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FOCUSED GROUND-WATER REMEDIATION WORK PLAN FOR THE 570 MAIN STREET FACILITY WESTBURY, NEW YORK

NYSDEC SITE CODE #130043A
(HAI DOCUMENT # NMB007.200.0019)

JUN 15 2000

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1.0 INTRODUCTION

1.1 General

Hull & Associates, Inc. (HAI) was retained by IMC Eastern Corp. (IMC) to prepare a Focused Ground-Water Remediation Work Plan for the former IMC Magnetics facility at 570 Main Street in Westbury, New York, New York State Department of Environmental Conservation (NYSDEC) Code #130043A (Site). The Site is within the New Cassel Industrial Area (NCIA), a Class 2 inactive hazardous waste site as designated by the NYSDEC.

Preparation of this document and all activities performed at the Site have been, to the maximum extent practicable, in accordance with the provisions of Consent Order Index # ___________ effective _______, 2000 (the Order).[1] To date, field work and reporting have also been, to the maximum extent practicable, consistent with the April 1998 Focused Ground-Water Investigation and Focused Ground-Water Feasibility Study Work Plan (Addendum 1 – HAI Document # NMB004.300.0074) and supporting documents contained therein.

Activities proposed in this Focused Remediation Work Plan are directed toward completing the preferred alternative of *in-situ* chemical oxidation of ground-water contamination, as identified in the September 1999 Focused Ground-Water Feasibility Study (Revised September 1999 – HAI Document # NMB007.200.0019). The NYSDEC issued a Record of Decision in March 2000 that identified *in-situ* chemical oxidation as the selected remedy for on-Site ground-water contamination.

This report is arranged in four sections. Section 1.0 provides an introduction including the Site description, Site history and operations, a summary of previous investigations and studies, an overview of project objectives, a description of project organization and a review of supporting documents. Section 2.0 describes the proposed work activities. Section 3.0 provides a schedule of implementation and Section 4.0 lists the references used to prepare this document. All figures, tables and plates referenced in this document are located at the end of the text.

[1] The Order addresses "Development and Implementation of a Focussed Groundwater Remediation for Operable Unit 2 of an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York."

1.2 Site Description

The Site is located at 570 Main Street in Westbury, New York, and is within the 170-acre NCIA. The NCIA contains approximately 200 industrial or commercial enterprises. A Site Location Map is presented on Figure 1. The Site was occupied by IMC from the early 1950s until 1992. The property is slightly over two acres with one manufacturing building and a paved parking lot covering most of the area. The Site is currently owned and occupied by Castle Collision, an entity unrelated to IMC.

1.3 Previous Investigations and Studies

1.3.1 Anson Environmental, Ltd.

Anson Environmental, Ltd. (Anson) performed preliminary investigative activities related to the closure of the IMC manufacturing operation at the Site. Anson reportedly developed a closure plan for the IMC facility in 1992; however, this closure plan was not available for review. Implementation of this closure plan began in March 1993, and consisted of exposing abandoned leaching pools and septic tanks from three areas of the Site, designated as Area 1, Area 2, and Area 3 (refer to Plate 1). Sediment and soil samples were collected from these locations for laboratory testing of volatile organic compounds (VOCs). Sediment samples were also collected from four floor drains in the building for laboratory VOC analyses. Finally, a composite sample of water was collected during power washing of floors in the building and samples of concrete floors were submitted for laboratory analyses.

Laboratory analyses revealed the presence of VOCs in soils and floor drain sediment samples. The highest concentrations were detected beneath Area 2.

Based upon findings from the field activities, Anson identified the following three main potential source areas:

1. Area 1, located outside the building in the Site's northeast corner;
2. Area 2, located outside the building in the Site's northwest corner; and

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FOR THE

570 MAIN STREET FACILITY WESTBURY, NEW YORK NYSDEC SITE CODE #130043A

MAY 2000

PREPARED FOR:

IMC EASTERN CORPORATION

PREPARED BY:

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3. Area 3, located outside the building near the Site's southwest corner.

In addition to these areas, Anson identified five probable floor drains that were also considered potential source areas.

Anson installed and sampled three ground-water monitoring wells in 1994. The monitoring wells were apparently screened from above the water table to a depth of approximately ten ft. below the water table. VOCs were detected in all monitoring wells.

1.3.2 Lawler, Matusky & Skelly Engineers, February 1995

Lawler, Matusky & Skelly Engineers (LMS) was contracted by NYSDEC to conduct a site investigation of the NCIA. The investigation consisted of a file review, ground-water sampling and analysis from 56 existing monitoring wells, and ground-water sampling and analysis from direct-push soil boring locations installed during the investigation. The Site was identified as a potential source of ground-water contamination in the VOC plume designated as the "570 Main Street plume;" however, this was never confirmed by investigations conducted by LMS or Anson.

1.3.3 Interim Remedial Measure (Soils), February 1997

HAI and Land Tech Remedial, Inc. (LTR – presently Handex of New York) conducted an Interim Remedial Measure (IRM) Investigation of soils at the Site from May to July 1996. Investigative activities were conducted per an approved Work Plan and included: completion of a detailed file review and source and release identification study; collection of unsaturated soil samples at various depths in eighty-eight direct-push borings; collection of five shallow ground-water samples; and completion of a soil vapor extraction (SVE) pilot test. The Final Investigation Report documents the results of the IRM.

Based on a file review and source and release identification study, four general areas of concern were evaluated including Areas 1, 2, and 3 and several dry well-type floor drains identified by previous investigations.

The primary contaminants detected in soils were VOCs, with tetrachloroethene (PCE) found at the highest concentrations. The highest concentration of PCE detected at the Site was almost 40,000,000 ug/kg, located at a depth of ten to twelve ft. beneath a former leaching pool in Area 2. Identification of PCE in excess of 1% of the soil mass provides strong indication of the presence of residual dense nonaqueous phase liquid (DNAPL) beneath Area 2.[2] With the exception of PCE, no VOCs exceeded 100 µg/kg in soils outside of Area 2. Furthermore, no VOCs other than PCE were detected below a depth of 10 ft. outside Area 2.

Table 1 presents a summary of analytical results for ground-water samples collected from existing monitoring wells MW-1, MW-2 and MW-3 and using direct-push sampling methods at five on-Site locations. All samples were collected from an interval less than ten ft. below the water table.

The highest VOC concentrations at the Site were collected from direct-push boring SB-25 at a depth interval of 60-62 ft. below the ground surface. Concentrations ranged up to 2,680 ug/L for PCE (mobile lab) and TCE (fixed lab), respectively. Combined with the distribution of VOCs in unsaturated soils, the relatively high concentrations of VOCs in SB-25 indicated that Area 2 is a likely source of ground-water contamination.

The IRM Investigation determined that heavy metals in soils did not require remediation based on their concentrations and distribution. Based on pathway completeness evaluations for VOCs, the IRM Investigation determined that active intervention would be required in Area 2. Considering the volatility of VOCs detected in Area 2 and the results of a pilot study, HAI and LTR selected soil vapor extraction (SVE) as the interim remedial measure and prepared a plan to describe operation, monitoring and maintenance of the system.

HAI and LTR installed a SVE system in August 1997 by connecting it to nested vapor extraction wells in Area 2 that were used for the pilot test. The system began continuous operation in October 1997. The SVE system continues to operate in accordance with the approved Soil Vapor Extraction Operation, Monitoring and Maintenance Plan.

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[2] Cohen, Robert M. and J.W. Mercer. 1993. *DNAPL Site Evaluation.* CRC Press, Inc. Boca Raton, FL.

1.3.4 Focused Ground-Water Investigation, September 1998

HAI and LTR conducted a Focused Ground-Water Investigation at the Site. Field investigations were conducted between June 18, 1998 through July 30, 1998. The objective of the work was to gather data for evaluating the fate and vertical and horizontal distribution of selected volatile organic compounds (VOCs) and metals in ground water upgradient and downgradient of Area 2, as described in the revised Work Plan for the Focused Ground-Water Investigation and Focused Ground-Water Feasibility Study (HAI Document # NMB004.300.0074).

Major field activities for the Focused Ground-Water Investigation included: installation of twelve monitoring wells in four three-well clusters; measurement of static water levels in the wells to confirm the direction of ground-water flow; sampling of wells and testing for VOCs and selected heavy metals; and completion of biodegradation studies. A summary of construction information for the monitoring wells is included on Table 2. Findings from the investigation are below.

1.3.4.1 Regional Geology/Hydrogeology

The majority of the ground water underlying NCIA is in unconsolidated glacial deposits of Pleistocene age and coastal-plain deposits, of both continental and marine origin, of late Cretaceous age. These unconsolidated deposits consist of gravel, sand, silt, and clay and are underlain by bedrock of lower Paleozoic and/or Precambrian age. The bedrock, which is virtually impermeable, forms the base of the ground-water reservoir. The two primary aquifers in the area of the Site are the Upper Glacial Aquifer and the Magothy aquifer. The Magothy aquifer is underlain by the Raritan clay.

The Upper Glacial Aquifer consists of outwash deposits of late Pleistocene age. The Upper Glacial Aquifer overlies the Magothy aquifer in the investigation area, and its deposits form the present land surface. The upper Pleistocene glacial outwash deposits consist of stratified deposits of sand and gravel with some cobbles and may locally contain thin clay beds. These deposits are highly permeable and allow recharge water to percolate downward with relative ease to the water table and, subsequently, to the underlying aquifers.

The Upper Glacial Aquifer, as defined and used by the USGS on Long Island, includes both the unsaturated and saturated portions of the upper Pleistocene deposits. USGS maps indicate that the thickness of the Upper Glacial Aquifer in the area of the Site is approximately 50 ft.[3] Data collected by HAI during investigation of the Site and by the NYSDEC during investigations in the NCIA indicate that the upper Pleistocene deposits in the NCIA are unsaturated; therefore, the water table may locally occur in the underlying Magothy aquifer approximately 55 ft. below grade. Regional ground-water flow direction local to the NCIA, as determined by the USGS and the Nassau County Department of Public Works, is towards the southwest.

The Magothy aquifer is the principal aquifer underlying Long Island and is the island's main source of potable water. The aquifer is composed of upper Cretaceous sediments that overlie the Raritan clay. Its deposits consist primarily of lenticular and discontinuous beds of very fine to medium sand, commonly clayey or containing thin clay lenses that are interbedded with clay and sandy clay silt, and some sand and gravel. Coarse beds of sand and gravel commonly occur in the lower 100 to 150 ft. of the aquifer. Previous investigations have indicated that the aquifer sediments appear to grade upward from coarser grained at the base to finer grained at the top. The greater proportion of the clay and sandy clay occurs in the upper half of the aquifer. Beds of clay occur locally towards the top of the aquifer and seem to be distributed irregularly throughout the Town of North Hempstead. This is evident in the well completion logs generated for public supply well numbers N-8956 and N-8957 in the Westbury Water District (Bowling Green Wells), which are located approximately 3,000 ft. southeast of the Site. A solid brown clay layer was logged during the drilling of well number N-8956 at 95 ft. below grade. This same clay layer was not encountered during the drilling of well number N-8957, which was installed only 140 ft. to the southeast of N-8956.

The Magothy aquifer is approximately 500 ft. thick beneath the NCIA, and is encountered at a depth of approximately 50 ft. below grade. According to the USGS it is quite possible that the uppermost part of the Magothy contains deposits of Pleistocene age, or, conversely, that the lower part of the upper glacial aquifer contains deposits of Cretaceous age. The boundary between the Cretaceous and

[3] U.S. Geological Survey, in cooperation with the Nassau County Department of Public Works, *Geology of the Town of North Hempstead, Nassau County, Long Island, New York.* 1979.

Pleistocene deposits is often indistinguishable in Nassau County because the sediments are of similar composition and show no significant lithological difference.

1.3.4.2 Site Geology/Hydrogeology

Unsaturated soils at the Site consist primarily of a heterogeneous mixture of brown to tan fine sands with lesser amounts of silt, medium sands, coarse sands and gravels. A discontinuous layer with increased silt content exists in the interval between grade and approximately 10 ft. below grade. Below this silty layer, soil composition remains generally constant with a slight fining-downward trend (progressively less coarse sands and gravels with depth) to approximately 50 ft. below grade. No clay lenses, or other impermeable features were encountered at the unsaturated deposits.

Saturated deposits were encountered at approximately 50 ft. below grade. These deposits consist primarily of brown to tan, fine to medium and fine to coarse sands. In the northwestern portion of the Site, extending to Main Street's north right-of-way, lenses of fine sand, silty fine and silty fine to medium sand, and clayey, silty fine to medium sand were encountered at depths between approximately 57 and 120 ft. below grade. Occasional thin silty clay seams were encountered during drilling of the MW-4 cluster in the north right-of-way for Main Street. These seams appear to pinch out toward the south. Saturated deposits are relatively homogeneous south of the MW-5 well cluster along the western boundary of the Site.

Soil organic carbon content at the Site was tested during the IRM Investigation and found to average approximately 0.2 percent total organic carbon (TOC). Higher TOC values were detected in the silty layer encountered in the near-surface sediments, with values as high as approximately 0.8 percent.

Water level measurements during the IRM Investigation and the Focused Ground-Water Investigation indicated a ground-water flow at the Site to be toward the southwest, consistent with the regional ground-water flow direction in the NCIA. The average ground-water gradient was determined to be approximately 0.0015 ft/ft. Figure 2 shows the piezometric surface, as measured in water table wells.

Minimal variations in heads were identified in clustered wells during the Focused Ground-Water Investigation. This indicates that ground-water flow within the upper ninety ft. of the aquifer is essentially horizontal.

1.3.4.3 Contaminant Distribution

Analytical results show that chlorinated VOCs are the primary contaminants in most of the wells at the Site. Of the chlorinated VOCs detected during the Interim Remedial Measures and Focused Ground-Water Investigation, PCE was found at the highest concentrations: up to 2,680 μg/L in a direct-push water sample collected directly beneath a leaching pool in Area 2; 660 μg/L in MW-2;and 160 μg/L in MW-5U, located near to and downgradient of Area 2. While no DNAPL was directly observed during the IRM Investigation or the Focused Ground-Water Investigation, detection of PCE at a concentration greater than 1 ppm indicates that DNAPL may exist beneath the water table.[4]

TCE and 1,1,1-TCA were detected at concentrations of up to 34 μg/L and 60 μg/L, respectively, in the MW-5 well cluster. At least one of the typical biodegradation daughter products 1,1-DCE, 1,1-DCA and/or cis 1,2-DCE was detected in all wells except MW-1.

Evaluation of the distribution of VOCs indicates that chlorinated VOCs, primarily PCE, 1,1,1-TCA, and TCE, are entering the Site from one or more upgradient sources and combining with VOCs in Area 2 ground water. A likely source of TCE is Atlas Graphics, located in a general upgradient direction of Area 2, and where TCE was recently detected in ground water at a concentration of 3,900 μg/L by NYSDEC. Analytical results from multi-level sampling at LMS probe location GP-20, installed just south of the corner of Main Street and Swalm Avenue in October 1993 (refer to Plate 1), indicate that TCE is the predominant VOC, supporting an interpretation that VOCs have migrated near to and beneath the Site from Atlas Graphics.

Elevated concentrations of PCE and TCE (660 and 330 μg/L, respectively) were detected in MW-2 during the IRM investigation. As MW-2 was located near the property's northern property line,

[4] Cohen, Robert M. and J.W. Mercer. 1993. *DNAPL Site Evaluation.* CRC Press, Inc. Boca Raton, FL.

upgradient of known potential source areas at the Site and approximately 80 feet east of Area 2, it is likely that the detected VOCs originated from one or more off-Site source.

VOC concentrations show marked reduction with distance from Area 2. As noted above, likely contribution of VOCs from one or more source upgradient of Area 2 and potential contribution from downgradient sources make it impossible to define the limits of VOCs originating from the Site.

Detection of daughter products in ground water indicates that biodegradation of chlorinated VOCs has occurred. In particular, detection of cis 1,2-DCE shows degradation of PCE and TCE. Taken together with the above observations, ground-water characterization results indicate that conditions in the aquifer system are moderately favorable for anaerobic degradation of PCE and TCE.

Microbial studies conducted during the Focused Ground-Water Investigation showed that at all wells sampled bacterial strains exist that are capable of biodegrading chlorinated VOCs. The strain most adaptable to VOC concentrations found at the Site was identified in ground water collected from MW-5U, providing strong evidence of active biodegradation in the vicinity of Area 2, where nutrient sources are likely to be the most abundant.

1.3.5 Ground-Water Sampling Subsequent to the Focused Ground-Water Investigation

During October 1998, IMC identified two monitoring wells, UN-22 and UN-24 (NYSDEC designations), located west of the Site. These were sampled to more completely define the distribution of VOCs downgradient of Area 2. The locations of UN-22 and UN-24 are shown on Plate 1.

Well soundings indicated that UN-22 and UN-24 are screened at or just below the water table. Table 4 summarizes chemical analysis of samples collected from the wells in November 1998. UN-22 contained TCE and PCE at concentrations of 230 ug/L and 11 ug/L, respectively. UN-24 contained TCE and PCE at concentrations of 68 ug/L and 11 ug/L, respectively. Ratios of TCE to PCE concentrations in these wells were not consistent with ratios observed in samples near Area 2 (e.g. the MW-5 cluster and SB-25), where PCE predominates. This indicates that at least a portion of the contamination found in UN-22 and UN-24 comes from a source other than Area 2.

Results from a July 1999 sampling event that included MW-1, MW-3 and well clusters MW-5 through MW-7 are summarized on Table 4. Changes in VOC concentrations between the July 1998 and July 1999 sampling events were variable. Of note was a reduction in the PCE concentration at MW-5U from 160 ug/L to 42 ug/L while the TCE concentration increased from 34 ug/L to 110 ug/L. PCE in MW-6U increased from 51 ug/L to 140 ug/L.

1.3.6 Focused Ground-Water Feasibility Study, September 1999

The Focused Ground-Water Feasibility Study examined the nature and distribution of contaminants in ground water, as determined by previous studies, and presented a ground-water model that evaluated current impacts to existing ground-water supply wells. The study concluded that contaminants originating at the Site are unlikely to be captured by Bowling Green or Westbury Water District Wells, and that the most realistic exposures to contamination would be ingestion of water from a future water supply well.

The study described probable VOC contamination entering the Site from one or more upgradient sources. The study concluded that continued migration of these VOCs onto the Site would make attainment of State Drinking Water maximum contaminant limits technically impracticable. The study therefore recommended identifying alternative cleanup standards, to be established during Remedial Design. Furthermore, the study evaluated remedial technologies with a focus on removing source material, to the extent possible, and allowing intrinsic remediation to reduce concentrations downgradient of the Site.

As a product of screening of numerous remedial technologies, HAI selected *in-situ* chemical oxidation in conjunction with intrinsic remediation as the preferred alternative for addressing ground-water contamination at the Site. *In-situ* chemical oxidation was determined to be more suited to achieving remedial goals than other technologies as it is capable of destroying source-concentration VOCs without producing toxic by-products. Given the size of the apparent source area and other Site-specific conditions, costs for employment of *in-situ* chemical oxidation were also found to be reasonable relative to other screened technologies.

1.4 Project Description and Objectives

The project will consist of installing additional ground-water monitoring wells upgradient and downgradient of the apparent source area (Area 2). HAI will also install chemical oxidation reagent application wells.

HAI will sample existing monitoring wells, new monitoring wells and new application wells to identify baseline conditions prior to conducting *in-situ* chemical oxidation pilot studies. ManTech Environmental Corporation will conduct bench testing on selected ground-water samples to identify appropriate quantities of conditioning agents and oxidizing reagent to be applied during a pilot study.

HAI and ManTech Environmental Corporation will complete a chemical oxidation pilot study in Area 2, evaluate data collected from the pilot study and, as appropriate, design a final remedial system. Upon completion of remedial activities, HAI will conduct five years of environmental monitoring to evaluate the permanence of the remedial action.

HAI has designed the project to meet the following primary objectives:

1. confirm the general applicability of *in-situ* chemical oxidation as a means of remediating ground water through baseline environmental sampling and bench testing;
2. evaluate site-specific performance of the *in-situ* chemical oxidation remedial method through pilot testing;
3. adjust the remedial approach as appropriate based on findings from pilot testing; and
4. employ *in-situ* chemical oxidation to significantly and permanently reduce VOC concentrations in ground water resulting from contamination in Area 2.

HAI will prepare a report describing findings from the pilot study. As the pilot study will result in treatment of the entire areal extent of the source area as HAI understands it, the final remedial design may not require additional application wells. However, additional applications of reagent are commonly required. To the extent that *in-situ* chemical oxidation is determined to be ineffective in achieving project objectives, HAI will propose one or more alternative technologies. Whether *in-situ* chemical oxidation is determined effective or an alternative technology is deemed necessary, the final design will include a long-term environmental monitoring plan.

1.5 Project Organization

The project will be managed from HAI's Mason, Ohio office. During implementation, HAI will assure that the type and quality of work conforms to this Work Plan and supporting documents.

1.5.1 Project Team

The work will be performed, on behalf of IMC, by HAI and several subcontractors, including:

1. ManTech Environmental Corporation, Chantilly, Virginia.
2. Lancaster Labs (Division of Thermo Analytical Inc.) in Lancaster, Pennsylvania (fixed laboratory analyses);
3. Handex of New York, Farmingdale, New York; and
4. Albert Tay PLS, Plainview, New York.

The above list identifies the subcontractors that have been identified by HAI to date. Other subcontractors may be used as necessary.

1.5.2 Project Staff

A brief description of the project staff and their responsibilities is given below. Figure 3 is a graphical representation of the project management structure.

Project Manager

The Project Manager, W. Lance Turley of HAI, will be responsible for the overall management of the project, including:

1. administering work, quality assurance and health and safety plans;
2. interpreting data and fulfilling reporting requirements;
3. helping to identify circumstances which necessitate interim actions and communicating to IMC when such circumstances are suspected or encountered;
4. providing communication between project personnel, subcontractors, and IMC; and

5. meeting the time requirements specified herein.

Technical Project Supervisor

The Project Hydrogeologist, Mr. Bill Dennis of HAI, will serve as the technical project supervisor. Mr. Dennis will oversee field investigations and environmental monitoring and assist the Project Manager in communications with ManTech Environmental Corporation, Handex of New York and Albert Tay (surveyor).

Site Health and Safety Officer

The Site Health and Safety Officer is Ms. Peg Chandler of HAI. Duties and responsibilities of the Health and Safety Officer are included in the Health and Safety Plan (HASP), Appendix C.

Quality Assurance Officer

The Quality Assurance Officer is Mr. Kevin Wildman of HAI. Duties and responsibilities of the Quality Assurance Officer are discussed in the Quality Assurance Project Plan (QAPP), Appendix B.

Laboratory Project Manager

The Analytical Laboratory Project Manager is Mr. Tim Oostdyk, an employee of Lancaster Labs. The Laboratory Project Manager will communicate with the Quality Assurance Officer, and report to the respective Laboratory Director. In addition, responsibilities of the Laboratory Project Manager include:

1. communicating between the laboratory and the field Quality Assurance Officer and Project Manager;
2. relating special needs of the field operations personnel to the laboratory
3. performing final review of all data packages before reporting results;
4. coordinating the sample load with the laboratory's available resources; and
5. providing appropriate glassware and equipment to meet sampling objectives.

Technical Advisors

Mr. Craig A. Kasper, P.E. and Mr. Mark J. Bonifas, P.E. of HAI and Mr. Ron Adams of ManTech Environmental Corporation will serve as the technical advisors for the project. Messrs. Kasper and Bonifas will assist primarily in evaluating contaminant distribution and fate and transport. Mr. Kasper is a licensed Professional Engineer in the State of New York. Mr. Adams will assist in evaluation of bench testing and pilot testing results and design and implementation of the final remedial system.

1.6 Organization of Work Plan and Supporting Documents

1.6.1 General

This Work Plan is supported by a Field Sampling and Analysis Plan (FSAP), a QAPP, a HASP and well logs for the existing on-site monitoring wells. These supporting documents are included along with the Focused Ground-Water Feasibility Work Plan as bound appendices to this Work Plan. Specifically, the FSAP is included as Appendix A, the QAPP is included as Appendix B, the HASP is included as Appendix C, and the well logs are included as Appendix D.

Data obtained pursuant to this work plan will be used to confirm the applicability of *in-situ* chemical oxidation for significantly and permanently reducing VOC concentrations in ground water resulting from contamination in Area 2. To the extent that bench testing and pilot studies demonstrate the technology to be effective, adjustments may be made to the pilot system to accomplish more extensive contaminant mass reduction.

Brief descriptions of the Work Plan and supporting documents are provided below.

1.6.2 Work Plan

This Work Plan provides the overall approach for the proposed investigative and remedial tasks. Rationale for gathering data, sampling locations and frequencies, and activities necessary to obtain the data are described.

1.6.3 Field Sampling and Analysis Plan

The FSAP in Appendix A provides guidelines for field sampling and analysis of ground water. Specifically, the FSAP addresses bench testing and the pilot study and includes discussions on:

1. sample locations and frequency;
2. sample designation;
3. soil sampling equipment and procedures;
4. field analytical procedures;
5. sample handling procedures;
6. decontamination of equipment;
7. documentation procedures;
8. field quality control procedures; and
9. management of investigation-derived materials.

1.6.4 Quality Assurance Project Plan

The QAPP in Appendix B is Lancaster Labs' *Laboratory Quality Assurance Project Plan.* This document describes the policies, organization, and specific quality assurance and control activities required to meet the data quality objectives for the project. The QAPP also includes documentation of Lancaster Labs' certification for analysis metals and volatiles pursuant to the New York State Department of Health Environmental Laboratory Approval Program Contract Laboratory Protocol.

1.6.5 Health and Safety Plan

The HASP in Appendix C has been prepared to address the procedures required to perform the field activities in a safe manner, and includes such items as:

1. project organization structure;
2. hazard assessment;
3. hazard communication and training;

4. contaminant monitoring;
5. safety considerations;
6. communications;
7. decontamination and cleanup procedures;
8. emergency response;
9. medical surveillance; and
10. Site management.

2.0 FOCUSED GROUND-WATER REMEDIATION

2.1 General

The Focused Ground-Water Remediation will consist of:

1. Task 1 – ground-water monitoring well and reagent application well installation;
2. Task 2 – baseline ground-water sampling and analysis;
3. Task 3 - bench testing of selected water samples;
4. Task 4 – pilot testing of *in-situ* chemical oxidation;
5. Task 5 – reporting of findings from tasks 1 through 4;
6. Task 6 – Remedial Design; and
7. Task 7 - Remedial Action.

Tasks 1 through 7 are analogous to a Pre-Design, in which a selected remedy is evaluated to determine the most appropriate configuration for a final design. However, given the small area to be remediated, the pilot system may also function as the final remedial system. To the extent that pilot testing and supporting studies indicate that *in-situ* chemical oxidation is an effective means of significantly and permanently reducing VOC concentrations in the apparent source area, the Remedial Design may simply consist of designing a long-term environmental monitoring program and recommending additional applications of reagent or making minor adjustments to the application system. If *in-situ* chemical oxidation is determined not to be effective in significantly reducing VOC concentrations, the Remedial Design result in alternative proposed technologies, potentially including further pilot testing.

2.2 Task 1 – Ground-Water Monitoring Well and Reagent Application Well Installation

2.2.1 Water Table Measurements

Prior to installing the new wells, the ground-water elevation will be measured in existing on-Site monitoring wells MW-1, MW-3 and the MW-4 through MW-7 well nests to confirm that the current water table elevations are within the range of historic elevations. If the current elevation falls outside the historic range, proposed screen intervals for new wells, described later in this document, may be adjusted.

The Field Sampling and Analysis Plan (FSAP) in Appendix A describes procedures for water and non-aqueous phase liquid (NAPL) interface measurement. Plate 1 shows the location of existing monitoring wells and Appendix D contains the existing monitoring well logs.

2.2.2 Ground-water Monitoring Well Locations and Depths

Proposed locations for the new monitoring wells are shown on Figure 4.[5] The PMW-8 well nest is located so that it can identify VOCs at various depths potentially entering the Site from upgradient sources. The PMW-9 and PMW-10 well couplets are located near to and in a general downgradient location with respect to leach pits LP-2A and LP-2B. These well couplets will be used to provide baseline ground-water quality data and information on contaminant destruction in the immediate vicinity of the apparent source area.

Exact location of the wells will be determined in the field based upon several factors, which may include, but are not limited to, drill rig and support equipment accessibility, local and state entity right-of-way restrictions, and utility locations. The monitoring well installation contractor will be responsible for obtaining all required permits and easements for the proposed drilling, ensuring all utility companies are contacted, and properly marking and avoiding utilities.

Proposed upper wells PMW-8U, PMW-9U and PMW-10U will each have a 15-ft. long well screen crossing the ground-water table (approximately thirteen ft. of screen below the water table).[6] Based upon previous static water level measurements collected at the Site, the water table below Area 2 has

[5] Designations for proposed monitoring wells have a "P" prefix. The "P" will be deleted from the designation after the well has been installed.

[6] Ground-water monitoring wells in the PMW-8 nest will be constructed using two-inch diameter, Schedule 40, PVC screens and risers. Wells making up the PMW-9 and PMW-10 couplets will be constructed using two-inch diameter, 0.010 slot wire-wrap stainless steel screens and stainless steel risers. These wells will be constructed in the same manner as the application wells, described in the following section. This construction will allow their use for as application wells should pilot studies determine that they are needed.

an approximate elevation 72 ft. above mean sea level (MSL). Therefore, the targeted elevations for the screened interval at all upper well locations are from approximately 77 to 62 ft. above MSL (approximately 45 to 60 ft. below the ground surface).

Proposed monitoring wells PMW-8M and PMW-8L will have screened intervals of ten ft. Proposed monitoring wells PMW-9L and PMW-10L will have screened intervals of 15 ft. Proposed screen elevations and depths for these and the upper wells will be as summarized below provided that current water table elevation, as measured prior to well installation, is within the historical range:

Proposed Monitoring Well	Construction	Elevation of Center of Screen (ft. above MSL)	Screened Interval (ft. above MSL)	Depth Below Grade[1] (ft.)
PMW-8U	PVC	69.5	62 to 77	45 to 60
PMW-8M	PVC	47	52 to 62	70 to 80
PMW-8L	PVC	27	32 to 42	90 to 100
PMW-9U	Stainless Steel	69.5	62 to 77	45 to 60
PMW-9L	Stainless Steel	49.5	42 to 57	65 to 80
PMW-10U	Stainless Steel	69.5	62 to 77	45 to 60
PMW-10L	Stainless Steel	49.5	42 to 57	65 to 80

1. Depth below grade is based on a surface elevation of 122 ft. MSL.

All wells will be surveyed by a surveyor registered in the State of New York and referenced to the same benchmark and coordinate system used in previous investigations.

During the soil boring process, soil samples will be collected using split spoon samplers at five-ft. intervals from the surface to a depth of approximately 50 ft. below the ground surface. Samples will be collected continuously below a depth of 50 ft. An HAI hydrogeologist will log all soil samples and conduct and record headspace screening for VOCs using a photoionization detector (PID) or flame ionization detector (FID). If the screening results in high values (e.g., > 200 ppm using a PID), the hydrogeologist will use a hydrophobic dye to screen for the presence non-aqueous phase liquids. Soil boring and monitoring well installation procedures are detailed in the FSAP in Appendix A.

2.2.3 Reagent Application Well Locations and Depths

Proposed locations for reagent application well couplets are shown on Figure 4.[7] Proposed application wells PAW-1U and PAW-1L are situated approximately 12 ft. west-northwest (side gradient) of PAW-2U and PAW-2L, which will be installed through the middle of the former leach pit LP2-B, where the highest concentrations of VOCs at the Site were detected. PAW-3U and PAW-3L will be installed approximately 10 ft. east (side- to upgradient) of the PAW-2 couplet, near the former leach pit LP2-2A. ManTech Environmental Corporation's experience with *in-situ* chemical oxidation at similar sites indicates that the reagent typically extends to treatment zone radius of approximately 15 ft. However, as the reagent migrates further from the application well, its ability to destroy VOCs is reduced. In order to counteract the reduction in effectiveness with distance from the well, ManTech Environmental Corporation recommends several ft. of overlap for radii of influence. Positioning of the proposed application wells is such that the required overlap should be accomplished.

The exact location of the application wells will be determined in the field based upon several factors, which may include, but are not limited to, drill rig and support equipment accessibility, local and state entity right-of-way restrictions, and utility locations. The monitoring well installation contractor will be responsible for obtaining all required permits and easements for the proposed drilling, ensuring all utility companies are contacted, and properly marking and avoiding utilities.

Proposed upper application wells PAW-1U, PAW-2U and PAW-3U will have 15 ft. well screens crossing the ground-water table (approximately 13 ft. of screen below the water table). Proposed lower application wells PAW-1L, PAW-2L and PAW-3L will have screened intervals of 15 ft., with the top of the screen approximately two ft. below the base of the upper well. Proposed screen elevations and depths for the application wells will be as summarized below provided that current water table elevation, as measured prior to well installation, is within the historical range:

[7] Designations for proposed application wells have a "P" prefix. The "P" will be deleted from the designation after the well has been installed.

Proposed Application Well	Construction	Elevation of Center of Screen (ft. above MSL)	Screened Interval (ft. above MSL)	Depth Below Grade[1] (ft.)
PAW-1U PAW-1L	Stainless Steel Stainless Steel	65.5 49.5	59 to 74 42 to 57	48 to 63 65 to 80
PAW-2U PAW-2L	Stainless Steel Stainless Steel	65.5 49.5	57 to 74 42 to 57	48 to 63 65 to 80
PAW-3U PAW-3L	Stainless Steel Stainless Steel	65.5 49.5	59 to 74 42 to 57	48 to 63 65 to 80

1. Depth below grade is based on a surface elevation of 122 ft. MSL.

All application wells will be surveyed by a surveyor registered in the State of New York and referenced to the same benchmark and coordinate system used in previous investigations.

Sampling and field screening for application well installation will be accomplished in the same manner as described for monitoring wells. Soil boring and application well installation procedures are detailed in the FSAP in Appendix A.

During installation of PAW-2U and PAW-2L, a saturated soil sample will be collected from a depth interval between 58 and 64 ft. below the ground surface. One split from the sample will be submitted to Lancaster Labs for chemical analysis described in section 2.3. The other split will be shipped to ManTech Environmental Corporation's Chantilly, Virginia testing facility for bench testing, as described in section 2.4.

2.2.4 Investigation-Derived Materials Management

Auger cuttings from the drilling operations will be collected and stockpiled separately on-site based on field screening results. If soils do not contain VOCs above background concentrations, as determined by headspace readings with a PID, the soils will be stockpiled on-site and secured under polyethylene sheeting. If the soils contain VOCs above background concentrations, they will be stored on-site in NYS DOT-approved 55-gallon steel drums and labeled in accordance with the FSAP. After the completion of drilling activities, the stockpiled and drummed soils will be analyzed for waste characterization. The waste characterization analyses will be used to determine the disposition of the stockpiled and/or drummed soils.

Ground water purged during drilling operations, well development or prior to sampling will be collected and stored on-site in NYS DOT-approved 55-gallon steel drums and labeled in accordance with the FSAP. After completion of drilling and sampling activities, the containerized water will be properly disposed of as determined by waste characterization analyses.

2.3 Task 2 - Baseline Ground-Water Sampling and Analytical Procedures

The newly installed monitoring and application wells and existing monitoring wells will be developed and sampled following the procedures described in the FSAP located in Appendix A. Following purging, water from all monitoring wells will be measured for temperature, pH, specific conductance, oxidation-reduction potential and dissolved oxygen using a flow-through cell. One ground-water sample from each well will be submitted to a Lancaster Labs and analyzed for VOCs in accordance with U.S. EPA SW-846 Method 8021B. Lancaster Labs' reporting of analytical results for VOCs will be provided in a NYSDEC ASP Category B deliverables data package.

Ground-water samples collected from the reagent wells and the newly installed monitoring wells will be analyzed by Lancaster Labs for: total iron in accordance with U.S. EPA SW-846 Method 7210; sulfate in accordance with Method 375.4; total organic carbon in accordance with U.S. EPA SW-846 Method 9060 and total dissolved solids in accordance with Method 160.1. Two-liter aliquots will also be collected from these wells and submitted to ManTech Environmental Corporation for bench testing, summarized in section 2.4.

Field blanks, trip blanks, and duplicate ground-water samples will be analyzed. All analytical procedures and detection limits are fully described in the QAPP located in Appendix B.

HAI will collect one saturated soil sample split during installation of PAW-2U and PAW-2L as described in section 2.2.3. The sample will be submitted to Lancaster labs for: for VOCs in accordance with U.S. EPA SW-846 Method 8021B; and total organic carbon in accordance with U.S. EPA SW-846 Method 9060

Results from baseline VOC analyses will identify the current distribution of contaminants in the apparent source area and across the Site. Baseline data will be compared with VOC concentrations following bench testing, pilot testing and the Remedial Action to determine the degree of mass reduction obtained through employment of the remedial technology.

Field parameters and inorganic analyses, along with VOC concentrations and ManTech Environmental Corporation's experience treating a wide variety of sites, will form a basis for estimating the lateral extent of aquifer material that can be treated per application well.

2.4 Task 3 – Bench Testing

ManTech Environmental Corporation will select several water samples and a saturated soil sample (described in Section 2.2.3) for bench testing based on the range of geochemical conditions determined through field measurements and VOC/inorganic compound concentrations identified through laboratory chemical analysis. A "baseline" (untreated) sample will be retained throughout the bench test for later VOC analysis. A "reaction" sample, collected from the same well as its respective "baseline" sample, will undergo bench testing. Bench testing will consist of applying reagents at various volumes based on known Site conditions. The ManTech Environmental Corporation laboratory technician will measure and record pH, temperature, weight, conductivity, oxidation-reduction potential and pertinent visual observations. After these measurements indicate that the reaction process is complete, both the "baseline" and "reaction" samples will be shipped to Lancaster Labs for VOC analysis in accordance with U.S. EPA SW-846 Method 8021B.

Bench testing results will be considered in the context of Site-specific geochemical and hydrogeologic conditions to identify an appropriate reagent dosage for each of the application well.

2.5 Task 4 – Pilot Testing

2.5.1 Reagent Application

A ManTech Environmental Corporation technician will measure ground-water depth, pH, oxidation-reduction potential, specific conductance, dissolved oxygen, temperature, and air quality parameters at the MW-5 and MW-8 monitoring well nests, PMW-9 and PMW-10 monitoring well couplets and all application wells. Monitoring will continue at regular intervals in the treatment area monitoring wells during the oxidation reagent (CleanOX®) application process. A sampling and monitoring schedule is provided in Section 2.2.

Following initial monitoring, ManTech Environmental Corporation will fit each application well with a wellhead seal that includes a riser fitted with two valves. One part of this riser is attached to the aboveground containers of reagents, and the other is used as a reaction vapor off-gassing vent. Conditioning and oxidation reagents will be applied separately to the application wells.

ManTech Environmental Corporation will introduce hydrochloric acid into the application wells to adjust the pH in the treatment zone material surrounding the well screens to effect a pH change to less than 5 standard units. Based on known site data and subject to bench test results, 150 to 250 gallons of approximately 1% to 3% aqueous hydrochloric acid solution will be added to each well per treatment event. Following pH conditioning, ferrous sulfate will be added to provide a concentration of about 100 ppm of ferrous ion in the formation material surrounding the application wells. Approximately 100 to 200 gallons of 5% aqueous ferrous sulfate solution will be added to each application well per well treatment event.

ManTech Environmental Corporation will apply hydrogen peroxide to all of the application wells at a concentration ranging from 10% to 20%. The estimated volume of hydrogen peroxide to be applied to the site will be finalized following review of bench testing results.

The acidified matrix coupled with the proper ferrous ion density will cause the peroxide to decompose into a hydroxyl radical in an exothermic reaction. The vertical depth of travel for the reaction is generally based on the screen interval at which the CleanOX® reagents are applied, depending on site hydrogeological conditions. The reagents will be applied to the upper saturated zone, approximately 50 feet to 80 feet below ground surface (treatment zone). The application process of conditioning reagents is expected to be completed within one to two days. Application of hydrogen peroxide will be completed during the remaining scheduled field work.

An increase in temperature due to exothermic reaction is expected to be limited to the treatment zone within a few feet of the application wells. However, changes in other ground-water parameters are expected at nearby downgradient treatment area monitoring wells. Following treatment, the effects of dilution by ground-water movement work to shift pH toward background levels. Long-term pH effects are avoided by using a dilute acid solution in the conditioning process. The pH effects created within the treatment volume are expected to subside within several days to a month following treatment. The iron effect is limited to the treatment area surrounding the application points and has been observed at other sites to decrease in concentration over several months to background levels. Decreased formation permeability as a result of oxidation treatment has not been observed at other CleanOX® project sites.

During the application events off gassing will occur. ManTech Environmental Corporation will monitor off-gassing vapors in the breathing zone and headspace of monitoring wells at regular intervals during the application events. Air monitoring will also be completed as needed within the nearby equipment compound and shed. Air monitoring parameters to be measured will include volatile compounds (measured with a PID), percent oxygen, percent carbon dioxide, and lower explosive limit. Other observations made during applications include, but are not limited to, excessive pressures and temperatures at the wellheads and fluid short-circuiting to the surface indicating mounding of ground water.

Depending upon results obtained from post-treatment sampling, described below, another CleanOX® application may and post-treatment sampling be conducted approximately two months after the first application.

2.5.2 Post-Treatment Sampling

HAI will perform post-treatment ground-water sampling approximately one week following completion of the CleanOX® treatment, and again at approximately three weeks following treatment. Following purging, ground-water samples will be collected from the MW-5 and MW-8 monitoring well nests, PMW-9 and PMW-10 monitoring well couplets and all application wells. Sampling will follow the procedures described in the FSAP located in Appendix A.

Water from the wells will be measured for temperature, pH, specific conductance, oxidation-reduction potential and dissolved oxygen using a flow-through cell. One ground-water sample from each well will be submitted to a Lancaster Labs and analyzed for VOCs in accordance with U.S. EPA SW-846 Method 8021B. Lancaster Labs' reporting of analytical results for VOCs will be provided in a NYSDEC ASP Category B deliverables data package.

Ground-water samples collected from the reagent wells and the newly installed monitoring wells will be analyzed by Lancaster Labs for: total iron in accordance with U.S. EPA SW-846 Method 7210; sulfate in accordance with Method 375.4; total organic carbon in accordance with U.S. EPA SW-846 Method 9060; and total dissolved solids in accordance with Method 160.1.

Field blanks, trip blanks, and duplicate ground-water samples will be analyzed. All analytical procedures and detection limits are fully described in the QAPP located in Appendix B.

Analytical results will be compared with baseline data to identify the percentage of VOC reduction achieved in and near Area 2 through *in-situ* chemical oxidation.

2.6 Task 5 - Reporting

Following completion of one or two *in-situ* chemical oxidation applications, HAI will prepare a report that includes::

1. a brief discussion of the local geology/hydrogeology at the Site and immediate vicinity, with an emphasis on new information gathered during proposed monitoring well and application well installation;
2. a discussion of field activities performed during well installation and baseline ground-water sampling (Tasks 1 and 2);
3. a scaled base map showing Site structures and existing and newly installed monitoring well and application locations;
4. a water table contour map showing flow direction and gradient;
5. a table presenting baseline ground-water analytical data obtained under Task 2 and, as appropriate, two dimensional isoconcentration maps showing lateral and vertical distribution of VOCs;

6. a discussion of the VOC distribution in Area 2 and Site-wide;

7. boring logs and well construction diagrams for newly constructed monitoring wells and application wells;

8. tables and text describing findings from the bench testing (Task 3)

9. a discussion of field activities performed during pilot testing (Task 4);

10. tables presenting field measurements and observations during Task 4;

11. tables and text describing results of the pilot testing, including estimates of percent contaminant reduction and descriptions of the overall effectiveness of the technology;

12. general recommendations as to treatment system modifications should be addressed during Remedial Design.

If VOC concentrations are reduced significantly as a result of the pilot testing, HAI may recommend long-term monitoring in lieu of a Remedial Design to evaluate the permanence of the reduction.

2.7 Task 6 - Remedial Design

As mentioned previously, the scope of the Remedial Design will be largely dependent upon results of preceding tasks. To the extent that *in-situ* chemical oxidation is determined to be an effective technology, Remedial Design may involve modifications to the pilot system and design of a long-term environmental monitoring program. Failure of the selected technology to attain cleanup goals may require identification, testing and implementation of another remedial technology.

3.0 SCHEDULE OF IMPLEMENTATION

An estimated project schedule follows. The estimated start date of July 17 assumes that the NYSDEC will complete final review of this work plan and supporting documents prior to July 10.

Durations estimated for the field work are based on work being conducted during normal business hours Monday through Friday. The schedule may require modification due to unexpected field conditions or NYSDEC review time.

July 17 through July 26, 2000	Task 1 – Ground-Water Monitoring Well and Reagent Application Well Installation
July 26 through August 11, 2000	Task 2 – Baseline Ground-Water Sampling and Analytical Procedures
July 29 through August 16, 2000	Task 3 - Bench Testing
August 21 through October 6, 2000	Task 4 – Pilot Testing[8]
October 6, 2000 through January 26, 2001	Task 5 – Reporting

Remedial Design will be initiated upon receipt of NYSDEC's review of the Pilot Study Report. HAI anticipates that the final Remedial Design will be completed within three months, dependent upon NYSDEC's requirement for, and review of, 30% and 90% design submittals. It is probable that the Remedial Action, if required, will begin during the summer of 2001. Environmental monitoring will continue for five years after active portions of the Remedial Action are completed.

[8]The schedule assumes one round of reagent application. If a second round of application is conducted, subsequent tasks will be moved back approximately seven weeks.

4.0 REFERENCES

A variety of technical documents and publications were referred to during the course of this project. Some of the references consulted are presented below. Referenced documents and publications may or may not have been reviewed in their entirety. The guidelines and procedures presented in the referenced documents and publications have not been strictly adhered to unless otherwise stated.

Anson Environmental Ltd., *Geologic logs for MW-1, MW-2 and MW-3*, April 26, 1994.

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Cohen, Robert M. and James W. Mercer, *DNAPL Site Evaluation*, C.K. Smoley, 1993.

Hull & Associates, Inc., *Final Investigation Report for the Investigation and Design of the Interim Remedial Measure for the Vadose Zone*, February 1997.

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McDonald, M.G., and A.W. Harbaugh, *A Modular Three-Dimensional Finite Difference Ground-water Flow Model*, U.S. Geological Survey Open-File Report 83-875, 1988.

New York Department of Environmental Conservation, *Order on Consent Index #1-W1-0750-96-02, Site Code #1-30-0434*, Signed on May 6, 1998.

New York Department of Environmental Conservation, *Record of Decision for Atlas Graphics Site, Site Code #1-30-043B*, February 2000.

New York Department of Environmental Conservation, *Record of Decision for IMC Magnetics Site, Site Code #1-30-043A*, March 2000.

New York State Statutes, *Article 27, Title 13 - Inactive Hazardous Waste Disposal Sites.*

New York State Regulations, *Title 6, Chapter IV, Subchapter B, Part 375 - Inactive Hazardous Waste Disposal Site Remedial Program.*

U.S. Geological Survey, in cooperation with the Nassau County Department of Public Works, *Geology of the Town of North Hempstead, Nassau County, Long Island, New York.* 1979.

Wiedemeier, M.A., et al., *Overview of the Technical Protocol for Natural Attenuation of Chlorinated Aliphatic Hydrocarbons in Ground Water, Under Development for the U.S. Air Force Center for Environmental Excellence.* Proceedings from the Symposium on Natural Attention of Chlorinated Organics in Ground Water, 1996.

TABLES

Focused Ground-Water Remediation Work Plan
Former IMC Magnetics Facility
Westbury, New York

Table 1

Summary of Ground-Water Analytical Results - Detected Analytes
May 1996 Sampling Event

ANALYTE	ANALYTICAL RESULTS FOR VOCs (ug/L)							
	MW-1	MW-2	MW-3	SB-25	SB-29	SB-54	SB-63	SB-65
1,1,1-TRICHLOROETHANE								
- Mobile Laboratory	<1	**7**	**2**	<1	<1	<1	<1	<1
- Fixed Laboratory	<0.5	<5	2.2	<13	<0.5	<1.3	**1.9**	<2.5
1,1-DICHLOROETHANE								
- Mobile Laboratory	NT	NT	NT	NT	NT	NT	NT	NT
- Fixed Laboratory	<0.5	<5	**1.8**	<13	<0.5	<1.3	<0.5	<2.5
1,1-DICHLOROETHENE								
- Mobile Laboratory	<1	<1	**1**	<1	<1	<1	<1	<1
- Fixed Laboratory	<0.5	<5	<0.5	<13	<0.5	<1.3	<0.5	<2.5
trans-1,2-DICHLOROETHENE								
- Mobile Laboratory	<1	<1	<1	<1	<1	<1	<1	<1
- Fixed Laboratory	<0.5	<5	<0.5	<13	<0.5	<1.3	**76**	<2.5
BENZENE								
- Mobile Laboratory	<1	<1	<1	<1	<1	<1	<1	<1
- Fixed Laboratory	<0.5	<5	<0.5	<13	<0.5	<1.3	<0.5	<2.5
CHLOROFORM								
- Mobile Laboratory	NT	NT	NT	NT	NT	NT	NT	NT
- Fixed Laboratory	<0.5	<5	**1.7**	<13	<0.5	<1.3	<0.5	<2.5
ETHYLBENZENE								
- Mobile Laboratory	<1	<1	<1	**4**	<1	<1	<1	<1
- Fixed Laboratory	<0.5	<5	<0.5	<13	<0.5	<1.3	<0.5	<2.5
METHYLENE CHLORIDE								
- Mobile Laboratory	NT	NT	NT	NT	NT	NT	NT	NT
- Fixed Laboratory	<0.5	**17**	**1.4**	**55**	<0.5	<1.3	**0.9**	<2.5
TETRACHLOROETHENE								
- Mobile Laboratory	**7**	**899**	**64**	**2,680**	<1	**55**	**48**	**172**
- Fixed Laboratory	**3.1**	**660**	**42**	**1000**	**0.8**	**31**	**42**	**160**
TOLUENE								
- Mobile Laboratory	<1	<1	<1	**33**	<1	<1	<1	<1
- Fixed Laboratory	<0.5	<5	<0.5	<13	<0.5	<1.3	<0.5	<2.5
TRICHLOROETHENE								
- Mobile Laboratory	<1	**206**	**10**	<1	<1	**102**	**55**	<1
- Fixed Laboratory	**0.7**	**330**	**15**	<13	<0.5	**110**	**44**	<2.5
TRICHLOROFLUOROMETHANE								
- Mobile Laboratory	NT	NT	NT	NT	NT	NT	NT	NT
- Fixed Laboratory	<0.5	**12**	**1**	<13	<0.5	<1.3	<0.5	<2.5
XYLENES (Total)								
- Mobile Laboratory	<1	<1	<1	**9**	<1	<1	<1	<1
- Fixed Laboratory	<0.5	<5	<0.5	<13	<0.5	<1.3	<0.5	<2.5
	ANALYTICAL DATA FOR METALS (mg/l)							
BARIUM (Total)								
- Fixed Laboratory	**0.054**	**0.079**	**0.047**	**0.34**	**0.3**	**0.37**	**0.13**	**0.18**
CADMIUM (Total)								
- Fixed Laboratory	<0.003	<0.003	<0.003	**0.032**	**0.0061**	<0.003	<0.003	**0.0067**
CHROMIUM (Total)								
- Fixed Laboratory	<0.010	<0.010	**0.032**	**5.2**	**3.2**	**1**	**0.71**	**1.7**
MERCURY (Total)								
- Fixed Laboratory	<0.0002	<0.0002	<0.0002	**0.0061**	**0.00031**	**0.00034**	**0.00033**	**0.00088**
LEAD (Total)								
- Fixed Laboratory	<0.003	<0.003	<0.003	**0.32**	**0.056**	**0.051**	**0.018**	**0.0066**

Focused Ground-Water Remediation Work Plan
Former IMC Magnetics Facility
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Table 2

Summary of Monitoring Well Construction

Monitoring Well I.D.	Location Relative to Area 2	Date(s) Installed	Drilling Method	Installed By	Northing (1)	Easting (1)	Ground Elevation (2)	Top of Casing Elevation (2)	Total Drilling Depth (ft.)	Screened Interval (ft.)	Sand Interval (ft.)	Bentonite Seal Interval (ft.)	Native Backfill Interval (ft.)	Concrete Interval (ft.)
MW-1	Side/Upgradient	04/26/94	4.25" ID HSA	Anson (4)	465	49	122.78	122.30	65	?-65 (6)	? (6)	? (6)	? (6)	0-? (6)
MW-2	Side/Upgradient	04/26/94	4.25" ID HSA	Anson (4)	467	152	--	--	65	?-65 (6)	? (6)	? (6)	? (6)	--
MW-3	Side/Downgradient	04/27/94	4.25" ID HSA	Anson (4)	55	293	121.52	121.12	65	?-65 (6)	? (6)	? (6)	? (6)	0-? (6)
MW-4U	Upgradient	6/29/98	8.25" ID HSA	LTR (5)	521	192	122.26	121.90	65	50-65	48-65	47-48/4-6	6-47	0-1
MW-4M	Upgradient	6/29/98	8.25" ID HSA	LTR (5)	521	192	122.26	121.93	114	104-114	102-114	100-101/4-6	6-47	0-1
MW-4L	Upgradient	6/29/98	8.25" ID HSA	LTR (5)	521	192	122.26	121.94	140	130-140	127-140	126-127/4-6	6-47	0-1
MW -5U	Downgradient	06/20/98	8.25" ID HSA	LTR (5)	422	242	122.26	121.93	60	50-65	45-60	4-6 / 41-42	6-41	0-1
MW-5M	Downgradient	06/20/98	8.25" ID HSA	LTR (5)	422	242	122.26	121.93	100	103-113	86-100	4-6/86-87	6-86	0-1
MW-5L	Downgradient	06/20/98	8.25" ID HSA	LTR (5)	422	242	122.26	121.84	140	50-65	127-140	4-6/126-127	6-126	0-1
MW -6U	Downgradient	06/23/98	8.25" ID HSA	LTR (5)	244	236	122.22	121.96	65	45-60	48-66	4-6 / 47-48	6-47	0-1
MW-6M	Downgradient	06/23/98	8.25" ID HSA	LTR (5)	244	236	122.22	121.68	100	90-100	88-100	4-6/87-88	6-87	0-1
MW-6L	Downgradient	06/23/98	8.25" ID HSA	LTR (5)	244	236	122.22	121.97	140	130-140	127-140	4-6/126-127	6-126	0-1
MW -7U	Downgradient	06/25/98	8.25" ID HSA	LTR (5)	75	282	119.85	119.68	60	45-60	41-60	4-6/41-42	6-41	0-1
MW-7M	Downgradient	06/25/98	8.25" ID HSA	LTR (5)	75	282	119.85	119.64	100	90-100	87-100	4-6/87-88	6-87	0-1
MW-7L	Downgradient	06/25/98	8.25" ID HSA	LTR (5)	75	282	119.85	119.72	140	130-140	127-140	4-6/126-127	6-126	0-1

Note: (1) Coordinates refer to a site grid, with origin southeast of building.
(2) Elevations reference Nassau County Datum.
(3) MW-2 was destroyed at surface through landscaping activities.
(4) Anson Environmental, Ltd., drilled by Miller Environmental.
(5) Land Tech Remedial, Inc.
(5) Construction intervals for MW-1, MW-2 and MW-3 are not known.

Focused Ground-Water Remediation Work Plan
Former IMC Magnetics Facility
Westbury, New York

Table 3

Summary of Ground-Water Analytical Results - Detected Analytes
July 8, 1998 Sampling Event

ANALYTE	ANALYTICAL RESULTS FOR VOCs (ug/L) - SW-846 Method 8010B														
	MW-1	MW-3	MW-4U	MW-4U (DUP)	MW-4M	MW-4L	MW-5U	MW-5M	MW-5L	MW-6U	MW-6M	MW-6L	MW-7U	MW-7M	MW-7L
1,1,1-TRICHLOROETHANE	<1.0	**2.9**	**7.6**	**7.7**	**11**	**1.8**	**14**	**60**	<1.0	**2.4**	**5.6**	**1.3**	**2.3**	<1.0	**4.5**
1,1-DICHLOROETHENE	<1.0	<1.0	**1.1**	**1.1**	**2.3**	<1.0	<2.0	**18**	<1.0	<1.0	**1.7**	<1.0	<1.0	<1.0	**1.2**
1,1-DICHLOROETHANE	<1.0	**3.7**	**1.2**	**1.2**	**1.8**	**4.5**	**2.1**	**12**	**4.1**	**1.4**	**4.2**	**4.4**	**3.3**	**2.1**	**2**
BROMOFORM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.2**
CIS-1,2-DICHLOROETHENE	<1.0	**7.7**	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	**2.2**	<1.0	<1.0	<1.0	<1.0	<1.0
TETRACHLOROETHENE	**2.1**	**19**	**2**	**2.1**	<1.0	<1.0	**160**	**21**	**2.1**	**51**	**1.6**	<1.0	**19**	**3.5**	<1.0
TOLUENE	<1.0	<1.0	<1.0	<1.0	**1.3**	**1.2**	<2.0	<1.0	<1.0	**1.9**	**45**	**100**	**3.6**	**6.1**	**32**
TRICHLOROETHENE	<1.0	**6.8**	**11**	**12**	<1.0	**1.5**	**34**	**10**	<1.0	**20**	<1.0	<1.0	**3**	<1.0	<1.0
ANALYTE	ANALYTICAL RESULTS FOR METALS (mg/L) - SW-846 Method 7000 Series														
BARIUM (Total)	<0.10	<0.10	**0.17**	**0.21**	<0.10	<0.1	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	**0.25**	<0.10	<0.10
CHROMIUM (Total)	<0.030	**0.058**	**0.167**	**0.223**	<0.03	<0.03	**0.049**	<0.030	<0.03	0.065	<0.030	<0.030	**0.155**	<0.030	<0.030
LEAD (Total)	<0.0030	**0.0034**	**0.054**	**0.054**	<0.003	**0.0236**	**0.024**	<0.0030	**0.0033**	**0.0218**	**0.0123**	**0.01**	**0.09**	<0.0030	0.0038

Focused Ground-Water Remediation Work Plan
Former IMC Magnetics Facility
Westbury, New York

Table 4

Summary of Ground-Water Analytical Results for Selected Off-Site Wells - Detected Analytes November 22, 1998

ANALYTE	WELL DESIGNATIONS AND ANALYTICAL RESULTS (ug/L)	
	UN-22	UN-24
1,1,1-Trichloroethane	12	2.6
CIS-1,2-Dichloroethene	8.6	37
Tetrachloroethene	11	11
Trichloroethene	230	68

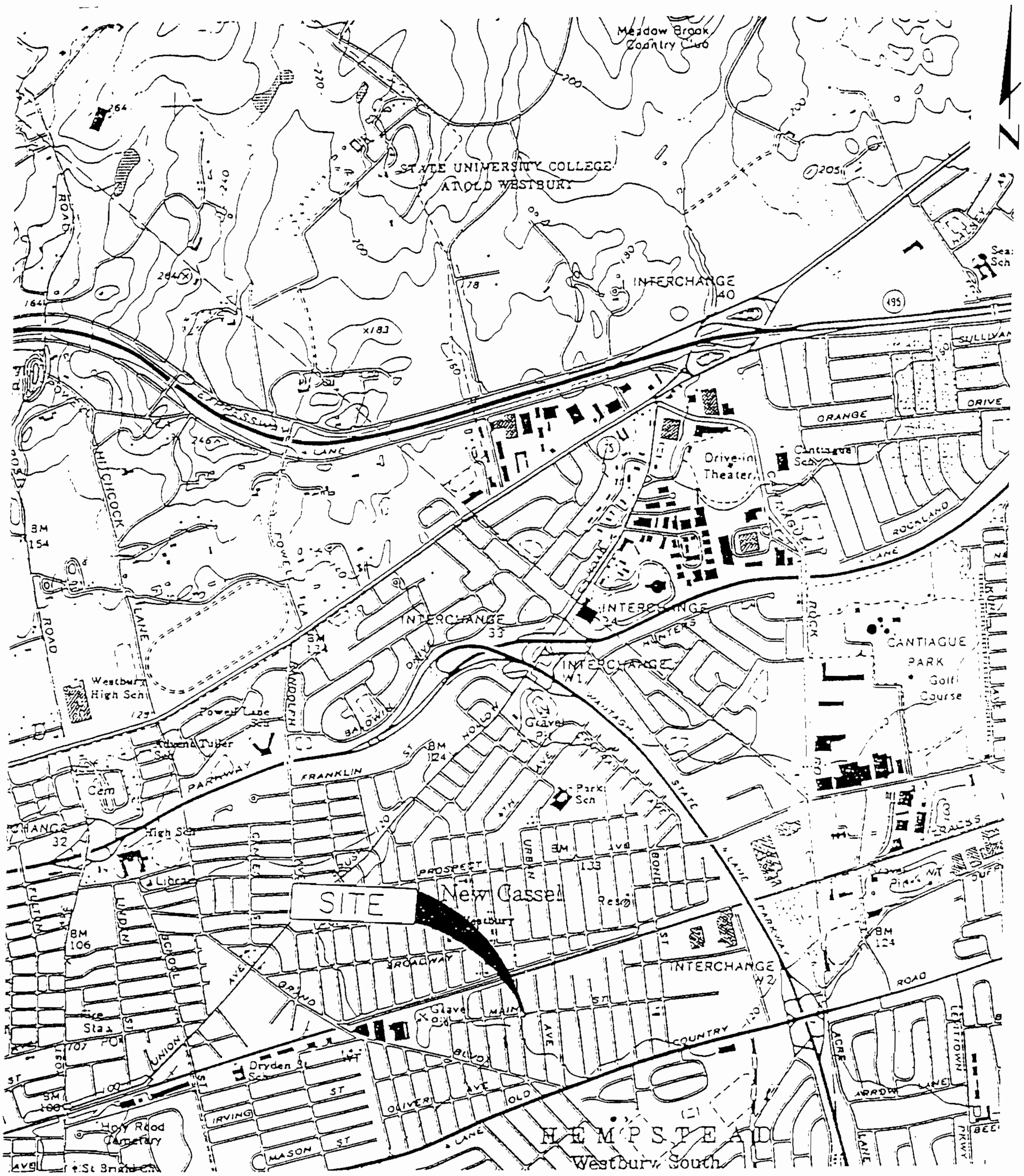
Focused Ground-Water Remediation Work Plan
Former IMC Magnetics Facility
Westbury, New York

Table 5

Summary of Ground-Water Analytical Results from July 1999 Sampling Event - Detected Analytes

ANALYTE	ANALYTICAL RESULTS FOR VOCs (ug/L)													
	MW-1	MW-3	MW-4U	MW-4M	MW-4L	MW-5U	MW-5M	MW-5L	MW-6U	MW-6M	MW-6L	MW-7U	MW-7M	MW-7L
1,1,1-TRICHLOROETHANE	<1.0	**1.4**	**3.7**	**2.6**	<1.0	**14**	**25**	**1.6**	<5.0	**41**	**5.1**	<1.0	<1.0	**22**
1,1-DICHLOROETHENE	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	**5.4**	<1.0	<5.0	**11**	**1.5**	<1.0	<1.0	**5.9**
1,1-DICHLOROETHANE	<1.0	**1.4**	<1.0	**1.1**	**1.0**	<2.0	**2.6**	**1.8**	<5.0	<1.0	**4.3**	<1.0	<1.0	**4.4**
cis-1,2-DICHLOROETHENE	<1.0	**18**	**4.4**	<1.0	<1.0	**4.0**	<1.0	<1.0	**10**	<1.0	<1.0	<1.0	<1.0	<1.0
CHLOROFORM	<1.0	**1.3**	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0
TETRACHLOROETHENE	**1.7**	**48**	**12**	<1.0	<1.0	**42**	<1.0	<1.0	**140**	**1.3**	<1.0	**26**	**3.5**	**1.4**
TRICHLOROETHENE	<1.0	**20**	**26**	<1.0	<1.0	**110**	<1.0	<1.0	**22**	<1.0	<1.0	**2.5**	<1.0	**1.8**
TRICHLOROFLUOROMETHANE	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<5.0	<1.0	<1.0	<1.0	<1.0	**2.5**

FIGURES



SCALE: 1" = 2000'
SOURCE: USGS 7.5 MIN. QUADRANGLE
HICKSVILLE, NEW YORK - 1967
(PHOTOREVISED - 1979)

0 500 1000 2000
SCALE IN FEET

NMB007.200.0014
5/24/00 db
UNIT 3 DISK1

FIGURE 1

Hull & Associates, Inc. MASON, OHIO	
570 MAIN STREET PROPERTY FOCUSED GROUND-WATER REMEDIATION WORK PLAN	
SITE LOCATION MAP	
WESTBURY, NEW YORK	
DATE: MAY 2000	PROJECT: NMB007

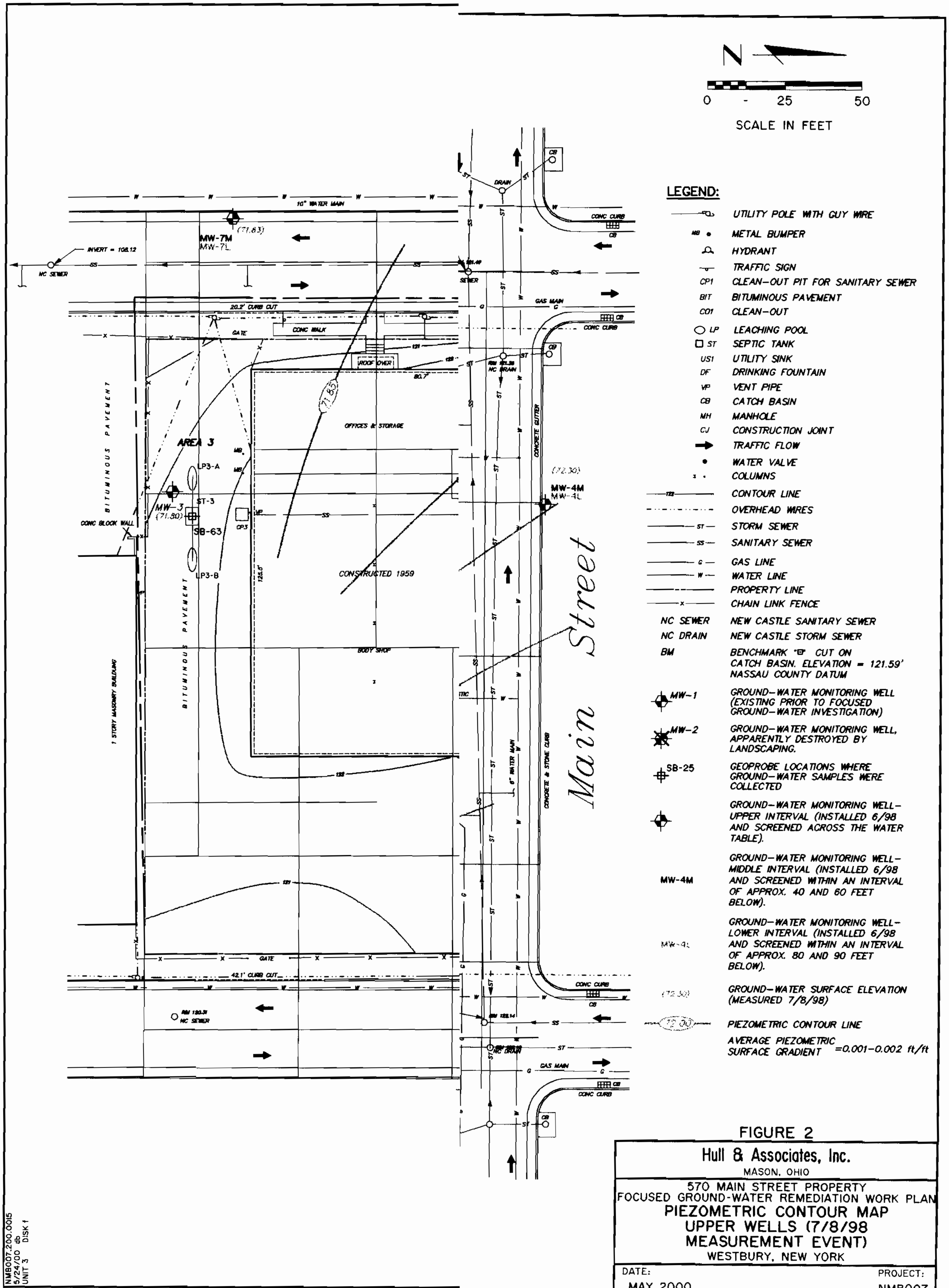


FIGURE 2

Hull & Associates, Inc.
MASON, OHIO

570 MAIN STREET PROPERTY
FOCUSED GROUND-WATER REMEDIATION WORK PLAN
PIEZOMETRIC CONTOUR MAP
UPPER WELLS (7/8/98
MEASUREMENT EVENT)
WESTBURY, NEW YORK

DATE: MAY 2000
PROJECT: NMB007

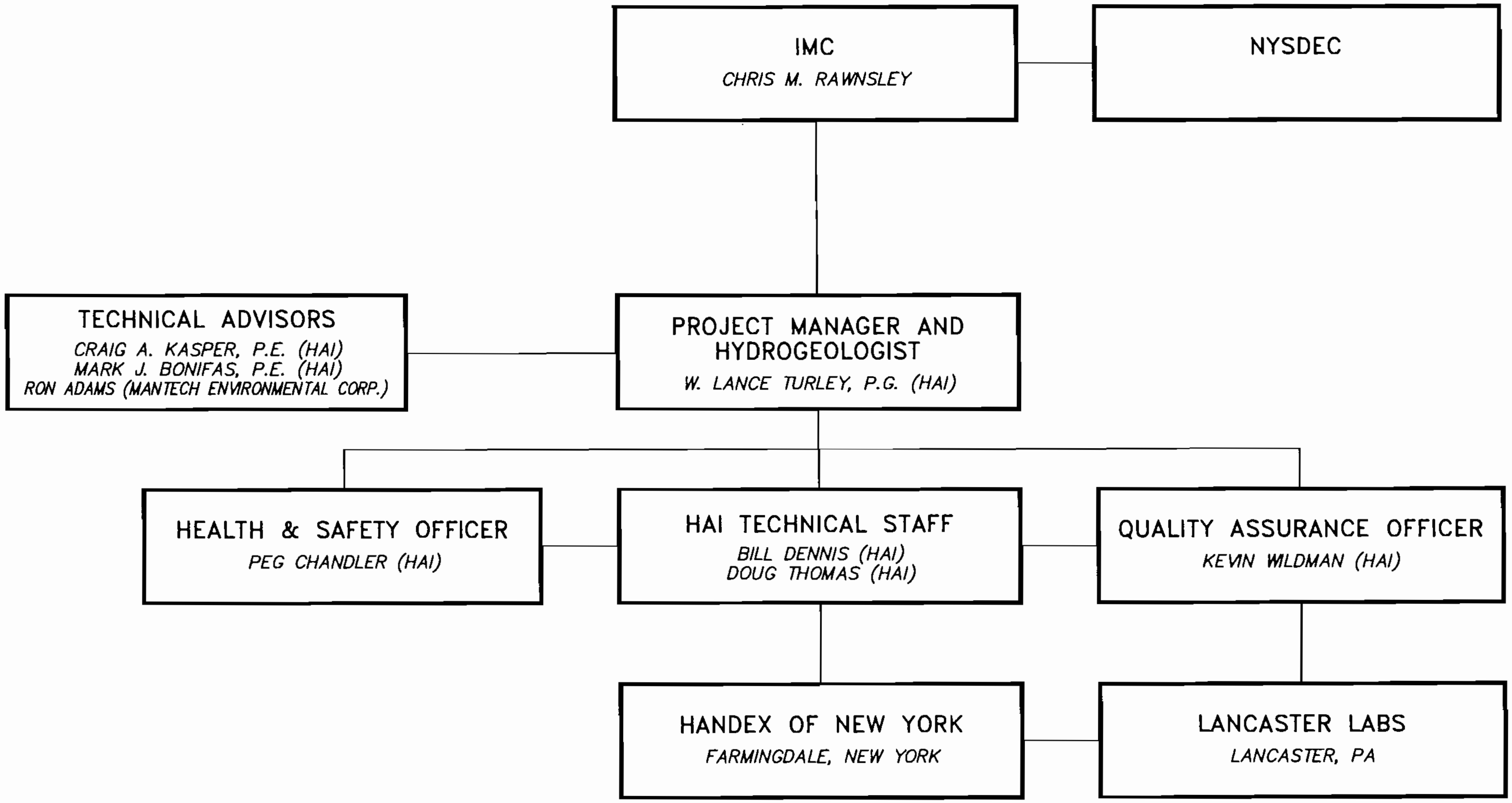


FIGURE 3

Hull & Associates, Inc.
MASON, OHIO

570 MAIN STREET PROPERTY
FOCUSED GROUND-WATER REMEDIATION WORK PLAN

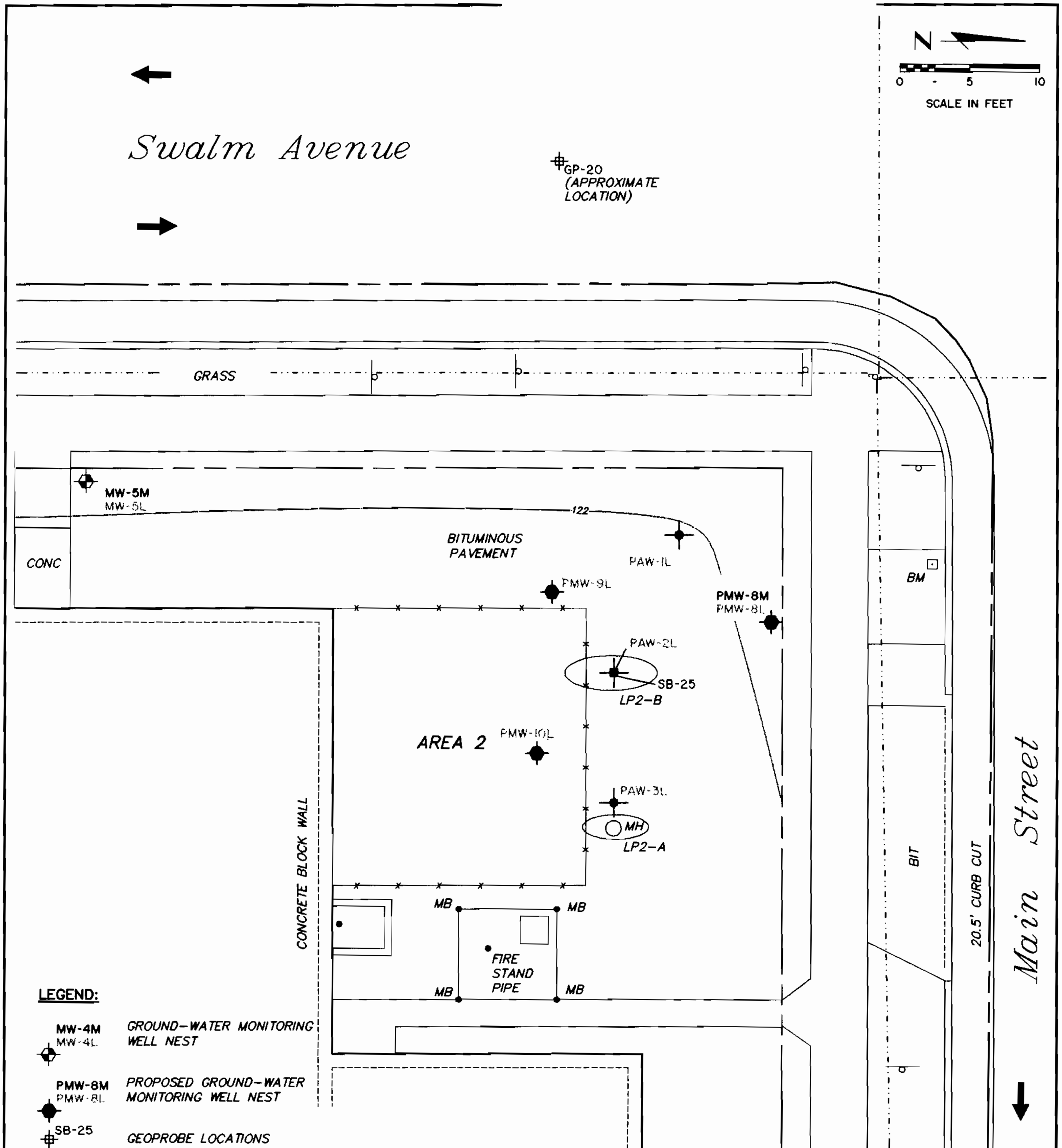
PROJECT MANAGEMENT CHART

WESTBURY, NEW YORK

DATE: MAY 2000

PROJECT: NMB007

NMB007.200.0018
5/24/00 db
UNIT 3 DISK 1



LEGEND:

MW-4M MW-4L	GROUND-WATER MONITORING WELL NEST
PMW-8M PMW-8L	PROPOSED GROUND-WATER MONITORING WELL NEST
SB-25	GEOPROBE LOCATIONS
PAW-1L	PROPOSED REAGENT APPLICATION WELL COUPLET
	OVERHEAD WIRES
	PROPERTY LINE
	CHAIN LINK FENCE
	TRAFFIC FLOW
	UTILITY POLE WITH GUY WIRE
MB	METAL BUMPER
BM	BENCHMARK "⊡" CUT ON CATCH BASIN. ELEVATION = 121.59' NASSAU COUNTY DATUM
MH	MANHOLE

NMB007.200.0017
5/24/00 db
UNIT 3 DISK f

FIGURE 4

Hull & Associates, Inc.
MASON, OHIO

570 MAIN STREET PROPERTY
FOCUSED GROUND-WATER REMEDIATION WORK PLAN

PROPOSED GROUND-WATER MONITORING WELLS AND REAGENT APPLICATION WELLS

WESTBURY, NEW YORK

DATE: MAY 2000
PROJECT: NMB007

PLATE

APPENDIX A

Field Sampling and Analysis Plan (FSAP)

APPENDIX B

Quality Assurance Project Plan (QAPP)

APPENDIX C

Health and Safety Plan (HASP)

APPENDIX D

Well Logs for Existing Monitoring Wells

ANSON ENVIRONMENTAL LTD.					
GEOLOGIC LOG					
STUDY		BORING		SAMPLER	
Study No.:	92061	Boring No.:	1	Type: Hollow stem auger	
Project:	IMC Magnetics	Location:	Westbury	Hammer:	
Date:	4/26/94	Depth:	65'	Fall:	
Driller:	Miller Env.	G.W. Elev.:	55'	Sample Interval: 5'	

No.	Rec.	Sample Interval	Blows/6"	Depth	Sample Description
1				0'	Yellowish brown color.
				-	sub rounded very coarse shape
				-	poorly sorted and very moist
				-	OVM reading = 0.00
				-	
				5'	Yellowish brown color
				-	sub rounded very coarse shape
				-	poorly sorted and very moist
				-	OVM reading = 0.00
				-	
				10'	Brownish yellow color
				-	sub rounded coarse
				-	well sorted some pebbles
				-	OVM reading = 0.00
				-	
				15'	Brownish yellow color
				-	sub rounded very coarse
				-	poorly sorted, some pebbles
				-	OVM reading = 0.00
				-	
				20'	Brownish yellow color
				-	sub rounded coarse shape
				-	poorly sorted, some pebbles
				-	OVM reading not detected
				-	
				25'	Brownish yellow color
				-	sub rounded shape
				-	well sorted, coarse to medium sand
				-	OVM reading not detected
				-	
				30'	Brownish yellow color.
				-	sub rounded
				-	well sorted, coarse to medium sand
				-	OVM reading not detected
				-	
				35'	Brownish yellow color

					rounded shape
					well sorted, medium sized sand
					OVM reding not detected
				40'	Brownish yellow color
					rounded
					Poorly sorted, medium sand
					some clay
					OVM reading not detected
				45'	Brownish yellow color
					Round shape
					well sorted, medium sand
					OVM reading not detected
				50'	Brownish yellow color
					round shape
					well sorted, medium sand
					clay very hard, stuck to augers
					OVM reading not detected
				55'	Brownish yellow color
					Round shape
					well sorted, medium sand
					OVM reading not detected
				60'	Brownish yellow color
					Round shape
					well sorted, medium to coarse sand
					OVM reading not detected
				65'	Bottom of well

ANSON ENVIRONMENTAL LTD.

GEOLOGIC LOG

STUDY		BORING		SAMPLER
Study No.:	92061	Boring No.:	2	Type: Hollow stem auger
Project:	IMC Magnetics	Location:	Westbury	Hammer:
Date:	4/26/94	Depth:	65'	Fall:
Driller:	Miller Env.	G.W. Elev.:	55'	Sample Interval: 5'

No.	Rec.	Sample Interval	OVM Reading	Depth	Sample Description
2			0	0'	Light brownish yellow color
				-	poorly sorted
				-	medium sand and pebbles
				-	sub angular shape
				-	not very moist
			ND	5'	yellowish brown color
				-	poorly sorted
				-	very coarse sand
				-	sub angular shape
				-	
			ND	10'	yellowish brown color
				-	well sorted with pebbles
				-	medium to coarse sand
				-	sub angular shape
				-	some moisture
			ND	15'	Yelowish Brown color
				-	poorly sorted with pebbles
				-	very coarse sand
				-	sub angular shape
				-	some soil moisture
			ND	20'	Yellowish brown color
				-	poorly sorted with pebbles
				-	very coarse sand
				-	sub angular shape
				-	some soil moisture
			ND	25'	Brownish yellow color
				-	poorly sorted with pebbles
				-	very coarse to medium sand type
				-	sub rounded shape
				-	soil moisture
			ND	30'	Brownish yellow color
				-	well sorted with pebbles
				-	coarse to very coarse sand
				-	sub rounded shape
				-	soil moisture
			ND	35'	Brownish yellow color

					poorly sorted with pebbles
					very coarse sand
					sub rounded shape
					soil moisture
			ND	40'	Yellow color
					well sorted some pebbles
					medium to coarse sand
					sub rounded shape
					soil moisture
			ND	45'	Yellow color
					well sorted
					medium to fine sand
					sub rounded shape
					soil moisture
			ND	50'	Yellow color
					well sorted
					fine to very fine sand
					sub rounded shape
					soil moisture
			ND	55'	Yellow color
					well sorted
					fine to very fine sand
					sub rounded shape
					soil moisture
			ND	60'	Yellow color
					well sorted
					very fine sand
					sub rounded shape
					soil moisture
			ND	65'	bottom of well

ANSON ENVIRONMENTAL LTD.
GEOLOGIC LOG

STUDY		BORING		SAMPLER
Study No.:	92061	Boring No.:	3	Type: Hollow stem auger
Project:	IMC Magnetics	Location:	Westbury	Hammer:
Date:	4/27/94	Depth:	65'	Fall:
Driller:	Miller Env.	G.W. Elev.:	55'	Sample Interval: 5'

No.	Rec.	Sample Interval	OVM Reading	Depth	Sample Description
3			0	0'	Coarse sand
				-	Dark brown color
				-	some pebbles
				-	
				-	
			ND	5'	coarse sand
				-	yellow brown color
				-	pebbles, poorly sorted sand
				-	
				-	
			ND	10'	coarse sand, yellow brown color
				-	pebbles
				-	poorly sorted sand
				-	
				-	
			ND	15'	coarse sand
				-	dark yellow to brownish color
				-	some pebbles poorly sorted
				-	
				-	
			ND	20'	coarse sand
				-	yellowish brown color
				-	some pebbles poorly sorted sands
				-	
				-	
			ND	25'	coarse sand
				-	yellowish brown color
				-	some pebbles poorly sorted sands
				-	
				-	
			ND	30'	coarse sand
				-	dark yellow brown
				-	pebbles and poorly sorted
				-	
				-	
			ND	35'	coarse sand

					yellow brown color
					pebbles and poorly sorted
			ND	40'	coarse sand
					yellow brown color
					some pebbles and poorly sorted
			ND	45'	medium sand
					brownish yellow color
					well sorted
			ND	50'	medium sand
					brownish yellow color
					well sorted
			ND	55'	medium sand
					light yellow brown in color
					well sorted
			ND	60'	medium sand
					pale brown
					well sorted
			ND	65'	bottom of well

Land Tech Remedial, Inc.

Soil Boring/Well Log No.: PMW-4U, M, L

Client: **Hull & Associates**

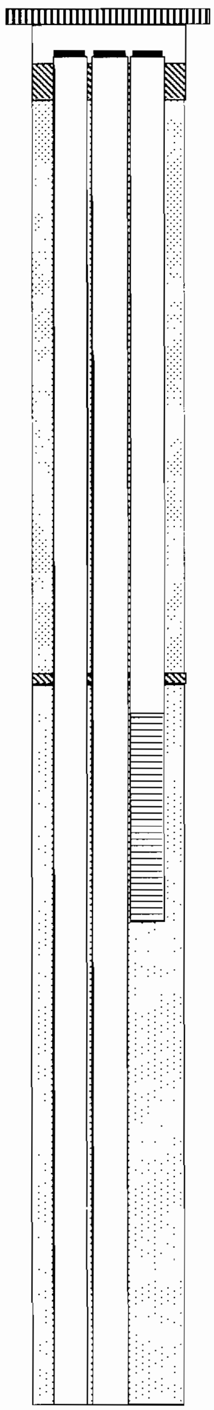
Project Name: **IMC Magnetics**

Project Location: **570 Main Street, Westbury, New York**

Project No: 11531 | Page: 1/2

Permit No.: NA

Date: 6/29/98



Depth Below Surface	PID Readings (ppm)	Sample Depth (feet)	Field Description of Soil
50	70.8	48-50	Loose, Orange fine to medium SAND, Sandy Silt lense top 2 ft.
	54.5	53-55	Loose Orange to Tan fine to medium SAND, trace Silty Clay
60	80.2	58-60	Medium dense, Orange to Tan SILTY SAND and CLAY.
	68.5	63-65	Loose, Orange to Tan Silty fine to medium SAND.
70	98.4	68-70	Medium Dense, Red and Tan Silty fine SAND and CLAY.
	50.9	73-75	Medium Dense, Striated Red Tan, Orange, Silty fine to medium SAND.
80	93.8	78-80	Loose, Tan and Orange fine to medium SAND.
	62.5	83-85	Striated loose, Tan Yellow Silty fine to medium SAND and medium dense, Red SILTY CLAY, trace Sand
90	67.3	88-90	Loose, Tan fine to medium SAND and medium dense, Tan Silty fine Sand.
	50.4	93-95	Loose, Tan fine to medium SAND.
100	68.7	98-100	Loose, Tan fine to medium SAND

Bore Hole Data	
Drilling Method:	Auger
Hole Diameter:	8 inches
Depth:	140 feet
Well Data	
Surface Casing	
Casing Type:	NA
Casing Diameter:	NA
Casing Length:	NA
Casing Interval:	NA
Well Casing	
Casing Type:	Sch. 40 PVC
Casing Diameter:	2-inch
Casing Length:	10 feet
Casing Interval:	0-10 feet
Screen	
Screen Type:	Sch. 40 PVC
Screen Diameter:	2-inch
Screen Slot:	0.10 inch
Screen Length:	10 feet
Screen Interval:	10-15 feet
Filter Media	
Media Type:	NA
Composition:	NA
Volume Used:	NA
Filter Interval:	NA
Grout Seal	
Bentonite Interval:	0-1 feet
Cement Interval:	NA
Well Head	
Concrete Pad:	Yes
Size:	24" X 24"
Road Box:	NA
Size:	NA
Depth to Water	
Date:	NA
Time:	
Depth:	NA
Well Development	
Method:	NA
Duration:	
Rate:	
Date:	

Legend

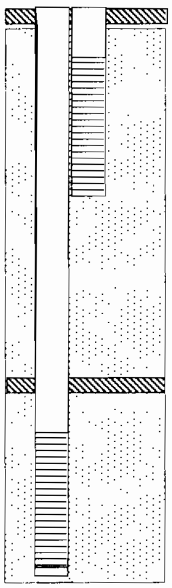
- Concrete Pad
- Casing Interval
- Screen Interval
- Native Fill Material
- Bentonite Interval
- Surface Casing
- Filter Pack

Land Tech Remedial, Inc.

Soil Boring/Well Log No.: PMW-4U, M, L

Client: Hull & Associates
Project Name: IMC Magnetics
Project Location: 570 Main Street, Westbury, New York

Project No.: 11531
Page: 2/2
Permit No.: NA
Date: 6/29/98

Depth Below Surface	Well Diagram	PID Readings (ppm)	Sample Depth (feet)	Field Description of Soil
100				
		74.6	103-105	Loose, Tan fine to medium SAND
110		59.9	108-110	Loose, Tan fine to medium SAND.
			113-115	No Recovery.
120		90.9	118-120	Loose, Tan fine to medium SAND.
		175	123-125	Loose, Tan fine to medium SAND, trace Silty Sand.
130		120	128-130	Loose, Tan fine to medium SAND
		136	133-135	Loose, Tan fine to medium SAND.
140		169	138-140	Loose, Tan fine to medium SAND.
150				
160				
170				
180				
190				
200				

Bore Hole Data

Drilling Method:	Auger
Hole Diameter:	8 inches
Depth:	140 feet

Well Data

Surface Casing

Casing Type:	NA
Casing Diameter:	NA
Casing Length:	NA
Casing Interval:	NA

Well Casing

Casing Type:	Sch. 40 PVC
Casing Diameter:	2-inch
Casing Length:	10 feet
Casing Interval:	0-10 feet

Screen

Screen Type:	Sch. 40 PVC
Screen Diameter:	2-inch
Screen Slot:	0.10 inch
Screen Length:	10 feet
Screen Interval:	10-15 feet

Filter Media

Media Type:	NA
Composition:	NA
Volume Used:	NA
Filter Interval:	NA

Grout Seal

Bentonite Interval	0-1 feet
Cement Interval:	NA

Well Head

Concrete Pad:	Yes
Size:	24" X 24"
Road Box:	NA
Size:	NA

Depth to Water

Date:	NA
Time	
Depth:	NA

Well Development

Method:	NA
Duration:	
Rate:	
Date:	

Legend

- Concrete Pad
- Casing Interval
- Screen Interval
- Native Fill Material
- Bentonite Interval
- Surface Casing
- Filter Pack

Land Tech Remedial, Inc.

Soil Boring/Well Log No.: PMW-5U, M, L

Client:	Hull & Associates	Project No.	11531
Project Name:	IMC Magnetics	Page	1/2
Project Location:	570 Main Street, Westbury, New York	Permit No.	NA
		Date	6/20/98

Depth Below Surface	Well Diagram	PID Readings (ppm)	Sample Depth (feet)	Field Description of Soil
0				
10				
20				
30				
40				
50		47.1	50-52	Loose, Brown to Tan fine SAND, Wet
		28.1	52-54	Loose, Tan fine to medium SAND, Wet
		0	54-56	Loose, Tan fine to medium SAND, little Pebbles, Wet
		0	56-58	Loose, Tan fine to medium SAND, little Pebbles, Saturated
		0	58-60	Loose, Tan fine to medium SAND, little Pebbles, Saturated
60		0	60-62	Loose, Tan to Orange fine to medium SAND, little fine Gravel, Saturated
		9.5	62-64	Loose, Tan fine to medium SAND, trace coarse Sand, little fine Gravel
		0	64-66	Loose, Tan fine to medium SAND, trace coarse Sand, little fine Gravel
		0	66-68	Loose, Tan fine SAND, trace medium to coarse Sand, trace fine Gravel
		42.4	68-70	Loose, Tan fine to medium SAND some coarse Sand, trace fine Gravel
70		68.9	70-72	Loose, Tan fine SAND, trace medium to coarse Sand
		46	72-74	Loose, Tan to Brown fine SAND
		87.8	74-76	Loose, Tan and Orange fine SAND, trace coarse Sand, Saturated
		94.9	76-78	Loose, Tan fine SAND, little medium and coarse Sand
		46.6	78-80	Loose, Tan fine to medium SAND
80		79.6	80-82	Loose, Tan and Orange fine to medium SAND, little coarse Sand
		44.8	82-84	Loose, Tan and Orange fine to medium SAND, trace coarse Sand
		45.4	84-86	Loose, Brown fine to medium SAND
		63	86-88	Loose, Brown to Amber fine SAND, trace medium Sand, Saturated
90		34.3	88-90	Loose, Brown Orange fine SAND, trace medium Sand, Saturated
		30.3	90-92	Loose, Brown Orange fine SAND, little medium Sand, Saturated
		30.8	92-94	Loose, Brown Orange fine SAND, trace coarse Gravel, Saturated
		106	94-96	Loose, Brown Orange fine SAND, trace medium Sand, Saturated
		45.4	96-98	Loose, Brown Orange fine to medium SAND, Saturated
100		48.7	98-100	Loose, Tan and Orange fine to medium to fine SAND, Saturated

Bore Hole Data	
Drilling Method	Auger
Hole Diameter	8 inches
Depth	140 feet
Well Data	
Surface Casing	
Casing Type	NA
Casing Diameter	NA
Casing Length	NA
Casing Interval	NA
Well Casing	
Casing Type	Sch. 40 PVC
Casing Diameter	2-inch
Casing Length	10 feet
Casing Interval	0-10 feet
Screen	
Screen Type	Sch. 40 PVC
Screen Diameter	2-inch
Screen Slot	0.10 inch
Screen Length	10 feet
Screen Interval	10-15 feet
Filter Media	
Media Type	NA
Composition	NA
Volume Used	NA
Filter Interval	NA
Grout Seal	
Bentonite Interval	0-1 feet
Cement Interval	NA
Well Head	
Concrete Pad	Yes
Size	24" X 24"
Road Box	NA
Size	NA
Depth to Water	
Date	NA
Time	
Depth	NA
Well Development	
Method	NA
Duration	
Rate	
Date	

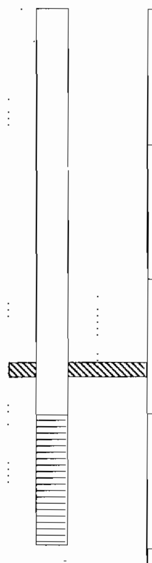
Legend

- Concrete Pad
- Casing Interval
- Screen Interval
- Native Fill Material
- Bentonite Interval
- Surface Casing
- Filter Pack

Land Tech Remedial, Inc.

Soil Boring/Well Log No.: PMW-5U, M, L

Client	Hull & Associates	Project No	11531
Project Name	IMC Magnetics	Permit No	NA
Project Location	570 Main Street, Westbury, New York	Date	6/20/98
		Page	2/2

Depth Below Surface	Well Diagram	PID Readings (ppm)	Sample Depth (feet)	Field Description of Soil
100				
		88.8	100-102	Loose, Tan and Orange fine SAND
		52	102-104	Medium Dense, Tan to Grey striated fine SAND
		39.4	104-106	Loose, Tan to Orange fine to medium SAND
		80.4	106-108	Loose, Tan to Orange fine to medium SAND
110		50.4	108-110	Loose, Tan to Orange fine to medium SAND
		74.7	110-112	Loose, Tan to Orange fine to medium SAND, trace coarse Sand
		54.[illegible]	112-114	Dense, Tan to Orange Silty fine SAND
		90.7	114-116	Dense, Tan, Red striated and Grey striated Silty fine SAND
		52.9	116-118	Dense, Tan, Grey, Red striated Silty fine SAND, trace Mica
120		39.3	118-120	Medium Dense, Tan to Grey, Red striated Silty fine SAND, trace Mica
		83.2	120-122	Medium dense, Tan Silty fine SAND
		113	122-124	Loose, Tan fine to medium SAND
		68.7	124-126	Loose, Tan fine to medium SAND
		46.6	126-128	Loose, Tan fine to medium SAND
130		62.9	128-130	Loose, Tan fine to medium SAND
		44.7	130-132	Loose, Tan Grey fine to medium SAND
		52.1	132-134	Loose, Tan fine to medium SAND
			134-136	Loose, Tan fine to medium SAND
			136-138	Loose, Tan fine to medium SAND
140			138-140	Loose, Tan fine to medium SAND
150				
160				
170				
180				
190				
200				

Bore Hole Data	
Drilling Method	Auger
Hole Diameter	8 inches
Depth	140 feet
Well Data	
Surface Casing	
Casing Type	NA
Casing Diameter	NA
Casing Length	NA
Casing Interval	NA
Well Casing	
Casing Type	Sch. 40 PVC
Casing Diameter	2-inch
Casing Length	10 feet
Casing Interval	0-10 feet
Screen	
Screen Type	Sch. 40 PVC
Screen Diameter	2-inch
Screen Slot	0.10 inch
Screen Length	10 feet
Screen Interval	10-15 feet
Filter Media	
Media Type	NA
Composition	NA
Volume Used	NA
Filter Interval	NA
Grout Seal	
Bentonite Interval	0-1 feet
Cement Interval	NA
Well Head	
Concrete Pad	Yes
Size	24" X 24"
Road Box	NA
Size	NA
Depth to Water	
Date	NA
Time	
Depth	NA
Well Development	
Method	NA
Duration	
Rate	
Date	

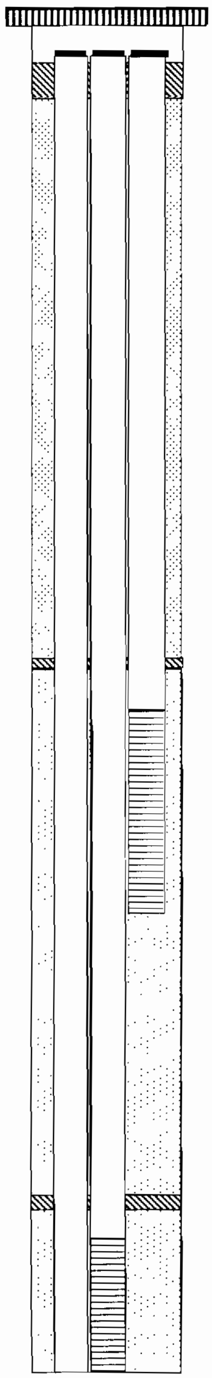
Legend

- Concrete Pad
- Casing Interval
- Screen Interval
- Native Fill Material
- Bentonite Interval
- Surface Casing
- Filter Pack

Land Tech Remedial, Inc.

Soil Boring/Well Log No.: PMW-6U, M, L

Client:	Hull & Associates	Project No.:	11531
Project Name:	IMC Magnetics	Permit No.:	NA
Project Location:	570 Main Street, Westbury, New York	Date:	6/23/98
		Page:	1/2



Depth Below Surface	PID Readings (ppm)	Sample Depth (feet)	Field Description of Soil
0			
10			
20			
30			
40			
50	61	48-50	Loose,Tan fine to medium SAND, slightly moist
	6.9	53-55	Loose,Tan fine to coarse SAND, some fine Gravel.
60	0	58-60	Loose, Tan fine to medium SAND, little coarse Sand, moist.
	0	63-65	Loose, Tan to brown fine to medium SAND, little coarse Sand.
70	0	68-70	Loose, Tan to brown fine to medium SAND, trace coarse Sand
	0	73-75	Loose, Tan to brown fine to medium SAND, trace coarse Sand.
80	0	78-80	Loose, Orangish tan, fine to medium SAND
	0	83-85	Loose Tan to brown, fine to medium SAND.
90	0	88-90	Loose Tan to brown, fine to medium SAND.
	0	93-95	Loose, Light Brown, fine to medium SAND.
100	0	98-100	Loose, Tan fine to medium SAND, little coarse Sand

Bore Hole Data	
Drilling Method:	Auger
Hole Diameter:	8 inches
Depth:	140 feet
Well Data	
Surface Casing	
Casing Type:	NA
Casing Diameter	NA
Casing Length	NA
Casing Interval	NA
Well Casing	
Casing Type:	Sch. 40 PVC
Casing Diameter:	2-inch
Casing Length:	10 feet
Casing Interval	0-10 feet
Screen	
Screen Type:	Sch. 40 PVC
Screen Diameter:	2-inch
Screen Slot:	0.10 inch
Screen Length:	10 feet
Screen Interval:	10-15 feet
Filter Media	
Media Type:	NA
Composition:	NA
Volume Used:	NA
Filter Interval:	NA
Grout Seal	
Bentonite Interval:	0-1 feet
Cement Interval:	NA
Well Head	
Concrete Pad:	Yes
Size	24" X 24"
Road Box	NA
Size:	NA
Depth to Water	
Date:	NA
Time:	
Depth:	NA
Well Development	
Method:	NA
Duration:	
Rate:	
Date:	

Legend

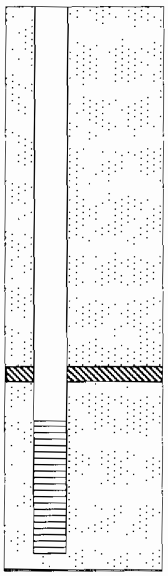
- Concrete Pad
- Casing Interval
- Screen Interval
- Native Fill Material
- Bentonite Interval
- Surface Casing
- Filter Pack

Land Tech Remedial, Inc.

Soil Boring/Well Log No.: PMW-6U, M, L

Client: Hull & Associates
Project Name: IMC Magnetics
Project Location: 570 Main Street, Westbury, New York

Project No.: 11531
Page: 2/2
Permit No.: NA
Date: 6/23/98



Depth Below Surface	PID Readings (ppm)	Sample Depth (feet)	Field Description of Soil
100			
	0	103105	Loose, Tan fine to medium SAND, little coarse Sand.
110	0	108-110	Loose Tan and Brown fine to medium SAND.
	0	113-115	Loose, Tan and Brown medium to fine SAND.
120	0	118-120	Loose, Tan and Brown medium to fine SAND, little coarse Sand.
	0	123-125	Loose, Orange-Brown medium to fine SAND, some coarse Sand trace fine Gravel.
130	0	128-130	Loose, Orange-Brown medium to fine SAND, some coarse Sand trace fine Gravel.
	0	133-135	Loose, Orange Brown medium to fine SAND, little coarse Sand.
140	0	138-140	Loose, Orange Yellow Brown fine to medium SAND, trace coarse Sand.
150			
160			
170			
180			
190			
200			

Bore Hole Data	
Drilling Method:	Auger
Hole Diameter:	8 inches
Depth:	140 feet
Well Data	
Surface Casing	
Casing Type:	NA
Casing Diameter:	NA
Casing Length:	NA
Casing Interval:	NA
Well Casing	
Casing Type:	Sch. 40 PVC
Casing Diameter:	2-inch
Casing Length:	10 feet
Casing Interval:	0-10 feet
Screen	
Screen Type:	Sch. 40 PVC
Screen Diameter:	2-inch
Screen Slot:	0.10 inch
Screen Length:	10 feet
Screen Interval:	10-15 feet
Filter Media	
Media Type:	NA
Composition:	NA
Volume Used:	NA
Filter Interval:	NA
Grout Seal	
Bentonite Interval:	0-1 feet
Cement Interval:	NA
Well Head	
Concrete Pad:	Yes
Size:	24" X 24"
Road Box:	NA
Size:	NA
Depth to Water	
Date:	NA
Time:	
Depth:	NA
Well Development	
Method:	NA
Duration:	
Rate:	
Date:	

Legend

- Concrete Pad
- Casing Interval
- Screen Interval
- Native Fill Material
- Bentonite Interval
- Surface Casing
- Filter Pack

Land Tech Remedial, Inc.

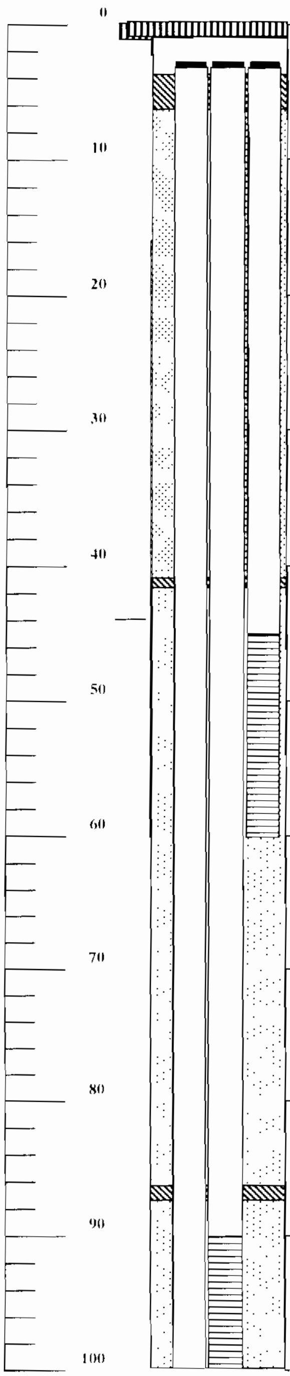
Soil Boring/Well Log No.: PMW-7U, M, L

Client: **Hull & Associates**
Project Name: **IMC Magnetics**
Project Location: **570 Main Street, Westbury, New York**

Project No.: 11531 Page: 1/2
Permit No.: NA
Date: 6/25/98

Depth Below Surface	PID Readings (ppm)	Sample Depth (feet)	Field Description of Soil
50	471	50-52	Loose, Tan fine to medium SAND, some coarse Sand, Wet
	28.1	52-54	Loose, Tan fine to medium SAND, some coarse Sand, Wet
	0	54-56	Loose, Tan fine to medium SAND, trace coarse Sand, Wet.
	0	56-58	Loose, Tan fine to medium SAND, some coarse Sand, Wet.
60	0	58-60	Loose, Tan Brown fine to medium SAND, some coarse Sand, Wet.
	0	60-62	Loose, Tan fine to medium SAND
	9.5	62-64	Loose, Tan fine to medium SAND.
	0	64-66	Loose, Tan fine to medium SAND.
	0	66-68	Loose, Tan fine to medium SAND, trace coarse Sand.
70	42.4	68-70	Loose, Tan fine to medium SAND, little coarse Sand.
	68.9	70-72	Loose, Tan fine to medium SAND, some coarse Sand.
	46	72-74	Loose, Tan/Orange fine to medium SAND, little coarse Sand.
	87.5	74-76	Loose, Tan fine to medium SAND, little coarse Sand.
	94.9	76-78	Loose, Tan fine to medium SAND, little coarse Sand
80	46.6	78-80	Loose, Tan fine to medium SAND, trace coarse Sand.
	79.6	80-82	Loose, Tan medium to fine SAND, some coarse Sand
	44.8	82-84	Loose, Tan medium to fine SAND, little coarse Sand
	45.4	84-86	Loose, Tan medium to fine SAND, little coarse Sand
	63	86-88	Loose, Tan medium to fine SAND.
90	34.3	88-90	Loose, Tan medium to fine SAND.
	30.3	90-92	Loose, Tan fine to medium SAND, trace coarse Sand
	30.8	92-94	Loose, Tan medium to fine SAND.
	106	94-96	Loose, Tan medium to fine SAND.
	45.4	96-98	Loose, Tan medium to fine SAND.
100	48.7	98-100	Loose, Tan medium to fine SAND.

Well Diagram



Bore Hole Data	
Drilling Method:	Auger
Hole Diameter:	8 inches
Depth:	140 feet
Well Data	
Surface Casing	
Casing Type:	NA
Casing Diameter:	NA
Casing Length:	NA
Casing Interval:	NA
Well Casing	
Casing Type:	Sch. 40 PVC
Casing Diameter:	2-inch
Casing Length:	10 feet
Casing Interval:	0-10 feet
Screen	
Screen Type:	Sch. 40 PVC
Screen Diameter:	2-inch
Screen Slot:	0.10 inch
Screen Length:	10 feet
Screen Interval:	10-15 feet
Filter Media	
Media Type:	NA
Composition:	NA
Volume Used:	NA
Filter Interval:	NA
Grout Seal	
Bentonite Interval:	0-1 feet
Cement Interval:	NA
Well Head	
Concrete Pad:	Yes
Size:	24" X 24"
Road Box:	NA
Size:	NA
Depth to Water	
Date:	NA
Time:	
Depth:	NA
Well Development	
Method:	NA
Duration:	
Rate:	
Date:	

Legend

- Concrete Pad
- Casing Interval
- Screen Interval
- Native Fill Material
- Bentonite Interval
- Surface Casing
- Filter Pack

Land Tech Remedial, Inc.

Soil Boring/Well Log No.: PMW-7U, M, L

Client: **Hull & Associates**
Project Name: **IMC Magnetics**
Project Location: **570 Main Street, Westbury, New York**

Project No.: 11531 Page: 2/2
Permit No.: NA
Date: 6/25/98

Depth Below Surface	Well Diagram	PID Readings (ppm)	Sample Depth (feet)	Field Description of Soil
100		88.8	100-102	Loose, Tan medium to fine SAND
		52	102-104	Loose, Tan medium to fine SAND
		39.4	104-106	Loose, Tan medium to fine SAND.
		80.4	106-108	Loose, Tan medium to fine SAND.
110		50.4	108-110	Loose, Tan fine to medium SAND, trace coarse Sand.
		74.7	110-112	Loose, Tan fine to medium SAND, trace coarse Sand.
		54.1	112-114	Loose, Tan fine to medium SAND
		90.7	114-116	Loose, Tan fine to medium SAND.
		52.9	116-118	Loose, Tan fine to medium SAND.
120		39.3	118-120	Loose, Tan fine to medium SAND.
		83.2	120-122	Loose, Tan fine to medium SAND.
		113	122-124	Loose, Tan fine to medium SAND.
		68.7	124-126	Loose, Tan fine to medium SAND
		46.6	126-128	Loose, Tan fine to medium SAND
130		62.9	128-130	Loose, Tan fine to medium SAND.
		44.7	130-132	Loose, Tan fine to medium SAND
		52.1	132-134	Loose, Tan fine to medium SAND
			134-136	
			136-138	
140			138-140	
150				
160				
170				
180				
190				
200				

Bore Hole Data	
Drilling Method:	Auger
Hole Diameter:	8 inches
Depth:	140 feet
Well Data	
Surface Casing	
Casing Type:	NA
Casing Diameter:	NA
Casing Length:	NA
Casing Interval:	NA
Well Casing	
Casing Type:	Sch. 40 PVC
Casing Diameter:	2-inch
Casing Length:	10 feet
Casing Interval:	0-10 feet
Screen	
Screen Type:	Sch. 40 PVC
Screen Diameter:	2-inch
Screen Slot:	0.10 inch
Screen Length:	10 feet
Screen Interval:	10-15 feet
Filter Media	
Media Type:	NA
Composition:	NA
Volume Used:	NA
Filter Interval:	NA
Grout Seal	
Bentonite Interval:	0-1 feet
Cement Interval:	NA
Well Head	
Concrete Pad:	Yes
Size:	24" X 24"
Road Box:	NA
Size:	NA
Depth to Water	
Date:	NA
Time:	
Depth:	NA
Well Development	
Method:	NA
Duration:	
Rate:	
Date:	

Legend

- Concrete Pad
- Casing Interval
- Screen Interval
- Native Fill Material
- Bentonite Interval
- Surface Casing
- Filter Pack