review to determine the appropriate level of community involvement and to notify all potentially interested parties that the 5-year review will be conducted.
- Document Review: All relevant documents and data are reviewed to obtain information to assess performance of the response action.
- Data Review and Analysis: The USEPA will review sampling and monitoring plans and results from monitoring activities, O&M reports, or other documentation of remedy performance, including previous 5-year review reports, if available. In some cases, it may be necessary to conduct supplemental sampling or collect other data to allow for complete analysis of the results.
- Site Inspection: The USEPA or its designated representative may conduct a Site inspection to visually confirm and document the conditions of the remedy, the Site, and the surrounding area. The inspection will be

conducted no more than nine months before the expected signature date of the 5-year review.

- Interviews: As necessary, interviews may be conducted with persons knowledgeable of Site conditions to provide additional information about the Site's status or remedy issues.
- Protectiveness Determination: The purpose of a 5-year review is to determine whether the remedy at the Site is, or upon completion will be, protective of human health and the environment. The USEPA's technical assessment of a remedy examines the following three questions. These questions provide a framework for organizing and evaluating data and ensure that all relevant issues are considered when determining the protectiveness of the remedy.
  - Is the remedy functioning as intended?
  - Are the exposure assumptions, toxicity data, cleanup levels, and Remedial Action Objectives still valid?
  - Has any other information come to light that could call into question the protectiveness of the remedy?

The conclusions of the 5-year review will include:

- Identification of issues, including the status of NPL deletion[1].
- Recommendations and follow-up actions.
- A determination of whether the remedy is, or is expected to be, protective of human health and the environment.

The USEPA will arrive at these conclusions through a technical assessment of the information collected during the document review, data collection, interviews, site inspection, and other activities. The CPRPs may assist in providing the information necessary for the 5-year review, including graphical presentation of groundwater data (to facilitate trend analysis), participation at the Site inspection, and development of responses to questions or comments that may arise during the review.

[1] It is USEPA's policy that the 5-year review requirement is independent of and unaffected by the deletion process. If a site has been deleted from the NPL, the 5-year review report should address the status of any deletion action.

3.0 CONTINGENCY MEASURES

3.1 General

The objective of this Section is to establish procedures for handling cover system damage or other detrimental Site conditions that occur outside the scope of routine maintenance.

Natural occurrences such as storms, drought, and subsidence should be considered "expected occurrences" and are addressed under Section 2.3. Other occurrences that are not expected to occur but may be discovered during a routine post-closure inspection are presented below. All corrective action, where appropriate, will be executed in a timely fashion after notifying the USEPA Project Coordinator.

3.2 Leachate Breakout

Leachate breakouts through the cover system would typically be discovered during regularly scheduled Site inspections. Breakouts are often characterized by clear or discolored localized seepage through the consolidation fill area cover. The most likely location for such a breakout would be along the lower slope or toe of the consolidated fill area. Damage from such a breakout will be repaired as quickly as possible with soil materials and methods as specified in the remedial construction specifications (see Appendix C). Areas where leachate breakouts occur will receive additional cover material that will be compacted and covered with topsoil for vegetative growth.

If cover repair/supplement methods to control leachate are unsuccessful, Benchmark will prepare a work plan, for submittal to and approval by USEPA, to determine appropriate response efforts. Response efforts may include more aggressive actions to control, minimize, or eliminate the conditions that are contributing to leachate breakout; or collection followed by on-site or off-site treatment and disposal of leachate.

3.3 Severe Erosion and Compromise of Cover System Integrity

Similar to leachate breakouts, erosion and a compromise of cover system integrity would be discovered during regularly scheduled Site inspections. The cause

of severe erosion will be investigated and repairs will be made consistent with the remedial construction specifications. These may include:

- Stripping and stockpiling topsoil and barrier protection layer material from the affected area for major soil cover material repairs.
- Regrading and recompacting the affected area with barrier soils in accordance with the specifications for barrier layer construction.
- Replacing topsoil and reseeding in accordance with the specifications for topsoil and turf.

If the cause of severe erosion is attributable to a condition that is likely to be frequently repeated (e.g., a surface water shedding pattern), Benchmark will prepare and submit to USEPA for approval a proposed design modification to mitigate the problem.

3.4 Unauthorized Dumping or Disposal

Unauthorized dumping or waste disposal will be reported to the USEPA, NYSDEC, and local law enforcement officials. Appropriate measures will be taken to determine the waste characteristics, containment requirements, and necessary removal techniques. The waste will be removed and disposed at an approved disposal facility. Efforts will be taken to eliminate further dumping and restrict subsequent entry to the Site. Persons found responsible for illegal dumping will be prosecuted according to the law and held accountable for all costs incurred in removing and disposing the waste.

3.5 Vectors

As a part of each Site inspection event, evidence of vectors will be recorded and described in the Post-Closure Field Inspection Report. Vectors include but are not limited to rodents, insects, and birds. In the event that a vector problem does arise, a plan for corrective action (e.g., trapping or extermination program implemented by licensed professionals) will be submitted to the USEPA for approval and implemented accordingly.

3.6 Air Contamination

Based on conditions measured during advancement of waste fill soil borings during the Remedial Investigation, gas venting to the atmosphere is not anticipated to present a health or fire risk. Benchmark will notify the USEPA if it is suspected that methane gas generation poses an explosion or human health hazard. If it is determined that such a hazard is present, a work plan will be developed, for submission to and approval by the USEPA, to determine if the venting system is functioning properly and the appropriate response actions. Possible response actions include replacing portions of the venting system, adding new vents, or installing an active gas withdrawal system. Any proposed remedial actions would be approved through the USEPA prior to implementation.

3.7 Fire

Fires will be immediately reported to the local fire department and quenched according to approved fire department protocol. Damage to the gas vents, surface drainage system, or final cover materials will be repaired where these systems have been compromised.

3.8 Vandalism

Vandalism will be reported to the local law enforcement authorities. If vandals have gained entry to the Site, appropriate measures will be taken to eliminate or restrict future access. Vandalism to Site structures, including gas and groundwater collection, groundwater monitoring and surface water management systems, will be repaired as appropriate where the damage is determined to have compromised the integrity of the final cover. Persons found in the act of Site vandalism will be prosecuted according to the law and will be held responsible for all costs incurred in repairing the damage to pre-existing conditions.

3.9 Emergency Phone Numbers

The following telephone numbers will be used in the event of an emergency at the Site:

Hospital
Tri-County Memorial Hospital
100 Memorial Drive
Gowanda, NY 14070-1111
(716) 532 -3377

Fire Department
Dayton Fire District #1
9604 Allen Street
Dayton, NY 14041
(716) 532-2627

Ambulance
Gowanda Ambulance Service
56 Chestnut Street
Gowanda, NY 14070
(716) 532-2323

Police
Gowanda Police Dept.
27 E Main Street
Gowanda, NY 14070
(716) 532-2020

The Site location is: Peter Cooper Markhams Superfund Site
Bentley Road
Markhams, New York
(Approximately 6 miles south of Gowanda, NY)

3.10 Emergency Procedures and Evacuation Route

Benchmark employees, local fire, police, emergency response teams, hospitals, and/or contractors who may be working at the Site will be informed of the Site location, layout, and potential Site safety hazards. In case of an emergency, all on-site personnel will meet at the northwest end of the access road where it intersects with Bentley Road and await further instruction. Figure 3 presents the hospital route. Directions to the hospital are as follows (approximately 8.3 miles):

1. From the Site turn right onto Bentley Rd.
2. Make a slight right onto Markham Road (Route 57)
3. Make a slight left onto Route 62 (Fair Plains Rd.).
4. Continue on Route 62 (Jamestown St.) into Gowanda until the five-way intersection
5. Turn left at the intersection onto West Main Street and travel west for 3 blocks.
6. At Aldrich Street turn right and proceed north to the first street on the left, Memorial Drive.
7. Make a left onto Memorial Drive and proceed to the Tri-County Memorial Hospital at 100 Memorial Drive. Follow signs to the ER.

4.0 HEALTH AND SAFETY PLAN

The Site-Specific Health and Safety Contingency Plan (HSCP) developed for use during implementation of remedial measures will be used during post-remedial on-site activities. Site representatives, contractors, and any other persons performing work at the Site are required to develop and enforce a HSCP as or more stringent than Benchmark's HSCP.

5.0 DOCUMENTATION REQUIREMENTS

5.1 Semi-Annual Reporting

All groundwater monitoring data will be submitted to the Site contacts listed in Section 2.2 on a semi-annual basis approximately 60 days after completion of sampling activities, unless otherwise agreed to with the USEPA. This information will be accompanied by a brief cover letter from Benchmark that summarizes the environmental data, describes the monitoring covered by the reporting period, and notifies the USEPA of any problems/corrective measures taken.

It is the intention of the Post-Remedial Groundwater and Surface Water Monitoring Plan to perform semi-annual (i.e., spring and fall) monitoring for the first two years of post-closure. Subsequent to completion and semi-annual report submission, groundwater monitoring will be conducted on an annual basis thereafter. Annual reporting will thereafter be performed in accordance with Section 5.2 of this Plan.

5.2 Annual Reporting

An Annual Monitoring and Maintenance Summary Report will be prepared and submitted to the Site contacts listed in Section 2.3, and will include the items listed below. (The Site contact list in Section 2.3 will be reviewed and updated annually).

- Results of post-closure Site inspections.
- A discussion of Site maintenance activities.
- A summary of groundwater elevation measurements. These results will be tabulated and used to prepare groundwater isopotential contour maps.
- A summary of semi-annual monitoring results including contraventions of NYSDEC Class GA groundwater quality standards and guidance values.
- A discussion of sample analytical results, including those parameters above background concentrations.
- A discussion of changes in groundwater quality that has occurred throughout the year.

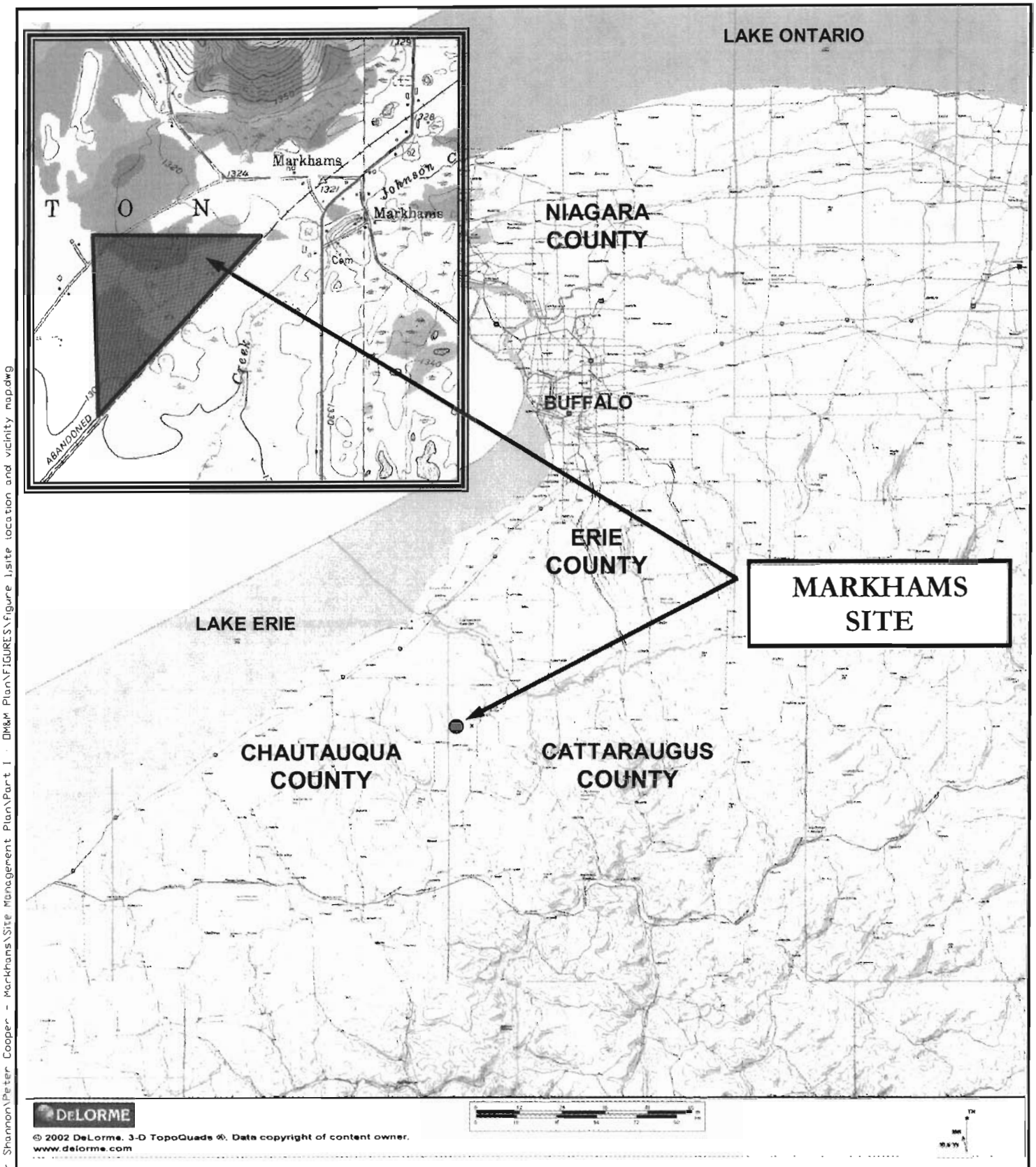
- Any proposed changes to the Post-Remedial Groundwater and Surface Water Monitoring Plan.
- Certification that all aspects of the Environmental Easement remain unchanged. Annual certification will be via the form included in Appendix B-2.

6.0 REFERENCES

1. Benchmark Environmental Engineering and Science, PLLC. June 2008. *Remedial Design Report and Contract Plans and Specifications for Peter Cooper Markhams Site, Dayton, New York.*

FIGURES

FIGURE 1



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PROJECT NO.: 0021-003-401
DATE: NOVEMBER 2008
DRAFTED BY: AJZ

SITE LOCATION AND VICINITY MAP

OPERATION, MAINTENANCE, AND MONITORING PLAN

PETER COOPER MARKHAMS SUPERFUND SITE
DAYTON, NEW YORK

PREPARED FOR

CPRPs FOR PETER COOPER MARKHAMS SITE

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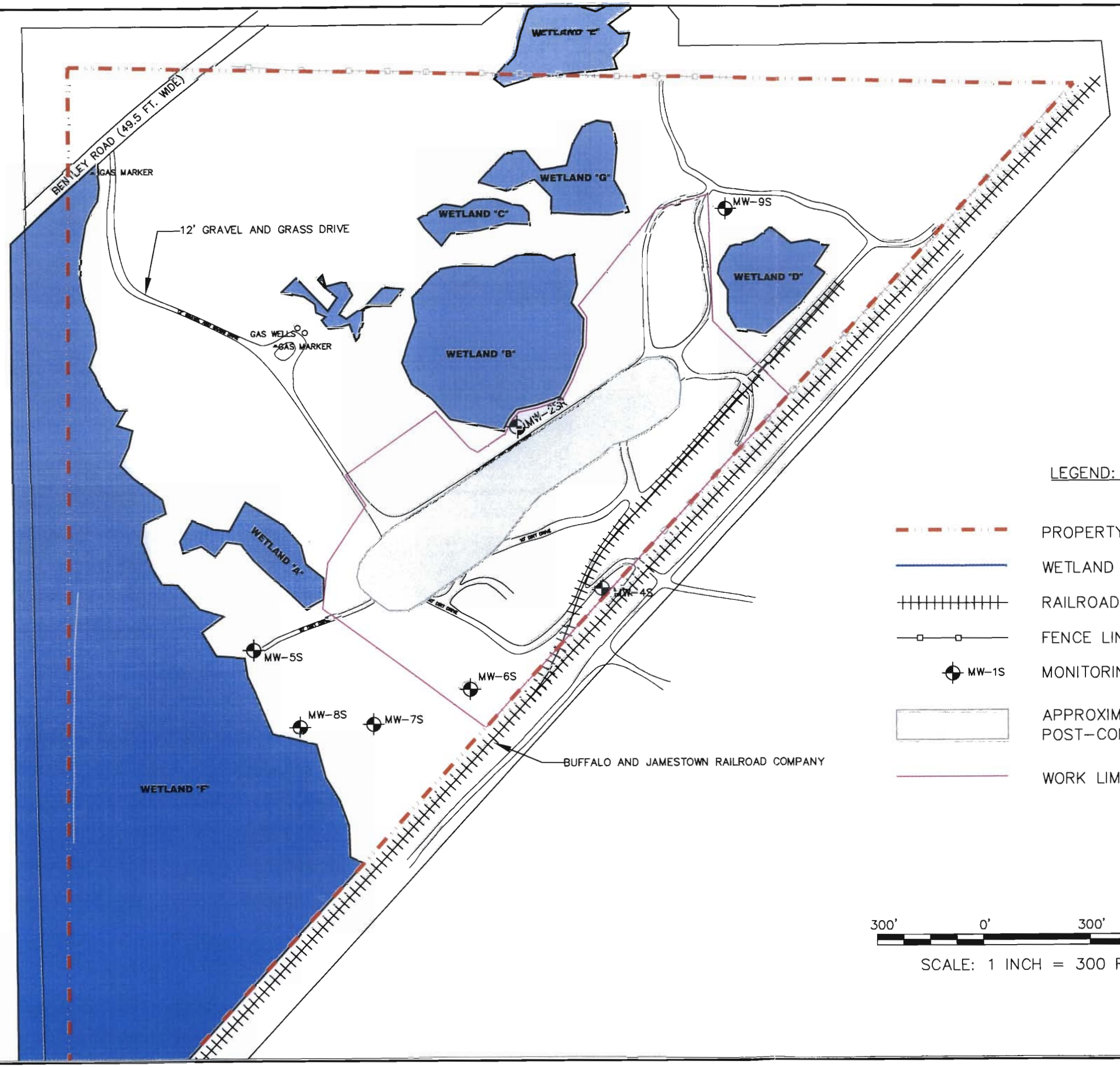

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LEGEND:

- PROPERTY BOUNDARY
- WETLAND BOUNDARY
- RAILROAD TRACKS
- FENCE LINE
- MW-1S — MONITORING NETWORK WELL LOCATION
- APPROXIMATE LOCATION OF POST-CONSOLIDATION WASTE/FILL
- WORK LIMITS

300' 0' 300' 600'

SCALE: 1 INCH = 300 FEET

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
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JOB NO.: 0021-003-401

SITE PLAN

OPERATION, MAINTENANCE, & MONITORING PLAN
PETER COOPER MARKHAMS SUPERFUND SITE
DAYTON, NEW YORK
PREPARED FOR
CPRPs FOR PETER COOPER MARKHAMS

FIGURE 2

DATE: NOVEMBER 2008
DRAFTED BY: AJZ

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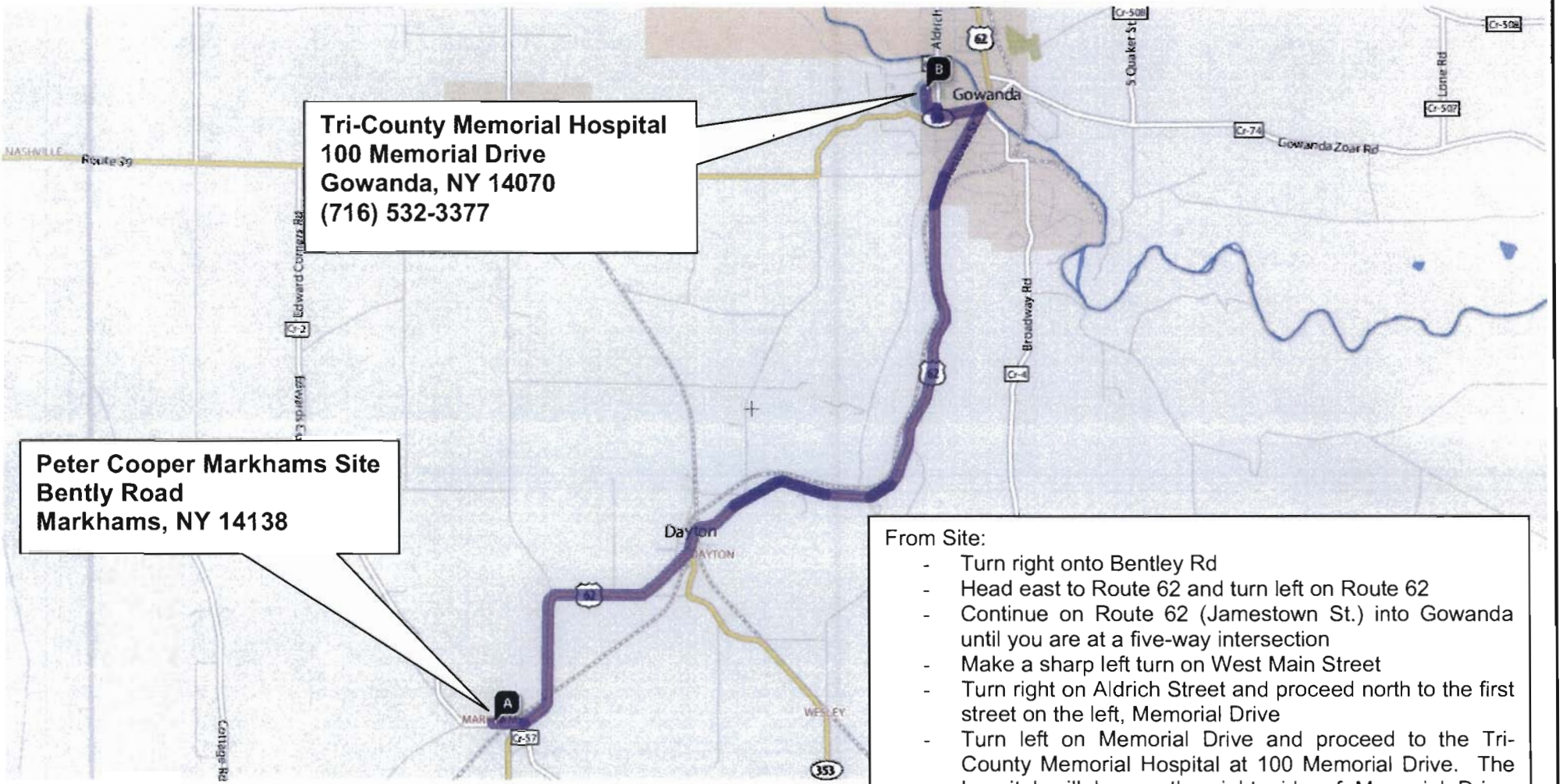

From Site:

- Turn right onto Bentley Rd
- Head east to Route 62 and turn left on Route 62
- Continue on Route 62 (Jamestown St.) into Gowanda until you are at a five-way intersection
- Make a sharp left turn on West Main Street
- Turn right on Aldrich Street and proceed north to the first street on the left, Memorial Drive
- Turn left on Memorial Drive and proceed to the Tri-County Memorial Hospital at 100 Memorial Drive. The hospital will be on the right side of Memorial Drive. Follow signs to Emergency Room.

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DATE: JANUARY 2008
DRAFTED BY: AJZ

HOSPITAL ROUTE MAP

POST-REMEDIAL OPERATION & MAINTENANCE PLAN

PETER COOPER MARKHAMS SITE
DAYTON, NEW YORK

PREPARED FOR
RESPONDENTS FOR PETER COOPER MARKHAMS SITE

FIGURE 3

Appendix A

POST-REMEDIAL GROUNDWATER MONITORING PLAN

OM&M PLAN
APPENDIX A

POST-REMEDIAL GROUNDWATER AND SURFACE WATER MONITORING PLAN

PETER COOPER MARKHAMS SUPERFUND SITE
DAYTON, NEW YORK

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POST-REMEDIAL GROUNDWATER AND SURFACE WATER MONITORING PLAN

PETER COOPER MARKHAMS SUPERFUND SITE DAYTON, NEW YORK

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POST-REMEDIAL GROUNDWATER AND SURFACE WATER MONITORING PLAN

PETER COOPER MARKHAMS SUPERFUND SITE DAYTON, NEW YORK

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APPENDICES

1.0 PURPOSE AND OBJECTIVES

The purpose of this Post-Remedial Groundwater and Surface Water Monitoring Plan is to identify and document the methods that will be employed at the Peter Cooper Markhams Superfund Site to detect changes in Site conditions following implementation of remedial measures. Accordingly, this Plan identifies groundwater and surface water sampling locations; collection procedures; analytical parameters and methodology; and data reporting and interpretation requirements that will be implemented following construction of the recommended remedial measures.

This Plan contains eight sections:

- Section 2.0 identifies the post-remedial monitoring locations to be sampled.
- Section 3.0 identifies the monitoring parameters and frequency.
- Section 4.0 presents field sampling procedures to be employed at the Site.
- Section 5.0 specifies analytical methods and quality control requirements.
- Section 6.0 presents corrective action measures to be taken in the event of changed field conditions or failure to meet quality assurance goals.
- Section 7.0 identifies data evaluation and reporting requirements.
- Section 8.0 presents references cited in this report.

2.0 MONITORING NETWORK

The Remedial Investigation Report for the Peter Cooper Markhams Superfund Site indicates that overburden groundwater flows in a southwesterly direction across the Site toward Wetland F. There are comparable hydraulic conductivities between shallow and deep wells, with no separating confining layer and similar geochemistry, indicating that the shallow and deeper units represent a single hydrostratigraphic unit. Accordingly, monitoring of select upgradient and downgradient shallow overburden wells and surface water from Wetland F will provide representative data to evaluate changes in site conditions. The planned groundwater and surface water monitoring network is described below.

2.1 Monitoring Locations

Groundwater monitoring will be performed at the following network locations (see Figure A-1), where the S identifier indicates a shallow overburden monitoring well:

- Upgradient monitoring well MW-9S.
- Perimeter downgradient monitoring wells MW-5S, MW-7S, and MW-8S.
- Downgradient Wetland F (surface water).
- Monitoring wells MW-4S and MW-6S will be sampled during the first semiannual event. The need for continued monitoring at these well locations will be evaluated following review of the initial sample data.
- Cross-gradient monitoring well MW-2SR (between Wetland B and waste/fill consolidation area). Well MW-2SR was installed during remedial construction measures as a replacement for MW-2S, and will be sampled during the first semiannual event. The need for continued monitoring at MW-2SR will be evaluated following review of the initial sample data.

In addition, the above-referenced well locations will be monitored on all events for water elevation information to facilitate preparation of overburden isopotential maps:

Construction logs for the groundwater monitoring wells identified above are included in Appendix A-1.

3.0 MONITORING PROGRAM

As described in Section 3.0, on-site groundwater monitoring will be conducted at specific monitoring wells and Wetland F. Details concerning the planned monitoring frequency, parameters, and analytical methods are described below. Table 1 presents a summary of the monitoring program requirements.

Groundwater monitoring will include both water quality and water level monitoring. Water level monitoring is intended to detect seasonal changes in the groundwater flow direction Groundwater elevation monitoring will be performed at all monitoring well locations identified on Table 1.

Samples will be collected at the surface water and monitoring well locations identified in Section 2.1 and summarized in Table 1. Procedures for well sampling are discussed in Section 5.0. Groundwater levels and surface water elevation will be recorded prior to well purging. Samples will be collected on a semi-annual (spring and fall) basis for the first two years of monitoring, and may be reduced to annually thereafter if the data supports the reduction. Samples will be analyzed for the parameters identified on Table 1. Laboratory and field parameters will be evaluated for reduction following two years of monitoring.

4.0 FIELD SAMPLING PROCEDURES

This section describes the sampling procedures that will be implemented at the Peter Cooper Markhams Superfund Site during routine environmental monitoring events.

4.1 Pre-Sampling Preparation

Prior to a scheduled sampling event, the following steps will be taken by sampling personnel:

- Review the sampling procedures.
- Assemble and inspect all field equipment necessary for sample collection.
- Verify that equipment is clean and in proper working order.
- Calibrate field test equipment at the beginning of each sampling day according to manufacturer's specifications. Field instrumentation will be maintained and operated according to the applicable guidelines presented in Appendix A-2.
- Examine shuttles, bottles, labels, and preservatives; contact laboratory immediately if any problems are discovered.
- Confirm sample delivery time and method of shipment with the laboratory.
- Establish a sampling team of at least two people.
- Establish monitoring well evacuation and sampling schedule for the activities of each day.

4.2 Groundwater Sampling

Applicable guidelines to be employed for collecting representative groundwater samples from monitoring wells and surface water samples from the wetland are provided in Appendix A-2. Applicable guidelines include:

- Groundwater Level Measurement
- Low-Flow (Minimal Drawdown) Groundwater Purging Procedures
- Groundwater Sample Collection Procedures
- Surface Water Collection Procedure

Groundwater sample collection equipment will consist of a peristaltic pump and dedicated pump tubing following low-flow purge and sample collection procedures. Prior to

sample collection, groundwater will be evacuated from each well at a low-flow rate (approximately 0.1 L/min) and field measurements for pH, Eh, specific conductance, temperature, turbidity, dissolved oxygen, visual/olfactory observations, and water level will be periodically recorded and monitored for stabilization. Purging will be considered complete when pH, specific conductivity and temperature stabilize and when the turbidity is measured below 50 NTU, or stabilized above 50 NTU. Stability is defined as the variation between field measurements of 10 percent or less and no overall upward or downward trend in the measurements. Upon stabilization of field parameters, groundwater samples will be collected and analyzed for the parameters presented in Table 1.

Surface water samples will be collected by carefully immersing a sample collection jar, attached to a dipper, into the water column. The contents of the collection jar will then be transferred to preserved laboratory bottles for analysis.

Prior to and immediately following collection of groundwater samples, field measurements for pH, specific conductance, temperature, turbidity, Eh, dissolved oxygen, as well as visual/olfactory observations and water level, will be recorded.

4.3 Post-Sampling Handling

All collected samples will be placed in pre-cleaned, pre-preserved laboratory provided sample bottles, cooled to 4°C in the field, and transported under proper chain-of-custody command to a qualified testing laboratory for analysis within proper holding times (see Section 6.2). A chain-of-custody form will be completed for each bulk container (i.e., cooler) of collected samples. The chain-of-custody form will be signed and dated by the person who performed sample collection, the person the samples were relinquished to for transport to the laboratory (if applicable) and the laboratory sample custodian who receives the samples. The applicable guideline for sample labeling, storage, and shipment is presented in Appendix A-2. The types and frequencies of field QA/QC samples to be collected are discussed in Section 6.0.

4.4 Field Equipment Cleaning

Non-dedicated purging equipment and water level monitoring probes will be cleaned before each use in accordance with the procedure for Non-Disposable and Non-Dedicated Sampling Equipment Decontamination presented in Appendix A-2. Peristaltic pump tubing

will be dedicated to each monitoring well and will not require cleaning other than that provided by the manufacturer. Dedicated equipment must be maintained within the sealed original manufacturer's packaging prior to installation at each monitoring location.

4.5 Documentation of Field Activities

The results of all field measurements and associated calculations will be recorded on standard forms included with the guidelines presented in Appendix A-2. During all activities, the following general information will be recorded on appropriate data sheets:

- Date
- Field sampling crew members
- Meteorological conditions
- Brief description of field activities planned for date indicated
- Tailgate Health and Safety meeting topics
- Location where work is performed
- Problems encountered and corrective actions taken
- All field measurements or descriptions made
- Any modifications made to sampling procedures

In addition, the following information will be recorded by the Field Team Leader during the collection of all environmental samples:

- Sample Locations and summary of the samples collected
- Completeness of the sampling effort
- Sample descriptions
- Results of all field measurements
- Results of field instrument calibrations
- Sample preservation used (if applicable)
- Chain-of-custody information.

All original forms and field notebooks will be placed in a project record file maintained at an agreed upon location.

5.0 SAMPLE ANALYTICAL PROGRAM

5.1 Parameters for Physical/Chemical Analysis

The analytical parameters that will be analyzed in the monitoring programs discussed in this Plan are listed in Tables 1 and 2.

5.2 Analytical Methods/Protocols

The methods that will be used for chemical analysis of all samples collected during this monitoring program are presented in Table 2. The sampling holding times, preservation, and container requirements are also presented.

5.3 Groundwater Monitoring Program Field Quality Control Samples

The following field quality control samples will be analyzed in support of the monitoring program at the Peter Cooper Markhams Site:

- **Blind Duplicate** – One blind duplicate will be collected and analyzed per 20 samples collected during each sampling event. The field sample containers will be returned to the laboratory identified only as the "blind duplicate". The well or sample location will be recorded in the Project Field Book and on the respective Water Sample Collection Log (see Appendix A-2) and the results will be compared to review analytical precision.

- **MS/MSD** – A sufficient volume of sample will be collected at one sampling location per sampling event for matrix spike/matrix spike duplicate (MS/MSD) analysis. The laboratory will report the results of the MS/MSD analysis, which will be reviewed for sampling and analysis precision and accuracy.

5.4 Laboratory Quality Control/Reporting Requirements

Laboratory quality control and reporting requirements will be as identified in the sections below.

5.4.1 General

- The laboratory will perform all standard in-house quality assurance/quality control (QA/QC) necessary to control the introduction of contamination in the lab and to insure the accuracy and precision of the data.
- The laboratory will strictly adhere to the quality control requirements specified in the analytical method references presented in Table 2.
- All laboratories involved in the monitoring program must be certified in the New York State Department of Health (NYSDOH) National Environmental Laboratory Approval Program (NELAP) for the parameters being analyzed.

5.4.2 Laboratory Quality Control Analyses

The laboratory will analyze the following quality control samples in addition to the field quality control samples described above:

- **Method Blanks** – Method Blanks will be analyzed at least once per batch. If a particular reagent or piece of analytical equipment used is changed during preparation of a sample batch, additional testing will be required.

- **Surrogates** – For volatile organic analyses, surrogate standards are added to each sample and recoveries are calculated for method performance accuracy. Surrogate standard recoveries will be reported according to USEPA SW-846 reporting and deliverable requirements.

5.4.3 Reporting and Deliverable Requirements

The laboratory must adhere to USEPA SW-846 reporting and deliverable requirements unless otherwise directed. The laboratory will submit the analytical report within 30 business days of receipt of the last batch of samples. The analytical report will also include for each sample:

- Sample location/sample number
- Date collected
- Date extracted or digested
- Date analyzed
- Analytical methodology (including preparation methodology)

- Method detection limits
- Sample dilution factor (if applicable)
- Chain-of-Custody forms

The analytical report also must contain a case narrative that will describe all QA/QC problems encountered during sample analysis. For each sample for which QA/QC problems are encountered, the following specific information will be reported in the case narrative:

- Sample identification number
- Sample matrix
- Parameters analyzed
- Data acceptance criteria exceeded
- Specific analytical problems that occurred
- Corrective action taken or attempted to resolve the problem(s)

5.5 Custody Procedures

Sample custody is controlled and maintained throughout the sample collection and analysis process. These procedures track and control the possession of sample from their source, in the field, to their final disposition, the laboratory. Laboratory chain-of-custody procedures further track the custody of samples during their tenure at the laboratory. A sample is in custody if it is:

- In someone's physical possession.
- In someone's view after being in physical possession.
- In a designated secure area.
- Placed in a locked container by an authorized individual.

This section discusses procedures to be used to adequately control and document sample custody.

5.5.1 Chain-of-Custody (COC) Forms

Chain-of-custody (COC) forms will be used to document the possession and transfer of custody of all samples. Typical information that will be supplied on the forms includes, but is not limited to:

- Field sample identification.
- Sample date and time of collection.
- Type of sample container.
- Sample location and depth (if applicable).
- Size and number of containers.
- Analyses required.

The COC form will be initiated and signed by the field sampling team. The method of shipment, name of the courier and any other pertinent information should be entered in the "remarks" section. The original copy accompanies the sample shipment and a copy is retained by the Field Team Leader. The completed COC form will be placed in a resealable plastic bag and taped to the underside of the lid of the cooler containing the samples designated on the form. A copy of the carrier air-bill (if applicable) will be retained as part of the permanent COC documentation.

When relinquishing custody, the transferor and transferee must sign, date and time the COC form. Each person accepting custody of sample(s) will note their condition on the form. This record documents transfer of custody of samples from the sampler to another person, to the laboratory or to/from a secure storage area.

5.5.2 Custody Seals

Custody seals are preprinted adhesive-backed seals with security slots designed to break if the seals are disturbed. Custody seals should be placed on sample shipping containers as necessary to detect tampering. Seals must be signed and dated before using. Clear strapping tape should be placed over the seals to ensure that the seals are not accidentally broken during shipment, while maintaining an accurate assessment of the shipment integrity.

5.5.3 Field Custody Procedures

The sample packaging and shipment procedures summarized below will ensure that the samples will arrive at the laboratory with the COC intact. The procedures for sample numbering are included in the field operating procedures presented in Appendix A-2. The basic COC sequence is as follows:

1. Use laboratory supplied sample containers.
2. Collect and preserve sample (if not pre-preserved) and seal container.
3. Complete sample label and place on container.
4. Document the sampling procedures and related information in the Project Field Book and on a Water Sample Collection Log form.
5. Complete COC record form.
6. Document custody transfers from field sampling personnel to anyone else with signatures, date, and time on COC record form.
7. Pack sample containers for shipment with proper preservatives and custody forms into cooler.

The Field Team Leader is personally responsible for the care and custody of the samples until they are transferred or properly dispatched. All bottles will be identified by the use of sample labels with unique sample numbers. The sample numbering system is presented in the FOP for sample labeling; storage and shipment (see Appendix A-2). The Field Team Leader is also responsible for the following:

- Ensuring only precleaned sample containers will be used and the coolers and/or boxes containing the empty sample containers are sealed with a custody tape seal during transportation to the field and while in storage prior to use. In the field, the precleaned sample containers will be stored in a secure location.
- Maintaining custody to so that as few individuals as possible handle the samples.
- Accurately recording and maintaining all sample data in the Project Field Book and ensuring all appropriate forms are completed.
- Determining whether proper custody procedures were followed during the sampling event and decide if additional samples are required.

- Ensuring proper completion of COC for each cooler in which samples are shipped. The samples must be shipped to the laboratory as soon as practical and must arrive within 24 hours of shipping.

5.5.4 Laboratory Custody Procedures

Laboratory custody procedures for sample receiving and log-in; sample storage and numbering; tracking during sample preparation and analysis; and storage of data will be performed in accordance with the analytical laboratory's QA/QC procedures.

6.0 CORRECTIVE ACTION

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter unacceptable procedures or performance that can affect data quality. Corrective action can occur during field activities, laboratory analyses, data validation (if applicable) and data assessment. All corrective action proposed and implemented will be documented on a Corrective Measures Report (see sample report in Appendix A-3). Corrective action should be implemented only after approval by the Project Manager, or his or her designee. If immediate corrective action is required, approvals should be secured by telephone from the Project Manager.

It shall be the responsibility of the project team, sampling team and laboratory staff to ensure that all measurement and sampling procedures are followed as specified and that measurement data meet the prescribed acceptance criteria. If problems are discovered, prompt corrective action will be taken.

6.1 Field Corrective Action

If errors in field procedures are found during the observation or review of field activities by project staff, corrective action will be initiated. Nonconformance to the QA/QC requirements of the field procedures will be identified immediately by project staff that know or suspect that a procedure is not being performed in accordance with the requirements. The Project Manager or his/her designee will be informed immediately upon discovery of all deficiencies. Timely action will be taken if corrective action is necessary.

Corrective actions in the field may be required when the sample network is changed or when sampling procedures and/or field analytical procedures require modification, due to unexpected conditions. In general, the Field Team Leader and Project Manager may identify the need for corrective action. The Project Manager will approve the corrective measure that will be that will be implemented by the field team and it will be the responsibility of the Project Manager to ensure that corrective action has been implemented.

Corrective actions will be documented in the Project Field Book and on a Corrective Measures Report (see sample report in Appendix A-3). No staff member will initiate corrective action without prior communication of findings to the Project Manager. If corrective actions are insufficient, work may be stopped by the Project Manager. Once a

corrective action is implemented, the effectiveness of the action will be verified by the Project Manger.

6.2 Laboratory Corrective Action

Corrective actions may be initiated if the quality assurance goals of the project are not achieved. The initial step in a corrective action is to instruct the analytical laboratory to examine its procedures to assess whether analytical or computational errors caused the anomalous result. Sample collection and handling procedures will be concurrently reviewed to assess whether they could have contributed to the anomalous result. If no error in laboratory procedures or sample collection and handling procedures can be identified, then the laboratory Project Director will assess whether reanalysis or resampling is required, or whether any protocol should be modified for future sampling events.

6.3 Corrective Action during Data Assessment

The need for corrective action may be identified during the data assessment process. Potential types of corrective action may include resampling by the field team or reinjection/reanalysis of samples by the laboratory. These actions are dependent upon the ability to mobilize the field team, and whether the data to be collected is necessary to meet the QA objectives (e.g., the holding times for samples is not exceeded, etc.). All required corrective actions will be documented by the Project Manager and/or the laboratory.

7.0 DATA EVALUATION AND REPORTING

Groundwater and surface water monitoring data generated in support of the Peter Cooper Markhams Site post-remedial monitoring program will be entered into a computer spreadsheet. The spreadsheet will be used for generating graphs showing the status and history of individual sampling points and compounds. The graphs and spreadsheets will also be used for historical trend analysis and to track environmental conditions within and offsite, as well as to assess performance of the remedial measures. A letter report will be prepared following the first semi-annual monitoring event. The letter reports will include:

- Sample collection date
- Groundwater elevation data
- Analytical results as compared to Class GA groundwater or surface water quality standards, as appropriate
- Upgradient well designation
- Sample location number
- QA/QC values
- Method detection limits
- Field sampling notes
- Chain-of-custody forms

An annual report will be prepared following the second semi-annual sampling event. In addition to the information described above, the annual report will include the following:

- A groundwater isopotential contour map for shallow overburden groundwater.
- A discussion of sample analytical results including elevations of parameters above background concentrations and historical trends evident from the data.
- A discussion of changes in water quality that has occurred from the previous year.
- A discussion of any proposed changes to the Peter Cooper Markhams Superfund Site Post-Remedial Monitoring Plan.
- A review of the data to either reduce the sampling frequency or reduce the parameter list, if warranted.

8.0 REFERENCES

1. Geomatrix Consultants, Inc. & Benchmark Environmental Engineering and Science, PLLC, Revised July 2006. *Remedial Investigation Report – Final, Peter Cooper Markhams Site, Dayton, New York.*

TABLES

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
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TABLE 1

MONITORING PROGRAM REQUIREMENTS

Peter Cooper Markhams Superfund Site
Dayton, New York

Sample Location	Est. Number of Samples Per Event[1]	Parameters	Frequency
Upgradient Monitoring Well			
MW-9S	1	Total Metals[2] Field Measurements[3] Water Quality Parameters[4]	Semi-Annually
Cross-Gradient Monitoring Well			
MW-2SR	1	Total Metals[2] Field Measurements[3] Water Quality Parameters[4]	1st Event; Semi-annually thereafter, if required
Monitoring Network Wells (water level and quality)			
MW-5S	1	Total Metals2 Field Measurements3 Water Quality Parameters4	Semi-Annually
MW-8S	1		
MW-7S	1		
Wetland F (Surface Water)	1		
MW-6S	1	Total Metals[2] Field Measurements[3] Water Quality Parameters[4]	1st Event; Semi-annually thereafter, if required
MW-4S	1		
QA/QC Samples [1]			
Blind Duplicate	1	Total Metals[2]	Semi-Annually
Matrix Spike	1		
Matrix Spike Duplicate	1		

Notes:

1. QA/QC samples will be collected at a frequency of 1 per 20 for each matrix.
2. Total metals include: arsenic, chromium, hexavalent chromium, manganese and iron; if field measured turbidity is greater than 50 NTU, dissolved metals will also be collected.
3. Field measurements include: pH, temperature, specific conductance, turbidity, Eh
4. Water quality parameters include: ammonia, nitrate, alkalinity, and total sulfide.

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TABLE 2

SAMPLE CONTAINER, VOLUME, PRESERVATION &
HOLDING TIME REQUIREMENTS

Peter Cooper Markhams Superfund Site
Dayton, New York

Matrix	Parameter	Method (Reference 1)	Container Type	Minimum Volume	Preservation (Cool to 4°C for all samples)	Holding Time from Sample Date
Groundwater/Surface Water	Total Metals (excluding Hex Chrome)	6010B	plastic	600 ml	HNO_3 to pH<2	6 months
	Hexavalent Chromium	7196A	plastic	400 ml	Cool to 4 °C	24 hours
	Ammonia	350.1	plastic	500 ml	H_2SO_4 to pH<2	28 days
	Nitrate	300	plastic	100 ml	H_2SO_4 to pH<2	48 hours
	Alkalinity	310.1	plastic	100 ml	Cool to 4 °C	14 days
	Sulfide, Total	9030B	plastic	500 ml	$C_4H_6O_4Zn$+NaOH to pH 9	7 days

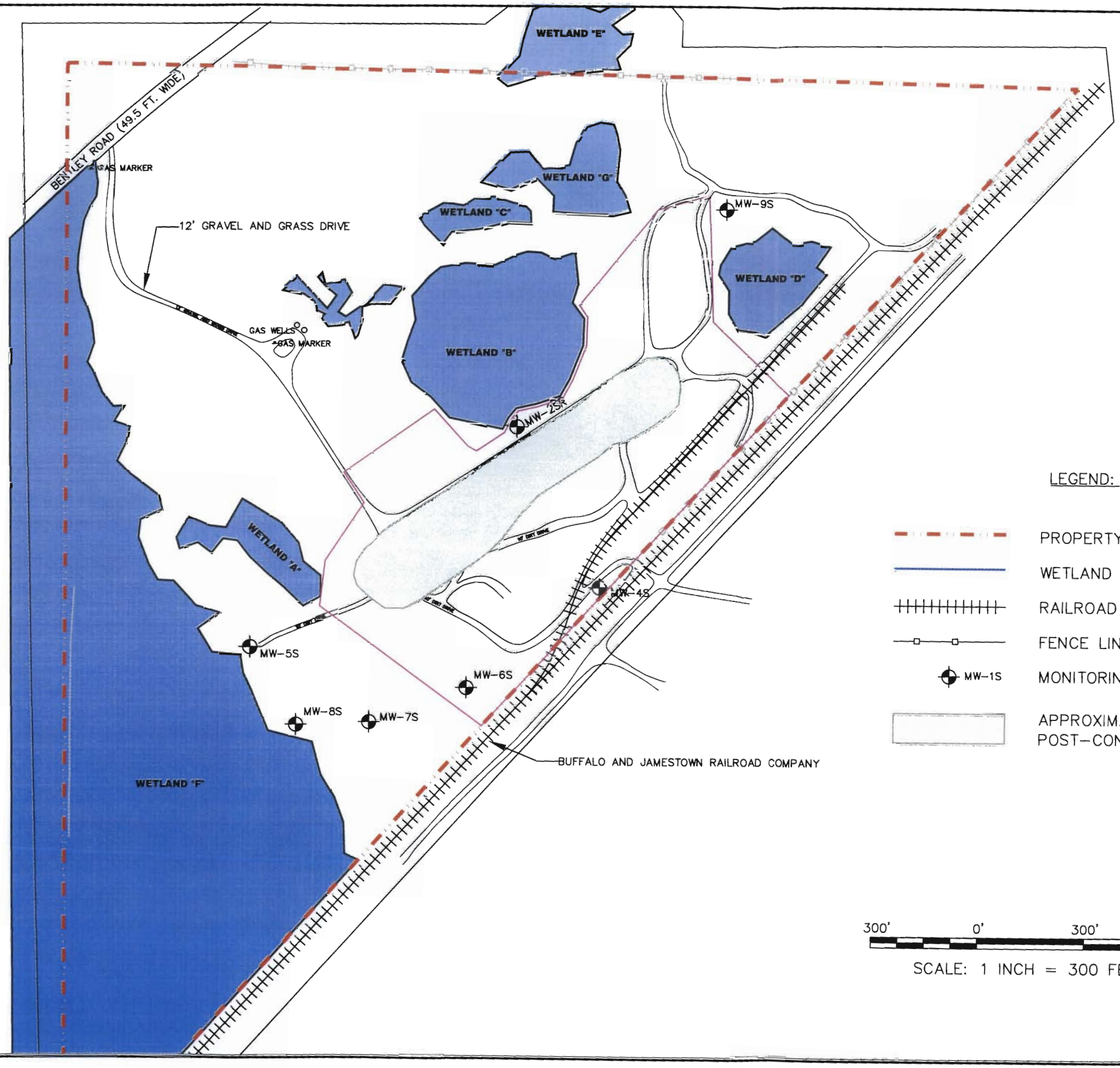
References:

1. Test Methods for Evaluating Solid Wastes, USEPA SW-846, Update III, 1991.

Notes:

1. Total metals include: arsenic, chromium, manganese and iron; if field measured turbidity is greater than 50 NTU, dissolved metals will also be collected.

FIGURES



N

LEGEND:

- PROPERTY BOUNDARY
- WETLAND BOUNDARY
- RAILROAD TRACKS
- FENCE LINE
- MW-1S MONITORING NETWORK WELL LOCATION
- APPROXIMATE LOCATION OF POST-CONSOLIDATION WASTE/FILL

300' 0' 300' 600'

SCALE: 1 INCH = 300 FEET

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
726 EXCHANGE STREET
SUITE 624
BUFFALO, NEW YORK 14210
(716) 856-0599

JOB NO.: 0021-003-401

SITE MONITORING NETWORK

OPERATION, MAINTENANCE, & MONITORING PLAN
PETER COOPER MARKHAMS SUPERFUND SITE
DAYTON, NEW YORK
PREPARED FOR
CPRPs FOR PETER COOPER MARKHAMS

FIGURE A-1

DATE: NOVEMBER 2008
DRAFTED BY: AJZ

F:\Benchmark\Clients\Collier Shannon\Peter Cooper - Markhams\Site Management Plan\Part 1 - OM&M Plan\Appendix A; Groundwater Monitoring Plan\Figure A-1; Site Monitoring Network.dwg, 1/29/2009 9:19:22 AM

APPENDIX A-1

BOREHOLE LOGS FOR NETWORK MONITORING WELLS

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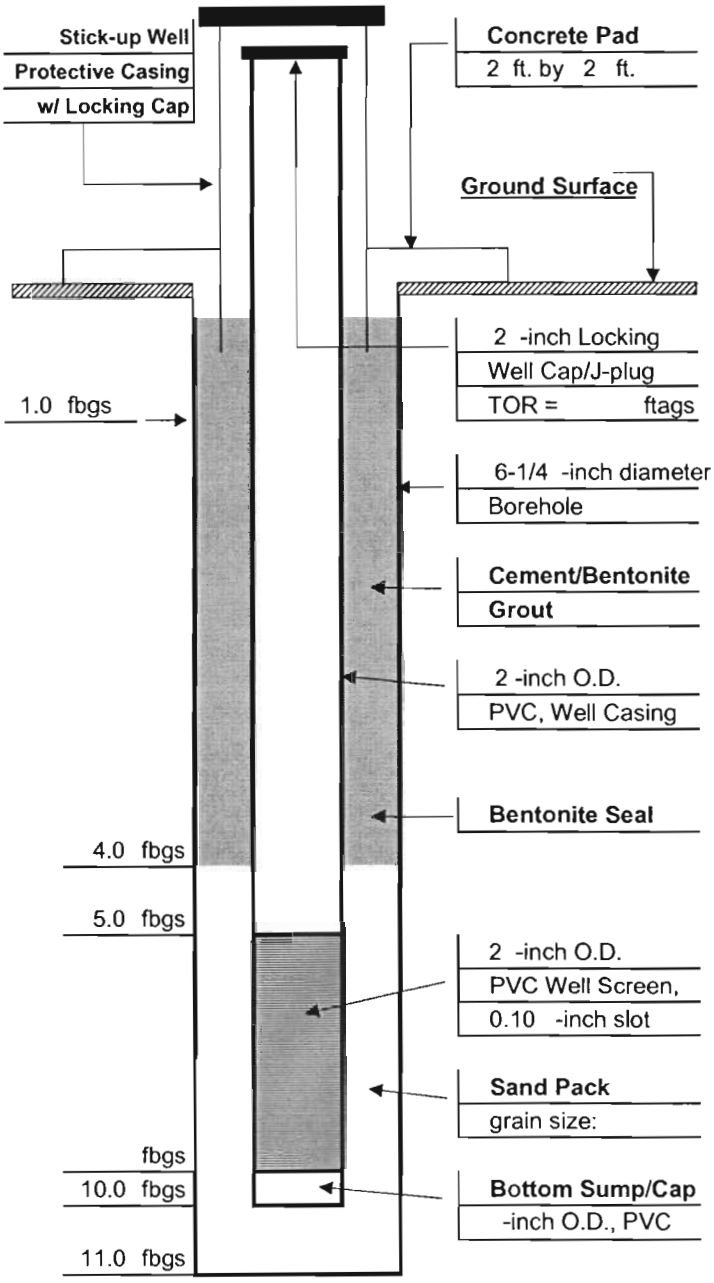
STICK-UP MONITORING WELL COMPLETION DETAIL

Project Name:	**Peter Cooper Markhams-NPL Site**	WELL NUMBER:	**MW-2SR**
Client:	**Collier Shannon**	Date Installed:	**09/02/08**
Boring Location:		Project Number:	**0021-003-401**



Driller Information

Company:	Earth Dimensions, Inc
Driller:	Andy Morris
Helper:	Andy
Permit Number:	N/A
Drill Rig Type:	ATV

Well Information

Land Surface Elevation:		fmsl (approximate)
Drilling Method:	Hollow Stem Auger	
Soil Sample Collection Method:	N/A	
Drilling Fluid:	N/A	
Fluid Loss During Drilling:	N/A	gallons (approximate)

Material of Well Construction

Casing:	SCH 40 PVC
Screen:	SCH 40 PVC
Sump:	N/A
Sand Pack:	Morrie Sand
Annular Seal:	Bentonite Grout

Well Development

Well Purpose:	Monitoring	
Techneque(s):	Bail	
Date Completed:	10/11/08	
BM/TK Personnel:	RLD	
Total Volume Purge:	15	gallons
Static Water Level (SWL):	5.65	fbTOR
Pump Depth:	bottom of well	
Purge Duration:	30	minutes
Yield:	N/A	gpm
Specific Capacity:	N/A	gpm/ft

Comments: Replacement of MW-2S

Total Depth =	12.80	fbTOR
stick-up =	2.8	feet
Total Depth =	10.00	fbgs

PREPARED BY: RLD DATE: 10/11/08

MW-4S

DATE STARTED 5/29/84
DATE FINISHED 5/29/84
SHEET 1 OF 1

RECRA RESEARCH, INC.
SUBSURFACE LOG

HOLE NO. B-4
SURFACE ELEV. 1307.90
G.W. DEPTH 1302.99
6/20/84

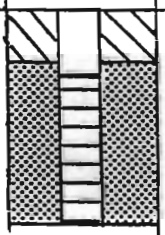
PROJECT Peter Cooper Markhams
2EM84001.5000

LOCATION 150' West of Railroad
80' North of B-1

DEPTH (ft)	LOG	SAMPLE TYPE	SAMPLE #	BLOWS ON SAMPLER 0-6	BLOWS ON SAMPLER 6-12	BLOWS ON SAMPLER 12-18	BLOWS ON SAMPLER 18-24	DESCRIPTION	NOTES
			1	4	4	8	6	Clayey silt dark brown, organic grading to reddish brown clayey silt, moist occasional gravel grading to abundant gravel and coarse sand	S#3 retained for chemical analysis sand
			2	7	7	7	5		
5			3	6	5	5	4		
			4	5	3	5	4	Silty sand greyish brown saturated	Screened material clayey silt, silty sand and coarse sand
			5	2	1	1	1	Coarse sand greyish brown reddish brown, saturated	
10			6	1	3	5	9	Fine-medium sand, grey, layers of black and reddish brown medium sand	Permeability: 2.0×10^{-7}
			7	12	20	22	21	Silty fine sand grey	S#8 retained for chemical analysis
15			8	8	11	7	7		
			9	3	5	7	15		
			10	5	17	25	40		
20	7 1/8"								
25									
30									

CLASSIFICATION ASTM D-2488
METHOD OF INVESTIGATION ASTM D1452-80
D1586-74

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG File Name: PC013B.BL	Report of Boring No. B-5 Sheet 1 of 1 MW-5
Project Location: Markhams, NY Client: Peter Cooper Corporations	SAMPLER Type: SPLIT SPOON Hammer: 140 lbs. Fall: 30"	Ground Water Depth 1299.43 Date 12/17/86 Depth Date File No. 1171-005-130
Boring Co.: Parratt-Wolfe Foreman: Mark Beck OBG Geologist: Peter Bogardus	Boring Location: Southwest Area: Wooded Area Ground Elevation: 1300.50' Dates: Started:08/28/86	Ended:08/28/86

Depth	Sample "N" Value	Sample Penetrn/ Recovery	Sample Depth	Sample Blows /6"	Sample Description	Stratum Change Depth	Equipment Installed	Field Testing Sal. 0/00	Field Testing Sp. Cond.	Field Testing HNU	Remarks
0											
5											
10											
15											
20											
25					NOT SAMPLED (SEE 5D)						
30											
35											
40											
45											
50											
55											

5' screen installed from 7.85' to 2.85'
5.85' of packed sand installed from 7.85' to 2'
2' of bentonite pellets installed from 2' to surface
4" protective lockable cover installed

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG	Report of Boring No.: MW-6D, 6S
Project Location: Markhams, NY Client: Peter Cooper Corporation	SAMPLER Type: Split-Spoon Hammer: 140 lbs. Fall: 30 inches	Ground Water Depth Date Depth Date File No.: 1171.005

Boring Co.: Buffalo Drilling
Foreman: Keith Scott
OBG Geologist: Peter Bogardus

Boring Location: South East Corner of Site
Ground Elevation:
Dates: Started: 6/1/88 Ended: 6/6/88

Depth	Sample No	Sample Depth in ft.	Sample Blows /6"	Sample Penetr/ Recovry	Sample "N" Value	Sample Description	Stratum Change General Descript	Equipment Installed	Field Testing pH	Field Testing Sp Cond	Field Testing HNU	Remks*
0	1	0-2	3-2-3-4	12	5	Rusty Brown moist silt, little fine to medium sand, trace of medium gravel.					.2	
							3				.2	
	2	2-4	4-5-6-7	15	13	Brown moist, medium to coarse sand, trace of silt.						
	3	4-6	4-5-5-3	15	10		4				.2	
5											.2	
	4	6-8	4-5-8-4	15	13	Brown moist fine to medium gravel, fine to coarse sand, little silt.						
							8				.2	
	5	9-11	2-6-10-5	15	16	Brown Very moist medium to coarse sand, some fine to medium gravel, little silt.						
10												
	6	14-16	11-14	15	42	Brown Wet fine to medium sand, trace of silt.					.4	
15			28-28									
							18				.4	
						Gray Wet fine sand and silt.						
	7	19-21	14-40	15	84							
20			44-47									
	8	24-26	12-20	15	40	Same as above, 3 ft of blow up in auger.					.2	
25			20-24									
		29-31				Same as above, 3 ft of blow up in auger.						
30												

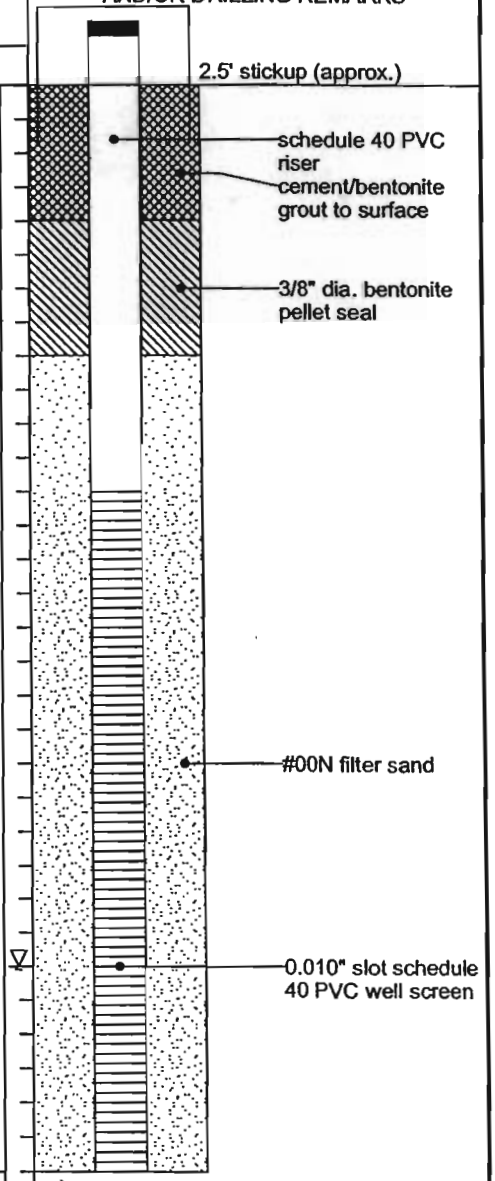
*6D 33-28 .010" Slot Screen
33-26 2 q Washed Silica Sand
26-23 Bentonite Pellets

6S 18.5 - 13.5 .010" Slot Screen
18.5 - 11.0 2 q Washed Silica Sand
11.0 - 10.2 Bentonite Seal

PROJECT: Peter Cooper Markhams R.I. Dayton, New York	**Log of Well No. MW-7S**		
BORING LOCATION: See Site Plan for MW locations	TOP OF RISER ELEVATION: 1312.52 fmsl		DATUM: NAD 83
DRILLING CONTRACTOR: Nothnagle Drilling, Inc.	DATE STARTED: 10/9/01		DATE FINISHED: 10/9/01
DRILLING METHOD: 4 1/4" dia. Hollow Stem Augers	TOTAL DEPTH: 16.0 fbgs		SCREEN INTERVAL: 6-16 fbgs
DRILLING EQUIPMENT: CME 750 ATV	DEPTH TO WATER:	FIRST 13 ft	COMPL.	CASING: 2" dia. PVC
SAMPLING METHOD: Not sampled for lithology	LOGGED BY: MAC		
HAMMER WEIGHT: Autohammer / DROP: NA	RESPONSIBLE PROFESSIONAL: Richard H. Frappa		REG. NO.

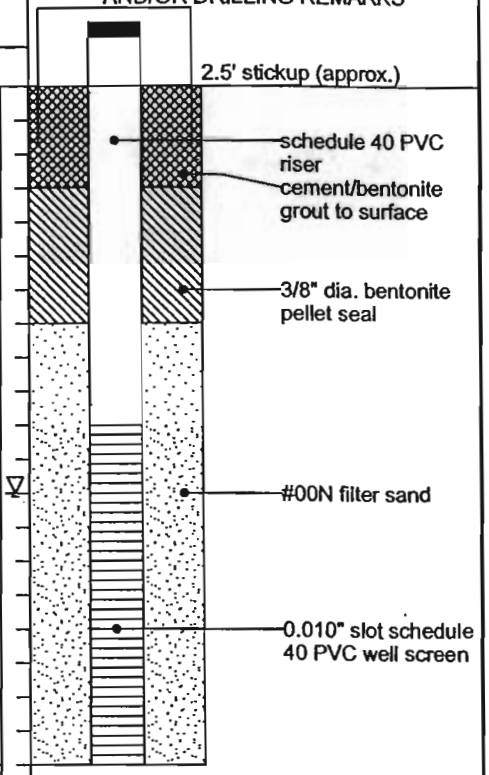
DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/foot	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.
					Surface Elevation: 1309.62 fmsl
1–20					MW-7S not logged for lithology. See log of MW-7D for lithologic descriptions.
16					End of boring at 16.0 fbgs.

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



PROJECT: Peter Cooper Markhams R.I. Dayton, New York	**Log of Well No. MW-8S**		
BORING LOCATION: See Site Plan for MW locations	TOP OF RISER ELEVATION: 1303.93 fmsl		DATUM: NAD 83
DRILLING CONTRACTOR: Nothnagle Drilling, Inc.	DATE STARTED: 10/5/01		DATE FINISHED: 10/5/01
DRILLING METHOD: 4 1/4" dia. Hollow Stem Augers	TOTAL DEPTH: 10.0 fbgs		SCREEN INTERVAL: 5-10 fbgs
DRILLING EQUIPMENT: CME 750 ATV	DEPTH TO WATER: FIRST 6 ft	COMPL.	CASING: 2" dia. PVC
SAMPLING METHOD: Not sampled for lithology	LOGGED BY: MAC		
HAMMER WEIGHT: Autohammer / DROP: NA	RESPONSIBLE PROFESSIONAL: Richard H. Frappa		REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ foot	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
					Surface Elevation: 1301.06 fmsl	2.5' stickup (approx.)
1–10					MW-8S not logged for lithology. See log of MW-8D for lithologic descriptions.	schedule 40 PVC riser cement/bentonite grout to surface 3/8" dia. bentonite pellet seal ▽ #00N filter sand 0.010" slot schedule 40 PVC well screen
11–20					End of boring at 10.0 fbgs.	



WELL_OVM MARKHAMS MWS.GPJ (2/05)

PROJECT: Peter Cooper Markhams R.I. Dayton, New York			**Log of Well No. MW-9S**
BORING LOCATION: See Site Plan for MW locations		TOP OF RISER ELEVATION: 1313.95 fmsl	DATUM: NAD 83
DRILLING CONTRACTOR: Nothnagle Drilling, Inc.		DATE STARTED: 10/2/04	DATE FINISHED: 10/2/01
DRILLING METHOD: 4 1/4" dia. Hollow Stem Augers		TOTAL DEPTH: 11.0 fbgs	SCREEN INTERVAL: 6-11 fbgs
DRILLING EQUIPMENT: CME 750 ATV		DEPTH TO WATER: FIRST 7 ft / COMPL.	CASING: 2" dia. PVC
SAMPLING METHOD: 2" dia. S.S. Split Spoons		LOGGED BY: MAC	
HAMMER WEIGHT: Autohammer	DROP: NA	RESPONSIBLE PROFESSIONAL: Richard H. Frappa	REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/foot	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
					Surface Elevation: 1311.49 fmsl	2.5' stickup (approx.)
1–10					MW-9S not logged for lithology. See log of MW-9D for lithologic descriptions.	schedule 40 PVC riser cement/bentonite grout to surface 3/8" dia. bentonite pellet seal 0.010" slot schedule 40 PVC well screen #00N filter sand
11					End of boring at 11.0 fbgs.	
12–20						

WELL_OVM MARKHAMS MWS.GPJ (2/05)

APPENDIX A-2

FIELD OPERATING PROCEDURES (FOPS)

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FIELD OPERATING PROCEDURES

Groundwater Level Measurement

FOP 022.0

GROUNDWATER LEVEL MEASUREMENT

PURPOSE

This procedure describes the methods used to obtain accurate and consistent water level measurements in monitoring wells, piezometers and well points. Water levels will be measured at monitoring wells and, if practicable, in supply wells to estimate purge volumes associated with sampling, and to develop a potentiometric surface of the groundwater in order to estimate the direction and velocity of flow in the aquifer. Water levels in monitoring wells will be measured using an electronic water level indicator (e-line) that has been checked for operation prior to mobilization.

PROCEDURE

1. Decontaminate the e-line probe and a lower portion of cable following the procedures referenced in the Benchmark Field Operating Procedure for Non-Disposable and Non-Dedicated Sampling Equipment Decontamination. Store the e-line in a protected area until use. This may include wrapping the e-line in clean plastic until the time of use.

2. Unlock and remove the well protective cap or cover and place on clean plastic.

3. Lower the probe slowly into the monitoring well until the audible alarm sounds. This indicates the depth to water has been reached.

4. Move the cable up and down slowly to identify the depth at which the alarm just begins to sound. Measure this depth against the mark on the lip of the well riser used as a surveyed reference point (typically the north side of the riser).

5. Read depth from the graduated cable to the nearest 0.01 foot. Do not use inches. If the e-line is not graduated, use a rule or tape measure graduated in 0.01-foot increments to measure from the nearest reference mark on the e-line cable.

6. Record the water level on a Water Level Monitoring Record (sample attached).

7. Remove the probe from the well slowly, drying the cable and probe with a clean paper wipe. Be sure to repeat decontamination before use in another well.

8. Replace well plug and protective cap or cover. Lock in place as appropriate.

ATTACHMENTS

Water Level Monitoring Record (sample)

REFERENCES

Benchmark FOPs:
040 Non-Disposable and Non-Dedicated Sampling Equipment Decontamination

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WATER LEVEL MONITORING RECORD

Project Name: Client:
Project No.: Location:
Field Personnel: Date:
Weather:

Well No.	Time	Top of Riser Elevation (fmsl)	Static Depth to Water (fbTOR)	Groundwater Elevation (fmsl)	Total Depth (fbTOR)	Last Total Depth Measurement (fbTOR)

SAMPLE

Comments/Remarks:

PREAPRED BY: DATE:

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FIELD OPERATING PROCEDURES

Low-Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedure

FOP 031.0

LOW FLOW (MINIMAL DRAWDOWN) GROUNDWATER PURGING & SAMPLING PROCEDURES

PURPOSE

This procedure describes the methods used for performing low flow (minimal drawdown) purging, also referred to as micro-purging, at a well prior to groundwater sampling to obtain a representative sample from the water-bearing zone. This method of purging is used to minimize the turbidity of the produced water. This may increase the representativeness of the groundwater samples by avoiding the necessity of filtering suspended solids in the field prior to preservation of the sample.

Well purging is typically performed immediately preceding groundwater sampling. The sample should be collected as soon as the parameters measured in the field (i.e., pH, specific conductance, dissolved oxygen, Eh, temperature, and turbidity) have stabilized.

PROCEDURE

1. Water samples should not be taken immediately following well development. Sufficient time should be allowed to stabilize the groundwater flow regime in the vicinity of the monitoring well. This lag time will depend on site conditions and methods of installation but may exceed one week.

2. Prepare the electronic water level indicator (e-line) in accordance with the procedures referenced in the Benchmark's Groundwater Level Measurement FOP and decontaminate the e-line probe and a lower portion of cable following the procedures referenced in the Benchmark's Non-disposable and Non-dedicated Sampling Equipment Decontamination FOP. Store the e-line in a protected area until use. This may include wrapping the e-line in clean plastic until the time of use.

3. Calibrate all sampling devices and monitoring equipment in accordance with manufacturer's recommendations, the site Quality Assurance Project Plan (QAPP) and/or Field Sampling Plan (FSP). Calibration of field

instrumentation should be followed as specified in Benchmark's Calibration and Maintenance FOP for each individual meter.

4. Inspect the well/piezometer for signs of vandalism or damage and record condition on the Groundwater Well Purge & Sample Collection Log form (sample attached). Specifically, inspect the integrity of the following: concrete surface seal, lock, protective casing and well cover, well casing and J-plug/cap. Report any irregular findings to the Project Manager.

5. Unlock and remove the well protective cap or cover and place on clean plastic to avoid introducing foreign material into the well.

6. Monitor the well for organic vapors using a PID, as per the Work Plan. If a reading of greater than 5 ppm is recorded, the well should be allowed to vent until levels drop below 5 ppm before proceeding with purging.

7. Lower the e-line probe slowly into the monitoring well and record the initial water level in accordance with the procedures referenced in Benchmark's Groundwater Level Measurement FOP. Refer to the construction diagram for the well to identify the screened depth.

8. Decontaminate all non-dedicated pump and tubing equipment following the procedures referenced in the Benchmark's Non-disposable and Non-dedicated Sampling Equipment Decontamination FOP.

9. Lower the purge pump or tubing (i.e., low-flow electrical submersible, peristaltic, etc.) slowly into the well until the pump/tubing intake is approximately in the middle of the screened interval. Rapid insertion of the pump will increase the turbidity of well water, and can increase the required purge time. This step can be eliminated if dedicated tubing is already within the well.

   Placement of the pump close to the bottom of the well will cause increased entrainment of solids, which may have settled in the well over time. Low-flow purging has the advantage of minimizing mixing between the overlying

stagnant casing water and water within the screened interval. The objective of low-flow purging is to maintain a purging rate, which minimizes stress (drawdown) of the water level in the well. Low-flow refers to the velocity with which water enters the pump intake and that is imparted to the formation pore water in the immediate vicinity of the well screen.

10. Lower the e-line back down the well as water levels will be frequently monitored during purge and sample activities.

11. Begin pumping to purge the well. The pumping rate should be between 100 and 500 milliliters (ml) per minute (0.03 to 0.13 gallons per minute) depending on site hydrogeology. Periodically check the well water level with the e-line adjusting the flow rate as necessary to stabilize drawdown within the well. If possible, a steady flow rate should be maintained that results in a stabilized water level (drawdown of 0.3 feet or less). If the water level exceeds 2 feet below static and declining, slow the purge rate until the water level generally stabilizes. Record each pumping rate and water level during the event.

    The low flow rate determined during purging will be maintained during the collection of analytical samples. At some sites where geologic heterogeneities are sufficiently different within the screened interval, high conductivity zones may be preferentially sampled.

12. Measure and record field parameters (pH, specific conductance, Eh, dissolved oxygen (DO), temperature, and turbidity) during purging activities. In lieu of measuring all of the parameters, a minimum subset could be limited to pH, specific conductance, and turbidity or DO.

    Water quality indicator parameters should be used to determine purging needs prior to sample collection in each well. Stabilization of indicator parameters should be used to determine when formation water is first encountered during purging. In general, the order of stabilization is pH, temperature, and specific conductance, followed by Eh, DO and turbidity. Performance criteria for determination of stabilization should be based on water-level drawdown, pumping rate and equipment specifications for measuring indicator

parameters. An in-line flow through cell to continuously measure the above parameters may be used. The in-line device should be disconnected or bypassed during sample collection.

13. Purging will continue until parameters of water quality have stabilized. Record measurements for field indicator parameters (including water levels) at regular intervals during purging. The stability of these parameters with time can be used to guide the decision to discontinue purging. Proper adjustments must be made to stabilize the flow rate as soon as possible.

14. Record well purging and sampling data in the Project Field Book or on the attached Groundwater Well Purge & Sample Collection Log (sample attached). Measurements should be taken approximately every three to five minutes, or as merited given the rapidity of change.

15. Purging is complete when field indicator parameters stabilize. Stabilization is achieved after all field parameters have stabilized for three successive readings. Three successive readings should be within ± 0.1 units for pH, ± 3% for specific conductance, ± 10 mV for Eh, and ± 10% for turbidity and dissolved oxygen. These stabilization guidelines are provided for rough estimates only, actual site-specific knowledge may be used to adjust these requirements higher or lower.

    An in-line water quality measurement device (e.g., flow-through cell) should be used to establish the stabilization time for several field parameters on a well-specific basis. Data on pumping rate, drawdown and volume required for parameter stabilization can be used as a guide for conducting subsequent sampling activities.

16. Collect all project-required samples from the discharge tubing at the flow rate established during purging in accordance with Benchmark's Groundwater Sample Collection Procedures FOP. **If a peristaltic pump and dedicated tubing is used, collect all project-required samples from the discharge tubing as stated before, however volatile organic compounds should be collected in accordance with the procedure presented in the next**

section. Continue to maintain a constant flow rate such that the water level is not drawn down as described above. Fill sample containers with minimal turbulence by allowing the ground water to flow from the tubing along the inside walls of the container.

17. If field filtration is recommended as a result of increased turbidity, an in-line filter equipped with a 0.45-micron filter should be utilized.

18. Replace the dedicated tubing down the well taking care to avoid contact with the ground surface.

19. Restore the well to its capped/covered and locked condition.

20. Upon purge and sample collection completion, slowly lower the e-line to the bottom of the well/piezometer. Record the total depth to the nearest 0.01-foot and compare to the previous total depth measurement. If a significant discrepancy exists, re-measure the total depth. Record observations of purge water to determine whether the well/piezometer had become silted due to inactivity or damaged (i.e., well sand within purge water). Upon confirmation of the new total depth and determination of the cause (i.e., siltation or damage), notify the Project Manager following project field activities.

PERISTALTIC PUMP VOC SAMPLE COLLECTION PROCEDURE

The collection of VOCs from a peristaltic pump and dedicated tubing assembly shall be collected using the following procedure.

1. Once all other required sample containers have been filled, turn off the peristaltic pump. The negative pressure effects of the pump head have not altered groundwater remaining within the dedicated tubing assembly and as such, this groundwater can be collected for VOC analysis.

2. While maintaining the pressure on the flexible tubing within the pump head assembly, carefully remove and coil the polyethylene tubing from the well; taking care to prevent the tubing from coming in contact with the ground

surface and without allowing groundwater to escape or drain from the tubing intake.

3. Once the polyethylene tubing is removed, turn the variable speed control to zero and reverse the pump direction.

4. Slowly increase the pump rate allowing the groundwater within the polyethylene tubing to be "pushed" out of the intake end (i.e., positive displacement) making sure the groundwater within the tubing is not "pulled" through the original discharge end (i.e., negative displacement). Groundwater pulled through the pump head assembly CANNOT be collected for VOC analysis.

5. Slowly fill each VOC vial by holding the vial at a 45-degree angle and allowing the flowing groundwater to cascade down the side until the vial is filled with as minimal disturbance as possible. As the vial fills, slowly rotate the vial to vertical. **DO NOT OVERFILL THE VIAL, AS THE PRESERVATIVE WILL BE LOST.** The vial should be filled only enough so that the water creates a slight meniscus at the vial mouth.

6. Cap the VOC vials leaving no visible headspace (i.e., air-bubbles). Gently tap each vial against your hand checking for air bubbles.

7. If an air bubble is observed, slowly remove the cap and repeat Steps 5 and 6.

ATTACHMENTS

Groundwater Well Purge & Sample Collection Log (sample)

REFERENCES

United States Environmental Protection Agency, 540/S-95/504, 1995. *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures.*

LOW FLOW (MINIMAL DRAWDOWN) GROUNDWATER PURGING & SAMPLING PROCEDURES

Benchmark FOPs:

007 *Calibration and Maintenance of Portable Dissolved Oxygen Meter*
008 *Calibration and Maintenance of Portable Field pH/Eh Meter*
009 *Calibration and Maintenance of Portable Field Turbidity Meter*
011 *Calibration and Maintenance of Portable Photoionization Detector*
012 *Calibration and Maintenance of Portable Specific Conductance Meter*
022 *Groundwater Level Measurement*
024 *Groundwater Sample Collection Procedures*
040 *Non-Disposable and Non-Dedicated Sampling Equipment Decontamination*
046 *Sample Labeling, Storage and Shipment Procedures*

LOW FLOW (MINIMAL DRAWDOWN) GROUNDWATER PURGING & SAMPLING PROCEDURES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

LOW FLOW METHOD GROUNDWATER PURGE & SAMPLE COLLECTION LOG

Project Name:	WELL LOCATION:
Project Number:	Sample Matrix: groundwater
Client:	Weather:

WELL DATA: DATE: TIME:

Casing Diameter (inches):	Casing Material:
Screened interval (fbTOR):	Screen Material:
Static Water Level (fbTOR):	Bottom Depth (fbTOR):
Elevation Top of Well Riser (fmsl):	Ground Surface Elevation (fmsl):
Elevation Top of Screen (fmsl):	Stick-up (feet):
Standing volume in gallons: [(bottom depth - static water level) x vol calculation in table per well diameter]:	

Volume Calculation

Well Diameter	Volume gal/ft
1"	0.041
2"	0.163
3"	0.367
4"	0.653
5"	1.020
6"	1.469

PURGING DATA: Pump Type:

Is equipment dedicated to location? yes no | Is tubing dedicated to location? yes no

Depth of Sample (i.e. Level of Intake) (fbTOR): | Approximate Purge Total Gal/Vol:

Time	Water Level (fbTOR)	Accumulated Volume (gallons)	pH (units)	Temperature (degrees C)	Specific Conductivity (µS/cm)	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance & Odor
	Initial								

SAMPLE

SAMPLING DATA: DATE: START TIME: END TIME:

Method: low-flow with dedicated tubing	Was well sampled to dryness? yes no
Initial Water Level (fbTOR):	Was well sampled below top of sand pack? yes no
Final Water Level (fbTOR):	Field Personnel:

PHYSICAL & CHEMICAL DATA:

	WATER QUALITY MEASUREMENTS					
Appearance: / Color: / Odor: / Sediment Present?	pH (units)	TEMP. (°C)	SC (uS)	TURB. (NTU)	DO (ppm)	ORP (mV)

REMARKS:

PREPARED BY:

BENCHMARK
ENVIRONMENTAL
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FIELD OPERATING PROCEDURES

Groundwater Sample Collection Procedures

FOP 024.0

GROUNDWATER SAMPLE COLLECTION PROCEDURES

PURPOSE

This procedure describes the methods for collecting groundwater samples from monitoring wells and domestic supply wells following purging and sufficient recovery. This procedure also includes the preferred collection order in which water samples are collected based on the volatilization sensitivity or suite of analytical parameters required.

PROCEDURE

Allow approximately 3 to 10 days following well development before performing purge and sample activities at any well location. Conversely, perform sampling as soon as practical after sample purging at any time after the well has recovered sufficiently to sample, or within 24 hours after evacuation, if the well recharges slowly. If the well does not yield sufficient volume for all required laboratory analytical testing (including quality control), a decision should be made to prioritize analyses based on contaminants of concern at the site. If the well takes longer than 24 hours to recharge, the Project Manager should be consulted. The following two procedures outline sample collection activities for monitoring and domestic type wells.

Monitoring Wells

1. Purge the monitoring well in accordance with the Benchmark FOPs for Groundwater Purging Procedures Prior to Sample Collection or Low Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedures. Perform sampling as soon as practical after purging at any time after the well has recovered sufficiently to sample, or within 24 hours after evacuation, if the well recharges slowly. If the well does not yield sufficient volume for all required laboratory analytical testing (including quality control), a decision should be made to prioritize analyses based on contaminants of concern at the site. Analyses will be prioritized in the order of the parameters volatilization sensitivity. After volatile organics have been collected, field parameters

must be measured from the next sample collected. If a well takes longer than 24 hours to recharge, the Project Manager should be consulted.

2. Sampling equipment that is not disposable or dedicated to the well will be decontaminated in accordance with the Benchmark Field Operating Procedure for Non-Disposable and Non-Dedicated Sampling Equipment Decontamination.

3. Calibrate all field meters (i.e., pH/Eh, turbidity, specific conductance, dissolved oxygen, PID etc.) in accordance with the Benchmark Field Operating Procedure for Calibration and Maintenance of the specific field meter.

4. Prepare the electronic water level indicator (e-line) in accordance with the procedures referenced in the Benchmark Field Operating Procedure for Groundwater Level Measurement and decontaminate the e-line probe and a lower portion of cable following the procedures referenced in the Benchmark Field Operating Procedure for Non-disposable and Non-dedicated Sampling Equipment Decontamination. Store the e-line in a protected area until use. This may include wrapping the e-line in clean plastic until the time of use.

5. Inspect the well/piezometer for signs of vandalism or damage and record condition on the Groundwater Well Purge, & Sample Collection Log (sample attached). Specifically, inspect the integrity of the following: concrete surface seal, lock, protective casing and well cover, well casing and J-plug/cap. Report any irregular findings to the Project Manager.

6. Unlock and remove the well protective cap or cover and place on clean plastic to avoid introducing foreign material into the well.

7. Calibrate the photoionization detector (PID) in accordance with the Benchmark Field Operating Procedure for Calibration and Maintenance of Portable Photoionization Detector.

8. Monitor the well for organic vapors using a PID, as per the Work Plan. If a reading of greater than 5 ppm is recorded, the well should be allowed to vent until levels drop below 5 ppm before proceeding with purging. Record PID measurements on a well-specific Groundwater Well Purge & Sample Collection Log (sample attached).

9. Lower the e-line probe slowly into the monitoring well and record the measurement on a well-specific Groundwater Well Purge & Sample Collection Log (sample attached).

10. Groundwater samples will be collected directly from the sampling valve on the flow through cell (low-flow), discharge port of a standard pump assembly (peristaltic, pneumatic, submersible, or Waterra™ pump) or bailer (stainless steel, PVC or polyethylene) into appropriate laboratory provided containers. In low-yielding wells at which the flow through cell is not used, the samples may be collected using a disposable bailer.

11. If disposable polyethylene bailers are used, the bailer should be lowered *slowly* below the surface of the water to minimize agitation and volatilization. For wells that are known to produce turbid samples (values greater than 50 NTU), the bailer should be lowered and retrieved at a rate that limits surging of the well.

12. Sampling data will be recorded on a Groundwater Well Purge & Sample Collection Log (sample attached).

13. Pre-label all sample bottles in the field using a waterproof permanent marker in accordance with the Benchmark Sample Labeling, Storage and Shipment FOP. The following information, at a minimum, should be included on the label:

    - Project Number;
    - Sample identification code (as per project specifications);
    - Date of sample collection (mm, dd, yy);
    - Time of sample collection (military time only) (hh:mm);
    - Specify "grab" or "composite" sample type;
    - Sampler initials;
    - Preservative(s) (if applicable); and
    - Analytes for analysis (if practicable).

14. Collect a separate sample of approximately 200 ml into an appropriate container prior to collecting the first and following the last groundwater sample collected to measure the following field parameters:

Parameter	Units
Dissolved Oxygen	parts per million (ppm)
Specific Conductance	μmhos/cm or μS or mS
pH	pH units
Temperature	°C or °F
Turbidity	NTU
Eh (*optional*)	mV
PID VOCs (*optional*)	ppm

Record all field measurements on a Groundwater Well Purge & Sample Collection Log (sample attached).

15. Collect samples into pre-cleaned bottles provided by the analytical laboratory with the appropriate preservative(s) added based on the volatilization sensitivity or suite of analytical parameters required, as designated in the **Sample Collection Order** section below.

16. Lower the e-line probe slowly into the monitoring well and record the measurement on a well-specific Groundwater Well Purge & Sample Collection Log (sample attached).

17. The samples will be labeled, stored and shipped in accordance with the Benchmark Field Operating Procedure for Sample Labeling, Storage and Shipment Procedures.

Domestic Supply Wells

1. Calculate or estimate the volume of water in the well. It is desirable to purge at least one casing volume before sampling. This is controlled, to some extent, by the depth of the well, well yield and the rate of the existing pump. If the volume of water in the well cannot be calculated, the well should be purged continuously for no less than 15 minutes.

2. Connect a sampling tap to an accessible fitting between the well and the pressure tank where practicable. A hose will be connected to the device and the hose discharge located 25 to 50 feet away. The well will be allowed to pump until the lines and one well volume is removed. Flow rate will be measured with a container of known volume and a stopwatch.

3. Place a clean piece of polyethylene or Teflon™ tubing on the sampling port and collect the samples in the order designated below and in the sample containers supplied by the laboratory for the specified analytes. ***DO NOT*** use standard garden hose to collect samples.

4. Sampling results and measurements will be recorded on a Groundwater Well Purge & Sample Collection Log (sample attached) as described in the previous section.

5. Collect samples into pre-cleaned bottles provided by the analytical laboratory with the appropriate preservative(s) added based on the volatilization sensitivity or suite of analytical parameters required, as designated in the **Sample Collection Order** section below.

6. The samples will be labeled, stored and shipped in accordance with the Benchmark Field Operating Procedure for Sample Labeling, Storage and Shipment Procedures.

SAMPLE COLLECTION ORDER

All groundwater samples, from monitoring wells and domestic supply wells, will be collected in accordance with the following.

1. Samples will be collected preferentially in recognition of volatilization sensitivity. The preferred order of sampling if no free product is present is:

    - Field parameters
    - Volatile Organic Compounds (VOCs)
    - Purgeable organic carbons (POC)
    - Purgeable organic halogens (POH)
    - Total Organic Halogens (TOX)
    - Total Organic Carbon (TOC)

- Extractable Organic Compounds (i.e., BNAs, SVOCs, etc.)
- Total petroleum hydrocarbons (TPH) and oil and grease
- PCBs and pesticides
- Total metals (Dissolved Metals)
- Total Phenolic Compounds
- Cyanide
- Sulfate and Chloride
- Turbidity
- Nitrate (as Nitrogen) and Ammonia
- Preserved inorganics
- Radionuclides
- Unpreserved inorganics
- Bacteria
- Field parameters

2. Document the sampling procedures and related information in the Project Field Book and on a Groundwater Well Purge & Sample Collection Log (sample attached).

DOCUMENTATION

The three words used to ensure adequate documentation for groundwater sampling are accountability, controllability, and traceability. Accountability is undertaken in the sampling plan and answers the questions who, what, where, when, and why to assure that the sampling effort meets its goals. Controllability refers to checks (including QA/QC) used to ensure that the procedures used are those specified in the sampling plan. Traceability is documentation of what was done, when it was done, how it was done, and by whom it was done, and is found in the field forms, Project Field Book, and chain-of-custody forms. At a minimum, adequate documentation of the sampling conducted in the field consists of an entry in the Project Field Book (with sewn binding), field data sheets for each well, and a chain-of-custody form.

As a general rule, if one is not sure whether the information is necessary, it should nevertheless be recorded, as it is impossible to over-document one's fieldwork. Years may go by before the documentation comes under close scrutiny, so the documentation must be capable of defending the sampling effort without the assistance or translation of the sampling crew.

The minimum information to be recorded daily with an indelible pen in the Project Field Book and/or field data sheets includes date and time(s), name of the facility, name(s) of the sampling crew, site conditions, the wells sampled, a description of how the sample shipment was handled, and a QA/QC summary. After the last entry for the day in the Project Field Book, the Field Team Leader should sign the bottom of the page under the last entry and then draw a line across the page directly under the signature.

PRECAUTIONS/RECOMMENDATIONS

The following precautions should be adhered to prior to and during sample collection activities:

- Field vehicles should be parked downwind (to avoid potential sample contamination concerns) at a minimum of 15 feet from the well and the engine turned off prior to PID vapor analysis and VOC sample collection.
- Ambient odors, vehicle exhaust, precipitation, or windy/dusty conditions can potentially interfere with obtaining representative samples. These conditions should be minimized and should be recorded in the field notes. Shield sample bottles from strong winds, rain, and dust when being filled.

- The outlet from the sampling device should discharge below the top of the sample's air/water interface, when possible. The sampling plan should specify how the samples will be transferred from the sample collection device to the sample container to minimize sample alterations.

- The order of sampling should be from the least contaminated to the most contaminated well to reduce the potential for cross contamination of sampling equipment (see the Sampling Plan or Work Plan).

- Samples should not be transferred from one sampling container to another.

- Sampling equipment must not be placed on the ground, because the ground may be contaminated and soil contains trace metals. Equipment and supplies should be removed from the field vehicle only when needed.

- Smoking and eating should not be allowed until the well is sampled and hands are washed with soap and water, due to safety and possibly sample contamination concerns. These activities should be conducted beyond a 15-foot radius of the well.

- No heat-producing or electrical instruments should be within 15 feet of the well, unless they are intrinsically safe, prior to PID vapor analysis.

- Minimize the amount of time that the sample containers remain open.

- Do not touch the inside of sample bottles or the groundwater sample as it enters the bottle. Disposable gloves may be a source of phthalates, which could be introduced into groundwater samples if the gloves contact the sample.

- Sampling personnel should use a new pair of disposable gloves for each well sampled to reduce the potential for exposure of the sampling personnel to contaminants and to reduce sample cross contamination. In addition, sampling personnel should change disposable gloves between purging and sampling operations at the same well.

- Sampling personnel should not use perfume, insect repellent, hand lotion, etc., when taking groundwater samples. If insect repellent must be used, then sampling personnel should not allow samples or sampling equipment to contact the repellent, and it should be noted in the documentation that insect repellent was used.

- Complete the documentation of the well. A completed assemblage of paperwork for a sampling event includes the completed field forms, entries in the Project Field Book (with a sewn binding), transportation documentation (if required), and possibly chain-of-custody forms.

ATTACHMENTS

Groundwater Well Purge & Sample Collection Log (sample)

REFERENCES

1. Wilson, Neal. *Soil Water and Ground Water Sampling*, 1995

Benchmark FOPs:

007 *Calibration and Maintenance of Portable Dissolved Oxygen Meter*
008 *Calibration and Maintenance of Portable Field pH/Eh Meter*
009 *Calibration and Maintenance of Portable Field Turbidity Meter*
011 *Calibration and Maintenance of Portable Photoionization Detector*
012 *Calibration and Maintenance of Portable Specific Conductance Meter*
022 *Groundwater Level Measurement*
023 *Groundwater Purging Procedures Prior to Sample Collection (optional)*
031 *Low Flow (Minimal Drawdown) Groundwater Purging & Sampling Procedures (optional)*
040 *Non-Disposable and Non-Dedicated Sampling Equipment Decontamination*
046 *Sample Labeling, Storage and Shipment Procedures*

GROUNDWATER SAMPLE COLLECTION PROCEDURES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

GROUNDWATER WE
PURGE & SAMPLE COLLECTION L

Project Name:	WELL NUMBER:
Project Number:	Sample Matrix:
Client:	Weather:

WELL DATA: DATE: TIME:

Casing Diameter (inches):	Casing Material:
Screened interval (fbTOR):	Screen Material:
Static Water Level (fbTOR):	Bottom Depth (fbTOR):
Elevation Top of Well Riser (fmsl):	Ground Surface Elevation (fmsl):
Elevation Top of Screen (fmsl):	Stick-up (feet):

PURGING DATA: DATE: START TIME: END TIME:

Method:	Is purge equipement dedicated to sample location? yes
No. of Well Volumes Purged:	Was well purged to dry[illegible]? yes
Standing Volume (gallons):	Was well purged bel[illegible]and pack? yes
Volume Purged (gallons):	Condition of We[illegible]
Purge Rate (gal/min):	Field Personnel:

VOLUME CALCULATION:

(A) Total Depth of Well (fbTOR):	
(B) Casing Diameter (inches):	
(C) Static Water Level (fbTOR):	
One Well Volume (V, gallons):	
$V = 0.0408 [(B)^2 \times \{ (A) - (C) \}]$	

* Use the table to the right to calculate one well volume by subtracting C [illegible] then multiplying by the volume calculation in the table per well diamter

Volume Calculation

Dia[illegible]	Volume gal/ft
[illegible]"	0.041
[illegible]	[illegible]63
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	1.02[illegible]
[illegible]	1.469

Stabilization Criteria

[illegible]ter	Criteria
pH	+/- 0.1 un
SC	+/- 3%
Turbidity	+/- 10%
DO	+/- 0.3 m
ORP	+/- 10 m

EVACUATION STABILIZATION TEST DATA

Time	Water Level (fbTOR)	Accumulated Volume (gallons)	pH (units)	[illegible]	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Appearance Odor
		initial						

SAMPLE

SAMPLING DATA: DATE: START TIME: END TIME:

Method:	Is sampling equipement dedicated to sample location? yes
Initial Water Level (fbTOR):	Was well sampled to dryness? yes
Final Water Level (fbTOR):	Was well sampled below top of sand pack? yes
Air Temperature (°F):	Field Personnel:
Source and type of water used in the field for QC purposes:	

PHYSICAL & CHEMICAL DATA:

DESCRIPTION OF WATER SAMPLE		
Odor		
Color		
NAPL		
Contains Sediment?	yes	no

WATER QUALITY MEASUREMENTS							
Sample	Time	pH (units)	TEMP. (°C)	SC (uS)	TURB. (NTU)	DO (ppm)	ORP (mV)
initial							
final							

REMARKS:

PREPARED BY:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

FIELD OPERATING PROCEDURES

Surface Water Sampling Procedures

FOP 064.0

SURFACE WATER SAMPLING PROCEDURES

PURPOSE

This procedure describes a method for collecting surface water samples. Sediment samples typically are collected in conjunction with surface water samples as dictated by the site-specific work plan. It should be noted, however, sediment sample collection procedures are not presented herein and Benchmark's sediment sampling FOPs 049 and 050 should be reviewed prior to sediment sample collection. This surface water sampling method incorporates the use of the laboratory provided sample bottle for collecting the sample, which eliminates the need for other equipment and hence, reduces the risk of introducing other variables into a sampling event.

PROCEDURE

1. Locate the surface water sample location.

2. Calibrate all field meters (i.e., pH/Eh, turbidity, specific conductance, dissolved oxygen, PID etc.) in accordance with the Benchmark Field Operating Procedure for Calibration and Maintenance of the specific field meter.

3. Wearing appropriate protective gear (i.e., latex gloves, safety glasses), as required in the Project Health and Safety Plan, prepare sample bottles for use.

4. If samples are to be collected from a stream, creek or other running water body, collect downstream samples first to minimize impacts on sample quality.

5. Surface water samples should be collected during a dry (non-precipitation) event to avoid any dilution effect from precipitation.

6. Pre-label all sample bottles in the field using a waterproof permanent marker in accordance with the Benchmark Sample Labeling, Storage and Shipment

FOP. The following information, at a minimum, should be included on the label:

- Project Number;
- Sample identification code (as per project specifications);
- Date of sample collection (mm, dd, yy);
- Time of sample collection (military time only) (hh:mm);
- Specify "grab" or "composite" sample type;
- Sampler initials;
- Preservative(s) (if applicable); and
- Analytes for analysis (if practicable).

7. Collect the surface water sample from the designated location by slowly submerging each sample bottle with minimal surface disturbance. If the sample location cannot be sampled in this manner due to shallow water conditions, a small depression can be created with a standard shovel to deepen the location to facilitate sample collection by direct grab. It should be noted, prior to disturbing sediment at any location for this purpose, all required sediment samples should be collected. All sediment cuttings will be removed from the area and the surface water allowed to flow through the depression for several minutes prior to collecting samples until clear (i.e., no visible sediment).

8. Collect samples from near shore. If water body is over three feet deep, check for stratification. Check each stratum for contamination using field measured water quality parameters. Collect samples from each stratum showing evidence of impact. If no stratum shows signs of impact, collect a composite sample having equal parts of water from each stratum.

9. Collect samples into pre-cleaned bottles provided by the analytical laboratory with the appropriate preservative(s) added based on the volatilization sensitivity or suite of analytical parameters required, as designated below:

   - Volatile Organic Compounds (VOCs)
   - Total Organic Halogens (TOX)

- Total Organic Carbon (TOC)
- Extractable Organic Compounds (i.e., BNAs, SVOCs, etc.)
- Total metals (Dissolved Metals)
- Total Phenolic Compounds
- Cyanide
- Sulfate and Chloride
- Turbidity
- Nitrate and Ammonia
- Radionuclides

10. For pre-preserved bottles, avoid completely submerging the bottle and overfilling to prevent preservative loss. Pre-preserved VOC vials should be filled from a second, unpreserved, pre-cleaned glass container. Never transfer samples from dissimilar bottle types (i.e., plastic to glass or glass to plastic).

11. Collect a separate sample of approximately 200 ml into an appropriate container prior to collecting the first and following the last surface water sample collected to measure the following field parameters:

Parameter	Units
Dissolved Oxygen	parts per million (ppm)
Specific Conductance	μmhos/cm or μS or mS
pH	pH units
Temperature	°C or °F
Turbidity	NTU
Eh (*optional*)	mV
PID VOCs (*optional*)	ppm

Record all field measurements on a Surface Water Quality Field Collection Log form (sample attached).

12. Record available information for the pond, stream or other body of water that was sampled, such as its size, location and depth in the Project Field Book and

on the Surface Water Quality Field Collection Log form (sample attached). Approximate sampling points should be identified on a sketch of the water body.

13. Label, store and ship all samples in accordance with the Benchmark Field Operating Procedure for Sample Labeling, Storage and Shipment Procedures.

ATTACHMENTS

Surface Water Quality Field Collection Log (sample)

REFERENCES

Benchmark FOPs:

007 *Calibration and Maintenance of Portable Dissolved Oxygen Meter*
008 *Calibration and Maintenance of Portable Field pH/Eh Meter*
009 *Calibration and Maintenance of Portable Field Turbidity Meter*
012 *Calibration and Maintenance of Portable Specific Conductance Meter*
046 *Sample Labeling, Storage and Shipment Procedures*

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

SURFACE WATER QUALITY FIELD COLLECTION LOG

PROJECT INFORMATION

Project Name:

Project No.:

Client:

SAMPLE DESCRIPTION

I.D.:

Matrix:

Location:

SAMPLE INFORMATION

Date Collected:

Time Collected:

Date Shipped to Lab:

Collected By:

Sample Collection Method:

LABORATORY ANALYSIS

SAMPLING INFORMATION

Weather:

Air Temperature:

Depth of Sample:

LOCATION

(Not to scale, dimensions are approximate)

Parameter	First	Last	Units
pH			unit
Temp.			
Cond.			mS
Turbidity			
Eh			
D.O.			ppm
Odor			Factor
Appearance			

EXACT LOCATION (if applicable)

Northing (ft)	Easting (ft)	Surface Elevation (fmsl)

SAMPLE

ADDITIONAL LABORATORY ANALYSIS:

ADDITIONAL REMARKS:

PREPARED BY: **DATE:**

APPENDIX A-3

CORRECTIVE MEASURES REPORT

BENCHMARK
ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

DAILY LOG	DATE			
	REPORT NO.			
	PAGE		OF	

CORRECTIVE MEASURES REPORT

Date:

Project:

Job No:

Location:

CQA Monitor(s):

Client:

Contractor:

Contractor's Supervisor:

WEATHER CONDITIONS:

Ambient Air Temp. - A.M.:

Ambient Air Temp. - P.M.:

Wind Direction:

Wind Speed:

Precipitation:

Corrective Measures Undertaken (reference Problem Identification Report No.)

Retesing Location:

Suggested Method of Minimizing Re-Occurrence:

Approvals (initial):

CQA Engineer:

Project Manager:

Signed:

CQA Representative

Appendix B

POST-REMEDIAL REPORT FORMS

Appendix B-1

POST-REMEDIAL FIELD INSPECTION REPORT

BENCHMARK
ENVIRONMENTAL
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Field Inspection Report
Post-Remedial Operation & Maintenance Plan

Property Name: Project No.:

Client:

Property Address: City, State: Zip Code:

Property ID: (Tax Assessment Map) Section: Block: Lot(s):

Preparer's Name: Date/Time:

CERTIFICATION

The results of this inspection were discussed with the Site Manager. Any corrective actions required have been identified and noted in this report, and a supplemental Corrective Action Form has been completed. Proper implementation of these corrective actions have been discussed with the Site Manager, agreed upon, and scheduled.

Preparer / Inspector: **Date:**

Signature:

Next Scheduled Inspection Date:

Property Access

1. Is the access road in need of repair?	☐ yes	☐ no	☐ N/A
2. Sufficient signage posted (No Trespassing)?	☐ yes	☐ no	☐ N/A
3. Has there been any noted or reported trespassing?	☐ yes	☐ no	☐ N/A

Please note any irregularities/ changes in site access and security:

Final Surface Cover / Vegetation

The integrity of the vegetative soil cover or other surface coverage (e.g., asphalt, concrete) over the entire Site must be maintained. The following documents the condition of the above.

1. Final Cover is in Place and in good condition?	☐ yes	☐ no	☐ N/A
Cover consists of (mainly):			
2. Evidence of erosion?	☐ yes	☐ no	☐ N/A
3. Cracks visible in pavement?	☐ yes	☐ no	☐ N/A
4. Evidence of distressed vegetation/turf?	☐ yes	☐ no	☐ N/A
5. Evidence of unintended traffic and/or rutting?	☐ yes	☐ no	☐ N/A
6. Evidence of uneven settlement and/or ponding?	☐ yes	☐ no	☐ N/A

Field Inspection Report
Post-Remedial Operation & Maintenance Plan

Final Surface Cover / Vegetation

7. Damage to any surface coverage? ☐ yes ☐ no ☐ N/A

If yes to any question above, please provide more information below.

Gas Vent System Monitoring and Maintenance

Are there signs of stressed vegetation around gas vents? ☐ yes ☐ no ☐ N/A

Are the gas vents currently intact and operational? ☐ yes ☐ no ☐ N/A

Has regular maintenance and monitoring been documented and enclosed or referenced?
☐ yes ☐ no ☐ N/A

Groundwater Monitoring

Is there a plan in place and currently being followed? ☐ yes ☐ no ☐ N/A

Are the wells currently intact and operational? ☐ yes ☐ no ☐ N/A

When was the most recent sampling event report and submittal? Date: _____

When is the next projected sampling event? Date: _____

Property Use Changes / Site Development

Has the property usage changed, or site been redeveloped since the last inspection?
☐ yes ☐ no ☐ N/A

If yes, please list with date: _____

Field Inspection Report
Post-Remedial Operation & Maintenance Plan

New Information

Has any new information been brought to the owner/engineer's attention regarding any and/or all engineering and institutional controls and their operation and effectiveness?

☐ yes ☐ no ☐ N/A

Comments: _____

This space for Notes and Comments

Please include the following Attachments:

1. Site Sketch
2. Photographs

BENCHMARK
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Corrective Action Certification
Post-Remedial Operation & Maintenance Plan

Property Name: Project No.:

Client:

Property Address: City, State: Zip Code:

Property ID: (Tax Assessment Map) Section: Block: Lot(s):

Preparer's Name: Date/Time:

Issue Addressed

The Environmental Inspection of the above property determined the need for corrective action. This form has been completed to document the required corrective action and it's implementation.

Description of Site Issue identified during Environmental Inspection (include sketch & photographs):

Corrective Action Taken

Date Completed:

Describe Action Taken (include sketch & photographs):

Certification of Implementation

The signatory hereby certifies that the corrective action as described in this form has been completed in accordance with all relevant requirements of the Soil/Fill Management Plan and other applicable documents.

Preparer / Inspector: **Date:**

Signature:

Please verify inclusion of the following Attachments:

1. Site Sketch
2. Photographs

Appendix B-2

ENVIRONMENTAL EASEMENT CERTIFICATION

Enclosure 1

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. N/A

Site Name Peter Cooper Markhams Superfund Site

Site Address: Bentley Road Zip Code: 14041

City/Town: Dayton

County: Cattaraugus

Current Use: Vacant

Intended Use: Undeveloped

Verification of Site Details **Box 2**

	YES	NO
1. Are the Site Details above, correct?	☐	☐
If NO, are changes handwritten above or included on a separate sheet?	☐	☐
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
3. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
4. Has a change-of-use occurred since the initial/last certification?	☐	☐
If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	☐
5. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), has any new information revealed that assumptions made in the Qualitative Exposure Assessment for offsite contamination are no longer valid?	☐	☐
If YES, is the new information or evidence that new information has been previously submitted included with this Certification?	☐	☐
6. For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), are the assumptions in the Qualitative Exposure Assessment still valid (must be certified every five years) ?	☐	☐

SITE NO. N/A Box 3

Description of Institutional Control Certification

	YES	NO
1. Compliance with the Site Management Plan (SMP) for the implemented remedy:	☐	☐
2. The groundwater beneath the Site is not used as a potable water source or for any other use without prior written permission of the Department:	☐	☐
3. Groundwater monitoring as specified in the SMP:	☐	☐
4. Operation and maintenance of the ASD system as specified in the SMP:	☐	☐

Description of Engineering Control Certification **Box 4**

	YES	NO
1. Maintenance of the cover systems over the Site:	☐	☐

Control Certification Statement

For each Institutional or Engineering control listed above, I certify by checking "Yes" that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(d) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

IC/EC CERTIFICATIONS
SITE NO. N/A

Box 5

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 2 & 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Box 6

QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) SIGNATURE

I certify that all information and statements in Box 4 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Qualified Environmental Professional for the _____

(Owner or Remedial Party) for the Site named in the Site Details Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification Stamp (if Required) Date

Enclosure 2

Certification of Institutional Controls/ Engineering Controls (ICs/ECs)
Step-by-Step Instructions, Certification Requirements and Definitions

The Owner, or Remedial Party, and when necessary, a Professional Engineer (P.E.), or the Qualified Environmental Professional (QEP), must review and complete the IC/EC Certification Form, sign the IC/EC Certifications Signature Page, and return it, along with the Periodic Review Report (PRR), within 45 days of the date of this notice.

Please use the following instructions to complete the IC/EC Certification.

I. Verification of Site Details (Box 1 and Box 2):

Answer the six questions in the Verification of Site Details Section. Questions 5 and 6 refer to only sites in the Brownfield Cleanup Program. ECL Section 27-1415-7(c) is included in **IV. IC/EC Certification Requirements**. The Owner and/or your P.E. or QEP may include handwritten changes and/or other supporting documentation, as necessary.

II. Verification of Institutional / Engineering Controls (Box 3 and Box 4)

Review the listed Institutional / Engineering Controls, confirming that all existing controls are listed, and that all existing controls are still applicable. If there is a control that is no longer applicable the Owner / Remedial Party is to petition the Department requesting approval to remove the control.

2. Select "YES" or "NO" for **Control Certification** for each IC/EC, based on Sections (a)-(e) of the **Control Certification Statement**.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. If the Department has any questions or concerns regarding the completion of the certification, the Project Manager will contact you.

3. If you cannot certify "Yes" for each Control, please continue to complete the remainder of this **Control Certification** form. Attach supporting documentation that explains why the **Control Certification** cannot be rendered, as well as a statement of proposed corrective measures, and an associated schedule for completing the corrective measures. Note that this **Control Certification** form must be submitted even if an IC or EC cannot be certified; however, the certification process will not be considered complete until corrective action is conducted.

   If the Department concurs with the explanation, the corrective measures, and the proposed schedule, a letter authorizing the implementation of those corrective measures will be issued by the Project Manager. Once the corrective measures are complete a new Periodic Review Report (with IC/EC Certification) is to be submitted within 45 days to the Department. If the Department has any questions or concerns regarding the PRR and/or completion of the IC/EC Certification, the Project Manager will contact you.

III. IC/EC Certification by Signature (Box 5 and Box 6):

1. If you certified "Yes" for each Control, please complete and sign the IC/EC Certifications page. To determine WHO signs the **IC/EC Certification,** please use Table 1. Signature Requirements for the IC/EC Certification, which follows.

Table 1. Signature Requirements for Control Certification Page

Type of Control	Example of IC/EC	Required Signatures
IC only	Environmental Easement Deed Restriction.	A site or property owner or remedial party.
IC with an EC which does not include a treatment system or engineered caps.	Fence, Clean Soil Cover, Individual House Water Treatment System, Vapor Mitigation System	A site or property owner or remedial party, and a QEP. (P.E. license not required)
IC with an EC that includes treatment system or an engineered cap.	Pump & Treat System providing hydraulic control of a plume, Part 360 Cap.	A site or property owner or remedial party, and a QEP with a P.E. license.

IV. IC/EC Certification Requirements:

Division of Environmental Remediation Program Policy requires periodic certification of IC(s) and EC(s) as follows:

For Environmental Restoration Projects: N.Y. Envtl Conserv.Law Section 56-0503 (Environmental restoration projects; state assistance)

For State Superfund Projects: Envtl Conserv.Law Section 27-1318. (Institutional and engineering controls)

For Brownfields Cleanup Program Projects: Envtl Conserv.Law Section 27-1415. (Remedial program requirements)

Envtl Conserv.Law Section 27-1415-7(c) states:

(c) At non-significant threat sites where contaminants in groundwater at the site boundary contravene drinking water standards, such certification shall also certify that no new information has come to the owner's attention, including groundwater monitoring data from wells located at the site boundary, if any, to indicate that the assumptions made in the qualitative exposure assessment of offsite contamination are no longer valid. Every five years the owner at such sites shall certify that the assumptions made in the qualitative exposure assessment remain valid. The requirement to provide such certifications may be terminated by a written determination by the Commissioner in consultation with the Commissioner of Health, after notice to the parties on the brownfield site contact list and a public comment period of thirty days.

Voluntary Cleanup Program: Applicable program guidance.

Petroleum Remediation Program: Applicable program guidance.

Federal Brownfields: Applicable program guidance.

Manufactured Gas Plant Projects: Applicable program guidance (including non-registry listed MGPs).

WHERE to mail the signed Certification Form by March 1st of each year (or within 45 days of the date of the Department notice letter):

New York State Department of Environmental Conservation
Division of Environmental Remediation

Attn: Division of Environmental Remediation – North Section
NYSDEC
270 Michigan Avenue
Buffalo, NY 14203-2999

Please note that extra postage may be required.

V. Definitions

"Engineering Control" (EC), means any physical barrier or method employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of a remedial program, or eliminate potential exposure pathways to contamination. Engineering controls include, but are not limited to, pavement, caps, covers, subsurface barriers, vapor barriers, slurry walls, building ventilation systems, fences, access controls, provision of alternative water supplies via connection to an existing public water supply, adding treatment technologies to such water supplies, and installing filtration devices on private water supplies.

"Institutional Control" (IC), means any non-physical means of enforcing a restriction on the use of real property that limits human and environmental exposure, restricts the use of groundwater, provides notice to potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of a remedial program or with the effectiveness and/or integrity of operation, maintenance, or monitoring activities at or pertaining to a remedial site.

"Professional Engineer" (P.E.) means an individual or firm licensed or otherwise authorized under article 145 of the Education Law of the State of New York to practice engineering.

"Property Owner" means, for purposes of an IC/EC certification, the actual owner of a property. If the site has multiple properties with different owners, the Department requires that the owners be represented by a single representative to sign the certification.

"Oversight Document" means any document the Department issues pursuant to each Remedial Program (see below) to define the role of a person participating in the investigation and/or remediation of a site or area(s) of concern. Examples for the various programs are as follows:

BCP (after approval of the BCP application by DEC) - Brownfield Site Cleanup Agreement.
ERP (after approval of the ERP application by DEC) - State Assistance Contract.
Federal Superfund Sites - Federal Consent Decrees, Administrative Orders on Consent or Unilateral Orders issued pursuant to CERCLA.
Oil Spill Program - Order on Consent, or Stipulation pursuant to Article 12 of the Navigation Law (and the New York Environmental Conservation Law).
State Superfund Program - Administrative Consent Order, Record of Decision.
VCP (after approval of the VCP application by DEC) - Voluntary Cleanup Agreement.
RCRA Corrective Action Sites- Federal Consent Decrees, Administrative Orders on Consent or permit conditions issued pursuant to RCRA.

"Qualified Environmental Professional" (QEP), means a person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding the presence of releases or threatened releases to the surface or subsurface of a property or off-site areas, sufficient to meet the objectives and performance factors for the areas of practice identified by this Part. Such a person must:

(1) hold a current professional engineer's or a professional geologist's license or registration issued by the State or another state, and have the equivalent of three years of full-time relevant experience in site investigation and remediation of the type detailed in this Part; or

(2) be a site remediation professional licensed or certified by the federal government, a state or a recognized accrediting agency, to perform investigation or remediation tasks consistent with Department guidance, and have the equivalent of three years of full-time relevant experience.

"Qualitative Exposure Assessment" means a qualitative assessment to determine the route, intensity, frequency, and duration of actual or potential exposures of humans and/or fish and wildlife to contaminants.

"Remedial Party" means a person implementing a remedial program at a remedial site pursuant to an order, agreement or State assistance contract with the Department.

"Site Management" (SM) means the activities undertaken as the last phase of the remedial program at a site, which continue after a Certificate of Completion is issued. Site management is conducted in accordance with a site management plan, which identifies and implements the institutional and engineering controls required for a site, as well as any necessary monitoring and/or operation and maintenance of the remedy.

"Site Management Plan" (SMP) means a document which details the steps necessary to assure that the institutional and engineering controls required for a site are in-place, and any physical components of the remedy are operated, maintained and monitored to assure their continued effectiveness, developed pursuant to Section 6 (DER10 Technical Guide).

"Site Owner" means the actual owner of a site. If the site has multiple owners of multiple properties with ICs and/or ECs, the Department requires that the owners designate a single representative for IC/EC Certification activities.

Appendix C

LANDSCAPING SPECIFICATIONS

SECTION 02101, CLEARING AND GRUBBING

SECTION 02200, FINAL COVER CONSTRUCTION

SECTION 02901, TOPSOIL

SECTION 02902, TURF

Appendix C-1

SECTION 02101, CLEARING AND GRUBBING

SECTION 02110
CLEARING AND GRUBBING

PART 1- GENERAL

1.1 DESCRIPTION

A. Scope: Subcontractor shall furnish all labor, materials, equipment and incidentals required to perform all clearing and grubbing as shown and specified.

B. Related Work Specified Elsewhere:
   1. Section 02901, Topsoil.
   2. Section 02902, Turf

1.2 JOB CONDITIONS

A. Protection:

   1. Streets, roads, adjacent property and other works and structures shall be protected throughout the entire project. Subcontractor shall return to original condition, satisfactory to Benchmark, damaged facilities caused by the Subcontractor's operations.

   2. Trees, shrubs and grassed areas which are to remain shall be protected from damage. Equipment, stockpiles, etc. shall not be permitted within tree branch spread. Trees shall not be removed without approval of Benchmark unless shown or specified.

PART 2- PRODUCTS

(Part 2 omitted this Section)

PART 3- EXECUTION

3.1 CLEARING AND GRUBBING

A. Limits of clearing shall be all areas within the Contract limit lines except as otherwise shown. Damage outside these limits caused by the Subcontractor's operations shall be corrected at the Subcontractor's expense.

B. Cut all existing vegetation within the Clearing Limit lines and all existing vegetation on waste/fill piles to grade.

C. Minimize the amount of low lying vegetative cover striping that occurs prior to waste relocation.

D. Clearing and grubbing limits may be extended, at the subcontractor's expense, to approximately 25' outside defined limits or as otherwise approved by Benchmark to facilitate access. No disturbance shall be permitted within wetland areas.

1. Cut all existing vegetation within the clearing limit lines and all vegetation on waste/fill piles to grade.
2. Strip all vegetation from areas requiring cover soils. Place no final cover system materials directly on top of grass or vegetation.
3. All stumps within 25 feet of the proposed clearing limits (excluding wetland areas) will also be removed if required for access. The removed stumps will be disposed within the consolidation area subgrade in a manner that prevents settling.
4. Large tree trunks and large branches within the clearing limits will either be removed from the site or cut into 24-inch lengths and buried within the landfill subgrade in a manner that prevents settling.
5. Small trees, small branches and woody brush will be mulched and disposed in a layer no more than two-inches thick across the consolidation area subgrade or spread onsite in a location acceptable to Benchmark.
6. Bury waste, vegetation and debris within the consolidation area subgrade in a manner to prevent soil settlement from occurring. Do no bury large pockets or piles of stumps, mulch or other debris.

E. Burning on site shall not be done unless approved by authorities having jurisdiction. All burning, on or off the site, shall be in complete accordance with rules and regulations of local authorities having jurisdiction.

F. Control air pollution caused by dust and dirt, and comply with governing regulations.

---END OF SECTION---

Appendix C-2

SECTION 02250, FINAL COVER CONSTRUCTION

SECTION 02250
FINAL CONSTRUCTION COVER

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope:

1. Subcontractor shall furnish all labor, materials, equipment, accessories and services necessary to excavate, screen, transport, place and compact soil and materials specified for the final cover as shown on the Drawings and herein specified.

B. Related Work Specified Elsewhere:

1. Section 02110, Clearing and Grubbing
2. Section 02901, Topsoil
3. Section 02902, Turf

1.2 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

A. Barrier Layer Material Tests:

1. Benchmark will perform in-place soil density testing to determine the degree of compaction of the recompacted barrier layer soil. A minimum of nine moisture-density tests using a nuclear densitometer shall be performed per acre per lift of completed barrier layer. Benchmark will determine the exact location of the moisture-density tests. The location of all nuclear densitometer tests will be referenced to the existing horizontal grid system. The Subcontractor shall be responsible for providing grade control at all times during barrier layer placement to facilitate test identification and coordination by Benchmark.
2. The soil shall be compacted to wet of the optimum moisture content and not less than the minimum density as described in the CQA Plan and item 3.4 of this Section. If the specified moisture and density is not obtained, the Subcontractor shall perform all work required to provide the specified amounts. This work shall include recompaction and/or complete removal and replacement of unacceptable barrier material until the specified moisture and density is achieved. All additional excavation and compaction work shall be performed by the Subcontractor at no additional cost to Benchmark until the specified degree of compaction is obtained.
3. Benchmark will perform one moisture content test per acre of the previous lift before placement of additional lifts. No additional lifts of final cover material will be permitted unless the moisture content of the soil is greater than the optimum. The Subcontractor shall obtain the approval of Benchmark before proceeding with placement of additional lifts.

4. Constant-head undisturbed laboratory permeability tests (Shelby tube) will be performed on the completed lifts of barrier material by Benchmark. The Subcontractor shall assist Benchmark in collecting the Shelby tube samples required for the performance of the permeability tests. The location of all permeability shall be referred to the existing horizontal grid system. The Subcontractor shall achieve maximum in-place soil permeability for the barrier layer material of 1.0×10^{-6} cm/sec.
5. Soils testing of material shall be performed in accordance with the following references:
   a. ASTM D 421, Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants.
   b. ASTM D 422, Particle-Size Analysis of Soils.
   c. ASTM D 689, Moisture-Density Relations of Soils.
   d. ASTM D 2922, Standard Test Methods for Soil and Soil Aggregates In-Place by Nuclear Methods (for shallow depths).
   e. ASTM D 1557, Moisture-Density Relations of Soils, Using 10 lb. Rammer and 18-inch Drop.
   f. ASTM D 2216, Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil Aggregate Mixtures.
   g. ASTM D 5084, Recompacted Constant-Head Permeability of Soils.
   h. ASTM D 4318, Liquid Limit Plastic Unit, and Plasticity Index of Soils.
6. The Subcontractor shall be thoroughly familiar with the requirements of the Engineer's Construction Quality Assurance (CQA) Plan. The quality assurance testing specified in the CQA Plan will be performed by Benchmark; however, the Subcontractor shall assist Benchmark in implementation of the CQA Plan. This includes performing site layout surveying, providing equipment and personnel to assist Benchmark in collection of soil samples, and implementation of corrective measures as described in the CQA Plan at no additional cost to Benchmark.

B. Benchmark shall perform all quality assurance testing on the topsoil as required under Section 02901, Topsoil.

C. Coordination:
1. The Subcontractor shall coordinate soil placement activities with the Benchmark's CQA Inspector to keep him fully informed regarding amounts of soil material needed, and when it will be placed.

PART 2 – MATERIALS

2.1 SOIL MATERIALS

A. General:

1. The Subcontractor shall be responsible for obtaining all the necessary State and Local permits required for the excavation of borrow source material.
2. All soil material shall be natural soil, free from excessive moisture or frost.
3. The Subcontractor shall remove al stumps, roots, muck, marl and stones exceeding 3-inches in greatest dimension prior to placement.
4. Stones smaller than 3-inches in diameter shall be kept apart and not permitted to accumulate in-groups.
5. Use no frozen material.
6. Benchmark shall collect the soil samples for analysis. The Subcontractor shall provide surveying, personnel and heavy equipment to assist Benchmark in the collection of the samples.

B. Barrier Layer Material:

1. In addition to Paragraph 2.1.A requirements, material shall contain no sod or vegetative matter.
2. Benchmark will perform CQA testing on the barrier layer material prior to placement. The Subcontractor will either stockpile the proposed material in 1000 cubic yard piles for testing by Benchmark or else dig representative test holes at the borrow area for testing. Specific requirements are described in the CQA Plan. The Subcontractor will not be permitted to use the soil for the barrier layer construction until after CQA testing has been completed and Benchmark approves the material.
3. Barrier layer material will conform to the following requirements:
   a. Recompacted Permeability: less than or equal to 1.0×10^{-6} cm/sec.
   b. Approximate Gradation:

Seize Size Designation	Percent Minimum Passing by Weight
3 – inch	100
No. 4	85
No. 200	50

C. Topsoil:

1. Soil material capable of supporting adequate vegetative growth meeting the requirements of Section 02901, Topsoil.

2.2 SEED

A. Refer to Section 02902, Turf.

PART 3 – EXECUTION

3.1 EXCAVATION

A. All miscellaneous excavation and grading shall be to the required lines, grades, depths and dimensions necessary as shown on the Contract Drawings.

B. In any case where the excavation or grading extends deeper than the required elevations, the over-excavated areas shall, at the discretion of Benchmark, be filled with acceptable material at no additional cost to Benchmark.

3.2 BARRIER LAYER PREPARATION

A. The Subcontractor shall be responsible for scarifying the top inch of the existing barrier layer as directed by Benchmark, prior to placement of additional barrier layer material.

3.3 GAS VENT INSTALLATION

A. Waste material excavated during gas vent installation shall be disposed of on-site within the waste fill area, the same day it is excavated, at a location specified by Benchmark.

3.4 BARRIER LAYER CONSTRUCTION

A. The Subcontractor shall utilize all soil material representative of one composite sample (approximately 5,000 cubic yards) before beginning to utilize other material representative of the next composite.

B. The barrier layer material shall be placed in loose lifts, approximately nine inches thick and shall be compacted to maximum lift thickness of six inches.

C. Each layer of barrier material shall be thoroughly tamped or rolled to the required degree of compaction and moisture. Successive layers shall not be placed until the layer under construction has been thoroughly compacted, tested, and approved by Benchmark.

D. The top inch of each completed and approved lift shall also be scarified or rolled with a pad-foot roller, unless otherwise directed by Benchmark, prior to placement of successive layers.

E. Material shall be mixed and spread in a manner to assure uniform lift thickness after placement.

F. Barrier layer material containing lumps, pockets or concentrations of rubble and stones, debris, wood or other organic matter shall not be placed. Fill containing unacceptable material shall be removed and disposed .

G. The Subcontractor shall remove existing vegetation prior to barrier layer placement.

H. All excavation, transportation and placement operations shall be such as will produce satisfactory gradation of materials after they have been spread and compacted. Dumping, spreading, sprinkling and compacting operations shall be carried out systematically so as not to interfere with each other.

I. Intermediate lifts will be seal rolled when subsequent lifts will not be placed within 48 hours of completion.

J. Damage to compacted lifts (viz., rutting by equipment or erosion) will be repaired prior to placing any overlying materials at no additional cost.

K. Any perforations in the barrier layer material resulting from grade stake removal or other causes shall be backfilled with acceptable barrier layer soil material or a dry soil-bentonite (50/50) mixture by the Subcontractor before material may be placed on the next lift.

L. Moisture Control:

1. The barrier layer material moisture content shall be maintained greater than optimum moisture content during placement.
2. Barrier layer material shall not be placed unless the moisture content of the previous lift is also greater than optimum.
3. When necessary, moisture will be added using approved sprinkling equipment. The Subcontractor shall, at his own expense, add sufficient water during rolling and tamping to assure complete compaction of material.
4. Place no more barrier material than can be compacted and tested the same day.
5. If, in the opinion of Benchmark, the material is too wet for satisfactory compaction, or compaction efforts may damage preceding layers of final cover, the Subcontractor shall temporarily stop work and the material will be allowed to dry. There shall be no additional cost to Benchmark for time and materials required to spread, dry and rework the material.
6. The placement or compaction of material will not be permitted during or immediately following rainfall. Construction of the barrier layer shall be conducted in such manner that a minimum of rainwater will be retained thereon. Compacted material that is damaged by washing shall be replaced by the Subcontractor in an acceptable manner at no additional cost.
7. No compaction of material will be permitted with free water on any portion of the layer to be compacted.
8. Place topsoil on each completed segment of cap immediately after CQA tests are approved by Benchmark to control moisture and prevent desiccation cracking.

M. Compaction:

1. Each lift of the barrier layer shall be compacted to not less than 90 percent of the modified proctor maximum density, in pounds per cubic foot, as

determined by the Modified Proctor Compaction Test, ASTM-D-1557 and as specified in the CQA Plan.

2. Benchmark will perform the compaction and moisture content tests in accordance with the CQA Plan.
3. The Subcontractor shall select equipment, which is capable of providing the minimum densities required by these specifications, and shall submit a description of the type of equipment he proposes to use to Benchmark for approval. Compaction equipment will be a tamping foot or sheepsfoot roller. A smooth roller shall not be used for compaction.
4. Lift thicknesses, water content (of the material), compactor weight and the number of passes of the compacting equipment will be adjusted as required to obtain the minimum specified density.
5. If the field and laboratory tests indicate unsatisfactory results, the Subcontractor shall provide the additional work effort necessary to achieve the desired degree of in-place moisture, density and permeability to the satisfaction of Benchmark. All additional compaction work or removing and replacing of soil material shall be performed by the Subcontractor at no additional cost to Benchmark.

3.5 TOPSOIL AND VEGETATIVE COVER

A. Following the completion of the barrier layer construction, six inches of topsoil will be placed to support vegetative growth. Refer to Sections 02901 and 02902 for specifications regarding topsoil and vegetative cover.

3.6 MINIMUM COVER SYSTEM THICKNESS

A. The Subcontractor shall obtain the approval of Benchmark for the minimum layer thickness of each layer before beginning the placement of subsequent layers.

B. The barrier layer shall have a minimum overall thickness of 18-inches after final compaction.

C. The topsoil layer shall have a minimum thickness of 6-inches after final rolling.

3.7 INSPECTION

A. Benchmark shall examine the areas and conditions under which the compaction work is to be performed and notify the Subcontractor of conditions detrimental to the proper and timely completion of the Work. Subcontractor shall not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

END OF SECTION

Appendix C-3

SECTION 02901, TOPSOIL

SECTION 02901
TOPSOIL

PART 1- GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Subcontractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install topsoil Work.
   2. The types of topsoil Work required include the following:
      a. Spreading topsoil.
      b. Maintenance Work.

B. Coordination:
   1. Review installation procedures under other Sections and coordinate the installation of items that must be installed with the topsoil.

C. Related Work Specified Elsewhere:
   1. Section 02101, Clearing and Grubbing.
   2. Section 02902, Turf.

1.2 QUALITY ASSURANCE

A. Benchmark will perform QA testing on the topsoil material prior to placement. The Subcontractor will either stockpile the material in 5000 cubic yard piles for testing by Benchmark or will dig representative test holes at the borrow area for testing. Specific requirements are described in the Construction Quality Assurance Plan and Paragraph 2.1. The Subcontractor will not be permitted to place topsoil until after QA testing has been completed and Benchmark approves the material.

B. Source Quality Control:
   1. Off-Site Topsoil: Obtain topsoil only from naturally well-drained sites where topsoil occurs in depth of not less than 4-inches; do not obtain from bogs or marshes.

C. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified:
   1. ASTM C 602, Agricultural Liming Materials.
   2. ASTM D 421-85, Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants.
   3. ASTM D 422-63, Particle-Size Analysis of Soils.
   4. ASTM D 2487-93, Classifications of Soils for Engineering Purposes (USCS).
   5. ASTM D 2974-87, Moisture, Ash, and Organic Matter of Peat and Other

Organic Soils.
6. ASTM D 4972-95 a, pH of Soils.
7. Association of Official Analytical Chemists, Official Methods of Analysis.

1.3 JOB CONDITIONS

A. Environmental Requirements: Do not spread topsoil if condition is unsuitable due to frost, excessive moisture or other conditions. Cease Work until the topsoil is in a suitable condition as determined by Benchmark.

PART 2- PRODUCTS

2.1 MATERIALS

A. General:
1. The Subcontractor shall be responsible for obtaining all the necessary State and Local permits required for the excavation of borrow source material.

B. Topsoil:
1. Fertile, friable, natural loam, surface soil, capable of sustaining vigorous plant growth, free of any admixture of subsoil, clods of hard earth, plants or roots, sticks or other extraneous material harmful to plant growth. Topsoil will meet the following criteria:

a.

Sieve Size Designation	Percent Passing By Weight
3-inch	100
1-inch	80-100
1/4-inch	65-100
No. 200	20-80

b. Clay content of material passing No. 200 sieve not greater than 20 percent, as determined by hydrometer tests.
c. pH 5.0 to pH 7.6. pH may be amended to meet these limits
d. Organic content at least 2.5 percent, as determined by ignition loss (may be amended to meet this requirement). Organic content less than 2.5 percent may not be adequate to establish vegetative growth.
e. Free of pests and pest larvae.
f. Soluble salt content not greater than 500 ppm.

PART 3- EXECUTION

3.1 INSPECTION

A. Benchmark will examine the subgrade, observe the conditions under which the

Work is to be performed, and notify Subcontractor of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to Benchmark.

3.2 INSTALLATION

A. Place and spread topsoil, over the areas shown, to a minimum depth of 6-inches after natural settlement and light rolling, in a manner that the completed work conforms to the lines and grades shown.

B. Do not spread topsoil while in a frozen condition or when moisture content is so great that excessive compaction will occur nor when so dry that dust will form in the air or that clods will not break readily.

C. Do not compact topsoil.

D. Alter the topsoil is spread, remove all large, stiff clods, rocks, roots or other foreign matter over 2-inches.

F. Manipulate topsoil to attain a properly drained surface.

G. Grade topsoil areas to smooth, even surface with loose, uniform, fine texture.

H. Roll and rake and remove ridges and fill all depressions, ruts, low spots or unsuitable areas which result after settlement.

I. Topsoil placed and graded on slopes steeper than *5* percent shall be promplty fertilized, seeded, mulched and stabilized by "tracking" with suitable equipment.

3.3 MAINTENANCE

A. Maintain topsoiled areas by filling in erosion channels and correcting drainage as required.

B. Maintain the topsoil in a loose, friable condition until seeding operations begin.

3.4 INSPECTION AND ACCEPTANCE

A. When the topsoiling Work is completed, including maintenance, Benchmark will make an inspection to determine acceptability.

B. Where inspected topsoil Work does not comply with the requirements, regrade rejected Work and maintain until reinspected by Benchmark and found to be acceptable.

END OF SECTION

Appendix C-4

SECTION 02902, TURF

SECTION 02902
TURF

PART 1- GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Subcontractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install turf Work.
   2. The extent of the turf Work shall include:
      a. All areas where Subcontractor places cover soils.
      b. All areas within the limits of clearing where existing vegetation is deemed insufficient as determined by Benchmark.
      c. All areas where Subcontractor's performance of Work damages existing vegetation as determined by Benchmark.
   3. The types of turf Work required include the following.
      a. Seeded areas.
      b. Soil amendments.
      c. Mulch.
      d. Replant unsatisfactory or damaged turf.

B. Coordination:
   1. Review installation procedures under other Sections and coordinate the installations of items that must be installed with the turf.

C. Related Work Specified Elsewhere:
   1. Section 02101, Clearing and Grubbing.
   4. Section 02901, Topsoil.

1.2 QUALITY ASSURANCE

A. Source Quality Control:
   1. General: Ship turf materials with certificates of inspection as required by governmental authorities. Comply with governing regulations applicable to turf materials.
   2. Analysis and Standards: Package standard products with manufacturer's certified analysis.

C. Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified:
   1. Association of Official Analytical Chemists, Official Methods of Analysis.
   2. American Joint Committee on Horticultural Nomenclature, Standardized Plant Names.
   3. ASTM C 602, Agricultural Liming Materials.

4. ASTM D 2487-93, Classification of Soils for Engineering Purposes (USCS).
5. FSO-F-241D, Fertilizer, Mixed, Commercial.
6. FSO-P-166E, Peat Moss; Peat, Humus; and Peat, Reed-sedge.
7. Official Seed Analysts of North America, Standards of Quality.

1.4 PRODUCT DELIVERY. STORAGE AND HANDLING

A. Delivery of Materials:
   1. Do not deliver seed until site conditions are ready for planting.
   2. Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery.
   3. Furnish seed in sealed, standard containers.
   4. Notify Benchmark of delivery schedule in advance so turf material may be inspected upon arrival at job site.
   5. Remove unacceptable material immediately from job site.

B. Storage of Materials:
   1. Store and cover materials to prevent deterioration. Remove packaged materials that have become wet or show deterioration or water marks from the project site.
   2. Seed that is wet or moldy or that has been otherwise damaged in transit or storage is not acceptable. Replace at no further cost to Benchmark or Respondents.

1.5 JOB CONDITIONS

A. Environmental Requirements:
   1. Proceed with and complete the turf Work as rapidly as portions of the site become available, working within the seasonal limitations for each type of turf required.
   2. Do not spread seed when wind velocity exceeds 5 miles per hour.
   3. Do not plant turf when drought, or excessive moisture, or other unsatisfactory conditions prevail.

B. Scheduling:
   1. Plant or install materials only during normal planting seasons. Correlate planting with specified maintenance periods and provide maintenance as specified herein.

1.6 ALTERNATIVES

A. If specified turf material is not obtainable, submit to Benchmark proof of non-availability and proposal for use of equivalent material.

PART 2- PRODUCTS

2.1 MATERIALS

A. Grass Materials:

1. Grass Seed Mixture: Provide fresh, clean, new-crop seed complying with the tolerance for purity and germination established by the Official Seed Analysts of North America. Provide seed of the grass species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, as specified.
2. **Soil Cap:** The soil cap areas requiring seeding shall be seeded with 196 lbs/acre of seed conforming to the following:

Name of Grass	Application Rate Per Acre	% of Mix	Variety
Tall Fescue	70.6 pounds	36%	KY-31
Orchard Grass	29.4 pounds	15%	PENNLATE
Creeping Red Fescue	39.2 pounds	20%	ENSYLVA
Perrenial Ryegrass	49 pounds	25%	POLLY
Birds-Foot Trefoil	7.8 pounds	4%	VIKING

   a. Germination and purity percentages should equal or exceed the minimum seed standard listed. If it is necessary to use seed as the germination percentage less than the minimum recommended above, increase the seeding rate accordingly to compensate for the lower germinations.
   b. Birds-Foot Trefoil is a legume that requires inoculation before sowing. The inoculants should be delivered with the seed mix and added before application.
   c. Weed seed content not over 0.25 percent and free of noxious weeds.
   d. All seed shall be rejected if the label lists any of the following grasses:
      1) Timothy.
      2) Sheep Fescue.
      3) Meadow Fescue.
      4) Canada Blue.
      5) Alta Fescue.
      6) Kentucky 31 Fescue.
      7) Bent Grass.

3. **Off Soil Cap:** Areas requiring seeding outside of the cap shall be seeded with 15 lbs/acre of conservation seed mix conforming to the following:

35%	Little Bluestem, PA ecotype
25%	Virginia Wild Rye
18%	Indiangrass, PA ecotype
15%	Big Bluestem
6%	Shelter Switchgrass
1%	Ticklegrass

B. Soil Amendments:

1. Lime: Natural limestone containing not less than 85 percent of total carbonates,

ground so that not less than 90 percent passes a 10-mesh sieve and not less than 50 percent passes a 100-mesh sieve.

C. Fertilizers:
   1. Commercial Fertilizer: Complete fertilizer of neutral character, with a minimum of 75 percent nitrogen derived from natural organic sources or urea form; 40-50 percent of the nitrogen shall be water-soluble. Available phosphoric acid derived from superphosphate, bone, or tankage. Potash derived from muriate of potash, containing 60 percent potash. Uniform in composition, free flowing and suitable for application with approved equipment. Provide fertilizer with the following percentages of available plant nutrients:
      a. Provide fertilizer with not less than 4 percent phosphoric acid and not less than 2 percent potassium, and the percentage of nitrogen required to provide not less than 1.5 pounds of actual nitrogen per 1000 square feet of seeded area. Provide nitrogen in a form that will be available to the grasses during the initial period of growth.
   2. Superphosphate: Soluble mixture of treated minerals; 20 percent available phosphoric acid.

D. Mulch:
   1. Anti-Erosion Mulch: Provide clean, seed-free salt hay or threshed straw of wheat, rye, oats or barley, free from noxious weeds. Materials that are low grade and unfit for farm use such as "U.S. Sample Grade" are acceptable.
   2. Wood Cellulose Fiber Pulp (Hydromulch):
      a. Provide specially prepared wood cellulose fiber, processed to contain no growth or germination inhibiting factors, and dyed an appropriate color to facilitate visual metering of application of the materials.
      b. Supply in packages having a gross weight not in excess of 60 pounds.
      c. Moisture content not to exceed 10 percent air dry weight, manufactured so that after addition and agitation in slurry tank the fibers become uniformly suspended to form a homogeneous slurry that when hydraulically sprayed on the ground the material will form a blotter like ground cover impregnated uniformly with seed and which after application allows the absorption of moisture, either rainfall or mechanical watering, to percolate to the underlying soil.
      d. Product and Manufacturer: Provide one of the following:
         1) Conwed Virgin Wood Fiber Mulch by Conwed Incorporated.
         2) Silva Fiber by Weyerhaeuser Company.
         3) Or equal.
   3. Hydromulch Adhesive:
      a. On areas and slopes graded between 1:3 and 1:5 provide 8.25 pounds of adhesive per 1000 square yards of seedbed incorporated into the hydroseed slurry.
      b. Provide the following:

1) A non-ionic galatomannan polysaccharide that forms a colloidal dispersion. Once adhesive film is formed and has been allowed to dry or cure, its resistance to solubility increases. Adhesive film shall be biodegradable, so that it eventually is broken down by water and/or by microbial action.
2) pH: 6 to 7.

E. Water: Potable.

F. Ball Stock Plantings
   a. Hybrid Poplar: Provide 4-5 foot tall ball stock plantings in good health and condition at time of planting.

PART 3- EXECUTION

3.1 INSPECTION

A. Subcontractor shall examine the topsoil, verify the elevations, and depth of topsoil, observe the conditions under which Work is to be performed, and notify Benchmark of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to Benchmark.

3.2 SOIL PREPARATION

A. Apply ground limestone, by machine, over all areas to receive turf, as required, to bring the soil to a neutral pH. Work lightly into the top 3 inches of topsoil at least five days before applying the commercial fertilizers.

B. Apply commercial fertilizers in the following quantities:
   1. For grass apply only at a rate sufficient to supply 1.5 pounds of nitrogen per 1000 square feet.

C. Apply commercial fertilizers within 10 days of planting.

D. Apply commercial fertilizers in 2 operations. First application shall be 3/4 of total amount.

E. Thoroughly and evenly incorporate commercial fertilizers with the soil to depth of 3 inches by discing, or other approved method.
   1. In areas inaccessible to power equipment, use hand tools.
   2. Adjacent to existing trees, adjust depth to avoid disturbing roots.

F. Apply superphosphate for turf areas at the rate of 20 pounds per 1000 square feet and

incorporate into the top 3 inches of topsoil.

G. Grade planting areas to smooth, even surface with loose, uniformly fine texture. Remove all stones and extraneous foreign material in excess of 2-inch diameter. Roll and rake and remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.

H. Apply a second dressing of fertilizer. Use 1/4 of the total required amount.

I. Moisten prepared planting areas before seeding, if soil is dry. Water thoroughly and allow surface moisture to dry before planting. Do not create a muddy soil condition.

J. Restore planting areas to specified condition if eroded or otherwise disturbed after fine grading and prior to seeding.

3.3 INSTALLATION

A. General: Maintain grade stakes until removal is mutually agreed upon by all parties concerned.

B. Seeding:
   1. Sow seed using a spreader or seeding machine.
   2. Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other.
   3. Sow not less than the quantity of seed specified.
   4. Cultipacker, or approved similar equipment, may be used to cover the seed and to firm the seedbed in one operation. In areas inaccessible to cultipacker:
      a. Rake the seed lightly into top 1/8 inch of soil, roll in two directions with a water ballast roller, weighing not less than 100 pounds per linear foot.
      b. Take care during raking that seed is not raked from one spot to another.
   5. Protect seeded areas against erosion by spreading specified mulch after completion of seeding operations.
      a. Protect seeded areas against hot, dry weather or drying winds by applying peat moss mulch not more than 24 hours after completion of seeding operations. Presoak and scatter evenly to a depth of from 1/8-inch to 3/16-inches thick and roll to a smooth surface. Do not mound.
      b. Spread anti-erosion mulch to form a continuous blanket not less than 1-1/2-inch loose measurement over seeded areas. Provide mulch with a partial coating of emulsified liquid tackifier. Place mulch using either of the following methods:
         1) Anchor mulch by spraying with liquid tackifier at the rate of 10 to 13 gallons per 1000 square feet.
         2) Place mulch with equipment that will blow or eject, by means of a constant air stream, controlled quantities of the mulch and tackifier in a

uniform pattern over the specified area. If the mulch is excessively cut or broken take measures to reduce the cutting or breakage to a limit approved by Benchmark. Introduce the tackifier into the air stream by means of a spray arranged so that it will partially coat the mulch with a spotty tack prior to the depositing of the mulch covering. Rate of application not less than 75 gallons per ton of mulch.

6. Do not leave seeded areas unmulched for longer than 3 days. Reseed areas which remain without mulch for longer than 3 days.
7. Prevent damage or staining of construction or other plantings adjacent to mulched areas.
8. Prevent foot or vehicular traffic, or the movement of equipment, over the mulched area. Reseed areas damaged as a result of such activity.
9. Water seeded areas thoroughly with a fine spray.

C. Ball Stock Plantings
   1. Hybrid Poplar: Dig each hole about twice the diameter of the rootball. Remove clay subsoil from the bottom of the holes and replace with topsoil when planting. Water the ball stock thoroughly after planting to settle the soil. Supply water every 10 days during the establishment period.

3.4 MAINTENANCE

A. Begin maintenance immediately after planting.

B. Maintain turf for not less than the period stated below, and longer as required to establish an acceptable stand, as determined by Benchmark.
   1. Seeded areas, not less than 60 days.
   2. If planted in fall and not given full 60 days of maintenance, or if not considered acceptable at that time, continue maintenance the following spring until acceptable turf is established.

C. Maintain seeded areas by watering, fertilizing, weeding, and other operations such as rolling, regrading and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas. After grass has started, re-seed repeatedly all areas greater than 8 inches square which fail to show a uniform stand of grass for any reason whatsoever until all areas are covered with a satisfactory stand of grass is achieved, as determined by Benchmark.

D. Cutting: to be performed by Benchmark after nesting birds have nested (no earlier than first week of August). Hand cutting to remove woody growth will be allowed in lieu of mechanical vegetative cover mowing with USEPA approval.

E. Watering: Provide and maintain temporary watering equipment as required to convey water from water sources and to keep lawn areas uniformly moist as required for proper growth.

F. For seeded areas lay out temporary watering system and arrange watering schedule to avoid walking over muddy and newly seeded areas. Use equipment and water to prevent puddling and water erosion and displacement of seed or mulch (if any).

3.5 CLEANUP AND PROTECTION

A. Keep work area in an orderly condition.

B. Protect turf Work and materials from damage. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged turf Work as directed.

C. Remove all rubbish, equipment and rejected materials from the project site.

D. Protection includes all temporary fences, barriers and signs and other work incidental to proper maintenance.

END OF SECTION

PART II

SOIL / FILL MANAGEMENT PLAN

SITE MANAGEMENT PLAN
PART II

SOIL/FILL MANAGEMENT PLAN

PETER COOPER MARKHAMS SUPERFUND SITE
DAYTON, NEW YORK

January 2009 0021-003-401
Revised June 26, 2009

Prepared by:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

SOIL/FILL MANAGEMENT PLAN
PETER COOPER MARKHAMS SUPERFUND SITE

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SOIL/FILL MANAGEMENT PLAN
PETER COOPER MARKHAMS SUPERFUND SITE

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APPENDICES

1.0 INTRODUCTION

1.1 Purpose and Scope

This Soil/Fill Management Plan (SFMP or Plan) has been prepared for inclusion in the Site Management Plan (SMP) for the Peter Cooper Markhams Superfund site (Site). The Site encompasses approximately 103 acres, and is bordered to the northwest by Bentley Road; to the northeast by a wooded property and farm field; to the southeast by a railroad right-of-way; and to the southwest by hardwood forest (see Figures 1 and 2). The purpose of this SFMP is to protect both the environment and human health following completion of remedial activities within the work limits of the contract documents (see Figure 2).

While the waste/fill piles have been consolidated under a cover system, subsurface information is rarely 100 percent complete or accurate, especially on a Site with a long and diverse history. As such, it is not unreasonable to anticipate the possibility that some quantity of impacted subsurface soil/fill could be encountered during post-remedial construction activities outside the consolidation area. Per the Environmental Easement (see Part III of the SMP), any activities that would interfere with, or adversely affect, the integrity or protectiveness of the cap are prohibited. In addition, development of the remainder of the property is not currently contemplated. However, impacted fill may be encountered if groundwater monitoring or gas venting wells require repair or replacement.

Compliance with this SFMP is required to properly manage any impacted subsurface soil/fill encountered during intrusive activities at the Site. This SFMP was developed with the express purpose of addressing unknown subsurface impacts if and when encountered. The SFMP also facilitates the transfer of responsibilities with property ownership.

This SFMP provides protocols for the proper handling of Site soil/fill during post-remedial construction activities, including:

- Excavation, grading, sampling, and handling of Site soil/fill.
- Acceptability of soil/fill from off-site sources for backfill or subgrade fill.
- Erosion and dust control measures.
- Fencing and other access controls.

- Health and safety procedures for subsurface construction work and the protection of the surrounding community.
- Acceptability and placement of final cover.
- Environmental easements.
- Notification and reporting requirements.

1.2 Soil/Fill Management Program Responsibility

The cooperating potentially responsible parties (CPRPs) will be responsible for all monitoring, implementing, and reporting requirements of this Plan. The CPRPs will not perform, contract, or permit their employees, agents, or assigns to perform any excavations or disturbance of Site soil/fill, except as delineated in this Plan. The CPRPs or their agents will be responsible for proper notification and reporting to regulatory agencies (i.e., United States Environmental Protection Agency) following any intrusive activities as described in Section 2.10 of this Plan. The USEPA may provide periodic monitoring of post-remedial construction activities to verify adherence to the requirements of this SFMP.

2.0 SOIL/FILL MANAGEMENT

2.1 Excavation and Handling of On-Site Soil/Fill

During post-remedial construction activities on the Site (excluding minor landscaping maintenance), Benchmark Environmental Engineering & Science, PLLC (Benchmark) or a Professional Engineer with experience in environmental site investigations will inspect soil/fill excavations or disturbances on behalf of the CPRPs. The soil/fill excavated, as well as the excavation sidewalls and floor, will be inspected for staining, discoloration, odors, or other observations indicative of the presence of waste, which historically is characterized as blackish or brownish sludge-like material containing traces of animal hair and exhibiting sulfur-type odor.

If, during post-remedial construction activities outside the consolidation area but within the work limits shown on Figure 2, soil/fill is encountered that exhibits one or more of these characteristics, the USEPA will be contacted and a remedial plan for addressing the impacted material will be developed. This may involve excavation and on-site disposal of the material beneath the consolidation area soil cover, extension of the consolidation area cover over the impacted area, or excavation and off-site disposal of the material. In the event that other, unexpected types of contamination are discovered (e.g., petroleum release), the soil/fill may also be field-screened for the presence of volatile organic compounds (VOCs) with a photoionization detector (PID) to assist in delineating the extent of impact. A MiniRae 2000 PID equipped with a 10.6 eV lamp, or other appropriate instrument(s), will be calibrated as per the manufacturer's requirements. Benchmark's field operating procedure (FOP) for PID screening is included in Appendix A of this Plan.

If off-site disposal is selected as the remedial approach, analysis for disposal purposes will be in accordance with the protocols delineated in Section 2.3 of this Plan.

2.2 Subgrade Backfill Material

2.2.1 Use Criteria

Subgrade material used to backfill excavations or to increase Site grades or elevations may be comprised of excavated on-site soil/fill or off-site soil/fill. The criteria under which these materials may be used as subgrade backfill are presented below.

- **Excavated, On-Site Soil/Fill:** Soil/fill that is excavated from the Site, including soils excavated for the purpose of accessing impacted soils (e.g., shallow soils overlying deeper impacted soils) may be used on-site as subgrade backfill provided that they do not exhibit the presence of waste or other signs of contamination as described in Section 2.1. On-site soils that exhibit visible or olfactory evidence of contamination, or elevated PID readings (i.e., >5 ppm) shall be staged on plastic sheeting or in roll-off containers covered with plastic sheeting while awaiting analytical results. Soil that does not exhibit evidence of staining, discoloration, or elevated PID readings will not require special handling prior to reuse. However, in no instance shall soil/fill excavated from within the work limits shown on Figure 2 be used outside the work limits unless prior written approval for such use is granted by USEPA.
- **Off-Site Soil/Fill:** Off-site soil/fill material will be documented as having originated from locations having no evidence of disposal or releases of hazardous, toxic, or radioactive substances, or petroleum products. The soil/fill material must be tested and meet the criteria identified on Table 1. In addition, no off-site materials meeting the definition of a solid waste as defined in 6 NYCRR, Part 360-1.2 (a) shall be used as backfill.

2.2.2 Borrow Source Sampling Requirements

Off-site borrow soils shall be tested to assure conformance with the criteria identified on Table 1. If an off-site soil/fill borrow source is of unknown origin or originates from a commercial, industrial or urban site, then a tiered approach based on the volume of impacted soil/fill being excavated will be used to determine the frequency of characterization sampling. In such instances, a minimum of one sample will be collected for each 250 cubic yards (CY) up to 1,000 CY of material excavated. If more than 1,000 CY of soil/fill are excavated from the same general vicinity and all samples of the first 1,000 CY meet the criteria listed in Table 1, the sample collection frequency may be reduced to one sample for each additional 1,000 CY of soil/fill from the same general vicinity, up to 5,000 CY. For borrow sources greater than 5,000 CY, sampling frequency may be reduced to one sample per 5,000 CY, provided all earlier samples met Table 1 criteria.

For off-site soil borrow sources originating from known, virgin sources, a similar sampling frequency as described above will be employed, except initial sampling will be at a frequency of one per 1,000 CY in lieu of one per 250 CY.

Grab samples will be collected for VOC analysis. For all other required analyses, a minimum of four grab samples will be collected to form a single composite sample.

Approximately equal aliquots of the grab samples will be composited in the field using a stainless steel trowel and bowl. The trowel and bowl shall be decontaminated with a non-phosphate detergent (i.e., Alconox®) and potable water wash solution followed by a distilled water rinse between sampling locations. The soil/fill samples will be analyzed in accordance with USEPA SW-846 Methodology by a New York State Department of Health (NYSDOH) ELAP-certified laboratory.

2.3 Soil/Fill Sampling and Analysis Protocol

Excavated soil/fill that is designated for off-site disposal (i.e., soil/fill that exhibits evidence of staining, discoloration, or elevated PID readings as described in Section 2.1 of this plan) will be sampled in accordance with the requirements of the off-site disposal facility and the appropriate regulatory authorities. In addition, the resulting excavation following removal of impacted soil/fill may require verification sampling and analysis to determine the limits of impact. Both characterization and verification sampling and analysis are discussed in the following sections.

2.3.1 Impacted Soil/Fill Characterization

The following procedure represents a suggested method for determining off-site disposal requirements for impacted soil/fill designated for off-site disposal. The sampling procedures, frequency, and parameter list must be coordinated with the off-site disposal facility prior to undertaking characterization work.

Excavated soil/fill should be separately stockpiled in 250 CY or smaller piles. A single grab sample will be collected from each stockpile, with the grab biased toward the zone displaying the most elevated field PID reading. If the stockpiles are from a single source area, sampling may be reduced to one sample per 1,000 CY following receipt of data from four 250 CY stockpiles.

The grab samples will be analyzed by a New York State Department of Health (NYSDOH) ELAP-certified laboratory for leachable (RCRA-listed) metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, and herbicides per 40 CFR Part 261. Analyses will be in accordance with the toxicity characteristic leaching procedure (TCLP) and USEPA SW-846 methodology. Additional parameters may be required for disposal characterization purposes.

If toxicity criteria are exceeded, the soil/fill will be transported to a permitted Treatment Storage and Disposal Facility (TSDF). If the analytical results are below these criteria, the soil/fill may be disposed off-site at a permitted solid waste disposal facility.

2.3.2 Verification Sampling

Verification sampling was not required during the remedial measures construction based on the nature of the waste fill material that was consolidated (i.e., surface piles readily differentiated from native soils due to the visual and olfactory characteristics of the waste fill material). Accordingly, verification sampling following excavation of similar materials, if encountered in the subgrade, is not required. However, in the event that other, unexpected types of contamination are discovered (e.g., petroleum release), a verification sampling approach will be developed and presented to the USEPA for approval as part of the remedial plan referenced in Section 2.1.

2.4 Erosion Controls

An important element of soil/fill management on this Site is the mitigation and control of surface erosion from stormwater runoff. For this reason, the Master Erosion Control Plan employed during the remedial measures (see Appendix B) will be implemented during soil disturbance and stockpiling activities.

2.5 Dust Controls

Particulate monitoring will be performed continuously at upwind and downwind locations of the Site during subgrade excavating, grading, and handling activities in accordance with the Community Air Monitoring Plan (CAMP), included in the Health and Safety Contingency Plan (see Appendix D of the RD Report) (Ref. 1). Dust suppression techniques will be employed as necessary to mitigate fugitive dust from unvegetated or disturbed soil/fill during post-remediation construction and redevelopment. Techniques to be used include one or more of the following:

- Applying water on haul roads.
- Wetting equipment and excavation faces.
- Spraying water on buckets during excavation and dumping.
- Hauling materials in properly tarped containers or vehicles.

- Restricting vehicle speeds on-site.
- Covering excavated areas and materials after excavation activity ceases.
- Reducing the excavation size and/or number of excavations.

All reasonable attempts will be made to keep visible and/or fugitive dust to a minimum.

2.6 Fencing, Access Control, and Signage

Interior temporary fencing shall be erected and maintained as necessary during construction activities to control access to open excavations and construction areas. Temporary fencing will be relocated by the property owner(s) as necessary as construction proceeds. All temporary fencing will be posted with "No Trespassing" signs.

2.7 Property Use Limitations

An environmental easement has been filed as part of the final remedial measures for the Site. The easement includes the following use restrictions:

- The extraction of groundwater and any activities that would interfere with, or adversely affect, the integrity or protectiveness of the cap are prohibited.

The environmental easement has been recorded with Cattaraugus County. The environmental easement will be binding for the CPRPs and all subsequent property owners and occupants.

2.8 Notification and Reporting Requirements

The USEPA will be notified that intrusive activities are being initiated a minimum of 5 working days in advance of construction. A NY State Licensed P.E. or a designated representative will inspect all subsurface excavation work for conformance with this SFMP.

The CPRPs will complete and submit to the USEPA an Annual Report by January 15 of each year. The Annual Report will contain certification that: the institutional controls put in place are still in place, have not been altered and are still effective; the remedy and protective cover have been maintained; and the conditions at the Site are fully protective of public health and the environment. If the cover system has been breached during the year covered by the Annual Report, the CPRPs will include a certification that all work was performed in conformance with the SFMP.

3.0 HEALTH AND SAFETY PROCEDURES

During intrusive activities, the CPRPs will be responsible for implementing suitable procedures to prevent both Site construction workers and the community from adverse exposure to residual parameters of concern and other potential hazards posed by the work. This will be accomplished through adherence to the written site-specific worker Health and Safety Contingency Plan (HSCP), prepared and implemented as part of the remedial measures for the Site. The HSCP was prepared in accordance with the regulations contained in OSHA 29CFR 1910.120, and includes a Community Air Monitoring Plan (CAMP) in conformance with NYSDOH requirements. Appendix D to the RD Report includes a copy of the HSCP (Ref. 1). The HSCP and CAMP will be implemented during post-remedial construction work involving disturbance or handling of Site soil/fill.

4.0 REFERENCES

1. Benchmark Environmental Engineering and Science, PLLC. June 2008. *Remedial Design Report for the Peter Cooper Markhams Superfund Site, Dayton, New York.*

TABLES

BENCHMARK
ENVIRONMENTAL
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TABLE 1

CRITERIA FOR USE OF OFF-SITE SOIL

Soil/Fill Management Plan
Peter Cooper Markhams Superfund Site
Dayton, New York

Parameter	Allowable Concentration for Use of Off-Site Soil
Volatile Organic Compounds (mg/kg)	
1,1,1-Trichloroethane	0.68
1,1-Dichloroethane	0.27
1,1-Dichloroethene	0.33
1,2-Dichlorobenzene	1.1
1,2-Dichloroethane	0.02
1,2-Dichloroethene(cis)	0.25
1,2-Dichloroethene(trans)	0.19
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
1,4-Dioxane	0.1
Acetone	0.05
Benzene	0.06
Butylbenzene	12
Carbon tetrachloride	0.76
Chlorobenzene	1.1
Chloroform	0.37
Ethylbenzene	1
Hexachlorobenzene	3.2
Methyl ethyl ketone	0.12
Methyl tert-butyl ether	0.93
Methylene chloride	0.05
Propylbenzene-n	3.9
Sec-Butylbenzene	11
Tert-Butylbenzene	5.9
Tetrachloroethene	1.3
Toluene	0.7
Trichloroethene	0.47

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TABLE 1

CRITERIA FOR USE OF OFF-SITE SOIL

Soil/Fill Management Plan
Peter Cooper Markhams Superfund Site
Dayton, New York

Parameter	Allowable Concentration for Use of Off-Site Soil
Volatile Organic Compounds (mg/kg)	
Trimethylbenzene-1,2,4	3.6
Trimethylbenzene-1,3,5	8.4
Vinyl chloride	0.02
Xylene (mixed)	1.6
Semi-Volatile Organic Compounds (mg/kg)	
Acenaphthene	98
Acenaphthylene	107
Anthracene	500
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1.7
Benzo(g,h,i)perylene	500
Benzo(k)fluoranthene	1.7
Chrysene	1
Dibenz(a,h)anthracene	0.56
Fluoranthene	500
Fluorene	386
Indeno(1,2,3-cd)pyrene	5.6
m-Cresol(s)	0.33
Naphthalene	12
o-Cresol(s)	0.33
p-Cresol(s)	0.33
Pentachlorophenol	0.8
Phenanthrene	500
Phenol	0.33
Pyrene	500

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TABLE 1

CRITERIA FOR USE OF OFF-SITE SOIL

Soil/Fill Management Plan
Peter Cooper Markhams Superfund Site
Dayton, New York

Parameter	Allowable Concentration for Use of Off-Site Soil
Metals (mg/kg)	
Arsenic	16
Barium	400
Beryllium	47
Cadmium	7.5
Chromium, Hexavalent[1]	19
Chromium, Trivalent[1]	1500
Copper	270
Cyanide	27
Lead	450
Manganese	2000
Mercury (total)	0.73
Nickel	130
Selenium	4
Silver	8.3
Zinc	2480
PCBs/Pesticides (mg/kg)	
2,4,5-TP Acid (Silvex)	3.8
4,4'-DDE	17
4,4'-DDT	47
4,4'-DDD	14
Aldrin	0.19
Alpha-BHC	0.02
Beta-BHC	0.09
Chlordane (alpha)	2.9
Delta-BHC	0.25
Dibenzofuran	210
Dieldrin	0.1
Endosulfan I	102
Endosulfan II	102

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TABLE 1

CRITERIA FOR USE OF OFF-SITE SOIL

Soil/Fill Management Plan
Peter Cooper Markhams Superfund Site
Dayton, New York

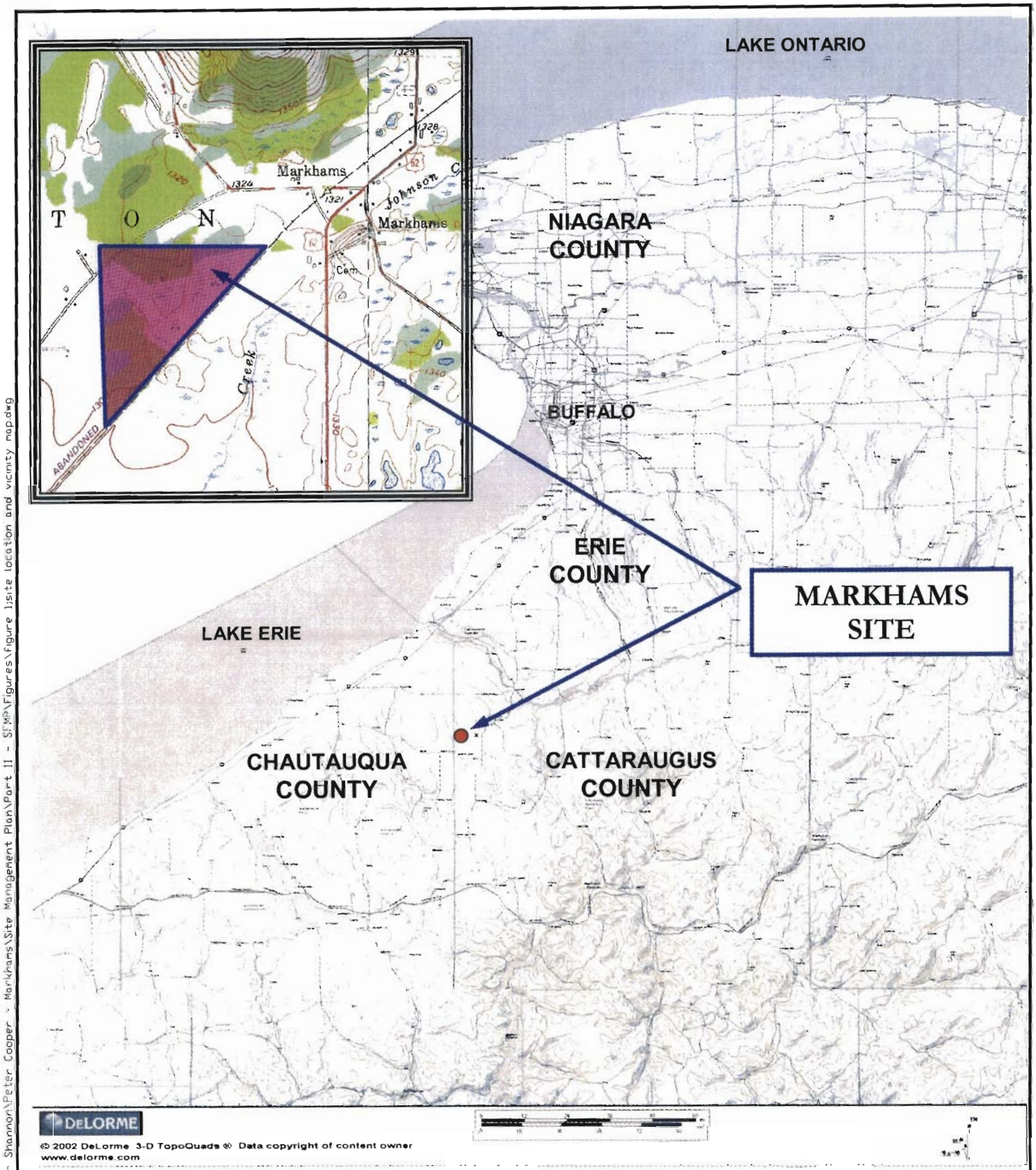
Parameter	Allowable Concentration for Use of Off-Site Soil
PCBs/Pesticides (mg/kg)	
Endosulfan sulfate	200
Endrin	0.06
Heptachlor	0.38
Lindane	0.1
Polychlorinated biphenyls	1

Notes:

1. The SCO for Hexavalent or Trivalent Chromium is considered to be met if the analysis for the total species of this contaminant is below the specific SCO for Hexavalent Chromium.

FIGURES

FIGURE 1



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PROJECT NO.: 0021-003-401
DATE: NOVEMBER 2008
DRAFTED BY: AJZ

SITE LOCATION AND VICINITY MAP

SOIL/FILL MANAGEMENT PLAN

PETER COOPER MARKHAMS SUPERFUND SITE
DAYTON, NEW YORK

PREPARED FOR
CPRPs FOR PETER COOPER MARKHAMS SITE

FILEPATH=\\Benchmark\Clients\Cpiller- Shannon\Peter Cooper - Markhams\Site Management Plan\Part II - SFMP\Figures\figure 1site location and vicinity map.dwg

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DATE: NOVEMBER 2008
DRAFTED BY: AJZ

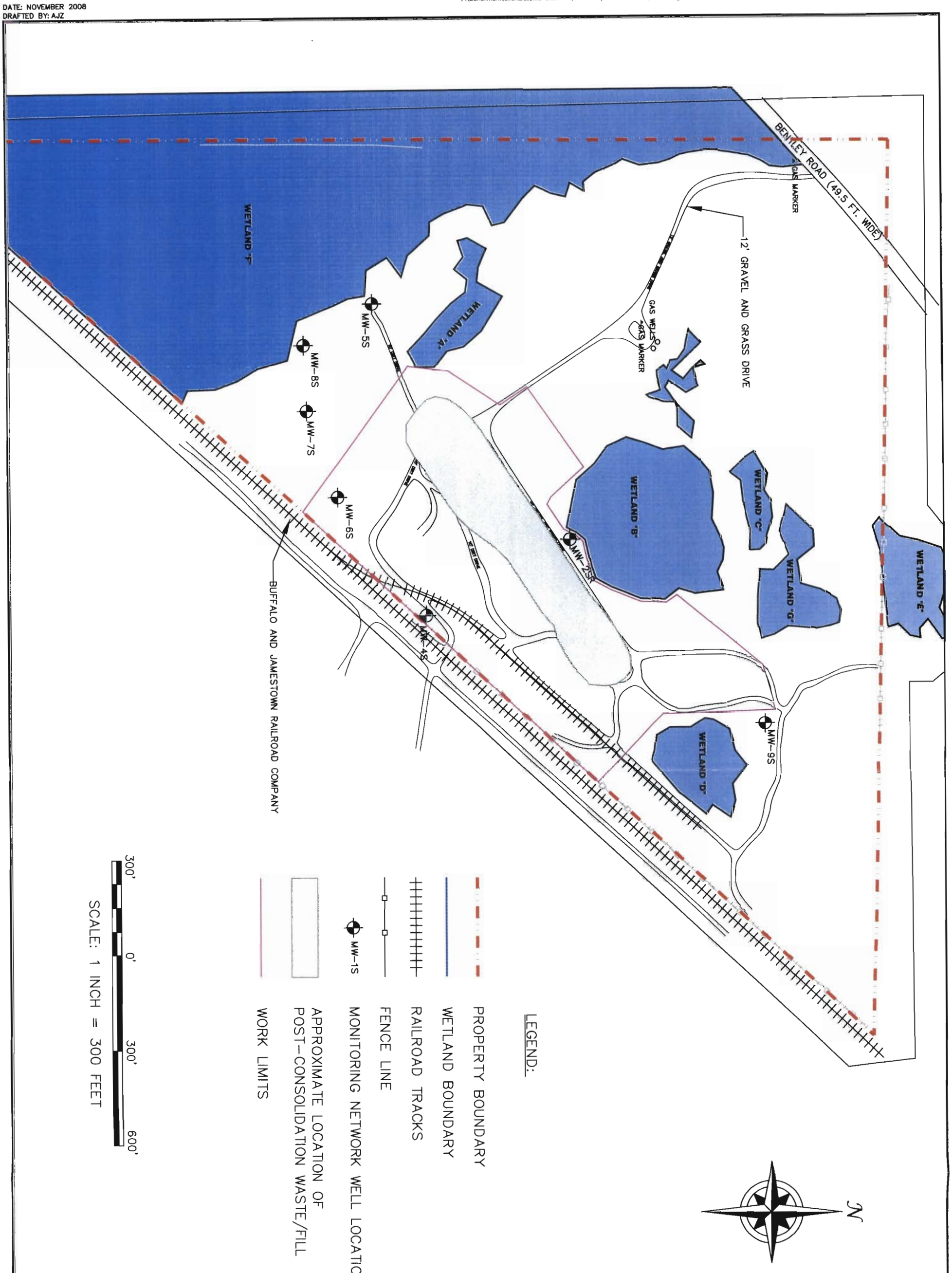

FIGURE 2

SITE PLAN

SOIL/FILL MANAGEMENT PLAN

PETER COOPER MARKHAMS SUPERFUND SITE

DAYTON, NEW YORK

PREPARED FOR

CPRPs FOR PETER COOPER MARKHAMS

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JOB NO.: 0021-003-401

APPENDIX A

FIELD OPERATING PROCEDURES

BENCHMARK
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FIELD OPERATING PROCEDURES

Screening of Soil Samples for Organic Vapors During Impacted Soil Removal Activities

FOP 048.0

SCREENING OF SOIL SAMPLES FOR ORGANIC VAPORS DURING IMPACTED SOIL REMOVAL ACTIVITIES

PURPOSE

This procedure is used to screen soil samples for the presence of volatile organic constituents (VOCs) using a field organic vapor meter. The field meter should either be a photoionization detector (PID) or flame-ionization detector (FID) type. This type of screening is generally performed during underground storage tank (UST) and/or impacted soil removal activities as a procedure for ensuring the health and safety of the community and personnel at the site as well as to identify potential VOC-impacted soil samples for laboratory analysis (i.e., confirmatory or verification samples). Soil samples are also screened in the field to provide assessment criteria to determine horizontal and vertical extents of VOC-impacts in order to ensure soils that may have been impacted by volatile organic substances are removed.

PROCEDURE

1. Calibrate air-monitoring equipment in accordance with the appropriate Benchmark's Field Operating Procedures or manufacturers recommendations for calibration of field meters.

2. Perform community air monitoring in accordance with the Project Work Plan and/or Benchmark's FOP: Real-Time Air Monitoring During Intrusive Activities.

3. Upon proper removal of any identified UST in accordance with NYSDEC Division of Environmental Remediation, Spill Response Unit or Bulk Storage Unit guidelines and/or Benchmark's FOP: Underground Storage Tank Removal Procedures; examine the four sidewalls and bottom of the excavation for visually impacted (i.e., stained) soils.

4. If visually impacted soils are identified, direct the excavating equipment operator to scrape the impacted area (i.e., sidewall or bottom of the excavation) and present the scraped soil for evaluation. NOTE: Under no circumstances should anyone enter an excavation greater than 4 feet in depth, unless absolutely necessary. Excavation entry may only occur under strict confined space entry procedures following implementation of specific engineering controls (i.e., continuous air monitoring, excavation shoring, trench box installation, benching).

5. Visually inspect and perform an open air PID/FID scan of the scraped soil sample noting stratification, visible staining, or other evidence of impact (i.e., presence of non-aqueous phase liquid, NAPL).

6. Collect a representative sample (approximately 100 milligrams (mg)) of soil using a decontaminated or dedicated stainless steel sampling tool (i.e., spoon, spatula, scoop, or approved equivalent), for field headspace determination of VOC-impact. Place the representative soil sample into a labeled wide-mouth glass jar approximately ½ to ¾ full and seal with aluminum foil and a screw top cap. Alternatively, the soil sample may be placed into a clean, re-sealable plastic bag and sealed. Be sure to leave adequate headspace above the soil sample within either sealed container.

7. Place the field screening sample (i.e., jar or bag) in a location where the ambient temperature is at least 70° Fahrenheit for at least 15 minutes, but no more than 60 minutes.

8. Carefully remove the screw top cap from the jar and slowly insert the tip of the organic vapor meter (PID or FID) through the aluminum foil seal making the smallest hole possible. Alternatively, unseal a portion of the plastic bag just big enough to insert the probe of a calibrated PID.

9. Record the depth, sample location (i.e., sidewall, bottom) and maximum reading in parts per million by volume (ppmv) in the Project Field Book and Impacted Soil Excavation Log (sample attached), at the depth interval corresponding to the depth of sample collection.

10. The representative soil samples collected from the excavation will be used to assess the vertical and horizontal limits of VOC-impact and guide the impacted soil removal activities in accordance with project requirements (i.e., PID scans less than 20 ppm will not require removal unless laboratory analytical results exceed regulatory limits).

11. Collect verification/confirmation samples in accordance with NYSDEC Division of Environmental Remediation, Spill Response Unit or Bulk Storage Unit guidelines and/or Benchmark's FOP: Surface and Subsurface Soil Sampling Procedures.

ATTACHMENTS

Impacted Soil Excavation Log (sample)

REFERENCES

Benchmark FOPs:

010 *Calibration and Maintenance of Portable Flame Ionization Detector*
011 *Calibration and Maintenance of Portable Photoionization Detector*
063 *Surface and Subsurface Soil Sampling Procedures*
073 *Real-Time Air Monitoring During Intrusive Activities*
074 *Underground Storage Tank Removal Procedures*

FOP 048.0

SCREENING OF SOIL SAMPLES FOR ORGANIC VAPORS DURING IMPACTED SOIL REMOVAL ACTIVITIES

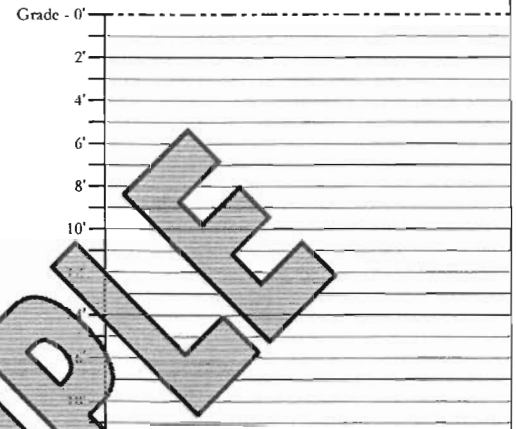
BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

IMPACTED SOIL EXCAVATION LOG

Project:	EXCAVATION I.D.:
Project No.:	Excavation Date:
Client:	Excavation Method:
Location:	CQA Observer:

Excavation Location: *NOT TO SCALE* *(approximate)*

Excavation Cross Section:



SAMPLE

TIME	Length:
Start:	Width:
End:	Depth:

Verification Sample I.D.	Depth (ft)	Location within Excavation (sidewall/bottom)	PID Scan (ppm)	PID Headspace (ppm)	Photos Y / N	

COMMENTS:

UST ENCOUNTERED:	☐ yes	☐ no	If yes, Describe (type, material, size, capacity etc.):
GROUNDWATER ENCOUNTERED:	☐ yes	☐ no	If yes, depth to GW:
VISUAL IMPACTS:	☐ yes	☐ no	Describe:
OLFACTORY OBSERVATIONS:	☐ yes	☐ no	Describe:
NON-NATIVE FILL ENCOUNTERED:	☐ yes	☐ no	
OTHER OBSERVATIONS:	☐ yes	☐ no	Describe:
QUANTITY OF IMPACTED SOIL REMOVED:			
FINAL DESTINATION OF IMPACTED SOIL:			
TYPE OF BACKFILL:			
SURFACE COMPLETION:			

APPENDIX B

MASTER EROSION CONTROL PLAN (MECP)

SOIL/FILL MANAGEMENT PLAN
APPENDIX B

MASTER EROSION CONTROL PLAN (MECP)

PETER COOPER MARKHAMS SUPERFUND SITE
DAYTON, NEW YORK

January 2009
Revised June 26, 2009

0021-003-401

Prepared by:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

SOIL/FILL MANAGEMENT PLAN
APPENDIX B

MASTER EROSION CONTROL PLAN
PETER COOPER MARKHAMS SUPERFUND SITE

Table of Contents

APPENDICES

1.0 INTRODUCTION

1.1 Background and History

The Peter Cooper Markhams Superfund Site encompasses approximately 103 acres, and is bordered to the northwest by Bentley Road; to the northeast by a wooded property and farm field; to the southeast by a railroad right-of-way; and to the southwest by hardwood forest. Surrounding property is entirely rural, consisting of small farm fields, open meadow, and forests. Remedial measures were implemented from July 30 to October 23, 2008 under an USEPA-issued Order (CERCLA-02-2000-2003).

1.2 Purpose and Scope

The Soil/Fill Management Plan (SFMP) describes protocols for the proper handling of Site soil/fill during post-remedial construction activities. The cooperating potentially responsible parties (CPRPs) will be responsible for all monitoring, implementing, and reporting requirements of the SFMP.

Since erosion control will be a critical component in preventing the potential migration of contaminants off-site, this Master Erosion Control Plan (MECP) was prepared to provide guidance to the CPRPs during intrusive activities on the Site. This MECP is a critical component of the SFMP, is generic in nature, and provides minimum erosion control practices to be used by the CPRPs and subsequent owners.

2.0 GENERAL PERMIT REQUIREMENTS

Since post-remedial construction activities at the Site will not disturb more than five acres of land, the Federal Water Pollution Control Act (as amended, 33 U.S.C. 1251 et. seq.) and the New York State Environmental Conservation Law (Article 17, Titles 7 and 8, and Article 70) do not apply.

3.0 POTENTIAL EROSION CONTROL CONCERNS

Potential areas and erosion control concerns during post-remedial construction activities include the following:

- Any disturbed portion of the cap that requires repair.
- Soil/fill excavations will require proper handling and disposal.

4.0 EROSION CONTROL MEASURES

4.1 Background

Standard soil conservation practices need to be incorporated into the construction plans to mitigate soil erosion damage, off-site sediment migration, and water pollution from erosion. These practices combine vegetative and structural measures, many of which will be permanent in nature and become part of the completed project (i.e., drainage channels and grading). Other measures will be temporary and serve only during the construction stage. Selected erosion and sediment control measures will meet the following criteria:

- Minimize erosion through project design (maximum slopes, phased construction, etc.).
- Incorporate temporary and permanent erosion control measures.
- Remove sediment from sediment-laden storm water before it leaves the Site.

4.2 Temporary Measures

Temporary erosion and sedimentation control measures and facilities will be used during post-remedial construction activities. They will be maintained until they are either no longer needed or until such time as permanent measures are installed and become effective. Erosion and sediment controls shall be installed in accordance with the standards and specifications presented in Appendix B-1. At a minimum, the following temporary measures will be used:

- Silt fencing
- Straw/hay bales
- Temporary vegetation/mulching
- Temporary sedimentation basins
- Cautious placement, compaction and grading of stockpiles

4.2.1 Silt Fencing

Construction and regrading activities will result in surface water flow to drainage ditches and swales, storm sewers, and adjacent properties. Silt fencing will be the primary sediment control measure used in these areas. Prior to extensive soil excavation or grading activities, silt fences will be installed along the perimeter of all construction areas. The orientation of the fencing will be adjusted as necessary as the work proceeds to accommodate changing Site conditions.

Intermediate fencing will be used upgradient of the perimeter fencing to help lower surface water runoff velocities and reduce the volume of sediment to perimeter fencing. Stockpiles will also be surrounded with silt fencing.

As sediment collects, the silt fences will be cleaned as necessary to maintain their integrity. Removed sediment will be used elsewhere on-site as general fill. All perimeter silt fences will remain in place until construction activities in an area are completed and vegetative cover has been established.

4.2.2 Straw and/or Hay Bales

Straw and/or hay bales will be used to intercept sediment laden storm water runoff in drainage channels during construction. The use of either hay or straw will be based on the availability of materials at the time of construction.

Bales will be placed in swales and ditches where the anticipated flow velocity is not expected to be greater than 5 feet/second (fps). Intermediate bales will be placed upgradient of the final barrier to reduce flow velocities and sediment loadings where higher velocities are anticipated.

As with silt fencing, sediment will be removed as necessary from behind the bales and disposed of on-site. Bales that have become laden with sediment or that have lost their structural integrity or effectiveness due to the weather will be replaced.

4.2.3 Cautious Placement of Stockpiles

Excavation activities will produce stockpiles of soil and subgrade soil/fill materials. Careful placement and construction of stockpiles will be required to control erosion. Stockpiles will be placed no closer than 50 feet from storm water inlets and parcel

boundaries. Additionally, stockpiles will be graded and compacted as necessary for positive surface water runoff and dust control. Impacted stockpiles will be underlain and covered with secured polyethylene tarpaulin until proper disposal has been secured.

4.3 Permanent Control Measures During Site Redevelopment

Permanent erosion and sedimentation control measures and structures will be installed as soon as practical during construction for long-term erosion protection. Examples of permanent erosion control measures could include:

- Using maximum slopes in erosion prone areas to limit erosion.
- Minimizing the potential contact with, and migration of, subsurface soil/fill through the placement of a "clean" soil cover system in all areas not covered with structures, roads, parking areas, sidewalks, etc.
- Planting and maintaining vegetation.
- Limiting runoff flow velocities to the extent practical.
- Lining collection channels with riprap, erosion control fabric, vegetation, or similar materials.

5.0 CONSTRUCTION MANAGEMENT PRACTICES

5.1 General

The following general construction practices should be evaluated for erosion and sedimentation control purposes during post-remedial construction activities:

- Clearing and grading only as much area as is necessary to accommodate the construction needs to minimize disturbance of areas subject to erosion (i.e., phasing the work).
- Covering exposed or disturbed areas of the Site as quickly as practical.
- Installing erosion and sediment control measures before disturbing the Site subgrade.
- Minimizing on-site and off-site tracking of soil by vehicles using routine entry/ exit routes.

5.2 Monitoring, Inspection, and Maintenance Plan

All erosion and sedimentation controls described in this Plan will be inspected by a qualified representative of the CPRPs within 24 hours of a heavy rainfall event and repaired or modified as necessary to effectively control erosion of turbidity problems. Inspections should include areas under construction, stockpile areas, erosion control devices (i.e., silt fences, hay bales, etc.), and locations where vehicles enter and leave the Site. Routine inspections of the entire Site should also be made on a monthly basis during development.

If inspections indicate problems, corrective measures should be implemented within 24 hours. A report summarizing the scope of the inspection, name of the inspector, date, observations made, and a description of the corrective actions taken should be completed. Examples of inspection forms to be completed are included in Appendix B-2.

APPENDIX B-1

EROSION CONTROL DETAILS

- *Silt Fence*
- *Straw Bale Dike*
- *Perimeter Dike/Swale*
- *Temporary Swale*
- *Sediment Trap for Drop Inlet*

New York State
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water

New York State Standards and Specifications for Erosion and Sediment Control

August 2005

New York State
Department of Environmental Conservation

George E. Pataki, Governor

STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition

A temporary barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a silt fence is to reduce runoff velocity and effect deposition of transported sediment load. Limits imposed by ultraviolet stability of the fabric will dictate the maximum period the silt fence may be used (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope lengths contributing runoff to a silt fence placed on a slope are:

Slope Steepness	Maximum Length (ft.)
2:1	25
3:1	50
4:1	75
5:1 or flatter	100

2. Maximum drainage area for overland flow to a silt fence shall not exceed ¼ acre per 100 feet of fence, with maximum ponding depth of 1.5 feet behind the fence; and

3. Erosion would occur in the form of sheet erosion; and

4. There is no concentration of water flowing to the barrier.

Design Criteria

Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff. All silt fences shall be placed as close to the areas as possible, but at least 10 feet from the toe of a slope to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.

Sensitive areas to be protected by silt fence may need to be reinforced by using heavy wire fencing for added support to prevent collapse.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. A detail of the silt fence shall be shown on the plan. See Figure 5A.8 on page 5A.21 for details.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682

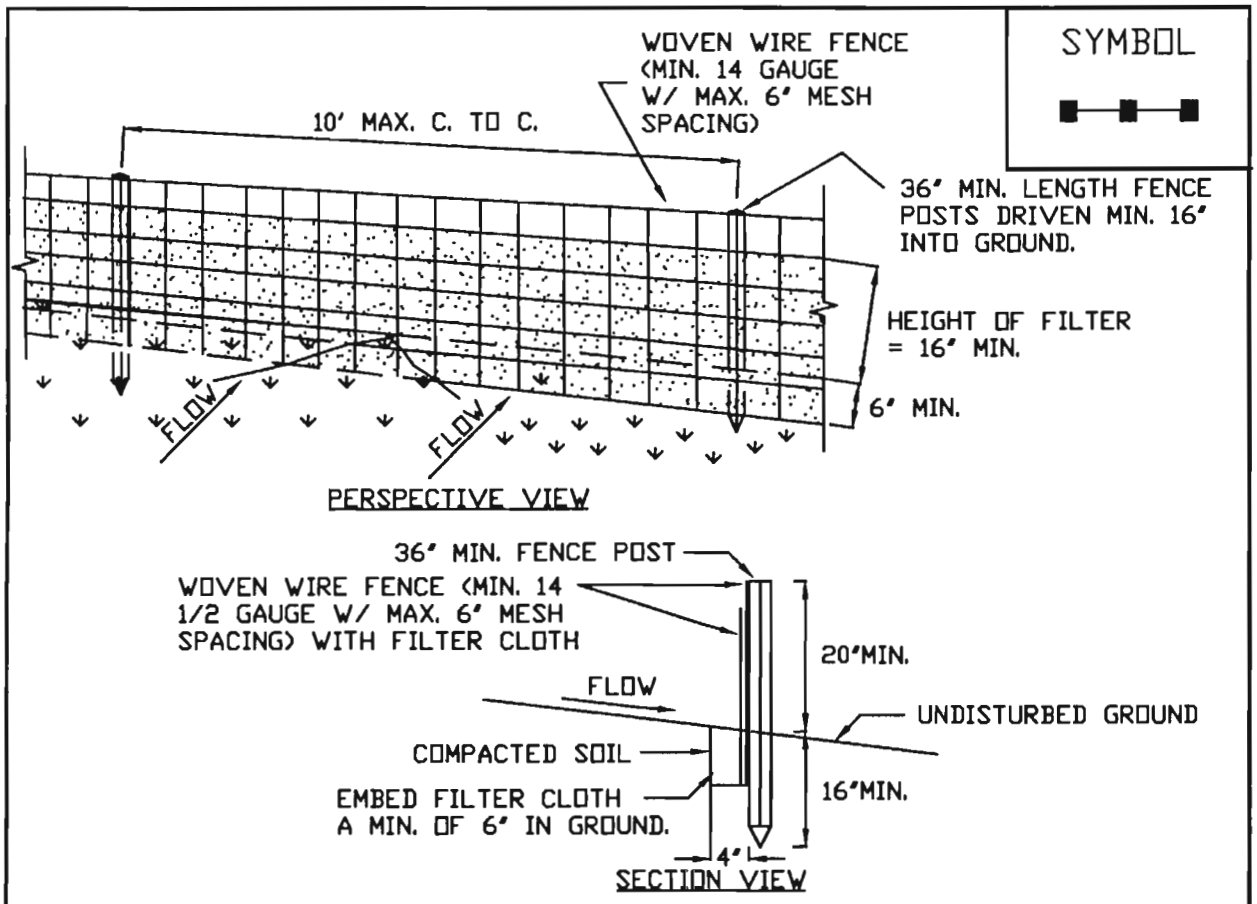
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Size	40-80	US Std Sieve CW-02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot.

3. Wire Fence (for fabricated units): Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated Units: Envirofence, Geofab, or approved equal, may be used in lieu of the above method providing the unit is installed per details shown in Figure 5A.8.

Figure 5A.8
Silt Fence

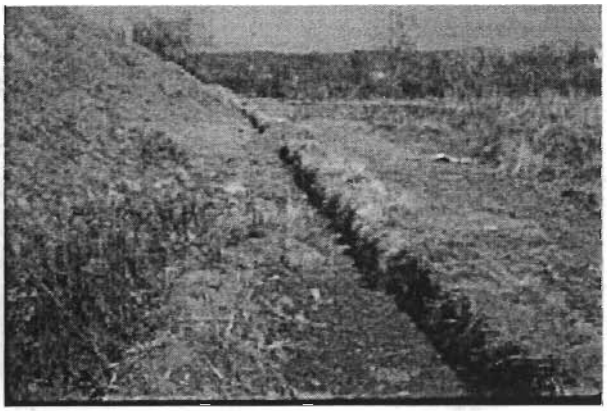


CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER 'T' OR 'U' TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN 'BULGES' DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	SILT FENCE

STANDARD AND SPECIFICATIONS FOR STRAW BALE DIKE



Definition

A temporary barrier of straw, or similar material, used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a bale dike is to reduce runoff velocity and effect deposition of the transported sediment load. Straw bale dikes have an estimated design life of three (3) months.

Conditions Where Practice Applies

The straw bale dike is used where:

1. No other practice is feasible.
2. There is no concentration of water in a channel or other drainage way above the barrier.
3. Erosion would occur in the form of sheet erosion.
4. Length of slope above the straw bale dike does not exceed these limits.

Constructed Slope	Percent Slope	Slope Length (ft.)
2:1	50	25
3:1	33	50
4:1	25	75

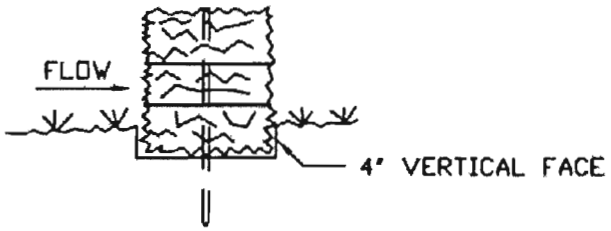
Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

The practice may also be used for a single family lot if the slope is less than 15 percent. The contributing drainage areas in this instance shall be less than one quarter of an acre per 100 feet of fence and the length of slope above the dike shall be less than 200 feet.

Design Criteria

The above table is adequate, in general, for a one-inch rainfall event. Larger storms could cause failure of this practice. Use of this practice in sensitive areas for longer than one month should be specifically designed to store expected runoff. All bales shall be placed on the contour with cut edge of bale adhering to the ground. See Figure 5A.7 on page 5A.18 or details.

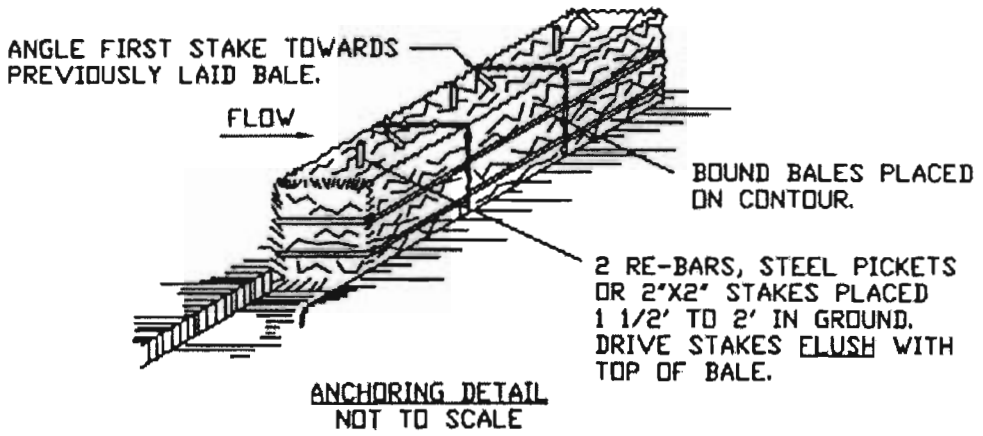
Figure 5A.7
Straw Bale Dike



SYMBOL

BEDDING DETAIL
NOT TO SCALE

DRAINAGE AREA NO MORE THAN 1/4 ACRE PER 100 FEET OF STRAW BALE DIKE FOR SLOPES LESS THAN 25%.



ANCHORING DETAIL
NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR REPLACEMENT SHALL BE MADE PROMTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULLNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

STRAW BALE DIKE

STANDARD AND SPECIFICATIONS FOR PERIMETER DIKE/SWALE

Definition

A temporary ridge of soil excavated from an adjoining swale located along the perimeter of the site or disturbed area.

Purpose

The purpose of a perimeter dike/swale is to prevent off site storm runoff from entering a disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area.

Conditions Where Practice Applies

Perimeter dike/swale is constructed to divert flows from entering a disturbed area, or along tops of slopes to prevent flows from eroding the slope, or along base of slopes to direct sediment laden flows to a trapping device.

The perimeter dike/swale shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 5A.3 on page 5A.8 for details.

The perimeter dike/swale shall not be constructed outside the property lines without obtaining legal easements from affected adjacent property owners. A design is not required for perimeter dike/swale. The following criteria shall be used:

Drainage area – Less than 2 acres (for drainage areas larger than 2 acres but less than 10 acres, see earth dike or temporary swale; for drainage areas larger than 10 acres, see standard and specifications for diversion).

Height – 18 inches minimum from bottom of swale to top of dike evenly divided between dike height and swale depth.

Bottom width of dike – 2 feet minimum.

Width of swale – 2 feet minimum.

Grade – Dependent upon topography, but shall have positive drainage (sufficient grade to drain) to an adequate outlet. Maximum allowable grade not to exceed 8 percent.

Stabilization – The disturbed area of the dike and swale shall be stabilized within 7 days of installation, in accordance with the standard and specifications for temporary swales.

Outlet

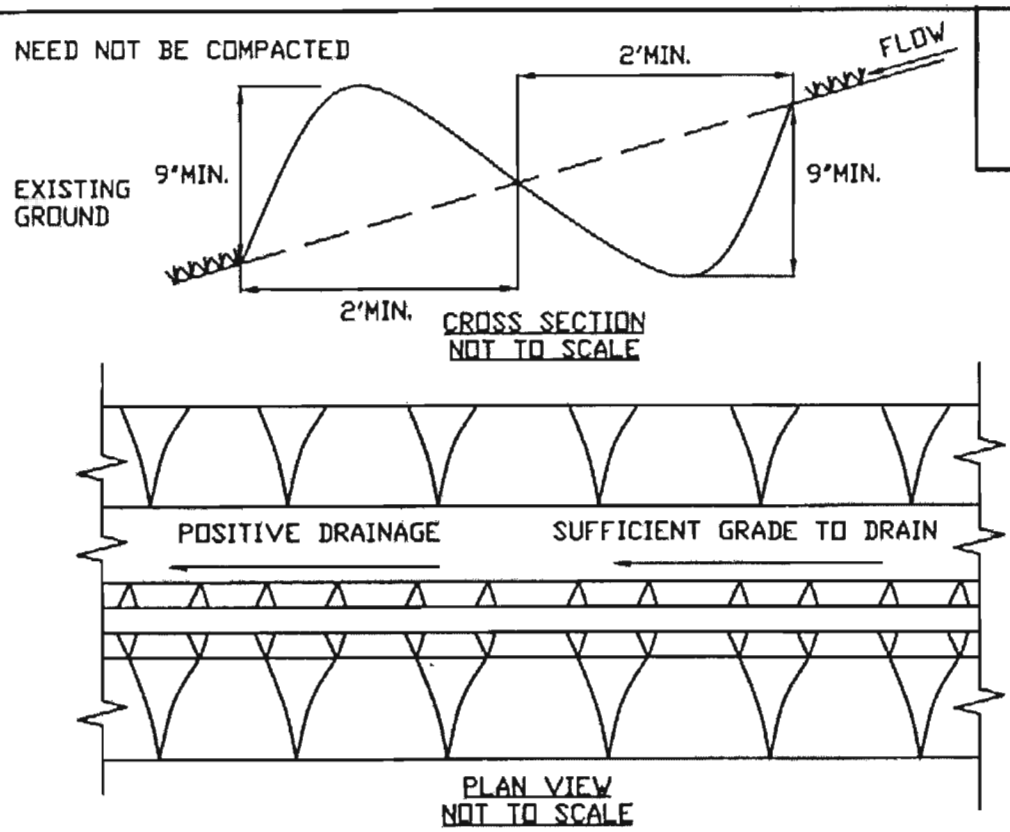
1. Perimeter dike/swale shall have a stabilized outlet.

2. Diverted runoff from a protected or stabilized upland area shall outlet directly onto an undisturbed stabilized area.

3. Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment trap, sediment basin, or to an area protected by any of these practices.

4. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

Figure 5A.3
Perimeter Dike/Swale



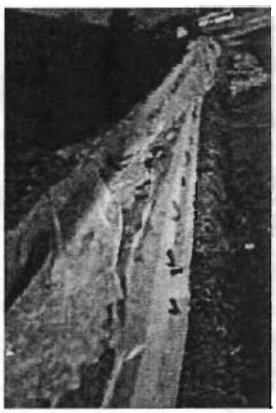
CONSTRUCTION SPECIFICATIONS

1. ALL PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSION VELOCITY.
4. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED IN THE STANDARD.
5. STABILIZATION OF THE AREA DISTURBED BY THE DIKE AND SWALE SHALL BE DONE IN ACCORDANCE WITH THE STANDARD AND SPECIFICATIONS FOR TEMPORARY SEEDING AND MULCHING, AND SHALL BE DONE WITHIN 10 DAYS.
6. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

MAX. DRAINAGE AREA LIMIT: 2 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	PERIMETER DIKE OR SWALE

STANDARD AND SPECIFICATIONS FOR TEMPORARY SWALE



Definition

A temporary excavated drainage way.

Purpose

The purpose of a temporary swale is to prevent runoff from entering disturbed areas by intercepting and diverting it to a stabilized outlet or to intercept sediment laden water and divert it to a sediment trapping device.

Conditions Where Practice Applies

Temporary swales are constructed:

1. to divert flows from entering a disturbed area.

2. intermittently across disturbed areas to shorten overland flow distances.

3. to direct sediment laden water along the base of slopes to a trapping device.

4. to transport offsite flows across disturbed areas such as rights-of-way.

Swales collecting runoff from disturbed areas shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 5A.2 on page 5A.5 for details.

	Swale A	Swale B
Drainage Area	<5 Ac	5-10 Ac
Bottom Width of Flow Channel	4 ft	6 ft
Depth of Flow Channel	1 ft	1 ft
Side Slopes	2:1 or flatter	2:1 or flatter
Grade	0.5% Min. 20% Max.	0.5% Min. 20% Max.

For drainage areas larger than 10 acres, refer to the Standard and Specification for Waterways on page 5B.11.

Stabilization

Stabilization of the swale shall be completed within 7 days of installation in accordance with the appropriate standard and specifications for vegetative stabilization or stabilization with mulch as determined by the time of year. The flow channel shall be stabilized as per the following criteria:

Type of Treatment	Channel Grade[1]	Flow Channel A (<5 Ac.)	Flow Channel B (5-10 Ac)
1	0.5-3.0%	Seed & Straw Mulch	Seed & Straw Mulch
2	3.1-5.0%	Seed & Straw Mulch	Seed and cover with RECP, Sod, or lined with plastic or 2 in. stone
3	5.1-8.0%	Seed and cover with RECP, Sod, or line with plastic or 2 in. stone	Line with 4-8 in. or stone or Recycled Concrete Equivalent[2] or geotextile
4	8.1-20%	Line with 4-8 in. stone or Recycled Concrete Equivalent[2] or geotextile	Site Specific Engineering Design

[1] In highly erodible soils, as defined by the local approving agency, refer to the next higher slope grade for type of stabilization.
[2] Recycled Concrete Equivalent shall be concrete broken into the required size, and shall contain no steel reinforcement.

Outlet

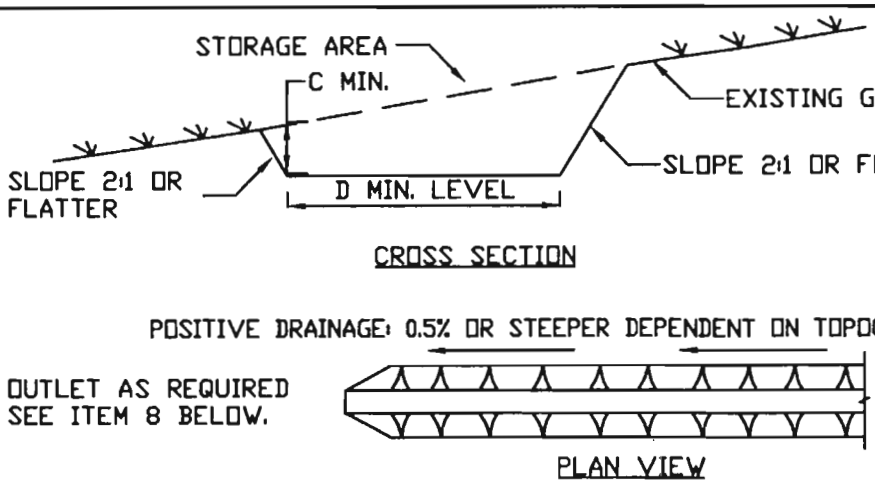
Swale shall have an outlet that functions with a minimum of erosion, and dissipates runoff velocity prior to discharge off the site.

Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin until the drainage area above the swale is adequately stabilized.

The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet condition.

If a swale is used to divert clean water flows from entering a disturbed area, a sediment trapping device may not be needed.

Figure 5A.2
Temporary Swale



CONSTRUCTION SPECIFICATIONS

1. ALL TEMPORARY SWALES SHALL HAVE UNINTERUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
5. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
6. FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
7. ALL EARTH REMOVED AND NOT NEEDED FOR CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. STABILIZATION SHALL BE AS PER THE FLOW CHANNEL STABILIZATION CHART BELOW:

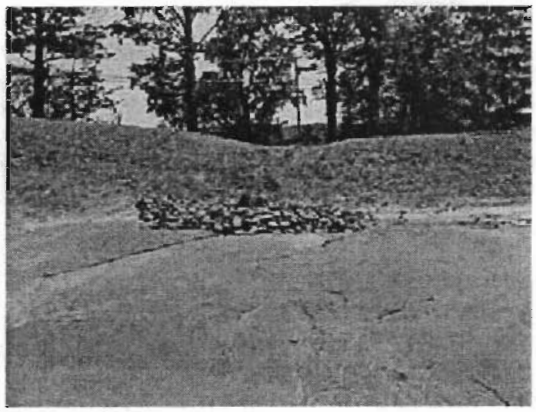
TYPE OF TREATMENT	CHANNEL GRADE	A(5 AC. OR LESS)	B(5 AC -10AC)
1	0.5-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1-5.0%	SEED AND STRAW MULCH	SEED AND COVER USING RECP
3	5.1-8.0%	SEED AND COVER WITH RECP	LINED WITH 4-8" RIP-RAP OR GEOTEXTILE
4	8.1-20.%	LINED WITH 4-8" RIP-RAP OR GEOTEXTILE	ENGINEERED DESIGN

9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

TEMPORARY SWALE

STANDARD AND SPECIFICATIONS FOR SEDIMENT TRAP



Definition

A temporary sediment control device formed by excavation and/or embankment to intercept sediment laden runoff and retain the sediment.

Purpose

The purpose of the structure is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties, and rights-of-way below the sediment trap from sedimentation.

Conditions Where Practice Applies

A sediment trap is usually installed in a drainage way, at a storm drain inlet, or other points of collection from a disturbed area.

Sediment traps should be used to artificially break up the natural drainage area into smaller sections where a larger device (sediment basin) would be less effective.

Design Criteria

If any of the design criteria presented here cannot be met, see Standard and Specification for Sediment Basin on page 5A.49.

Drainage Area

The drainage area for sediment traps shall be in accordance with the specific type of sediment trap used (Type I through V).

Location

Sediment traps shall be located so that they can be installed prior to grading or filling in the drainage area they are to protect. Traps must not be located any closer than 20 feet from a proposed building foundation if the trap is to function during building construction. Locate traps to obtain maximum storage benefit from the terrain and for ease of cleanout and disposal of the trapped sediment.

Trap Size

The volume of a sediment trap as measured at the elevation of the crest of the outlet shall be at least 3,600 cubic feet per acre of drainage area. The volume of a constructed trap shall be calculated using standard mathematical procedures. The volume of a natural sediment trap may be approximated by the equation: Volume (cu.ft.) = 0.4 x surface area (sq.ft.) x maximum depth (ft.).

Trap Cleanout

Sediment shall be removed and the trap restored to the original dimensions when the sediment has accumulated to ½ of the design depth of the trap. Sediment removed from the trap shall be deposited in a protected area and in such a manner that it will not erode.

Embankment

All embankments for sediment traps shall not exceed five (5) feet in height as measured at the low point of the original ground along the centerline of the embankment. Embankments shall have a minimum four (4) foot wide top and side slopes of 2:1 or flatter. The embankment shall be compacted by traversing with equipment while it is being constructed. The embankment shall be stabilized with seed and mulch as soon as it is completed

The elevation of the top of any dike directing water to any sediment trap will equal or exceed the maximum height of the outlet structure along the entire length of the trap.

Excavation

All excavation operations shall be carried out in such a manner that erosion and water pollution shall be minimal. Excavated portions of sediment traps shall have 1:1 or flatter slopes.

Outlet

The outlet shall be designed, constructed, and maintained in such a manner that sediment does not leave the trap and that erosion at or below the outlet does not occur.

Sediment traps must outlet onto stabilized (preferable undisturbed) ground, into a watercourse, stabilized channel, or into a storm drain system. Distance between inlet and outlet should be maximized to the longest length practicable.

Trap Details Needed on Erosion and Sediment Control Plans

Each trap shall be delineated on the plans in such a manner that it will not be confused with any other features. Each trap on a plan shall indicate all the information necessary to properly construct and maintain the structure. If the drawings are such that this information cannot be delineated on the drawings, then a table shall be developed. If a table is developed, then each trap on a plan shall have a number and the numbers shall be consecutive.

The following information shall be shown for each trap in a summary table format on the plans.

1. Trap number
2. Type of trap
3. Drainage area
4. Storage required
5. Storage provided (if applicable)
6. Outlet length or pipe sizes
7. Storage depth below outlet or cleanout elevation
8. Embankment height and elevation (if applicable)

Type of Sediment Traps

There are five (5) specific types of sediment traps which vary according to their function, location, or drainage area.

I. Pipe Outlet Sediment Trap
II. Grass Outlet Sediment Trap
III. Catch Basin Sediment Trap
IV. Stone Outlet Sediment Trap
V. Riprap Outlet Sediment Trap

I. Pipe Outlet Sediment Trap

A Pipe Outlet Sediment Trap consists of a trap formed by embankment or excavation. The outlet for the trap is through a perforated riser and a pipe through the embankment. The outlet pipe and riser shall be made of steel, corrugated metal or other suitable material. The top of the embankment shall be at least 1 ½ feet above the crest of the riser. The top 2/3 of the riser shall be perforated with one (1) inch nominal diameter holes or slits spaced six (6) inches vertically and horizontally placed in the concave portion of the corrugated pipe.

No holes or slits will be allowed within six (6) inches of the top of the horizontal barrel. All pipe connections shall be watertight. The riser shall be wrapped with ½ to ¼ inch hardware cloth wire then wrapped with filter cloth with a sieve size between #40-80 and secured with strapping or connecting band at the top and bottom of the cloth. The cloth shall cover an area at least six (6) inches above the highest hole and six (6) inches below the lowest hole. The top of the riser pipe shall not be covered with filter cloth. The riser shall have a base with sufficient weight to prevent flotation of the riser. Two approved bases are:

1. A concrete base 12 in. thick with the riser embedded 9 in. into the concrete base, or

2. One quarter inch, minimum, thick steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or earth placed on it to prevent flotation. In either case, each side of the square base measurement shall be the riser diameter plus 24 inches.

Pipe outlet sediment traps shall be limited to a five (5) acre maximum drainage area. Pipe outlet sediment traps may be interchangeable in the field with stone outlet or riprap sediment traps provided that these sediment traps are constructed in accordance with the detail and specifications for that trap.

Select pipe diameter from the following table:

Minimum Sizes

Barrel Diameter[1] (in.)	Riser Diameter[1] (in.)	Maximum Drainage Area (ac.)
12	15	1
15	18	2
18	21	3
21	24	4
21	27	5

[1] Barrel diameter may be same size as riser diameter.

See details for Pipe Outlet Sediment Trap ST-I in Figure 5A.16 (1) and 5A.16 (2) on pages 5A.38 and 5A.39.

II. Grass Outlet Sediment Trap

A Grass Outlet Sediment Trap consists of a trap formed by excavating the earth to create a holding area. The trap has a discharge point over natural existing grass. The outlet crest width (feet) shall be equal to four (4) times the drainage area (acres) with a minimum width of four (4) feet. The outlet shall be free of any restrictions to flow. The outlet lip must remain undisturbed and level. The volume of this trap shall be computed at the elevation of the crest of the outlet. Grass outlet sediment traps shall be limited to a five (5) acre maximum drainage area.

See details for Grass Outlet Sediment Trap ST-II in Figure 5A.17 on page 5A.40.

III. Catch Basin Sediment Trap

A Catch Basin Sediment Trap consists of a basin formed by excavation on natural ground that discharges through an opening in a storm drain inlet structure. This opening can either be the inlet opening or a temporary opening made by omitting bricks or blocks in the inlet.

A yard drain inlet or an inlet in the median strip of a dual highway could use the inlet opening for the type outlet. The trap should be out of the roadway so as not to interfere with future compaction or construction. Placing the trap on the opposite side of the opening and diverting water from the roadway to the trap is one means of doing this. Catch basin sediment traps shall be limited to a three (3) acre maximum drainage area. The volume of this trap is measured at the elevation of the crest of the outlet (invert of the inlet opening).

See details for Catch Basin Sediment Trap ST-III in Figure 5A.18 on page 5A.41.

IV. Stone Outlet Sediment Trap

A Stone Outlet Sediment Trap consists of a trap formed by an embankment or excavation. The outlet of this trap is over a stone section placed on level ground. The minimum length (feet) of the outlet shall be equal to four (4) times the drainage area (acres).

Required storage shall be 3,600 cubic feet per acre of drainage area.

The outlet crest (top of stone in weir section) shall be level, at least one (1) foot below top of embankment and no more than one (1) foot above ground beneath the outlet. Stone used in the outlet shall be small riprap (4 in. x 8 in.). To provide more efficient trapping effect, a layer of filter cloth should be embedded one (1) foot back into the upstream face of the outlet stone or a one (1) foot thick layer of two (2) inch or finer aggregate shall be placed on the upstream face of the outlet.

Stone Outlet Sediment Traps may be interchangeable in the field with pipe or riprap outlet sediment traps provided they are constructed in accordance with the detail and specifications for those traps. Stone outlet sediment traps shall be limited to a five (5) acre maximum drainage area.

See details for Stone Outlet Sediment Trap ST-IV in Figure 5A.19 on page 5A.42.

V. Riprap Outlet Sediment Trap

A Riprap Outlet Sediment Trap consists of a trap formed by an excavation and embankment. The outlet for this trap shall be through a partially excavated channel lined with riprap. This outlet channel shall discharge onto a stabilized area or to a stable watercourse. The riprap outlet sediment trap may be used for drainage areas of up to a maximum of 15 acres.

Design Criteria for Riprap Outlet Sediment Trap

1. The total contributing drainage area (disturbed or undisturbed either on or off the developing property) shall not exceed 15 acres.
2. The storage needs for this trap shall be computed using 3600 cubic feet of required storage for each acre of drainage area. The storage volume provided can be figured by computing the volume of storage area available behind the outlet structure up to an elevation of one (1) foot below the level weir crest.
3. The maximum height of embankment shall not exceed five (5) feet.
4. The elevation of the top of any dike directing water to a riprap outlet sediment trap will equal or exceed the minimum elevation of the embankment along the entire length of this trap.

Riprap Outlet Sediment Trap ST-V
(for Stone Lined Channel)

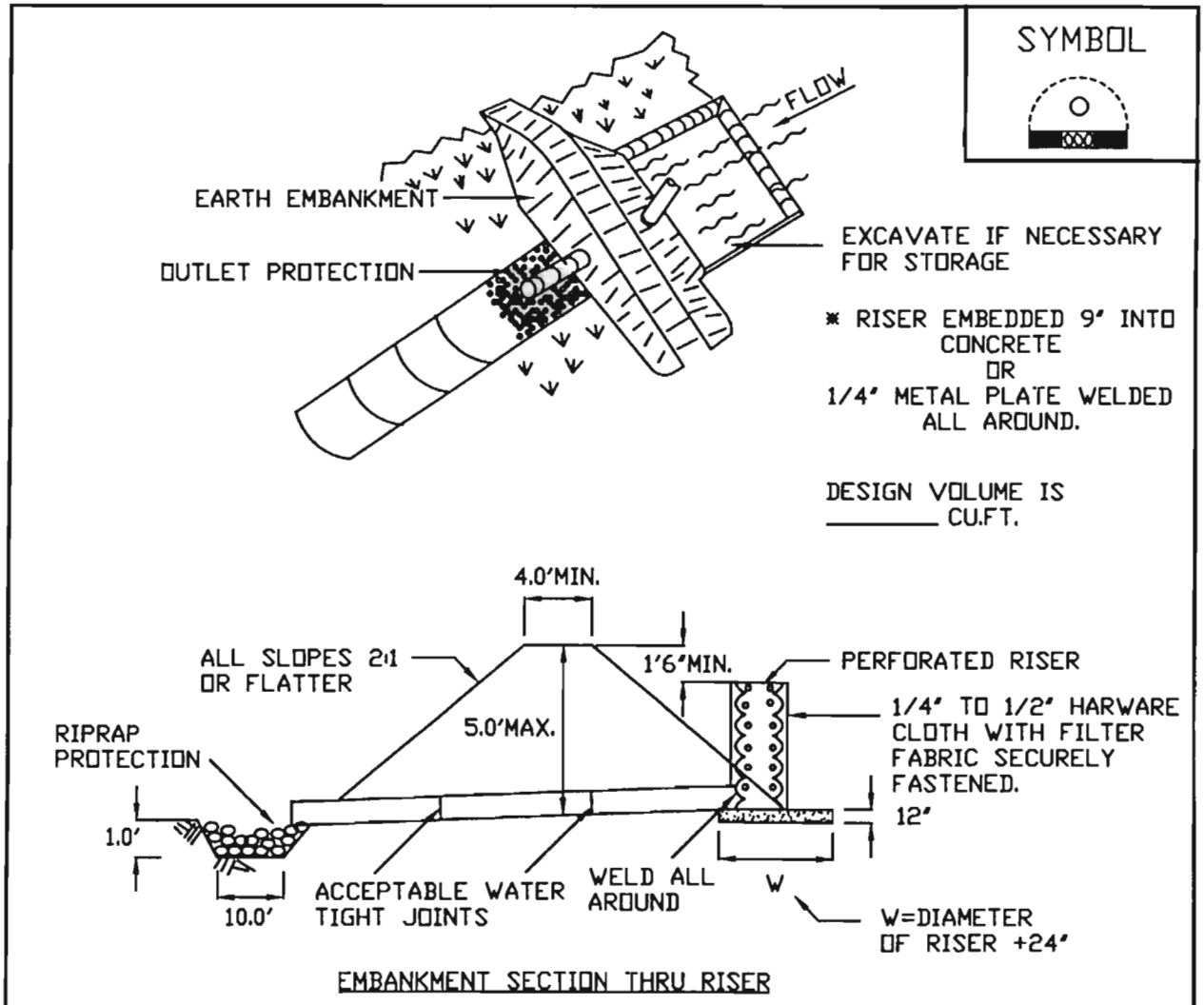
Contributing Drainage Area (ac.)	Depth of Channel (a) (ft.)	Length of Weir (b) (ft.)
1	1.5	4.0
2	1.5	5.0
3	1.5	6.0
4	1.5	10.0
5	1.5	12.0
6	1.5	14.0
7	1.5	16.0
8	2.0	10.0
9	2.0	10.0
10	2.0	12.0
11	2.0	14.0
12	2.0	14.0
13	2.0	16.0
14	2.0	16.0
15	2.0	18.0

See details for Riprap Outlet Sediment Trap ST-V on Figures 5A.20(1) and 5A.20(2) on pages 5A.43 and 5A.44.

Optional Dewatering Methods

Optional dewatering devices may be designed for use with sediment traps. Included are two methods, which may be used. See Figure 5A.21 on page 5A.45 for details.

Figure 5A.16(1)
Pipe Outlet Sediment Trap: ST-I



SIZES OF PIPE NEEDED:

BARREL DIAMETER: _____
RISER DIAMETER: _____

NOTE:
CONSTRUCTION SPECIFICATION SHOULD BE ATTACHED TO THIS DETAIL TO COMPLETE DESIGN.

MAXIMUM DRAINAGE AREA: 5 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA – NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	PIPE OUTLET SEDIMENT TRAP ST-I

Figure 5A.16(2)
Pipe Outlet Sediment Trap: ST-I—Construction Specifications

SYMBOL

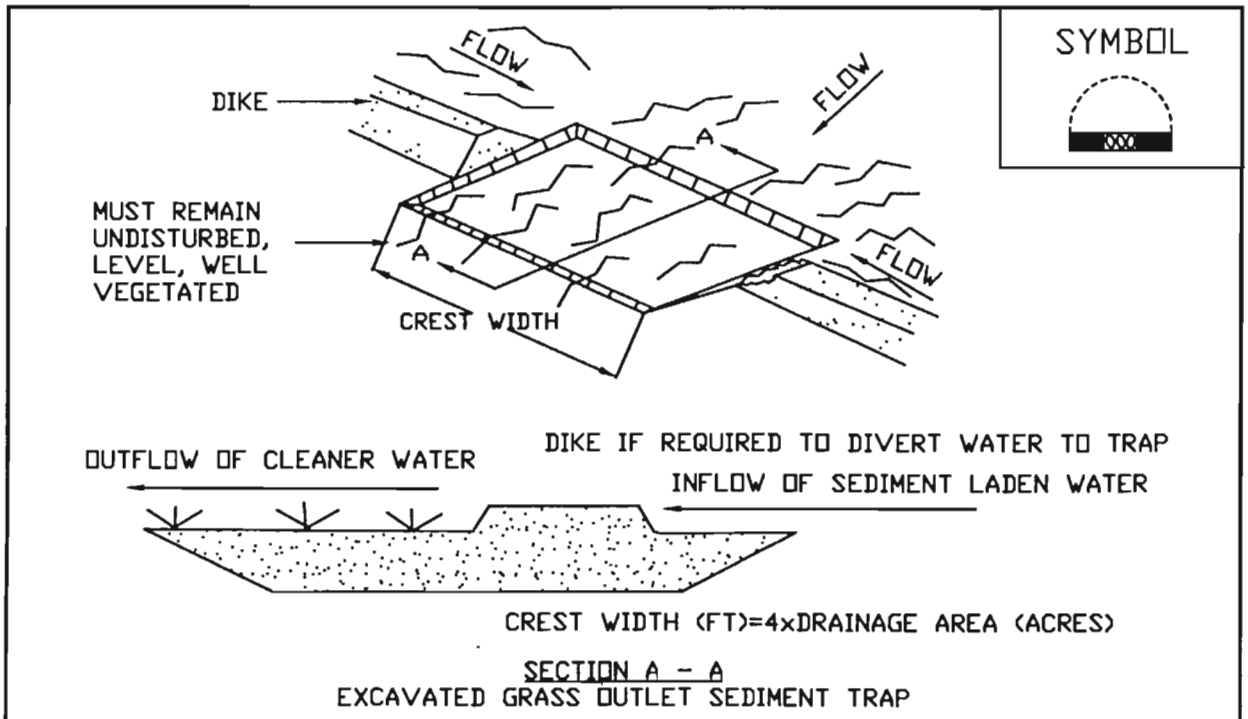
CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
4. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
5. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
6. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
7. THE STRUCTURE SHALL BE REMOVED AND AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
8. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER; CUT SLOPES 1:1 OR FLATTER.
9. ALL PIPE CONNECTIONS SHALL BE WATERTIGHT.
10. THE TOP 2/3 OF THE RISER SHALL BE PERFORATED WITH ONE (1) INCH DIAMETER HOLES OR SLITS SPACED SIX (6) INCHES VERTICALLY AND HORIZONTALLY AND PLACED IN THE CONCAVE PORTION OF PIPE. NO HOLES WILL BE ALLOWED WITHIN SIX (6) INCHES OF THE HORIZONTAL BARREL.
11. THE RISER SHALL BE WRAPPED WITH 1/4 TO 1/2 INCH HARDWARE CLOTH WIRE THEN WRAPPED WITH FILTER CLOTH (HAVING AN EQUIVALENT SIEVE SIZE OF 40-80). THE FILTER CLOTH SHALL EXTEND SIX (6) INCHES ABOVE THE HIGHEST HOLE AND SIX (6) INCHES BELOW THE LOWEST HOLE. WHERE ENDS OF THE FILTER CLOTH COME TOGETHER, THEY SHALL BE OVER-LAPPED, FOLDED AND STAPLED TO PREVENT BYPASS.
12. STRAPS OR CONNECTING BANDS SHALL BE USED TO HOLD THE FILTER CLOTH AND WIRE FABRIC IN PLACE. THEY SHALL BE PLACED AT THE TOP AND BOTTOM OF THE CLOTH.
13. FILL MATERIAL AROUND THE PIPE SPILLWAY SHALL BE HAND COMPACTED IN FOUR (4) INCH LAYERS. A MINIMUM OF TWO (2) FEET OF HAND COMPACTED BACKFILL SHALL BE PLACED OVER THE PIPE SPILLWAY BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.
14. THE RISER SHALL BE ANCHORED WITH EITHER A CONCRETE BASE OR STEEL PLATE BASE TO PREVENT FLOTATION. FOR CONCRETE BASED THE DEPTH SHALL BE TWELVE (12) INCHES WITH THE RISER EMBEDDED NINE (9) INCHES. A 1/4 INCH MINIMUM THICKNESS STEEL PLATE SHALL BE ATTACHED TO THE RISER BY A CONTINUOUS WELD AROUND THE BOTTOM TO FORM A WATERTIGHT CONNECTION AND THEN PLACE TWO (2) FEET OF STONE, GRAVEL, OR TAMPED EARTH ON THE PLATE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

PIPE OUTLET
SEDIMENT TRAP
ST-I

Figure 5A.17
Grass Outlet Sediment Trap: ST-II



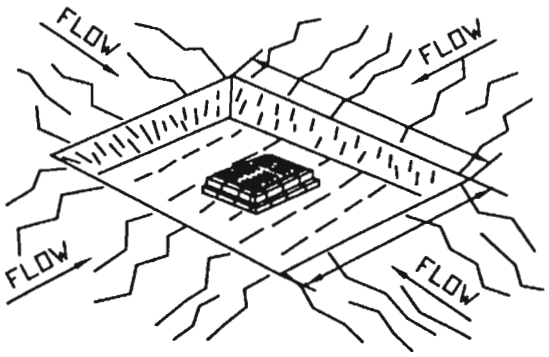
CONSTRUCTION SPECIFICATIONS

1. VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE AREA.
2. MINIMUM CREST WIDTH SHALL BE 4 x DRAINAGE AREA
3. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
4. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
5. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
6. THE SEDIMENT TRAP SHALL BE REMOVED AND AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
7. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

MAXIMUM DRAINAGE AREA: 5 ACRES

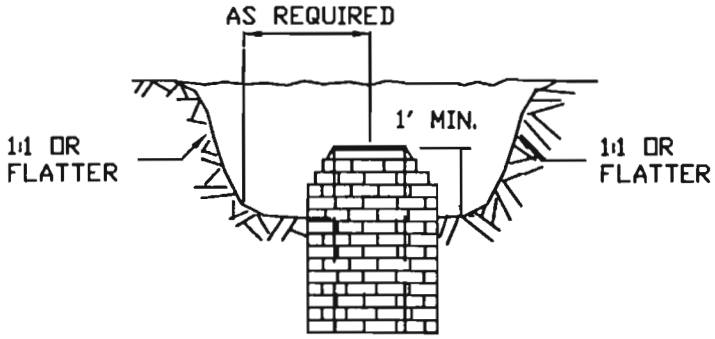
ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	GRASS OUTLET SEDIMENT TRAP ST-II

Figure 5A.18
Catch Basin Sediment Trap: ST-III



YARD DRAIN

SYMBOL



CROSS SECTION

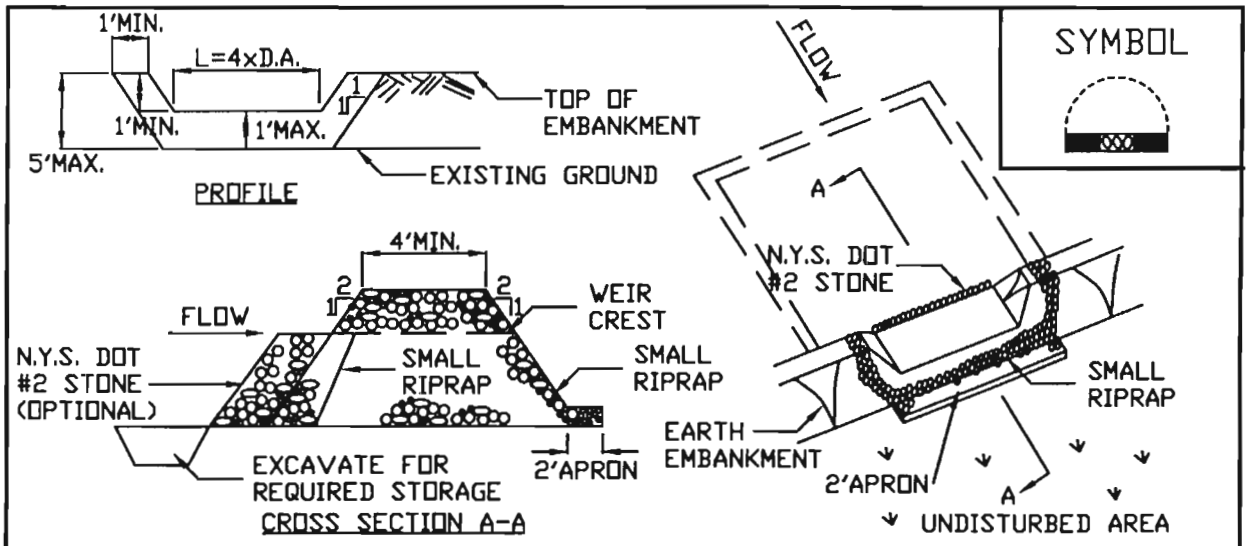
CONSTRUCTION SPECIFICATIONS

1. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
2. THE VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
3. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
5. THE SEDIMENT TRAP SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE CONSTRUCTED DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
6. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

MAXIMUM DRAINAGE AREA: 3 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	CATCH BASIN SEDIMENT TRAP ST-III

Figure 5A.19
Stone Outlet Sediment Trap: ST-IV



OPTION: A ONE FOOT LAYER OF N.Y.S. DOT #2 STONE MAY BE PLACED ON THE UPSTREAM SIDE OF THE RIPRAP INPLACE OF THE EMBEDDED FILTER CLOTH.

CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS AND OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. ALL CUT AND FILL SLOPES SHALL BE 2:1 OR FLATTER.
4. THE STONE USED IN THE OUTLET SHALL BE SMALL RIPRAP 4"-8" ALONG WITH A 1' THICKNESS OF 2" AGGREGATE PLACED ON THE UP-GRADE SIDE ON THE SMALL RIPRAP OR EMBEDDED FILTER CLOTH IN THE RIPRAP.
5. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. IT SHALL BE PLACED ON SITE AND STABILIZED.
6. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
7. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
8. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

MAXIMUM DRAINAGE AREA 5 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE OUTLET SEDIMENT TRAP ST-IV

Figure 5A.20(1)
Riprap Outlet Sediment Trap: ST-V

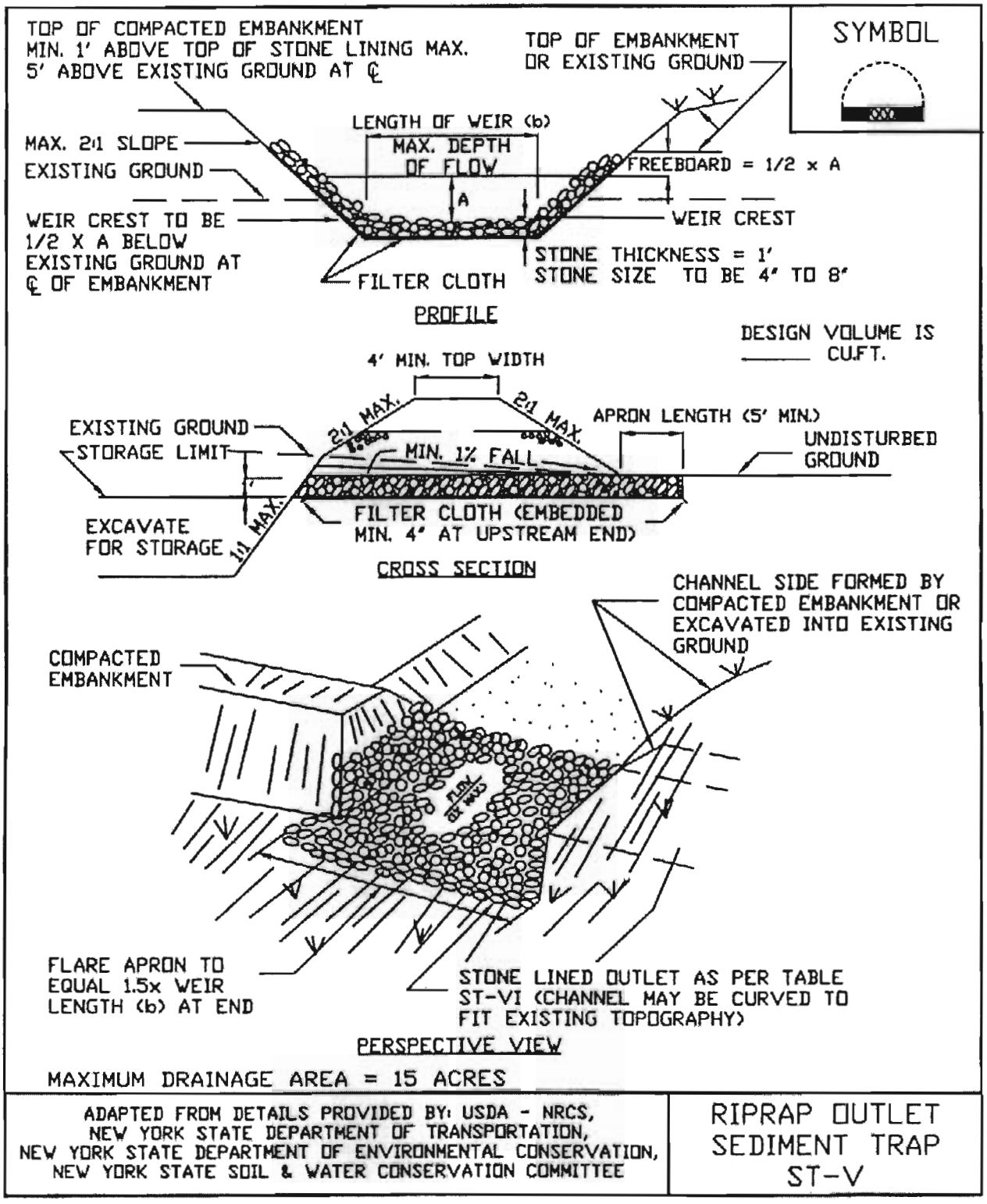


Figure 5A.202)
Riprap Outlet Sediment Trap: ST-V—Construction Specifications

SYMBOL

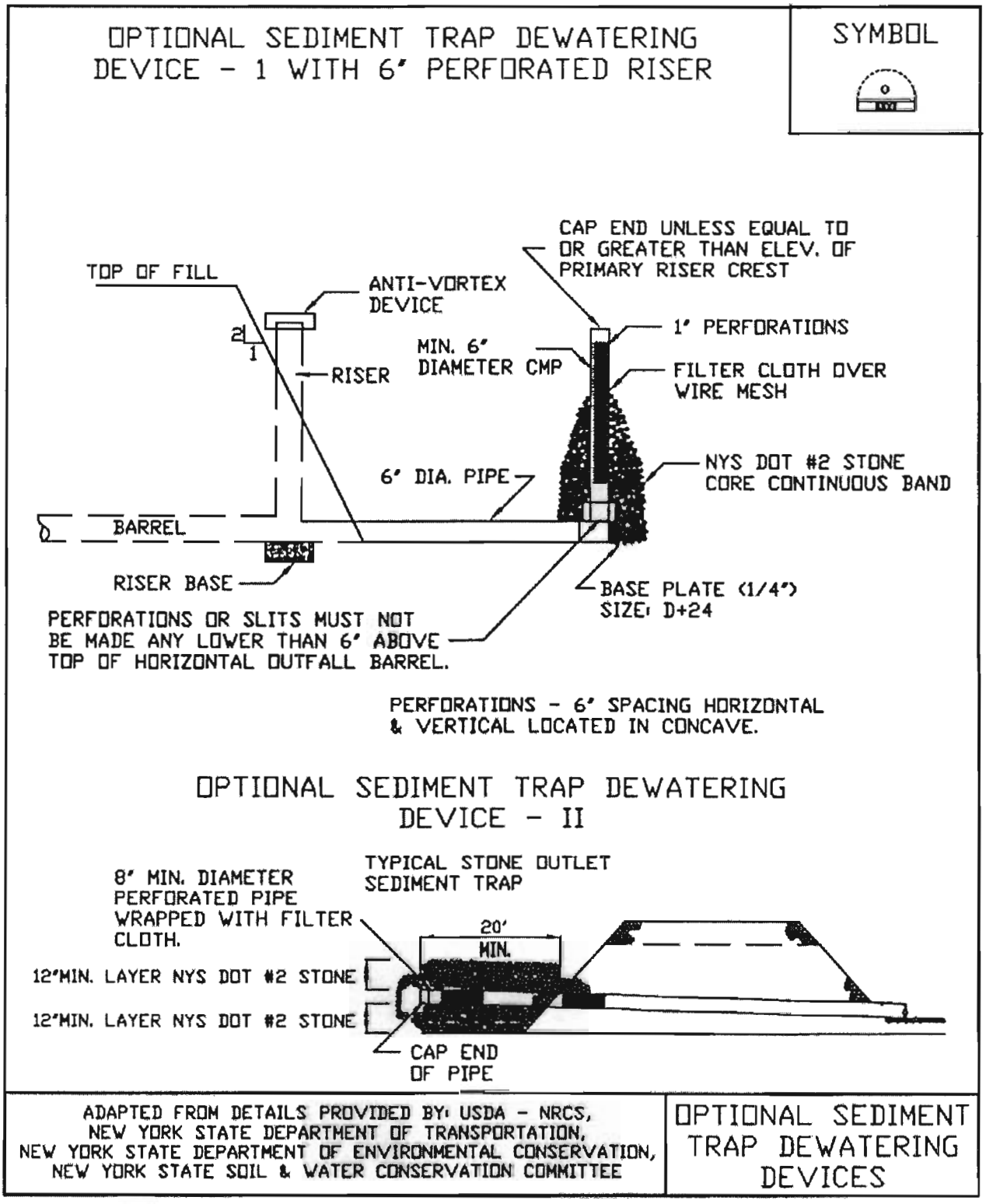
CONSTRUCTION SPECIFICATIONS

1. THE AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED. MAXIMUM HEIGHT OF OF EMBANKMENT SHALL BE FIVE (5) FEET, MEASURED AT CENTERLINE OF EMBANKMENT.
3. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER, CUT SLOPES 1:1 OR FLATTER.
4. ELEVATION OF THE TOP OF ANY DIKE DIRECTING WATER INTO TRAP MUST EQUAL OR EXCEED THE HEIGHT OF EMBANKMENT.
5. STORAGE AREA PROVIDED SHALL BE FIGURED BY COMPUTING THE VOLUME AVAILABLE BEHIND THE OUTLET CHANNEL UP TO AN ELEVATION OF ONE (1) FOOT BELOW THE LEVEL WEIR CREST.
6. FILTER CLOTH SHALL BE PLACED OVER THE BOTTOM AND SIDES OF THE OUTLET CHANNEL PRIOR TO PLACEMENT OF STONE. SECTIONS OF FABRIC MUST OVERLAP AT LEAST ONE (1) FOOT WITH SECTION NEAREST THE ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OUTLET CHANNEL.
7. STONE USED IN THE OUTLET CHANNEL SHALL BE FOUR (4) TO EIGHT (8) INCH RIPRAP. TO PROVIDE A FILTERING EFFECT, A LAYER OF FILTER CLOTH SHALL BE EMBEDDED ONE (1) FOOT WITH SECTION NEAREST ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OF OUTLET CHANNEL.
8. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
9. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRED AS NEEDED.
10. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION ARE MINIMIZED.
11. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
12. DRAINAGE AREA FOR THIS PRACTICE IS LIMITED TO 15 ACRES OR LESS.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS,
NEW YORK STATE DEPARTMENT OF TRANSPORTATION,
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

RIPRAP OUTLET
SEDIMENT TRAP
ST-V

Figure 5A.21
Optional Sediment Trap Dewatering Devices



APPENDIX B-2

INSPECTION AND MAINTENANCE REPORT FORM

Inspection and Maintenance Report Form

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inches or more

Regular Inspector:_____ Rainfall Event Inspector:_____ Rainfall (inches):____

Contractor Activities	OK	NO	N/A	Notes
Are construction onsite traffic routes, parking, and storage of equipment and supplies restricted to areas specifically designated for those uses?				
Are locations of temporary soil stock piles of construction materials in approved areas?				
Is there any evidence of spills and resulting cleanup procedures?				
General Erosion & Sediment Controls				
Are sediment and erosion controls installed in the proper location and according to the specifications set out in the MECP				
Are all operational storm drain inlets protected from sediment inflow?				
Do any seeded or landscaped areas require maintenance, irrigation, fertilization, seeding or mulching?				
Is there any evidence that sediment is leaving the site?				
Is there any evidence of erosion or cut fill slopes?				
Perimeter Road Use				
Does much sediment get tracked on to the perimeter road? Is the gravel clean or is it filled with sediment? Does all traffic use the perimeter road to leave the site? Is maintenance or repair required for the perimeter road?				

_____ _____

Inspected by (Signature) Date

Inspection and Maintenance Report Form

To be completed every 7 days and within 24 hours of a rainfall event of 0.5 inches or more

Inspector: _____

STABILIZATION MEASURES					
Area	Date Since Last Disturbed	Date of Next Disturbance	Stabilized? Yes/No	Stabilized with	Condition

Stabilization Required: _____

To be performed by: _____ On or before: _____

PART III

ENVIRONMENTAL EASEMENTS

SITE MANAGEMENT PLAN
PART III

ENVIRONMENTAL EASEMENTS

PETER COOPER MARKHAMS SUPERFUND SITE
DAYTON, NEW YORK

November 2008
Revised June 26, 2009

0021-003-401

Prepared by:

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

Environmental Easement

The Environmental Easement on file with the Cattaraugus County Clerk's office is attached. This easement prohibits the extraction of groundwater and any activities that would interfere with or adversely affect the integrity or protectiveness of the cap.

Annual Inspection & Certification Program

The Peter Cooper Markhams Superfund Site will be inspected annually by a Qualified Environmental Professional (QEP) representing the owner or cooperating Potentially Responsible Parties (cPRPs). This QEP will, at a minimum, hold a 4-year college degree in environmental sciences or engineering, and be supervised by a New York State Licensed Professional Engineer.

The Annual Certification will be stamped and signed by a New York State Licensed Professional Engineer and certify and attest that the institutional and engineering controls employed at the Site are unchanged from the previous certification and:

- Are in place and effective.
- Are performing as designed.
- That nothing has occurred that would impair the ability of the controls to protect the public health and environment.
- That nothing has occurred that would constitute a violation or failure to comply with any operation and maintenance plan for such controls.
- Access is available to the Site to evaluate continued maintenance of such controls.

If maintenance, repair, or corrective action is required, the owner/CPRP's representative shall notify the USEPA, schedule the necessary repairs, and subsequently notify the USEPA when the repairs have been completed.

The property owner/CPRP's representative shall also certify on an annual basis that no new information regarding environmental conditions at the Site has come to the owner's attention. The Annual Certification Report will be submitted every year, beginning in November 2009.

OGC Attorney
Freeman

ENVIRONMENTAL PROTECTION EASEMENT
AND
DECLARATION OF RESTRICTIVE COVENANTS

This Environmental Protection Easement and Declaration of Restrictive Covenants is made this ____ day of _____, 2008, by and between the Peter Cooper Corporations upon Order and Judgment of the Hon. Larry Himelein, J.S.C., being a defunct Delaware corporation and record owner of the property identified herein ("Grantor") and a group of entities being those parties named as Potentially Responsible Parties for certain potentially hazardous conditions at the site, including Wilhelm Enterprises Corporation, a New York corporation having an address at 333 International Drive Suite B-4, Williamsville, NY 14221; Prime Tanning Company, a Maine corporation having an address at 20 Sullivan Street, Berwick, ME 03901; Seton Company, a Pennsylvania corporation having an address at 30445 Northwestern Hwy Suite 225, Farmington Hills, MI 48334; Viad Corp, an Arizona corporation having an address at 1850 North Central Avenue Suite 800, Phoenix, AZ 85004; GST AutoLeather, a Michigan corporation having an address at 20 Oak Hollow Drive Suite 300, Southfield, MI 48033; Brown Shoe Company, Inc., a Missouri corporation having an address at 8300 Maryland Avenue PO Box 29, St. Louis, MO 63166; Con Agra Grocery Products Company, a Nebraska corporation having an address at One Con Agra Drive, Omaha, NE 68102; Beggs & Cobb Corporation, a Delaware corporation having an address at 139 Lynnfield Street, Peabody, MA 01960; Genesco, Inc., a Tennessee corporation having an address at PO Box 731 Suite 490, Nashville, TN 37202; Leucadia National Corporation, a New York corporation having an address at 315 Park Avenue South, New York, NY 10010; S.B. Foot Tanning Company, a Minnesota corporation having an address at 805 Bench Street, Red Wing, MN 55066; and Horween Leather Company, a Illinois corporation having an address at 2015 Elston Avenue, Chicago, IL 60614, (collectively the "Grantees"); acting on their own behalf and f/b/o third party beneficiaries being the United States of America acting by and through the Environmental Protection Agency ("EPA") and the State of New York, acting through the Department of Environmental Conservation ("DEC").

WITNESSETH:

WHEREAS, Grantor is the owner of a parcel of land located in the County of Cattaraugus, State of New York, more particularly described on **Exhibit A** attached hereto and made a part hereof together with any buildings and improvements thereon and appurtenances thereto (the "Property"); and

WHEREAS, the Property is part of the Peter Cooper (Markhams) Superfund Site ("Site"), which the U.S. Environmental Protection Agency ("EPA"), pursuant to Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9605, placed on the National Priorities List, as set forth in Appendix B of the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300, by publication in the Federal Register on February 3, 2000; and

WHEREAS, in a Record of Decision dated December 1, 2006 (the "ROD"), EPA, with the concurrence of the New York State Department of Environmental Conservation ("NYSDEC") selected a "response action" for the Site, which provides, in part, for the following actions at the Site: consolidating waste/fill piles; capping the consolidated wastes with a low permeability soil cover consistent with State requirements, including seeding with a mixture to foster natural habitat; and institutional controls to prohibit the use of groundwater unless and until groundwater quality standards are met and to restrict activities on the Site that could compromise the integrity of the cap; and

WHEREAS, the parties hereto have agreed that Grantor shall grant a permanent easement and covenant: a) to provide a right of access over the Property to the Grantees for purposes of implementing, facilitating and monitoring the response action; and b) to impose on the Property use restrictions that will run with the land for the purpose of protecting human health and the environment; and

WHEREAS, Grantor, by Order of the Supreme Court, Cattaraugus County, shall cooperate with EPA and the Grantees in the implementation of all response actions at the Site;

NOW, THEREFORE:

1. Grant: Grantor, on behalf of itself, its successors and assigns, in consideration of the terms of the Consent Decree in the case of the United States of America v. Wilhelm Enterprises Corporation et al. ("Consent Decree"), upon the Order of the Supreme Court, Cattaraugus County, does hereby give, grant, covenant and declare in favor of the Grantees that the Property shall be subject to the restrictions on use and rights of access set forth below, and does give, grant and convey to the Grantees with general warranties of title the perpetual right to enforce said restrictions and rights, which shall be of the nature and character, and for the purposes hereinafter set forth, with respect to the Property.

2. Purpose: It is the purpose of this instrument to convey to the Grantees real property rights, which will run with the land, to facilitate the remediation of past environmental contamination and to protect human health and the environment by reducing the risk of exposure to contaminants.

3. Restrictions on use: The following restrictions on use apply to the use of the Property, run with the land and are binding on the Grantor and its heirs, successors and assigns: the extraction of groundwater, and any activities that would interfere with, or adversely affect, the integrity or protectiveness of the cap are prohibited.

4. Modification or termination of restrictions: The restrictions on use specified in the preceding paragraph of this instrument may only be modified, or terminated in whole or in part, in writing, by the Grantees, with the prior written consent of EPA, provided, however, that any modification or termination of said restrictions shall not adversely affect the remedy selected by EPA for the Site. If requested by the Grantor, and approved by EPA, such writing will be executed by Grantees in recordable form.

5. Right of access: A right of access to the Property at all reasonable times for the following purposes shall run with the land and be binding on Grantor and its heirs, successors and assigns:

   a) Implementing the response actions in the ROD, including, but not limited to, consolidating waste/fill piles and capping of the consolidated waste;

   b) Verifying any data or information relating to the Site;

   c) Verifying that no action is being taken on the Property in violation of the terms of this instrument or of any federal or state environmental laws or regulations;

   d) Conducting investigations under CERCLA relating to contamination on or near the Site, including, without limitation, sampling of air, water, sediments, soils; and

   e) Implementing additional or new response actions under CERCLA.

6. Reserved rights of Grantor: Grantor hereby reserves unto itself, its heirs, successors, and assigns, all rights and privileges in and to the use of the Property which are not incompatible with the restrictions, rights, covenants and easements granted herein.

7. Federal authority: Nothing in this document shall limit or otherwise affect EPA's rights of entry and access or EPA's authority to take response actions under CERCLA, the NCP, or other federal law.

8. No public access and use: No right of access or use by the general public to any portion of the Property is conveyed by this instrument.

9. Public notice: Grantor agrees to include in each instrument conveying any interest in any portion of the Property, including but not limited to deeds, leases and mortgages, a notice which is in substantially the following form:

NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO AN ENVIRONMENTAL PROTECTION EASEMENT AND DECLARATION OF RESTRICTIVE COVENANTS, DATED _____, 20__, RECORDED IN THE CLERK'S OFFICE, COUNTY OF CATTARAUGUS, ON _____, 20 , IN BOOK _____, PAGE _____, IN FAVOR OF, AND ENFORCEABLE BY, GRANTEES [as listed herein], AND BY THE UNITED STATES OF AMERICA AND THE STATE OF NEW YORK, AS THIRD PARTY BENEFICIARY[IES].

Within thirty (30) days of the date any such instrument of conveyance is executed, Grantor

agrees to provide Grantees and EPA with a certified true copy of said instrument and, if it has been recorded in the public land records, its recording reference.

10. Enforcement: The Grantees shall be entitled to enforce the terms of this instrument by resort to specific performance. All remedies available hereunder shall be in addition to any and all other remedies at law or in equity, including CERCLA. Any forbearance, delay or omission to exercise Grantees' rights under this instrument in the event of a breach of any term of this instrument shall not be deemed to be a waiver by the Grantee of such term or of any of the rights of the Grantees under this instrument.

11. Damages: Grantees shall also be entitled to recover damages for breach of any covenant or violation of the terms of this instrument including any impairment to the remedial action that increases the cost of the selected response action for the Site as a result of such breach or violation.

12. Waiver of certain defenses: Grantor hereby waives any defense of laches, estoppel, or prescription.

13. Covenants: Grantor hereby covenants to and with the Grantees and their assigns, that the Grantor is lawfully seized in fee simple of the Property, that the Grantor has a good and lawful right and power to sell and convey it or any interest therein, that the Property is free and clear of encumbrances except as otherwise disclosed to and accepted by Grantees and that the Grantor will forever warrant and defend the title thereto and the quiet possession thereof.

14. Notices: Any notice, demand, request, consent, approval, or communication under this instrument that either party desires or is required to give to the other shall be in writing and shall either be served personally or sent by first class mail, postage prepaid, addressed as follows:

To Grantees:

Wilhelm Enterprises Corporation
c/o Lipman & Biltekoff, LLP
333 International Drive Suite B-4
Williamsville, New York 14221

Prime Tanning Company
20 Sullivan Street
Berwick, ME 03901

Seton Company
30445 Northwestern Highway, Suite 225
Farmington Hills, 48334

Viad Corporation
1850 North Central Avenue, Suite 800
Phoenix, AZ 85004

GST AutoLeather
20 Oak Hollow Drive, Suite 300
Southfield, MI 48033

Brown Shoe Company, Inc.
8300 Maryland Avenue
PO Box 29
St. Louis, MO 63166

Con Agra Grocery Products Company
One Con Agra Drive
Omaha, NE 68102

Beggs & Cobb Corporation
139 Lynnfield Street
Peabody, MA 01960

Genesco, Inc.
PO Box 731, Suite 490
Nashville, TN 37202

Leucadia National Corporation
315 Park Avenue South
New York, NY 10010

S.B. Foot Tanning Company
805 Bench Street
Red Wing, MN 55066

Horween Leather Company
2015 Elston Avenue
Chicago, IL 60614

15. General provisions:

a) Controlling law: The interpretation and performance of this instrument shall be governed by the laws of the United States or, if there are no applicable federal laws, by the law of the state where the Property is located.

b) Liberal construction: Any general rule of construction to the contrary

notwithstanding, this instrument shall be liberally construed in favor of the grant to effectuate the purpose of this instrument and the policy and purpose of CERCLA. If any provision of this instrument is found to be ambiguous, an interpretation consistent with the purpose of this instrument that would render the provision valid shall be favored over any interpretation that would render it invalid.

c) Severability: If any provision of this instrument, or the application of it to any person or circumstance, is found to be invalid, the remainder of the provisions of this instrument, or the application of such provisions to persons or circumstances other than those to which it is found to be invalid, as the case may be, shall not be affected thereby.

d) Entire agreement: This instrument sets forth the entire agreement of the parties with respect to rights and restrictions created hereby, and supersedes all prior discussions, negotiations, understandings, or agreements relating thereto, all of which are merged herein; provided that nothing in this instrument shall be deemed to alter or modify the Consent Decree.

e) No forfeiture: Nothing contained herein will result in a forfeiture or reversion of Grantor's title in any respect.

f) Joint obligation: If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

g) Successors: The covenants, easements, terms, conditions, and restrictions of this instrument shall be binding upon, and inure to the benefit of, the parties hereto and their respective personal representatives, heirs, successors, and assigns and shall continue as a servitude running in perpetuity with the Property. The term "Grantor", wherever used herein, and any pronouns used in place thereof, shall include the persons and/or entities named at the beginning of this document, identified as "Grantor" and their personal representatives, heirs, successors, and assigns. The term "Grantee", wherever used herein, and any pronouns used in place thereof, shall include the persons and/or entities named at the beginning of this document, identified as "Grantee" and their personal representatives, heirs, successors, and assigns.

h) Captions: The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon construction or interpretation.

i) Counterparts: The parties may execute this instrument in two or more counterparts, which shall, in the aggregate, be signed by both parties; each counterpart shall be deemed an original instrument as against any party who has signed it. In the event of any disparity between the counterparts produced, the recorded counterpart shall be controlling.

j) Third-Party Beneficiary: Grantor and Grantee hereby agree that the United States, through EPA and the State of New York through NYSDEC shall be, on behalf of the public,

third-party beneficiaries of the benefits, rights and obligations conveyed to Grantee in this instrument; provided that nothing in this instrument shall be construed to create any obligations on the part of EPA or NYSDEC.

TO HAVE AND TO HOLD unto the Grantee and its assigns forever.

IN WITNESS WHEREOF, the Supreme Court, Cattaraugus County, has caused this instrument to be entered and recorded in the name of Grantor by Order of the Court dated _____, 2008.

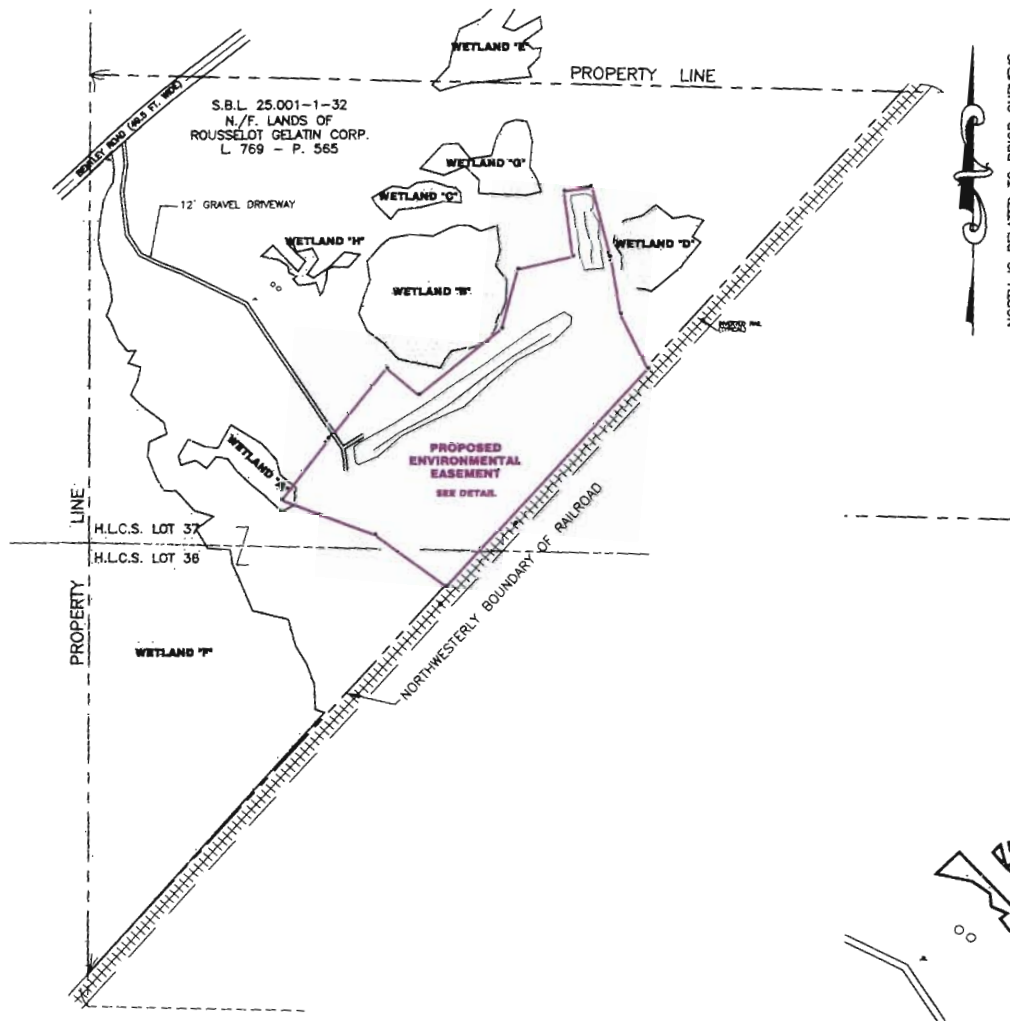
Peter Cooper Corporations

_____

Attachment: Exhibit A - legal description of the Property

EXHIBIT A - DESCRIPTION OF PROPERTY

ALL THAT TRACT OR PARCEL OF LAND, situate in the Town of Dayton, County of Cattaraugus and State of New York, distinguished as being part of Lots 36 and 37, Township 5 and Range 9 of the Holland Land Company's Survey, being a triangular parcel of land bounded on the west by west lines of Lots 36 and 37; on the north by a line parallel with the south bounds of Lot 37 and 25 chains and 15 links north thereof; and on the southeast by lands formerly conveyed to the Buffalo and Jamestown Railroad Company; containing 136 acres more or less.



NORTH IS RELATED TO PRIOR SURVEYS

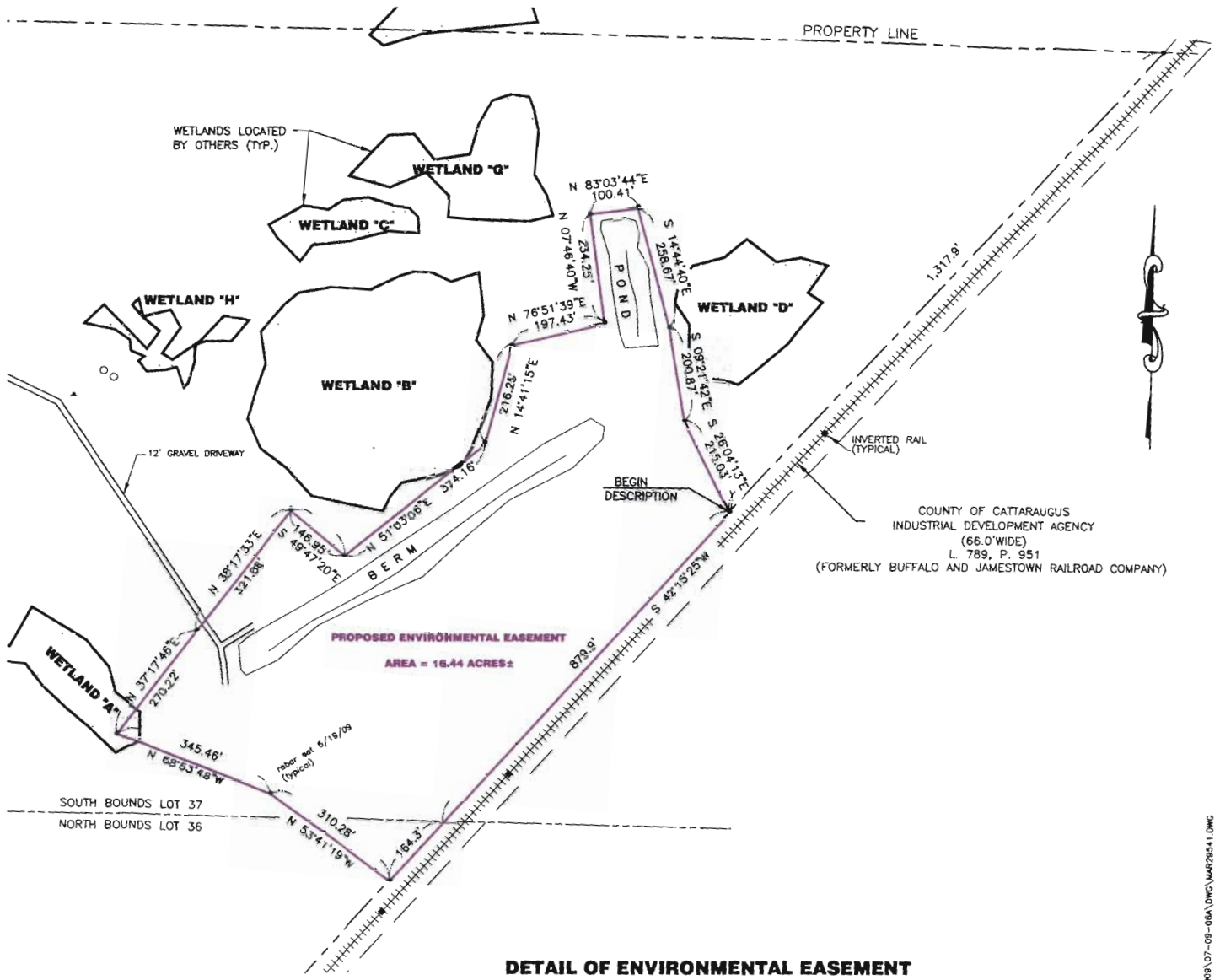
NOTES:

(1) This survey and plat were prepared for Benchmark Environmental Engineering & Science, PLLC, 2558 Hamburg Turnpike, Suite 300, Lackawanna, New York 14218. Telephone: (716) 856-0599

(2) This survey is prepared with the benefit of review of a map prepared by E & M Engineers and Surveyors, P.C., 482 South Cascade Drive, Springville, New York 14141-0159

(3) The Easement Area shown hereon is a part of County Tax Parcel Number (S.B.L.) 25.001-1-32, property conveyed by Peter Cooper Corporations to Rousselot Gelatin Corp. as described in a deed filed in the Cattaraugus County Clerk's Office in Liber 769 of Deeds at page 565.

(4) Easement staked on June 19, 2009.



MAP OF TOWN OF DAYTON TAX IDENTIFICATION NO. (S.B.L.) 25.001-1-32

(PERIMETER SURVEY AND MAP MADE BY E & M ENGINEERS AND SURVEYORS, P.C.)

SCALE: 1" = 400'

DESCRIPTION OF SUBJECT EASEMENT

An EASEMENT to be exercised in, on and over the property hereinafter described situate in the Town of Dayton, County of Cattaraugus and State of New York; being part of Lot Nos. 36 and 37, Town 5 and Range 9 of the Holland Land Company's Survey; and being more particularly bounded and described as follows:

BEGINNING at a rebar on the northwesterly boundary of property of the County of Cattaraugus Industrial Development Agency as described in a deed filed in the Cattaraugus County Clerk's Office in Liber 789 of Deeds at page 951 (formerly Buffalo and Jamestown Railroad Company), said rebar being South 42 degrees 15 minutes 25 seconds West as measured along said boundary of property of County of Cattaraugus Industrial Development Agency, a distance of 1,317.9 feet from a point at its intersection with the northerly line of property of Rousselot Gelatin Corp., hereinafter referenced; thence South 42 degrees 15 minutes 25 seconds West along said boundary of the County of Cattaraugus Industrial Development Agency, a distance of 1,044.2 feet to a rebar, said rebar being 164.3 feet distant southwesterly as measured along the last described line from a point at its intersection with the northerly line of said Lot No. 36 (southerly line of Lot No. 37); thence through the property of said Rousselot Gelatin Corp., the following thirteen (13) courses and distances: (1) North 53 degrees 41 minutes 19 seconds West, a distance of 310.28 feet to a rebar; thence (2) North 68 degrees 53 minutes 48 seconds West, a distance of 345.46 feet to a rebar; thence (3) North 37 degrees 17 minutes 46 seconds East, a distance of 270.22 feet to a rebar; thence (4) North 38 degrees 17 minutes 33 seconds East, a distance of 321.88 feet to a rebar; thence (5) South 49 degrees 47 minutes 20 seconds East, a distance of 146.95 feet to a rebar; thence (6) North 51 degrees 03 minutes 06 seconds East, a distance of 374.16 feet to a rebar; thence (7) North 14 degrees 41 minutes 15 seconds East, a distance of 216.25 feet to a rebar; thence (8) North 76 degrees 51 minutes 39 seconds East, a distance of 197.43 feet to a rebar; thence (9) North 07 degrees 46 minutes 40 seconds West, a distance of 234.25 feet to a rebar; thence (10) North 83 degrees 03 minutes 44 seconds East, a distance of 100.41 feet to a rebar; thence (11) South 14 degrees 44 minutes 40 seconds East, a distance of 258.67 feet to rebar; thence (12) South 09 degrees 21 minutes 42 seconds East, a distance of 200.87 feet to a rebar; thence (13) South 26 degrees 04 minutes 13 seconds East, a distance of 215.03 feet to the rebor at the point or place of beginning. Containing 16.44 acres, more or less.

Being part of the some premises conveyed to Rousselot Gelatin Corp. as described in a deed dated October 22, 1976 and filed in the Cattaraugus County Clerk's Office in Liber 769 of Deeds at page 565.

DETAIL OF ENVIRONMENTAL EASEMENT

SCALE: 1" = 200'

200 0 200 400 600

Scale: 1" = 200'

WARNING: ALTERATIONS TO THIS DOCUMENT NOT CONFORMING TO SECTION 7209, SUBDIVISION 2, STAT. EDUCATION LAW, ARE PROHIBITED

X:\LAND PROJECTS 2009\07-09-06A\DWG\MAP29541.DWG

ABATE ASSOCIATES ENGINEERS & SURVEYORS, P.C.

BUFFALO, NEW YORK
JAMESTOWN, NEW YORK

4455 GENESEE STREET, P.O. BOX 218
BUFFALO, NEW YORK 14225-0218
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FAX: 716-632-2555
E-MAIL: abatengr@abatepc.com

200 HARRISON STREET, P.O. BOX 3008
JAMESTOWN, NEW YORK 14702-3008
TELEPHONE: 716-488-2903
FAX: 716-486-2902
E-MAIL: abatejhm@windstream.net

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JOB NO.: 29541
DATE: JUNE 25, 2009
SCALE: AS SHOWN
DRAWING NO.: MAP29541
DRAWN BY: E. A. OLSON
CHECKED BY: J. E. GOSSETT

SURVEY OF LANDS OF:

PETER COOPER — MARKHAMS SITE

BENTLEY ROAD
TOWN OF DAYTON
CATTARAUGUS COUNTY - NEW YORK
BEING PART OF LOT NO. 36 & 37, TOWN 5 AND RANGE 9
OF THE HOLLAND LAND COMPANY'S SURVEY