New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau B
625 Broadway, Albany, New York 12233-7016
Phone: (518) 402-9768 • FAX: (518) 402-9020
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

NOV 12 2004

November 3, 2004

Mr. Doug Grimmer
Senior Property Manager
Baker Properties
485 Washington Avenue
Pleasantville, NY 10570

RE: Former Magna Metals, Site No. 360003

Dear Mr. Grimmer:

In response to your October 1, 2004 FOIL request, enclosed are the documents you requested. There is no charge for these documents.

If you need additional information, please do not hesitate to contact us at (518) 402-9768.

Sincerely,

Lauren MacDonald

Lauren MacDonald
Division of Environmental Remediation

Enclosures

cc: Sally Dewes, P.E.

BCLP02779

RECEIVED
AUG 20 2004
REMEDIAL BUREAU B

DRAFT SUPPLEMENTAL REMEDIAL INVESTIGATION REPORT

FOR THE

FORMER MAGNA METALS SITE
(NYSDEC Site No. 360003)
TOWN OF CORTLANDT
WESTCHESTER COUNTY, NEW YORK

August 2004

PREPARED BY:

Tetra Tech FW, Inc.
1000 The American Road
Morris Plains, New Jersey 07950

ADDENDUM TO:

REMEDIAL INVESTIGATION/FEASIBILITY STUDY REPORT
FOR THE
MAGNA METALS SITE
TOWN OF CORTLANDT, NEW YORK
November 1998

BCLP02780

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1
1.1 Purpose and Objective 1-1
1.2 Site Background 1-1
1.3 Report Organization 1-1

2.0 SCOPE OF INVESTIGATION 2-1
2.1 Additional Leach Pit Location Survey 2-1
2.1.1 Geophysical Survey 2-1
2.1.2 Leach Pit Excavation 2-2
2.1.3 Leach Pit and Refuse Area Sampling 2-3
2.1.4 Leach Pit Survey 2-4
2.2 Homeowner Survey 2-4
2.3 Groundwater Contamination Delineation 2-4
2.3.1 Overburden Monitoring Wells 2-4
2.3.2 Bedrock Monitoring Wells 2-5
2.3.3 Groundwater Sampling 2-6
2.3.4 Monitoring Well Survey 2-6
2.3.5 Groundwater Level Measurements and Surface Water Survey 2-6
2.4 Building Interior Sampling 2-7
2.5 Surface Soil Sampling 2-7
2.6 Surface Water and Sediment Sampling 2-7
2.7 Investigation Derived Waste 2-8

3.0 PHYSICAL RESULTS OF INVESTIGATION 3-1
3.1 Site Geology 3-1
3.2 Site Hydrogeology 3-1
3.3 Cross Section 3-2

4.0 NATURE AND EXTENT OF CONTAMINATION 4-1
4.1 Applicable Criteria Levels 4-1
4.2 Leach Pit Analytical Results 4-2
4.2.1 Leach Pit Inorganics Results 4-2
4.2.2 Leach Pit Volatiles Results 4-2
4.2.3 Leach Pit Semi-Volatiles Results 4-2
4.2.4 Leach Pit PCBs and Pesticides Results 4-3
4.3 Refuse Area Analytical Results 4-3
4.4 Groundwater Analytical Results 4-3
4.4.1 Groundwater Volatiles Results 4-3
4.4.2 Groundwater Inorganics Results 4-3
4.5 Surface Soil Analytical Results 4-4
4.5.1 Surface Soil Volatiles Results 4-4
4.5.2 Surface Soil Inorganics Results 4-4
4.6 Surface Water Analytical Results 4-4
4.7 Sediment Analytical Results 4-4
4.7.1 Sediment PAH Results 4-4
4.7.2 Sediment Metals Results 4-5

5.0 STEP IIC FISH AND WILDLIFE IMPACT ANALYSIS 5-1

BCLP02781

6.0 SUMMARY AND CONCLUSIONS 6-1
6.1 Relative Comparison of Data to Phase One Data 6-1
6.1.1 Volatile Organic Compounds 6-1
6.1.2 Semi-Volatile Organic Compounds 6-1
6.1.3 Pesticide and PCB Compounds 6-1
6.1.4 Inorganic Analytes 6-1
6.2 Additional Supplemental RI (Phase Two) Summary and Conclusions 6-1

BCLP02782

TABLE OF CONTENTS
(Continued)

List of Tables

Table 2-1 Leach/Septic Pit Ids, Sludge Thickness, and Construction Details
Table 2-2 Groundwater and Surface Water Elevations
Table 4-1 Leach Pit/Refuse Area Sample Results
Table 4-2 Groundwater Sample Results
Table 4-3 Surface Soil Sample Results
Table 4-4 Surface Water Sample Results
Table 4-5A Sediment Sample Results - PAH Compounds
Table 4-5B Sediment Sample Results – Inorganic Analytes

BCLP02783

TABLE OF CONTENTS
(Continued)

List of Figures

Figure 2-1 Site Plan
Figure 2-2 Leach/Septic Pit Location Plan
Figure 3-1 Geologic Cross Section
Figure 3-2 Groundwater Surface Contour Map
Figure 4-1 Soil/Sludge Contaminant Distribution Map
Figure 4-2 Groundwater Contaminant Distribution Map
Figure 4-3 Surface Water/Sediment Contaminant Distribution Map

BCLP02784

TABLE OF CONTENTS
(Continued)

List of Appendices

Appendix A NYSDEC Historical Documentation
Appendix B Hagar Richter Geophysical Report
Appendix C Photograph Log of Leach Pit Excavation Findings
Appendix D Boring Logs and Well Construction Diagrams
Appendix E Well Development Data
Appendix F Well Purge Data Sheets
Appendix G Data Usability Summary Reports
Appendix H Summary Sheets for Sampling Results
Appendix I Fish and Wildlife Impact Analysis

BCLP02785

1.0 INTRODUCTION

Presented herein is the Supplemental Remedial Investigation (RI) Report for the Magna Metals Site, Town of Cortlandt, New York, prepared pursuant to the New York State Department of Environmental Conservation (NYSDEC)-approved Final Supplemental Remedial Investigation/Feasibility Study (RI/FS) Work Plan Addendum. This document has been prepared by Tetra Tech FW, Inc. (formerly Foster Wheeler Environmental Corporation) as an addendum to the November 1998 Draft Remedial Investigation/Feasibility Study Report for the Magna Metals Site prepared by Foster Wheeler Environmental Corporation.

1.1 PURPOSE AND OBJECTIVE

The purpose of the Supplemental RI/FS was to address NYSDEC comments on the Draft RI/FS Report. A Supplemental Work Plan was submitted and approved by NYSDEC in March 2003. The objective of the Supplemental RI/FS was to perform horizontal and vertical delineation of the soil and groundwater contamination in the potential source area of the site, the leach pit area.

1.2 SITE BACKGROUND

Site background information is presented in the November 1998 Draft RI/FS Report.

1.3 REPORT ORGANIZATION

The organization of the Supplemental RI Report presented herein is as follows:

Section 1.0, Introduction, describes the purpose, objectives, and organization of the Supplemental RI Report.

Section 2.0, Scope of Investigation, presents the specific activities performed as part of the field investigation. Descriptions of the sampling procedures, installation procedures, and surveying techniques are provided. The chemical sampling program is outlined, with the sampling locations, sample types and analytical parameters described.

Section 3.0, Physical Results of Investigation, describes the physical characteristics of the site area, including topography, surface and groundwater hydrology, and geology.

Section 4.0, Nature and Extent of Contamination, summarizes the analytical results of the sampling investigation performed at the site. The type and concentration of the detected constituents are described for each matrix sampled.

Section 5.0, Summary of Fish and Wildlife Investigation Assessment, presents a brief synopsis of the findings from sediment and toxicological sample analyses.

BCLP02786

Section 6.0, Summary and Conclusions, presents a summary of the major points and conclusions of the Supplemental RI Report.

BCLP02787

BCLP02788

2.0 SCOPE OF INVESTIGATION

Pursuant to the Final Supplemental Remedial Investigation/Feasibility Study (RI/FS) Work Plan Addendum approved by the New York State Department of Environmental Conservation (NYSDEC), additional field activities were performed at the former Magna Metals Site located in Cortlandt, New York from the summer of 2003 through spring 2004. This section describes the tasks performed during the supplemental field investigation program, along with the associated methods and procedures that were utilized.

2.1 ADDITIONAL LEACH PIT LOCATION SURVEY

Historical documentation, contained in NYSDEC files, show that two septic tanks and up to nine drainage structures existed on the Magna Metals site at one time (Appendix A). Prior to the commencement of fieldwork during the summer of 2003, Tetra Tech FW (TtFW), formerly Foster Wheeler Environmental Corporation, had positively identified a total of seven pits/tanks. The site plan with pit locations is presented in Figure 2-1. Five of the known pit structures (historically identified as Pits B, C, D, E and F – see Table 2-1) are of a concrete cinderblock construction and were apparently used for leaching solids from the electroplating process water. The sixth structure (Pit G, Table 2-1) is a concrete tank with internal baffles believed to increase the water flow through the tank and promote settling of solids. This tank, located off the northwest corner of the Magna Metals building, was apparently fed from drains in the building. The seventh known structure (Pit A, Table 2-1) is a concrete tank that appears to be a septic system distribution or storage tank that may receive liquids from a sump in the southwest corner of the Magna Metals building. Pits A and G, hereafter referred to as septic tank (ST)-01 and leach pit (LP)-01, respectively, appear to be the first tanks in the series of settling tanks/leach pits at the site (Figure 2-2).

During the Supplemental RI, a more complete effort, described in Sections 2.2.1 and 2.2.2, was made to determine the locations and condition of additional underground structures.

2.1.1 Geophysical Survey

In effort to locate additional pits located at the Magna Metals site, TtFW retained Hager-Richter Geoscience, Inc. (Hager-Richter) to perform a geophysical survey of the area in which the undiscovered leach pits were thought to be. Prior to performing the geophysical survey, field reconnaissance and brush clearing activities were performed during July and August of 2003. These efforts resulted in the discovery of two additional leach pits (LP-09 and LP-0A on Figure 2-1). Both leach pits are of prefabricated concrete construction with side-walls perforated by approximately 1-inch diameter holes. The pits appear to have gravel bottoms and gravel packing around the tank sides to facilitate the filtration of water away from the pits. One inlet pipe enters and one outlet pipe exits leach pit LP-0A. LP-09 contains only an inlet pipe and therefore appears to be the terminus of the leach pit series.

On August 4th and 11th, 2003 Hager-Richter conducted field operations of the geophysical survey. Based on the historical documents, an area north of the known pits, approximately 30 feet by 165 feet in size, was identified for geophysical survey. On March 29th and 30th, 2004 GEOD Corp. surveyed the corners of the area surveyed by Hager-Richter. The area surveyed is presented on Figure 2-1.

Two geophysical methods; electromagnetic terrain conductivity (EM) and ground penetrating radar (GPR) were used to conduct the survey. EM data was collected at approximately two-foot intervals along parallel lines spaced approximately 2.5 feet apart. GPR data was also collected along parallel lines spaced no greater than 2.5 feet apart to aid in the identification of subsurface anomalies.

Based on the results of the geophysical survey, six relatively large, flat-topped subsurface anomolies were detected. The size and shape of these targets were determined to be consistent with potential leach/septic pits. Additionally, some smaller flat reflectors that could represent smaller leach/septic pits and general areas of buried metal and apparent conductive anomalies were detected (see Hager-Richter report, Appendix B, Figure 5). A complete report of Hager-Richter's findings, submitted to TtFW on August 18, 2003, is provided as Appendix B.

Based on the results of the geophysical survey, locations of potential leach/septic structures were marked in the field with flags by Hager-Richter personnel. A photograph of the geophysical area with flagged targets is provided as photo 1 in Appendix C of this report.

2.1.2 Leach Pit Excavation

Operations to find and excavate additional leach pits were conducted from August through October 2003. A total of thirteen leach pits/septic tanks were identified by the end of the excavation activities. The results of the excavation work are described below. Photographs documenting the findings are presented in Appendix C.

On August 11th and 25th, 2003, TtFW personnel hand excavated targets identified by Hager-Richter. The targets were excavated to depths ranging from 1.5 to 2.5 feet below ground surface (bgs). This effort did not result in the discovery of any additional pits.

After excavation of targets, TtFW personnel began excavations tracing pipes connecting known leach pits. By tracing the pipes, three additional leach pits (LP-06, LP-07, and LP-08) were discovered (photos 2 – 4 in Appendix C). These three leach pits are of prefabricated concrete construction similar to leach pits LP-0A and LP-09.

The pipes traced off of the known leach pits were perforated and of PVC or composite plastic construction. A photograph displaying the type of inter connecting pipes is provided as photo 5 in Appendix C.

Using polyethylene tubing fed through the pipes observed to enter/exit leach pits, TtFW confirmed that leach pits LP-04, LP-06 through LP-09 and LP-0A are directly connected, with no pits believed to be in-between these pits (Figure 2-2). This method was also used to confirm a connection between leach pits LP-02 through LP-05 (Figure 2-2). Several attempts were made to verify a connection between ST-02 and LP-02. Each attempt failed as the tubing appeared to encounter an obstruction approximately 25 feet to the north of ST-02. Based on historic drawings, this obstruction may be another leach pit.

BCLP02789

A pipe leading from leach pit LP-05 was excavated on August 26, 2003. The effort was terminated approximately 7 ft north of the leach pit opening at 4 feet bgs, the greatest depth that could be reached by hand digging methods.

On October 9th and 10th, 2003, with the use of a Bobcat Model 325 Mini-excavator, the pipe leading to the north from leach pit LP-05 was further traced and another leach pit (LP-06A) was uncovered (photo 6 in Appendix C). Leach pit LP-06A, is of concrete cinderblock construction, similar to pits LP-02 through LP-05 (Table 2-1), and contains one inlet pipe on the southern wall and one pipe exiting the pit on the northern side. The exiting pipe has been blocked and apparently sealed off using a tarred tin coffee can (photo 7 in Appendix C). Utilizing polyethylene tubing, it was determined that leach pit LP-06A is connected to leach pit LP-05. The pipe leading north from of leach pit LP-06A was traced approximately 11 feet north of the leach pit and to a depth of approximately 7.5 feet bgs, the maximum depth able to be reached with the mini-excavator. The pipe appeared to continue to the north, but could not be followed further with the available equipment.

The mini-excavator was also used to excavate the remaining targets identified by Hager-Richter during the geophysical survey. Five targets that appeared to be inline with the pipe leading north from leach pit LP-06A were excavated to depths ranging from approximately 2.8 to 4 feet bgs. The excavation of these targets did not result in discovery or any additional pits.

Ten of the thirteen leach pits were observed to contain sludge cake. The sludge cake in pits ST-02, LP-02, LP-03 and LP-05, which had been left open to the elements, was moist. Sludge cake in pits LP-06A, LP-07, LP-08, LP-09 and LP-0A, which had been covered until discovery during the Supplemental RI, were desiccated. The desiccated sludge cake in LP-06 is shown in photo 7 of Appendix C. Table 2-1 identifies the approximate thickness of sludge cake observed in each leach pit/septic tank.

2.1.3 Leach Pit and Refuse Area Sampling

Sampling of the leach pits/septic tanks took place on July 30th, August 26th, September 5th and October 10th, 2003. Eleven pits were sampled: LP-02, LP-03, LP-05, LP-06, LP-06A, LP-07, LP-08, LP-09, LP-0A, ST-01 and ST-02. Samples were collected using decontaminated stainless-steel hand-augers, bowls, and spoons. Details of the decontamination procedure that was employed can be found in the RI/FS Work Plan submitted to the NYSDEC by Foster Wheeler Environmental in August 1995.

When possible, two samples were collected from each pit, one of the sludge-cake materials and a second of the soil immediately below the sludge-cake. The sludge-cake materials contained fine laminations of a variety of colors including greens, grays, maroons, pinks, browns, yellows and blues (photo 8 in Appendix C). The southern septic tank (ST-01) had an apparent concrete bottom, and therefore only a sludge sample was collected from this pit. Pits LP-0A and LP-09 contained only trace amounts of sludge above the soil. As such, only one sample was collected from each of these pits. The samples collected from leach pits LP-0A and LP-09 were a combination of soil and the overlying sludge cake.

BCLP02790

A total of nineteen samples and two duplicate samples were collected and analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semi-volatile organic compounds (SVOCs), TCL pesticides and polychlorinated biphenyls (PCBs), Target Analyte List (TAL) metals, cyanide and total organic carbon (TOC). Sludge materials, when present, were described and soils were classified according to the Unified Soil Classification System (USCS).

No sample was collected from LP-01 as the pit has and apparent concrete/solid bottom with no sludge present. Leach pit LP-04 could not be sampled as this pit has been filled with asphalt pieces, glass bottles and other debris.

One sample was collected from 2.5 to 3.0 feet bgs in the apparent refuse area located north of the former Magna Metals building (soil boring RA on Figure 2-1). A decontaminated stainless steel hand auger, bowl and spoon were used to collect the sample. The sample was analyzed for TCL VOCs, TCL SVOCs, TCL pesticides and PCBs, TAL metals, cyanide and TOC.

2.1.4 Leach Pit Survey

Leach pit locations were surveyed using a Trimble Pro XRS global positioning system (GPS). GPS data was collected on February 27, 2004.

2.2 HOMEOWNER SURVEY

On August 8, 2003, officials at the Cortlandt Town Hall were contacted regarding potential private wells in the area. Based on discussions with Mickey Foster in the Town Water Department, it was concluded that all residents are currently on town water. Some town residents still have private wells, but these properties are either not in the area of the site. Private wells are upgradient of the former Magna Metals property by at least ¼ to ½ mile.

2.3 GROUNDWATER CONTAMINATION DELINEATION

From August 22 through September 3, 2003, five additional monitoring wells (three overburden and two bedrock) were installed by B&B Drilling of Netcong, New Jersey using an HBX-B-61 Rig. Monitoring well locations are displayed on Figure 2-2. The wells were installed in an attempt to complete delineation of groundwater contamination in the overburden, to determine if groundwater in the underlying bedrock has been impacted, and to better define the local groundwater flow regime. Two bedrock monitoring wells were installed to determine if the contamination in the overburden aquifer had migrated to the underlying bedrock aquifer.

2.3.1 Overburden Monitoring Wells

On August 26 through 28, 2003, monitoring wells MW-05, MW-06, and MW-08 (Figure 2-1) were installed in the overburden. Monitoring well MW-05 was installed upgradient of the leach pit area for the collection of background groundwater chemistry samples. Monitoring well MW-06 was installed in the leach pit area to assist in defining the northerly extent of groundwater contamination detected in samples collected from monitoring well MW-04 in

BCLP02791

May 1998. Monitoring well MW-08 was installed to assist in delineation the horizontal extent of groundwater contamination downgradient of the leach pit area.

Overburden monitoring well borings were drilled with 4 ¼ inner-diameter hollow stem augers (HSA). The boreholes were completed as monitoring wells and screened across the water table using two-inch Schedule 40 PVC riser and 10 slot Schedule 40, slotted PVC screen. Sand packs were constructed with No. 1 silica sand. Boring logs and monitoring well construction diagrams are provided in Appendix D.

Well development was conducted by pumping and surging until the well responded to water level changes in the formation and produced clear, sediment-free water to the extent possible. The wells were developed with a goal of producing water of not more than 10% variation between successive field parameters. The following data were recorded in the field logbook as part of the development procedures:

- The static water level measured from the top of the well casing before, during and after development is completed,
- The calculated quantity of water standing in the well prior to development,
- The sounded depth of the well before and after development to determine if silt has accumulated inside the well,
- The physical character of water removed including changes during development such as water clarity, color, particulates and odor,
- The pH, Eh, dissolved oxygen, and specific conductance of the discharge during development of the well,
- The type and size/capacity of pump used,
- The surging technique(s) used,
- The quantity of fluid/water removed and the time for removal (both incremental and total values).

Monitoring well development data sheets are provided in Appendix E.

2.3.2 Bedrock Monitoring Wells

Bedrock monitoring wells MW-04D and MW-07 (Figure 2-1) were installed on August 22 through September 3, 2003. Bedrock monitoring well borings were drilled with 4 ¼ HSA in the overburden and a 5 5/8-inch roller bit in bedrock. MW-04D was installed immediately adjacent to MW-04 to determine if contamination of the overburden aquifer had migrated into the underlying bedrock aquifer. MW-07 was installed approximately 600 feet in the general downgradient direction of MW-04 along Rosalind Drive. MW-07 was initially planned as an overburden well to assist in determining the downgradient edge of the plume; however bedrock was encountered at 2 feet bgs, thus the well was completed as a bedrock well. Boring logs and monitoring wells construction diagrams are provided in Appendix D.

The bedrock monitoring wells were developed following the same procedures as for the overburden monitoring wells (Section 2.3.1). Monitoring well development data sheets for the bedrock wells are provided in Appendix E.

BCLP02792

BCLP02793

2.3.3 Groundwater Sampling

The groundwater sampling program was designed to provide additional information for a more precise understanding of overburden and bedrock water bearing units at the site, and to further define the presence, nature and extent of a contamination plume. One round of sampling was performed on October 6 through 8, 2003. Groundwater samples were collected from seven of the nine site monitoring wells (MW-01, MW-02, MW-04, MW-04D, MW-05, MW-07, and MW-08) The collected samples were analyzed for TCL VOCs, TAL metals and cyanide.

All wells, except MW-04, were sampled using NYSDEC-approved USEPA Low Flow Sampling Procedures. Groundwater samples were collected using a 2-inch stainless steel Grundfos pump with Teflon-lined tubing. Grundfos pumps were decontaminated prior to sampling each well using the following procedure:

- 5 minute potable water rinse;
- 5 minute Alconox and potable water rinse;
- 5 minute distilled water rinse; and
- Final flush with distilled water.

Specific conductance, pH, dissolved oxygen, oxidation-reduction potential, turbidity and temperature were measured at the start of purging operations and periodically (approximately every 3 minutes) during purging. Stabilization of these parameters (pH: ± 0.1; conductivity: ± 3%; dissolved oxygen: ± 10%; oxidation-reduction potential: ± 10 mV; turbidity: >50 NTU or ±10%) over three consecutive readings indicated that the groundwater within the well was at equilibrium. Well purge data sheets are presented in Appendix F.

Due to a low volume of water in MW-04, this well was bailed dry using a 1" diameter Teflon bailer and then allowed to recharge. Once the well had recharged, samples were collected using a Teflon bailer. Due to the small volume of water extracted from the well during purging (approximately 0.25 gallons), water quality measurements were not collected.

No sample could be collected from monitoring wells MW-03 and MW-06. MW-03 was dry and MW-06 was bailed but contained only mud and sediment. As such, no sample was collected.

2.3.4 Monitoring Well Survey

GEOD Corporation of Newfoundland, New Jersey surveyed the monitoring well locations. Horizontal control was referenced to the New York State Plane coordinate system using the North American Datum of 1983 (NAD83). Vertical control was referenced to the North American Vertical Datum of 1988 (NAVD88). The survey was performed on March 29th and 30th, 2004.

2.3.5 Groundwater Level Measurements and Surface Water Survey

A synoptic round of water levels was collected on March 30, 2004 in coordination with a survey of five surface water elevation locations. Water levels were collected using a Solinst interface probe. GEOD Corporation performed the survey of the surface water elevations. Horizontal

control was referenced to the New York State Plane coordinate system using the North American Datum of 1983 (NAD83). Vertical control was referenced to the North American Vertical Datum of 1988 (NAVD88). The results of the synoptic round of water level measurements are displayed in Table 2-2.

2.4 BUILDING INTERIOR SAMPLING

Per the Final Supplemental RI/FS Work Plan, sampling beneath the slab of the former Magna Metals building was not performed because the building not demolished during the course of the field work.

2.5 SURFACE SOIL SAMPLING

On July 29th and 30th, 2003, ten surface soil samples were collected from the 0 to 2-inch bgs interval. The samples were collected using a stainless steel spoon and bowl and were analyzed for TCL VOCs, TAL metals and cyanide. Prior to sample collection, the bowl and spoon were decontaminated with the same chemical decontamination procedure described in section 2.1.3. The surface soil sample locations were surveyed using a Trimble Pro XRS GPS. GPS data was collected on July 30, 2003 and February 27, 2004 and sample locations are presented on Figure 2-1.

2.6 SURFACE WATER AND SEDIMENT SAMPLING

The results of the previous investigations conducted by Foster Wheeler Environmental Corporation indicated the following:

(1) Presence of ecological receptors in the habitats adjacent to the Magna Metals property;
(2) Presence of potential site related contaminants in these habitats;
(3) Complete exposure pathways for receptors to be exposed to the contaminants; and
(4) The observed concentrations of polycyclic aromatic hydrocarbons (PAHs) and metals that exceeded pertinent eco-screening level values.

These findings indicated that a toxic effect based assessment (Step IIC of the FWIA process) was warranted to collect site-specific data for assessing risk to ecological receptors and assist in remedial decision making for this Site.

Concentrations of metals and PAHs were found to exceed sediment-screening level benchmarks in the creek and pond basin areas downstream from the Site. Surface water samples collected from three locations proximal to former leach pits exceeded background levels and the NYSDEC water quality criterion for Class C waters. These exceedances suggested that survival of aquatic life may be impacted by local sources or discharges of contaminants from the site.

As required by NYSDEC regulations, investigations were conducted to determine what effects (if any) were being manifested in the aquatic habitats present. A site-specific biological/chemical study was performed to reduce inherent uncertainties applied in the Step IIB Pathways and Criteria Specific Analysis (conducted previously during the 1998 RI). The Step IIC includes:

BCLP02794

- Community level analysis using benthic macroinvertebrate studies;
- Organism level analysis using surface water and sediment toxicity testing; and
- Supplemental sediment and surface water sampling.

This three-study method approach was used to supplement the existing Step II A-B analysis. The data collected supplied a site-specific basis for identifying risks to ecological resources present and will assist in the identification and selection of specific remedial action alternatives for the site.

Benthic samples were collected from 7 locations on March 29th and 30th, 2004. Sediment for toxicity and supplemental analyses (TAL metals, PAH, TOC and acid volatile sulfide and soluble extractable metals) were collected March 30th through April 3rd, 2004. Surface water samples for TAL metals and toxicity analyses were collected on March 29, 2004.

Sample locations were surveyed using a Trimble Pro XRS GPS. GPS data was collected March 25th through April 3rd, 2004. GPS data is presented on Figure 2-1.

2.7 INVESTIGATION DERIVED WASTE

Prior to the start of investigative work related to the supplemental RI/FS, investigation derived waste (IDW) from the 1998 investigation was removed from the site (July 25, 2003). IDW resulting from work performed as part of the supplemental RI/FS work was stored on site in 55-gallon steel drums. Following the completion of supplemental RI/FS investigative activities, a second IDW removal event occurred (May 3, 2004). All waste removal was performed by ONYX Environmental under the supervision of TtFW personnel.

BCLP02795

BCLP02796

3.0 PHYSICAL RESULTS OF INVESTIGATION

Topography is fairly steep throughout the 0.5-mile radius from the site. Elevations range from 300 to 600 feet above mean sea level (MSL). On the former Magna Metals site, topography ranges from 360 feet MSL along the eastern site boundary, to 320 feet MSL along the western site boundary.

Stormwater drainage flows towards the west, following site topography, and drains into an unnamed tributary of Furnace Brook and a large wetland area northwest of the site. The unnamed tributary flows north to Furnace Brook, which it joins approximately 150 feet northwest of the Magna Metals Site boundary. Furnace Brook, a Class C stream, flows south/southwest through the wetland area and discharges into a pond located approximately 250 feet downgradient (west) of the site. The wetlands are not classified as New York State regulated wetlands. Based on the homeowner survey (Section 2.2), there are no drinking water aquifers in the vicinity of the site.

3.1 SITE GEOLOGY

The primary geologic characteristics of the subsurface conditions at the site and surrounding area consists primarily of a sandy to silty sand overburden unit, approximately 2 to 18 feet thick, overlying Hornblende bedrock, which is a associated with the New England Upland geologic unit. Figure 3-1 presents Cross-Section A-A', which shows the relationship of the units. The transect of Cross Section A-A' is depicted on Figure 2-1.

In the leach pit area, it is presumed that much of the overburden material is fill resulting from the installation of the leach pits. Based on boring logs (Appendix D), it is inferred that the fill material extends at least as deep as the bottoms of the leach pits. This depth appears to range from approximately 7 to 10 feet bgs across the site. Hager-Richter's geophysical report indicated areas on the site of apparent conductive anomalies as well as areas of buried metal. Excavation efforts in the leach pit area confirmed the presence of buried debris consisting mostly metal lamp parts and some pieces of lamp glass and other lamp associated debris. A photograph of the lamp debris uncovered is provided as photo 9 in Appendix C.

Bedrock was encountered at depths of 2 to 18 feet bgs at the site. The bedrock was found to be generally hard with fresh weathering. Rock quality designations (RQD's) of the bedrock ranged from 47% to 100%. At the MW-07 location, a fracture zone was present in the bedrock at 9 to 15 feet bgs.

3.2 SITE HYDROGEOLOGY

Overburden groundwater exists in the form of a very shallow water bearing unit (i.e., typically less than five feet in thickness). Based on water level measurements collected on March 30, 2004 (Table 2-2), overburden groundwater elevations ranged from 311.06 ft msl (MW-08) to 361.09 ft msl (MW-01). Overburden groundwater flow direction is to the west toward the unnamed tributary, the wetland area, and the confluence of the unnamed tributary and Furnace Brook. Overburden groundwater likely discharges to the unnamed tributary, Furnace Brook, and

the local wetlands. Figure 3-2 displays groundwater flow as interpreted from the March 30, 2004 data. Based on Figure 3-2, the hydraulic gradient in the overburden between the site and the unnamed tributary and wetland area is approximately 0.1 ft/ft.

Horizontal groundwater flow in the bedrock can not be characterized. Bedrock groundwater elevations ranged from 324.71 ft msl (MW-04D) to 326.25 ft msl (MW-07). Based on the March 30, 2004 groundwater data collected from monitoring wells MW-04 and MW-04D, there is a slightly upward vertical hydraulic gradient between the bedrock and overburden water bearing units.

3.3 CROSS SECTION

Cross section (A-A') (Figure 3-1) extends from the leach pit area, through the wetland area, and to Furnace Brook. The cross-section was prepared to depict the relationship of the fill, native overburden, and bedrock, to the potential source area (the leach pit area) and to potential environmental receptors (wetlands, Furnace Brook, and the unnamed tributary). Cross Section A-A' runs approximately perpendicular to groundwater and topographic contour lines and therefore roughly parallels the groundwater flow and surface water runoff flow directions. The topography of the native soil roughly mimics the topography of the underlying bedrock, with the relief of the surface topography having been enhanced in the Leach Pit Area with the addition of fill to cover the leach pits. Surface runoff follows the dip of the land surface and runs from the leach pit area into the wetland area. Overburden groundwater is not depicted in the vicintiy of MW-06 because this well was dry during groundwater sampling. However, water table groundwater flow, whether in the overburden or bedrock, likely discharges to the wetland area and eventually to Furnace Brook and the unnamed tributary.

BCLP02797

BCLP02798

4.0 NATURE AND EXTENT OF CONTAMINATION

The Magna Metals site investigation was a multimedia environmental sampling and analysis program which included the collection and analysis of septic tank/leach pit sludge and soil samples, surface water and sediment samples, surface soil samples, and groundwater samples to determine the presence, nature and extent of contamination at the site.

Samples were submitted to Chemtech Environmental Laboratories of Mountainside, New Jersey for laboratory analysis of the various chemical parameters. The data generated by the laboratory was validated by a TtFW chemist familiar with the analyses and certified by US Environmental Protection Agency (EPA) Region II personnel to perform organic and inorganic data validation. Two data usability summary reports (DUSRs) were produced during the data validation process and are provided as Appendix G. One DUSR discusses the surface soil, subsurface soil, sludge, and groundwater sample analytical data. The second DUSR discusses the surface water and sediment analytical data. Analytical results summary sheets for data packages generated during the Supplemental RI are presented in Appendix H.

The samples were analyzed by methods stated in the New York State Department of Environmental Conservation (NYSDEC)-Analytical Services Protocol (ASP), and the laboratory program included the following analyses:

- TCL VOCs;
- TCL SVOCs;
- TCL Pesticides and PCBs;
- TAL Metals;
- Cyanide; and
- Total Organic Carbon.

The tabulated results of the sampling investigation are summarized by environmental medium as Tables 4-1 through 4-5.

Data qualifiers are noted throughout the text and tables to indicate concentrations which are undetected (designated with a "U", "ND" or "--"); estimated ("J"); and/or rejected ("R"). A "B" found in the organics data indicates that the compound was also detected in an associated laboratory blank, possibly showing inter-laboratory contamination. In contrast, a "B" found in the inorganics data indicates that the element was detected above the instrument detection limit but below the method-specific and matrix-specific quantitation limit.

4.1 APPLICABLE CRITERIA LEVELS

The analytical results were compared to NYSDEC standards and/or guidance values to assist in the interpretation of data results.

Leach pit sludge and soil samples, refuse area sample and surface soil concentrations, discussed in Sections 4.2, 4.3 and 4.5 respectively, were reviewed against the recommended soil clean-up

objectives given in Appendix A of the NYSDEC Division Technical and Administrative Guidance Memorandum (TAGM): Determination of Soil Clean-up Objectives and Clean-up Levels (January 1994).

Groundwater analytical data, discussed in Section 4.4, were reviewed against the standards and guidance values given in NYSDEC Ambient Water Quality Standards and Guidance Values, June 1998, updated in January 1999 and April 2000.

To assist in the comparison of results, compound concentrations on the summary result tables in the following subsections and on Tables 4-1 through 4-5 that are above applicable criteria levels are highlighted with shading. In addition, Figures 4-1 through 4-3 present the distribution of contaminants detected during the site investigation at concentrations exceeding the applicable criteria levels.

4.2 LEACH PIT ANALYTICAL RESULTS

Samples were collected from eleven leach pits at the Magna Metals Site. The eleven pits sampled were the southern septic tank (ST01), the northern septic tank (ST02), leach pit LP-02, LP-03, LP-05, LP-06, LP-06A, LP-07, LP-08, LP-09 and LP-0A. Samples were analyzed for TAL metals, TCL VOCs, TCL SVOCs, TCL pesticides and PCBs, TOC and cyanide. The results of these analyses are discussed below. Analytical results are presented in Table 4-1, and the distribution of exceedances is presented in Figure 4-1.

4.2.1 Leach Pit Inorganics Results

Of the soil/sludge samples collected from the eleven pits, all had metals results that exceeded the NYSDEC Recommended Soil Clean-up Criteria. Generally speaking, the samples collected below the sludge cake material had fewer exceedances and/or metals concentrations that were significantly lower than those of the overlying sludge material sampled from the same pit. The results of the soil samples were still in exceedance by many magnitudes. Depending on the analyte, metals results exceeded the NYSDEC Recommended Soil Clean-up Criteria by factors ranging from approximately 1.1 (aluminum) to 4246 (nickel).

4.2.2 Leach Pit Volatiles Results

One leach pit sample (ST-01) had a volatiles exceedance. This sample exceeded the NYSDEC Recommended Clean-up Criteria for m/p-Xylenes (criteria: 1200 ug/kg; sample: 1600 ug/kg).

4.2.3 Leach Pit Semi-Volatiles Results

Six of the leach pit samples (LP-02, LP-05, LP-07, LP-09, LP-0A, ST-02) had semi-volatile results that exceeded the NYSDEC Recommended Soil Clean-up Criteria. Of these six samples, three samples were of the sludge material, and the underlying soil samples from the corresponding leach pit had no semi-volatile exceedances. The exceedance samples collected from LP-0A and LP-09 contained both sludge cake material and underlying soil, as the sludge layer was very thin in these leach pits. A sample of the underlying soils from the northern septic tank (ST-02) was found to have semi-volatile results exceeding the NYSDEC Recommended

BCLP02799

Soil Clean-up Criteria. This sample was the only soil sample of underlying soils to contain semi-volatile compounds that were above the NYSDEC Recommended Soil Clean-up Criteria. Depending on the analyte, semi-volatile results for leach pit samples exceeded the NYSDEC Recommended Soil Clean-up Criteria by factors ranging from approximately 1.1 to 31.1.

4.2.4 Leach Pit PCBs and Pesticides Results

Of the leach pit samples, no analytical results for PCBs or pesticides exceeeded the NYSDEC Recommended Soil Clean-up Criteria.

4.3 REFUSE AREA ANALYTICAL RESULTS

One soil samples was collected from the apparent refuse area. The soil sample (RA) was collected from a depth of 2.5 – 3.0' below ground surface (bgs) and was analyzed for TCL VOCs, TCL SVOCs, TCL pesticides and PCBs, TAL metals, cyanide, and TOC. Analytical results are presented in Table 4-1, and the distribution of exceedances is presented in Figure 4-1.

The refuse area soil sample had no volatile, semi-volatile, pesticide or PCB results that exceeded the NYSDEC Recommended Soil Clean-up Criteria.

Soil sampled from the former refuse area had metals results that were in excess of the NYSDEC Soil Clean-up Criteria. Depending on the analyte, metals results in the refuse area soil sample exceeded the NYSDEC Recommended Soil Clean-up Criteria by factors ranging from approximately 1.4 to 117.

4.4 GROUNDWATER ANALYTICAL RESULTS

Seven of the nine monitoring wells at the Magna Metals Site were sampled during the fall of 2003. Five of the monitoring wells were over burden wells (MW-01, MW-02, MW-04, MW-05, and MW-08) and two were bedrock monitoring wells (MW-04D and MW-07). All of the groundwater samples were analyzed for TCL VOCs, TAL metals and cyanide. Samples from MW-01 and MW-04 were additionally analyzed for dissolved metals due to the turbidity of the sample. Table 4-2 provides a summary of the groundwater sample results, and the distribution of contaminant exceedances in groundwater samples is presented in Figure 4-2.

4.4.1 Groundwater Volatiles Results

Samples from three of the monitoring wells (MW-02, MW-04 and MW-04D) had VOC results that exceeded the NYSDEC Groundwater Quality Standards. The volatile compounds in excess included tetrachloroethene, trichloroethene and cis-1,2-dichloroethene. Depending on the analyte, volatile results in the groundwater samples exceeded the NYSDEC Groundwater Quality Standards by factors ranging from approximately 1.1 to 182.

4.4.2 Groundwater Inorganics Results

Samples all seven monitoring wells and the duplicate sample had metals results that exceeded the NYSDEC Groundwater Quality Standards. Groundwater sampled from MW-04 also had

BCLP02800

dissolved metals results that exceeded NYSDEC standards. Depending on the analyte, metals results in the groundwater samples exceeded the NYSDEC Groundwater Quality Standards by factors ranging from approximately 1.1 to 47.7.

4.5 SURFACE SOIL ANALYTICAL RESULTS

Ten surface soil samples (SS-06 through SS-15) were collected at the Magna Metals Site. Surface soil samples were collected from a depth of 0 to 2–inches bgs and were analyzed for TCL VOCs, TAL metals and cyanide. A summary of the surface soil results is provided in Table 4-3, and the distribution of exceedences in surface soil samples is presented in Figure 4-1.

4.5.1 Surface Soil Volatiles Results

None of the surface soil samples had volatile results that exceeded the NYSDEC Recommended Soil Clean-up Criteria.

4.5.2 Surface Soil Inorganics Results

Seven of the surface soil samples collected from the Magna Metals Site had metals results that exceeded the NYSDEC Recommended Soil Clean-up Criteria. Depending on the analyte, metals results in the surface soil samples exceeded the criteria by factors ranging from approximately 1.1 to 75.5.

4.6 SURFACE WATER ANALYTICAL RESULTS

Ten surface water samples and one duplicate sample were collected and analyzed for TAL metals. All of the samples were found to have metal concentrations that were in excess of the NYSDEC Water Quality Standards for a Class C Stream. Metals found to be above criteria were aluminum, cobalt, copper, iron, nickel, selenium, and zinc. Results exceeded the applicable criteria by factors ranging from approximately 1.1 to 48 (Table 4-4). The distribution of exceedances in surface water samples is presented in Figure 4-3.

4.7 SEDIMENT ANALYTICAL RESULTS

Fourteen sediment samples and one duplicate sample were collected and analyzed for polyaromatic hydrocarbons (PAHs) and TAL metals. PAH analytical results for sediment samples are presented in Table 4-5A, and metals analytical results for sediment samples are presented in Table 4-5B. The distribution of exceedances in sediment samples is presented in Figure 4-3.

4.7.1 Sediment PAH Results

Six of the fourteen samples contained PAH compounds that were in excess of the NYSDEC sediment criteria. The distribution of PAHs in sediments is presented in Figure 4-3. Depending

BCLP02801

on the analyte, PAH results in sediments exceeded applicable criteria by factors ranging from 1.1 to 84.

PAHs are not typically associated with metals plating processes such as those conducted at the former Magna Metals Site and their presence in sediments is likely not a result of former site activities. PAHs were not detected in sediment samples SD-13 and SD-14, collected upgradient of the confluence of Furnace Brook and the unnamed tributary. However PAHs were detected in sediment samples collected in the unnamed tributary and downgradient of the confluence of Furnace Brook and the unnamed tributary, including sediment sample SD-17 which was collected upgradient of the site. Therefore, it is likely that PAHs detected in sediment samples have been transported by stormwater runoff from Furnace Dock Road, which crosses the unnamed tributary upgradient of sediment sample location SD-17.

4.7.2 Sediment Metals Results

Metals results exceeded criteria in thirteen of the fourteen sediment samples (Table 4-5B). Metals were not detected in the upgradient sample SD-17 collected in the unnamed tributary. Only one metal, nickel, was detected at approximately 1.26 times the criterion in the sediment sample SD-13, collected upgradient of the site in Furnace Brook. Metals found to be above criteria were chromium, copper, lead, nickle and zinc. The distribution of metals exceedances in sediment samples is presented in Figure 4-3. Depending on the analyte, metals results exceeded criteria by factors ranging from approximately 1.1 to 9.5.

BCLP02802

5.0 STEP IIC FISH AND WILDLIFE IMPACT ANALYSIS

The results of the Step IIC of the Fish and Wildlife Impact Analysis (FWIA) are discussed as part of the updated FWIA document presented in Appendix I.

BCLP02803

6.0 SUMMARY AND CONCLUSIONS

6.1 RELATIVE COMPARISON OF DATA TO PHASE ONE DATA

In general, concentrations and distributions of contaminant compounds and analytes detected during the Supplemental RI are consistent with contaminant concentrations and distributions detected during Phase I of the RI.

6.1.1 Volatile Organic Compounds

Similar to the Phase I findings, xylenes were detected in the sludge contained in pit ST-01 and TCE was detected in the groundwater sample collected from MW-04. During the Supplemental RI, xylenes were also detected at low concentrations in sludge or soils within or below leach pits, and TCE was detected in the groundwater sample collected from monitoring well MW-04D. Except for pit ST-01, leach pit sludge and soil were not sampled, nor was bedrock groundwater sampled, during Phase I.

6.1.2 Semi-Volatile Organic Compounds

In both the Phase I and the Supplemental RI, PAH compounds were detected in several downgradient sediment samples. These PAH compounds are not believed to be site related, and are more likely result from storm water runoff from Furnace Dock Road and Cross Road. PAHs were also detected in leach pit sludge and soil samples during the Supplemental RI. This media was not sampled, except in pit ST-01, during Phase I. PAH compounds were detected in ST-01 sludge during Phase I.

6.1.3 Pesticide and PCB Compounds

Pesticides and PCBs were detected during Phase I in downgradient surface soils and sediments of the unnamed tributary. These compounds were not analyzed in surface soil and sediment samples during the Supplemental RI, and are not believed to be related to former site activities. Pesticides and PCBs were not detected in leach pit sludge or soil samples during the Supplemental RI; however, pesticides and PCBs were detected in the sample of sludge from ST-01 during Phase I.

6.1.4 Inorganic Analytes

Phase I and Supplemental RI analytical results indicate that all media sampled are affected by inorganic contaminants of concern at concentrations above soil cleanup criteria. In particular, chromium, copper, mercury, nickel, and zinc are potentially site related analytes that were detected at concentrations exceeding applicable criteria during both the Phase I and the Supplemental RI.

6.2 ADDITIONAL SUPPLEMENTAL RI (PHASE TWO) SUMMARY AND CONCLUSIONS

- Thirteen leach pits/septic pits have been discovered at the Magna Metals site.

BCLP02804

- There appear to have been two phases of leach pit construction at the site. The first and older set of leach pits is constructed of concrete cinder blocks with an apparently soil or gravel bottom. Leach pits of this construction are ST-02, LP-02, LP-03, LP-04, LP-05, and LP-06A.

  The second and newer set of leach pits is constructed of prefabricated concrete cylinders with perforated sides and apparently soil or gravel bottoms. Leach pits of this construction are LP-06, LP-07, LP-08, LP-0A, and LP-09. It appears that the pipe exiting from LP-06A was abandoned and additional fill material added to the site prior to the construction of the newer set of pits. The newer set of leach pits ties into the older set of pits at leach pit LP-05.

- Sludge or sludge cakes are still present in twelve of the thirteen pits at the site. The pits still containing sludge or sludge cake are ST-02, LP-02, LP-03, LP-04, LP-05, LP-06, LP-06A, LP-07, LP-08, LP-0A, and LP-09.

- Based on observations and investigations in the field, fluids flowed from ST-01 to ST-02 to LP-02 to LP-03 to LP-04 to LP-05 to LP-06A. After abandonment of the pipe leading from LP-06A, flow proceeded from LP-05 to LP-06, to LP-07, to LP-08, to LP-0A to LP-09. LP-09 appears to be the end of the leach pit line, as no pipe exits this pit.

- Based on inorganic analytical results (particularly copper) for the surface water sample collected at location SW-22, groundwater samples collected from monitoring wells MW-04 and MW-04D, and surface soil samples collected downgradient of the leach pit area and the former Magna Metals building (SS-06, SS-07, SS-08, SS-09, SS-10, SS-11, and SS-12) it appears that the wetlands east of Furnace Brook and the unnamed tributary may be impacted by contaminated groundwater or surface runoff originating in the vicinity of the leach pit area and site building.

- Impacts to pelagic and benthic aquatic life were observed in indigenous and laboratory based analyses. The primary environmental media of concern are surface waters and sediments of Furnace Brook, its unnamed tributary, and the palustrine wetlands associated with the site.

BCLP02805

BCLP02806

LEGEND

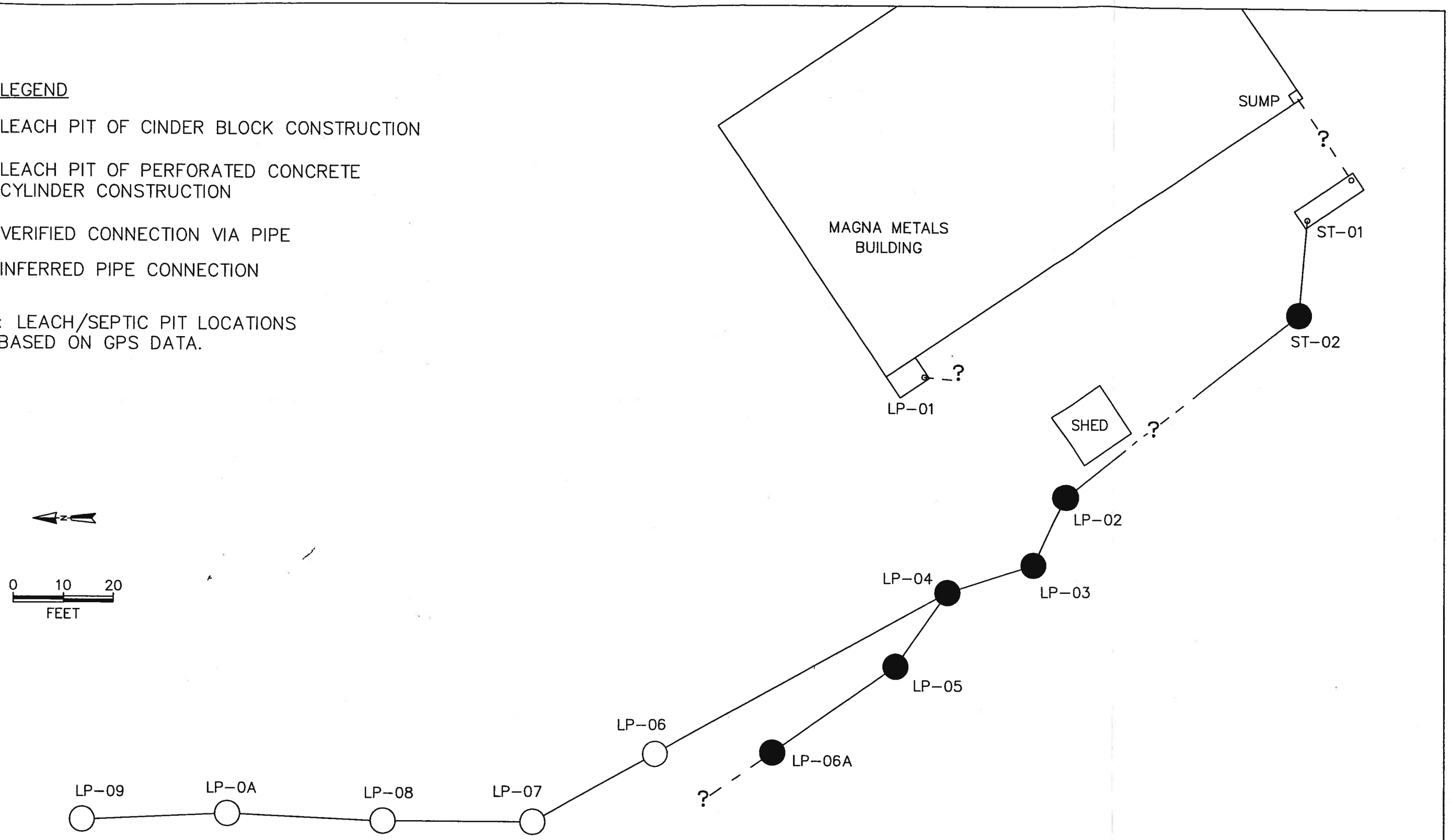
● LEACH PIT OF CINDER BLOCK CONSTRUCTION

○ LEACH PIT OF PERFORATED CONCRETE CYLINDER CONSTRUCTION

——— VERIFIED CONNECTION VIA PIPE

- -?- - INFERRED PIPE CONNECTION

NOTE: LEACH/SEPTIC PIT LOCATIONS ARE BASED ON GPS DATA.

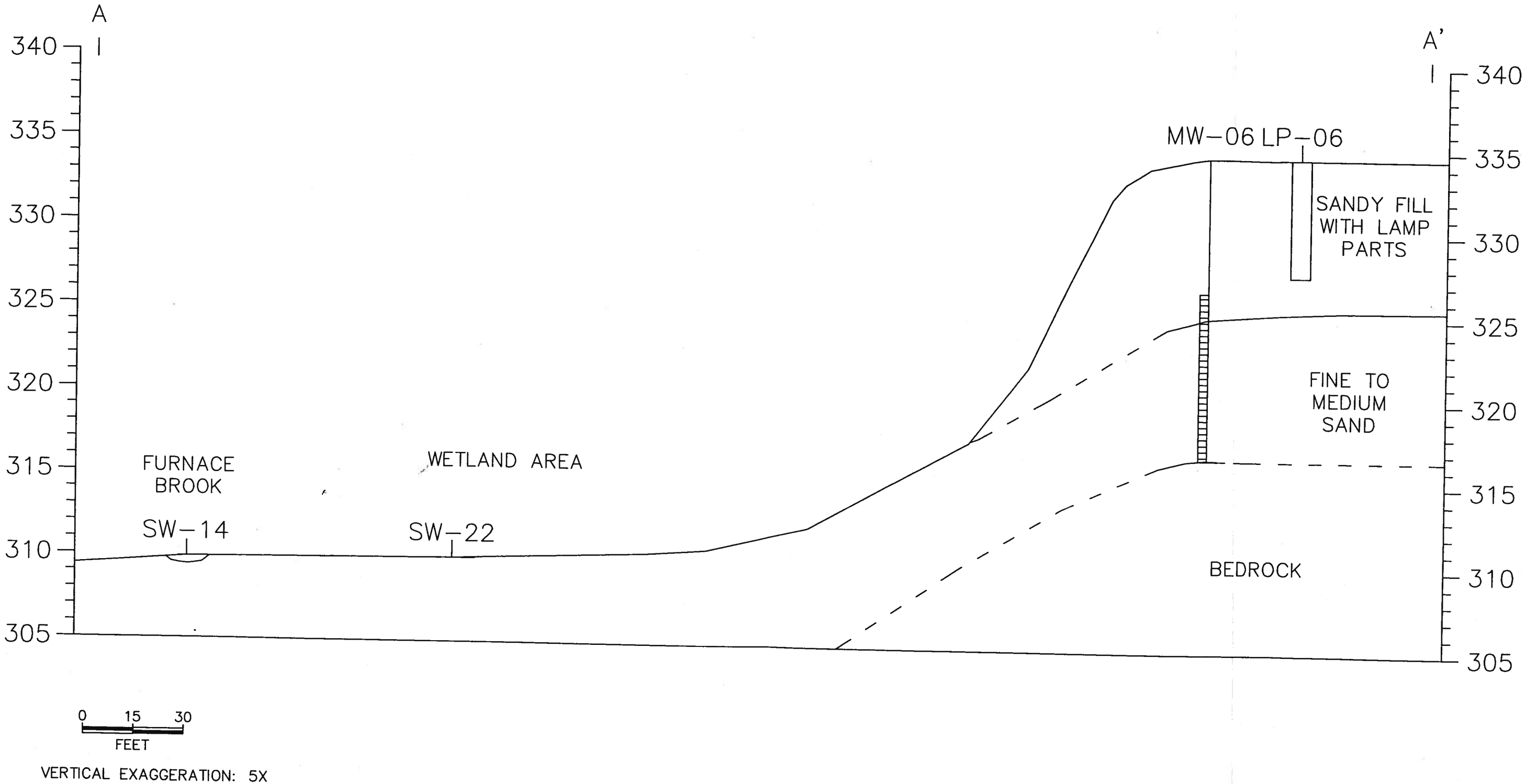


TETRA TECH FW, INC.

TITLE:
Leach/Septic Pit Location Map
Magna Metals
Cortlandt, New York

DWN.: CTS	DATE: 06/22/04	PROJECT NO.: 1172.0003	
CHKD:	REV.: 0	FIGURE NO.: 2-2	
DES.: DPC	APPD:		

N:GIS\GISKEY\GISPROJ31\MAGNA METALS\FIGURE 2-2 062204.DWG



TETRA TECH FW, INC.

TITLE:
Cross-Section A - A'
Magna Metals
Cortlandt, New York

DWN.: CTS	DATE: 06/28/04	PROJECT NO.: 1172.0003	
CHKD:	REV.: 0		
DES.: DPC	APPD:	FIGURE NO.: 3-1	

N:\GIS\GISKEY\GISPROJ31\MAGNA METALS\FIGURE 3-1 062804.DWG

BCLP02807

Table 2-1
Leach/Septic Pit IDs, Sludge Thickness, and Construction Details
Magna Metals - Cortlandt, New York

Current Pit ID	Previous Pit ID	Approximate Depth to Sludge (feet)*	Approximate Depth to Soil (feet)*	Approximate Sludge Thickness (feet)	Leach Pit Construction
ST-01	Pit A	6	-	NE	Rectangular shape with concrete walls and bottom
ST-02	Pit B	7	7.6	0.6	Cinderblock
LP-01	Pit G	NE	NE	NE	Rectangular shape, concrete walls with internal baffles
LP-02	Pit C	7	7.75	0.75	Cinderblock
LP-03	Pit D	7	8.3	1.3	Cinderblock
LP-04	Pit E	-	-	-	Cinderblock
LP-05	Pit F	7	8	1.0	Cinderblock
LP-06	**	7	7.3	0.3	Pre-fabricated
LP-06A	**	7	8	1.0	Cinderblock
LP-07	**	7	7.1	0.1	Pre-fabricated
LP-08	**	7	7.02	0.02	Pre-fabricated
LP-09	**	7	NE	<0.02	Pre-fabricated
LP-0A	**	7	NE	<0.02	Pre-fabricated

* Depths measured in feet below pit opening
** Leach pit discovered during 2004 field effort.
- Not able to measure
NE - Not estimated
Cinderblock - Cylindrical shape with concrete cinderblock construction
Pre-fabricated - Cylindrical, pre-fabricated concrete construction with 1" diameter perforations along sidewalls
All pits except ST-01and LP-01 are approximately 6' in diameter.
LP-04 is filled with debris, depth could not be measured

Table 2-2
Groundwater and Surface Water Elevations
March 30, 2004
Magna Metals - Cortlandt, New York

Location	Northing (feet)	Easting (feet)	Measuring Point Elevation (feet msl)	Depth to Water (feet)	Water Elevation (feet msl)
MW-01	889547.12	665389.57	367.94	6.85	361.09
MW-02	889760.21	665127.51	346.57	14.81	331.76
MW-03	889806.63	665090.97	341.92	16.67	325.25
MW-04D	889832.07	665073.80	339.61	14.9	324.71
MW-04	889840.26	665070.73	338.03	13.47	324.56
MW-05	890191.50	665491.01	343.40	11.71	331.69
MW-06	889901.83	665025.92	336.97	16.14	320.83
MW-07	889316.93	664899.66	334.73	8.48	326.25
MW-08	889301.20	664474.00	317.54	6.48	311.06
SWEL-1	889844.39	664863.44	309.86	0.00	309.86
SWEL-2	889797.07	664799.56	309.83	0.00	309.83
SWEL-3	890262.07	664686.03	309.97	0.00	309.97
SWEL-4	890099.19	664725.83	309.93	0.00	309.93
SWEL-5	889492.49	665113.99	316.31	0.00	316.31

msl - Mean Sea Level
Horizontal Datum North American Datum of 1983 (NAD83 New York State Plane Coordinates Zone 3101)
Vertical Datum is North American Vertical Datum of 1988 (NAVD88)

Tabl
Leach Pit/Refuse Area Samples
Compounds Exceeding Soil Cleanup Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date** **Sample Depth (ft. bgs)**		NYSDEC Recommended Soil Cleanup Criteria	LP-02 MM-LP02-073003 7/30/2003 10	LP-02 MM-LP02-08260310.010 8/26/2003 10.75	LP-03 MM-LP03-073003 7/30/2003 7.75	LP-03 MM-LP13-073003 Duplicate of MM-LP03-073003
Constituent						
m/p-Xylenes	(ug/kg)	1200	9UJ	3U	9.3UJ	11UJ
Benzo(a)anthracene	(ug/kg)	224	220J	35UJ	110UJ	130UJ
Benzo(a)pyrene	(ug/kg)	61	[250]J	53UJ	160UJ	190UJ
Benzo(b)fluoranthene	(ug/kg)	1100	270J	35UJ	110UJ	130UJ
Chrysene	(ug/kg)	400	220J	56UJ	180UJ	200UJ
Dibenz(a,h)anthracene	(ug/kg)	14	160UJ	53UJ	170UJ	190UJ
Aluminum	(mg/kg)	5040*	[5700]J	4450	[5340]J	4500J
Arsenic	(mg/kg)	7.5	[627]J	[9.7]	[947]J	[1190]J
Barium	(mg/kg)	300	124J	29.5	199J	222J
Beryllium	(mg/kg)	0.32*	0.14J	0.13J	[0.6]J	[0.43]J
Cadmium	(mg/kg)	1	[13.7]J	0.05U	[16.2]J	[19.2]J
Calcium	(mg/kg)	1690*	[9920]J	1380	[11000]J	[13600]J
Chromium	(mg/kg)	10	[2690]J	[34.1]J	[3980]J	[4070]J
Cobalt	(mg/kg)	30	[62.3]J	3.4J	[74.5]J	[86.6]J
Copper	(mg/kg)	25	[33500]J	[203]	[27200]J	[31300]J
Iron	(mg/kg)	10000*	[22500]J	5880	[32000]J	[35000]J
Lead	(mg/kg)	3.7*	[649]J	[6.2]	[849]J	[1030]J
Magnesium	(mg/kg)	2100*	[2910]J	1570	[4210]J	[4950]J
Manganese	(mg/kg)	250*	[610]J	83J	[713]J	[864]J
Nickel	(mg/kg)	15*	[38200]J	[226]	[53800]J	[62900]J
Potassium	(mg/kg)	864*	580J	451J	463J	405J
Selenium	(mg/kg)	2	[473]J	[13]J	[1120]J	[1410]J
Sodium	(mg/kg)	86.8*	[9060]J	[124]J	[6980]J	[8690]J
Thallium	(mg/kg)	ND*	1.8UJ	0.62U	2UJ	2.2UJ
Zinc	(mg/kg)	23.3*	[37300]J	[235]	[28900]J	[35600]J
Mercury	(mg/kg)	0.1	[0.92]J	0.01U	[0.75]J	[1.1]J

Notes:
U - Non-detect
J - Estimated
D - Dilution
R - Rejected
Shading & [ ] - Indicates exceedance of criteria.
* - Criteria is based on the maximum site background concentration from background location MW-1 as stated in the November 1998 RI/FS.

Tabl :

Leach Pit/Refuse Area Samples
Compounds Exceeding Soil Cleanup Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date** **Sample Depth (ft. bgs)**		NYSDEC Recommended Soil Cleanup Criteria	LP-03 MM-LP03-0905031.3-2 9/5/2003 9	LP-05 MM-LP05-073003 7/30/2003 8.5	LP-05 MM-LP05-0905031.0-1 9/5/2003 8.7	LP-06 MM-LP06-0905030.3-0 9/5/2003 7.8
Constituent						
m/p-Xylenes	(ug/kg)	1200	3.8U	3.7U	2.9U	6.8UJ
Benzo(a)anthracene	(ug/kg)	224	57J	[510]J	35U	80UJ
Benzo(a)pyrene	(ug/kg)	61	67U	[500]J	52U	120UJ
Benzo(b)fluoranthene	(ug/kg)	1100	44U	550J	35U	80UJ
Chrysene	(ug/kg)	400	71U	[540]J	55U	130UJ
Dibenz(a,h)anthracene	(ug/kg)	14	67U	66UJ	52U	120UJ
Aluminum	(mg/kg)	5040*	[14700]	[9670]	4560	[7110]J
Arsenic	(mg/kg)	7.5	[103]	[37.8]	[19.4]	[376]J
Barium	(mg/kg)	300	142	104	50.4	223J
Beryllium	(mg/kg)	0.32*	[0.43]J	[0.35]J	0.20J	0.31UJ
Cadmium	(mg/kg)	1	0.7	[1.2]	0.13U	[1.3]J
Calcium	(mg/kg)	1690*	[3000]	[3620]	[3190]	[2840]J
Chromium	(mg/kg)	10	0.25R	[535]	0.20R	0.45R
Cobalt	(mg/kg)	30	0.32R	11.1	0.25R	0.57R
Copper	(mg/kg)	25	[987]	[246]	[152]	[34700]JD
Iron	(mg/kg)	10000*	[18500]	[12400]	[20000]	[22200]J
Lead	(mg/kg)	3.7*	[67.2]	[66]	[10.5]	[858]J
Magnesium	(mg/kg)	2100*	[5380]	[3150]	1770	[3560]J
Manganese	(mg/kg)	250*	229	[274]	206	[262]J
Nickel	(mg/kg)	15*	[2380]	[2070]	[340]	[63700]JD
Potassium	(mg/kg)	864*	[1430]J	654J	589J	[1050]J
Selenium	(mg/kg)	2	[184]	[16.9]	[29.8]	[178]J
Sodium	(mg/kg)	86.8*	[574]	[699]J	[111]J	[1520]J
Thallium	(mg/kg)	ND*	0.41U	0.77U	0.33U	[23.6]J
Zinc	(mg/kg)	23.3*	[4940]	[2240]J	[693]	[15900]J
Mercury	(mg/kg)	0.1	0.1	[0.13]J	0.02	0.02UJ

Notes:
U - Non-detect
J - Estimated
D - Dilution
R - Rejected
Shading & [ ] - Indicates exceedance of criteria.
* - Criteria is based on the maximum site background concentration from background location MW-1 as stated in the November 1998 RI/FS.

Tabl

Leach Pit/Refuse Area Samples
Compounds Exceeding Soil Cleanup Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date** **Sample Depth (ft. bgs)**		NYSDEC Recommended Soil Cleanup Criteria	LP-06 MM-LP06-0905030-0.3 9/5/2003 7.3	LP-06A MM-LP06A-101003 10/10/2003 11	LP-06A MM-LP06A-1010032-2.5 10/10/2003 11.5	LP-07 MM-LP07-0905030-0.1 9/5/2003 7.1
Constituent						
m/p-Xylenes	(ug/kg)	1200	5.4U	3.5U	5.5U	24
Benzo(a)anthracene	(ug/kg)	224	180J	51J	65U	[470]
Benzo(a)pyrene	(ug/kg)	61	94U	62U	97U	[360]J
Benzo(b)fluoranthene	(ug/kg)	1100	210J	62J	65U	730
Chrysene	(ug/kg)	400	220J	66U	100U	[620]
Dibenz(a,h)anthracene	(ug/kg)	14	95U	62U	98U	[89]J
Aluminum	(mg/kg)	5040*	[10600]	[10500]	[8730]	3270
Arsenic	(mg/kg)	7.5	[10.3]	[29.3]	[609]	[79.1]
Barium	(mg/kg)	300	152	67.3	111	61.8
Beryllium	(mg/kg)	0.32*	[0.68]J	[0.37]J	0.26U	0.15U
Cadmium	(mg/kg)	1	0.23U	0.15U	[7.2]	0.14U
Calcium	(mg/kg)	1690*	[16800]	[3950]	[3550]	[1990]
Chromium	(mg/kg)	10	0.37R	[440]	[5050]	0.22R
Cobalt	(mg/kg)	30	5.8J	16.3	[340]	0.28R
Copper	(mg/kg)	25	[483]	[3580]	[15000]D	[9710]D
Iron	(mg/kg)	10000*	[18600]	[14100]	[18700]	8260
Lead	(mg/kg)	3.7*	[268]	[39.5]J	[279]J	[197]
Magnesium	(mg/kg)	2100*	[3450]	[3370]	[2870]	1890
Manganese	(mg/kg)	250*	[715]	[330]	[344]	135
Nickel	(mg/kg)	15*	[781]	[2940]	[23200]D	[45600]
Potassium	(mg/kg)	864*	[1640]J	607J	402J	567J
Selenium	(mg/kg)	2	[3.1]	[80.1]	[7.3]	[53.5]
Sodium	(mg/kg)	86.8*	[2750]	[303]J	[964]J	[544]J
Thallium	(mg/kg)	ND*	0.60U	0.39U	[8.1]	[16.9]
Zinc	(mg/kg)	23.3*	[386]	[2100]J	[8570]J	[7020]
Mercury	(mg/kg)	0.1	[0.17]	[0.15]	[0.50]	0.09

Notes:
U - Non-detect
J - Estimated
D - Dilution
R - Rejected
Shading & [ ] - Indicates exceedance of criteria.
* - Criteria is based on the maximum site background concentration from background location MW-1 as stated in the November 1998 RI/FS.

Tabl

Leach Pit/Refuse Area Samples
Compounds Exceeding Soil Cleanup Criteria
Magna Metals - Cortlandt, New York

Site Sample ID Sample Date Sample Depth (ft. bgs)		NYSDEC Recommended Soil Cleanup Criteria	LP-07 MM-LP07-0905030.1-0 9/5/2003 7.5	LP-08 MM-LP08-0905030-0.3 9/5/2003 7.3	LP-08 MM-LP18-0905030-0.3 Duplicate of MM-LP08-0905030-0.3	LP-08 MM-LP08-0905030.3-0 9/5/2003 7.6
Constituent						
m/p-Xylenes	(ug/kg)	1200	3.0U	3.1U	3.1U	5.5J
Benzo(a)anthracene	(ug/kg)	224	44J	36U	37U	36U
Benzo(a)pyrene	(ug/kg)	61	54U	55U	55U	54U
Benzo(b)fluoranthene	(ug/kg)	1100	44J	36U	37U	36U
Chrysene	(ug/kg)	400	57U	58U	58U	57U
Dibenz(a,h)anthracene	(ug/kg)	14	54U	55U	55U	54U
Aluminum	(mg/kg)	5040*	[15300]	[5110]	4080	3760
Arsenic	(mg/kg)	7.5	[16.7]	[8.6]	[7.6]	3.8
Barium	(mg/kg)	300	116	26.7	21.9J	20.1J
Beryllium	(mg/kg)	0.32*	[0.46]J	0.20J	0.17J	0.18J
Cadmium	(mg/kg)	1	0.13U	0.13U	0.13U	0.13U
Calcium	(mg/kg)	1690*	[3300]	1460	1310	1200
Chromium	(mg/kg)	10	0.21R	0.21R	0.21R	0.21R
Cobalt	(mg/kg)	30	0.26R	0.27R	5.3J	5.3J
Copper	(mg/kg)	25	[185]	[210]	[214]	[35.3]
Iron	(mg/kg)	10000*	[19500]	7990	6680	6020
Lead	(mg/kg)	3.7*	[22.7]	[15.3]	[19.1]	2.9
Magnesium	(mg/kg)	2100*	[6700]	[2110]	1650	1680
Manganese	(mg/kg)	250*	[280]	97	89.4	97.8
Nickel	(mg/kg)	15*	[2510]	[468]	[399]	[99.3]
Potassium	(mg/kg)	864*	[1260]J	550J	442J	447J
Selenium	(mg/kg)	2	[4.7]	[2.1]	1.5	0.98
Sodium	(mg/kg)	86.8*	[289]J	[118]J	111U	108U
Thallium	(mg/kg)	ND*	0.34U	0.34U	0.35U	0.34U
Zinc	(mg/kg)	23.3*	[962]	[440]	[402]	[220]
Mercury	(mg/kg)	0.1	0.01R	0.01U	0.01U	0.01U

Notes:
U - Non-detect
J - Estimated
D - Dilution
R - Rejected
Shading & [ ] - Indicates exceedance of criteria.
* - Criteria is based on the maximum site background concentration from background location MW-1 as stated in the November 1998 RI/FS.

Tabl

Leach Pit/Refuse Area Samples
Compounds Exceeding Soil Cleanup Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date** **Sample Depth (ft. bgs)**		NYSDEC Recommended Soil Cleanup Criteria	LP-09 MM-LP09-073003 7/30/2003 7.5	LP-0A MM-LP0A-073003 7/30/2003 7.5	RA MM-RA-2.5-3.0-100703 10/7/2003 3	ST-01 MM-ST01-082603 8/26/2003 6
Constituent						
m/p-Xylenes	(ug/kg)	1200	3.4U	3.3U	3.5U	[1600]JD
Benzo(a)anthracene	(ug/kg)	224	65J	[680]J	41U	84UJ
Benzo(a)pyrene	(ug/kg)	61	[68]J	[1900]J	61UJ	130UJ
Benzo(b)fluoranthene	(ug/kg)	1100	81J	[2200]J	41UJ	84UJ
Chrysene	(ug/kg)	400	64UJ	[910]J	65U	130UJ
Dibenz(a,h)anthracene	(ug/kg)	14	60UJ	[350]J	61UJ	130UJ
Aluminum	(mg/kg)	5040*	[10700]	[5890]	[15300]	[7100]J
Arsenic	(mg/kg)	7.5	[16.8]	[15.6]	6.5	[330]J
Barium	(mg/kg)	300	106	49.6	[431]	94.3J
Beryllium	(mg/kg)	0.32*	0.28J	0.16J	0.26J	0.25J
Cadmium	(mg/kg)	1	[1.5]	[1.4]	[1.6]J	[4.2]J
Calcium	(mg/kg)	1690*	[3600]	[1850]	[18200]J	[8360]J
Chromium	(mg/kg)	10	[167]	[142]	[35]	[354]J
Cobalt	(mg/kg)	30	[46.9]	5.9J	8.5	12.8J
Copper	(mg/kg)	25	[388]	[1660]	[2930]	[368]J
Iron	(mg/kg)	10000*	[34000]	[10400]	[30300]	[13300]J
Lead	(mg/kg)	3.7*	[75.4]	[118]	[354]	[208]J
Magnesium	(mg/kg)	2100*	[40400]	[2580]	[3890]J	[2960]J
Manganese	(mg/kg)	250*	[591]	198	[562]	[271]J
Nickel	(mg/kg)	15*	[454]	[158]	[32.1]	[6470]J
Potassium	(mg/kg)	864*	[1060]J	491J	[1470]J	512J
Selenium	(mg/kg)	2	[7.3]	[9.6]	0.51U	[225]J
Sodium	(mg/kg)	86.8*	[432]J	[269]J	[2680]J	[5010]J
Thallium	(mg/kg)	ND*	0.7U	0.69U	0.38U	1.5UJ
Zinc	(mg/kg)	23.3*	[1440]J	[717]J	[833]	[12500]DJ
Mercury	(mg/kg)	0.1	0.03J	0.01UJ	0.06	[0.27]J

Notes:
U - Non-detect
J - Estimated
D - Dilution
R - Rejected
Shading & [ ] - Indicates exceedance of criteria.
* - Criteria is based on the maximum site background concentration from background location MW-1 as stated in the November 1998 RI/FS.

Tabl

Leach Pit/Refuse Area Samples
Compounds Exceeding Soil Cleanup Criteria
Magna Metals - Cortlandt, New York

Site Sample ID Sample Date Sample Depth (ft. bgs)		NYSDEC Recommended Soil Cleanup Criteria	ST-02 MM-ST02-0826030-1 8/26/2003 10	ST-02 MM-ST02-0826031-1.25 8/26/2003 10.25
Constituent				
m/p-Xylenes	(ug/kg)	1200	7.6UJ	3.3U
Benzo(a)anthracene	(ug/kg)	224	89UJ	160J
Benzo(a)pyrene	(ug/kg)	61	130UJ	[110]J
Benzo(b)fluoranthene	(ug/kg)	1100	89UJ	130J
Chrysene	(ug/kg)	400	140UJ	120J
Dibenz(a,h)anthracene	(ug/kg)	14	130UJ	59UJ
Aluminum	(mg/kg)	5040*	[6660]J	[12000]
Arsenic	(mg/kg)	7.5	[767]J	[82.7]
Barium	(mg/kg)	300	108J	203
Beryllium	(mg/kg)	0.32*	0.24J	[0.34]J
Cadmium	(mg/kg)	1	[10.7]J	0.39J
Calcium	(mg/kg)	1690*	[9810]	[9160]
Chromium	(mg/kg)	10	[1690]J	[240]J
Cobalt	(mg/kg)	30	[84.2]J	20.8
Copper	(mg/kg)	25	[8180]J	[593]
Iron	(mg/kg)	10000*	[19500]J	[18400]
Lead	(mg/kg)	3.7*	[325]J	[26.8]
Magnesium	(mg/kg)	2100*	[3290]J	[9770]
Manganese	(mg/kg)	250*	[579]J	[394]J
Nickel	(mg/kg)	15*	[49400]DJ	[1830]
Potassium	(mg/kg)	864*	596J	[2050]J
Selenium	(mg/kg)	2	[565]J	[27.8]J
Sodium	(mg/kg)	86.8*	[11900]J	[906]
Thallium	(mg/kg)	ND*	[2]J	0.69U
Zinc	(mg/kg)	23.3*	[29800]DJ	[1830]
Mercury	(mg/kg)	0.1	[0.37]J	0.01J

Notes:
U - Non-detect
J - Estimated
D - Dilution
R - Rejected
Shading & [ ] - Indicates exceedance of criteria.
* - Criteria is based on the maximum site background concentration from background location MW-1 as stated in the November 1998 RI/FS.

Table 4-2
Groundwater Samples
Compounds Exceeding Groundwater Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date**	NYSDEC Groundwater Quality Standards	MW-01 MM-GWMW01-100603 10/6/2003	MW-02 MM-GWMW02-100803 10/8/2003	MW-04 MM-GWMW04-100803 10/8/2003	MW-04D MM-GWMW04D-100803 10/8/2003	MW-04D MM-GWMW05D-100803 Duplicate of MM-GWMW04D-100803
Constituent						
Tetrachloroethene	5	0.70UJ	0.70U	[13]	[13]	[14]
Trichloroethene	5	0.72U	[9.4]	[910]D	[870]D	[870]D
cis-1,2-Dichloroethene	5	0.62U	0.62U	[7.7]	4.9J	[5.5]
Arsenic	25	4.0U	4.0U	[133]	6.9J	4.8J
Barium	1000	156J	294	[1140]	395	350
Beryllium	3	0.12J	0.10U	[5.6]	0.10U	0.13J
Chromium	50	17.8	11.4	[139]	2.5J	2.0J
Copper	200	8.4J	8.8J	[240]	3.6U	3.6U
Iron	300	[1540]	[346]	[37200]	[3810]	[3510]
Magnesium	35000	14800	[48900]	[38600]	[44300]	[39400]
Manganese	300	45.3	29.4	[6400]	[9500]	[8510]
Nickel	100	18.2J	88.1	[108]	15.8J	13.8J
Selenium	10	1.3U	[30.8]	[131]	[30.4]	[23.9]
Sodium	20000	12700J	[264000]J	[76900]J	[126000]J	[111000]J
Thallium	0.5	5.3U	5.3U	[10.5]	[8.6]J	[8.3]J
Cyanide	200	10U	10U	[555]	74J	27J
Arsenic - Dissolved	25	4.0U	NS	[46.8]	NS	NS
Iron - Dissolved	300	55.0J	NS	[14300]	NS	NS
Manganese - Dissolved	300	3.2J	NS	[5810]	NS	NS
Selenium - Dissolved	10	1.3U	NS	[71.1]	NS	NS
Sodium - Dissolved	20000	12900J	NS	[77800]J	NS	NS

Notes:
All results are in ug/l.
U - Non-detect
J - Estimated
D - Dilution
NS - Not Sampled
Shading & [ ] - Indicates exceedance of criteria.

Table 4-2
Groundwater Samples
Compounds Exceeding Groundwater Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date**	NYSDEC Groundwater Quality Standards	MW-05 MM-GWMW05-100603 10/6/2003	MW-07 MM-GWMW07-100703 10/7/2003	MW-08 MM-GWMW08-100703 10/7/2003
Constituent				
Tetrachloroethene	5	0.70UJ	0.70UJ	0.70UJ
Trichloroethene	5	0.72U	0.72U	0.72U
cis-1,2-Dichloroethene	5	0.62U	0.62U	0.62U
Arsenic	25	7.7J	4.0U	4.0U
Barium	1000	170J	266	68.9J
Beryllium	3	0.36J	0.10U	0.10J
Chromium	50	44.8	1.4U	20.6
Copper	200	15.8J	3.6U	52.8
Iron	300	[33800]	33.2J	[3160]
Magnesium	35000	14600	[74700]	[66200]
Manganese	300	[5660]	63.4	174
Nickel	100	29.5J	8.2J	89.9
Selenium	10	1.6J	1.3U	3.5J
Sodium	20000	[62900] J	[57200] J	[36800] J
Thallium	0.5	[14.4]	5.3U	5.3U
Cyanide	200	10U	10U	10U
Arsenic - Dissolved	25	NS	NS	NS
Iron - Dissolved	300	NS	NS	NS
Manganese - Dissolved	300	NS	NS	NS
Selenium - Dissolved	10	NS	NS	NS
Sodium - Dissolved	20000	NS	NS	NS

Notes:
All results are in ug/l.
U - Non-detect
J - Estimated
D - Dilution
NS - Not Sampled
Shading & [ ] - Indicates exceedance of criteria.

Table 4-3
Surface Soil Samples
Compounds Exceeding Soil Cleanup Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date** **Sample Depth (in. bgs)**	NYSDEC Recommended Soil Cleanup Criteria	SS-06 MM-SS06-073003 7/30/2003 0-2	SS-07 MM-SS07-072903 7/29/2003 0-2	SS-08 MM-SS08-072903 7/29/2003 0-2	SS-09 MM-SS09-073003 7/30/2003 0-2	SS-10 MM-SS10-073003 7/30/2003 0-2	SS-11 MM-SS11-072903 7/29/2003 0-2
Constituent							
Arsenic	7.5	5.5	[62.7]	3.5	[149]	[54.7]J	1.6
Barium	300	69.4	82.4	75.3	[407]	260J	48.2
Beryllium	0.59*	0.41J	0.3J	0.23J	[0.85]	0.53J	0.21J
Calcium	5060**	1220	3470	1890	[5470]	[7210]J	3310
Chromium	70.5**	27.4	[952]	14.2	[232]	[210]J	10.8
Cobalt	30	7.8	8	6.3J	13.2	[40.3]J	6.6
Copper	25	[545]	[370]	[62.7]	[1980]	[1120]J	[30.2]
Iron	21100**	[39900]	14800	11100	12900	[34800]J	11000
Lead	91.7**	[95.3]	[96.1]	37.6	44.8	[122]J	12.1
Magnesium	7830**	2470	6220	2200	2980	[8410]J	2440
Manganese	408**	392	393	134	267	[699]J	251
Nickel	87.5**	26.4	[483]	27.3	[335]	[1360]J	11.6
Potassium	496**	381J	[575]J	402J	[886]J	[1090]J	[655]J
Selenium	2	1.3J	[18.7]	0.82J	[28.9]	[49.5]J	0.4U
Sodium	96.4*	47.3U	[969]J	52.2U	[279]J	[517]J	92.8J
Zinc	50.7**	[133]J	[3830]J	[76.9]J	[869]J	[1050]J	[250]J
Mercury	0.15**	0.12J	0.09J	[0.52]J	0.15J	[0.21]J	0.03J

Notes:
All results are in mg/kg.
U - Non-detect
J - Estimated
R - Rejected
Shading & [ ] - Indicates exceedance of criteria.
* - Criteria is based on the maximum site background concentration from background locations SS-4 and SS-5 as stated in the November 1998 RI/FS.
** - Criteria is based on the maximum site background concentration from background locations SS-13, SS-14, and SS-55 as stated in the July 2004 RI/FS.

Table 4-3
Surface Soil Samples
Compounds Exceeding Soil Cleanup Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date** **Sample Depth (in. bgs)**	NYSDEC Recommended Soil Cleanup Criteria	SS-12 MM-SS12-072903 7/29/2003 0-2	SS-13 MM-SS13-072903 7/29/2003 0-2	SS-14 MM-SS14-072903 7/29/2003 0-2	SS-15 MM-SS15-072903 7/29/2003 0-2
Constituent					
Arsenic	7.5	1.7	2.6	4.3	3.7
Barium	300	71.6	76.1	139	80.9
Beryllium	0.59*	0.21J	0.59J	0.26J	0.29J
Calcium	5060**	1640	5060	2630	1690
Chromium	70.5**	10.6	19.5	15.4	70.5
Cobalt	30	5.9	5J	7.7	26.5
Copper	25	[136]	22.8	21.2	22.4
Iron	21100**	9830	17900	13700	21100
Lead	91.7**	20.8	67.4	91.7	39.2
Magnesium	7830**	2280	1910	2730	7830
Manganese	408**	214	95.4	408	335
Nickel	87.5**	11.1	17.8	17.3	87.5
Potassium	496**	[651]J	387J	496J	442J
Selenium	2	0.38U	0.5U	1.1J	0.63J
Sodium	96.4*	[122]J	60.3U	54.1U	53.4U
Zinc	50.7**	[160]J	19.8J	50.7J	44.4J
Mercury	0.15**	0.01R	0.14J	0.15J	0.13J

Notes:
All results are in mg/kg.
U - Non-detect
J - Estimated
R - Rejected
Shading & [ ] - Indicates exceedance of criteria.
* - Criteria is based on the maximum site background concentration from background locations SS-4 and SS-5 as stated in the November 1998 RI/FS.
** - Criteria is based on the maximum site background concentration from background locations SS-13, SS-14, and SS-55 as stated in the July 2004 RI/FS.

Table 4-4
Surface Water Samples
Compounds Exceeding Surface Water Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date**	NYSDEC Water Quality Standards Class C*	SW-13 MM-SW13-032904 3/29/2004	SW-14 MM-SW14-032904 3/29/2004	SW-15 MM-SW15-032904 3/29/2004	SW-16 MM-SW16-032904 3/29/2004	SW-17 MM-SW17-032904 3/29/2004	SW-18 MM-SW18-032904 3/29/2004
Constituent							
Aluminum	100	[366]	[690]	[328]	[316]	[282]	[342]
Arsenic	150	4.8U	4.8U	4.8U	4.8U	4.8U	4.8U
Barium	NC	53.5J	79J	105J	99.7J	82.2J	132J
Calcium	NC	32700	35000	31000	29100	25000	31100
Chromium	132	1.2U	1.3J	1.2U	1.2U	2.2J	1.2U
Cobalt	5	2.4U	2.4U	2.4U	2.4U	2.4U	2.4U
Copper	16	0.74U	[57.6]J	0.74U	0.74U	0.74UJ	0.74U
Iron	300	[327]J	[1670]J	212J	205J	107J	[583]J
Lead	8	1.8UJ	1.8UJ	1.8UJ	1.8UJ	1.8UJ	1.8UJ
Magnesium	NC	20200	21400	30100	28200	23500	55200
Manganese	NC	73.8	234	118	112	35.2	134
Nickel	94	5.5U	24.8J	20.9J	19.9J	12.5J	16J
Potassium	NC	2940J	3130J	2990J	2700J	2360J	5140J
Selenium	4.6	5.2U	5.2U	5.2U	5.2U	5.2U	5.2U
Sodium	NC	43000J	38300J	67000J	62100J	61500J	38900J
Thallium	8	5.8U	5.8U	5.8U	5.8U	5.8U	5.8U
Vanadium	14	1.9U	1.9U	1.9U	1.9U	1.9U	1.9U
Zinc	150	8.1U	23.7J	11.5J	14.4J	13J	10.6J

Notes:
All results are in ug/l.
U - Non-detect
J - Estimated
Shading and [ ] - Indicates exceedance of criteria.
* - Criteria is based on a Class C stream class which is the most stringent for surface water.

Table 4-4
Surface Water Samples
Compounds Exceeding Surface Water Criteria
Magna Metals - Cortlandt, New York

Site Sample ID Sample Date	NYSDEC Water Quality Standards Class C*	SW-18 MM-SW18D-032904 Duplicate of MM-SW18-032904	SW-19 MM-SW19-032904 3/29/2004	SW-20 MM-SW20-032904 3/29/2004	SW-21 MM-SW21-032904 3/29/2004	SW-22 MM-SW22-032904 3/29/2004
Constituent						
Aluminum	100	[383]J	[728]J	[358]J	[725]J	[381]J
Arsenic	150	4.8U	4.8U	4.8U	4.8U	6.9J
Barium	NC	141J	119J	74.6J	185J	33.4J
Calcium	NC	32100	32900	30500	32400	10600
Chromium	132	1.2U	2.6J	1.2U	3.4J	26.7
Cobalt	5	2.4U	2.4U	2.4U	2.8J	[5.1]J
Copper	16	0.74UJ	[22.6]J	0.74UJ	5.5J	[772]J
Iron	300	[903]J	[2180]J	[363]J	[4790]J	[2020]J
Lead	8	1.8UJ	1.8UJ	1.8UJ	3.5J	1.8UJ
Magnesium	NC	56500	27000	25800	49700	5680
Manganese	NC	0.2R	0.2R	0.2R	0.2R	0.2R
Nickel	94	19.4J	22.4J	7J	29.9J	[161]
Potassium	NC	5400J	3910J	3140J	5000J	828J
Selenium	4.6	5.2U	5.2U	5.2U	5.2U	[8.7]J
Sodium	NC	40500J	48400J	48500J	36100J	12100J
Thallium	8	5.8U	5.8U	5.8U	6.9J	5.8U
Vanadium	14	1.9U	2J	1.9U	2J	1.9U
Zinc	150	16.8J	57.3J	9.3J	27.4J	[343]J

Notes:
All results are in ug/l.
U - Non-detect
J - Estimated
Shading and [ ] - Indicates exceedance of criteria.
* - Criteria is based on a Class C stream class which is the most stringent for surface water.

Table 4-5A
Sediment Samples
PAH Compounds Exceeding Sediment Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date** **Sample Depth**	Sample Result	Units	NYSDEC Sediment Criteria	Sample Specific Criteria TOC=40,000 mg/kg	SD-13 MM-SD13-033004 3/30/2004 0-6 in. bgs	Sample Specific Criteria TOC=60,000 mg/kg	SD-14 MM-SD14-033004 3/30/2004 0-6 in. bgs	Sample Specific Criteria TOC=40,000 mg/kg	SD-15 MM-SD15-033004 3/30/2004 0-6 in. bgs
Constituent									
Anthracene		(ug/kg)	986 *	39440	29UJ	59160	46UJ	39440	31UJ
Benzo(a)anthracene		(ug/kg)	1.3 *	52	18UJ	78	29UJ	52	[470]J
Benzo(a)pyrene		(ug/kg)	1.3 *	52	21UJ	78	34UJ	52	[660]J
Benzo(b)fluoranthene		(ug/kg)	1.3 *	52	65UJ	78	100UJ	52	[1200]J
Benzo(ghi)perylene		(ug/kg)	NC *	NC	53UJ	NC	85UJ	NC	220J
Benzo(k)fluoranthene		(ug/kg)	1.3 *	52	42UJ	78	66UJ	52	[600]J
Chrysene		(ug/kg)	1.3 *	52	39UJ	78	62UJ	52	[650]J
Fluoranthene		(ug/kg)	1020 *	40800	17UJ	61200	27UJ	40800	1400J
Fluorene		(ug/kg)	73 *	2920	35UJ	4380	55UJ	2920	37UJ
Indeno(1,2,3-cd)pyrene		(ug/kg)	1.3 *	52	29UJ	78	47UJ	52	32UJ
Phenanthrene		(ug/kg)	120 *	4800	27UJ	7200	44UJ	4800	590J
Pyrene		(ug/kg)	8775 *	351000	22UJ	526500	35UJ	351000	1300J

Notes:
U - Non-detect
J - Estimated
R - Rejected
Shading and [ ] - Indicates exceedance of criteria.
* - Sediment criteria in units of ug/g Organic Carbon. Sample specific criteria were calculated using the TOC results.

Table 4-5A
Sediment Samples
PAH Compounds Exceeding Sediment Criteria
Magna Metals - Cortlandt, New York

Site Sample ID Sample Date Sample Depth	Sample Result Units	NYSDEC Sediment Criteria	Sample Specific Criteria TOC=18,000 mg/kg	SD-16 MM-SD16-033004 3/30/2004 0-6 in. bgs	Sample Specific Criteria TOC=6,100 mg/kg	SD-17 MM-SD17-033104 3/31/2004 0-6 in. bgs	Sample Specific Criteria TOC=76,000 mg/kg	SD-18 MM-SD18-033104 3/31/2004 0-6 in. bgs
Constituent								
Anthracene	(ug/kg)	986 *	17748	17UJ	6014.6	200J	74936	37UJ
Benzo(a)anthracene	(ug/kg)	1.3 *	23.4	[140]J	7.93	[470]	98.8	[160]J
Benzo(a)pyrene	(ug/kg)	1.3 *	23.4	[190]J	7.93	[430]J	98.8	[220]J
Benzo(b)fluoranthene	(ug/kg)	1.3 *	23.4	[260]J	7.93	[670]J	98.8	[260]J
Benzo(ghi)perylene	(ug/kg)	NC *	NC	32UJ	NC	150J	NC	68UJ
Benzo(k)fluoranthene	(ug/kg)	1.3 *	23.4	[190]J	7.93	[380]J	98.8	[220]J
Chrysene	(ug/kg)	1.3 *	23.4	[190]J	7.93	[490]	98.8	[180]J
Fluoranthene	(ug/kg)	1020 *	18360	410J	6222	1300	77520	410J
Fluorene	(ug/kg)	73 *	1314	21UJ	445.3	70J	5548	44UJ
Indeno(1,2,3-cd)pyrene	(ug/kg)	1.3 *	23.4	18UJ	7.93	[48]J	98.8	38UJ
Phenanthrene	(ug/kg)	120 *	2160	190J	732	[900]	9120	170J
Pyrene	(ug/kg)	8775 *	157950	380J	53527.5	1000	666900	380J

Notes:
U - Non-detect
J - Estimated
R - Rejected
Shading and [ ] - Indicates exceedance of criteria.
* - Sedir criteria in units of ug/g Organic Carbon. Sample specific criteria were c ted using the TOC results.

Table 4-5A
Sediment Samples
PAH Compounds Exceeding Sediment Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date** **Sample Depth**	Sample Result Units	NYSDEC Sediment Criteria	Sample Specific Criteria TOC=60,000 mg/kg	SD-18 MM-SD18D-033104 Duplicate of MM-SD18-033104	Sample Specific Criteria TOC=89,000 mg/kg	SD-19A MM-SD19A-033104 3/31/2004 0-6 in. bgs	Sample Specific Criteria TOC=100,000 mg/kg	SD-20 MM-SD20-033104 3/31/2004 0-6 in. bgs
Constituent								
Anthracene	(ug/kg)	986 *	59160	41UJ	87754	52UJ	98600	87UJ
Benzo(a)anthracene	(ug/kg)	1.3 *	78	26UJ	115.7	33UJ	130	55UJ
Benzo(a)pyrene	(ug/kg)	1.3 *	78	30UJ	115.7	38UJ	130	63UJ
Benzo(b)fluoranthene	(ug/kg)	1.3 *	78	92UJ	115.7	120UJ	130	190UJ
Benzo(ghi)perylene	(ug/kg)	NC *	NC	75UJ	NC	95UJ	NC	160UJ
Benzo(k)fluoranthene	(ug/kg)	1.3 *	78	59UJ	115.7	74UJ	130	120UJ
Chrysene	(ug/kg)	1.3 *	78	55UJ	115.7	69UJ	130	120UJ
Fluoranthene	(ug/kg)	1020 *	61200	180J	90780	250J	102000	51UJ
Fluorene	(ug/kg)	73 *	4380	49UJ	6497	62UJ	7300	100UJ
Indeno(1,2,3-cd)pyrene	(ug/kg)	1.3 *	78	42UJ	115.7	53UJ	130	88UJ
Phenanthrene	(ug/kg)	120 *	7200	39UJ	10680	49UJ	12000	82UJ
Pyrene	(ug/kg)	8775 *	526500	31UJ	780975	220J	877500	65UJ

Notes:
U - Non-detect
J - Estimated
R - Rejected
Shading and [ ] - Indicates exceedance of criteria.
* - Sediment criteria in units of ug/g Organic Carbon. Sample specific criteria were calculated using the TOC results.

Table 4-5A
Sediment Samples
PAH Compounds Exceeding Sediment Criteria
Magna Metals - Cortlandt, New York

Site Sample ID Sample Date Sample Depth	Sample Result Units	NYSDEC Sediment Criteria	Sample Specific Criteria TOC=49,000 mg/kg	SD-21 MM-SD21-040304 4/3/2004 0-6 in. bgs	Sample Specific Criteria TOC=12,000 mg/kg	SD-22 MM-SD22-040304 4/3/2004 0-6 in. bgs	Sample Specific Criteria TOC=10,000 mg/kg	SD-23 MM-SD23-040304 4/3/2004 0-6 in. bgs
Constituent								
Anthracene	(ug/kg)	986 *	48314	86UJ	11832	87UJ	9860	66UJ
Benzo(a)anthracene	(ug/kg)	1.3 *	63.7	55UJ	15.6	55UJ	13	[360]J
Benzo(a)pyrene	(ug/kg)	1.3 *	63.7	62UJ	15.6	63UJ	13	[410]J
Benzo(b)fluoranthene	(ug/kg)	1.3 *	63.7	190UJ	15.6	190UJ	13	[680]J
Benzo(ghi)perylene	(ug/kg)	NC *	NC	160UJ	NC	160UJ	NC	120UJ
Benzo(k)fluoranthene	(ug/kg)	1.3 *	63.7	120UJ	15.6	120UJ	13	94UJ
Chrysene	(ug/kg)	1.3 *	63.7	110UJ	15.6	120UJ	13	[510]J
Fluoranthene	(ug/kg)	1020 *	49980	50UJ	12240	51UJ	10200	1000J
Fluorene	(ug/kg)	73 *	3577	100UJ	876	100UJ	730	78UJ
Indeno(1,2,3-cd)pyrene	(ug/kg)	1.3 *	63.7	87UJ	15.6	88UJ	13	66UJ
Phenanthrene	(ug/kg)	120 *	5880	81UJ	1440	81UJ	1200	450J
Pyrene	(ug/kg)	8775 *	429975	64UJ	105300	65UJ	87750	790J

Notes:
U - Non-detect
J - Estimated
R - Rejected
Shading and [ ] - Indicates exceedance of criteria.
* - Sedir criteria in units of ug/g Organic Carbon. Sample specific criteria were c ted using the TOC results.

Table 4-5A
Sediment Samples
PAH Compounds Exceeding Sediment Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date** **Sample Depth**	Sample Result Units	NYSDEC Sediment Criteria	Sample Specific Criteria TOC=140,000 mg/kg	SD-24 MM-SD24-040304 4/3/2004 0-6 in. bgs	Sample Specific Criteria TOC=100,000 mg/kg	SD-25 MM-SD25-040304 4/3/2004 0-6 in. bgs	Sample Specific Criteria TOC=100,000 mg/kg	SD-26 MM-SD26-040304 4/3/2004 0-6 in. bgs
Constituent								
Anthracene	(ug/kg)	986 *	138040	R	98600	13UJ	98600	14UJ
Benzo(a)anthracene	(ug/kg)	1.3 *	182	R	130	8.3UJ	130	100J
Benzo(a)pyrene	(ug/kg)	1.3 *	182	R	130	9.5UJ	130	120J
Benzo(b)fluoranthene	(ug/kg)	1.3 *	182	R	130	76J	130	[180]J
Benzo(ghi)perylene	(ug/kg)	NC *	NC	R	NC	24UJ	NC	26UJ
Benzo(k)fluoranthene	(ug/kg)	1.3 *	182	R	130	19UJ	130	85J
Chrysene	(ug/kg)	1.3 *	182	R	130	71J	130	[150]J
Fluoranthene	(ug/kg)	1020 *	142800	R	102000	160J	102000	280J
Fluorene	(ug/kg)	73 *	10220	R	7300	16UJ	7300	17UJ
Indeno(1,2,3-cd)pyrene	(ug/kg)	1.3 *	182	R	130	13UJ	130	14UJ
Phenanthrene	(ug/kg)	120 *	16800	R	12000	80J	12000	130J
Pyrene	(ug/kg)	8775 *	1228500	R	877500	120J	877500	220J

Notes:
U - Non-detect
J - Estimated
R - Rejected
Shading and [ ] - Indicates exceedance of criteria.
* - Sediment criteria in units of ug/g Organic Carbon. Sample specific criteria were calculated using the TOC results.

Table 4-5B
Sediment Samples
Inorganic Compounds Exceeding Sediment Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date** **Sample Depth**	Sample Result Units	New York State DEC Sediment Criteria	SD-13 MM-SD13-033004 3/30/2004 0-6 in. bgs	SD-14 MM-SD14-033004 3/30/2004 0-6 in. bgs	SD-15 MM-SD15-033004 3/30/2004 0-6 in. bgs	SD-16 MM-SD16-033004 3/30/2004 0-6 in. bgs	SD-17 MM-SD17-033104 3/31/2004 0-6 in. bgs	SD-18 MM-SD18-033104 3/31/2004 0-6 in. bgs
Constituent								
Aluminum	(mg/kg)	NC	9920J	13800J	10100J	9080J	4080	12700J
Arsenic	(mg/kg)	33	2.3J	8.3J	8.3J	3.7J	1.5	12J
Barium	(mg/kg)	NC	229J	334J	266J	154J	47.5	409J
Beryllium	(mg/kg)	NC	0.86J	1.2J	0.82J	0.55J	0.28J	0.98J
Calcium	(mg/kg)	NC	4940J	13400J	7130J	7190J	16200	13300J
Chromium	(mg/kg)	110	31.1J	49.1J	[158]J	43.4J	16.4J	[166]J
Cobalt	(mg/kg)	NC	14.4J	22.5J	16.5J	12.8J	5.4J	36.1J
Copper	(mg/kg)	110	24.4J	[672]J	[1040]J	107J	9.9	[327]J
Iron	(mg/kg)	40000	11500J	13600J	10900J	12400J	6590	14400J
Lead	(mg/kg)	110	23.6J	39.5J	32.2J	22.9J	6.7	88.7J
Magnesium	(mg/kg)	NC	4400J	6310J	5280J	6880J	11900	9190J
Manganese	(mg/kg)	1100	391J	598J	958J	313J	337	241J
Nickel	(mg/kg)	50	[63.5]J	[300]J	[332]J	[143]J	35.6	[460]J
Potassium	(mg/kg)	NC	444J	726J	585J	833J	560J	584J
Selenium	(mg/kg)	NC	2.1J	12J	18.2J	2J	0.42U	9.9J
Silver	(mg/kg)	2.2	0.39UJ	0.6UJ	0.42UJ	0.24UJ	0.14U	0.49UJ
Sodium	(mg/kg)	NC	281J	770J	766J	348J	127J	276J
Thallium	(mg/kg)	NC	1.2UJ	1.9UJ	1.3UJ	0.74UJ	0.44UJ	1.5UJ
Vanadium	(mg/kg)	NC	22.3J	31.2J	20.6J	22.2J	9.3	43.4J
Zinc	(mg/kg)	270	106J	146J	[528]J	139J	37.3	[290]J
Mercury	(mg/kg)	1.3	0.09J	0.12J	0.15J	0.06J	0.01J	0.17J
TOC	(mg/kg)	NC	40000J	60000J	40000J	18000J	6100	76000J
AVS/SEM	(ratio)		<1.0UJ	>1.0J	>1.0J	>1.0J	>1.0	<1.0UJ

Notes:
U - Non-detect
J - Estimated
R - Rejec
Shading] - Indicates exceedance of criteria.

Table 4-5B
Sediment Samples
Inorganic Compounds Exceeding Sediment Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date** **Sample Depth**	Sample Result Units	New York State DEC Sediment Criteria	SD-18 MM-SD18D-033104 Duplicate of MM-SD18-033104	SD-19A MM-SD19A-033104 3/31/2004 0-6 in. bgs	SD-20 MM-SD20-033104 3/31/2004 0-6 in. bgs	SD-21 MM-SD21-040304 4/3/2004 0-6 in. bgs	SD-22 MM-SD22-040304 4/3/2004 0-6 in. bgs	SD-23 MM-SD23-040304 4/3/2004 0-6 in. bgs
Constituent								
Aluminum	(mg/kg)	NC	12900J	11500J	11500J	15800J	18000J	12000J
Arsenic	(mg/kg)	33	7.7J	12.2J	4.1J	2.7UJ	2.7UJ	2UJ
Barium	(mg/kg)	NC	506J	418J	283J	374J	391J	278J
Beryllium	(mg/kg)	NC	1.1J	1.3J	1.6J	0.99J	1.1J	0.74J
Calcium	(mg/kg)	NC	14600J	16400J	10700J	13600J	10600J	11600J
Chromium	(mg/kg)	110	[159]J	[133]J	62.7J	60.5J	78.3J	73.7J
Cobalt	(mg/kg)	NC	35.7J	58.8J	21.3J	34.7J	39.8J	32.4J
Copper	(mg/kg)	110	[230]J	[281]J	[241]J	[403]J	[415]J	[194]J
Iron	(mg/kg)	40000	19600J	17400J	18200J	30100J	35300J	26600J
Lead	(mg/kg)	110	76.4J	91.5J	38.9J	[112]J	53.9J	48.7J
Magnesium	(mg/kg)	NC	10300J	11000J	7400J	8620J	10600J	12400J
Manganese	(mg/kg)	1100	456J	302J	482J	735J	693J	525J
Nickel	(mg/kg)	50	[364]J	[365]J	[200]J	[180]J	[170]J	[155]J
Potassium	(mg/kg)	NC	618J	440J	747J	1460J	1970J	1440J
Selenium	(mg/kg)	NC	8.8J	10.1J	10.8J	12.4J	7.7J	6.7J
Silver	(mg/kg)	2.2	0.55UJ	0.69UJ	1.1UJ	1.2UJ	1.2UJ	0.91UJ
Sodium	(mg/kg)	NC	638J	620J	401J	427UJ	471J	490J
Thallium	(mg/kg)	NC	3.4J	2.2UJ	3.6UJ	3.8UJ	3.7UJ	2.8UJ
Vanadium	(mg/kg)	NC	42.2J	61J	28.5J	38J	44.7J	31J
Zinc	(mg/kg)	270	259J	176J	258J	191J	195J	270J
Mercury	(mg/kg)	1.3	0.16J	0.14J	0.15J	0.22J	0.25J	0.14J
TOC	(mg/kg)	NC	60000J	89000J	100000J	49000J	12000J	10000J
AVS/SEM	(ratio)		>1.0J	>1.0J	<1.0UJ	>1.0J	<1.0UJ	<1.0UJ

Notes:
U - Non-detect
J - Estimated
R - Rejected
Shading and [ ] - Indicates exceedance of criteria.

Table 4-5B
Sediment Samples
Inorganic Compounds Exceeding Sediment Criteria
Magna Metals - Cortlandt, New York

Site **Sample ID** **Sample Date** **Sample Depth**	Sample Result Units	New York State DEC Sediment Criteria	SD-24 MM-SD24-040304 4/3/2004 0-6 in. bgs	SD-25 MM-SD25-040304 4/3/2004 0-6 in. bgs	SD-26 MM-SD26-040304 4/3/2004 0-6 in. bgs
Constituent					
Aluminum	(mg/kg)	NC	14400J	3310	6310
Arsenic	(mg/kg)	33	2.7UJ	0.4U	1.4J
Barium	(mg/kg)	NC	331J	65.3J	209J
Beryllium	(mg/kg)	NC	1J	0.17J	0.28J
Calcium	(mg/kg)	NC	10400J	2170	2580
Chromium	(mg/kg)	110	76.3J	81.2	75.4
Cobalt	(mg/kg)	NC	39.7J	26.7	21.5
Copper	(mg/kg)	110	[216]J	[137]J	[130]J
Iron	(mg/kg)	40000	34700J	17500	16300
Lead	(mg/kg)	110	42.2J	10.1J	18.5J
Magnesium	(mg/kg)	NC	10800J	18600	12400
Manganese	(mg/kg)	1100	338J	301	549
Nickel	(mg/kg)	50	[161]J	[149]	[121]
Potassium	(mg/kg)	NC	1500J	324J	471J
Selenium	(mg/kg)	NC	4.7J	0.53U	0.56U
Silver	(mg/kg)	2.2	1.2UJ	0.19J	0.19UJ
Sodium	(mg/kg)	NC	423UJ	119J	67.1U
Thallium	(mg/kg)	NC	3.8UJ	0.55UJ	0.6UJ
Vanadium	(mg/kg)	NC	42J	14.5J	21.8J
Zinc	(mg/kg)	270	170J	82.8	68.8
Mercury	(mg/kg)	1.3	0.2J	0.02	0.04
TOC	(mg/kg)	NC	140000J	100000	100000
AVS/SEM	(ratio)		<1.0UJ	>1.0	>1.0

Notes:
U - Non-detect
J - Estimated
R - Rejec
Shading] - Indicates exceedance of criteria.

LEGEND

MW-01 MONITORING WELL LOCATION

SW-15 SURFACE WATER SAMPLE OR ELEVATION LOCATION

320 CONTOUR LINE (20 FT INTERVAL)

320 GROUNDWATER CONTOUR

GROUNDWATER FLOW

GEOPHYSICAL SURVEY

APPROXIMATE WETLAND AREA

NOTES:
1. MW-04D AND MW-07 WERE NOT INCLUDED IN THE CONTOURING BECAUSE THEY ARE SCREENED IN BEDROCK.

2. LOCATIONS OF FORMER MAGNA METALS BUILDING, 1 STORY CONCRETE BLOCK BUILDING, SHED, GEOPHYSICAL SURVEY AREA, AND MONITORING WELLS ARE BASED ON SURVEY DATA.

SOURCES:
1. CONTOUR LINES, FURNACE DOCK ROAD, AND FURNACE BROOK BELOW POND BASED ON MOHEGAN LAKE, NY AND PEEKSKILL, NY TOPOGRAPHIC QUADRANGLES, 7.5-MINUTE SERIES, DATED 1956 AND 1957, RESPECTIVELY, AND PHOTOREVISED IN 1981.

2. ADDITIONAL SURFACE FEATURES BASED ON WESTCHESTER COUNTY DEPARTMENT OF PLANNING AERIAL PHOTOGRAPH (SPRING 1990), DECEMBER 18, 1999 AERIAL PHOTOGRAPH, AND SURVEY DATA.

3. APPROXIMATE WETLAND AREA BASED ON FIELD OBSERVATIONS.

0 40 80
FEET

TETRA TECH FW, INC.

TITLE:
Overburden Groundwater Contours
Magna Metals
Cortlandt, New York

DWN: CTS	DES.: CTS	PROJECT NO.: 1172.0003
CHKD:	APPD:	FIGURE NO.: 3-2
DATE: 06/21/04	REV.: 0	

N:\GIS\GISKEY\GISPROJ31\MAGNA METALS\FIGURE 3-2 062104.DWG

BCLP02830

LEGEND

PHASE I SURFACE SOIL LOCATION

PHASE I SURFACE WATER AND SEDIMENT

PHASE I SOIL BORING LOCATION

LP-01 LEACH PIT LOCATION

SW-01 SUPPLEMENTAL RI SURFACE WATER SAMPLE OR ELEVATION LOCATION

SD-01 SUPPLEMENTAL RI SEDIMENT SAMPLE LOCATION

SS-01 SUPPLEMENTAL RI SOIL SAMPLE OR ELEVATION LOCATION

BA-01 SUPPLEMENTAL RI SOIL BORING LOCATION

MW-01 MONITORING WELL LOCATION

GEOPHYSICAL SURVEY

APPROXIMATE REFUSE AREA

APPROXIMATE WETLAND AREA

NOTES:
1. PHASE I SAMPLE LOCATIONS AND SUPPLEMENTAL RI SOIL BORINGS ARE APPROXIMATE.

2. LOCATIONS OF FORMER MAGNA METALS BUILDING, 1 STORY CONCRETE BLOCK BUILDING, SHED, GEOPHYSICAL SURVEY AREA, AND MONITORING WELLS ARE BASED ON SURVEY DATA.

3. LOCATIONS OF LEACH PITS AND SUPPLEMENTAL RI SURFACE WATER SAMPLES, SEDIMENT SAMPLES, AND SURFACE SOIL SAMPLES ARE BASED ON GPS COORDINATES.

SOURCES:
1. CONTOUR LINES, FURNACE DOCK ROAD, AND FURNACE BROOK BELOW POND BASED ON MOHEGAN LAKE, NY AND PEEKSKILL, NY TOPOGRAPHIC QUADRANGLES, 7.5-MINUTE SERIES, DATED 1956 AND 1957, RESPECTIVELY, AND PHOTOREVISED IN 1981.

2. ADDITIONAL SURFACE FEATURES BASED ON WESTCHESTER COUNTY DEPARTMENT OF PLANNING AERIAL PHOTOGRAPH (SPRING 1990), DECEMBER 18, 1999 AERIAL PHOTOGRAPH, AND SURVEY DATA.

3. APPROXIMATE REFUSE AREA BASED ON NYSDEC DRAWING.

4. APPROXIMATE WETLAND AREA BASED ON FIELD OBSERVATIONS.

0 40 80
FEET

LOCATION	NORTHING (FT.)	EASTING (FT.)	ELEVATION (FT. MSL)
LP-02	889806.15	665099.69	
LP-03	889817.18	665084.14	
LP-04	889832.41	665084.36	
LP-05	889850.62	665071.88	
LP-06	889869.97	665059.52	
LP-07	[illegible]	[illegible]	
LP-08	[illegible]	[illegible]	
LP-09	889945.34	665002.1	
LP-10	889996.02	665005.39	
LP-04	889970.07	665003.64	
MW-01	889547.12	665389.57	365.75
MW-02	889760.21	665127.51	344.1
MW-03	889808.83	665099.47	353.37
MW-04	889848.29	665079.71	355.5
MW-04D	[illegible]	[illegible]	15.1
MW-05	890191.3	665491.01	340.42
MW-06	[illegible]	665025.06	[illegible]
MW-07	[illegible]	[illegible]	[illegible]
MW-08	[illegible]	[illegible]	17.[illegible]
BA	889969.991	665071.6	
SD-13	890234.23	664696.04	
SD-14	889953.07	664725.91	
SD-15	889968.6	664871.29	
SD-16	889795.69	664973.85	
SD-17	[illegible]	[illegible]	
SD-18	[illegible]	[illegible]	
SD-19	889847.99	664864	
SD-20	889610.38	664734.74	
SD-21	889590.471	664882.04	
SD-22	889494.73	664595.61	
SD-23	889448.52	664546.08	
SD-24	[illegible]	[illegible]	
SD-25	[illegible]	[illegible]	
SD-26	889971.03	664224.12	
SD-26	889994.06	663894.18	
SS-06	889890.38	664970.118	
SS-07	889845.039	665000.575	
SS-08	889774.93	665034.91	
SS-09	889852.49	664953.46	
SS-10	889732.339	665001.284	
SS-11	889819.767	665122.928	
SS-12	889792.665	665143.566	
SS-13	890248.88	664780.5	
SS-14	890215.401	665004.313	
SS-15	890421.99	664721.22	
ST-01	889752.07	665156.24	
ST-02	889761.92	665139.88	
SW-13	890234.23	664696.04	
SW-14	889953.07	664725.91	
SW-15	889903.6	664871.29	
SW-16	889795.69	664973.85	
SW-17	889499.24	665115.3	
SW-18	889785.9	664891.58	
SW-19	889847.99	664864	
SW-20	889610.38	664734.74	
SW-21	889752.64	664956.18	
SW-22	889973.65	664812.24	
SWEL-1	889844.39	664863.44	309.86
SWEL-2	889797.07	664799.56	309.83
SWEL-3	890262.07	664686.03	309.97
SWEL-4	890099.19	664725.83	309.93
SWEL-5	889492.49	665113.99	316.31

DWN: CTS	DES.: CTS	PROJECT NO.: 1172.0003	
CHKD:	APPD:	FIGURE NO.: 2-1	
DATE: 06/21/04	REV.: 0		

TETRA TECH FW, INC.

TITLE:
Site Plan with Sample, Pit and Monitoring Well Locations
Magna Metals
Cortlandt, New York

G:\GISKEY\GSPROJ31\MAGNA METALS\FIGURE 2-1_062104.DWG

BCLP02834

LEGEND

LP-01 7 LE ACH PIT LOCATION

1 PROPERTY LINE SYM. SAMPLE LOCATION

(1) SUPPLEMENTAL RI SOIL BORING LOCATION

CONSTITUENT	UNITS	NY-SCOL	MM-LP07-072303 07/08/2003
Benzo(a)anthracene	(ug/kg)	61	[250]U
Benzo(a)pyrene	(ug/kg)	61	[250]U
Chrysene	(ug/kg)	400	[250]U
Aluminum	(mg/kg)	5040	[3110]
Arsenic	(mg/kg)	7.5	[7.6]
Beryllium	(mg/kg)	0.32	[0.6]
Cadmium	(mg/kg)	1	[0.5]
Calcium	(mg/kg)	1690	[1100]
Chromium	(mg/kg)	10	[15.6]
Cobalt	(mg/kg)	30	[14.9]
Copper	(mg/kg)	25	[29.3]
Iron	(mg/kg)	10000	[30300]
Lead	(mg/kg)	3.7	[197]
Magnesium	(mg/kg)	2100	[1340]
Manganese	(mg/kg)	250	[367]
Nickel	(mg/kg)	15	[33.1]
Potassium	(mg/kg)	864	[1470]
Sodium	(mg/kg)	86.8	[1930]
Thallium	(mg/kg)	ND	[0.63]
Zinc	(mg/kg)	23.3	[1440]

CONSTITUENT	UNITS	NY-SCOL	MM-LP09-073003 07/30/2003
Benzo(a)pyrene	(ug/kg)	61	[68]J
Aluminum	(mg/kg)	5040	[10700]
Arsenic	(mg/kg)	7.5	[13.5]
Cadmium	(mg/kg)	1	[1.3]
Calcium	(mg/kg)	1690	[3600]
Chromium	(mg/kg)	10	[16]
Cobalt	(mg/kg)	30	[46.9]
Copper	(mg/kg)	25	[38]
Iron	(mg/kg)	10000	[34000]
Lead	(mg/kg)	3.7	[19.4]
Magnesium	(mg/kg)	2100	[1300]
Manganese	(mg/kg)	250	[370]
Nickel	(mg/kg)	15	[36.8]
Potassium	(mg/kg)	864	[1520]
Sodium	(mg/kg)	86.8	[1710]
Zinc	(mg/kg)	23.3	[1440]J

CONSTITUENT	UNITS	NY-SCOL	MM-LP08-073003 07/30/2003
Benzo(a)anthracene	(ug/kg)	224	[190]J
Benzo(a)pyrene	(ug/kg)	61	[190]J
Benzo(b)fluoranthene	(ug/kg)	1100	[2000]J
Chrysene	(ug/kg)	400	[310]J
Dibenzo(a,h)anthracene	(ug/kg)	14	[50]J
Aluminum	(mg/kg)	5040	[5930]
Arsenic	(mg/kg)	7.5	[15.4]
Cadmium	(mg/kg)	1	[1.4]
Calcium	(mg/kg)	1690	[1700]
Chromium	(mg/kg)	10	[15]
Cobalt	(mg/kg)	30	[20]
Copper	(mg/kg)	25	[29]
Iron	(mg/kg)	10000	[37000]
Lead	(mg/kg)	3.7	[156]
Magnesium	(mg/kg)	2100	[1200]
Manganese	(mg/kg)	250	[370]
Nickel	(mg/kg)	15	[34]
Potassium	(mg/kg)	864	[1340]
Sodium	(mg/kg)	86.8	[1100]
Zinc	(mg/kg)	23.3	[1300]

CONSTITUENT	UNITS	NY-SCOL	MM-LP13-073003 07/30/2003
Aluminum	(mg/kg)	5040	[3110]
Arsenic	(mg/kg)	7.5	[8.6]
Copper	(mg/kg)	25	[210]
Iron	(mg/kg)	10000	[21000]
Lead	(mg/kg)	3.7	[1.5]
Magnesium	(mg/kg)	2100	[1410]
Manganese	(mg/kg)	250	[1080]
Nickel	(mg/kg)	15	[33]
Potassium	(mg/kg)	864	[1470]
Sodium	(mg/kg)	86.8	[1930]
Zinc	(mg/kg)	23.3	[1440]

CONSTITUENT	UNITS	NY-SCOL	MM-LP03-0505031.3-2 09/05/2003	MM-LP03-0505031.3-2 09/05/2003 Duplicate	MM-LP03-0505031.3-2 09/05/2003
Aluminum	(mg/kg)	5040	[3110]	[230]	3700
Arsenic	(mg/kg)	7.5	[7.6]	[7.6]	3.6
Copper	(mg/kg)	25	[210]	[214]	[15.3]
Iron	(mg/kg)	10000	[21000]	[9810]	[9.7]
Magnesium	(mg/kg)	2100	[1410]	[350]	[-]
Nickel	(mg/kg)	15	[-58]	[229]	[-19]
Potassium	(mg/kg)	864	[1470]	[11.5]	[-2]
Sodium	(mg/kg)	86.8	[1130]	[110]	[-100]
Zinc	(mg/kg)	23.3	[1400]	[429]	[-2]

CONSTITUENT	UNITS	NY-SCOL	MM-LP02-073003 07/30/2003	MM-LP02-0826310.010 08/26/2003
Benzo(a)pyrene	(ug/kg)	61	[250]J	53U
Aluminum	(mg/kg)	5040	[5700]J	4450
Arsenic	(mg/kg)	7.5	[6.7]J	[9.7]
Cadmium	(mg/kg)	1	[1.7]J	0.05U
Calcium	(mg/kg)	1690	[9920]J	1360
Chromium	(mg/kg)	10	[269]J	[34.1]
Cobalt	(mg/kg)	30	[62.3]J	3.4J
Copper	(mg/kg)	25	[35000]J	[203]
Iron	(mg/kg)	10000	[22500]J	5880
Lead	(mg/kg)	3.7	[449]J	[6.2]
Magnesium	(mg/kg)	2100	[2910]J	1570
Manganese	(mg/kg)	250	[610]J	832
Mercury	(mg/kg)	0.1	[0.92]J	0.01U
Nickel	(mg/kg)	15	[38200]J	[226]
Selenium	(mg/kg)	2	[473]J	[133]
Sodium	(mg/kg)	86.8	[4060]J	[124]
Zinc	(mg/kg)	23.3	[37300]J	[215]

CONSTITUENT	UNITS	NY-SCOL	MM-LP05-073003 07/30/2003	MM-LP05-0505031.0-1 09/05/2003
Benzo(a)anthracene	(ug/kg)	224	[510]J	34U
Benzo(a)pyrene	(ug/kg)	61	[500]J	52U
Chrysene	(ug/kg)	400	[540]J	55U
Aluminum	(mg/kg)	5040	[9570]	4560
Arsenic	(mg/kg)	7.5	[17.8]	[19.4]
Beryllium	(mg/kg)	0.32	[0.35]J	0.26J
Cadmium	(mg/kg)	1	[1.2]	0.13J
Calcium	(mg/kg)	1690	[5020]	[3190]
Chromium	(mg/kg)	10	[535]	8
Copper	(mg/kg)	25	[246]	[15]
Iron	(mg/kg)	10000	[12600]	[20000]
Lead	(mg/kg)	3.7	[66]	[10.5]
Magnesium	(mg/kg)	2100	[3150]	1770
Manganese	(mg/kg)	250	[274]	208
Mercury	(mg/kg)	0.1	[0.13]J	0.02
Nickel	(mg/kg)	15	[270]	[34]
Selenium	(mg/kg)	2	[18.9]	[29.8]
Sodium	(mg/kg)	86.8	[899]J	[111]
Zinc	(mg/kg)	23.3	[2240]J	[693]

CONSTITUENT	UNITS	NY-SCOL	MM-SS09-073003 07/30/2003
Arsenic	(mg/kg)	7.5	[14.9]
Barium	(mg/kg)	300	[407]
Beryllium	(mg/kg)	0.16	[0.35]
Calcium	(mg/kg)	5060	[3470]
Chromium	(mg/kg)	70.5	[232]
Copper	(mg/kg)	25	[1980]
Nickel	(mg/kg)	87.5	[335]
Potassium	(mg/kg)	498	[585]
Selenium	(mg/kg)	2	[28.9]
Sodium	(mg/kg)	96.4	[779]
Zinc	(mg/kg)	50.7	[859]

CONSTITUENT	UNITS	NY-SCOL	MM-SS07-072903 07/29/2003
Arsenic	(mg/kg)	7.5	[62.7]
Chromium	(mg/kg)	70.5	[95]
Copper	(mg/kg)	25	[370]
Lead	(mg/kg)	91.7	[96.1]
Nickel	(mg/kg)	87.5	[48]
Potassium	(mg/kg)	498	[575]
Selenium	(mg/kg)	2	[18.7]
Sodium	(mg/kg)	96.4	[969]
Zinc	(mg/kg)	50.7	[5530]

CONSTITUENT	UNITS	NY-SCOL	MM-LP06A-101003 10/10/2003	MM-LP06A-101003Z-2.5 10/10/2003
Aluminum	(mg/kg)	5040	[10500]	[8730]
Arsenic	(mg/kg)	7.5	[29.3]	[69]
Beryllium	(mg/kg)	0.32	[0.37]J	0.26J
Cadmium	(mg/kg)	1	0.15U	[7.2]
Calcium	(mg/kg)	1690	[3950]	[3550]
Chromium	(mg/kg)	10	[440]	[505]
Cobalt	(mg/kg)	30	16.3	[34.0]
Copper	(mg/kg)	25	[3580]	[15000]J
Iron	(mg/kg)	10000	[41100]	[18700]
Lead	(mg/kg)	3.7	[39.5]J	[279]
Magnesium	(mg/kg)	2100	[3370]	[2870]
Manganese	(mg/kg)	250	[330]	[341]
Mercury	(mg/kg)	0.1	0.15	[0.50]
Nickel	(mg/kg)	15	[294]	[32000]J
Selenium	(mg/kg)	2	[80.1]	[73]
Sodium	(mg/kg)	86.8	[303]	[984]
Thallium	(mg/kg)	ND	0.39U	[8.1]
Zinc	(mg/kg)	23.3	[2100]J	[8570]J

CONSTITUENT	UNITS	NY-SCOL	MM-SS11-072903 07/29/2003
Copper	(mg/kg)	25	[30.2]
Potassium	(mg/kg)	498	[655]
Zinc	(mg/kg)	50.7	[250]

CONSTITUENT	UNITS	NY-SCOL	MM-SS12-072903 07/29/2003
Copper	(mg/kg)	25	[19]
Potassium	(mg/kg)	498	[651]
Sodium	(mg/kg)	96.4	[72]
Zinc	(mg/kg)	50.7	[160]

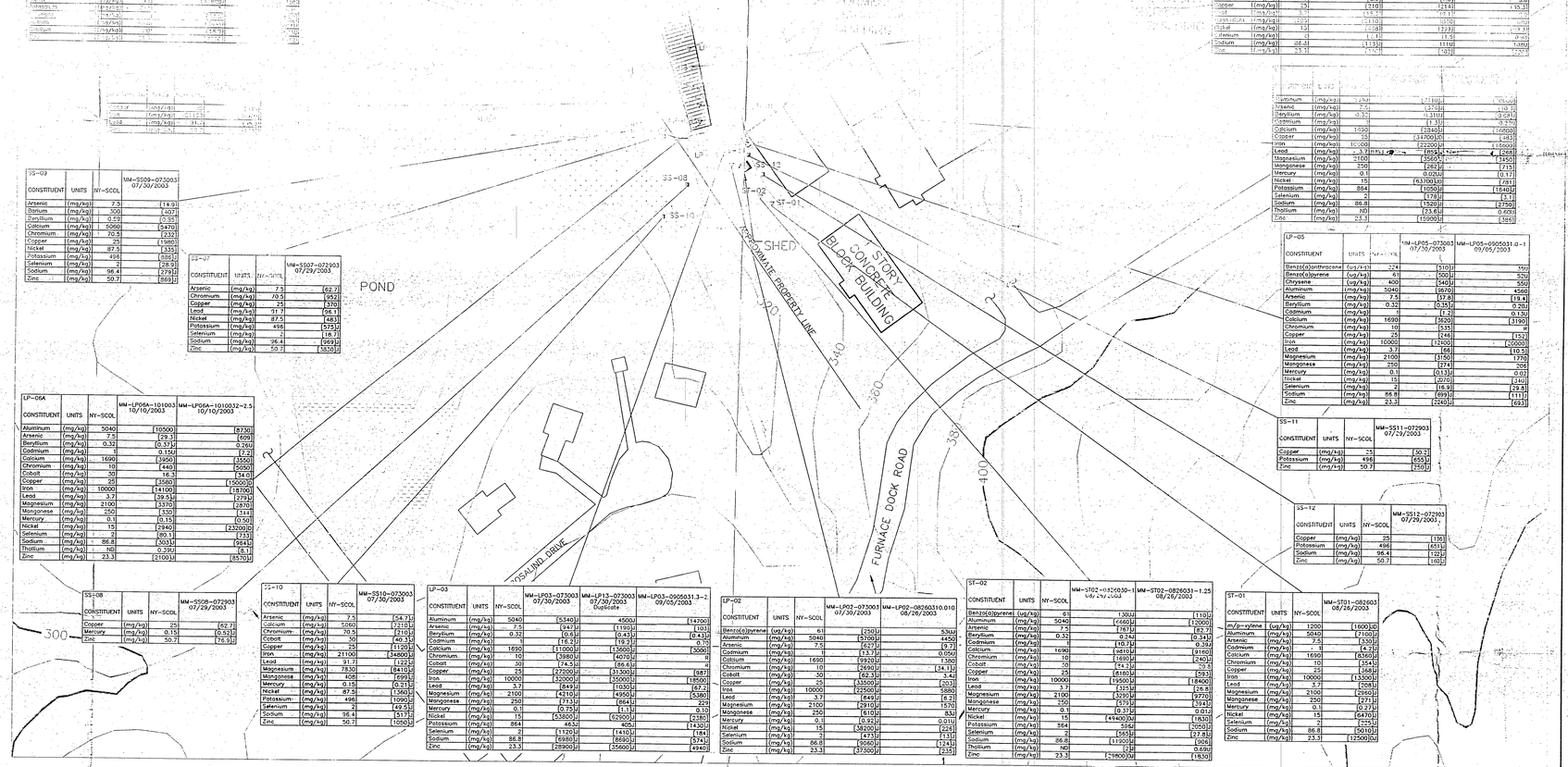
CONSTITUENT	UNITS	NY-SCOL	MM-SS08-072903 07/29/2003
Copper	(mg/kg)	25	[62.7]
Mercury	(mg/kg)	0.15	[0.52]
Zinc	(mg/kg)	50.7	[76.9]

CONSTITUENT	UNITS	NY-SCOL	MM-SS10-073003 07/30/2003
Arsenic	(mg/kg)	7.5	[54.7]
Calcium	(mg/kg)	5060	[2210]
Chromium	(mg/kg)	70.5	[210]
Cobalt	(mg/kg)	30	[40.3]
Copper	(mg/kg)	25	[1120]
Iron	(mg/kg)	21100	[34800]
Lead	(mg/kg)	91.7	[122]
Magnesium	(mg/kg)	7830	[8410]
Manganese	(mg/kg)	408	[699]
Mercury	(mg/kg)	0.15	[0.21]
Nickel	(mg/kg)	87.5	[1360]
Potassium	(mg/kg)	498	[1090]
Selenium	(mg/kg)	2	[49.5]
Sodium	(mg/kg)	96.4	[517]
Zinc	(mg/kg)	50.7	[1090]

CONSTITUENT	UNITS	NY-SCOL	MM-LP03-073003 07/30/2003	MM-LP13-073003 07/30/2003 Duplicate	MM-LP03-0505031.3-2 09/05/2003
Aluminum	(mg/kg)	5040	[5340]J	4500J	[14700]
Arsenic	(mg/kg)	7.5	[947]J	[1190]J	[103]
Beryllium	(mg/kg)	0.32	[0.6]J	[0.43]J	[0.43]J
Cadmium	(mg/kg)	1	[16.2]J	[19.2]J	0.75
Calcium	(mg/kg)	1690	[11000]J	[13600]J	[3000]
Chromium	(mg/kg)	10	[380]J	[407]J	8
Cobalt	(mg/kg)	30	[74.5]J	[86.6]J	7
Copper	(mg/kg)	25	[27000]J	[31300]J	[987]
Iron	(mg/kg)	10000	[32000]J	[35000]J	[18500]
Lead	(mg/kg)	3.7	[849]J	[1030]J	[67.2]
Magnesium	(mg/kg)	2100	[4210]J	[4950]J	[5380]
Manganese	(mg/kg)	250	[713]J	[864]J	229
Mercury	(mg/kg)	0.1	0.75J	[1.1]J	0.10
Nickel	(mg/kg)	15	[53800]J	[62900]J	[2380]
Potassium	(mg/kg)	864	463J	405J	[1430]
Selenium	(mg/kg)	2	[1120]J	[1410]J	[184]
Sodium	(mg/kg)	86.8	[6980]J	[8690]J	[574]
Zinc	(mg/kg)	23.3	[28900]J	[35600]J	[4940]

CONSTITUENT	UNITS	NY-SCOL	MM-ST02-0826030-1 08/26/2003	MM-ST02-0826031-1.25 08/26/2003
Benzo(a)pyrene	(ug/kg)	61	120U	[110]
Aluminum	(mg/kg)	5040	[6660]J	[12000]
Arsenic	(mg/kg)	7.5	[76]J	[82]
Beryllium	(mg/kg)	0.32	0.24J	[0.34]
Cadmium	(mg/kg)	1	[10.1]J	0.35J
Calcium	(mg/kg)	1690	[4810]J	[9160]
Chromium	(mg/kg)	10	[169]J	[240]
Cobalt	(mg/kg)	30	[14.3]J	7.5
Copper	(mg/kg)	25	[8160]J	[593]
Iron	(mg/kg)	10000	[19500]J	[18400]
Lead	(mg/kg)	3.7	[325]J	[26.8]
Magnesium	(mg/kg)	2100	[3290]J	[9770]
Manganese	(mg/kg)	250	[479]J	[394]
Mercury	(mg/kg)	0.1	[0.37]J	0.01J
Nickel	(mg/kg)	15	[49400]J	[1830]
Potassium	(mg/kg)	864	596J	[2050]
Selenium	(mg/kg)	2	[563]J	[27.8]J
Sodium	(mg/kg)	86.8	[11900]J	[906]
Thallium	(mg/kg)	ND	[1]J	0.69J
Zinc	(mg/kg)	23.3	[29800]J	[1830]

CONSTITUENT	UNITS	NY-SCOL	MM-ST01-082603 08/26/2003
m/p-xylene	(ug/kg)	1200	[1600]J
Aluminum	(mg/kg)	5040	[7100]J
Arsenic	(mg/kg)	7.5	[130]J
Cadmium	(mg/kg)	1	[4.2]
Calcium	(mg/kg)	1690	[6360]J
Chromium	(mg/kg)	10	[354]J
Copper	(mg/kg)	25	[368]J
Iron	(mg/kg)	10000	[13300]J
Lead	(mg/kg)	3.7	[208]
Magnesium	(mg/kg)	2100	[2960]J
Manganese	(mg/kg)	250	[271]J
Mercury	(mg/kg)	0.1	[0.27]J
Nickel	(mg/kg)	15	[6470]J
Selenium	(mg/kg)	2	[25]J
Sodium	(mg/kg)	86.8	[5010]J
Zinc	(mg/kg)	23.3	[12500]J



SOURCES:
1. CONTOUR LINES, FURNACE DOCK ROAD, AND FURNACE BROOK BELOW POND BASED ON MOHEGAN LAKE, NY AND PEEKSKILL, NY TOPOGRAPHIC QUADRANGLES, 7.5-MINUTE SERIES, DATED 1956 AND 1957, RESPECTIVELY, AND PHOTOREVISED IN 1981.
2. ADDITIONAL SURFACE FEATURES BASED ON WESTCHESTER COUNTY DEPARTMENT OF PLANNING AERIAL PHOTOGRAPH (SPRING 1990), DECEMBER 18, 1999 AERIAL PHOTOGRAPH, AND SURVEY DATA.
3. APPROXIMATE WETLAND AREA BASED ON FIELD OBSERVATIONS.

TETRA TECH FW, INC.

TITLE:
Soil Exceedances
Magna Metals
Cortlandt, New York

DWN: CTS	DES.: CTS	PROJECT NO.: 1172.0003
CHKD:	APPD:	FIGURE NO.: 4-1
DATE: 06/22/04	REV.: 0	

\GIS_RESKE1\GISPROJ3\MAGNA METALS\FIGURE 4-1 062204.DWG

BCLP02832

LEGEND

MW-01 MONITORING WELL LOCATION

320 CONTOUR LINE (20 FT INTERVAL)

GEOPHYSICAL SURVEY

APPROXIMATE WETLAND AREA

NOTES:
1. ALL GROUNDWATER RESULTS ARE REPORTED IN UG/L.

2. QUALIFIERS ARE DEFINED ON TABLE 4-2.

3. BRACKETS INDICATE AN EXCEEDANCE OF NYSDEC GROUNDWATER QUALITY STANDARDS (NY-GWQS).

4. LOCATIONS OF FORMER MAGNA METALS BUILDING, 1 STORY CONCRETE BLOCK BUILDING, SHED, GEOPHYSICAL SURVEY AREA, AND MONITORING WELLS ARE BASED ON SURVEY DATA.

SOURCES:
1. CONTOUR LINES, FURNACE BROOK ROAD, AND FURNACE BROOK BELOW POND BASED ON MOHEGAN LAKE, NY AND PEEKSKILL, NY TOPOGRAPHIC QUADRANGLES, 7.5-MINUTE SERIES, DATED 195[illegible] AND [illegible], RESPECTIVELY, AND PHOTOREVISED IN 1981.

[illegible] DECEMBER 18, 1999 AERIAL PHOTOGRAPH, AND SURVEY [illegible]

MW-04 CONSTITUENT	NY-GWQS	MM-GWMW04-100803 10/08/2003
cis-1,2-Dichloroethylene	5	[7.7]
Tetrachloroethylene	5	[13]
Trichloroethylene	5	[910]D
Arsenic	25	[133]
Barium	1000	[1140]
Beryllium	3	[5.6]
Chromium	50	[139]
Copper	200	[240]
Iron	300	[37200]
Magnesium	35000	[38600]
Manganese	300	[6400]
Nickel	100	[108]
Selenium	10	[131]
Sodium	20000	[76900]J
Thallium	0.5	[10.5]
Cyanide	200	[555]
Arsenic - Dissolved	25	[46.8]
Iron - Dissolved	300	[14300]
Manganese - Dissolved	300	[5810]
Selenium - Dissolved	10	[71.1]
Sodium - Dissolved	20000	[77800]J

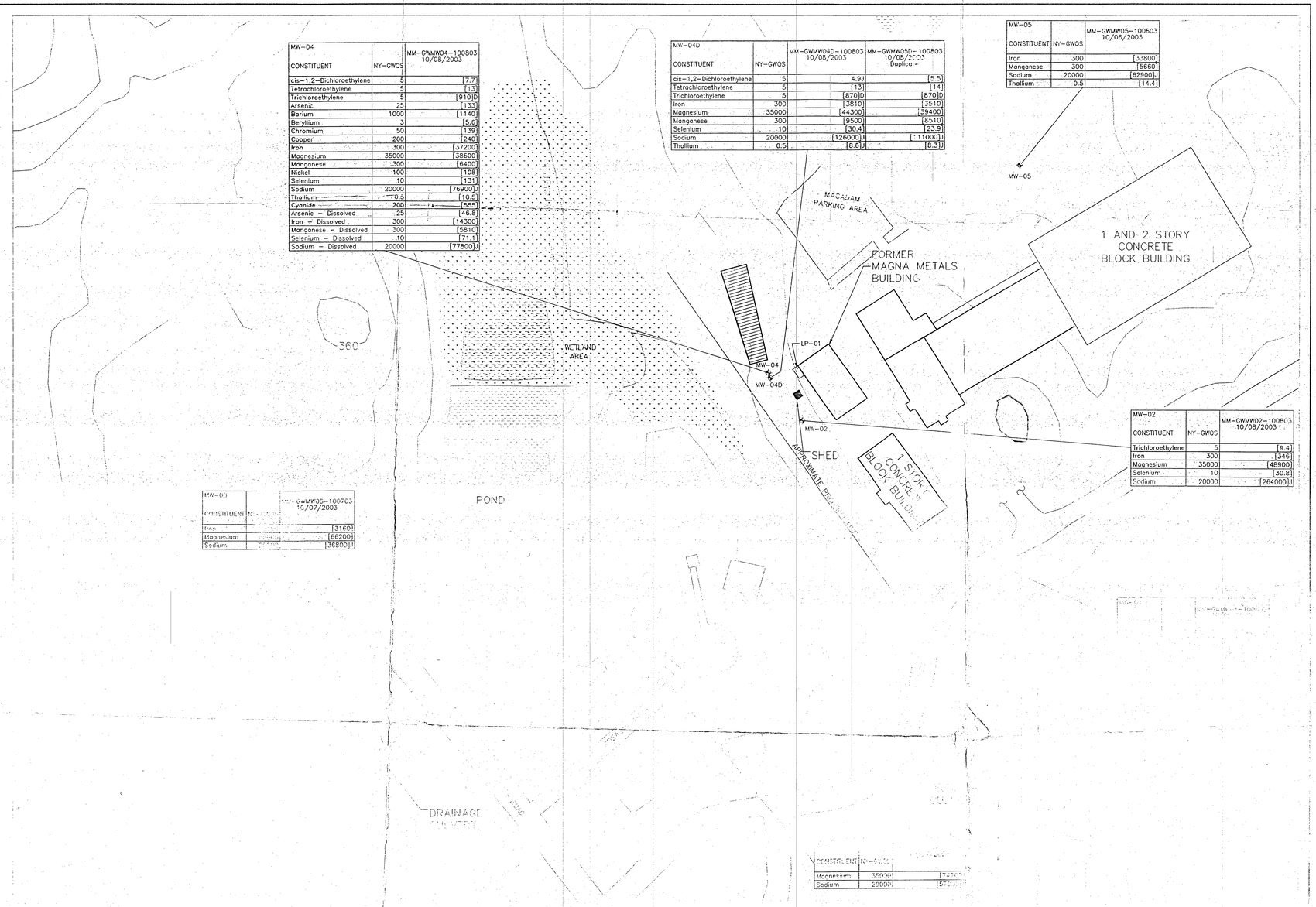
MW-04D CONSTITUENT	NY-GWQS	MM-GWMW04D-100803 10/08/2003	MM-GWMW05D-100803 10/08/2003 Duplicate
cis-1,2-Dichloroethylene	5	4.9J	[5.5]
Tetrachloroethylene	5	[13]	[14]
Trichloroethylene	5	[870]D	[870]D
Iron	300	[3810]	[3510]
Magnesium	35000	[44300]	[39400]
Manganese	300	[9500]	[6510]
Selenium	10	[30.4]	[23.9]
Sodium	20000	[126000]J	[111000]J
Thallium	0.5	[8.6]	[8.3]

MW-05 CONSTITUENT	NY-GWQS	MM-GWMW05-100803 10/08/2003
Iron	300	[33800]
Manganese	300	[5660]
Sodium	20000	[62900]J
Thallium	0.5	[14.4]

MW-02 CONSTITUENT	NY-GWQS	MM-GWMW02-100803 10/08/2003
Trichloroethylene	5	[9.4]
Iron	300	[346]
Magnesium	35000	[48900]
Selenium	10	[30.8]
Sodium	20000	[264000]J

MW-05 CONSTITUENT	NY-GWQS	MM-GWMW05-100703 10/07/2003
Iron	[illegible]	[3160]
Magnesium	[illegible]	[66200]
Sodium	[illegible]	[36800]J

CONSTITUENT	NY-GWQS	[illegible]
Magnesium	35000	[illegible]
Sodium	20000	[illegible]



TETRA TECH FW, INC.

TITLE:
Groundwater Exceedances
Magna Metals
Cortlandt, New York

DWN:	DES:	PROJECT NO.:
CTS	CTS	1172.0003
DATE: 06/21/04	REV.: 0	FIGURE NO.: 4-2

N:\GIS\GISKEY\GISPROJ31\MAGNA METALS\FIGURE 4-2 062104.DWG

BCLP02833

LEGEND

SW-5 SUPPLEMENTAL RI SURFACE WATER SAMPLE OR ELEVATION LOCATION

SD-15 SUPPLEMENTAL RI SEDIMENT SAMPLE LOCATION

320 CONTOUR LINE (20 FT INTERVAL)

GEOPHYSICAL SURVEY

APPROXIMATE WETLAND AREA

NOTES:
1. QUALIFIERS ARE DEFINED ON TABLES 4-4 AND 4-5.

2. BRACKETS INDICATE AN EXCEEDANCE OF NYSDEC SEDIMENT CRITERIA (NY-SC) OR NYSDEC WATER QUALITY STANDARDS – CLASS B (NYS-WQS-B).

3. SEDIMENT CRITERIA FOR PAHs WERE ADJUSTED BASED ON TOC SAMPLES TAKEN AT EACH LOCATION.

4. LOCATIONS OF FORMER MAGNA METALS BUILDING, 1 STORY CONCRETE BLOCK BUILDING, SHED, GEOPHYSICAL SURVEY AREA, AND MONITORING WELLS ARE BASED ON SURVEY DATA.

SOURCES:
1. CONTOUR LINES, FURNACE DOCK ROAD, AND FURNACE BROOK BELOW POND BASED ON MOHEGAN LAKE, NY AND PEEKSKILL, NY TOPOGRAPHIC QUADRANGLES, 7.5-MINUTE SERIES, DATED 1956 AND 1957, RESPECTIVELY, AND PHOTOREVISED IN 1981.

2. MANMADE PRIVATE FEATURES BASED ON WESTCHESTER COUNTY DEPARTMENT OF PLANNING AERIAL PHOTOGRAPHY [illegible] 1995, REVISED [illegible] 1997.

3. APPROXIMATE WETLAND AREA BASED ON FIELD OBSERVATION.

0 40 80
FEET

SW-13			MM-SW13-032904 03/29/2004
CONSTITUENT	UNITS	NY-WQS-B	
Aluminum	(ug/l)	100	[366]
Iron	(ug/l)	300	[327]J

SD-13			MM-SD13-033004 03/30/2004
CONSTITUENT	UNITS	NY-SC	
Nickel	(mg/kg)	50	[63.5]J

SW-22			MM-SW22-032904 03/29/2004
CONSTITUENT	UNITS	NY-WQS-B	
Aluminum	(ug/l)	100	[381]J
Cobalt	(ug/l)	5	[5.1]J
Copper	(ug/l)	16	[772]J
Iron	(ug/l)	300	[2020]J
Nickel	(ug/l)	94	[161]
Selenium	(ug/l)	4.6	[8.7]J
Zinc	(ug/l)	150	[343]J

SW-15			MM-SW15-032904 03/29/2004
CONSTITUENT	UNITS	NY-WQS-B	
Aluminum	(ug/l)	100	[328]

SD-15			MM-SD15-033004 03/30/2004
CONSTITUENT	UNITS	NY-SC	
Benzo(a)anthracene	(ug/kg)	52	[470]J
Benzo(a)pyrene	(ug/kg)	52	[660]J
Benzo(b)fluoranthene	(ug/kg)	52	[1200]J
Benzo(k)fluoranthene	(ug/kg)	52	[600]J
Chrysene	(ug/kg)	52	[650]J
Chromium	(mg/kg)	110	[158]J
Copper	(mg/kg)	110	[1040]J
Nickel	(mg/kg)	50	[332]J
Zinc	(mg/kg)	270	[528]J

SW-14			MM-SW14-032904 03/29/2004
CONSTITUENT	UNITS	NY-WQS-B	
Aluminum	(ug/l)	100	[690]
Copper	(ug/l)	16	[57.6]J
Iron	(ug/l)	300	[1670]J

SD-14			MM-SD14-033004 03/30/2004
CONSTITUENT	UNITS	NY-SC	
Copper	(mg/kg)	110	[672]J
Nickel	(mg/kg)	50	[300]J

SD-20			MM-SD20-033104 03/31/2004
CONSTITUENT	UNITS	NY-SC	
Copper	(mg/kg)	110	[241]J
Nickel	(mg/kg)	50	[200]J

SW-20			MM-SW20-032904 03/29/2004
CONSTITUENT	UNITS	NY-WQS-B	
Aluminum	(ug/l)	100	[358]J
Iron	(ug/l)	300	[363]J

SD-21			MM-SD21-040304 04/03/2004
CONSTITUENT	UNITS	NY-SC	
Copper	(mg/kg)	110	[403]J
Lead	(mg/kg)	110	[112]J
Nickel	(mg/kg)	50	[180]J

SD-24			MM-SD24-040304 04/03/2004
CONSTITUENT	UNITS	NY-SC	
Copper	(mg/kg)	110	[216]J
Nickel	(mg/kg)	50	[161]J

SD-22			MM-SD22-040304 04/03/2004
CONSTITUENT	UNITS	NY-SC	
Benzo(a)anthracene	(ug/kg)	13	[360]J
Benzo(a)pyrene	(ug/kg)	13	[410]J
Benzo(b)fluoranthene	(ug/kg)	13	[680]J
Chrysene	(ug/kg)	13	[510]J
Copper	(mg/kg)	110	[194]J
Nickel	(mg/kg)	50	[78]

SD-23			MM-SD23-040304 04/03/2004
CONSTITUENT	UNITS	NY-SC	
Benzo(b)anthracene	(ug/kg)	130	[180]
Chrysene	(ug/kg)	130	[150]
Copper	(mg/kg)	110	[130]
Nickel	(mg/kg)	50	[177]

SW-17			MM-SW17-033104 03/31/2004
CONSTITUENT	UNITS	NY-WQS-B	
Aluminum	(ug/l)	100	[542]
Iron	(ug/l)	300	[663]J

SD-17			MM-SD17-033104 03/31/2004	NY-SCOC	Exceedance
CONSTITUENT	UNITS	NY-SC			
Benzo(a)anthracene	(ug/kg)	98.8	[320]J	78	[242]
Benzo(a)pyrene	(ug/kg)	98.8	[370]J	78	[292]
Benzo(b)fluoranthene	(ug/kg)	98.8	260]J	78	182]
Benzo(k)fluoranthene	(ug/kg)	98.8	220]J	78	142]
Chrysene	(ug/kg)	98.8	180]J	78	102]
Chromium	(mg/kg)	110	166]J	110	[56]
Copper	(mg/kg)	110	327]J	110	[217]
Nickel	(mg/kg)	50	[97]	50	[47]
Zinc	(mg/kg)	270	[214]	270	[-56]

SW-19			MM-SW19-032904 03/29/2004
CONSTITUENT	UNITS	NY-WQS-B	
Aluminum	(ug/l)	100	[728]J
Copper	(ug/l)	16	[22.6]J
Iron	(ug/l)	300	[2180]J

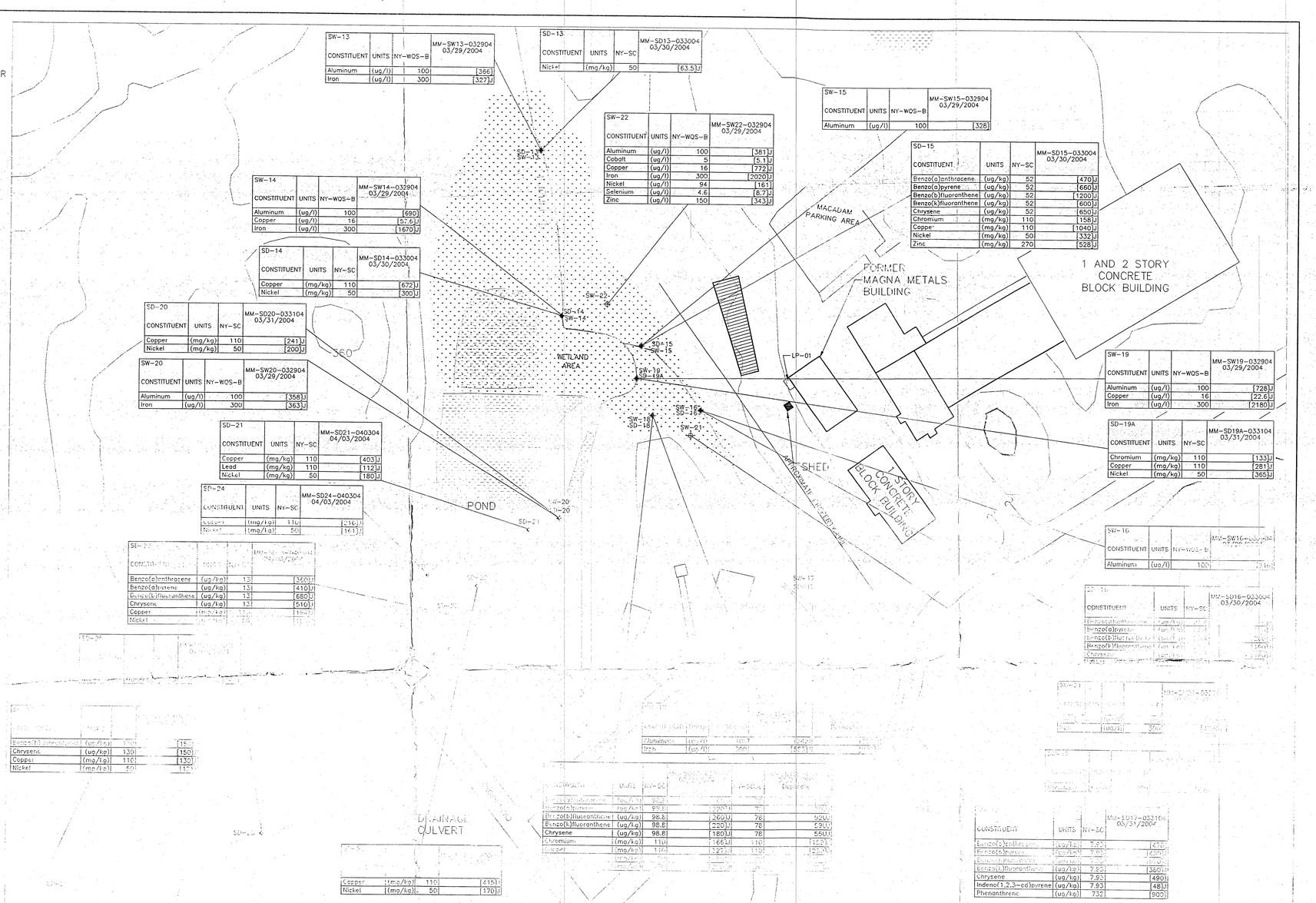
SD-19A			MM-SD19A-033104 03/31/2004
CONSTITUENT	UNITS	NY-SC	
Chromium	(mg/kg)	110	[133]J
Copper	(mg/kg)	110	[281]J
Nickel	(mg/kg)	50	[365]J

SW-16			MM-SW16-033104 03/31/2004
CONSTITUENT	UNITS	NY-WQS-B	
Aluminum	(ug/l)	100	[31]J

SD-16			MM-SD16-033004 03/30/2004
CONSTITUENT	UNITS	NY-SC	
Benzo(a)anthracene	(ug/kg)	[illegible]	[illegible]
Benzo(a)pyrene	(ug/kg)	[illegible]	[illegible]
Benzo(b)fluoranthene	(ug/kg)	[illegible]	[illegible]
Benzo(k)fluoranthene	(ug/kg)	[illegible]	[illegible]
Chrysene	(ug/kg)	[illegible]	[illegible]
PAHs	(ug/kg)	[illegible]	[illegible]

SW-21			MM-SW21-033104 03/31/2004
CONSTITUENT	UNITS	NY-WQS-B	
Aluminum	(ug/l)	100	[illegible]
Iron	(ug/l)	300	[illegible]

SD-21			MM-SD21-033104 03/31/2004
CONSTITUENT	UNITS	NY-SC	
Benzo(a)anthracene	(ug/kg)	7.93	[270]
Benzo(a)pyrene	(ug/kg)	7.93	[430]J
Benzo(b)fluoranthene	(ug/kg)	7.93	[430]J
Benzo(k)fluoranthene	(ug/kg)	7.93	[360]J
Chrysene	(ug/kg)	7.93	[490]
Indeno(1,2,3-cd)pyrene	(ug/kg)	7.93	[48]J
Phenanthrene	(ug/kg)	732	[900]



TETRA TECH FW, INC.

TITLE:
Sediment and Surface Water Exceedances
Magna Metals
Cortlandt, New York

DWN: CTS	DSGN: CTS	PROJ. NO. 112G0002
CHK:		
DATE: 06/21/04	REV.: 0	FIGURE NO. 4-3

N:\GIS\GISKEY\C-SPROJ31\MAGNA METALS\FIGURE 4-3 062104.DWG

BCLP02834