

**WORK PLAN**  
**OPERABLE UNIT 2 SUPPLEMENTAL INVESTIGATION**  
**PHASE 2**  
TransTechnology Site #1-30-101  
Glen Head, New York

*Submitted to:*  
**Breeze-Eastern Corporation, Whippany, New Jersey**

*Submitted by:*  
**AMEC Geomatrix, Inc., Amherst, New York**

July 2010

Project 6238

## TABLE OF CONTENTS

	<b>Page</b>
1.0 INTRODUCTION .....	1
1.1 PRIOR SUBMITTALS UNDER THE ORDER ON CONSENT.....	1
1.2 PREVIOUS INVESTIGATION RESULTS.....	2
1.3 OU-2 INVESTIGATION OBJECTIVE AND PHASED APPROACH.....	3
1.4 SUMMARY OF PHASE 1 INVESTIGATION .....	3
1.5 PHASE 2 INVESTIGATION OBJECTIVE .....	4
2.0 PHASE 2 SCOPE OF WORK.....	5
2.1 PHASE 2 GROUNDWATER SAMPLE LOCATIONS.....	5
2.1.1 Primary Profile Holes.....	5
2.1.2 As-Needed Profile Hole Locations .....	5
2.2 GROUNDWATER PROFILING METHODS .....	6
2.2.1 Borehole Advancement.....	6
2.2.2 Soil Vapor Sampling.....	7
2.2.3 Groundwater Sampling .....	7
2.2.4 Groundwater Sample Analyses .....	7
2.2.5 Borehole Closure .....	8
2.3 PERMANENT MONITORING WELL INSTALLATION AND SAMPLING .....	8
2.4 CONTINGENCY FOR GEOPROBE REFUSAL PRIOR TO ADEQUATE DEPTH.....	8
2.5 ACCESS CONSIDERATIONS/PHASE 2 INVESTIGATION WORK PLAN .....	9
3.0 OU-2 SUPPLEMENTAL INVESTIGATION PHASE 2 REPORT.....	10
4.0 PROPOSED SCHEDULE.....	11

## FIGURES

Figure 1	Site Location Map
Figure 2	Existing Monitoring Well Locations
Figure 3	Phase 1 Groundwater Sample Location Plan
Figure 4	Supplemental OU-2 Investigation Phase 1 Results: TCE and PCE ( $\mu\text{g/l}$ )
Figure 5	Recommended Phase 2 Investigation Sample Locations

**WORK PLAN**  
**OPERABLE UNIT 2 SUPPLEMENTAL INVESTIGATION PHASE 2**  
TransTechnology Site #1-30-101  
Glen Head, New York

**1.0 INTRODUCTION**

AMEC-Geomatrix Consultants (AMEC) was retained by Breeze-Eastern Corporation (BEC), formerly known as TransTechnology Corporation (TTC), to implement the Supplemental Work Plan for Operable Unit 2 (Supplemental Work Plan) for the property located at One Robert Lane in Glen Head, New York (Site). The Site location is shown on Figure 1. The Site is currently listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York State as Site Number 1-30-101 with a Classification 2. The Site is being investigated and remediated in accordance with Order on Consent Index # W1-0913-02-02 executed between TTC and the New York State Department of Environmental Conservation (NYSDEC).

In a letter dated June 25, 2004, NYSDEC separated the Site remediation work into two Operable Units. Operable Unit 1 (OU-1) was designated by NYSDEC for soil remediation. Operable Unit 2 (OU-2) was designated by NYSDEC for groundwater on and off the Site as it relates or pertains to the Site.

In accordance with the Supplemental Work Plan, the Supplemental OU-2 Investigation is being conducted in two phases. The Phase 1 Investigation has been completed and the results have been used to design the Phase 2 Investigation. The Work Plan for Supplemental OU-2 Investigation Phase 2 (Phase 2 Work Plan) is presented herein.

**1.1 PRIOR SUBMITTALS UNDER THE ORDER ON CONSENT**

To date, the following documents required by the Order on Consent have been submitted to and approved by NYSDEC:

1. Remedial Investigation/Feasibility Study Work Plan (Geomatrix, July 2002). Approved by NYSDEC (letter dated September 27, 2002).
2. Remedial Investigation Report (Geomatrix, September 2005). Approved by NYSDEC (letter dated September 8, 2005).
3. Feasibility Study Report for Operable Unit 1 (Geomatrix, September 2005). Approved by NYSDEC (letter dated September 8, 2005).

4. Remedial Design/Remedial Action Work Plan (Geomatrix, June 2007). Approved by NYSDEC (letter dated July 10, 2007).
5. Supplemental Work Plan for Operable Unit 2 (Geomatrix, April 2008). Approved by NYSDEC (letter dated June 2, 2008).
6. Technical Memorandum: Operable Unit 2 Supplemental Investigation Phase 1 Results (AMEC-Geomatrix, October 9, 2009)

## **1.2 PREVIOUS INVESTIGATION RESULTS**

The September 2005 Remedial Investigation (RI) Report presents the results of prior groundwater (i.e., OU-2) investigation activities conducted at the Site. Eleven groundwater monitoring wells have been installed and sampled at the Site. Monitoring well locations are shown on Figure 2. In addition, one off-Site well installed by NYSDEC as part of a regional study was sampled as part of the RI. The September 2005 RI Report presents the following conclusions with respect to OU-2:

1. The RI confirmed the results of the NYSDEC Preliminary Site Assessment Report for the Glen Head Groundwater Plume (September 2000) which showed that Site (and regional) groundwater has been impacted by apparent spillage of dry cleaning chemicals at current or former dry cleaning establishments located upgradient of the Site in the Village of Glen Head. The chemicals attributable to the dry cleaners are tetrachloroethene (PCE) and degradation products including trichloroethene (TCE).
2. The Site may also have contributed some TCE to groundwater.
3. Groundwater flow at the Site occurs generally from southeast to northwest.
4. On-Site groundwater is not used for water supply. Future development plans for the Site do not contemplate development of an on-Site water supply.
5. The furthest downgradient wells at the Site (MW-7 and MW-8) indicate off-Site migration in groundwater is not occurring to the north from this area. However, it is possible that some off-Site migration may occur in a more westerly direction which would not be detected in wells MW-7 and MW-8.

The Supplemental Investigation of OU-2 was designed to investigate the potential for off-Site migration to the west.

### **1.3 OU-2 INVESTIGATION OBJECTIVE AND PHASED APPROACH**

The overall objective of the Supplemental OU-2 Investigation is to provide additional data sufficient for characterization of the nature and extent of chemical presence in groundwater attributable to past releases at the Site sufficient for completion of a Feasibility Study (FS) to address groundwater impacts related to the Site.

As described in the Supplemental Work Plan, the Supplemental OU-2 Investigation is being implemented in two phases. The Phase 1 Investigation was conducted on-Site with the objective of characterizing the extent to which impacted groundwater may be migrating off the Site property to the west. The Phase 1 Investigations were therefore focused on the western perimeter of the property (see Section 1.4). The Phase 2 Investigation will be conducted downgradient of the Site based on the results of Phase 1.

### **1.4 SUMMARY OF PHASE 1 INVESTIGATION**

Phase 1 Investigation tasks included collection of groundwater samples from three existing on-Site monitoring wells (MW-2, MW-9, and MW-10) for analyses of Target Compound List Volatile Organic Chemicals (TCL VOCs) and “groundwater profiling” at two locations along the western Site boundary. Groundwater profiling entails collection of depth discrete groundwater samples from a single borehole and analyses for selected Site-related VOCs (consisting of TCE, PCE and potential products of degradation). Groundwater profile hole and monitoring well locations sampled during the Phase 1 Investigation are shown on Figure 3.

During the groundwater profiling, continuous physio-chemical data are collected by means of downhole sensors integrated into the probing device. Two low hydraulic conductivity horizons, indicative of clay presence, were encountered in each profile hole. In GP-01, clay was encountered from 160 to 180 feet bgs and again from 205 to 220 feet bgs. Clay layers were encountered in profile hole GP-02 from 150 to 175 feet bgs and from 208 to 220 feet bgs.

Chemicals detected in one or more groundwater samples were TCE, PCE, and cis-1,2-dichloroethene (cis-1,2-DCE). Results are summarized on Figure 4. The results of the Phase 1 Investigation are consistent with the conclusions of the RI in that TCE presence is largely limited to the upper 20 feet of groundwater. In profile hole GP-02, TCE was not detected below approximately 120 feet (approximately 10 feet below the water table). In profile hole GP-1, located approximately 200 feet north of GP-02, generally lower concentrations of TCE were detected, however detectable TCE (5.1 ug/l) was present to a depth of 150 feet (approximately 40 feet below the water table).

As indicated above, there is a low hydraulic conductivity clay layer encountered at approximately 160 feet bgs in GP-1 and 150 feet bgs in GP-02. This low hydraulic conductivity layer is approximately 20 to 25 feet in thickness. Chemicals were not detected below this layer.

The Phase 1 Investigation indicated a potential for off-Site migration of impacted groundwater. The highest measured TCE concentration occurred in monitoring well MW-2, located near the midpoint of the western Site property line. Hydraulic head monitoring conducted for the RI and Phase 1 Investigation indicates groundwater flow occurs primarily to the northwest. This suggests the optimal location to monitor potential off-Site migration would be northwest of on-Site well MW-2. This area is targeted for investigation in Phase 2 as described in the remainder of this work plan.

#### **1.5 PHASE 2 INVESTIGATION OBJECTIVE**

The objective of the Supplemental OU-2 Investigation Phase 2 is to obtain data for delineation of potential Site-related groundwater impacts in the area downgradient of the Site sufficient for completion of a FS to address groundwater impacts related to the Site.

## **2.0 PHASE 2 SCOPE OF WORK**

### **2.1 PHASE 2 GROUNDWATER SAMPLE LOCATIONS**

The results of the Phase 1 investigation indicate that additional groundwater monitoring locations would be needed northwest of impacted areas of the Site in order to delineate the extent of the VOC plume. The indicated Phase 2 monitoring locations are situated within the neighborhood known as Todd Estates which borders the Site on the west. Review of aerial photography suggests sampling points could be located along Todd Drive East which approximately parallels the western property boundary at distance of about 150 feet west of the Site.

The Phase 2 Investigation will utilize groundwater profiling similar to the Phase 1 Investigation (though, as described in Section 3.0 different borehole advancement methods will be used). It is planned that permanent groundwater monitoring wells will be installed in selected profile boreholes (see Section 2.3).

#### **2.1.1 Primary Profile Holes**

Based on the Phase 1 investigation results, a minimum of three groundwater sampling locations will be required to complete the delineation of the VOC plume. These locations are referred to as Primary Profile Holes and are proposed to be located along Todd Drive East as shown on Figure 5. The three Primary Profile Holes (as proposed) are located along a transect approximately 150 feet downgradient of the area where Site-impacted groundwater appears to be migrating toward the western property boundary (i.e., the area approximately bounded by the locations of MW-10 and GP-1 shown on Figure 3). The Primary Profile Holes will be drilled and sampled as described below. Groundwater samples will be submitted to a commercial laboratory for rapid turnaround (24 to 48 hours). The results will be used to assess the need for additional profile holes.

#### **2.1.2 As-Needed Profile Hole Locations**

The need for additional (i.e., As-Needed) profile holes will be determined based on the results of the groundwater sampling from the three Primary Profile Holes. Specifically, levels of TCE and TCE degradation products detected will be compared to water quality standards or other comparison criteria and the results will be discussed with NYSDEC representatives. Results above comparison criteria may result in a determination by NYSDEC that additional groundwater profile locations are appropriate.

If the Primary Profile Hole results lead to a determination that additional locations more distant from the Site are found to be necessary for plume delineation, potential locations based on

aerial photography include: Todd Court, a cul-de-sac located approximately 400 feet west of the Site; Roosevelt Street, a cul-de-sac located approximately 800 feet west of the Site; and the parking lot for the school located 800 feet northwest of the Site. These As-Needed Profile Hole locations are shown on Figure 5.

If the Primary Profile Hole results lead to a determination that additional locations are necessary to expand the Primary Profile Hole transect line to the north and/or south potential additional locations are shown on Figure 5.

## **2.2 GROUNDWATER PROFILING METHODS**

Depth discrete groundwater samples will be collected from the three Primary Profile Holes and from up to five As-Needed Profile Holes. Profile Hole locations are shown on Figure 5.

### **2.2.1 Borehole Advancement**

The Phase 2 Investigation will be conducted within a residential neighborhood. In order to limit the disruption, noise and inconveniences which would normally be associated with a drilling program of this scope, BEC has elected to utilize specialized direct push (Geoprobe) borehole advancement technology. The benefits of this technology are that it will allow use of much smaller equipment, it is faster and generates minimal drilling waste compared to the conventional mud-rotary drilling methods generally used for groundwater sampling at these depths. The disadvantage is that the sampling depth will be limited to a maximum of approximately 150 feet below ground surface (BGS) and it is not certain the technique will be successful for installation of permanent groundwater monitoring wells. BEC has determined the advantages with respect to minimizing community disruption and drilling wastes and the potential to generate a large amount of high quality data in a relatively short time frame outweigh the disadvantage of potentially having to remobilize for targeted followup investigation (see Section 2.4).

Boreholes will be advanced using a track-mounted Geoprobe 8040DT unit. The 8040DT Geoprobe machine is hydraulically powered and uses static and dynamic percussion force and/or conventional drilling techniques for subsurface sampling. It is capable of driving 2.25 inch, 3.25 inch and 4.5 inch tooling. According to a local contactor (Zebra Environmental Corporation), the 8040DT has been used to drill to 150 feet depth in similar materials as expected to be encountered in the Phase 2 Investigation. However, this depth is at the high end of the range of expected performance and should be considered a maximum objective. Refusal may be encountered at lesser depths.

### **2.2.2 Soil Vapor Sampling**

One soil vapor sample will be collected from each borehole at a depth of 8 feet below ground surface using the Geoprobe soil vapor sampling tool designed for vapor collection. Samples will be collected using SUMMA canisters for a minimum 30 minute sampling duration. Soil vapor samples will be analyzed for TCE, PCE and potential degradation products (cis- and trans-1,2 dichloroethene, 1,1-dichloroethene, and vinyl chloride) using United States Environmental Protection Agency (USEPA) Method TO-15 (TO-15).

### **2.2.3 Groundwater Sampling**

The profile holes will be advanced to a maximum total depth of approximately 150 feet below ground surface (bgs). Groundwater samples will be collected using a screen point sampler from the following intervals:

- top two feet below the water table (estimated to occur at 100 to 110 feet bgs)
- at intervals of 10 feet to a depth 40 to 50 feet below the water table (or to refusal, see Section (2.4))

Samples are collected by threading a clean sampler onto the leading end of a probe rod which is driven to the sample interval. While the sampler is driven to depth, O-ring seals at the drive head and expendable drive point provide a watertight system. Chase rods are sent downhole until the leading rod contacts the bottom of the sample screen. The tool string is then retracted while the screen is held in place with the chase rods. As the tool string is retracted, the expendable point is released from the sampler sheath to allow depth-discrete collection of the groundwater sample. At each point, groundwater samples will be collected from the bottom up.

While it is anticipated this method will prove feasible for collection of groundwater samples to sufficient depths, there is a possibility that the geologic materials encountered could provide refusal prior to delineating the vertical extent of the plume. If this occurs, the contingency plan for deep sample collection described in Section 2.4 will be followed.

### **2.2.4 Groundwater Sample Analyses**

Groundwater samples will be analyzed for TCE, PCE and potential degradation products by a qualified laboratory using SW-846 Third Edition Methods with USEPA Contract Laboratory Program (CLP) deliverables. Preliminary results (lacking the full deliverables package) will be available within 24 to 48 hours after sample receipt by the laboratory. These preliminary results will be used for the following:

- Identify the need for sampling from As-Needed Profile Holes
- Identify locations and screened intervals for permanent groundwater monitoring wells

Determinations of the number and locations of As-Needed Profile Holes and permanent monitoring wells will be made in concert by BEC and NYSDEC representatives.

### **2.2.5 Borehole Closure**

All probe holes will be backfilled with indigenous soil and/or clean sand. Pavement will be repaired with either ready mix concrete or cold patch asphalt (depending on the existing pavement).

### **2.3 PERMANENT MONITORING WELL INSTALLATION AND SAMPLING**

It is anticipated that at least two profile holes will be converted to permanent off-Site groundwater monitoring wells. At locations where BEC/NYSDEC determine permanent monitoring wells will be installed, the attempt will be made to install the wells using the 8040DT to drive 4.5 inch tooling. The wells will be constructed using 10 feet of 2-inch diameter PVC well screen and an appropriate length of 2-inch diameter riser. Each well will be finished at the surface with a flush mount well cover. While it is believed this method will prove feasible, there is a possibility that the geologic materials encountered could provide refusal of the 4.5-inch tooling prior to reaching the desired depth. If this occurs, the contingency plan for permanent well installation described in Section 2.4 will be followed.

Groundwater samples will be collected from the permanent wells using low flow sampling methods. Groundwater samples will be analyzed for TCE, PCE and potential degradation products by a qualified laboratory using SW-846 Third Edition Methods with USEPA CLP deliverables.

### **2.4 CONTINGENCY FOR GEOPROBE REFUSAL PRIOR TO ADEQUATE DEPTH**

As suggested above, the sampling planned for the Phase 2 Investigation may test the limits of the Geoprobe 8040DT technology. This could result in termination of boreholes prior to the planned depths. If this occurs, the Phase 2 Investigation will continue using the GP8040DT to collect as many of the planned samples as feasible. At that point, the data from the truncated program will be evaluated and presented in the Phase 2 Investigation Report to NYSDEC (see Section 3.0). The Phase 2 Investigation Report would include recommendations for followup remobilization and additional sample collection using rotary drilling methods if substantial data gaps are identified based on the results of the samples collected.

Similarly, the Geoprobe 8040DT may prove to be unsuitable for permanent monitoring well installations. If this occurs, the Phase 2 Investigation will proceed without the permanent monitoring well installations. The Phase 2 Investigation Report would then identify the locations of permanent wells to be installed in a followup program and describe the planned drilling and installation methodology.

## **2.5 ACCESS CONSIDERATIONS/PHASE 2 INVESTIGATION WORK PLAN**

The potential locations of the profile holes identified above are subject to change based on NYSDEC input, Community input and/or access considerations.

### **3.0 OU-2 SUPPLEMENTAL INVESTIGATION PHASE 2 REPORT**

The OU-2 Supplemental Investigation Phase 2 Report will be prepared and submitted to NYSDEC within 90 days of completion of field activities. The OU-2 Supplemental Investigation Phase 2 Report will include:

1. All Phase 2 field observations and sample analytical results
2. Identification of any deviations from this work plan including any failures to advance holes to the target completion depth (150 feet BGS for Primary Profile Holes) or problems with conversions of selected profile holes to permanent groundwater monitoring wells
3. Recommendations for permanent monitoring well installations if not completed in Phase 2 Investigation
4. An evaluation of the extent of off-Site groundwater impacts attributable to the Site
5. An evaluation of the off-Site data sufficiency for completion of the OU-2 FS, particularly with respect to any deviations from this work plan
6. Recommendations for follow-up off-Site groundwater sampling if data gaps are identified.
7. Preliminary schedule for completion of the OU-2 FS

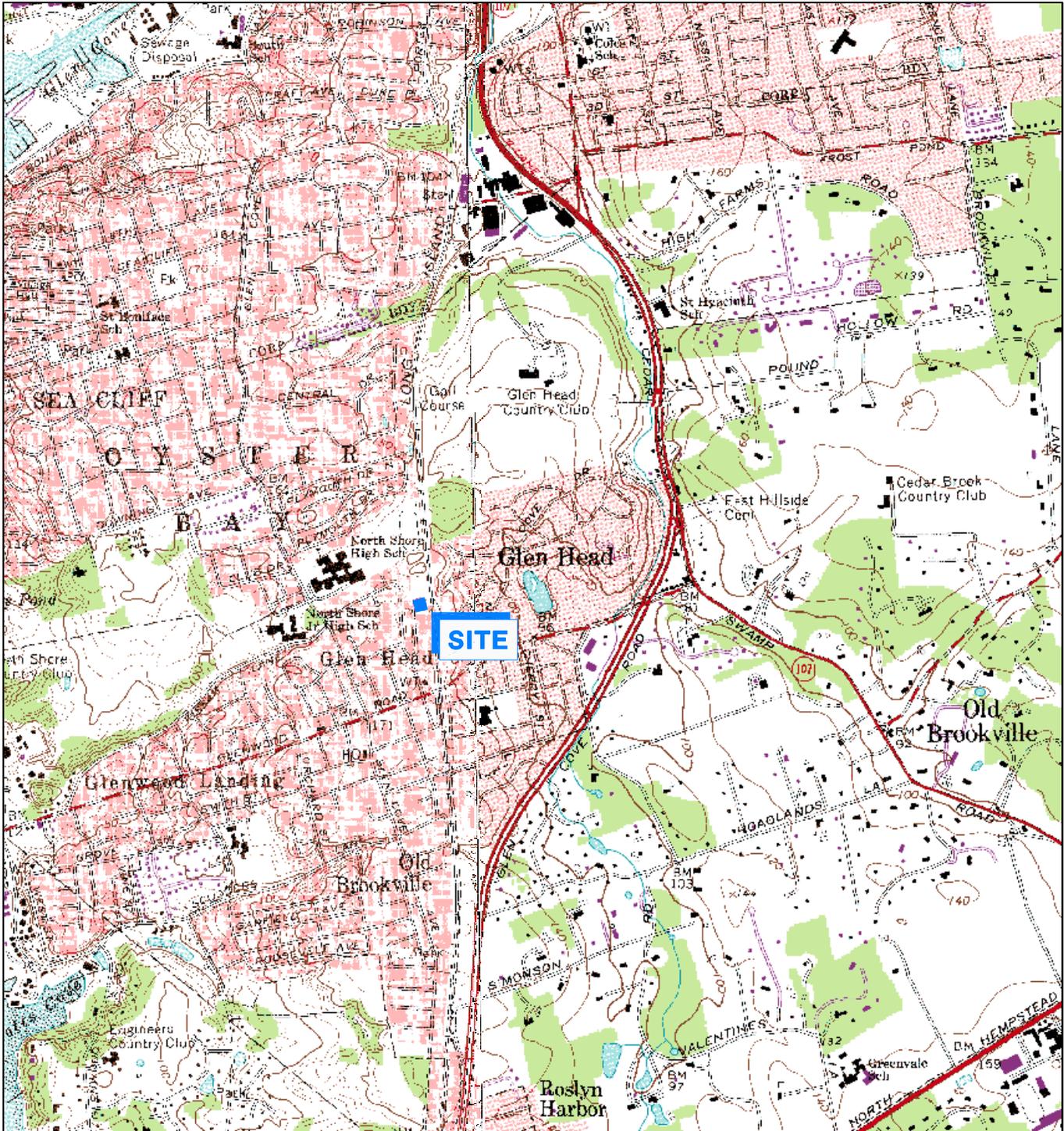
#### 4.0 PROPOSED SCHEDULE

The schedule proposed for this project is as follows:

<b><u>Task</u></b>	<b><u>Target Completion Date</u></b>
Planning, community notifications	September 7, 2010
Contractor Selection	September 7, 2010
Field Investigations	October 15, 2010
Report to NYSDEC	December 15, 2010

## FIGURES

---



SOURCE:

USGS HICKSVILLE AND SEA CLIFF, NY QUADRANGLES.

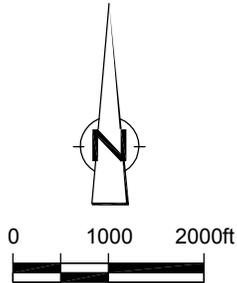
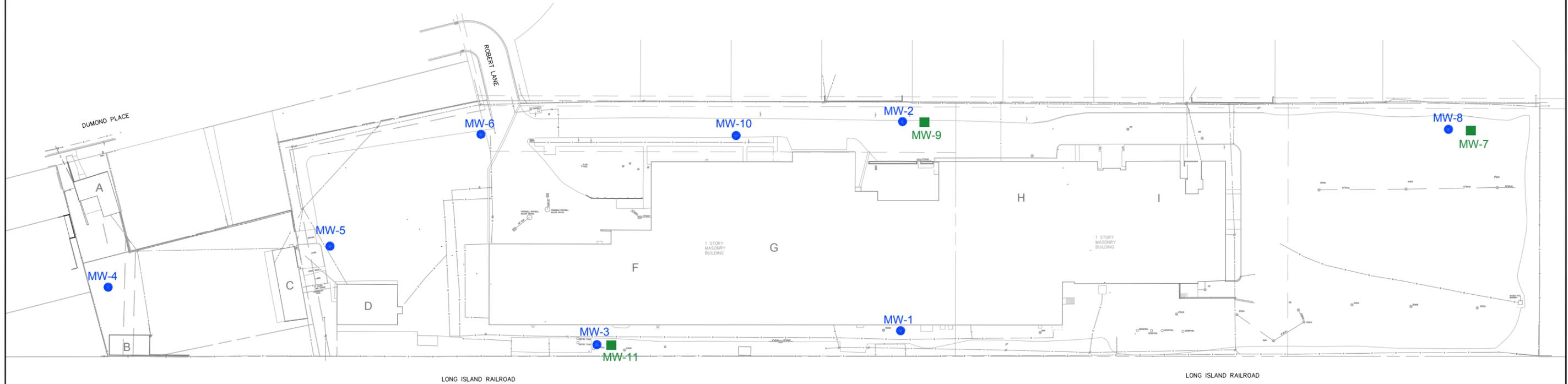
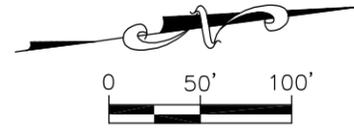


figure 1

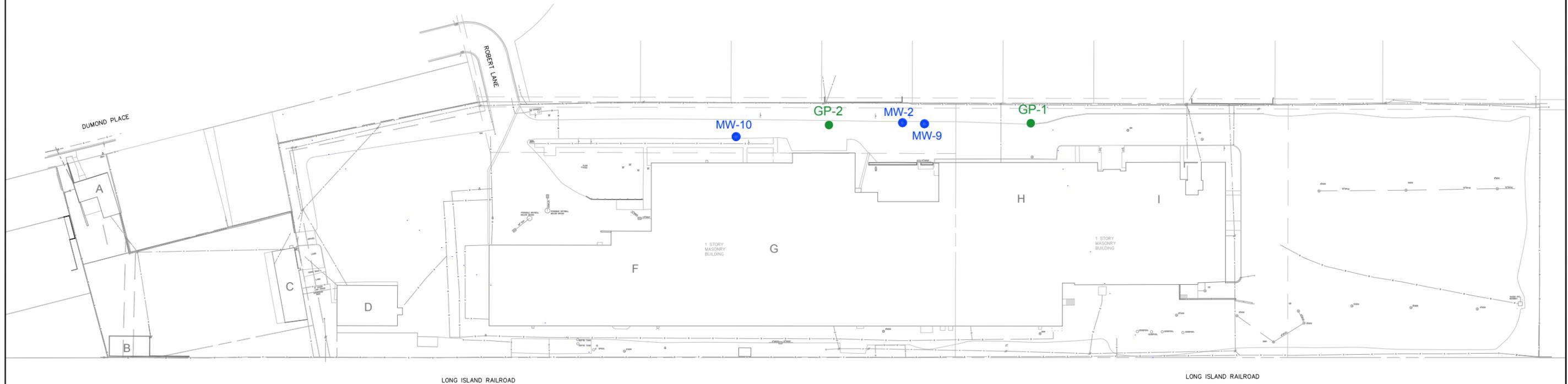
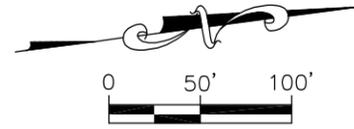
SITE LOCATION MAP  
 TRANSTECHNOLOGY GLEN HEAD SITE  
*Glen Head, New York*



**LEGEND**

- MW-4 ● UPPER ZONE GROUNDWATER MONITORING WELL LOCATION
- MW-7 ■ LOWER ZONE GROUNDWATER MONITORING WELL LOCATION

<b>EXISTING MONITORING WELL LOCATIONS</b> TRANSTECHNOLOGY CORPORATION GLEN HEAD, NEW YORK		
<b>AMEC Geomatrix</b>	Project No. 6238	Figure 2



**LEGEND**

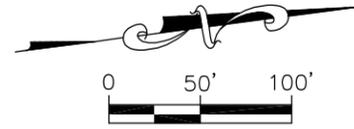
- MW-4 ● EXISTING WELL TO BE SAMPLED
- GP-1 ● GROUNDWATER PROFILE LOCATION

PHASE I GROUNDWATER SAMPLE LOCATIONS  
 TRANSTECHNOLOGY CORPORATION  
 GLEN HEAD, NEW YORK

**AMEC Geomatrix**

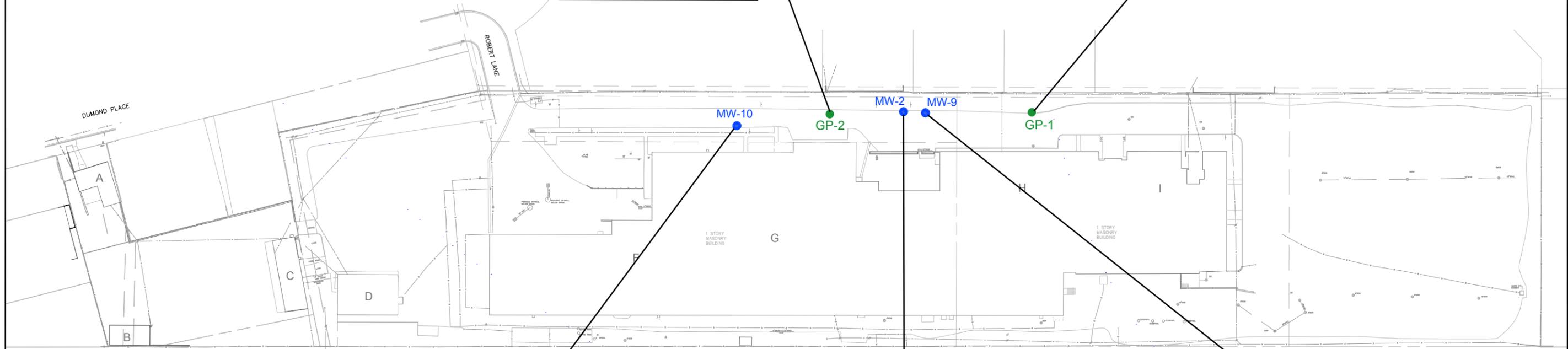
Project No.  
6238

Figure  
3



GP-2		
Depth	Concentrations	
(feet bgs)	TCE	PCE
110.00	290	6.3
120.25	120	ND
130.25	ND	ND
142.65	ND	ND
150.25	ND	ND
179.25	ND	ND
199.25	ND	ND

GP-1		
Depth	Concentrations	
(feet bgs)	TCE	PCE
110.0	25	ND
120.0	200	4.1
130.0	27	ND
140.0	13	ND
150.0	5.1	ND
180.3	ND	ND
200.0	ND	ND



MW-10		
Screened Interval	Concentrations	
(feet bgs)	TCE	PCE
105.3 - 120.3	560	15

MW-2		
Screened Interval	Concentrations	
(feet bgs)	TCE	PCE
107 - 122	720	14

MW-9		
Screened Interval	Concentrations	
(feet bgs)	TCE	PCE
124.1 - 149.1	0.58J	0.58J

**LEGEND**

- MW-4 ● EXISTING WELL TO BE SAMPLED
- GP-1 ● GROUNDWATER PROFILE LOCATION
- TCE TRICHLOROETHANE
- PCE TETRACHLOROETHENE
- bgs BELOW GROUND SURFACE
- ND CHEMICAL NOT DETECTED AT DETECTION LIMIT OF 2 ug/L
- J ESTIMATED CONCENTRATION
- CONCENTRATIONS IN ug/L

PHASE I OU-2 INVESTIGATION RESULTS:  
 TCE AND PCE (ug/L)  
 AUGUST - SEPTEMBER 2008  
 BREEZE-EASTERN CORPORATION  
 GLEN HEAD, NEW YORK

**AMEC Geomatrix**

Project No.  
6238

Figure  
4



0 ft 200 ft

Notes:

- Existing Monitoring Well Location
- ⊗ Existing Groundwater Profile Hole Location
- ⊗ Proposed Profile Hole Locations (approximate)
- Proposed As-Needed Profile Hole Locations (approximate)

**RECOMMENDED PHASE 2 INVESTIGATION  
MONITORING WELL LOCATION**  
Breeze-Eastern Corporation  
Glen Head, New York

By: DMH	Date: 9/29/09	Project No. 6238
---------	---------------	------------------

<b>AMEC Geomatrix</b>	Figure 5
-----------------------	----------