Annual Groundwater Monitoring Report Year 11 (May 2007- May 2008)

Groundwater Recovery and Treatment System
Former Miller Container Site
Site #7-38-029
Fulton, New York

Submitted To:
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-1010

Prepared for:
Miller Brewing Company
3939 West Highland Boulevard
Milwaukee, Wisconsin 53201-0482

Prepared by:
Earth Tech Northeast, Inc.
40 British American Blvd.
Latham, New York 12110

August 2008

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

1.0 INTRODUCTION

This report presents information concerning the data collection, analyses, results, conclusions, and recommendations for the remedial systems operations at the former Miller Brewing Company (MBCo) Container Site (the "Site"), Registry #7-38-029 located in the Town of Volney, Oswego County, New York . This report presents all information pertaining to the Eleventh Year of operations at the Site during the period from May 1, 2007 through May 1, 2008.

Additionally, this report presents the results of a supplemental site investigation (SSI) performed in April-June 2008. The purpose of the SSI was to locate and delineate to the extent practical any residual free-phase chlorinated solvents remaining in the subsurface soils within the Northern Operable Unit Source Area and Southern Operable Unit Source Area of the Site.

The Site Location Map is included as **Figure 1-1**. The Site Plan is included as **Figure 1-2**.

1.1 BACKGROUND

Detailed background, site history, and chronology of significant events have been previously reported.

1.2 DESIGN SUBMITTALS

The engineering design of the remedial system was developed in four submittals. The 100% design submittal, dated August 1996, consisted of the following:

Volume I - Design Report
Volume II - Technical Specifications
Volume III - Design Drawings
Volume IV - Health and Safety Plan
Volume V - Construction Quality Assurance Plan

The detailed engineering design submittals were reviewed by NYSDEC and approved in correspondence dated 7 August 1996.

1.3 SYSTEM CONSTRUCTION AND START-UP

The formal system start-up operation period was conducted to demonstrate consistent conformance with the performance goals of the system design. The start-up period was initiated on 26 February 1997 and continued for six months until 29 August 1997. Upon demonstration that the system performed to required specifications, Operation, Maintenance and Monitoring (OM&M) of the remedial system commenced and has continued since that time.

1.4 FINAL ENGINEERING REPORT

The Final Engineering Report was submitted to the New York State Department of Environmental Conservation (NYSDEC) in December 1997. A Contingency Plan and an Operation Maintenance and Monitoring Plan for the remedial system were submitted to NYSDEC in May 1998 as supplements to the Final Engineering Report. The Contingency Plan outlines the procedures to be conducted if the remedial system fails to achieve any of the goals of the ROD.

1.5 ANNUAL REPORTS

Earth Tech prepared and submitted annual groundwater monitoring reports for the first ten years of system operations (May 1, 1997 through May 1, 2007). Those reports documented the operation maintenance and monitoring of the system and its effectiveness.

1.6 OTHER STUDIES AND REPORTS

A number of supplemental studies and/or pilot projects have been conducted on-site to evaluate alternative treatment technologies including Permeable Reactive Barrier Walls and Enhanced Reductive Dechlorination. Based on the results of those studies and conclusions reported by Earth Tech in previous annual groundwater monitoring reports and in reports prepared by others and submitted to NYSDEC, there is some evidence in the data that a potential source of sustained release of chlorinated solvents may remain in the soils beneath the facility.

A Soil Vapor Intrusion (SVI study) was conducted by O'Brien & Gere (OBG) Engineers and reported to NYSDEC. The study was performed to evaluate the potential for the intrusion of site-related contaminants in the soil vapor beneath the floor slab soil gas to have impacted the indoor air quality. The SVI study reported elevated concentrations of contaminants beneath the slab. However, the concentrations of site related compounds were reported to be less than both NYSDOH air guideline values and OSHA permissible exposure limits in the indoor air samples.

A conceptual design for a soil vapor intrusion (SVI) mitigation system was developed by OBG in the event that the slab or site conditions changed. Suction points were located inside the building were included in the plans for sub-slab depressurization. The final design and installation of the system was estimated at 10 weeks for completion.

In September 2007, Chrysteel sold the site to Riccelli Enterprises. The design and installation of the SVI mitigation system was placed on hold pending details from Riccelli concerning planned renovations to the former container building so that these renovations could be accommodated within the sub-slab system design. As of October 1, 2008, Miller has not yet received the details of the renovations and it plans to meet with Riccelli in the fall of 2008 to review the results of the results of the supplemental site investigation completed this year and discuss the status of existing and potential supplemental site remedial measures.

In February 2008, an Enhanced In-Situ Bioremediation system Pilot Study Report was completed by OBG and transmitted to NYSDEC. The purpose of the EISB pilot test activities was to provide an assessment of the viability of EISB as a remedial alternative to ground water extraction and treatment and consider the appropriateness of a site-wide implementation of the EISB approach.

The Report concluded that the natural groundwater flow conditions were not conducive to **a passive** EISB approach. Source control under a forced gradient might be appropriate but it was determined that the implementation of such an approach would not significantly reduce the time to achieve groundwater SCGs.

2.0 REMEDIAL SYSTEM OPERATION

This section presents a summary of the operational monitoring performed for the eleventh year of operations in general accordance with the Operations, Maintenance & Monitoring Plan. The OM&M Plan includes detailed maintenance and monitoring procedures and was approved by NYSDEC.

2.1 GROUNDWATER RECOVERY SYSTEM

The groundwater recovery system has been in operation at the site since February 1997. A discussion of the pertinent operational requirements, as well as the monitoring activities conducted during the tenth year of operation is presented below.

2.1.1 Recovery System Operation

A total of thirteen serviceable groundwater recovery wells, RW-1 through RW-13, are located on-site. Pumping of RW-1 was permanently discontinued on August 21, 2003 with the consent of NYSDEC Pumping of RW-2 was permanently discontinued on April 21, 2000 with the consent of NYSDEC (Discontinued recovery wells are highlighted in red for easy reference). The well pumps for RW-2 and RW-1 were removed and placed in storage at the treatment facility. The wells remain serviceable but no groundwater was recovered from these wells during the monitoring period.

Due to operation of this remedial system migration of contaminated groundwater in the Northern Operable Unit (NOU) and Southern Operable Unit (SOU) groundwater plumes is hydraulically controlled through the continuous pumping of 11 groundwater recovery wells (i.e., seven wells in the NOU groundwater plume, RW-3, RW-4, RW-5, RW-10, RW-11, RW-12, RW-13 and four wells in the SOU groundwater plume, RW-6, RW-7, RW-8 and RW-9).

Pumping of RW-4 in the NOU-source area and RW-6, RW-7, and RW-8 in the SOU-source area was suspended on August 15, 2005, with the consent of the NYSDEC as part of a pilot study performed by OBG to test the efficacy of various biological reductive enhanced dechlorination substrate additives being. The results of the that pilot study have been reported to NYSDEC. Approval for resumption of pumping at RW-4, RW-6, RW-7, and RW-8 was received from NYSDEC on April 4, 2008. Pumping at RW-4 and RW-8 resumed on May 28, 2008.

With the consent of NYSDEC RW-6 and RW-7 remained off-line pending completion of the Supplemental Site Investigation.

With the consent of NYSDEC, these wells remained off during the completion of a Supplemental Site Investigation (SSI). The results of the SSI are included in this report. Consequently, RW-4, RW-6, RW-7, and RW-8 were not in operation during this reporting period. (The temporarily suspended recovery wells are highlighted in blue for easy reference). All other recovery wells were in continuous operation during the monitoring period except for brief intermittent power outages.

2.1.2 Recovery System Monitoring

2.1.2.1 Precipitation and Water Table Elevation

Precipitation data was collected daily at the City of Fulton municipal well field throughout the reporting period. The data is used to evaluate recharge, shallow aquifer hydrology, and system performance. A summary of the daily precipitation data for the reporting period and a graph of that data are included in Appendix B. Total precipitation includes rain and snow-water equivalent (SWE) from snowfall. The municipality no longer collects snow data and rainfall data separately.

A review of the data indicates that the total precipitation for the May 2007 -May 2008 reporting period was 50.39 inches. The average annual rainfall for the area over the past 11 years is approximately 43 inches.

The depth to water is measured monthly in all of the site-related monitoring and recovery wells, at the City of Fulton municipal well field. The depth to water is converted to water table elevations and used to contour the site water table, update the site hydrological conceptual model as necessary, assist in the evaluation of the recovery and treatment system performance, and assess the impact of the recovery system dynamics on the aquifer. A summary table of the recorded precipitation data, depth to water and calculated water table elevations at each monitoring well for each month of the reporting period is included in **Appendix A**.

2.1.2.2 Recovery Well Flow Monitoring

Each groundwater recovery well is fitted with a magnetic-inductance totalizer that records the total flow volume in gallons (manufacturer's cut-sheets were included in the system design submittals). The flow volumes measured by the totalizers were recorded 64 times (that is approximately five times per month) during the reporting period. The total flow volume from the recovery well network for each monitoring period was determined by the difference in totalizer readings at the beginning and end of each period.

The flow rate in gallons per minute for each well was determined by dividing the total flow volume in gallons by the number of days (times 1440 min/day) in the period. Based on the totalizer readings, approximately 4.98 million gallons (MG) of groundwater was recovered during the eleventh year of operations. The total volume of groundwater recovered during the 11 years of operation is estimated at 176.48 MG.

Prior to the temporary shutdown RW-4, RW-6, RW-7, and RW-8, the recovery system was operating at an average pumping rate of approximately 36,644 gallons per day (gpd), or 25.45 gallons per minute (gpm). After suspension of pumping at RW-4, RW-6, RW-7, and RW-8 on August 15, 2005, the average pumping rate was reduced to 13,763 gpd (a reduction of 63%) at an average of 9.56 gpm. It is anticipated that the resumption of pumping at these wells will restore recovery form these four wells to their pre-suspension flow rates

During the past monitoring period the system was operating at a combined average daily flow rate of 13,619 gallons per day or 9.46 gpm. The total system recovery reduced from 9.56 to 9.46 gpm (2%) This slight additional decrease in total recovery well production over last year's production is believed to be the result of temporary biofouling of RW-5 and RW-9 due to the biological bloom caused by the in-situ enhanced biological reductive dechlorination field-scale pilot study performed by OBG. Both wells have experienced a reduction in recovery rates of over an order of magnitude since the injection of the dechlorination enhancing substrates. It is anticipated that these wells will return to higher pumping rates once the effects of the biofouling have been cleared.

The flow rates in down gradient recovery wells RW10, RW-11, RW-12, and RW-13 do not demonstrate any trend indicating a loss of efficiency or any effect from the pilot test substrate injections. These wells are substantially beyond the area of influence of the substrate infusion grids and would not be expected to show any impacts from the pilot tests. Recorded totalizer readings and the calculated flow rates for each operational recovery well are included in tabular format in **Appendix B**. A summary table of recovery well flow rates during the last annual monitoring period is included as **Table 2-1.**

2.1.2.3 Analytical Sampling

Groundwater samples are collected periodically from selected wells and submitted for laboratory analysis. The purpose of the monitoring is to generate the data necessary to evaluate the effectiveness of the system at controlling the migration of contamination to the City of Fulton municipal well field and recovering contaminated groundwater in the NOU and SOU groundwater plumes.

Table 2-2 contains a listing of the monitoring wells and analytical methods used for each sampling location and event. The samples are analyzed for the parameters on the USEPA Methods 601/602 lists, plus xylene. In addition, select monitoring wells (see Table 2-2) are analyzed for the compounds on the USEPA Method 624 list due to the potential presence of ketone compounds.

The Early Warning Network wells identified in **Table 2-2** are used to assess the impact to water quality immediately upgradient of and within the cone of influence of municipal wells M-2A and K-1. The Supplementary Monitoring Well Network and the Recovery Well Network identified in Table 2-2 are sampled to monitor the effectiveness of the recovery system. All wells were sampled quarterly.

Groundwater samples are collected monthly from the production wells (K-1 and M-2A) at the City of Fulton municipal well field and from the influent to and effluent from the water treatment facility (WTF). The samples are analyzed for the parameters included on the USEPA Method 502.2 list. Additionally, effluent samples are analyzed for total coliform and E.coli. The production wells and influent samples are collected to assess groundwater quality. The effluent samples are collected to evaluate the effectiveness of the treatment facility. The frequency of water level monitoring, the frequency of sampling and the analytical methods are presented in **Table 2-3**.

Field parameters were measured by sampling personnel using portable field instruments. An independent, NYSDOH Environmental Laboratory Approval Program (ELAP) certified analytical laboratory analyzed the remaining parameters.

Quality Control (QC) samples are collected monthly and include trip blanks and blind duplicates.

2.2 GROUNDWATER TREATMENT SYSTEM

The groundwater treatment system was installed at the site to reduce contaminant concentrations in recovered groundwater to concentrations suitable for discharge. A discussion of the operations as well as the maintenance and monitoring activities for the system is presented below.

2.2.1 Treatment System Flow

The groundwater recovery and treatment system was fully operational in February 1997. Based on daily calculations of the flow from the treatment system storage tanks to the air stripper tower, the total volume of groundwater treated during the eleventh year of operation was approximately 4.61 million gallons. The average flow through the treatment system before the shutdown of RW-4, RW-6, RW-7, and RW-8 was approximately 27.23 gpm. The total system through-put has been reduced 64.6 % to 9.63 gpm since the pumping of RW-4, RW-6, RW-7, and RW-8 was suspended.

A comparison of the daily treatment system totalizer data to the periodic recovery well totalizer data indicates that the recovery well systems recorded approximately 370,000 gallons more flow than the treatment system through-put. This difference is approximately 7% of the total flow, which is more than the ±2% margin of error specified by the manufacturers cut-sheets (see design submittals) for the individual pieces of flow monitoring equipment. However, since each of the recovery well flow measurements can be off by as much as ± 2% the difference between the recovery well and treatment plant flows could be off by as much as ± 28% with all wells pumping without indicating any problem with the system.

2.2.2 Treatment System Monitoring

Monthly monitoring of the groundwater treatment system was conducted to demonstrate SPDES substantive compliance of the system, to assist in the ongoing evaluation of the effectiveness of the system in remediating the collected groundwater, and to refine the degree and frequency of routine maintenance needs. A log of the pertinent groundwater treatment system operating variables (e.g., flow rates, air stripper exhaust pressure, upstream and downstream pressures in the filter vessels and activated carbon beds, and other general observations) was developed throughout the remediation period and is maintained on file in the Process Treatment Building. System operating variables are recorded in this log on a daily basis.

Treatment system performance has been demonstrated through the collection and analysis of samples at various locations within the process train. A summary of the treatment system-monitoring program is presented in **Table 2-4**.

Monthly sampling of the system effluent was performed to demonstrate compliance with the SPDES permit. To date, no concentration of any compound of concern has been detected in excess of the permit limits. In accordance with the SPDES permit, the results of the effluent monitoring are reported to NYSDEC monthly. Monthly sampling of the treatment system influent is also conducted to provide the basis for the ongoing evaluation of the effectiveness of the system.

All samples collected were taken as single grab samples from sample ports on the appropriate process lines or tanks. Sampling was conducted in a manner such that the samples were representative of normal treatment process operation. A New York State Department of Health ELAP-certified laboratory analyzed all samples. **Table 2-5** identifies the parameters, methods, method references, holding times, preservatives, and container specifications for analysis of the treatment system samples.

2.3 HAZARDOUS WASTE RESIDUALS

Groundwater treatment operations generate hazardous waste residuals because of the separation processes incorporated in the treatment system and by regular maintenance operations. These wastes include:

- silts/sludges from filters;
- pre-filtration system components (i.e., filter bags);
- oil sludge from the oil/water separator; and
- disposable personal protective equipment such as gloves, coveralls, etc.

The wastes generated at the site are stored in 55-gallon drums inside the treatment building prior to off-site disposal. These activities comply with applicable State and Federal regulations concerning permitting, accumulation, record keeping and reporting for large quantity generators (LQGs).

2.3.1 Accumulation and Storage

Any hazardous wastes (spent carbon, filter bags, etc.) that may be generated from the treatment process are properly stored within the treatment building, which is designed to provide adequate secondary containment in case of a leak or tank/drum rupture. Additionally, specific labeling and storage requirements, as specified in the approved OM&M plan, for the hazardous waste containers are in affect, as well as minimum preparedness and prevention measures for contingency situations.

2.3.2 Record Keeping and Reporting

Complete historical record keeping and reporting requirements relative to the treatment facility, including manifesting and labeling waste shipments and preparation of annual generators reports as needed are maintained and stored on-site. Waste manifests are also completed for each shipment of hazardous waste sent off-site and the appropriate copies distributed. Original signed copies are retained at the facility for a minimum of three years after shipment. Prior to shipment, a waste profile for each waste type is obtained.

No waste materials requiring off-site disposal were generated during this reporting period.

3.0 REMEDIAL SYSTEM PERFORMANCE

This section describes the overall remedial system performance during the eleventh year of system operations based on evaluation of the groundwater monitoring data.

3.1 GROUNDWATER RECOVERY SYSTEM

Four of the eleven recovery wells (RW-4, RW-6, RW-7, and RW-8) were taken offline with the consent of NYSDEC in August 2005 for a pilot study and were not operational during the reporting period. Seven groundwater recovery wells (RW-3, RW-5, RW-9, RW-10, RW-11, RW-12, and RW-13) were in continuous operation during the reporting period. The total volume of groundwater recovered during the 11th year of operations was 4,984,776 gallons. The average recovery rate for the entire system for the year was 13,619 gpd. The following sections discuss contaminant removal by the recovery wells and the influence of the recovery well system on groundwater flow.

3.1.1 Contaminant Removal

Periodic monitoring of groundwater recovery volumes and analysis of samples collected from each recovery well and the equalization tank of the treatment system was conducted during the 11th year of operation. **Table 3-1** presents a summary of the groundwater sampling results for each of the recovery wells for Year 11.

The total mass removal for year 10 was reportedly less than 10% of the annual mass removal rate prior to the suspension of pumping of RW-4, RW-6, RW-7, and RW-8. Since these wells have remained off-line during the entire monitoring period and the recovery rates for RW-3 and RW-5 have been significantly reduced due to bio-fouling of the aquifer, the total mass removal in Year 11 has been reduced even further. Based of the well pumping rates and the concentration of total chlorinated volatile organic compounds (CVOCs) in each of the operational pumping wells, the total mass removal is estimated at less than 3.5 lbs.

The monitoring results from the recovery wells reflect the types and concentrations of contaminants being recovered from each individual well during the reporting period. Graphs of analyte concentrations versus time for each of recovery well and summary tables of all historical groundwater data for each recovery wells are included in Appendix E.

The total mass of CVOCs recovered from the aquifer during the first eleven years of operation was reported at approximately 523.8 lbs (180 lbs - year 1, 100 lbs - year 2; 50 lbs - year 3, 35 lbs - year 4, 47 lbs - year 5, 37.4 lbs - year 6, 27.9 lbs- year 7, 32.4 lbs- year 8, 10.42 lbs-year 9, 3.68 lbs-year 10, and 3.5lbs- year 11).

3.1.2 Groundwater Capture

No appreciable or significant changes to the water levels are apparent in quarterly groundwater elevation monitoring data compared to previous year's conditions. The overall groundwater flow pattern across the site has not significantly changed with the discontinuation of pumping at RW-4, RW-6, RW-7, and RW-8 or from the reduction in flow rates in RW-3, RW-5, and RW-9. As previously reported by Earth Tech, the drawdown and cones of depression caused by the recovery well network has minimal impact on the overall flow patterns (at the macro scale) beyond the immediate vicinity of the recovery wells.

3.2 GROUNDWATER TREATMENT FACILITY

The groundwater treatment facility (GWTF) was in continuous operation throughout the monitoring period. Based on the daily totalizer readings of the flow rate from the GWTF storage tanks to the air-stripper tower, a total of 4.6 MG was treated by the plant from May 1, 2007 through April 30, 2008 at an average rate of 12,613 gpd (8.76 gpm).

3.2.1 Influent Sampling and Results

Samples are collected from the in-line sampling port on the feed line from the treatment plant equalization tank to the Air Stripper Tower (AST) on a monthly basis and analyzed for the parameters listed in Table 2-3. The results of this sampling are reported to NYSDEC monthly. The equalization tank combines the groundwater from the operating recovery wells prior to injection to the AST.

Table 3-2 presents a summary of the sampling results of the treatment system influent monitoring for the eleventh year of operation. These results represent the types and concentrations of contaminants being removed by the system. Graphical analysis of the treatment system influent data indicates that the total and average concentration of each compound and the total CVOCs continue to decline slowly (or remain constant compared to the previous year). Graphs of the treatment system monitoring results are included in Appendix G.

The primary contaminants recovered were PCE, cis-1, 2-DCE, and TCA. Other CVOCs recovered included 1,1-DCE, 1,1-DCA, and TCE. Benzene, Chloroform, Ehtylbenzene, Methylene Chloride, Toluene, Vinyl Chloride, MEK, MIBK, and Xylene were not detected in any influent sample collected during the annual monitoring period. No significant change over previous reporting periods was observed in the relative contributions of individual contaminants.

3.2.2 Effluent Sampling and Results

Samples of the treated groundwater effluent are collected concurrently with the influent sampling events and analyzed for the same suites of parameters to evaluate the effectiveness of the treatment system. The results of these sampling events are reported directly to NYSDEC.

The results of monthly effluent sampling of the AST indicated that all compounds were reported below the method detection limits. Based on the sample results, the treatment system has demonstrated effective treatment of the recovered contaminants to the substantive requirements of the SPDES Permit.

4.0 GROUNDWATER MONITORING RESULTS

Groundwater quality is routinely monitored on a quarterly basis through the collection and analysis of groundwater samples from the municipal production wells, early-warning network wells, supplemental network wells, and the recovery well network. As noted in Section 2.1.2 (see Table 2-2), the municipal wells continue to be sampled monthly.

The site is divided into three functional areas; the Northern Operable Unit (NOU), the Southern Operable Unit (SOU), and the municipal well field (MWF). The NOU and SOU are each divided into a source area and a plume area. Additionally, for reporting purposes the NOU-plume is divided into two areas, the NOU-plume and Taylor Property, roughly along the former axis of the plume as delineated in the RI.

Each of the regularly scheduled sampling events were completed and the results submitted to NYSDEC in separate monitoring reports. Analytical data summaries for monitoring well networks and concentration plots over time are included in Appendix I.

4.1 NORTHERN OPERABLE UNIT

Groundwater quality in the NOU is evaluated through the quarterly sampling of 17 wells; 4 recovery wells (RW-3, RW-4, RW-5, and RW-13), ten early-warning monitoring wells (MW-8I, MW-8D, MW-13D, MW-17D, MW-38S, MW-51D, MW-56D, MW-61D, MW-62S, and MW-63S), and 3 supplemental wells (MW-2S, MW-3D, and MW-16D). All of these wells are within or downgradient of the contaminant plume. RW-4 was taken offline in August 2005, and was not sampled during this monitoring period. All of the identified wells except for MW-62S have historically exhibited concentrations of TCA, 1,1-DCA, PCE, TCE, 1,1-DCE, and/or c-1, 2-DCE in excess of the SCGs. For reporting purposes, the NOU is divided into three areas, the NOU-Source area, the NOU-Plume area, and the NOU-Taylor Property area. The results for each of these area are discussed in the following sections,

4.1.1 NOU - Source Area

Two recovery wells (RW-3 and RW-5), three early-warning network wells (MW-38S, MW-62S, and MW-63S) and three supplemental network wells (MW-2S, MW-3D, and MW-16D) were sampled quarterly to monitor the groundwater quality in the NOU source area.

Summary

The compounds and concentrations reported in the samples collected from each of NOU Source area monitoring wells during this monitoring period were generally consistent with those reported in previous monitoring periods. The concentrations of individual compounds fluctuated somewhat with an overall decreasing trend in both the total and average concentrations being reported with some notable exceptions.

During this reporting period, the concentrations of individual compounds and the total CVOCSs detected in Recovery Well RW-3 decreased from approximately 750 µg/l to approximately 450 µg/l. Additionally, the ratio of PCE to its daughter products has increased.

The decreased concentrations observed in RW-3 are likely to be due to the reduced pumping capacity of the well. Evidence discussed in Section 5 indicates the RW-3 is pulling a dissolved phase plume being generated in the soils beneath the building down into the deeper portion of the aquifer. With the reduction in pumping rate, the associated cone of depression is substantially smaller and the contaminant plume being less drawn to the well and thus being more highly diluted. The increase in the ratio parent

(PCE) to daughter (TCE and DCE) products demonstrates the loss of effectiveness of the impact from the enhanced reductive dechlorination substrate additions and a return to previous conditions

RW-5 continues to demonstrate a slight decreasing trend in both individual and total CVOCS concentrations. The ratio of PCE to its daughter products appears to have decreased slightly from 12-1 to approximately 10-1 but the results are inconclusive. No readily apparent effect of the discontinuation of pumping at RW-4 or from the substrate injections was apparent in the concentrations of CVOCs observed in samples collected from RW-5 during this reporting period.

As previously reported, the total average CVOC concentration in samples collected from MW-38S increased from approximately 360 µg/L in 2005 to 740 µg/L in 2006 after discontinuation of pumping at RW-4. The average concentration remained at 690 µg/l during the past four monitoring events. This increase in the reported concentration in MW-38S continues to support the conclusion first reported in the Fifth Year Annual Report that a source area may remain in the vicinity of MW-38S. However, since that time additional wells (PZ-1 and PZ-2), two pilot tests, and the SSI have collected additional information in this area. No evidence of a source for the rebound in CVOC concentrations in MW-38S has been found.

The concentrations of individual and total CVOCs reported in samples collected from MW-62S and MW-63S was non-detect. The last reported detectable concentration of chlorinated compounds in either of these wells was in September 2002.

4.1.2 NOU - Plume Area

One recovery well (RW-13) and seven early-warning network wells (MW-8I, MW-8D, MW-13D, MW-17D, MW-51D, MW-56D, and MW-61D) were sampled quarterly during the reporting period to monitor the groundwater quality in the NOU plume area. As previously reported, no shallow groundwater wells are included in the monitoring well network for this area.

As demonstrated by the results of the RI, and the first several years of monitoring, the dissolved contaminant plume in the NOU source area is present only in the intermediate and deep aquifer in the area east of the pond (and its drainage ditch) and north of the facility access road. It is believed that this is the result of a north-south oriented dynamic shallow water groundwater divide associated with the pond and its drainage ditch. The divide effectively prevents the migration of shallow contamination from the NOU source area.

Summary

The effectiveness of hydraulic containment in the NOU plume area is generally indicated by the trends in the concentrations of contaminants of concern observed in RW-13, MW-8I and MW-8D (within the capture zone of RW-13) and in downgradient well MW-13D. The concentrations of individual and totalCVOCss reported in samples collected from RW-13, MW-8I and MW-8D continue to demonstrate a fluctuation about a slowly declining average total concentration trend. Total CVOCs concentrations during the reporting period ranged from 0.54 µg/l in MW-8I to 46.1µg/l in MW-8D.

The overall declining trends observed over time suggest that groundwater capture by RW-13 in the NOU plume area is slowly reducing the contaminant concentrations along the northern edge of the plume downgradient from the source area. The data indicates that RW-13 effectively maintains hydraulic control.

4.1.3 NOU-Taylor Property

Groundwater quality in the NOU plume area beneath and about the former Taylor Property downgradient of the shallow groundwater divide and south of the facility access road, is evaluated through the monitoring of 3 recovery wells (RW-10, RW-11, and RW-12), and 8 Early Warning Network wells (MW-14D, MW-21S, MW-25S, MW-25D, MW-32D, MW-33S, MW-34D and MW-35D).

These wells have historically exhibited concentrations of TCA, 1,1-DCA, PCE, 1,1-DCE, and/or cis-1,2-DCE at concentrations that exceeded the concentrations in down gradient municipal wells K-2, M-2, and M-2A. As previously reported, the concentration of individual and total CVOCs had steadily declined since initiation of pumping at RW-11, RW-12, and RW-13. However, during this year's monitoring period, the total concentration of CVOCs has remained somewhat constant with a slight increase in TCA (particularly in RW-11).

Summary

The reported concentration of individual and total CVOCs in samples collected from RW-10, RW-11, and RW-12 continues to demonstrate the declining trend reported in previous year's reports. No individual compound was reported at a concentration in excess of 5 µg/L except PCE. PCE was reported at a maximum concentration of 6.5 µg/l in the sample collected from RW-11 in January 2007.

Monitoring wells MW-14D, MW-21S, MW-25S, MW-25D, MW-32D, MW-33S, MW-34D and MW-35D are within the projected capture zones of one or more of the Taylor Property recovery wells. The total average concentration of individual and total CVOCs has fluctuated somewhat but continues to demonstrate an overall decreasing trend. Contaminant concentrations in all of these wells, except MW-34D, have been reduced by an order of magnitude (90%) since the initiation of groundwater recovery from the recovery wells. The concentrations of individual compounds are nearing or below the SCGs in most of these wells.

The average concentration of total CVOCs in MW-34D has been reduced approximately 71% from 87.1 µg/l to 25.3 µg/l since January 2000. The concentration of PCE and 1,1,1-TCA in MW-34D remains consistently higher than the concentrations of these compounds in nearby recovery well RW-11 but continues to demonstrate a decreasing trend in both total and total average concentration.

The concentrations of total and 4-Period average total CVOCs in the Taylor Property monitoring well network continue to demonstrate a declining trend with fluctuations between successive monitoring events. These declining trends demonstrate the effectiveness of the Taylor Property recovery wells at maintaining hydraulic control and remediation of the groundwater plume.

Monitoring wells MW-25S and MW-25D are located down gradient of the Taylor Property and beyond the projected influence of the composite cone of depression formed by pumping the recovery wells. Groundwater samples from both wells were non-detect for all analytes during the reporting period. No CVOCs have been detected in MW-25D since 1999 and Earth Tech has recommended that the sampling of this well be discontinued. Toluene has been occasionally detected in MW-25S at concentrations less than 5 µg/l. The last reported detection was in July 2005 at 1.7 µg/l.

4.2 SOUTHERN OPERABLE UNIT

Groundwater quality in the SOU is monitored by periodic sampling of four recovery wells (RW-6, RW-7, RW-8, and RW-9), one early-warning network monitoring wells (MW-37I) and three supplemental network monitoring wells (MW-36S, MW-47S, and MW-48S). RW-6, RW-7, and RW-8 were temporarily taken offline in August 2005. For reporting purposes, the SOU is divided ibnto two areas, the SOU-Source area and the SOU-plume area. The results for each of these areas are discussed in following sections.

RW-6, RW-7, MW-36S, MW-47S, and MW-48S are within the SOU source area. RW-8, RW-9, and MW-37I are within or immediately down gradient of the SOU plume. All of these wells have historically exhibited significant concentrations of 1,1,1-TCA, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, and/or vinyl chloride.

4.2.1 SOU – Source Area

RW-6, RW-7, MW-36S, MW-47S, and MW-48S are within the SOU source area. These wells were historically sampled semi-annually. With the consent of NYSDEC, due to the collapse of the dissolved plume back onto the recovery well network, a significant reduction in the total area residually impacted, and discontinuation of required monitoring for a number of wells that had exhibited no detections for several years, the site-wide sampling frequency for all wells was changed to quarterly commencing in April 2004. Data collected from these wells is used to evaluate the effectiveness of the recovery wells at preventing the down gradient migration of contamination toward the NOU-Taylor Property, and the City of Fulton municipal wells. However, no samples were collected from RW-6 or RW-7 during the reporting period.

MW-36S is located approximately 75 feet southeast of RW-7 and assumed to be beyond or near the edge of the projected composite capture zone of the recovery wells in SOU-Source area. This well is sampled quarterly to evaluate the potential for contamination from the SOU-Source area to migrate cross gradient toward the southern property boundary.

The concentration of individual and total CVOCs in MW-36S historically fluctuates somewhat with a declining trend through 2005. However, the concentration increased in the two 2006 sampling events from approximately 42 µg/l to 119 µg/l in the January 2006 event. Since that time, the total concentration has declined steadily with a total CVOC concentration of 47.7 µg/l reported in April 2007. Review of the quarterly monitoring data indicates that the concentration of vinyl chloride in MW-36S increased after initiation of the pilot test. The concentration increased from 17 µg/l in July 2005 to 44 µg/l in October 2006 then subsequently declined to 3.1 µg/l in April 2007. During this same period, the concentration of 1,2-DCE increased from 48 µg/l to 75 µg/l and then declined to 38 µg/l.

MW-47S and MW-48S are located near recovery wells RW-6 and RW-7 and within the estimated capture zones of those wells. These wells had been sampled semi-annually to evaluate the effectiveness of the SOU-Source area recovery wells. Since pumping at RW-6 and RW-7 was temporarily suspended, sampling of these wells was continued to evaluate the effects of non-pumping/static conditions.

The combined concentration of DCE and VC in samples collected from MW-48S increased from approximately 500 µg/l in April 2005 to 3,610 µg/l in October 2006. By April 2007, the concentration had declined to 2,110 µg/l. The concentration of both of these compounds is substantially greater than what had previously being reported in RW-6 and RW-7.

A somewhat similar effect appears in the results of samples collected at MW-47S. The concentration of DCE, reported at 4.5 µg/l in April 2005, increases to 25 µg/l in October 2005 then decreases to 15 µg/l in October 2006 and 9.8 µg/l in April 2006. However, the concentration of DCE in MW-47S has historically fluctuated erratically with occasional spikes of 50+ µg/l and vinyl chloride was not detected in this well either before or after the pilot test.

Summary

Three SOU shallow zone monitoring wells (MW-36S, MW-47S and MW-48S) located near recovery wells RW-6 and RW-7 have been periodically sampled over the ten-year treatment period. The concentrations of individual and total CVOCs fluctuated during the reporting period in all wells; however, the average total CVOC concentrations were lower than the previous reporting period.

A slight increase in total CVOC concentrations was observed during the October 2005 sampling event, after the recovery wells were taken offline. The historical data indicates that the October sampling event typically exhibits a spike in concentrations that is likely associated with seasonal variables. However, based on other data observed in the monitoring wells some of the increase is likely that some of the result of the discontinuation of pumping at RW-6 and RW-7.

Review of the relative concentrations of the primary contaminants and their daughter products appears to indicate some effect from the enhanced reductive dechlorination pilot test on the groundwater in this area. However, these monitoring wells are significantly upgradient and beyond the anticipated area of influence of the test areas. Consequently, the observed results are more likely to be associated with the altered pumping conditions.

4.2.2 SOU – Plume Area

Groundwater quality in the SOU plume area is monitored by routine sampling of two recovery wells (RW-8 and RW-9), two early-warning network wells (MW-37I and MW-54I), and one supplemental network well (MW-27S). Recovery well RW-8 was not sampled during this reporting period.

The concentrations of total CVOCs in RW-9 declined by over 60% from 9,281 µg/l to 3,194 µg/l during the last monitoring period. From this, it appear that the substrate injection immediately upgradient of RW-9 has had a significant effect on the concentration of contaminants in the groundwater at this well. However, some or all of this reduction could also result from increased dilution resulting from an increased percentage of the total groundwater recovered being generated from less contaminated down gradient areas due to the changes in aquifer properties caused by fouling of the upgradient formation by the substrate injections.

Monitoring well MW-37I is located slightly south of, and halfway between SOU-Source area recovery well RW-7 and SOU plume area recovery well RW-8. With the discontinuation of pumping at RW-6 and RW-7 in the SOU-Source area in August 2005 it might be expected to see the concentrations of individual and total CVOCs at this location increase as hydraulically control of the source area migration is no longer being maintained. However, the concentration of individual and total CVOCs declines 53%-66%. During this same period, the ratio of PCE to its daughter product DCE doubles (from 0.44-1 to 0.88-1), while the ratio of DCE to its daughter VC remains constant at 14-1.

Monitoring well MW-54I, located southeast of RW-8, has historically exhibited very low CVOC concentrations. No contaminants of concern had been reported in samples collected from this well since February 2000. However, both TCA and DCA were reported in all four quarterly sampling events at this location. The maximum reported concentration was 1.7 µg/l of DCA in the April 2007 sampling event.

MW-27S is located midway between the SOU plume area and the Taylor Property near the southern limit of the Site. This well acts as an early warning well for the possible migration of contaminants in the shallow zone from the SOU off-site to the south. No CVOCs were detected in this well during the reporting period.

Summary

A significant reduction in the concentrations of individual and total CVOCs was reported in RW-9 during the monitoring period. This is a direct result of the substrate infusion pilot test. However, it is unclear if this change is due to contaminant reduction from the dechlorination process or if changes in hydraulic properties of the formation caused by the substrate. It was previously noted that the flow rates at RW-9 have been reduced dramatically since the initiation of the pilot test, suggesting the flow path of water to RW-9 or the well screen has be fouled. The observed reduction may be the result of dechlorination of the PCE or the result of this fouling. A review of the ratios of PCE to its daughter product cis-1,2-DCE in RW-9 indicates that the ratio of these compounds changed from approximately 25-1 to approximately 3-1 since initiation of the pilot study indicting that the pilot test was very successful at reductively dechlorination the PCE therefore it is considered likely that most of the observed reduction in total CVOCs was the result of reductive dechlorination.

The results for MW-37I are curious and counter intuitive. It would be natural to assume that the concentration of contaminants would increase due the loss of hydraulic control with the temporary suspension of pumping at RW-6 and RW-7. However, the opposite occurred. Considering that MW-37I is within approximately 50 feet of one of the pilot test injection grids it is likely that the continued reduction in contaminant concentrations at this location is a direct result of the injections.

The results for MW-54I indicate that in the absence of hydraulic control there may be a naturally existing preferential migration pathway for the plume with low concentrations of TCA and DCA along the southern property boundary. However, the reported concentrations of TCA and DCA at this location have never been greater than the 5 µg/l and therefore it does not represent a significant issue. Earth Tech's previous recommendation for discontinuation of sampling at this well location is withdrawn until sufficient data is available to demonstrate that the concentration of any individual site-related compound at this location will not increase above 5 µg/l.

4.3 CITY OF FULTON MUNICPAL WELL FIELD

4.3.1 Groundwater Quality

Sampling of the groundwater from municipal wells K-1 and M-2A is conducted monthly to evaluate the groundwater quality in the aquifer used by the City of Fulton municipal water supply system. Additionally, early-warning monitoring wells MW-10I, MW-28S, and MW-28I are sampled to provide early detection of the migration of site related compounds to the municipal well field from the Site.

No contaminants were reported in any samples collected from municipal well K-1 during the reporting period at a concentration that exceeded the SCGs. Additionally, no compounds were reported in any samples collected from K-1 at a concentration that exceeded the method detection limits of 0.5 µg/l.

No contaminants were reported in any samples collected from municipal well M-2A during the reporting period at a concentration that exceeded the SCGs. Two compounds, PCE and TCA, were reported in all samples collected during the monitoring period at concentrations that exceeded the method detection limits of 0.5 µg/l. PCE was reported ranging from 0.93 to 1.5 µg/l and TCA was reported ranging from 1.0 to 1.7 µg/l. The general trend in the concentration of individual and total CVOCs reported in this well continues to decline slowly over time.

MW-10I has been historically non-detect since its installation and remained so throughout the reporting period. Earth Tech has recommended the discontinuation of sampling for this well in previous annual reports and the collected data continues to support that recommendation.

MW-28S showed a slight declining trend in total CVOC concentration over the reporting period. PCE has been the only compound detected in MW-28S since 2001 and the concentration of PCE has fluctuated somewhat since that time with a slight decreasing trend. The PCE concentration during the last monitoring period continues to remain close to or less than 0.5 µg/l.

The concentration of individual and total CVOCs in samples collected from MW-28I has demonstrated a slight increasing trend for the first two quarterly sampling events then declined to the same concentrations reported in last year's annual report. No individual compound has been reported at a concentration in excess of ambient water quality standards since December 2002.

Summary

No individual compound has been detected in the municipal wells at concentrations in excess of the SCGs stated in the ROD since April 2000.

The combined flow influent of wells K-1 and M-2A to the pre-treatment plant has reported no detectable concentrations greater than 0.5 µg/l of site any related contaminant since January 2005.

The data conclusively demonstrates that the groundwater recovery and treatment system at the Site has achieved the SCGs at the limits of the AOC as defined by and required in the ROD. Additionally, the recovery system is effectively preventing the migration of contamination from the source areas to the municipal well field.

4.3.2 Pre-Treatment Facility Monitoring

Influent and effluent samples are collected monthly at the City of Fulton pre-treatment facility. Influent samples are collected from the combined flow of K-1 and M-2A prior to injection into the air stripper tower after mixing in the equalization tank. The effluent from the air stripper is sampled prior to addition to the municipal water system distribution holding tanks.

No CVOCs were detected at a concentration that exceeded the method detection limits of 0.5 µg/l in any influent samples to the WTF air stripper tower during the entire reporting period except in the January 2007 sampling event. TCA was reported in the January 2007 sampling event at 0.57 µg/l. However, according to the City's pumping records maintained on-site, municipal well K-1 was offline for maintenance at the time that influent sample was collected. Consequently, this sample result is attributable to well M-2A only and does not represent the combined flow from both wells.

The concentrations of contaminants have been historically non-detect at < 0.5 µg/l in samples of the effluent of the pre-treatment system for the City of Fulton municipal wells. No compounds were reported in the effluent during the reporting period.

Summary

Based on the data, the combined influent to the municipal water pre-treatment plant has been effectively reduced to the required system design standard of less than the 0.5 µg/l. Consequently, pre-treatment of the combined flow of K-1 and M-2A is no longer required.

5.0 SUPPLEMENTAL SITE INVESTIGATION

At the request of MBCo, Earth Tech conducted a Supplemental Site Investigation at facility. The Investigation was performed utilizing a Geoprobe Membrane Interface Probe equipped with a temperature and pressure probe, flame and photoionization detectors, and an electron capture device. Geoprobe and MIP services were provided by Zebra Environmental Corp. (Zebra). The purpose of the investigation was to delineate to the extent practical the lateral and vertical extent of dissolved phase contamination in identified areas of concern and to evaluate the potential for residual DNAPL to remain in the subsurface.

5.1 INTRODUCTION

Based on historical data and site history, there are three potential areas where residual chlorinated solvents may still be present in the subsurface soils. Interpretation of historical site data indicated that two potential residual source areas may be present in the NOU: the former drum storage area near MW-38S; and, the former drum storage area spill containment tank immediately north of the west end of the building. The data also suggests that there may be a residual source area associated with the former product and process USTs near RW-6 and RW-7 in the SOU. The locations of these three areas are depicted on **Figure 5-1.**

Although it is possible that DNAPL may be present at the base of the silty sand aquifer underlying the site at a depth of 40 to 70 feet below grade the concentrations of dissolved phase contaminants historically observed in the recovery and monitoring well networks do not support this hypothesis. It was therefore considered more likely that residual chlorinated solvents remained trapped in the soil in the upper silty alluvium within the upper 30 feet of the overburden.

The investigation was performed utilizing a modified USEPA Triad approach using the results collected in the field to direct the investigation. A number of initial borings were advanced about the center of each area concern. Additional subsequent borings were then added until sufficient information was collected to complete the investigation of each area.

5.1.1 Project Personnel

Mr. Kevin P. McGrath, CPG, Earth Tech Inc.,	Project Manager
Mr. Gary Mullen, Earth Tech Inc.,	Field Oversight
Mr. Brad Carlson, ZEBRA Environmental	Data Analyst
Mr. John Diamond, ZEBRA Environmental	Geoprobe Operator
Mr. Will McAllister, ZEBRA Environmental	MIP Operator

5.1.2 Summary of Equipment

The following list includes the equipment used for this project. More in-depth descriptions of specific sensor capabilities are included in other sections of this report.

Model 5400 Geoprobe unit

1. Electrical Conductivity (EC) / Membrane Interface Probe (MIP) Unit
2. Probe Rods

Data Acquisition Vehicle

- MIP 3500 controller unit
- MIP 6500 Series Probe (120v)
- PEEK Trunklines
- FC5000 Field Computer
- Printer
- Hewlett Packard 5890 Series II Gas Chromatograph fitted with an Electron Capture Detector (ECD), Photo Ionization Detector (PID) and a Flame Ionization Detector (FID)
- Electrical generator
- Compressed Gas Cylinders

Electrical Conductivity Probe Capabilities

The electrical conductivity (EC) probe measures the relative electrical conductivity of soil and ground water in contact with the probe, and provides a means to estimate the relative grain size distribution of the soil particles. Higher relative electrical conductivity measured by the probe should be interpreted as indicative of the presence of more colloidal sized soil particles compared with soil horizons exhibiting lower conductivity. The soil zones with lower relative electrical conductivity measured by the probe should be interpreted as indicative of less colloidal sized soil particles, and the presence of a greater percentage of silt and sand sized particles.

The EC probe data will also be influenced by other electrolytes in the soil or aquifer. Salt water intrusion, brine spills, excessive fertilizer applications or other events that increase the loading of ions in the soil/aquifer matrix will influence EC results.

Membrane Interface Probe Capabilities

The Membrane Interface Probe (MIP) is a percussion tolerant CVOC sensor that can continuously log volatile organics that diffuse through a semi-permeable membrane. Using a carrier gas, the CVOC's are brought to the surface through tubing, which is connected to a laboratory grade Electron Capture Detector (ECD), Photoionization Detector (PID) and Flame Ionization Detector
(FID) for immediate screening. All of these detectors are mounted in a Hewlett Packard 5890 Series II Gas Chromatograph cabinet..

The Membrane Interface Probe (MIP) measures the relative concentration of Volatile Organic Compounds (VOCs) in the soil and aquifer adjacent to a sampling window in the probe body. Heating of the soil and aquifer in direct contact with the probe increases the potential volatilization of the CVOCs which can move through a membrane in the sampling window in response to the concentration gradient on either side of the membrane.

Once the CVOCs have diffused through the membrane, they are entrained in a carrier gas that delivers them to detectors in an above-ground gas chromatograph. The detectors produce a signal deflection in response to the CVOCs, which is captured and stored for future interpretation. The MIP can detect the presence of CVOCs, but does not produce concentration data or specific compound speciation. The lower limit of detection is influenced by the in situ conditions, the contaminants, the detectors used and other on site conditions. In general, halogenated compounds are detected at lower concentrations compared to non-halogenated organic compounds.

Since these data are relative to each other, collection of discrete soil or groundwater samples adjacent to one or more of the MIP probe locations for comparison to the response data can be used to standardize the results. Care must be taken to ensure that the samples are collected at the specific portions of the profile where the MIP data was collected. The inherent non-homogenous nature of soil and aquifer materials will result in some inconsistency between MIP data and quantitative analytical results, so the standardization process will not be completely precise.

The following is a description of the ECD, PID and FID

Electron Capture Detector (ECD)

Highly sensitive detector used to detect Hydrocarbons (ionization potential < 10.7 eV)
Compounds of Interest: Chlorinated Compounds (Halogentated)
Detection Sensitivity approximately 250 ppb – 2500 ppb
Detection Range: approximately 10.7 eV

The radioactive Nickel 63 sealed inside the ECD detector emits electrons (beta particles) which collide with and ionize the make-up gas molecules (either nitrogen or P5). This reaction forms a stable cloud of free electrons in the ECD detector cell. The ECD electronics work to maintain a constant current equal to the standing current through the electron cloud by applying a periodic pulse to the anode and cathode. The standing current value is selected by the operator; the standing current value sets the pulse rate through the ECD cell, a standing current value of 300 means that the detector electronics will maintain a constant current of 0.3 nanoamperes through the ECD cell by periodically pulsing. If the current drops below the set standing current value, the number of pulses per second increases to maintain the standing current.

When electronegative compounds enter the ECD cell from the column, they immediately combine with some of the free electrons, temporarily reducing the number remaining in the electron cloud. When the electron population is decreased, the pulse rate is increased to maintain a constant current equal to the standing current. The pulse rate is converted to an analog output, which is acquired by the HP data system. Unlike other detectors, which measure an increase in signal response, the ECD detector electronics measure the pulse rate needed to maintain the standing current.

Photo Ionization Detector (PID)

Highly sensitive detector used to detect Hydrocarbons (ionization potential < 10.6 eV)
Compounds of Interest: Volatile Organic Hydrocarbons (Aromatic)
Detection Sensitivity: approximately 1 ppm
Detection Range: approximately 1 ppm to 10,000 ppm
Dynamic Range: approximately 10E6 μV

The Photo Ionization Detector (PID) responds to all molecules whose ionization potential is below 10.6eV, including aromatics and molecules with carbon double bonds. The PID is nondestructive, so the sample can be routed through the PID and passed on, in series, with the FID.

Flame Ionization Detector

Highly sensitive detector used to detect Hydrocarbons
Compounds of Interest: Volatile Organic Hydrocarbons
Detection Sensitivity: > 100 PPB
Detection Range: approximately 100 ppb to 100,000 ppm
Dynamic Range: approximately 10E7 µV

The Flame Ionization Detector (FID) is the most popular detector. Its popularity is due to its universal response and its ease of use. The FID responds to carbon and therefore produces a signal for all carbon containing compounds. The FID responds to any molecule with a carbon-hydrogen bond, such as aliphatic straight chained molecules, but its response is either poor or nonexistent to compounds such as CCl_4 or NH_3. Since the FID is mass sensitive, and not concentration sensitive, changes in the carrier gas flow rate have little effect on the detector response. It is preferred for general hydrocarbon analysis. The FID response is stable from day to day. It is generally robust and easy to operate. But because it uses a hydrogen diffusion flame to ionize compounds for analysis, it destroys the sample in the process.

5.2 FIELD ACTIVITIES

5.2.1 MIP Borings

The field investigation commenced on April 28, 2008 and was completed on May 29, 2008 in two mobilizations. The investigation consisted of the collection of EC/MIP logs at twenty two (22) initial locations between April 28 and May 1, 2008 and an additional thirteen (13) locations completed on May 28 and May 29, 2008. The initial twelve MIP locations were pre-selected by Earth Tech. Subsequent probe points were selected in the field based on previous probe results and findings.

After processing the results of the initial mobilization in consultation with MBCo, a second mobilization was conducted to add additional bounding points and fill apparent data gaps around suspected hot spots. As a result of the second round mobilization, a fourth area of concern was identified and delineated. The results for each area of concern are discussed separately in the following sections.

At each location the EC/MIP probe was advanced to the target depth in 1 foot intervals. The target depth for each probe was established at refusal or the depth at which observed contamination had reduced to approximately 25% of its measured peak response in the boring. As the probe was being driven to depth, the electrical conductivity data and detector responses were being continuously recorded by the system's data acquisition hardware and software. Upon completion of the logging, the probe rod assembly was extracted from the ground and cleaned, and the borehole filled with Bentonite. At the completion of each boring, the data was processed and uploaded directly to an internet share point site for review by the project manager and data analyst.

The locations of exterior probe points were measured with a portable GPS array mounted to the mast of the Geoprobe. Interior locations could not be accurately located with the GPS due to interference and consequently were measured from known fixed points inside the building and manually added to the site map. Exterior locations are estimated to be within ½ meter of their actual location, interior locations are estimated to be within 1 meter of their actual location The locations of each of the 35 MIP locations are included on **Figure 5-2.**

5.2.2 Well Installations and Sampling

After review of the MIP data logs, groundwater monitoring wells were installed at four locations. One well was installed at each of four locations determined to represent the highest potential for dissolved phase contamination based on the ECD results. The wells were installed using the Geoprobe drilling rig to drive a 2.25-inch diameter MacroCore spoon samplers to the required depth. Continuous soil cores were collected in 4 foot increments from grade to the final pre-selected depth at three of the four locations. (continuous core sampling was not performed at MW-69 due to time constraints).

Each well was constructed with a five (5) or ten (10) foot length of 1.75-inch Geoprobe pre-pack monitoring well screen and sufficient riser to extend to grade. A bentonite seal was placed on top of the filter pack and the remainder of the boring backfilled with cuttings. A flush mount protective cover was installed over the well.

Groundwater samples were collected approximately 1 week after construction of the wells. The wells were gauged and purged with a dedicated micro-bailer prior to sampling. One groundwater sample was collected from each well and submitted for analysis for CVOCs using either USEPA Method 601/602 (MW-67S and 68S) or 8260B (MW-69 and MW-70). Laboratory services were provided by Life Science Laboratories, East Syracuse, NY.

5.3 MIP INVESTIGATION RESULTS

The overall results of the MIP Investigation are presented in the "Data Visualization Report" included in **Appendix X**. and discussed in Section 5.4. The following sections discuss the results for each of the three areas of concern identified in Section 5.1 and a fourth area of concern discovered during the investigation.

5.3.1 AREA 1: Former Drum Storage Area

Area 1 is the open field north of the former drum storage area in northern parking area in the vicinity of MW-38S. Anecdotal evidence has suggested that empty drums had been rinsed and emptied in this area. Analysis of historical monitoring well data for MW-38S has indicated that high concentrations of CVOCs are present in this well in association with high water levels or excessive precipitation events. Since discontinuation of pumping at RW-4 water levels and contaminant concentrations in MW-38S have been notably higher than was previously being reported.

A total of 6 MIP points (EMIP-1, EMIP-2, EMIP-3, EMIP-4, EMIP-24, and EMIP-25) were installed in this area. Since the objective was to identify an assumed shallow source area, the initial four points were installed to 12 feet below grade. After review of the data, additional points (EMIP-24 and EMIP-25 were installed to refusal at approximately 25 feet below grade.

Two (EMIP-1 and EMIP-2) of the four MIP locations about MW-38S reported a slightly ECD response (approximately 100,000 μV) in the vadose zone above the water table, assumed at approximately 9.5 feet below grade based on water level in MW-38S). EMIP-3 and EMIP-4 reported an ECD response below the water table at a maximum of approximately 400,000 μV. EMIP-24 reported a spike (400,000 μV) in the soil above the water table at 4 feet below grade that reduced to baseline by 6 feet below grade and slight response in the water peaking at 175,000 μV at 15 feet below grade. EMIP-25 reported a spike of 250,000 μV at the surface that reduced rapidly and continuously with depth.

Based on these results, it appears that some residual soil contamination may remain along the northern edge of the former drum storage are just off the parking lot near EMIP-25. However, the magnitude of the ECD response does not indicate a significant sequestered source remains in AREA 1.

5.3.2 AREA 2: Former Drum Storage Area and Spill Containment Tank

Area 2 is located in the northwest corner of the facility and includes the former drum storage area and associated spill containment tank. The initial MIP investigation of this area commenced with the installation of EMIP-5 through EMIP-8. Based on the results of these points six (6) additional points (EMIP-12, 13, 14, 17, 18, and 19) were added in the initial mobilization. One well, MW-67 was installed in this area adjacent to EMIP-19. After review of the initial mobilization data, four additional MIP locations (EMIP 23, 26, 27, and 36) and one additional monitoring well (MW-69) were added to the investigation of this area.

Based on water level data collected in April 2008, the water table in this area was approximately 15 feet below grade during the investigation. The temperature logs for the MIP for EMIP-5 through 8 indicate a sudden drop in the temperature of the sensor plate of 10ºC at 14-16 feet below grade indicate of penetration of the water table. Based on historical site water levels, the depth to groundwater varies seasonally from 12 to 20 feet below grade on the Area 2.

The ECD reported CVOCs in Area 2 in the soils at less than 16 feet below grade in 8 of the 14 borings, in the vadose zone (15-20 feet below grade) at 8 locations, and in the groundwater at 12 locations. Based on a review of all of the ECD, PID, and MIP data logs for Area 2 there is no evidence of a free phase product remaining in the soils. However, there is evidence of adsorbed CVOCs or potentially small pockets of sequestered free product in the soils in this area. The data also demonstrates the presence of a plunging dissolved phase contaminant plume migrating laterally and vertically toward RW-5.

EMIP 6, 7, 8, 12, 13, and 18 reported maximum response in the upper soil unit at depths less than 16 feet below grade. Locations 6, 7, 8 and 12 are associated with the former spill containment tank and the presence of high concentrations in the upper soil zones strongly suggests that some residual contamination remains in the upper soils in this area. Since the contamination is above the seasonally high water level or within the fluctuation zone of the water table, it represents a source of continuing sustained release until mitigated.

The distribution and concentration of contamination observed in the zone from 15-20 feet below grade at locations 5, 6, 12, 13, 14, 17, 18, and 23 suggests a second spill potentially associated with the RCRA storage area or its containment trench piping may also have occurred. Maximum response in the ECD is reported in location 6 and 12 associated with the former tank and at locations 13 and 18 associated with the former drum storage area.

The response of the ECD, PID and FID reports that a dissolved phase plume is being generated in the northeast corner of the building and moving laterally and vertically down gradient toward RW 5. The plume, which has an apparent concentration of greater than 2000 ppm of total CVOCs, extends from the water table at EMIP-6, to 28-40 feet below grade at MW-7, to 31-56 feet below grade at EMIP-36.

The groundwater samples collected from the two monitoring wells installed in Area 2 MW-67S and MW-69, reportedly contained 975 µg/l and 2,856 µg/l total CVOCs, respectively. MW-67S was drilled to 24 feet below grade and screened across the water table from 14-24 feet. MW-69 was drilled to 40 feet below grade adjacent to EMIP 19 and set with 5 feet of screen from 35-40 feet. The analytical results are consistent with the observed ECD response of adjacent MIP locations.

5.3.3 AREA 3: Former USTs

Area 3 is located in the southwest corner of the facility. The initial MIP investigation of this area commenced with the installation of EMIP-9 through EMIP-11. Based on the results of these three points, five (5) additional points (EMIP-15, 16, 20, 21, and 22) were added in the initial mobilization. One well, MW-68S was installed in this area between EMIP-15 and 16.

Based on the historical water levels for MW-47S, the water table in this area of the site is approximately 20 feet below grade with a range of 14-24 feet (based on pumping conditions). No comparative water level data was collected in this area during the period of the investigation. However, based on the MIP temperature probe data, a 10ºC drop in the temperature of the sensor plate in MIP 10 occurs at 13 feet below grade indicating saturation occurred at that depth.

Review of the PID, FID, and ECD data for these MIP points indicates that CVOCs were detected in the soils from 11-15 feet below grade at six (6) of these locations (EMIP 11, 15, 16, 20, 21,and 22), in the vadose zone from 14-20 feet at six locations (EMIP 9, 10, 11, 12, 16 , and 21) and in the groundwater (< 20 feet below grade) at five (5) locations (EMIP 9, 11,16, 20, and 21). The maximum ECD response was observed in the soil and vadose zones only except at location 16.

The relatively low response of the ECD in the soils for the MIP locations closest to the former USTs (9, 10, 11, 20, and 22) indicates that there is no significant source remaining in the soils in Area 3. Maximum response was observed in the vadose zone soils at location 10, 15, and 16 but no impact was observed at locations 22 suggesting that locations 15 and 16 are being influenced by conditions in Area 2 and not the former USTs.

Groundwater impacts in this area are observed in the shallow aquifer (from 14-25 feet below grade) at locations 11 and 16 and in the deeper aquifer (<25 feet below grade) at locations 9, 20 and 20. The apparent concentrations of total CVOS observed in the shallow and deep aquifer are approximately 2000 ppb in the upper zone and 300-500 ppb in the deeper unit. The results for MW-68S reported 1305 µg/l total CVOCs in the sample collected from 15-20 feet.

5.3.4 AREA 4: Loading Bay Spill

Based on the review of the initial round of MIP data collection, one additional MIP point was planned for the second mobilization to bound the limits of observed impacts from Area 3. EMIP-28 was installed in the southern access roadway south of the loading bays resulting in the discovery of a previously unsuspected potential fourth area of concern. Seven additional MIP points (EMIP-29, 30, 31, 32, 33, 34, and 35) and one groundwater monitoring well (MW 70) were installed to complete the delineation of this area.

Based on historical water level data from MW-39D, the water table in this area fluctuates from 9.5 to 19 feet below grade seasonally with an average of 14.5 feet. Based on the sensor temperature logs for MIP 28 and MIP 29, the temperature on the sensor plate drops 10ºC at 9.25 and 10.5 feet respectively.

The ECD response for EMIP-28 spiked to Maximum (10E7 µV) at 2 feet below grade and continued at maximum to 28 feet below grade. EMIP-29 spiked at 6 feet below grade and continued at maximum response to 22 feet below grade. None of the other borings reported maximum spikes in CVOC concentrations. All of them reported some contaminant concentration in the upper soils and groundwater down to approximately 14 feet below grade.

Monitoring well MW-70 was installed adjacent to MIP-28 to a depth of 20 feet. The well was screened from 15-20 feet below grade and one groundwater sample collected from the well. The laboratory analytical results reported a total CVOC concentration in the groundwater at this location of 2038 µg/l. No readily available historical data is available for comparative purposes.

A review of the PID, FID, and ECD data logs for this area does not appear to indicate the presence of a free phase product. It appears that a surface spill probably associated with loading-off loading procedures in the loading bay area may have occurred. The impact appears to be limited to the upper 15 feet soil over a small area (approximately 40 feet radius). A nearly vertical groundwater plume is emanating from this area and plunging toward north an northeast toward RW-6/7 and RW-8, respectively. The dissolved plume does not appear to have significantly expanded laterally. The groundwater plume is not bounded to the east-southeast, however, this is the up gradient direction.

5.4 DATA VISUALIZATION

The results for each MIP location were processed into a qualitative 2-dimensional and 3 dimensional images of the contaminant concentrations across the site. The 2-dimensional images are presented as cross-sectional transverses, the 3-dimensional images in solid models from various axial perspectives. The 3-dimensional images were also reduced into to vertical planar views in 2-foot increments from grade to the maximum depth of penetration of the MIP. The following sections discuss the various images included in the visualization report and Earth Tech's interpretation of those images.

5.4.1 2-Dimenisonal Cross Sections

Two(2) 2-dimensional cross sections of traverse A-A'are included in the visualization report. The traverse is depicted on the insert planar view map at the top of the cross section. Others transects can be readily generated from the data along any desired axis. However, the selected axis for presentation represent Earth Tech's opinion of the most visually representative of overall site conditions. Note the cross-sections are actually panal diagrams from point to point and not projected images of data onto an imaginary axis.

The first cross-section is "ECD Cross Section A-A'" passes through the points representing residual source areas (EMIP 6, 8,16, 10, and 29) and an apparent down gradient plunging dissolved phase groundwater plume emanating from location 6 and migrating through location 7, 26, and 36. The color coding represents a gradational scale where purple equals minimal detection at approximately 250 ppb (ECD only) and red represents concentrations of CVOCs based on the maximum sensitivity of the ECD and PID combined (assumed in excess of excess of 10,000 ppb total CVOCs).

Based on this profile, it appears that the primary areas of concern are the upper soils and vadose zone soils in the immediate vicinity of EMIP 6, 16, and 29 and groundwater along the axis from location 6 and 36 and immediately below location 6. Minor pockets of contamination are also present in the soils at locations 18 and 10.

It is also evident from this cross section that the contaminants observed in the shallow soils at EMIP-29 are unrelated to the main historical spill area beneath the facility and therefore represent a unique, previously undiscovered spill area.

Once all the EMIP data points and data have been added to the site-wide GPS database, topographic elevation adjustments can be made for each point and a more accurate graphical representation generated. However, in general, it appears that a residual source remains at or near the water table in the central area of the transect beneath the building that is generating a dissolved plume that is migrating toward the west-southwest and plunging from the water table to 50 feet below grade.

The second 2-dimensional profile, also along transect A-A'; presents the recorded soil conductivity data at each of the selected locations. Recalling the discussion on soil conductivity versus grain size in Section 5.1.2, colloidal particles have relatively higher electrical conductivity than courser grained particles. Overlaying the ECD/PID profile onto the electrical conductivity profile suggests that the highest reported concentrations of contaminants are associated with colloidal (clayey) soils. The groundwater plume emanating from the EMIP 6 area is migrating west-southwest and plunging downward in a channel or series of layers of higher grain sized materials while being impacted by the sustained release from these colloidal soils.

5.4.2 2 Dimensional and 3 Dimensional Solid Models

Four (4) 2-dimensional and four (4) 3-dimensional solid models of the data are presented in the visualization report. The models depict the main mass of the residual contamination within the boundaries of the MIP investigation area (at approximately 500 ppm or greater) as viewed in 2 and 3 dimensional space along the four cardinal axial directions.

As with the interpretation of the individual logs and the cross-sectional analysis, the models demonstrate the main mass of contamination remaining on site is in the soils beneath the northwestern corner of the facility and in the groundwater down gradient from that area. A shallow pocket of residual contamination with minor groundwater plume development and migration also remains in the area around MIP-29.

5.4.3 2-Dimensional Planar Views

A total of 29 planar views are included in the data visualization report. They were generated using a krigging algorithim and include all of the available ECD data from all MIP locations. The planar reviews are in 2-foot increments commencing at 2-feet below grade and extending to the maximum penetration depth of the MIP at 58 feet below grade.

The planar views demonstrate the presence of sequestered residual contamination in the soil in the northwest portion of the facility and the plunging groundwater plume emanating from this area. The maximum reported impacts commence at approximately 12 feet below grade and cover the maximum area at 14-16 feet below grade then contract inward to 28 feet below grade. From 30 feet to 50 feet, the maximum observed impacts begin to expand again and extend out beneath the building and down gradient toward EMIP-36.

Earth Tech interprets the planar views to be indicative of a spill or multiple spills beneath the floor of the facility. The evidence suggests that spills occurred at both USTs in the southern area and from the spill containment tank. The spill(s) migrated downward through the soil until reaching some barrier layer or shift in media properties that caused the material to spread laterally. The apparent presence of more clay rich soils in discontinuous lenses within the upper silty-sand later beneath the building could be responsible for the lateral spreading of the spill spreading.

The evidence suggests that a spill or spills of some unknown quantity occurred from both the USTS and from the spill containment tank. An additional spill also occurred near EMIP-29 and is most probably associated with some type of incident at the loading dock area or the fill ports outside the southwest corner of the former above ground storage tank containment building. Some of the spilled material appears to be trapped in finer grained soils and natural fluctuation of the water levels has created a large smear zone over a wide area 14-18 feet beneath the entire northeast section of the building (an area estimated at 20,000-30,000 square feet).

6.0 CONCLUSIONS

Remedial actions have been implemented by the Miller Brewing Company (MBCo) at the Former Miller Container Site under two Orders of Consent between MBCo and NYSDEC; 1991 IRM Order # A7-0265-9106 and 1995 Remedial Program Order #A7-0322-9411.

Under the IRM Order, MBCo was required to construct a Treatment System such that certain specified contaminants are treated to the point where they are "nondetectable," defined in the order as less than 0.5 µg/l (see ¶ IV(ii) of the IRM Order) and MBCo is to remain responsible under this Order for certain administrative obligations until "*Remedial measures cause the aquifer to be remedied to the point where treatment is no longer necessary*"(see ¶ XVII.B of the IRM Order).

The obligations specified for MBCo for remedial work on the Former Miller Container site (Registry Site # 7-38-029) are set forth in the Remedial Program Order, which incorporates the Record of Decision dated March 1995 (attached as Appendix A to the Order). Page 11 of the ROD identifies the five goals for this Order as follows:

1. Eliminate to the extent practicable the contamination present within the on-site soils/waste (reduce soil contaminant concentrations) to levels protective of groundwater;

2. Eliminate the potential for direct human or animal contact with contaminated on-site soil;

3. Mitigate the impacts of contaminated groundwater to the environment;

4. Prevent, to the extent practical the migration of contaminants in the source areas to the groundwater; and,

5. To the extent practicable, provide for attainment of SCGs for groundwater quality at the limits of the area of concern (AOC). The AOC for the site is the area from the spill source locations to the Fulton municipal well field.

The selected remedial system for the contamination detected at the Former Miller Container Site has been constructed and operated in accordance with the NYSDEC-approved Remedial Design. The operation, maintenance, and monitoring (OM&M) of the remedial system as been performed in accordance with the NYSDEC-approved OM&M plan Based upon the evaluation of system operations and monitoring data collected during 11 years of recovery and treatment system operations, Earth Tech concludes the following.

The first remedial program goal stated in the Order is to "eliminate to the extent practicable the contamination present within the on-site soils/waste (reduce soil contaminant concentrations) to levels protective of groundwater". This goal has not yet been achieved.

> The results of the Supplemental Site Investigation (SSI) (included in Section 5) indicate that residual contamination associated with the former drum storage area and spill containment tank (NOU-source area) remains in the vadose zone soils beneath the northwest corner of facility. The data also indicates that this area continues to generate a dissolved phase contaminant plume.

The SSI also identified a previously undiscovered area of concern located immediately south of the facility loading bay between the loading dock and the groundwater recovery and treatment plant. The total area of concern has been delineated and is approximately a 40 foot radius conical area centered on the location of EMIP-28 extending from approximately 3 feet below grade to a maximum depth of approximately 22 feet below grade (approximately 4,000 cubic yards).

The current system is capable of eliminating the source area residual contamination through the dissolution and recovery of the dissolved contamination over time: however, this is a very inefficient and lengthy process. Based on these findings, Earth Tech concludes that supplemental mitigation efforts for on-site soils would greatly accelerate achievement of this goal of the ROD. Additional evaluation is needed to determine if supplemental measures would be feasible and/or cost-effective.

The second remedial goal of the Order is to protect human health and the environment by eliminating direct human and animal contact with contaminated on-site soil. All impacted surface and near surface soils have been removed/mitigated by remedial actions and/or are beneath the impermeable floor of the facility effectively achieving this second remedial goal.

No complete exposure pathway was identified in the Human Health Risk Assessment portion of the RI as long as the soils remain undisturbed.

The results of the SSI indicate that no accessible shallow soil impacts remain. Impacted shallow soils were identified beneath the impermeable roadway in the southern area of the site. Residual soil impacts remain beneath the building but they are at depth (greater than 14 feet) where potential contact is impractical.

The third remedial goal is to mitigate the impacts of contaminated water to the environment. This remedial goal is substantively achieved by maintaining hydraulic control of the dissolved plume to prevent the migration of contamination while removing contaminant mass through active recovery and treatment of the groundwater. The intent of this goal is to prevent migration of the dissolved plume and to "mitigate" residual groundwater contamination within the defined area of concern to concentrations below the applicable SCGs (less than 5 µg/l per compound) within the 30-year design life of the approved remedial system.

Based on analysis of the monitoring data collected during the eleven years of remedial system operations, total contaminant concentrations continue to decrease across the site and the total area of impacted groundwater has been receding toward the recovery well network wells. These trends are observed down gradient in the date from the recovery well networks in the NOU-plume area, the NOU-Taylor Property area, and the SOU plume area. The data also indicates that the operation of the NOU-plume area and NOU-Taylor Property recovery well network has substantially curtailed down gradient migration of the plume toward the municipal well field and is effectively mitigating impacts in the aquifer.

The groundwater recovery system continues to effectively recover CVOCs from the impacted aquifer and has significantly reduced the total concentrations within the area of concern. During the 11 years of operation, approximately 530 lbs of CVOCs have been recovered by the groundwater recovery and treatment system. Total annual contaminant mass removal has been substantially reduced from 180 lbs in 1997 to 3.5 lb in 2008 by a combination of total site-wide reduction in contaminant concentrations and a reduction in total system recovery rates.

Recovery well RW-1 was shut down on or about August 8, 2003 with NYSDEC's approval and has remained inactive through the end of the current reporting period.

Recovery well RW-2 was shut down in April 2000 in conjunction with a pilot study for a Permeable Reactive Barrier Wall (PRB). No consequence to the hydraulic containment of the plume was noted as a result of this temporary shut down of this well and consequently, with NYSDEC's approval, this recovery well has remained non-operational since that time.

Recovery wells RW-4, RW-6, RW-7, and RW-8 were temporarily shut down on or about August 15, 2005 as part of a pilot study. These wells were inactive through the end of the current reporting period.

Based on the results of the SSI, RW-6 and RW-7 appear to have effectively removed the concentrated plume in the SOU-Source area associated with the former USTs. The data indicates that continued operation of these wells is causing the unintended migration of the dissolved plume from other areas into their zone of influence.

Monitoring data indicates that large portions of the plume as delineated in the RI have already achieved the SCGs, specifically in NOU-plume and NOU-Taylor property plume areas.

Total CVOC concentrations in the groundwater in the NOU-source and SOU-source areas remain high. The results of the SSI demonstrated that residual soil impacts are present beneath the floor of the building in the NOU-Source are and that a groundwater plume is emanating from these soils. Consequently, it is considered highly improbable that the current system can achieve site-wide mitigation within the design life of the system without supplemental mitigation of the soil. Based on this, Earth Tech concludes that a supplemental mitigation and/or system optimization program could significantly accelerate the mitigation of impacted groundwater and achievement of this goal. However, additional evaluation is needed to determine if supplemental measures would be feasible and/or cost-effective.

The groundwater treatment system effectively treated the recovered groundwater from the recovery well network. The groundwater treatment system continued to effectively remove greater than 99% of contaminants to the substantive requirements of the SPDES Permit.

In 1999, Earth Tech demonstrated to the NYSDEC that virtually all contaminant removal by the system occurs in the air stripper portion of the process and therefore requested that the liquid phase carbon treatment (polishing) portion of the process be discontinued. In a letter dated July 19, 1999, the NYSDEC granted permission to remove liquid phase carbon treatment provided that the unit remains present on standby pending possible future modifications to the system. Earth Tech subsequently removed the carbon units from service at the end of July 1999. No modifications to the groundwater recovery system requiring the reactivation of carbon treatment were made during the reporting period. The current, recovery system effluent data continues to support the decision to discontinue carbon treatment of the groundwater.

The remedial system continues to recover and treat groundwater but at a significantly reduced lower flow rate. Flow rates for the eleventh year monitoring period were substantially decreased over the previous reporting periods due to the temporary suspension of pumping from four of the recovery wells (RW-4, RW-6, RW-7, and RW-8) and a substantial reduction in the flow rates from three recovery wells (RW-3, RW-5, and RW-9) impacted by the enhanced biological reduction pilot test.

The flow rates observed in RW-5 have been substantially reduced (from 0.5 gpm to 0.05 gpm) by impacts from the field scale in-situ pilot study. The SSI indicates that a plume of CVOCs being generated by residual soil impacts in NOU plume area may be bypassing the capture zone of RW-5 under these reduced pumping rates of this well. Additionally, the apparent concentration of CVOCs at EMIP-36 (estimated at 3000 µg/l) is substantially higher than the concentration of approximately 120 µg/l reported in RW-5 during the April 2008 sampling event suggesting that RW-5 is inefficient at capturing the concentrated plume and could be modified and/or relocated to improve mass removal.

The fourth remedial goal is to "*prevent, to the extent practical, the migration of contaminants in the source areas to the groundwater*".

NYSDEC's intent and interpretation of this goal are unclear as it appears to be a reiteration of Goal #1. Preventing "migration" from the source areas "to the groundwater" could be achieved by either "*elimination of contamination present in on-site soils*" or prevention of direct contact of impacted soils with the groundwater. Regardless, the data presented in this year's report indicates that this goal has not yet been achieved.

The SSI has identified an area of impacted vadose-zone soils in the NOU and a plunging dissolved phase plume emanating from these soils. Additionally, there is some evidence that under its current reduced flow conditions caused by biofouling of the aquifer, RW-5 may no longer be effective at capturing all of the plume emanating from the NOU.

As previously noted RW-6 and RW-7 remain inactive pending evaluation of alternatives based on the results of the SSI. The planar and cross sectional profiles of the plume delineated in the SSI for the area around RW-6 and RW-7 indicate that no residual contamination remains in the soils at these locations. Relatively low concentrations of dissolved contaminants remain but the highest observed measurements are at 18-20 feet below grade and not in the deep zone (30-50 feet dbg) where these recovery wells are screened. The shape of the plume as delineated by the MIP suggests that impacted groundwater being generated in the residual source areas to the north and south of these wells is being drawn cross-gradient and downward into the deep aquifer by the operation of these wells. This is effectively causing the dissolved plume to expand and plunge beneath the floor of the building. These wells could be modified, relocated and/or replaced to substantially improve total system performance and eliminate this concern.

The fifth remedial goal of the Order is, "*To the extent practicable, provide for attainment of SCGs for groundwater quality at the limits of the rea of concern* (AOC). The AOC for the site is defined in the ROD as the area from the spill source locations to the Fulton municipal well field". The applicable Standards, Criteria, and Guidance (SCGs) are the New York State Ambient Water Quality Standards, specified in the ROD (later included in NYSDEC, Division of Water, *Technical and Operational Guidance Series, Version 1.1.1* (TOGS), reissued June 1998). Based on the available data, this fifth remedial goal has been effectively achieved.

As previously noted, no site related compound has been reported in the municipal production wells since October 2000 at a concentration in excess of the SCGs for groundwater as specified in the ROD.

Using MW-28I as the "limit" of the AOC with respect to the plume's closest approach to the municipal wells, the concentration of each individual site related compound has steadily decreased since operation of the on-site groundwater recovery and treatment remedial system began. No site related compound has been reported in the samples collected at MW-28I at a concentration in excess of 5 µg/l since February 2003.

Based on evaluation of system operation and monitoring for the past 11 years and the results of the SSI, Earth Tech concludes that the current groundwater recovery and treatment systems are functioning within their design limitations with respect to achievement of the goals of the ROD. However, it is unlikely that the system will achieve all of the goals of the ROD within its design life of 30 years. Supplemental mitigation and/or remedial system optimization programs could be implemented to accelerate mitigation. Additional evaluation of these efforts would be needed to assess the cost and feasibility of these measures.

7.0 RECOMMENDATIONS

Based upon the data and conclusions presented in this Annual Groundwater Monitoring Report, the following recommendations are presented:

- Pumping at RW-1 was discontinued in August 2003 with the consent of NYSDEC. The data for Year 11 does not suggest any substantial benefit would be gained by reactivating this well. Earth Tech recommends RW-1 be permanently decommissioned.

- Pumping at RW-2 was discontinued in April 2000 with the consent of NYSDEC. The groundwater monitoring data for Year 11 does not suggest any substantial benefit would be gained by reactivating this well. However, RW-2 is the next down gradient recovery well from the dissolved contaminant plume identified in the SSI. It cannot be determined at this time if the reduced flow rate of RW-5 caused by biofouling of the well is allowing the migration of the plume toward the NOU-plume area and reactivation of RW-2 may be necessary in the future. Consequently, Earth Tech recommends that RW-2 remain inactive but not be decommissioned at this time.

- Most of the NOU-Taylor property plume monitoring wells have achieved ambient water quality standards. Additionally the concentrations of 4-period average and total CVOCs reported in RW-10, RW-11, and RW-12 have achieved nearly asymptotic conditions. Minimal additional benefit would be gained by continued operations of these wells. Earth Tech recommends a temporary suspension of recovery from these wells.

- An increased monitoring frequency for down gradient wells MW-35D and MW28I should be conducted during the suspension of pumping at RW10, RW-11, and RW-12. Increased monitoring should be continued until sufficient data is collected to demonstrate conclusively that no significant impact to the water quality at these early warning wells would result from a permanent suspension of pumping at RW-10, RW-11, and RW-12. Earth Tech recommends that MW-35D and MW28I be sampled on a bi-monthly (every other month) basis for one year after pumping of RW-10, RW-11, and RW-12 is suspended then continued on a quarterly basis until the resulting effects of the suspension of pumping can be demonstrated to be a non-issue with respect down gradient migration of the plume.. The NOU-Taylor Property recovery well systems should be maintained and pumping resumed if necessary.

- The groundwater monitoring well network has been periodically sampled on a not less than quarterly basis for over eleven years. Analysis of the data as reported to NYSDEC indicates that the recovery system has hydraulic control of the plume, the plume has contracted back to the source areas, and total contaminant mass has been substantially reduced. Additionally, the data indicates that a fairly comprehensive understanding of site dynamics has been achieved. No loss of control of the plume or our understanding of the site would result from altering the site-wide monitoring frequency from quarterly to semi-annual sampling events. Earth Tech recommends that the monitoring frequency for the currently active monitoring wells be changed to semi-annual. Sliding quarters are recommended to continue to capture the seasonal variations; i.e. Year 1, 1st and 3rd Qrtrs; Year 2, 2nd and 4th Qrtrs, Year 3, 3rd and 1st Qrtrs).

TABLES

TABLE 2-1

AVERAGE and TOTAL
GROUNDWATER RECOVERY FLOW

WELL	AVERAGE	TOTAL
RW-1	0.00	0
RW-2	0.00	0
RW-3	0.17	91163
RW-4	0	0
RW-5	0.27	136775
RW-6	0	0
RW-7	0.00	0
RW-8	0.00	0
RW-9	0.06	34512
RW-10	0.60	312915
RW-11	2.31	1204801
RW-12	2.86	1490609
RW-13	3.26	1714001
TOTALS	**9.53**	**4984776**

TABLE 2-2

FORMER MILLER BREWING COMPANY
MONITORING WELL SAMPLING SCHEDULE
ELEVENTH YEAR OF OPERATION
May 1, 2007 through May 1, 2008

FUNCTIONAL MONITORING GROUPS					
Northern Operable Unit		**Southern Operable Unit**		**Taylor**	**Municipal**
Source Area	**Plume Area**	**Source Area**	**Plume Area**	**Property**	**Wells**
MW-2S*	MW-8I	MW-36S*	MW-27S	MW-14D	K-1**
MW-3D*	MW-8D	MW-47S*	MW-37I*	MW-21S	M2-A**
MW-16D*	MW-13D	MW-48S*	MW-54I	MW-25S	MW10I
MW-38S*	MW-17D	RW-6	RW-8	MW-25D	MW-28S
MW-62S*	MW-51D	RW-7	RW-9	MW-32D	MW-28I
MW-63S*	MW-56D			MW-33S	
RW-3	MW-61D			MW-34D	
RW-4	RW-13			MW-35D	
RW-5				RW-10	
				RW-11	
				RW-12	

NOTE:

Unless otherwise designated, samples analyzed for EPA Methods 601/602 plus xylenes.
* EPA Method 624 plus xylenes

All wells sampled quarterly unless otherwise noted.
** Municipal wells sampled monthly

TABLE 2-3

FORMER MILLER BREWING COMPANY
GROUNDWATER RECOVERY SYSTEM MONITORING PROGRAM
ELEVENTH YEAR OF OPERATION
May 1, 2007 through May 1, 2008

Location	Parameter(s)	Frequency
Water Quality Monitoring		
Monitoring Wells	EPA Method 601/602, plus xylenes, EPA Method 624 (select wells), Eh, pH, Temperature, Turbidity, Specific Conductivity	Quarterly
Recovery Wells RW-3, RW-4, RW-5, RW-10, RW-11, RW-12, RW-13	EPA Method 601/602, plus xylenes, Eh, pH, Temperature, Turbidity, Specific Conductivity	Quarterly
RW-6 & RW-7	EPA Method 624, plus xylenes, Eh, pH, Temperature, Turbidity, Specific Conductivity, & Oil & Grease	Quarterly
RW-8 & RW-9	EPA Method 624, plus xylenes, Eh, pH, Temperature, Turbidity, Specific Conductivity	Quarterly
Municipal Wells (M-2A & K-1))	EPA Method 502.2	Monthly
WTF Influent & Effluent	EPA Method 502.2, effluent (total colifiorm)	Monthly
Water Level Monitoring	ALL WELLS	Monthly
Flow Rate Monitoring	Individual Recovery Wells AST Plant	Daily

TABLE 2-4

FORMER MILLER BREWING COMPANY
TREATMENT SYSTEM MONITORING PROGRAM
ELEVENTH YEAR OF OPERATION
May 1, 2007 through May 1, 2008

Monitoring Activity	Location	Parameter	Frequency
Groundwater Sampling	System Influent (“AST INF”)	EPA Method 624 VOCs, plus xylenes Oil & Grease	Monthly
	Final Effluent (“Final EFF”)	EPA Method 624 VOCs, plus xylenes Oil & Grease	Monthly
	Oil Water Separator Effluent (“OWS EFF”)	Oil and Grease	Monthly

TABLE 2-5

FORMER MILLER BREWING COMPANY
ANALYTICAL METHODS AND PROTOCOLS
ELEVENTH YEAR OF OPERATION
May 1, 2007 through May 1, 2008

Parameter	Method	Method Reference	Holding Time	Preservation	Container
Volatile Organic Compounds Xylenes	601/602 624	(1)	7 days	4 drops concentrated HCl, Cool to 4 ^{o}C	2-40 ml glass vials w/teflon-lined septa
Iron Manganese Copper Zinc	200.7 200.7 200.7 200.7	(1) (1) (1) (1)	180 days 180 days 180 days 180 days	HNO_3 to pH <2 HNO_3 to pH <2 HNO_3 to pH <2 HNO_3 to pH <2	1-1 liter polyethylene bottle
Hardness Oil and grease	130.1 413.1	(1)	6 months 26 days	HNO_3 to pH <2 H_2SO_4 to pH <2 @ 4 ^{o}C	1-500 ml polyethylene bottle 1-1 liter glass bottle
pH, Temp, Turbidity, Eh, Specific Conductivity	Field	NA	(2)	None	1-500 ml polyethylene bottle

Notes/References:
(1) 40 CFR Part 136; Chemical Analysis of Water and Wastewater, EPA 600/4-49-020, Rev. March 93.
(2) Conduct test immediately following collection of samples.

TABLE 3-1
Recovery Well Quarterly Sampling Results
Eleventh Year May 1, 2007 through May 1, 2008

WELL	Date	Benzene	Ethyl benzene	Toluene	Chloroform	1,1,1-TCA	1,1,-DCA	1,1-DCE	Methylene Chloride	PCE	TCE	c-1,2-DCE	Vinyl Chloride	TOTAL VOCS	TOTAL CVOCS
RW-3	17-Jul-07	<1	<1	<1	<1	20	51	15	9.0	34	190	330	54	703.00	703.00
	18-Oct-07	<1	<1	<1	<1	33	43	24	<1	290	98	250	20	758.00	758.00
	10-Jan-08	<1	<1	<1	<1	19	20	15	<1	190	54	160	16	474.00	474.00
	16-Apr-08	<1	<1	<1	<1	26	20	16	<1	210	64	130	28	494.00	494.00
RW-5	17-Jul-07	<2	<2	<2	<2	17	4.4	2.3	3.7	140	19	32	<2	218.40	218.40
	18-Oct-07	<5	<5	<5	<5	19	<5	<5	<10	180	20	40	<5	259.00	259.00
	10-Jan-08	<5	<5	<5	<5	13	<5	<5	<10	130	19	38	<5	200.00	200.00
	16-Apr-08	<1	<1	<1	<1	3.8	2.5	2.3	<1	68	14	27	2.2	119.80	119.80
RW-9	17-Jul-07	<5	<5	<5	<5	69	22	64	8.9	410	17	83	7.4	681.30	681.30
	18-Oct-07	<10	<10	<10	<10	45	25	37	12	280	16	90	11	516.00	516.00
	10-Jan-08	<10	<10	<10	<10	10	<10	12	<10	75	<10	34	<10	131.00	131.00
	16-Apr-08	<1	<1	<1	<1	9.1	9.6	10.0	2.5	75	11	26	9.0	152.20	152.20
RW-10	17-Jul-07	<0.5	<0.5	<0.5	<0.5	1.9	<0.5	<0.5	<0.5	4.2	<0.5	<0.5	<0.5	6.10	6.10
	18-Oct-07	<0.5	<0.5	<0.5	<0.5	3.0	<0.5	1.00	<0.5	6.1	<0.5	<0.5	<0.5	10.10	10.10
	10-Jan-08	<0.5	<0.5	<0.5	<0.5	2.8	<0.5	0.78	<0.5	5.7	<0.5	<0.5	<0.5	9.28	9.28
	16-Apr-08	<0.5	<0.5	<0.5	<0.5	2.4	<0.5	0.79	<0.5	5.0	<0.5	<0.5	<0.5	8.19	8.19
RW-11	17-Jul-07	<0.5	<0.5	<0.5	<0.5	1.00	<0.5	<0.5	<0.5	3.8	<0.5	<0.5	<0.5	4.80	4.80
	18-Oct-07	<0.5	<0.5	<0.5	<0.5	1.0	<0.5	<0.5	<0.5	4.6	<0.5	<0.5	<0.5	5.60	5.60
	10-Jan-08	<0.5	<0.5	<0.5	<0.5	1.0	<0.5	<0.5	<0.5	4.6	<0.5	<0.5	<0.5	5.60	5.60
	16-Apr-08	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	3.5	<0.5	<0.5	<0.5	4.34	4.34
RW-12	17-Jul-07	<0.5	<0.5	<0.5	<0.5	1.4	<0.5	0.53	<0.5	3.8	<0.5	<0.5	<0.5	5.73	5.73
	18-Oct-07	<0.5	<0.5	<0.5	<0.5	1.5	<0.5	0.54	<0.5	4.1	<0.5	<0.5	<0.5	6.14	6.14
	10-Jan-08	<0.5	<0.5	<0.5	<0.5	1.6	<0.5	0.62	<0.5	4.3	<0.5	<0.5	<0.5	6.52	6.52
	16-Apr-08	<0.5	<0.5	<0.5	<0.5	1.3	<0.5	0.68	<0.5	3.1	<0.5	<0.5	<0.5	5.08	5.08
RW-13	17-Jul-07	<0.5	<0.5	<0.5	<0.5	9.6	2.8	6.0	<0.5	17	<0.5	0.88	<0.5	36.28	36.28
	17-Oct-07	<0.5	<0.5	<0.5	<0.5	9.6	2.6	5.6	<0.5	21	<0.5	0.86	<0.5	39.66	39.66
	10-Jan-08	<0.5	<0.5	<0.5	<0.5	8.8	2.8	5.2	<0.5	20	<0.5	0.79	<0.5	37.59	37.59
	16-Apr-08	<0.5	<0.5	<0.5	<0.5	6.9	4.4	5.3	<0.5	17	<0.5	0.96	<0.5	34.56	34.56

All results in µg/l

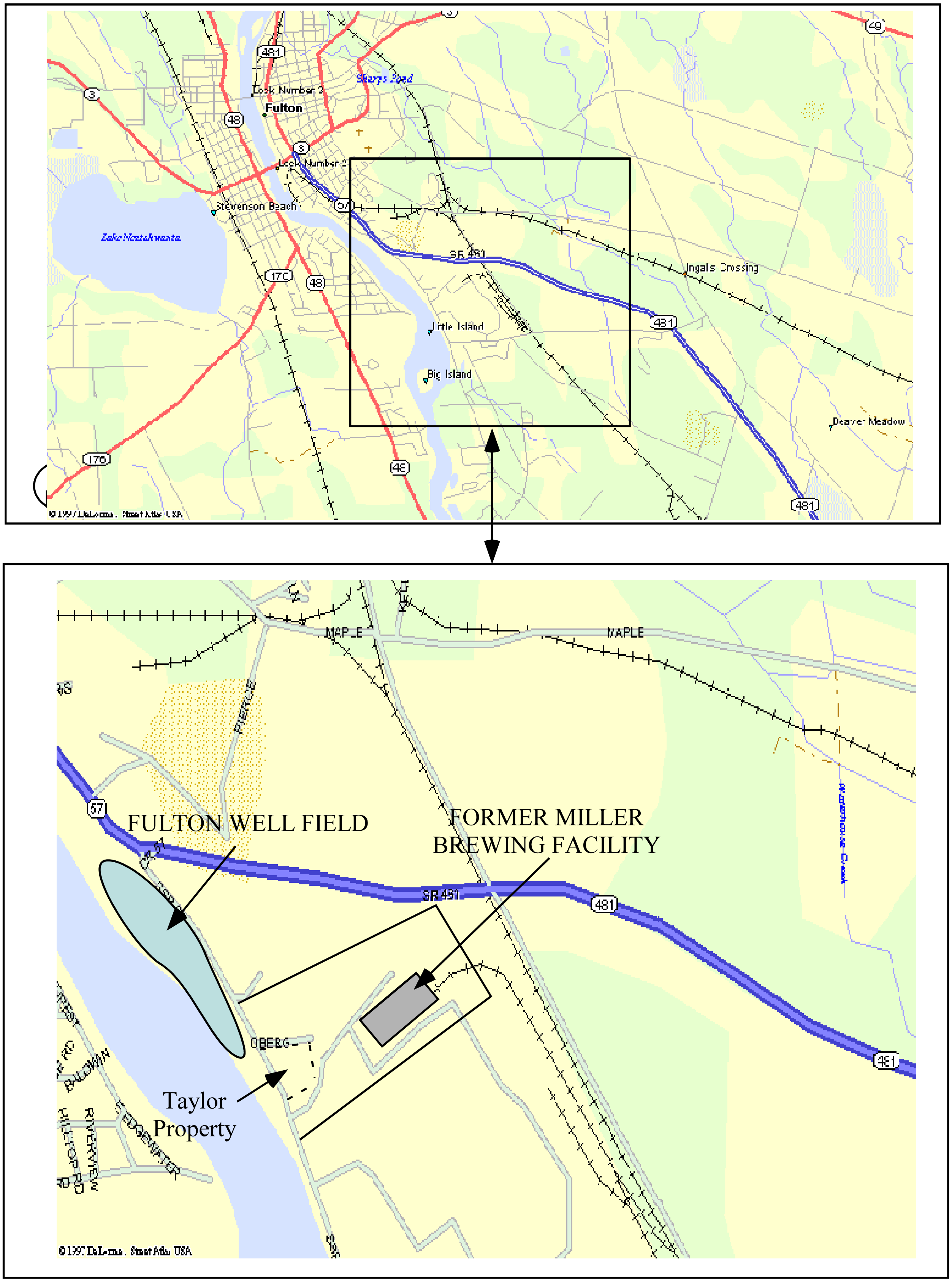
AIR STRIPPER INFLUENT SAMPLING DATA

DATE: February 17, 1997 - April 16, 2008

AST INFLUENT DATA - USEPA Method 624 + Xylenes, Keytones; Oil & Grease

DATE	Oil & Grease	Benzene	Chloroform	1,1-DCA	1,1-DCE	c-1,2-DCE	Ethyl-benzene	Methylene Chloride	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Acetone	MEK	MIBK	Total Xylenes
26-May-05	6.7	<1	<1	11	15	72	<1	<2	87	<1	34	4.7	1.4	<10	<10	<10	<1
23-Jun-05	<5	<1	<1	12	15	91	<1	<2	86	<1	32	5.6	1.6	<10	<10	<10	<1
20-Jul-05	<5	<1	<1	9.7	13	68	<1	<2	81	<1	27	5.0	1.2	<10	<10	<10	<1
25-Aug-05	<6	<1	<1	5.4	8	17	<1	<2	75	<1	26	5.1	<1	<10	<10	<10	<1
28-Sep-05	<5	<1	<1	5.2	6.6	21	<1	<2	87	<1	22	6.3	<1	<10	<10	<10	<1
20-Oct-05	<5	<1	<1	4.5	5.9	16	<1	<2	72	<1	18	4.6	1.6	<10	<10	<10	<1
29-Nov-05	<5	<1	<1	4.0	5.8	14	<1	<2	69	<1	15	4.0	1.6	<10	<10	<10	<1
20-Dec-05	<5	<1	<1	3.8	5.1	15	<1	<2	95	<1	14	4.3	1.6	<10	<10	<10	<1
10-Jan-06	<5	<1	<1	3.5	3.8	15	<1	<2	47	<1	9.1	4.1	1.6	<10	<10	<10	<1
21-Feb-06	<5	<1	<1	4.0	5.4	16	<1	<2	82	<1	14	6.2	1.6	<10	<10	<10	<1
21-Mar-06	23	<1	<1	4.1	5.5	17	<1	<2	83	<1	14	6.5	1.6	<10	<10	<10	<1
11-Apr-06	<5	<1	<1	3.8	5.3	18	<1	<2	80	<1	13	6.2	1.6	<10	<10	<10	<1
23-May-06	<5	<1	<1	2.9	2.4	16	<1	<2	41	<1	5.9	5.4	<1	<10	<10	<10	<1
14-Jun-06	<5	<1	<1	3.7	4.7	19	<1	<2	58	<1	10.0	6.4	<1	<10	<10	<10	<1
12-Jul-06	<5	<1	<1	5.0	6.8	28	<1	<2	64	<1	13	7.4	<1	21*	<10	<10	<1
23-Aug-06	<5	<2	<2	3.9	3.9	18	<2	<2	43	<2	8.0	5.2	<2	<20	<20	<20	<2
13-Sep-06	<5	<2	<2	3.9	4.3	22	<2	<2	47	<2	7.7	5.3	<2	<20	<20	<20	<2
18-Oct-06	<5	<2	<2	3.8	4.5	19	<2	<2	51	<2	9.3	5.1	<2	<20	<20	<20	<2
15-Nov-06	<5	<2	<2	2.7	4.0	15	<2	<2	52	<2	8.2	4.4	<2	<20	<20	<20	<2
19-Dec-06	<5	<1	<1	<1	3.6	<1	<1	<1	44	<1	6.7	4.1	<1	<10	<10	<10	<2
10-Jan-07	<5	<1	<1	2.6	3.0	13	<1	<1	37	<1	5.9	3.3	<1	<10	<10	<10	<1
20-Feb-07	<5	<1	<1	<1	1.9	6.2	<1	<1	29	<1	4.6	2.8	<1	<10	<10	<10	<1
27-Mar-07	<5	<1	<1	<1	1.8	12	<1	<1	24	<1	4.4	3.0	<1	<10	<10	<10	<1
11-Apr-07	<5	<1	<1	1.7	2.2	8.9	<1	<1	23	<1	4.0	2.6	<1	<10	<10	<10	<1
16-May-07	<5	<1	<1	1.6	2.7	9.8	<1	<1	21	<1	4.4	3.0	<1	<10	<10	<10	<1
20-Jun-07	<5	<1	<1	1.8	2.1	8.4	<1	<1	16	<1	4.1	3.3	<1	<10	<10	<10	<1
17-Jul-07	<5	<1	<1	2.0	2.1	5.3	<1	<1	12	<1	4.0	3.0	<1	<10	<10	<10	<1
22-Aug-07	<5	<1	<1	1.6	1.6	6.0	<1	<1	14	<1	3.2	2.0	<1	<10	<10	<10	<1
20-Sep-07	<5	<1	<1	1.7	2.5	5.2	<1	<1	16	<1	4.0	2.0	<1	<10	<10	<10	<1
18-Oct-07	<5	<1	<1	1.8	2.2	4.4	<1	<1	16	<1	3.8	2.4	<1	<10	<10	<10	<1
28-Nov-07	<5	<1	<1	<1	1.5	1.7	<1	<1	9.9	<1	3.1	<1	<1	<10	<10	<10	<1
18-Dec-07	<5	<1	<1	<1	1.6	<1	<1	<1	7.2	<1	3.1	<1	<1	<10	<10	<10	<1
10-Jan-08	<5	<1	<1	1.2	1.5	3.5	<1	<1	12	<1	3.2	1.4	<1	<10	<10	<10	<1
13-Feb-08	<5	<1	<1	1.2	1.3	3.5	<1	<1	9.4	<1	2.7	1.2	<1	<10	<10	<10	<1
11-Mar-08	<5	<1	<1	1.4	1.4	3.8	<1	<1	12.0	<1	3.0	1.4	<1	<10	<10	<10	<1
16-Apr-08	<5	<1	<1	1.7	1.2	2.9	<1	<1	8.9	<1	2.9	1.3	<1	<10	<10	<10	<1

FIGURES



EARTH TECH

A Tyco Infrastructure Services Company

FIGURE 1-1

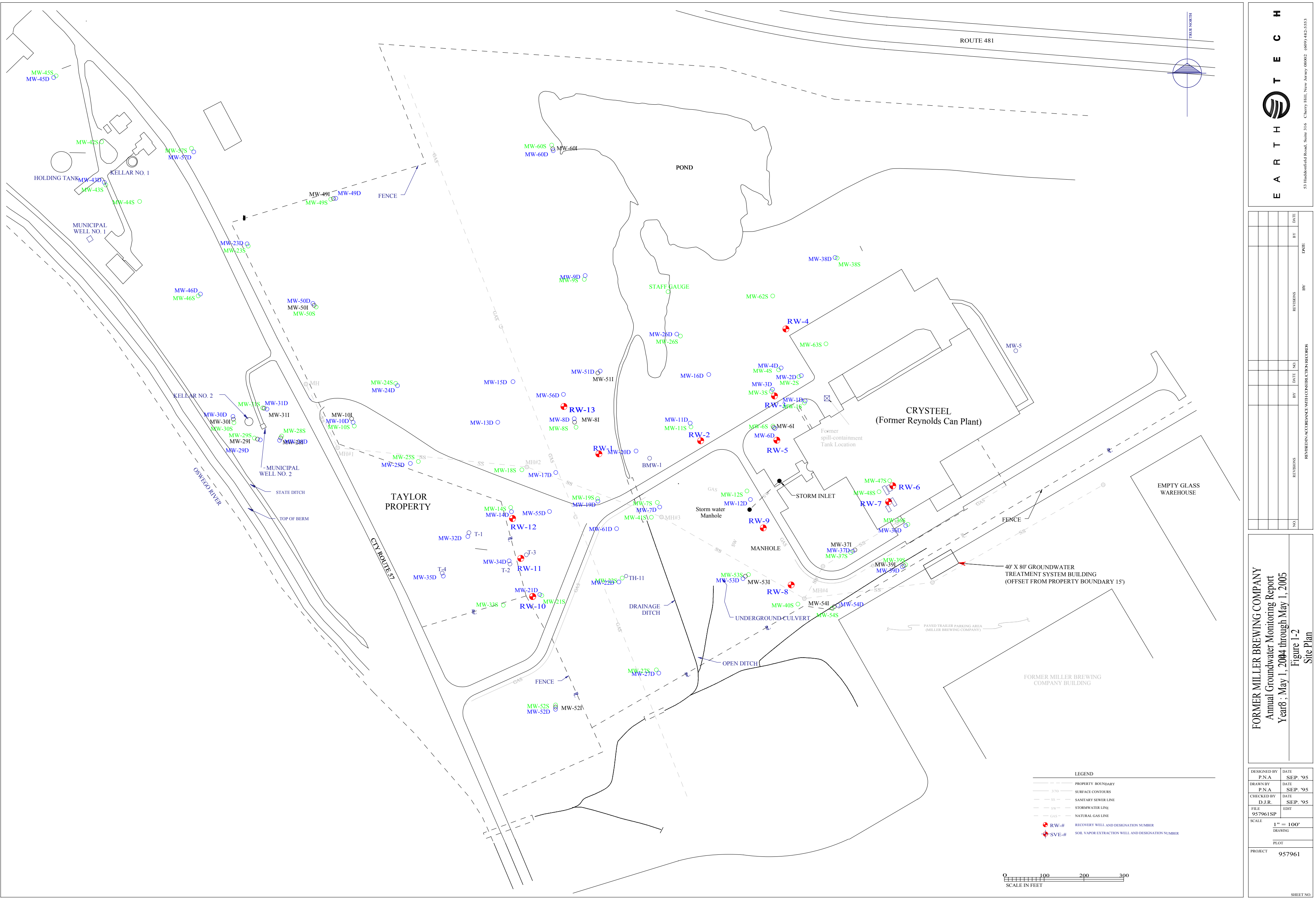
Site Location Map

Former Miller Brewing Company Facility

Fulton, NY

Aug 2003

19525.02


ROUTE 481
TRUE NORTH
POND
STAFF GAUGE
CRYSTEEL
(Former Reynolds Can Plant)
Former spill-containment Tank Location
TAYLOR PROPERTY
CTY ROUTE 57
OSWEGO RIVER
HOLDING TANK
KELLAR NO. 1
KELLAR NO. 2
MUNICIPAL WELL NO. 1
MUNICIPAL WELL NO. 2
STATE DITCH
TOP OF BERM
FENCE
STORM INLET
Storm water Manhole
MANHOLE
DRAINAGE DITCH
UNDERGROUND CULVERT
OPEN DITCH
EMPTY GLASS WAREHOUSE
40' X 80' GROUNDWATER TREATMENT SYSTEM BUILDING (OFFSET FROM PROPERTY BOUNDARY 15')
FORMER MILLER BREWING COMPANY BUILDING
RW-1
RW-2
RW-3
RW-4
RW-5
RW-6
RW-7
RW-8
RW-9
RW-10
RW-11
RW-12
RW-13
LEGEND
PROPERTY BOUNDARY
SURFACE CONTOURS
SANITARY SEWER LINE
STORMWATER LINE
NATURAL GAS LINE
RW-# RECOVERY WELL AND DESIGNATION NUMBER
SVE-# SOIL VAPOR EXTRACTION WELL AND DESIGNATION NUMBER
0 100 200 300
SCALE IN FEET
EARTH TECH
53 Haddonfield Road, Suite 316 Cherry Hill, New Jersey 08002 (609) 482-5553
REVISIONS
FORMER MILLER BREWING COMPANY
Annual Groundwater Monitoring Report
Year8 ; May 1, 2004 through May 1, 2005
Figure 1-2
Site Plan
DESIGNED BY P.N.A
DATE SEP. '95
DRAWN BY P.N.A
DATE SEP. '95
CHECKED BY D.J.R.
DATE SEP. '95
FILE 957961SP
SCALE 1" = 100'
PROJECT 957961
SHEET NO.

AREA 1 :

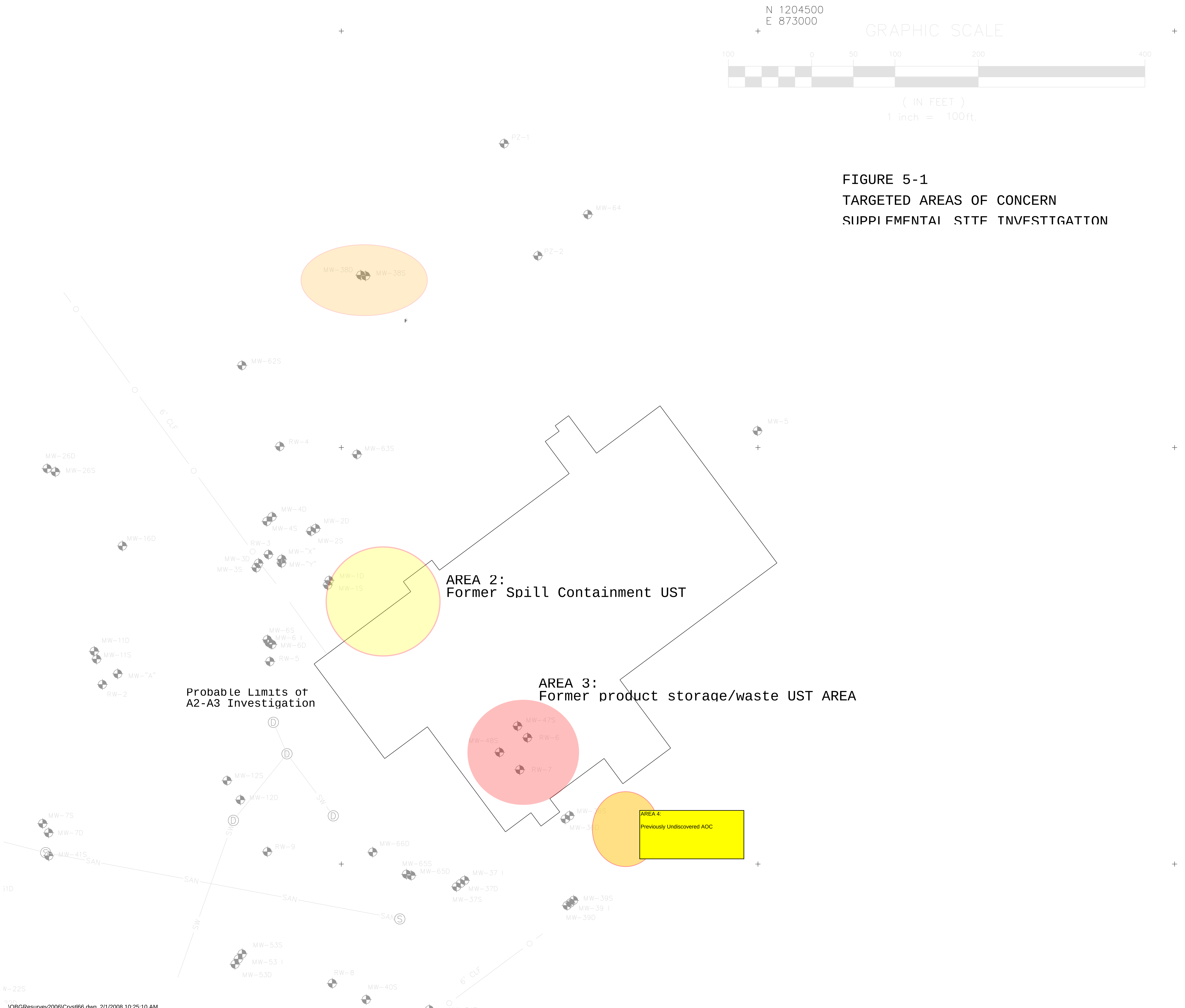
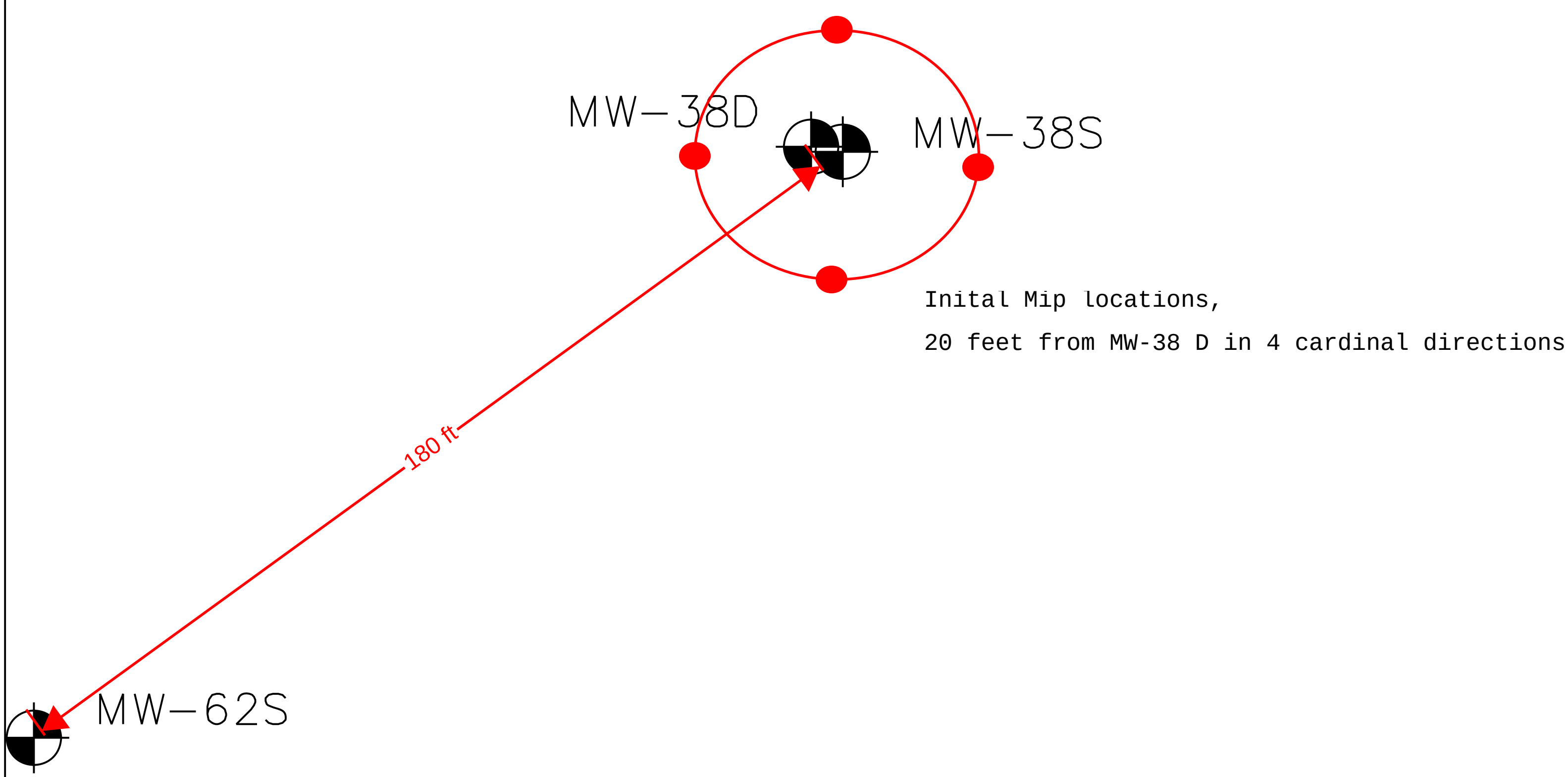


FIGURE 5-1
TARGETED AREAS OF CONCERN
SUPPLEMENTAL SITE INVESTIGATION

FIGURE 2-A1 Former Drum Storage Area



...\OBGResurvey2006\Crystl66.dwg 2/1/2008 12:46:12 PM

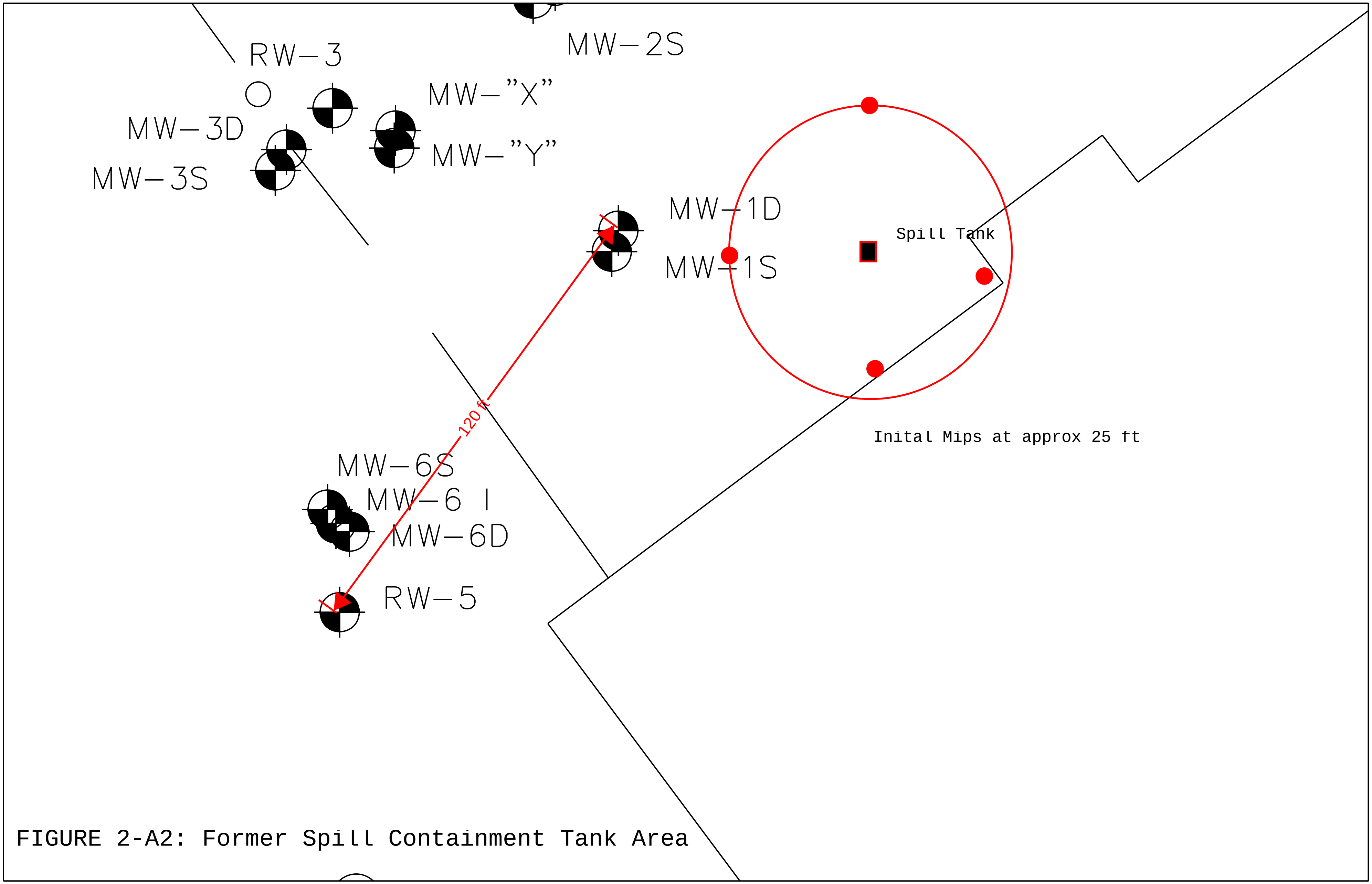
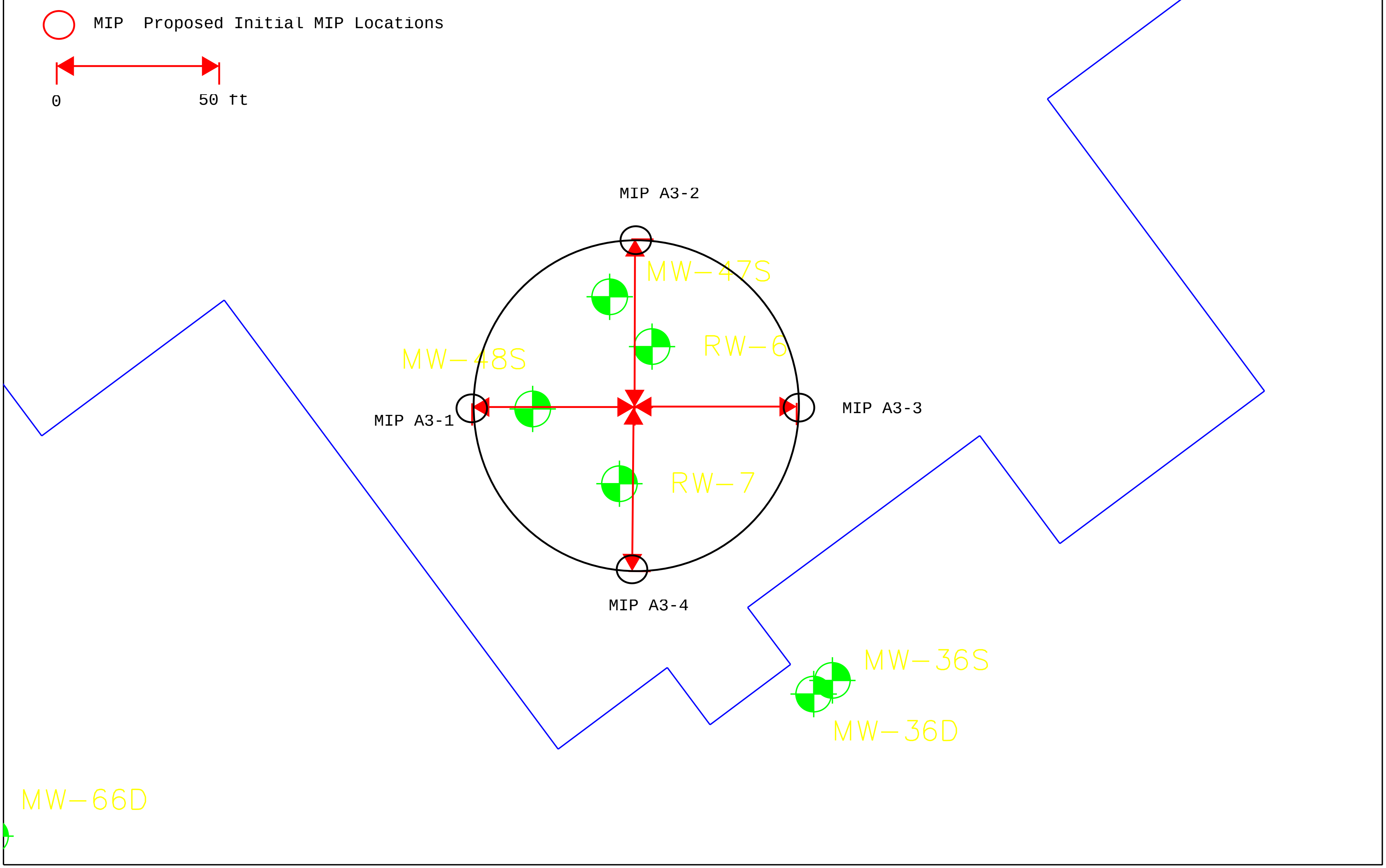


FIGURE 2-A2: Former Spill Containment Tank Area

...\OBGResurvey2006\Crystl66.dwg 2/1/2008 12:47:14 PM

FIGURE 2-A3 : INITIAL MIP LOCATIONS; Former Sub-slab UST area

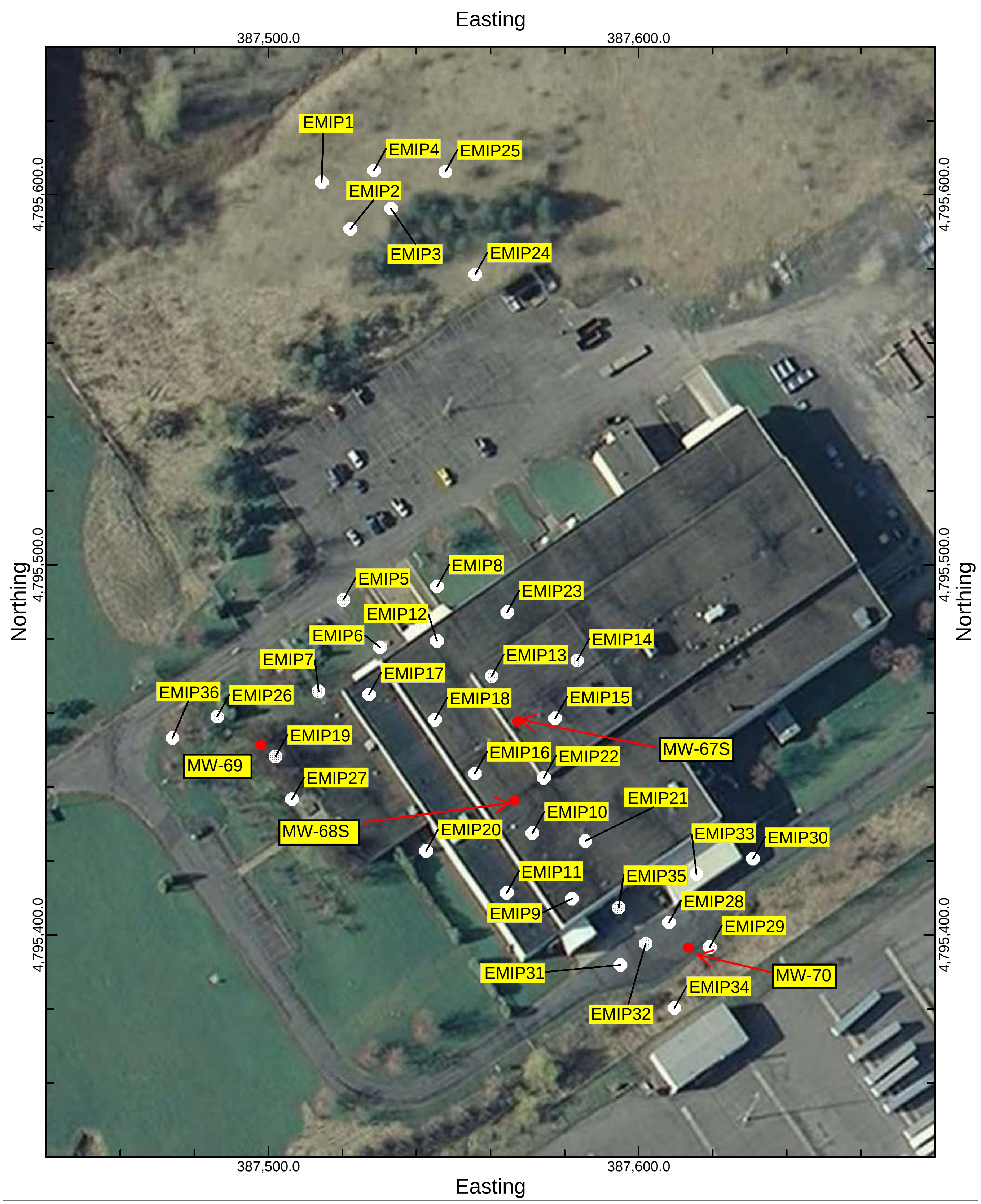


...\OBGResurvey2006\Crystl66.dwg 1/25/2008 1:07:14 PM

Earth Tech, Inc.
Site Investigation Report
Former Miller Brewing Company Facility
Fulton, NY

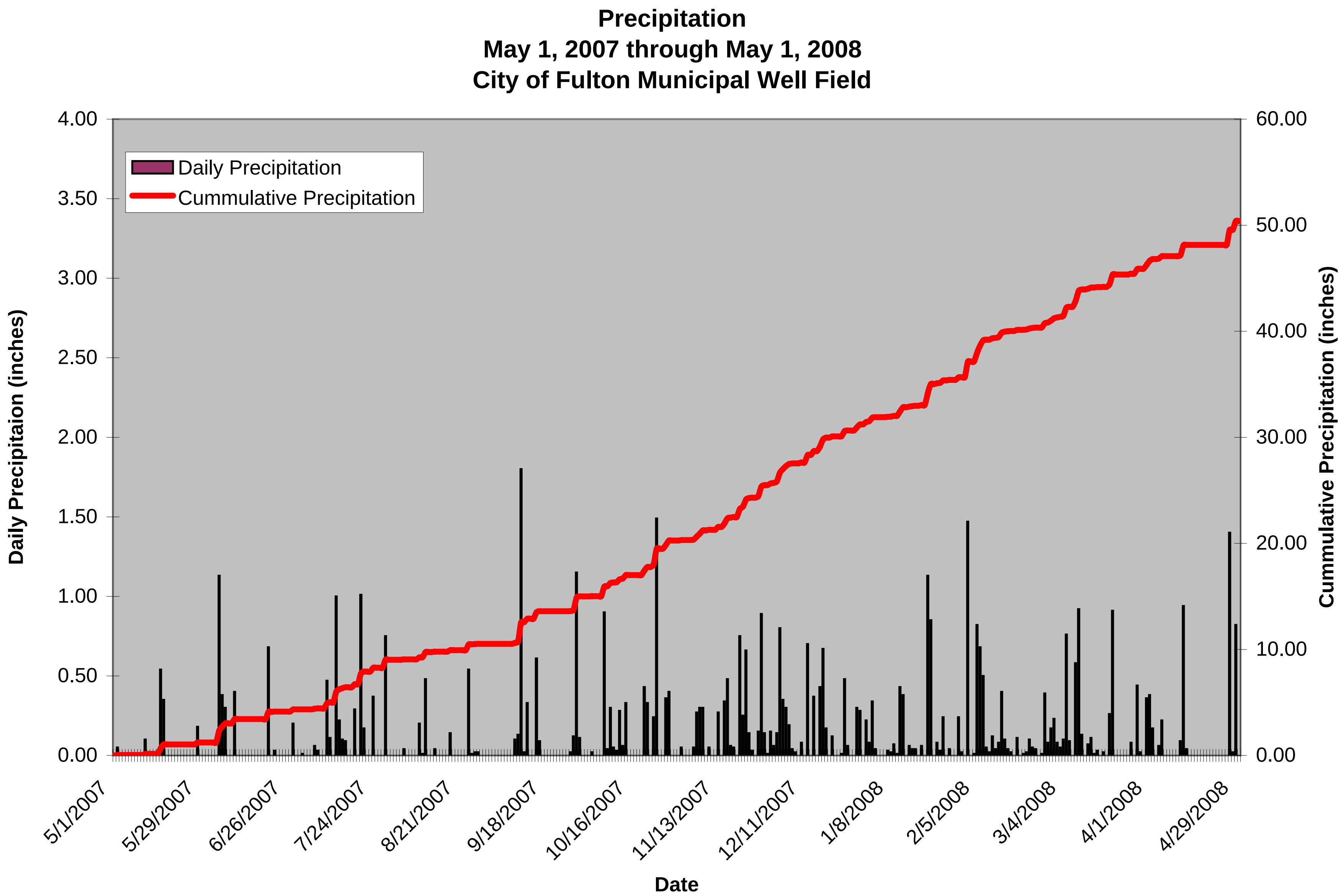
FIGURE 5-2

Borehole Location Map



APPENDIX A

Precipitation and Water Levels


Precipitation
May 1, 2007 through May 1, 2008
City of Fulton Municipal Well Field
Daily Precipitation
Cummulative Precipitation
Daily Precipitaion (inches)
Cummulative Precipitation (inches)
Date
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
5/1/2007
5/29/2007
6/26/2007
7/24/2007
8/21/2007
9/18/2007
10/16/2007
11/13/2007
12/11/2007
1/8/2008
2/5/2008
3/4/2008
4/1/2008
4/29/2008

DATE	DAILY PRECIPITATION	ANNUAL PRECIPITATION
5/1/2007	0.00	0.00
5/2/2007	0.05	0.05
5/3/2007	0.00	0.05
5/4/2007	0.00	0.05
5/5/2007	0.00	0.05
5/6/2007	0.00	0.05
5/7/2007	0.00	0.05
5/8/2007	0.00	0.05
5/9/2007	0.00	0.05
5/10/2007	0.00	0.05
5/11/2007	0.10	0.15
5/12/2007	0.00	0.15
5/13/2007	0.00	0.15
5/14/2007	0.00	0.15
5/15/2007	0.00	0.15
5/16/2007	0.54	0.69
5/17/2007	0.35	1.04
5/18/2007	0.00	1.04
5/19/2007	0.00	1.04
5/20/2007	0.00	1.04
5/21/2007	0.00	1.04
5/22/2007	0.00	1.04
5/23/2007	0.00	1.04
5/24/2007	0.00	1.04
5/25/2007	0.00	1.04
5/26/2007	0.00	1.04
5/27/2007	0.00	1.04
5/28/2007	0.18	1.22
5/29/2007	0.00	1.22
5/30/2007	0.00	1.22
5/31/2007	0.00	1.22
6/1/2007	0.00	1.22
6/2/2007	0.00	1.22
6/3/2007	0.00	1.22
6/4/2007	1.13	2.35
6/5/2007	0.38	2.73
6/6/2007	0.30	3.03
6/7/2007	0.00	3.03
6/8/2007	0.00	3.03
6/9/2007	0.40	3.43
6/10/2007	0.00	3.43
6/11/2007	0.00	3.43
6/12/2007	0.00	3.43
6/13/2007	0.00	3.43
6/14/2007	0.00	3.43
6/15/2007	0.00	3.43
6/16/2007	0.00	3.43
6/17/2007	0.00	3.43
6/18/2007	0.00	3.43

6/19/2007	0.00	3.43
6/20/2007	0.68	4.11
6/21/2007	0.00	4.11
6/22/2007	0.03	4.14
6/23/2007	0.00	4.14
6/24/2007	0.00	4.14
6/25/2007	0.00	4.14
6/26/2007	0.00	4.14
6/27/2007	0.00	4.14
6/28/2007	0.20	4.34
6/29/2007	0.00	4.34
6/30/2007	0.00	4.34
7/1/2007	0.01	4.35
7/2/2007	0.00	4.35
7/3/2007	0.00	4.35
7/4/2007	0.00	4.35
7/5/2007	0.06	4.41
7/6/2007	0.03	4.44
7/7/2007	0.00	4.44
7/8/2007	0.00	4.44
7/9/2007	0.47	4.91
7/10/2007	0.11	5.02
7/11/2007	0.00	5.02
7/12/2007	1.00	6.02
7/13/2007	0.22	6.24
7/14/2007	0.10	6.34
7/15/2007	0.09	6.43
7/16/2007	0.00	6.43
7/17/2007	0.00	6.43
7/18/2007	0.29	6.72
7/19/2007	0.00	6.72
7/20/2007	1.01	7.73
7/21/2007	0.17	7.90
7/22/2007	0.00	7.90
7/23/2007	0.00	7.90
7/24/2007	0.37	8.27
7/25/2007	0.00	8.27
7/26/2007	0.00	8.27
7/27/2007	0.00	8.27
7/28/2007	0.75	9.02
7/29/2007	0.00	9.02
7/30/2007	0.00	9.02
7/31/2007	0.00	9.02
8/1/2007	0.00	9.02
8/2/2007	0.00	9.02
8/3/2007	0.04	9.06
8/4/2007	0.00	9.06
8/5/2007	0.00	9.06
8/6/2007	0.00	9.06
8/7/2007	0.00	9.06
8/8/2007	0.20	9.26

8/9/2007	0.01	9.27
8/10/2007	0.48	9.75
8/11/2007	0.00	9.75
8/12/2007	0.00	9.75
8/13/2007	0.04	9.79
8/14/2007	0.00	9.79
8/15/2007	0.00	9.79
8/16/2007	0.00	9.79
8/17/2007	0.00	9.79
8/18/2007	0.14	9.93
8/19/2007	0.00	9.93
8/20/2007	0.00	9.93
8/21/2007	0.00	9.93
8/22/2007	0.00	9.93
8/23/2007	0.00	9.93
8/24/2007	0.54	10.47
8/25/2007	0.01	10.48
8/26/2007	0.02	10.50
8/27/2007	0.02	10.52
8/28/2007	0.00	10.52
8/29/2007	0.00	10.52
8/30/2007	0.00	10.52
8/31/2007	0.00	10.52
9/1/2007	0.00	10.52
9/2/2007	0.00	10.52
9/3/2007	0.00	10.52
9/4/2007	0.00	10.52
9/5/2007	0.00	10.52
9/6/2007	0.00	10.52
9/7/2007	0.00	10.52
9/8/2007	0.10	10.62
9/9/2007	0.13	10.75
9/10/2007	1.80	12.55
9/11/2007	0.02	12.57
9/12/2007	0.33	12.90
9/13/2007	0.00	12.90
9/14/2007	0.00	12.90
9/15/2007	0.61	13.51
9/16/2007	0.09	13.60
9/17/2007	0.00	13.60
9/18/2007	0.00	13.60
9/19/2007	0.00	13.60
9/20/2007	0.00	13.60
9/21/2007	0.00	13.60
9/22/2007	0.00	13.60
9/23/2007	0.00	13.60
9/24/2007	0.00	13.60
9/25/2007	0.00	13.60
9/26/2007	0.02	13.62
9/27/2007	0.12	13.74
9/28/2007	1.15	14.89

9/29/2007	0.11	15.00
9/30/2007	0.00	15.00
10/1/2007	0.00	15.00
10/2/2007	0.00	15.00
10/3/2007	0.02	15.02
10/4/2007	0.00	15.02
10/5/2007	0.00	15.02
10/6/2007	0.00	15.02
10/7/2007	0.90	15.92
10/8/2007	0.04	15.96
10/9/2007	0.30	16.26
10/10/2007	0.05	16.31
10/11/2007	0.03	16.34
10/12/2007	0.28	16.62
10/13/2007	0.06	16.68
10/14/2007	0.33	17.01
10/15/2007	0.00	17.01
10/16/2007	0.00	17.01
10/17/2007	0.00	17.01
10/18/2007	0.00	17.01
10/19/2007	0.00	17.01
10/20/2007	0.43	17.44
10/21/2007	0.33	17.77
10/22/2007	0.00	17.77
10/23/2007	0.24	18.01
10/24/2007	1.49	19.50
10/25/2007	0.00	19.50
10/26/2007	0.00	19.50
10/27/2007	0.36	19.86
10/28/2007	0.40	20.26
10/29/2007	0.00	20.26
10/30/2007	0.00	20.26
10/31/2007	0.00	20.26
11/1/2007	0.05	20.31
11/2/2007	0.00	20.31
11/3/2007	0.00	20.31
11/4/2007	0.00	20.31
11/5/2007	0.05	20.36
11/6/2007	0.27	20.63
11/7/2007	0.30	20.93
11/8/2007	0.30	21.23
11/9/2007	0.00	21.23
11/10/2007	0.05	21.28
11/11/2007	0.00	21.28
11/12/2007	0.00	21.28
11/13/2007	0.27	21.55
11/14/2007	0.00	21.55
11/15/2007	0.34	21.89
11/16/2007	0.48	22.37
11/17/2007	0.06	22.43
11/18/2007	0.05	22.48

11/19/2007	0.00	22.48
11/20/2007	0.75	23.23
11/21/2007	0.25	23.48
11/22/2007	0.66	24.14
11/23/2007	0.14	24.28
11/24/2007	0.03	24.31
11/25/2007	0.00	24.31
11/26/2007	0.15	24.46
11/27/2007	0.89	25.35
11/28/2007	0.14	25.49
11/29/2007	0.01	25.50
11/30/2007	0.15	25.65
12/1/2007	0.06	25.71
12/2/2007	0.14	25.85
12/3/2007	0.80	26.65
12/4/2007	0.35	27.00
12/5/2007	0.30	27.30
12/6/2007	0.19	27.49
12/7/2007	0.04	27.53
12/8/2007	0.02	27.55
12/9/2007	0.00	27.55
12/10/2007	0.08	27.63
12/11/2007	0.00	27.63
12/12/2007	0.70	28.33
12/13/2007	0.00	28.33
12/14/2007	0.37	28.70
12/15/2007	0.00	28.70
12/16/2007	0.43	29.13
12/17/2007	0.67	29.80
12/18/2007	0.17	29.97
12/19/2007	0.00	29.97
12/20/2007	0.12	30.09
12/21/2007	0.00	30.09
12/22/2007	0.00	30.09
12/23/2007	0.01	30.10
12/24/2007	0.48	30.58
12/25/2007	0.06	30.64
12/26/2007	0.00	30.64
12/27/2007	0.00	30.64
12/28/2007	0.30	30.94
12/29/2007	0.28	31.22
12/30/2007	0.00	31.22
12/31/2007	0.22	31.44
1/1/2008	0.08	31.52
1/2/2008	0.34	31.86
1/3/2008	0.04	31.90
1/4/2008	0.00	31.90
1/5/2008	0.00	31.90
1/6/2008	0.00	31.90
1/7/2008	0.03	31.93
1/8/2008	0.02	31.95

1/9/2008	0.07	32.02
1/10/2008	0.01	32.03
1/11/2008	0.43	32.46
1/12/2008	0.38	32.84
1/13/2008	0.00	32.84
1/14/2008	0.06	32.90
1/15/2008	0.04	32.94
1/16/2008	0.04	32.98
1/17/2008	0.00	32.98
1/18/2008	0.06	33.04
1/19/2008	0.00	33.04
1/20/2008	1.13	34.17
1/21/2008	0.85	35.02
1/22/2008	0.00	35.02
1/23/2008	0.08	35.10
1/24/2008	0.03	35.13
1/25/2008	0.24	35.37
1/26/2008	0.00	35.37
1/27/2008	0.04	35.41
1/28/2008	0.00	35.41
1/29/2008	0.00	35.41
1/30/2008	0.24	35.65
1/31/2008	0.02	35.67
2/1/2008	0.00	35.67
2/2/2008	1.47	37.14
2/3/2008	0.00	37.14
2/4/2008	0.01	37.15
2/5/2008	0.82	37.97
2/6/2008	0.68	38.65
2/7/2008	0.50	39.15
2/8/2008	0.05	39.20
2/9/2008	0.02	39.22
2/10/2008	0.12	39.34
2/11/2008	0.04	39.38
2/12/2008	0.08	39.46
2/13/2008	0.40	39.86
2/14/2008	0.10	39.96
2/15/2008	0.04	40.00
2/16/2008	0.02	40.02
2/17/2008	0.00	40.02
2/18/2008	0.11	40.13
2/19/2008	0.00	40.13
2/20/2008	0.01	40.14
2/21/2008	0.02	40.16
2/22/2008	0.10	40.26
2/23/2008	0.05	40.31
2/24/2008	0.04	40.35
2/25/2008	0.00	40.35
2/26/2008	0.01	40.36
2/27/2008	0.39	40.75
2/28/2008	0.08	40.83

2/29/2008	0.17	41.00
3/1/2008	0.23	41.23
3/2/2008	0.08	41.31
3/3/2008	0.05	41.36
3/4/2008	0.10	41.46
3/5/2008	0.76	42.22
3/6/2008	0.09	42.31
3/7/2008	0.00	42.31
3/8/2008	0.58	42.89
3/9/2008	0.92	43.81
3/10/2008	0.13	43.94
3/11/2008	0.00	43.94
3/12/2008	0.07	44.01
3/13/2008	0.11	44.12
3/14/2008	0.01	44.13
3/15/2008	0.03	44.16
3/16/2008	0.00	44.16
3/17/2008	0.02	44.18
3/18/2008	0.00	44.18
3/19/2008	0.26	44.44
3/20/2008	0.91	45.35
3/21/2008	0.00	45.35
3/22/2008	0.00	45.35
3/23/2008	0.00	45.35
3/24/2008	0.00	45.35
3/25/2008	0.00	45.35
3/26/2008	0.08	45.43
3/27/2008	0.00	45.43
3/28/2008	0.44	45.87
3/29/2008	0.02	45.89
3/30/2008	0.00	45.89
3/31/2008	0.36	46.25
4/1/2008	0.38	46.63
4/2/2008	0.17	46.80
4/3/2008	0.00	46.80
4/4/2008	0.06	46.86
4/5/2008	0.22	47.08
4/6/2008	0.00	47.08
4/7/2008	0.00	47.08
4/8/2008	0.00	47.08
4/9/2008	0.00	47.08
4/10/2008	0.00	47.08
4/11/2008	0.09	47.17
4/12/2008	0.94	48.11
4/13/2008	0.04	48.15
4/14/2008	0.00	48.15
4/15/2008	0.00	48.15
4/16/2008	0.00	48.15
4/17/2008	0.00	48.15
4/18/2008	0.00	48.15
4/19/2008	0.00	48.15

4/20/2008	0.00	48.15
4/21/2008	0.00	48.15
4/22/2008	0.00	48.15
4/23/2008	0.00	48.15
4/24/2008	0.00	48.15
4/25/2008	0.00	48.15
4/26/2008	0.00	48.15
4/27/2008	1.40	49.55
4/28/2008	0.02	49.57
4/29/2008	0.82	50.39
4/30/2008	0.00	50.39

WATER LEVEL DATA

Well	MP	Depth to Water				Water Table Elevation			
	Elevation	Apr-08	Jan-08	Oct-07	Jul-07	Apr-08	Jan-08	Oct-07	Jul-07
MW-1S	378.16	16.53			19.71	361.63	NA	NA	358.45
MW-1D	377.58	16.18		21.55		361.40	NA	356.03	NA
MW-2S	376.15	14.81	15.68	20.06	18.10	361.34	360.47	356.09	358.05
MW-2D	376.52	15.27	16.07	20.51	18.58	361.25	360.45	356.01	357.94
MW-3S	375.31	14.30	15.06		17.56	361.01	360.25	NA	357.75
MW-3D	375.58	14.53	15.39	19.71	17.83	361.05	360.19	355.87	357.75
MW-4S	373.09	11.98		17.18	15.35	361.11	NA	355.91	357.74
MW-4D	372.81	11.68		16.88	15.05	361.13	NA	355.93	357.76
MW-5	376.44	7.66		10.97	12.05	368.78	NA	365.47	364.39
MW-6S	376.3	14.99	16.19	20.63		361.31	360.11	355.67	NA
MW-6I	376.71	15.54	16.49	20.88	19.07	361.17	360.22	355.83	357.64
MW-6D	377	15.81	16.67	21.19	19.41	361.19	360.33	355.81	357.59
MW-7S	371.87	10.15		16.18	14.28	361.72	NA	355.69	357.59
MW-7D	371.83	11.61		16.65	15.01	360.22	NA	355.18	356.82
MW-8S	367.79	3.63	2.28	15.78	14.11	364.16	365.51	352.01	353.68
MW-8I	367.18	7.97	8.57	12.81	11.05	359.21	358.61	354.37	356.13
MW-8D	367.36	10.22	11.27	15.03	13.40	357.14	356.09	352.33	353.96
MW-9S	365.82	3.65		11.12	9.70	362.17	NA	354.70	356.12
MW-9D	366.21	6.51		11.34	9.50	359.70	NA	354.87	356.71
MW-10S	363.44	9.44		13.10	11.81	354.00	NA	350.34	351.63
MW-10I		9.33		13.81	12.50	-9.33	NA	-13.81	-12.50
MW-10D	362.93	10.20		12.90	11.60	352.73	NA	350.03	351.33
MW-11S	371.75	11.40		16.41	14.68	360.35	NA	355.34	357.07
MW-11D	370.85	10.60		15.61	13.84	360.25	NA	355.24	357.01
MW-12S	375.28	13.95		19.40	17.48	361.33	NA	355.88	357.80
MW-12D	375.09	13.91		19.26	17.54	361.18	NA	355.83	357.55
MW-13D	364.31	8.42	9.48	12.54	10.93	355.89	354.83	351.77	353.38
MW-14S	379.11	23.71	24.93	27.63	26.17	355.40	354.18	351.48	352.94
MW-14D	379.24	23.91	24.78	27.80	26.33	355.33	354.46	351.44	352.91
MW-15D	369.1	12.89	13.97	17.13	15.44	356.21	355.13	351.97	353.66
MW-16D	365.29	4.99	5.53	9.92	8.11	360.30	359.76	355.37	357.18
MW-17D	371.79	15.75	16.72	19.83	18.30	356.04	355.07	351.96	353.49
MW-18S	374.68	18.98	20.03	23.00	221.51	355.70	354.65	351.68	153.17
MW-19S	370.36	7.54		13.97	13.63	362.82	NA	356.39	356.73
MW-19D	370.48	12.17		16.79	15.22	358.31	NA	353.69	355.26
MW-20D	371.35				13.43	NA	NA	NA	357.92
MW-21S	378.33	23.19	24.10		25.55	355.14	354.23	NA	352.78
MW-21D	379.02	23.91	24.81	26.87	26.26	355.11	354.21	352.15	352.76
MW-22S	367.35	5.96	5.71	16.92	15.93	361.39	361.64	350.43	351.42
MW-22D	367.26	9.96	10.59	14.35	13.03	357.30	356.67	352.91	354.23
MW-23S	365.53	13.79		17.91	16.38	351.74	NA	347.62	349.15

WATER LEVEL DATA

Well	MP Elevation	Depth to Water				Water Table Elevation			
		Apr-08	Jan-08	Oct-07	Jul-07	Apr-08	Jan-08	Oct-07	Jul-07
MW-23D	365.93	14.22		18.41	16.84	351.71	NA	347.52	349.09
MW-24S	362.59	7.25		11.25	9.75	355.34	NA	351.34	352.84
MW-24D	362.74	7.53		11.50	10.03	355.21	NA	351.24	352.71
MW-25S	365.05	10.05	11.04	13.92	12.44	355.00	354.01	351.13	352.61
MW-25D	367.19	12.19	13.16	16.05	14.56	355.00	354.03	351.14	352.63
MW-26S	365.91	5.33	5.66	10.23	8.43	360.58	360.25	355.68	357.48
MW-26D	365.54	5.36	5.90	10.24	8.41	360.18	359.64	355.30	357.13
MW-27S	365.86	5.07	3.52	10.95	10.17	360.79	362.34	354.91	355.69
MW-27D	365.76	6.65	6.44	11.01	10.12	359.11	359.32	354.75	355.64
MW-28S	356	4.59	5.55	7.85	6.57	351.41	350.45	348.15	349.43
MW-28I	354.36	5.18	6.16	8.41	7.25	349.18	348.20	345.95	347.11
MW-28D	356.1	4.87	5.81	8.09	7.01	351.23	350.29	348.01	349.09
MW-29S	354.36	3.02		6.24	5.18	351.34	NA	348.12	349.18
MW-29I	354.42	3.13		6.35	5.20	351.29	NA	348.07	349.22
MW-29D	354.3	3.27		6.50	5.38	351.03	NA	347.80	348.92
MW-30S	353.15	1.87		5.04	3.93	351.28	NA	348.11	349.22
MW-30I	353.16	1.90		5.14	3.99	351.26	NA	348.02	349.17
MW-30D	353.13	1.90		5.24	4.03	351.23	NA	347.89	349.10
MW-31S	354.71	3.33		5.64	4.94	351.38	NA	349.07	349.77
MW-31I	354.72	3.63		6.19	5.88	351.09	NA	348.53	348.84
MW-31D	355.3	3.74		7.12	8.94	351.56	NA	348.18	346.36
MW-32D	380.35	21.86	22.81	25.60	24.19	358.49	357.54	354.75	356.16
MW-33S	384.15	27.45	28.39	31.11	29.74	356.70	355.76	353.04	354.41
MW-34D	384.15	29.09	30.05	32.87	31.47	355.06	354.10	351.28	352.68
MW-35D	380.42	26.93	27.65	30.10	28.95	353.49	352.77	350.32	351.47
MW-36S	375.71	12.73	13.67	18.76	16.84	362.98	362.04	356.95	358.87
MW-36D	375.67	12.72	13.70	18.72	16.84	362.95	361.97	356.95	358.83
MW-37S	376.02	13.93	14.58	19.64	17.85	362.09	361.44	356.38	358.17
MW-37I	376.37	14.46	15.02	20.06	18.34	361.91	361.35	356.31	358.03
MW-37D	376.27	14.04	14.79	19.76	17.98	362.23	361.48	356.51	358.29
MW-38S	372.55	9.63	9.80	14.55	12.85	362.92	362.75	358.00	359.70
MW-38D	372.23	7.63	8.32	12.87	10.98	364.60	363.91	359.36	361.25
MW-39S	371.33	8.36		14.58	12.91	362.97	NA	356.75	358.42
MW-39I	371.43	9.09		14.95	13.41	362.34	NA	356.48	358.02
MW-39D	371.52	9.28		14.98	13.36	362.24	NA	356.54	358.16
MW-40S	371.1	9.65	9.06	14.23	12.51	361.45	362.04	356.87	358.59
MW-41S	370.28	8.43			13.21	361.85	NA	NA	357.07
MW-42S	353.08					NA	NA	NA	NA
MW-43S	352.57					NA	NA	NA	NA
MW-43D	352.65					NA	NA	NA	NA
MW-44S	352.12					NA	NA	NA	NA

WATER LEVEL DATA

Well	MP	Depth to Water				Water Table Elevation			
	Elevation	Apr-08	Jan-08	Oct-07	Jul-07	Apr-08	Jan-08	Oct-07	Jul-07
MW-45S	354.50					NA	NA	NA	NA
MW-45D	354.04					NA	NA	NA	NA
MW-46S	353.12					NA	NA	NA	NA
MW-46D	353.28					NA	NA	NA	NA
MW-47S	379.72				20.95	NA	NA	NA	358.77
MW-48S	379.82				21.11	NA	NA	NA	358.71
MW-49S	378.02	24.03		28.46	26.70	353.99	NA	349.56	351.32
MW-49I	378.24	24.26		28.57	26.82	353.98	NA	349.67	351.42
MW-49D	378.12	23.95		28.28	26.50	354.17	NA	349.84	351.62
MW-50S	361.86	5.17		11.56	11.31	356.69	NA	350.30	350.55
MW-50I	361.64	7.45		11.50	10.03	354.19	NA	350.14	351.61
MW-50D	361.74	7.58		11.60	10.09	354.16	NA	350.14	351.65
MW-51I	366.91	7.05	7.62	11.93	10.11	359.86	359.29	354.98	356.80
MW-51D	366.44	6.61	7.17	11.54	9.69	359.83	359.27	354.90	356.75
MW-52S	367.8	12.78	13.62	16.50	15.20	355.02	354.18	351.30	352.60
MW-52I	367.41	12.39	13.20	16.08	14.78	355.02	354.21	351.33	352.63
MW-52D	367.15	12.11	12.88	15.79	14.50	355.04	354.27	351.36	352.65
MW-53S	369.23	8.30		13.60	12.15	360.93	NA	355.63	357.08
MW-53I	368.68	7.90		13.10	11.65	360.78	NA	355.58	357.03
MW-53D	368.51	7.83		13.08	11.64	360.68	NA	355.43	356.87
MW-54S	371.45	9.49	10.00	15.05	13.47	361.96	361.45	356.40	357.98
MW-54I	371.54	10.38	10.55	15.63	14.21	361.16	360.99	355.91	357.33
MW-54D	371.62	10.12	10.45	15.46	14.02	361.50	361.17	356.16	357.60
MW-55D	373.64	18.14	19.13	22.04	20.56	355.50	354.51	351.60	353.08
MW-56D	366.78	8.01	8.80	12.80	11.05	358.77	357.98	353.98	355.73
MW-60S	366.83	8.40		16.40	11.31	358.43	NA	350.43	355.52
MW-60I	366.72	8.29		16.28	11.21	358.43	NA	350.44	355.51
MW-60D	366.83	8.43		16.38	11.31	358.40	NA	350.45	355.52
MW-61D	369.51	10.40	10.90	15.20	13.59	359.11	358.61	354.31	355.92
MW-62S	367.82	6.65	7.19	11.57	9.73	361.17	360.63	356.25	358.09
MW-63S	372.88	11.00	11.45	16.10	12.95	361.88	361.43	356.78	359.93
MW-64	375.72	3.65		11.91	11.30	372.07	NA	363.81	364.42
MW-65S	380.14	17.10		23.08	20.95	363.04	NA	357.06	359.19
MW-65D	380.15	18.70		24.17	22.57	361.45	NA	355.98	357.58
MW-66D	378.4	17.00		22.55	20.83	361.40	NA	355.85	357.57
						NA	NA	NA	NA
PZ-1	374.44	7.62		13.55	11.61	366.82	NA	360.89	362.83
PZ-2	376.01	4.50		13.19	11.79	371.51	NA	362.82	364.22

APPENDIX B

Recovery Well Flows

Former Miller Brewing Company Facility
Fulton, NY
Recovery Well Flow Rates
Eleventh Year May 1, 2007 through May 1, 2008

DATE	Well						
	RW-3	RW-5	RW-9	RW-10	RW-11	RW-12	RW-13
4/30/2007	1486295	3751758	2674159	3544312	12260291	1630463	11841529
5/4/2007	1487482	3753830	2674758	3548787	12276063	1649049	11862017
5/7/2007	1488384	3755275	2675166	3552263	12288437	1663640	11880745
5/11/2007	1489549	3757233	2675720	3556618	12303945	1682169	11903330
5/15/2007	1490669	3759072	2676227	3560723	12318646	1699879	11924193
5/21/2007	1492313	3761716	2676948	3566766	12340342	1726466	11955165
6/6/2007	1496598	3768680	2678803	3582549	12397903	1798157	12035481
6/11/2007	1497677	3770549	2679283	3586497	12412293	1816288	12057970
6/13/2007	1498198	3771437	2679501	3588442	12419459	1825279	12068388
6/18/2007	1499466	3773588	2680016	3593107	12436832	1847085	12092758
6/20/2007	1499979	3774476	2680222	3594972	12443797	1855739	12102368
6/26/2007	1501401	3777039	2680823	3600430	12464367	1881457	12130438
7/2/2007	1502696	3779253	2681324	3604938	12481489	1903309	12156236
7/10/2007	1504222	3782063	2681946	3610613	12503449	1931428	12188609
7/13/2007	1504317	3783315	2682218	3613042	12512939	1943631	12202330
7/16/2007	1504373	3784576	2682492	3615652	12523144	1956845	12218618
7/20/2007	1505187	3786259	2682858	3618895	12535862	1973387	12237446
7/27/2007	1506870	3789102	2683472	3624436	12557804	2001808	12268773
7/30/2007	1507625	3790286	2683727	3626755	12566964	2012739	12281509
8/3/2007	1508636	3791892	2684070	3629888	12579413	2029943	12298522
8/10/2007	1510412	3794776	2684688	3635387	12601398	2058636	12328055
8/13/2007	1511113	3795897	2684936	3637525	12609874	2069921	12339633
8/16/2007	1511894	3797113	2685207	3639876	12619323	2082358	12352411
8/20/2007	1512862	3798624	2685539	3642745	12630970	2097657	12368023
8/24/2007	1513841	3800154	2685870	3645650	12642800	2113015	12386722
8/31/2007	1515461	3802775	2686433	3650542	12662847	2140274	12410301
9/4/2007	1516385	3804304	2686757	3653331	12674442	2156001	12425823
9/10/2007	1517717	3806500	2687215	3657309	12691151	2178733	12448218
9/14/2007	1518577	3807892	2687514	3659908	12702141	2193661	12463271
9/18/2007	1519472	3809389	2687832	3662530	12713379	2208757	12478450
9/24/2007	1520789	3811474	2688276	3666434	12730120	2231202	12505495
9/28/2007	2/15/6066	3812886	2688578	3668983	12741064	2245955	12523305
10/3/2007	1522318	3813992	2688811	3670914	12749388	2257138	12537788

Former Miller Brewing Company Facility
Fulton, NY
Recovery Well Flow Rates
Eleventh Year May 1, 2007 through May 1, 2008

DATE	Well						
	RW-3	RW-5	RW-9	RW-10	RW-11	RW-12	RW-13
10/8/2007	1523379	3815753	2689172	3674119	12763213	2275902	12560734
10/11/2007	1524007	3816843	2689397	3676006	12771277	2286871	12573830
10/19/2007	1525749	3819820	2689997	3680754	12793850	2317465	12609721
10/29/2007	1528107	3823468	2691381	3687297	12821046	2353884	12654977
11/2/2007	1528965	3824965	2691712	3690099	12832668	2368993	12673329
11/5/2007	1529632	3826106	2691948	3692259	12841581	2380558	12687040
11/9/2007	1530612	3827703	2692438	3695226	12853785	2396445	12705706
11/19/2007	1531811	3831397	2693740	3701953	12881380	2432281	12751122
12/14/2007	1533877	3838336	2697408	3719747	12951549	2519338	12860066
12/26/2007	1537130	3841182	2698764	3729296	12988461	2563512	12918152
1/2/2008	1539722	3844769	2699553	3735874	13013876	2593436	12956103
1/7/2008	1541283	3847247	2699995	3740827	13033212	2616005	12982205
1/11/2008	1542954	3849224	2700431	3744868	13048844	2634261	13004506
1/18/2008	1544910	3852448	2701003	3751684	13074973	2664579	13038256
1/22/2008	1545863	3854370	2701198	3755812	13090370	2682513	13057482
1/29/2008	1547421	3857510	2701480	3762778	13116076	2712897	13092816
2/6/2008	1551506	3861085	2702537	3770616	13145452	2747361	13135655
2/11/2008	1553669	3863422	2703174	3776038	13165747	2770583	13163479
2/18/2008	1556134	3866590	2703715	3783127	13191649	2800716	13201577
2/22/2008	1557516	3868293	2704031	3787340	13206966	2818652	13224029
2/28/2008	1558803	3870918	2704247	3793264	13228398	2843757	13253760
3/12/2008	1563608	3876759	2705673	3806578	13278082	2902218	13319741
3/21/2008	1568905	3877696	2707155	3815451	13312273	2942354	13366469
3/24/2008	1569927	3877696	2707336	3818989	13324162	2956056	13380888
3/30/2008	1573190	3877696	2707790	3826397	13351486	2987430	13415743
4/4/2008	1574951	3877696	2708102	3830677	13367311	3005482	13439705
4/11/2008	1576831	3880738	2708348	3837961	13394173	3036669	13470506
4/14/2008	1577032	3882102	2708582	3841155	13405836	3050431	13484333
4/17/2008	1577233	3882995	2708650	3844239	13417238	3063944	13497885
4/21/2008	1577458	3884464	2708671	3848172	13431651	3081151	13515331
4/23/2008	1577458	3885443	2708671	3850458	13440114	3091257	13525221
4/30/2008	1577458	3888533	2708671	3857227	13465092	3121072	13555530
TOTALS	91163	136775	34512	312915	1204801	1490609	1714001
% of Total	1.83	2.74	0.69	6.28	24.17	29.90	34.38

APPENDIX C

Treatment System Flows

MILLER BREWING SITE REMEDIATION
GWTF TOTALIZER READINGS

MAY 1, 2005 through May 1, 2006

May-07

Day	Reading	Daily Gallons
1	22363083	12112
2	22375195	16299
3	22391494	16351
4	22407845	16323
5	22424168	16378
6	22440546	16405
7	22456951	16376
8	22473327	16519
9	22489846	16593
10	22506439	12407
11	22518846	16543
12	22535389	16536
13	22551925	16544
14	22568469	12424
15	22580893	16578
16	22597471	13467
17	22610938	15448
18	22626386	13325
19	22639711	8654
20	22648365	24774
21	22673139	16565
22	22689704	12393
23	22702097	16702
24	22718799	12490
25	22731289	16644
26	22747933	12468
27	22760401	14466
28	22774867	14466
29	22789333	12322
30	22801655	16379
31	22818034	12281
Total for Month	454951	
Daily Average	14675.84	
Average GPM	10.19	

Jun-07

Day	Reading	Daily Gallons
1	22830315	15219
2	22845534	13287
3	22858821	12292
4	22871113	16394
5	22887507	13403
6	22900910	9815
7	22910725	14452
8	22925177	6121
9	22931298	16991
10	22948289	15071
11	22963360	16229
12	22979589	12356
13	22991945	16620
14	23008565	12469
15	23021034	16507
16	23037541	12922
17	23050463	15867
18	23066330	12258
19	23078588	14415
20	23093003	12263
21	23105266	12332
22	23117598	16386
23	23133984	12328
24	23146312	12324
25	23158636	12332
26	23170968	16163
27	23187131	4165
28	23191296	12547
29	23203843	16676
30	23220519	12458
Total for Month	402485	
Daily Average	13416.17	
Average GPM	9.32	

MILLER BREWING SITE REMEDIATION
GWTF TOTALIZER READINGS

MAY 1, 2005 through May 1, 2006

Jul-07		Daily Gallons
1	23232977	12461
2	23245438	12437
3	23257875	16498
4	23274373	12396
5	23286769	12360
6	23299129	12573
7	23311702	2021
8	23313723	4212
9	23317935	12532
10	23330467	12299
11	23342766	16486
12	23359252	12314
13	23371566	12432
14	23383998	12647
15	23396645	15459
16	23412104	13467
17	23425571	12437
18	23438008	12379
19	23450387	16588
20	23466975	12328
21	23479303	12352
22	23491655	12391
23	23504046	13009
24	23517055	12414
25	23529469	12451
26	23541920	14385
27	23556305	14485
28	23570790	12449
29	23583239	12420
30	23595659	12374
31	23608033	12403
Total for Month	387514	
Daily Average	12500.45	
Average GPM	8.68	

Aug-07		Daily Gallons
1	23620436	12447
2	23632883	12217
3	23645100	12361
4	23657461	12306
5	23669767	12269
6	23682036	12334
7	23694370	12409
8	23706779	12409
9	23719188	12428
10	23731616	11166
11	23742782	10021
12	23752803	11913
13	23764716	12437
14	23777153	12495
15	23789648	16610
16	23806258	8459
17	23814717	12435
18	23827152	12557
19	23839709	12551
20	23852260	12636
21	23864896	12632
22	23877528	11084
23	23888612	12716
24	23901328	12763
25	23914091	12722
26	23926813	12728
27	23939541	12750
28	23952291	8478
29	23960769	12710
30	23973479	12666
31	23986145	12670
Total for Month	378112	
Daily Average	12197.16	
Average GPM	8.47	

MILLER BREWING SITE REMEDIATION
GWTF TOTALIZER READINGS

MAY 1, 2005 through May 1, 2006

Sep-07

		Daily Gallons
1	23998815	12745
2	24011560	9802
3	24021362	11461
4	24032823	12651
5	24045474	13115
6	24058589	7890
7	24066479	12592
8	24079071	12654
9	24091725	12627
10	24104352	9832
11	24114184	11296
12	24125480	12817
13	24138297	12793
14	24151090	12802
15	24163892	8560
16	24172452	12799
17	24185251	12769
18	24198020	12822
19	24210842	12937
20	24223779	13017
21	24236796	12992
22	24249788	13000
23	24262788	8664
24	24271452	12914
25	24284366	12983
26	24297349	12920
27	24310269	12915
28	24323184	6741
29	24329925	0
30	24329925	4875
	24334800	
Total for Month	343780	
Daily Average	11459.33	
Average GPM	7.96	

Oct-07

		Daily Gallons
1	24334800	13394
2	24348194	12931
3	24361125	12977
4	24374102	12937
5	24387039	12900
6	24399939	11706
7	24411645	9852
8	24421497	12945
9	24434442	12868
10	24447310	12864
11	24460174	12928
12	24473102	12932
13	24486034	12918
14	24498952	12946
15	24511898	9547
16	24521445	12032
17	24533477	12972
18	24546449	12850
19	24559299	12954
20	24572253	12955
21	24585208	8646
22	24593854	5476
23	24599330	13593
24	24612923	17351
25	24630274	13000
26	24643274	12974
27	24656248	13005
28	24669253	12968
29	24682221	13066
30	24695287	12964
31	24708251	13006
Total for Month	378326	
Daily Average	12204.06	
Average GPM	8.48	

MILLER BREWING SITE REMEDIATION
GWTF TOTALIZER READINGS

MAY 1, 2005 through May 1, 2006

Nov-07

Day	Reading	Daily Gallons
1	24721257	12952
2	24734209	12968
3	24747177	12940
4	24760117	12913
5	24773030	12963
6	24785993	12939
7	24798932	12965
8	24811897	12940
9	24824837	12957
10	24837794	12859
11	24850653	6481
12	24857134	12875
13	24870009	12801
14	24882810	12742
15	24895552	12696
16	24908248	12729
17	24920977	11491
18	24932468	12667
19	24945135	12645
20	24957780	12564
21	24970344	13455
22	24983799	13385
23	24997184	13645
24	25010829	13623
25	25024452	12497
26	25036949	14667
27	25051616	13557
28	25065173	14394
29	25079567	12244
30	25091811	0
Total for Month	383560	
Daily Average	12785.33	
Average GPM	8.88	

Dec-07

Day	Reading	Daily Gallons
1	25091811	0
2	25091811	0
3	25091811	0
4	25091811	12503
5	25104314	12432
6	25116746	12457
7	25129203	16666
8	25145869	12588
9	25158457	12535
10	25170992	12561
11	25183553	9838
12	25193391	13260
13	25206651	17005
14	25223656	9242
15	25232898	12410
16	25245308	12734
17	25258042	4689
18	25262731	3954
19	25266685	17574
20	25284259	12797
21	25297056	17048
22	25314104	12800
23	25326904	16220
24	25343124	17546
25	25360670	14943
26	25375613	20124
27	25395737	9763
28	25405500	17434
29	25422934	13187
30	25436121	17005
31	25453126	17211
Total for Month	361315	
Daily Average	11655.32	
Average GPM	8.09	

MILLER BREWING SITE REMEDIATION
GWTF TOTALIZER READINGS

MAY 1, 2005 through May 1, 2006

Jan-08

		Daily Gallons
1	25470337	12861
2	25483198	17139
3	25500337	12971
4	25513308	16985
5	25530293	13326
6	25543619	17048
7	25560667	14518
8	25575185	16893
9	25592078	17197
10	25609275	12785
11	25622060	16897
12	25638957	12562
13	25651519	16902
14	25668421	14793
15	25683214	12918
16	25696132	16302
17	25712434	12421
18	25724855	16402
19	25741257	12196
20	25753453	12291
21	25765744	16257
22	25782001	12141
23	25794142	12817
24	25806959	12152
25	25819111	15658
26	25834769	12054
27	25846823	-4069
28	25842754	31945
29	25874699	11944
30	25886643	15801
31	25902444	11697
Total for Month	449318	
Daily Average	14494.13	
Average GPM	10.07	

Feb-08

		Daily Gallons
1	25914141	15478
2	25929619	11622
3	25941241	11613
4	25952854	15556
5	25968410	19225
6	25987635	12236
7	25999871	15653
8	26015524	11707
9	26027231	14590
10	26041821	12813
11	26054634	9177
12	26063811	16300
13	26080111	14802
14	26094913	12220
15	26107133	13387
16	26120520	16722
17	26137242	16355
18	26153597	16158
19	26169755	16053
20	26185808	10745
21	26196553	11984
22	26208537	8668
23	26217205	13721
24	26230926	12854
25	26243780	14987
26	26258767	9062
27	26267829	9057
28	26276886	14154
29	26291040	10485
Total for Month	374442	
Daily Average	12911.79	
Average GPM	8.97	

MILLER BREWING SITE REMEDIATION

GWTF TOTALIZER READINGS

MAY 1, 2005 through May 1, 2006

Mar-08

Day	Reading	Daily Gallons
1	26301525	10290
2	26311815	13424
3	26325239	9888
4	26335127	12667
5	26347794	9086
6	26356880	12126
7	26369006	9024
8	26378030	8994
9	26387024	8711
10	26395735	11744
11	26407479	7962
12	26415441	11861
13	26427302	8832
14	26436134	8831
15	26444965	11873
16	26456838	8944
17	26465782	8921
18	26474703	12025
19	26486728	11816
20	26498544	8873
21	26507417	9561
22	26516978	10871
23	26527849	8713
24	26536562	8716
25	26545278	10000
26	26555278	10009
27	26565287	10779
28	26576066	9167
29	26585233	8436
30	26593669	9312
31	26602981	9640
Total for Month	326095	
Daily Average	10519.19	
Average GPM	7.30	

Apr-08

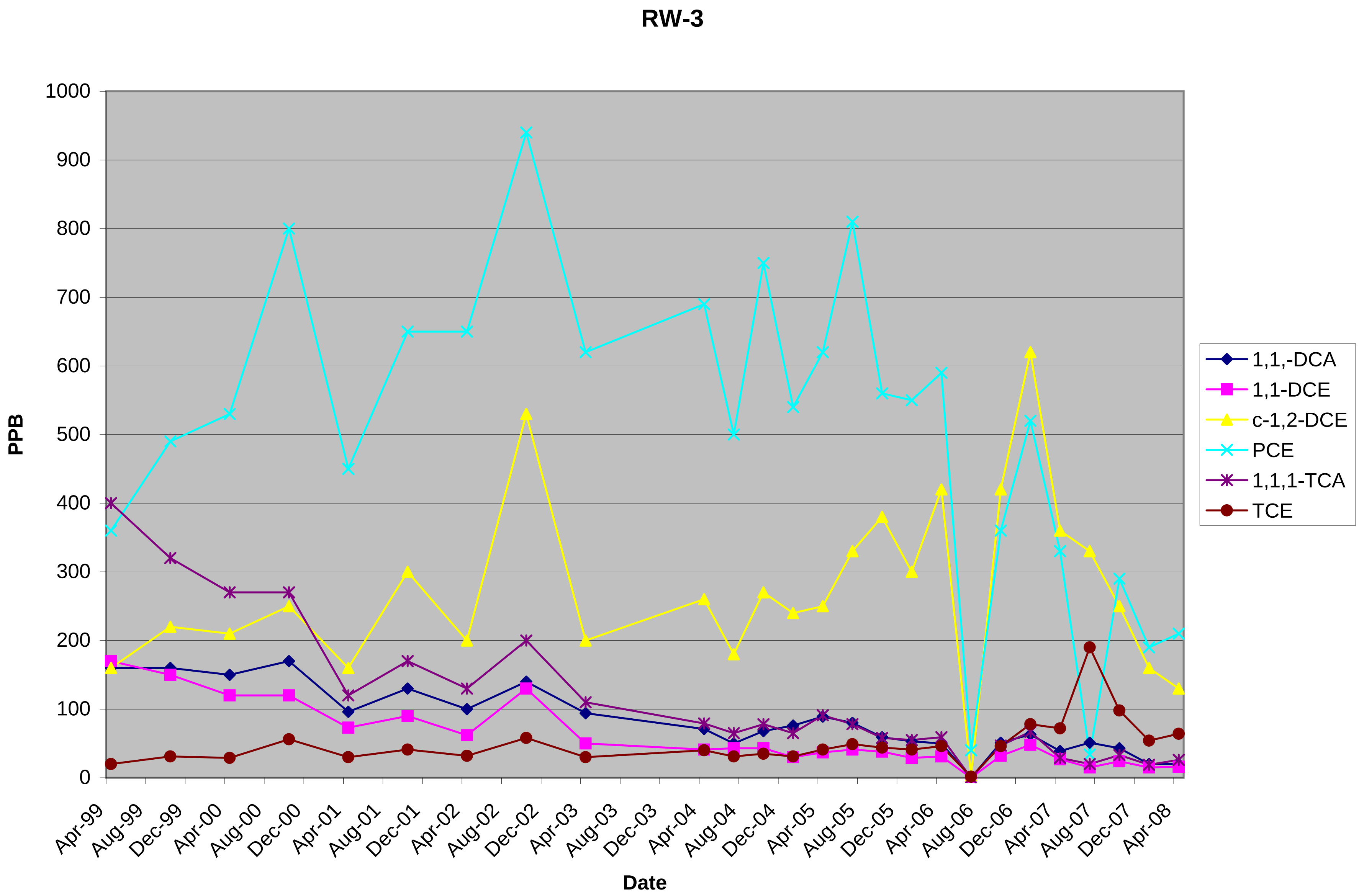
Day	Reading	Daily Gallons
1	26612621	12241
2	26624862	8400
3	26633262	9500
4	26642762	9745
5	26652507	7972
6	26660479	7793
7	26668272	7589
8	26675861	9630
9	26685491	6873
10	26692364	0
11	26692364	0
12	26692364	0
13	26692364	0
14	26692364	14255
15	26706619	14370
16	26720989	15035
17	26736024	14420
18	26750444	19601
19	26770045	17663
20	26787708	16642
21	26804350	19383
22	26823733	19399
23	26843132	14403
24	26857535	19067
25	26876602	17756
26	26894358	15574
27	26909932	18923
28	26928855	19162
29	26948017	18838
30	26966855	17025
May-08 1	26983880	
Total for Month	363874	
Daily Average	12129.13	
Average GPM	8.42	

APPENDIX D

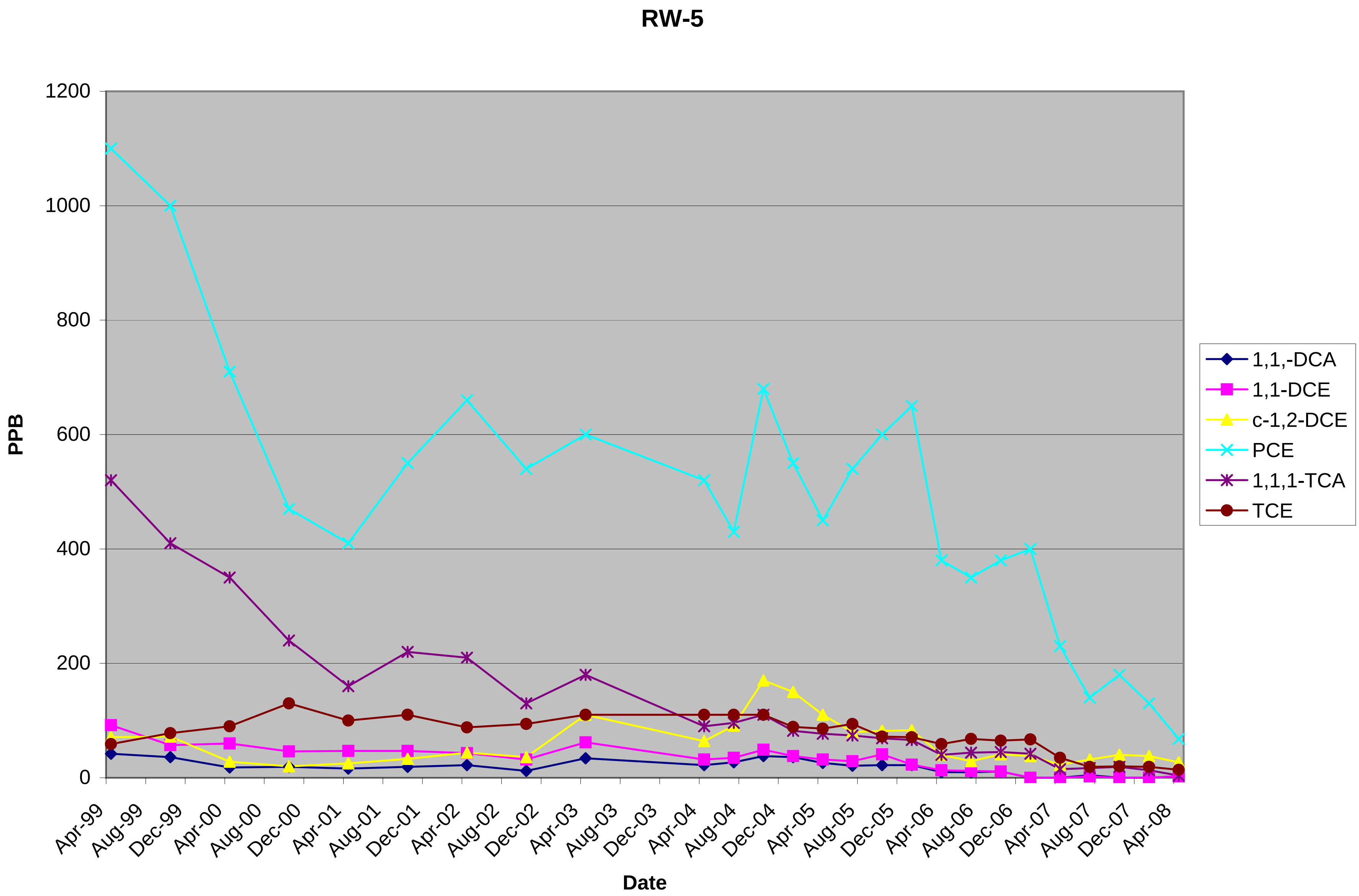
Hazardous Waste Disposal Documentation

APPENDIX E

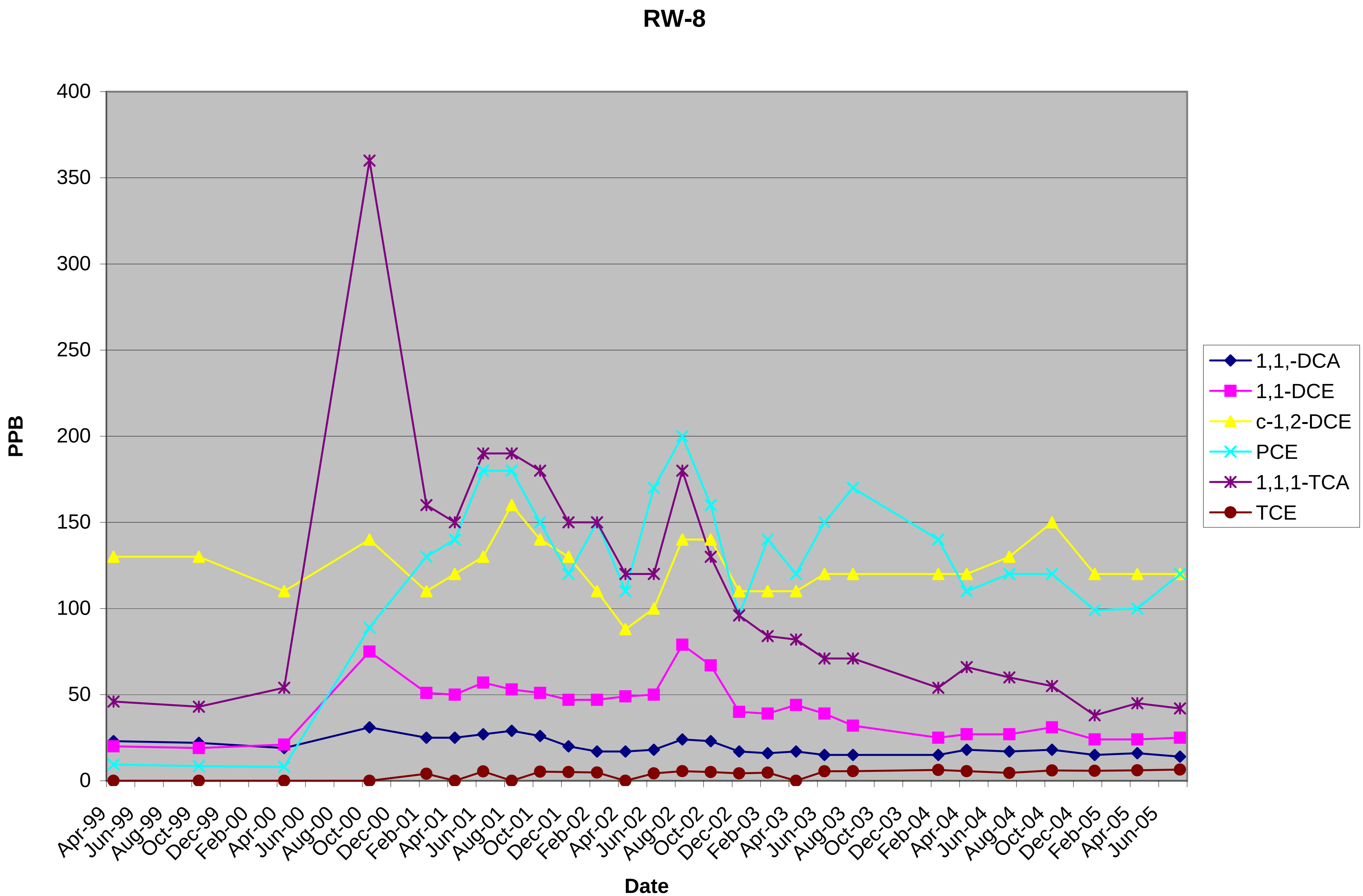
Recovery Well Concentration Plots



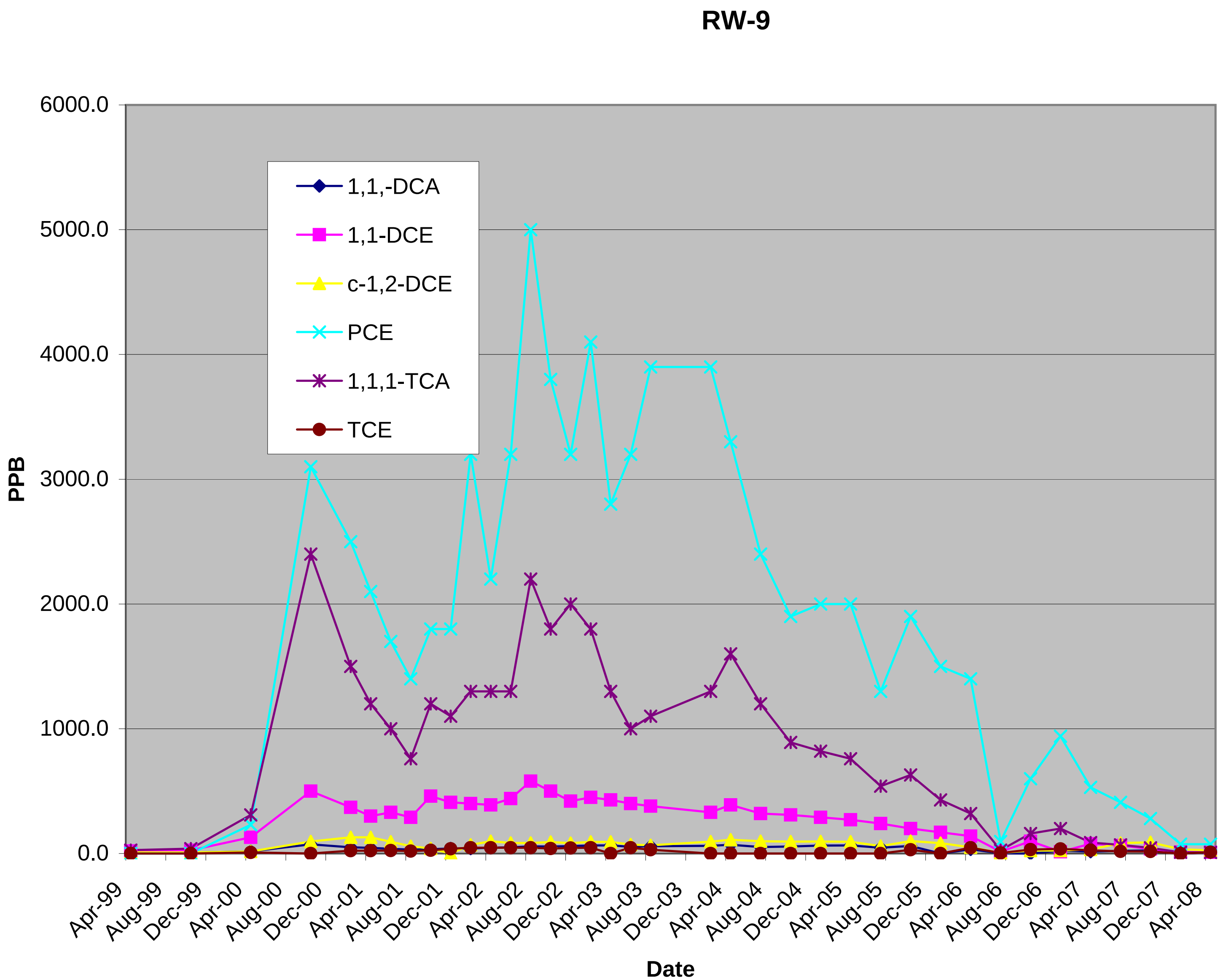
RW-3
PPB
1000
900
800
700
600
500
400
300
200
100
0
Apr-99
Aug-99
Dec-99
Apr-00
Aug-00
Dec-00
Apr-01
Aug-01
Dec-01
Apr-02
Aug-02
Dec-02
Apr-03
Aug-03
Dec-03
Apr-04
Aug-04
Dec-04
Apr-05
Aug-05
Dec-05
Apr-06
Aug-06
Dec-06
Apr-07
Aug-07
Dec-07
Apr-08
Date
1,1,-DCA
1,1-DCE
c-1,2-DCE
PCE
1,1,1-TCA
TCE



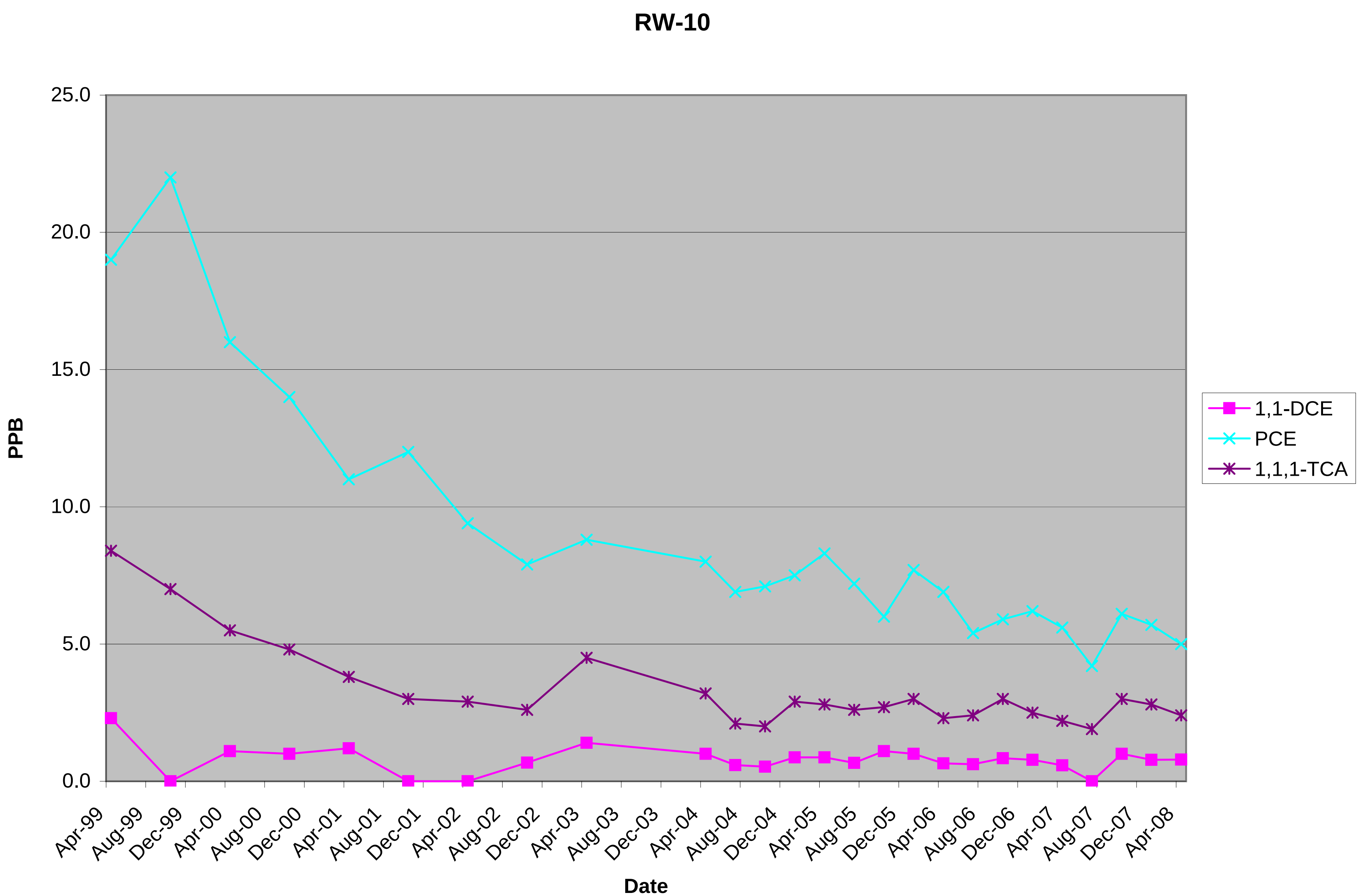
RW-5
PPB
1200
1000
800
600
400
200
0
Apr-99
Aug-99
Dec-99
Apr-00
Aug-00
Dec-00
Apr-01
Aug-01
Dec-01
Apr-02
Aug-02
Dec-02
Apr-03
Aug-03
Dec-03
Apr-04
Aug-04
Dec-04
Apr-05
Aug-05
Dec-05
Apr-06
Aug-06
Dec-06
Apr-07
Aug-07
Dec-07
Apr-08
Date
1,1,-DCA
1,1-DCE
c-1,2-DCE
PCE
1,1,1-TCA
TCE



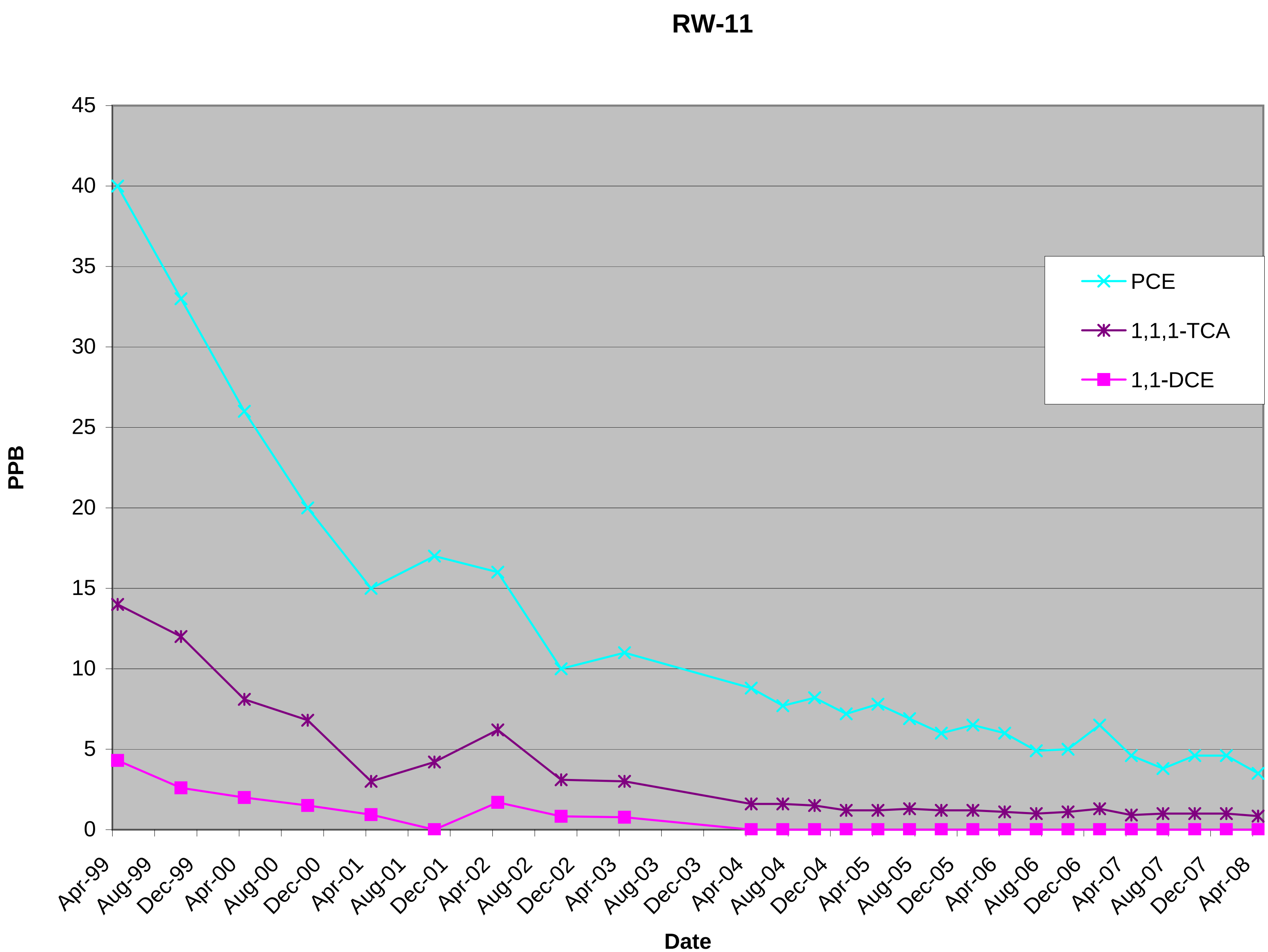
RW-8
PPB
400
350
300
250
200
150
100
50
0
Apr-99
Jun-99
Aug-99
Oct-99
Dec-99
Feb-00
Apr-00
Jun-00
Aug-00
Oct-00
Dec-00
Feb-01
Apr-01
Jun-01
Aug-01
Oct-01
Dec-01
Feb-02
Apr-02
Jun-02
Aug-02
Oct-02
Dec-02
Feb-03
Apr-03
Jun-03
Aug-03
Oct-03
Dec-03
Feb-04
Apr-04
Jun-04
Aug-04
Oct-04
Dec-04
Feb-05
Apr-05
Jun-05
Date
1,1,-DCA
1,1-DCE
c-1,2-DCE
PCE
1,1,1-TCA
TCE

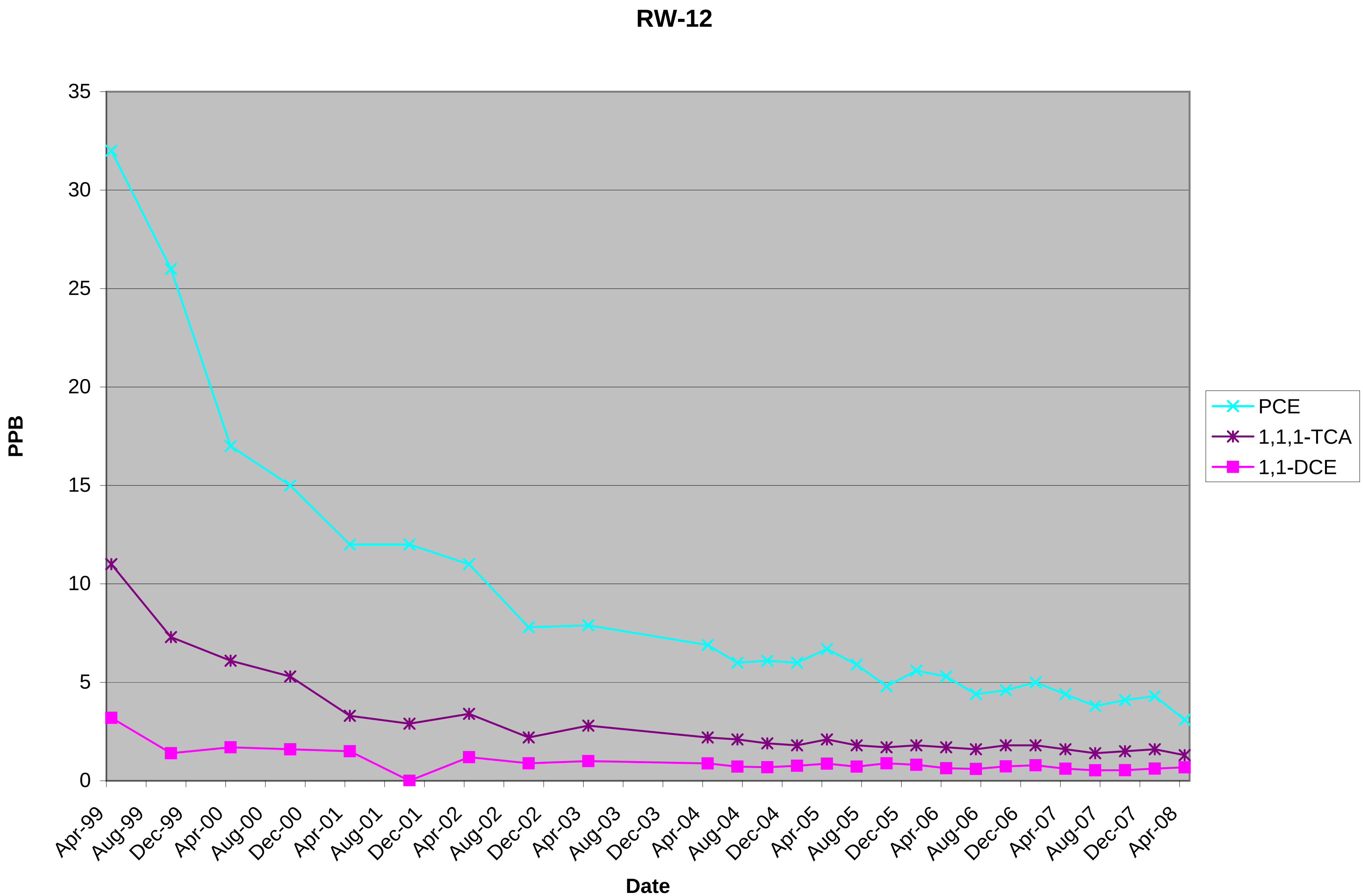


RW-9
PPB
6000.0
5000.0
4000.0
3000.0
2000.0
1000.0
0.0
1,1,-DCA
1,1-DCE
c-1,2-DCE
PCE
1,1,1-TCA
TCE
Apr-99
Aug-99
Dec-99
Apr-00
Aug-00
Dec-00
Apr-01
Aug-01
Dec-01
Apr-02
Aug-02
Dec-02
Apr-03
Aug-03
Dec-03
Apr-04
Aug-04
Dec-04
Apr-05
Aug-05
Dec-05
Apr-06
Aug-06
Dec-06
Apr-07
Aug-07
Dec-07
Apr-08
Date

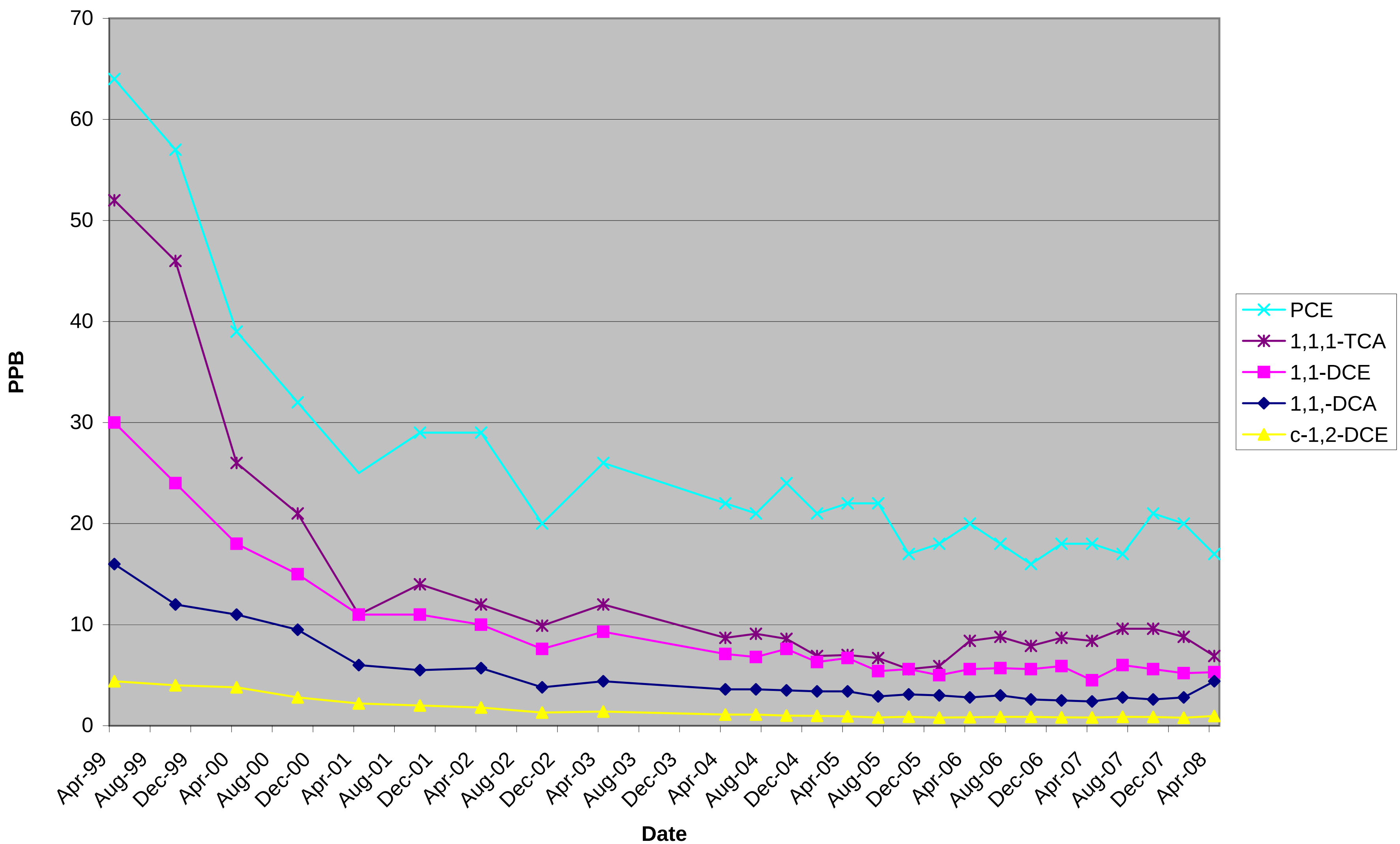


RW-10
PPB
25.0
20.0
15.0
10.0
5.0
0.0
Apr-99
Aug-99
Dec-99
Apr-00
Aug-00
Dec-00
Apr-01
Aug-01
Dec-01
Apr-02
Aug-02
Dec-02
Apr-03
Aug-03
Dec-03
Apr-04
Aug-04
Dec-04
Apr-05
Aug-05
Dec-05
Apr-06
Aug-06
Dec-06
Apr-07
Aug-07
Dec-07
Apr-08
Date
1,1-DCE
PCE
1,1,1-TCA


RW-11
PPB
45
40
35
30
25
20
15
10
5
0
PCE
1,1,1-TCA
1,1-DCE
Apr-99
Aug-99
Dec-99
Apr-00
Aug-00
Dec-00
Apr-01
Aug-01
Dec-01
Apr-02
Aug-02
Dec-02
Apr-03
Aug-03
Dec-03
Apr-04
Aug-04
Dec-04
Apr-05
Aug-05
Dec-05
Apr-06
Aug-06
Dec-06
Apr-07
Aug-07
Dec-07
Apr-08
Date

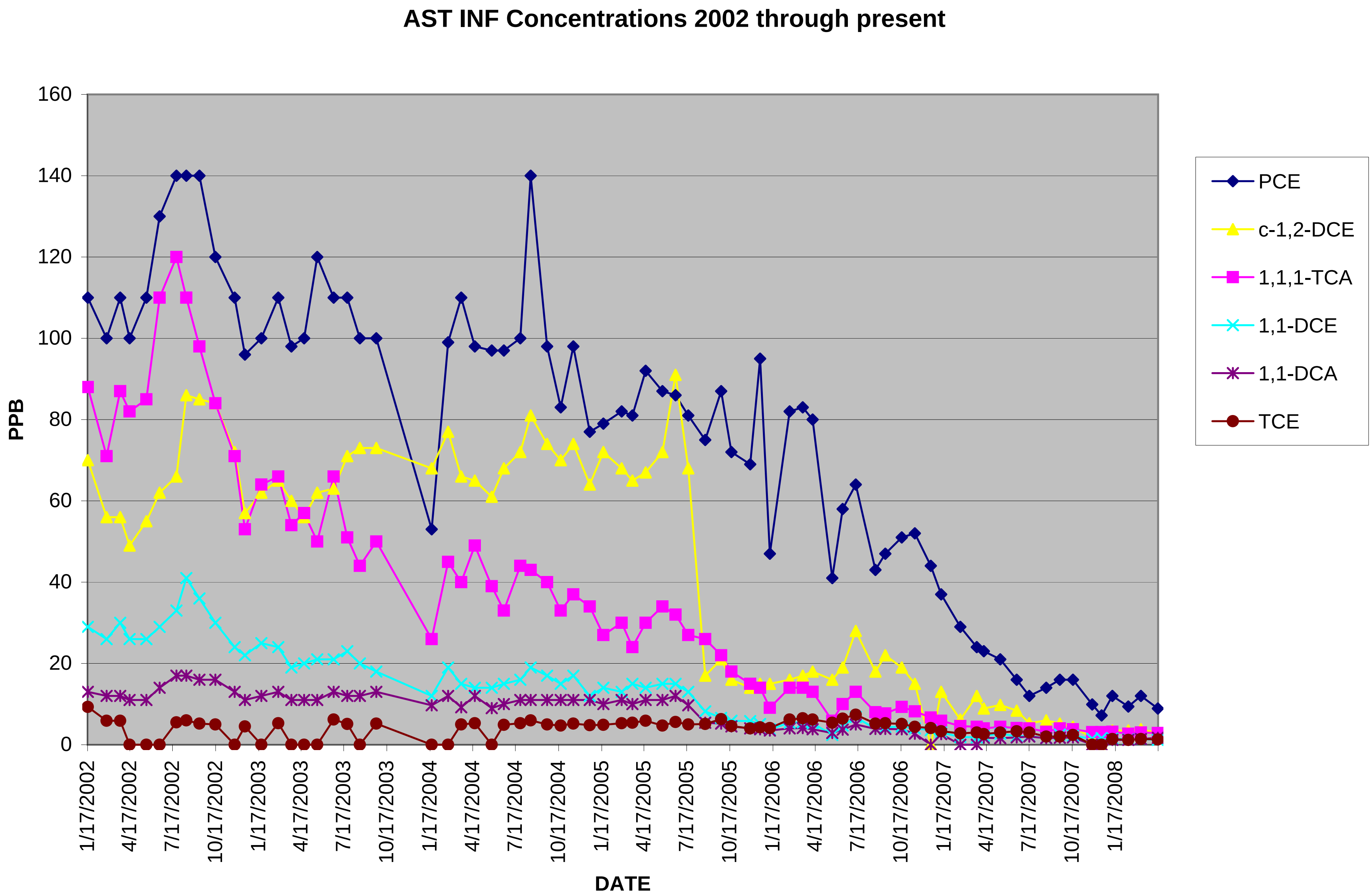

RW-12
PPB
35
30
25
20
15
10
5
0
Apr-99
Aug-99
Dec-99
Apr-00
Aug-00
Dec-00
Apr-01
Aug-01
Dec-01
Apr-02
Aug-02
Dec-02
Apr-03
Aug-03
Dec-03
Apr-04
Aug-04
Dec-04
Apr-05
Aug-05
Dec-05
Apr-06
Aug-06
Dec-06
Apr-07
Aug-07
Dec-07
Apr-08
Date
PCE
1,1,1-TCA
1,1-DCE

RW-13


PPB
70
60
50
40
30
20
10
0
Apr-99
Aug-99
Dec-99
Apr-00
Aug-00
Dec-00
Apr-01
Aug-01
Dec-01
Apr-02
Aug-02
Dec-02
Apr-03
Aug-03
Dec-03
Apr-04
Aug-04
Dec-04
Apr-05
Aug-05
Dec-05
Apr-06
Aug-06
Dec-06
Apr-07
Aug-07
Dec-07
Apr-08
Date
PCE
1,1,1-TCA
1,1-DCE
1,1,-DCA
c-1,2-DCE

APPENDIX F

Treatment System Influent Concentration Plots


AST INF Concentrations 2002 through present
PPB
DATE
160
140
120
100
80
60
40
20
0
1/17/2002
4/17/2002
7/17/2002
10/17/2002
1/17/2003
4/17/2003
7/17/2003
10/17/2003
1/17/2004
4/17/2004
7/17/2004
10/17/2004
1/17/2005
4/17/2005
7/17/2005
10/17/2005
1/17/2006
4/17/2006
7/17/2006
10/17/2006
1/17/2007
4/17/2007
7/17/2007
10/17/2007
1/17/2008
PCE
c-1,2-DCE
1,1,1-TCA
1,1-DCE
1,1-DCA
TCE

AIR STRIPPER INFLUENT SAMPLING DATA

DATE: February 17, 1997 - April 16, 2008

AST INFLUENT DATA - USEPA Method 624 + Xylenes, Keytones; Oil & Grease

DATE	Oil & Grease	Benzene	Chloroform	1,1-DCA	1,1-DCE	c-1,2-DCE	Ethyl-benzene	Methylene Chloride	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Acetone	MEK	MIBK	Total Xylenes
26-May-05	6.7	<1	<1	11	15	72	<1	<2	87	<1	34	4.7	1.4	<10	<10	<10	<1
23-Jun-05	<5	<1	<1	12	15	91	<1	<2	86	<1	32	5.6	1.6	<10	<10	<10	<1
20-Jul-05	<5	<1	<1	9.7	13	68	<1	<2	81	<1	27	5.0	1.2	<10	<10	<10	<1
25-Aug-05	<6	<1	<1	5.4	8	17	<1	<2	75	<1	26	5.1	<1	<10	<10	<10	<1
28-Sep-05	<5	<1	<1	5.2	6.6	21	<1	<2	87	<1	22	6.3	<1	<10	<10	<10	<1
20-Oct-05	<5	<1	<1	4.5	5.9	16	<1	<2	72	<1	18	4.6	1.6	<10	<10	<10	<1
29-Nov-05	<5	<1	<1	4.0	5.8	14	<1	<2	69	<1	15	4.0	1.6	<10	<10	<10	<1
20-Dec-05	<5	<1	<1	3.8	5.1	15	<1	<2	95	<1	14	4.3	1.6	<10	<10	<10	<1
10-Jan-06	<5	<1	<1	3.5	3.8	15	<1	<2	47	<1	9.1	4.1	1.6	<10	<10	<10	<1
21-Feb-06	<5	<1	<1	4.0	5.4	16	<1	<2	82	<1	14	6.2	1.6	<10	<10	<10	<1
21-Mar-06	23	<1	<1	4.1	5.5	17	<1	<2	83	<1	14	6.5	1.6	<10	<10	<10	<1
11-Apr-06	<5	<1	<1	3.8	5.3	18	<1	<2	80	<1	13	6.2	1.6	<10	<10	<10	<1
23-May-06	<5	<1	<1	2.9	2.4	16	<1	<2	41	<1	5.9	5.4	<1	<10	<10	<10	<1
14-Jun-06	<5	<1	<1	3.7	4.7	19	<1	<2	58	<1	10.0	6.4	<1	<10	<10	<10	<1
12-Jul-06	<5	<1	<1	5.0	6.8	28	<1	<2	64	<1	13	7.4	<1	21*	<10	<10	<1
23-Aug-06	<5	<2	<2	3.9	3.9	18	<2	<2	43	<2	8.0	5.2	<2	<20	<20	<20	<2
13-Sep-06	<5	<2	<2	3.9	4.3	22	<2	<2	47	<2	7.7	5.3	<2	<20	<20	<20	<2
18-Oct-06	<5	<2	<2	3.8	4.5	19	<2	<2	51	<2	9.3	5.1	<2	<20	<20	<20	<2
15-Nov-06	<5	<2	<2	2.7	4.0	15	<2	<2	52	<2	8.2	4.4	<2	<20	<20	<20	<2
19-Dec-06	<5	<1	<1	<1	3.6	<1	<1	<1	44	<1	6.7	4.1	<1	<10	<10	<10	<2
10-Jan-07	<5	<1	<1	2.6	3.0	13	<1	<1	37	<1	5.9	3.3	<1	<10	<10	<10	<1
20-Feb-07	<5	<1	<1	<1	1.9	6.2	<1	<1	29	<1	4.6	2.8	<1	<10	<10	<10	<1
27-Mar-07	<5	<1	<1	<1	1.8	12	<1	<1	24	<1	4.4	3.0	<1	<10	<10	<10	<1
11-Apr-07	<5	<1	<1	1.7	2.2	8.9	<1	<1	23	<1	4.0	2.6	<1	<10	<10	<10	<1
16-May-07	<5	<1	<1	1.6	2.7	9.8	<1	<1	21	<1	4.4	3.0	<1	<10	<10	<10	<1
20-Jun-07	<5	<1	<1	1.8	2.1	8.4	<1	<1	16	<1	4.1	3.3	<1	<10	<10	<10	<1
17-Jul-07	<5	<1	<1	2.0	2.1	5.3	<1	<1	12	<1	4.0	3.0	<1	<10	<10	<10	<1
22-Aug-07	<5	<1	<1	1.6	1.6	6.0	<1	<1	14	<1	3.2	2.0	<1	<10	<10	<10	<1
20-Sep-07	<5	<1	<1	1.7	2.5	5.2	<1	<1	16	<1	4.0	2.0	<1	<10	<10	<10	<1
18-Oct-07	<5	<1	<1	1.8	2.2	4.4	<1	<1	16	<1	3.8	2.4	<1	<10	<10	<10	<1
28-Nov-07	<5	<1	<1	<1	1.5	1.7	<1	<1	9.9	<1	3.1	<1	<1	<10	<10	<10	<1
18-Dec-07	<5	<1	<1	<1	1.6	<1	<1	<1	7.2	<1	3.1	<1	<1	<10	<10	<10	<1
10-Jan-08	<5	<1	<1	1.2	1.5	3.5	<1	<1	12	<1	3.2	1.4	<1	<10	<10	<10	<1
13-Feb-08	<5	<1	<1	1.2	1.3	3.5	<1	<1	9.4	<1	2.7	1.2	<1	<10	<10	<10	<1
11-Mar-08	<5	<1	<1	1.4	1.4	3.8	<1	<1	12.0	<1	3.0	1.4	<1	<10	<10	<10	<1
16-Apr-08	<5	<1	<1	1.7	1.2	2.9	<1	<1	8.9	<1	2.9	1.3	<1	<10	<10	<10	<1

APPENDIX G

Monitoring Well Analytical Results

GROUNDWATER SAMPLING RESULTS-FORMER MILLER BREWING FACILITY

NYSDEC SITE # 7-38-029

Quarterly Sampling

DATE: July 19, 2007 Report No.: 0711983

QUARTERLY MONITORING WELLS - USEPA Method 601/602 + Xylenes, c-1,2-DCE

WELL	Water Level	Benzene	Chloro-ethane	1,1-DCA	1,1-DCE	c-1,2-DCE	Ethyl-benzene	Methylene Chloride	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Total Xylene
MW-2S	**18.10**	<2	**5.0**	**21**	**12**	**180**	<2	<2	**75**	<2	**16**	**6.1**	<2	<2
MW-3D	**17.83**	<2	<2	**3.8**	**7.5**	**4.5**	<2	<2	**140**	<2	**31**	**16**	<2	<2
MW-8I	**11.05**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.3**	<0.5	<0.5	<0.5	<0.5	<0.5
MW-8D	**13.40**	<0.5	<0.5	**0.87**	**3.5**	**0.83**	<0.5	<0.5	**26**	<0.5	**12**	**0.64**	<0.5	<0.5
MW-13D	**10.93**	<0.5	<0.5	<0.5	**0.97**	<0.5	<0.5	<0.5	**5.9**	<0.5	**3.4**	<0.5	<0.5	<0.5
MW-14D	**26.33**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**2.1**	<0.5	**0.67**	<0.5	<0.5	<0.5
MW-16D	**8.11**	<0.5	<0.5	**1.7**	**2.8**	**0.58**	<0.5	<0.5	**34**	<0.5	**15**	**0.68**	<0.5	<1
MW-17D	**18.30**	<0.5	<0.5	**0.56**	**2.2**	<0.5	<0.5	<0.5	**1.8**	<0.5	**8.4**	<0.5	<0.5	<0.5
MW-21S	**25.55**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**4.4**	<0.5	**1.8**	<0.5	<0.5	<0.5
MW-25S	**12.44**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-28S	**6.57**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.57**	<0.5	<0.5	<0.5	<0.5	<0.5
MW-28I	**7.25**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.5**	<0.5	**2.3**	<0.5	<0.5	<0.5
MW-32D	**24.19**	<0.5	<0.5	**1.3**	**1.9**	<0.5	<0.5	<0.5	**5.5**	<0.5	**5.6**	<0.5	<0.5	<0.5
MW-33S	**29.74**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**3.1**	<0.5	**1.7**	<0.5	<0.5	<0.5
MW-34D	**31.47**	<0.5	<0.5	<0.5	**1.7**	<0.5	<0.5	<0.5	**15**	<0.5	**6.4**	<0.5	<0.5	<0.5
MW-35D	**28.95**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**2.8**	<0.5	**1.1**	<0.5	<0.5	<0.5
MW-36S	**16.84**	<0.5	**0.62**	**11**	**1.3**	**44**	<0.5	<0.5	**1.3**	<0.5	<0.5	<0.5	**33**	<0.5
MW-37I	**18.34**	<0.5	<0.5	**12**	**3.1**	**58**	<0.5	<0.5	**49**	<0.5	**8.3**	**2.1**	**5.1**	<0.5
MW-38S	**12.85**	<2	<2	**96**	**14**	**170**	<2	<2	**180**	<2	**10.0**	**43**	<2	<2
MW-X	**n/a**	<5	<5	**110**	**18**	**190**	<5	<5	**220**	<5	**12**	**49**	<5	<5
MW-47S	**20.95**	<0.5	<0.5	**9.7**	**5.1**	**38**	<0.5	<0.5	**34**	<0.5	**21**	**6.9**	<0.5	<0.5
MW-48S	**21.11**	<20	<20	**270**	**170**	**3700**	<20	<20	**33**	<20	**540**	**24**	**710**	<20
MW-51D	**9.69**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**2.7**	<0.5	<0.5	<0.5
MW-54I	**14.21**	<0.5	<0.5	**1.7**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.3**	<0.5	<0.5	<0.5
MW-56D	**11.05**	<0.5	<0.5	<0.5	**0.64**	<0.5	<0.5	<0.5	**2.6**	<0.5	**4.2**	<0.5	<0.5	<0.5
MW-61D	**13.59**	<0.5	<0.5	**0.52**	**1.6**	<0.5	<0.5	<0.5	**4.4**	<0.5	**4.4**	<0.5	<0.5	<0.5
MW-62S	**9.73**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-63S	**12.95**	<0.5	<0.5	**0.75**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES:

MW-2S indicated 3.9 µg/l trans-1,2-Dichloroethene

MW-36S indicated 1.9 µg/l trans-1,2-Dichloroethene

MW-37I indicated 2.0 µg/l trans-1,2-Dichloroethene

MW-47S indicated 0.87 µg/l trans-1,2-Dichloroethene

MW-48S indicated 67 µg/l trans-1,2-Dichloroethene, 26µg/l 1,2-Dichloroethane

All data given inµg/l unless otherwise specified.

EarthTech

A tyco International Ltd. Company

GROUNDWATER SAMPLING RESULTS-FORMER MILLER BREWING FACILITY

NYSDEC SITE # 7-38-029

Quarterly Sampling

DATE: October 17, 2007   Report No.: 0718625

QUARTERLY MONITORING WELLS - USEPA Method 601/602 + Xylenes, c-1,2-DCE

WELL	Water Level	Benzene	Chloro-ethane	1,1-DCA	1,1-DCE	c-1,2-DCE	Ethyl-benzene	Methylene Chloride	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Total Xylene
MW-2S	**20.06**	<5	**6.1**	**25**	**14**	**250**	<5	<5	**120**	<5	**21**	**7.1**	<5	<5
MW-3D	**19.71**	<5	<5	<5	**10.0**	<5	<5	<5	**230**	<5	**38**	**22**	<5	<5
MW-8I	**12.81**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-8D	**15.03**	<0.5	<0.5	**0.81**	**3.7**	**0.74**	<0.5	<0.5	**25**	<0.5	**12**	**0.72**	<0.5	<0.5
MW-13D	**12.54**	<0.5	<0.5	<0.5	**0.80**	<0.5	<0.5	<0.5	**5.0**	<0.5	**2.7**	<0.5	<0.5	<0.5
MW-14D	**27.80**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.8**	<0.5	**0.54**	<0.5	<0.5	<0.5
MW-16D	**9.92**	<1	<1	**4.4**	**4.5**	<1	<1	<1	**33**	<1	**24**	**2.5**	<1	<1
MW-X	**n/a**	<1	<1	**4.5**	**5.0**	<1	<1	<1	**38**	<1	**26**	**3.1**	<1	<1
MW-17D	**19.83**	<0.5	<0.5	**0.69**	**3.2**	<0.5	<0.5	<0.5	**2.4**	<0.5	**11**	<0.5	<0.5	<0.5
MW-21S	**<26.75**	<0.5	<0.5	<0.5	**0.69**	<0.5	<0.5	<0.5	**5.7**	<0.5	**2.8**	<0.5	<0.5	<0.5
MW-25S	**13.92**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-28S	**7.85**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.59**	<0.5	<0.5	<0.5	<0.5	<0.5
MW-28I	**8.41**	<0.5	<0.5	<0.5	**0.69**	<0.5	<0.5	<0.5	**2.2**	<0.5	**3.2**	<0.5	<0.5	<0.5
MW-32D	**25.60**	<0.5	<0.5	**1.0**	**1.5**	<0.5	<0.5	<0.5	**4.5**	<0.5	**3.8**	<0.5	<0.5	<0.5
MW-33S	**31.11**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**2.8**	<0.5	**1.4**	<0.5	<0.5	<0.5
MW-34D	**32.87**	<0.5	<0.5	<0.5	**2.1**	<0.5	<0.5	<0.5	**16**	<0.5	**7.4**	<0.5	<0.5	<0.5
MW-35D	**30.10**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.9**	<0.5	**1.1**	<0.5	<0.5	<0.5
MW-36S	**18.76**	<0.5	**0.50**	**12**	**1.4**	**25**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**26**	<0.5
MW-37I	**20.06**	<2	<2	**13**	**4.5**	**75**	<2	**2.7**	**58**	<2	**11**	**2.4**	**5.8**	<2
MW-38S	**14.55**	<5	<5	**52**	**9.8**	**120**	<5	**6.3**	**200**	<5	**9.8**	**37**	<5	<5
MW-51D	**11.54**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**3.0**	<0.5	<0.5	<0.5
MW-54I	**15.63**	<0.5	<0.5	**1.6**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.0**	<0.5	<0.5	<0.5
MW-56D	**12.80**	<0.5	<0.5	**0.84**	**1.6**	**8.9**	<0.5	<0.5	<0.5	<0.5	**4.6**	**12**	<0.5	<0.5
MW-61D	**15.20**	<0.5	<0.5	**0.88**	**3.1**	**0.56**	<0.5	<0.5	**4.1**	<0.5	**6.2**	<0.5	<0.5	<0.5
MW-62S	**11.57**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-63S	**16.10**	<0.5	<0.5	**0.52**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: All data given in µg/l unless otherwise specified.

GROUNDWATER SAMPLING RESULTS-FORMER MILLER BREWING FACILITY

NYSDEC SITE # 7-38-029

Quarterly Sampling

DATE: January 8, 2008

Report No.: 0800464

QUARTERLY MONITORING WELLS - USEPA Method 601/602 + Xylenes, c-1,2-DCE

WELL	Water Level	Benzene	Chloro-ethane	1,1-DCA	1,1-DCE	c-1,2-DCE	Ethyl-benzene	Methylene Chloride	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Total Xylene
MW-2S	15.68	<5	<5	30	17	190	<5	<5	170	<5	23	10.0	<5	<5
MW-3D	15.39	<5	<5	<5	9.4	<5	<5	<5	220	<5	33	20	<5	<5
MW-8I	8.57	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.52	<0.5	<0.5	<0.5	<0.5	<0.5
MW-8D	11.27	<0.5	<0.5	0.88	2.8	<0.5	<0.5	<0.5	17	<0.5	8.2	0.55	<0.5	<0.5
MW-13D	9.42	<0.5	<0.5	<0.5	0.52	<0.5	<0.5	<0.5	3.1	<0.5	1.6	<0.5	<0.5	<0.5
MW-14D	9.48	<1	<1	<1	<1	<1	<1	<1	1.00	<1	<1	<1	<1	<1
MW-16D	5.53	<1	<1	7.2	5.5	1.2	<1	<1	39	<1	27	1.00	<1	<1
MW-17D	16.72	<1	<1	<1	1.4	<1	<1	<1	1.00	<1	5.2	<1	<1	<1
MW-21S	24.10	<0.5	<0.5	<0.5	0.74	<0.5	<0.5	<0.5	5.5	<0.5	2.6	<0.5	<0.5	<0.5
MW-25S	11.04	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-28S	5.55	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-28I	6.16	<0.5	<0.5	<0.5	0.55	<0.5	<0.5	<0.5	2.1	<0.5	2.2	<0.5	<0.5	<0.5
MW-32D	22.81	<0.5	<0.5	1.4	2.3	<0.5	<0.5	<0.5	5.3	<0.5	5.0	<0.5	<0.5	<0.5
MW-33S	28.39	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.3	<0.5	1.9	<0.5	<0.5	<0.5
MW-34D	30.05	<0.5	<0.5	<0.5	2.1	<0.5	<0.5	<0.5	19	<0.5	6.9	<0.5	<0.5	<0.5
MW-35D	27.65	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.5	<0.5	0.77	<0.5	<0.5	<0.5
MW-36S	13.67	<0.5	<0.5	7.7	0.76	26	<0.5	<0.5	0.68	<0.5	<0.5	<0.5	25	<0.5
MW-37I	15.02	<2	<2	12	2.6	55	<2	<2	63	<2	6.6	2.2	5.0	<2
MW-38S	9.80	<10	<10	94	16	200	<10	<10	280	<10	12	56	<10	<10
MW-51D	7.17	<0.5	<0.5	<0.5	0.58	<0.5	<0.5	<0.5	<0.5	<0.5	3.4	<0.5	<0.5	<0.5
MW-54I	10.55	<0.5	<0.5	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.86	<0.5	<0.5	<0.5
MW-X	n/a	<0.5	<0.5	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.82	<0.5	<0.5	<0.5
MW-56D	8.80	<0.5	<0.5	<0.5	0.88	2.2	<0.5	<0.5	2.0	<0.5	3.2	1.6	<0.5	<0.5
MW-61D	10.90	<0.5	<0.5	0.75	1.8	<0.5	<0.5	<0.5	4.2	<0.5	3.5	<0.5	<0.5	<0.5
MW-62S	11.45	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-63S	7.19	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: All data given in µg/l unless otherwise specified.

EarthTech

A tyco International Ltd. Company

GROUNDWATER SAMPLING RESULTS-FORMER MILLER BREWING FACILITY

NYSDEC SITE # 7-38-029

Quarterly Sampling

DATE: April 16, 2008

Report No.: 0805972

QUARTERLY MONITORING WELLS - USEPA Method 601/602 + Xylenes, c-1,2-DCE

WELL	Water Level	Benzene	Chloro-ethane	1,1-DCA	1,1-DCE	c-1,2-DCE	Ethyl-benzene	Methylene Chloride	PCE	Toluene	1,1,1-TCA	TCE	Vinyl Chloride	Total Xylene
MW-2S	14.81	<2	6.9	16	9.0	190	<2	<2	72	<2	11	4.9	<2	<2
MW-3D	14.53	<2	<2	2.6	6.6	4.3	<2	<2	140	<2	20	16	<2	<2
MW-8I	7.97	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-8D	10.22	<0.5	<0.5	5.2	7.1	1.3	<0.5	<0.5	32	<0.5	13	1.2	<0.5	<0.5
MW-13D	8.42	<0.5	<0.5	<0.5	0.98	<0.5	<0.5	<0.5	4.9	<0.5	2.8	<0.5	<0.5	<0.5
MW-14D	23.91	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.6	<0.5	0.64	<0.5	<0.5	<0.5
MW-16D	4.99	<0.5	<0.5	13	11	3.4	<0.5	<0.5	50	<0.5	43	1.00	<0.5	<0.5
MW-17D	15.75	<0.5	<0.5	0.76	4.2	<0.5	<0.5	<0.5	2.8	<0.5	12	<0.5	<0.5	<0.5
MW-21S	23.19	<0.5	<0.5	<0.5	0.62	<0.5	<0.5	<0.5	4.0	<0.5	1.9	<0.5	<0.5	<0.5
MW-25S	10.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-28S	4.59	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-28I	5.18	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	0.81	<0.5	<0.5	<0.5
MW-32D	21.86	<0.5	<0.5	1.1	1.8	<0.5	<0.5	<0.5	3.7	<0.5	3.4	<0.5	<0.5	<0.5
MW-33S	27.45	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.1	<0.5	1.8	<0.5	<0.5	<0.5
MW-34D	29.09	<0.5	<0.5	<0.5	2.3	<0.5	<0.5	<0.5	15	<0.5	6.5	<0.5	<0.5	<0.5
MW-35D	26.93	<0.5	<0.5	<0.5	0.67	<0.5	<0.5	<0.5	1.4	<0.5	2.0	<0.5	<0.5	<0.5
MW-36S	12.73	<0.5	<0.5	4.8	0.80	18	<0.5	<0.5	0.90	<0.5	<0.5	<0.5	27	<0.5
MW-37I	14.46	<1	<1	6.4	1.3	20	<1	<1	26	<1	2.6	1.2	2.7	<1
MW-X	N/A	<0.5	<0.5	8.1	1.6	29	<0.5	<0.5	38	<0.5	3.6	1.6	4.1	<0.5
MW-38S	9.63	<2	<2	100	20	150	<2	<2	200	<2	10	39	<2	<2
MW-51D	7.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.3	<0.5	<0.5	<0.5
MW-54I	10.38	<0.5	<0.5	0.82	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.58	<0.5	<0.5	<0.5
MW-56D	8.01	<0.5	<0.5	<0.5	1.7	<0.5	<0.5	<0.5	6.6	<0.5	5.1	0.65	<0.5	<0.5
MW-61D	10.40	<0.5	<0.5	0.92	1.5	<0.5	<0.5	<0.5	3.7	<0.5	2.5	<0.5	<0.5	<0.5
MW-62S	6.65	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-63S	11.00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: All data given in µg/l unless otherwise specified. MW-X reported 0.60 µg/l trans-1,2-Dichloroethene

MW-2S reported 3.5 µg/l trans-1,2-Dichloroethene

MW-36S reported 0.56 µg/l trans-1,2-Dichloroethene

MW-38S reported 2.3 µg/l trans-1,2-Dichloroethene

EarthTech

A tyco International Ltd. Company

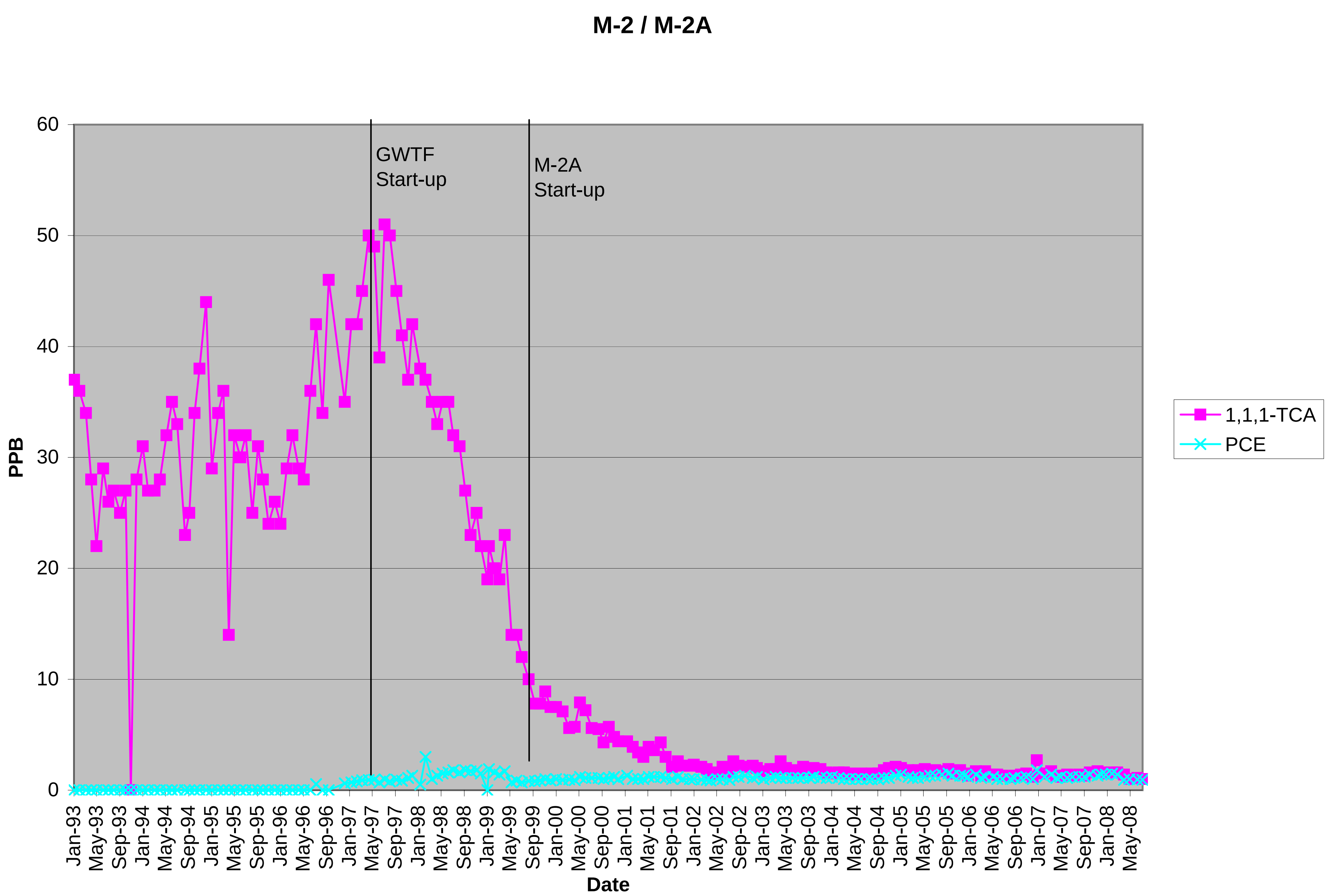
APPENDIX H

Municipal Well Analytical Results and Plots

City of Fulton Municipal Water Supply pre-treatment Analytcial Summary
Volatile Organic Compounds

Location	PCE	1,1,1-TCA	Total VOC
K-1			
27-Mar-07	<0.5	<0.5	0.00
23-Apr-07	<0.5	<0.5	0.00
16-May-07	<0.5	<0.5	0.00
20-Jun-07	<0.5	<0.5	0.00
17-Jul-07	<0.5	<0.5	0.00
22-Aug-07	<0.5	<0.5	0.00
20-Sep-07	<0.5	<0.5	0.00
18-Oct-07	<0.5	<0.5	0.00
28-Nov-07	<0.5	<0.5	0.00
18-Dec-07	<0.5	<0.5	0.00
10-Jan-08	<0.5	<0.5	0.00
13-Feb-08	<0.5	<0.5	0.00
11-Mar-08	<0.5	<0.5	0.00
16-Apr-08	<0.5	<0.5	0.00
15-May-08	<0.5	<0.5	0.00
26-Jun-08	<0.5	<0.5	0.00
23-Jul-08	<0.5	<0.5	0.00
M-2 / M-2A			
16-May-07	**1.2**	**1.2**	2.40
20-Jun-07	**1.1**	**1.4**	2.50
17-Jul-07	**1.2**	**1.3**	2.50
22-Aug-07	**1.2**	**1.4**	2.60
20-Sep-07	**1.2**	**1.3**	2.50
18-Oct-07	**1.4**	**1.6**	3.00
28-Nov-07	**1.3**	**1.7**	3.00
18-Dec-07	**1.4**	**1.6**	3.00
10-Jan-08	**1.4**	**1.5**	2.90
13-Feb-08	**1.5**	**1.6**	3.10
11-Mar-08	**1.4**	**1.6**	3.00
16-Apr-08	**0.93**	**1.4**	2.33
15-May-08	**0.99**	**1.00**	1.99
26-Jun-08	**0.96**	**1.1**	2.06
23-Jul-08	**0.93**	**1.00**	1.93
WTF-INF			
16-May-07	<0.5	<0.5	0.00
20-Jun-07	<0.5	<0.5	0.00
17-Jul-07	<0.5	<0.5	0.00
22-Aug-07	<0.5	<0.5	0.00
20-Sep-07	<0.5	<0.5	0.00
18-Oct-07	<0.5	<0.5	0.00
28-Nov-07	<0.5	<0.5	0.00
18-Dec-07	<0.5	<0.5	0.00
10-Jan-08	<0.5	<0.5	0.00
13-Feb-08	<0.5	<0.5	0.00
11-Mar-08	<0.5	<0.5	0.00
16-Apr-08	<0.5	<0.5	0.00
15-May-08	<0.5	<0.5	0.00

All other reported compounds ND < 0.5 µg/l


M-2 / M-2A
PPB
Date
GWTF
Start-up
M-2A
Start-up
1,1,1-TCA
PCE
0
10
20
30
40
50
60
Jan-93
May-93
Sep-93
Jan-94
May-94
Sep-94
Jan-95
May-95
Sep-95
Jan-96
May-96
Sep-96
Jan-97
May-97
Sep-97
Jan-98
May-98
Sep-98
Jan-99
May-99
Sep-99
Jan-00
May-00
Sep-00
Jan-01
May-01
Sep-01
Jan-02
May-02
Sep-02
Jan-03
May-03
Sep-03
Jan-04
May-04
Sep-04
Jan-05
May-05
Sep-05
Jan-06
May-06
Sep-06
Jan-07
May-07
Sep-07
Jan-08
May-08

APPENDIX I

MIP INVESTIGATION
DATA VISUALIZATION REPORT

ZEBRA

June 16, 2008

Kevin P. McGrath
Earth Tech Inc.
40 British American Blvd.
Latham, NY 12110

Attention: Mr. McGrath

RE: Summary Report for Direct Sensing Services
Former Miller Brewing Company Facility - Fulton, NY
ZEBRA RFP NO. DS12969

Dear Mr. McGrath:

The following is a summary of site activities performed by ZEBRA Environmental at the Former Miller Brewing Company Facility - Fulton, NY. This report also includes a list of project personnel, a summary of the equipment used in the project and the capabilities of the equipment. A summary of the logging point name and the terminal depth achieved ***MIP field book*** (MIPFieldBook_earth_tech_miller.xls) in Microsoft Excel Format has been prepared and is available on the Earth Tech Miller SharePoint. The work was started on April 28, 2008.

PROJECT PERSONNEL:

Mr. Kevin P. McGrath, Earth Tech Inc.
Mr. James Clark, Earth Tech Inc.
Mr. Brad Carlson, ZEBRA Environmental
Mr. Ethan Plank, ZEBRA Environmental
Mr. Will McAllister, ZEBRA Environmental

SUMMARY OF EQUIPMENT USED IN THE PROJECT AND CAPABILITIES

The following list includes the equipment used for this project. More in-depth descriptions are included in other sections of this report.

1. Electrical Conductivity (EC) / Membrane Interface Probe (MIP) Unit
2. Probe Rods
3. Data Acquisition Vehicle
    - MIP 3500 controller unit
    - MIP 6500 Series Probe (120v)
    - PEEK Trunklines
    - FC5000 Field Computer
    - Printer

- Gas Chromatograph fitted with a Electron Capture Detector (ECD), Photo Ionization Detector (PID) and a Flame Ionization Detector (FID)
- Electrical generator
- Compressed Gas Cylinders

The following lists the capabilities of the Electrical Conductivity and Membrane Interface Probe Unit. More in-depth descriptions for this technology are included in other sections of this report.

Electrical Conductivity Probe Capabilities

The electrical conductivity (EC) probe measures the relative electrical conductivity of soil and ground water in contact with the probe, and provides a means to estimate the relative grain size distribution of the soil particles. Higher relative electrical conductivity measured by the probe should be interpreted as indicative of the presence of more colloidal sized soil particles compared with soil horizons exhibiting lower conductivity. The soil zones with lower relative electrical conductivity measured by the probe should be interpreted as indicative of less colloidal sized soil particles, and the presence of a greater percentage of silt and sand sized particles.

Since these measurements are relative, collection of soil cores adjacent to one or more of the EC probe locations for comparison to the EC data can be used to standardize the results. The physical inspection of grain size distribution in the different soil horizons can then be compared to the EC data to make inferences regarding the EC data at other locations where soil samples were not collected. Alternatively, the EC data can be compared to well logs collected adjacent to one of the probe locations for standardization.

The EC probe data will also be influenced by other electrolytes in the soil or aquifer. Salt water intrusion, brine spills, excessive fertilizer applications or other events that increase the loading of ions in the soil/aquifer matrix will influence EC results. It is not anticipated that any of these type events have occurred at this site.

Membrane Interface Probe Capabilities

The Membrane Interface Probe (MIP) measures the relative concentration of Volatile Organic Compounds (VOCs) in the soil and aquifer adjacent to a sampling window in the probe body. Heating of the soil and aquifer in direct contact with the probe increases the potential volatilization of the VOCs which can move through a membrane in the sampling window in response to the concentration gradient on either side of the membrane. Once the VOCs have diffused through the membrane, they are entrained in a carrier gas that delivers them to detectors in an above-ground gas chromatograph. The detectors produce a signal deflection in response to the VOCs, which is captured and stored for future interpretation.

The MIP can detect the presence of gross VOCs, but does not produce concentration data or specific compound speciation. The lower limit of detection is influenced by the in situ conditions, the contaminants, the detectors used and other on site conditions. In general, halogenated compounds are detected at lower concentrations compared to non-halogenated organic compounds.

Since these data are relative to each other, collection of discrete soil or groundwater samples adjacent to one or more of the MIP probe locations for comparison to the response data can be used to standardize the results. Care must be taken to ensure that the samples are collected at the specific portions of the profile where the MIP data was collected. The inherent non-homogenous nature of soil and aquifer materials will result in some inconsistency between MIP data and quantitative analytical results, so the standardization process cannot be completely precise.

DETAILED DESCRIPTION OF SITE ACTIVITIES

ZEBRA mobilized a fully equipped Electrical Conductivity/Membrane Interface Probe System (EC/MIP) mounted on a Gator Unit to the site. The "data acquisition vehicle" carried the system 6500 Gas Controller unit, FC5000 Field Computer, printer, O.I. Analytical Model 4430 Photoionization Detector (PID) and Flame Ionization Detector (FID), O.I. Analytical Electron Capture Detector (ECD), generator and all required compressed gases, two (2) complete assemblies of MIP probes, probe rods and trunk lines, as well as all the tools and supplies needed for the EC/MIP logging. The ZEBRA field team utilized a track mounted Model 5400 Geoprobe unit to advance the EC/MIP probes into the subsurface.

The project involved collecting EC/MIP logs at twenty two (22) locations Phase I and thirteen (13) locations Phase II, identified by the representatives of Earth Tech, and ZEBRA. Project Personnel recorded the location of the logging/sampling locations on a site plan.

At each location the EC/MIP probe was advanced to the target depth in 1 foot intervals. As the probe was being driven to depth, the electrical conductivity data and detector responses were being continuously recorded by the system's data acquisition hardware and software. Upon completion of the logging, the probe rod assembly was extracted from the ground and cleaned, and the borehole filled with Bentonite.

The Membrane Interface Probe (MIP) is a percussion tolerant VOC sensor that can continuously log volatile organics that diffuse through a semi-permeable membrane. Using a carrier gas, the VOC's are brought to the surface through tubing, which is connected to a laboratory grade Electron Capture Detector (ECD), Photoionization Detector (PID) and Flame Ionization Detector (FID) for immediate screening. All of these detectors are mounted in a Hewlett Packard 5890 Series II Gas Chromatograph cabinet. The following is a description of the ECD, PID and FID.

Electron Capture Detector (ECD)

Highly sensitive detector used to detect Hydrocarbons (ionization potential < 10.7 eV)
Compounds of Interest: Chlorinated Compounds (Halogentated)
Detection Sensitivity: > 500 PPB
Detection Range: approximately 10.7 eV

The radioactive Nickel 63 sealed inside the ECD detector emits electrons (beta particles) which collide with and ionize the make-up gas molecules (either nitrogen or P5). This reaction forms a stable cloud of free electrons in the ECD detector cell. The ECD electronics work to maintain a constant current equal to the standing current through the electron cloud by applying a periodic pulse to the anode and cathode. The standing current value is selected by the operator; the standing current value sets the pulse rate through the ECD cell, a standing current value of 300 means that the detector electronics will maintain a constant current of 0.3 nanoamperes through the ECD cell by periodically pulsing. If the current drops below the set standing current value, the number of pulses per second increases to maintain the standing current. When electronegative compounds enter the ECD cell from the column, they immediately combine with some of the free electrons, temporarily reducing the number remaining in the electron cloud. When the electron population is decreased, the pulse rate is increased to maintain a constant current equal to the standing current. The pulse rate is converted to an analog output, which is acquired by the HP data system. Unlike other detectors which measure an increase in signal response, the ECD detector electronics measure the pulse rate needed to maintain the standing current.

Photo Ionization Detector (PID)

Highly sensitive detector used to detect Hydrocarbons (ionization potential < 10.6 eV)
Compounds of Interest: Volatile Organic Hydrocarbons (Aromatic)
Detection Sensitivity: > 1 PPM
Detection Range: approximately 10^6

The Photo Ionization Detector (PID) responds to all molecules whose ionization potential is below 10.6eV, including aromatics and molecules with carbon double bonds. The PID is nondestructive, so the sample can be routed through the PID and passed on, in series, with the FID.

Flame Ionization Detector

Highly sensitive detector used to detect Hydrocarbons
Compounds of Interest: Volatile Organic Hydrocarbons
Detection Sensitivity: > 100 PPB
Detection Range: approximately 10^7

The Flame Ionization Detector (FID) is the most popular detector. Its popularity is due to its universal response and its ease of use. The FID responds to carbon and therefore produces a signal for all carbon containing compounds. The FID responds to any molecule with a carbon-hydrogen bond, such as aliphatic straight chained molecules, but its response is either poor or nonexistent to compounds such as CCl_4 or NH_3. Since the FID is mass sensitive, and not concentration sensitive, changes in the carrier gas flow rate have little effect on the detector response. It is preferred for general hydrocarbon analysis. The FID response is stable from day to day. It is generally robust and easy to operate. But because it uses a hydrogen diffusion flame to ionize compounds for analysis, it destroys the sample in the process.

An integral part of the MIP system is the direct sensing soil conductivity system. This system utilizes a specially designed probe that will withstand the rigors of percussion probing while taking continuous measurements of soil conductivity as it is being driven into the ground. The sensing probe is linked to a control box where the signal is received by a lap top computer. The signal from the probe is matched with precise depth measurements and logged on the screen. The consultant is able to read real time data showing changes in soil conductivity/resistivity. These changes can be used to identify lithology, contaminant mass, salt-water intrusion, or any other subsurface condition that displays a change in conductivity/resistivity.

Data Presentation

A Log displaying the response from each of the three (3) detectors (ECD, PID, and FID) and Conductivity has been prepared and is available on the Earth Tech SharePoint Site. The logs showing the ECD, PID, and FID detector response reported in micro volts, and the conductivity in MilliSiemens per meter. The depth below grade is depicted on the X - axis with 0 feet (land surface) located at the bottom left of the page. The maximum depth logged below grade is at the bottom right of the page. Regarding electronic data transfer, all data collected on site has been compiled on Excel spread sheets and submitted to you on the Earth Tech SharePoint Site.

A Data Visualizations Report containing site maps, site photographs, cross-sections, profiles, and solid models has been prepared and is available on the Earth Tech SharePoint Site.

ZEBRA appreciates the opportunity to provide these services and looks forward to working with Earth Tech in the future. Should there be any questions regarding this project or our other services, please do not hesitate to contact us.

Sincerely yours,

William B. Carlson

William B. Carlson
ZEBRA Environmental Corp.

PLF: wbc

cc: Matt Ednie, ZEBRA – Albany, NY

Earth Tech, Inc.
Site Investigation Report
Former Miller Brewing Company Facility
Fulton, NY

Table of Contents

Click to jump

ZEBRA MIP Field Book

EARTH TECH	MILLER BREWING							
Number of Days MIP	5	1						
Weather		Sunny						
DEPTH for DAY		160						
DATE		4/28/2008	4/28/2008	4/28/2008	4/28/2008	4/28/2008	4/28/2008	4/18/2008
DS12969								
Number of locations	23	EMIP1	EMIP2	EMIP3	EMIP4	EMIP5	EMIP6	EMIP7
MIP Unit		gator	gator	gator	gator	gator	gator	gator
	0							
Probe #H654	701	12	12	12	12	32	38	42
Probe #H679	0							
	0							
Total Depth	701							
Response Test Result	10ul TCE	Good	Good	Good	Good	Good	Good	Good
PID MAX		64713	54945	47619	45177	41514	84249	69597
ECD MAX		117216	168498	289377	433455	788767	991453	1003663
FID MAX		10989	1001221	10989	12210	12210	12210	1019536
Water								
PID Lamp Percentage		50	50	50	50	50	50	50
Mass Flow		40	40	40	40	40	40	40
ECD		Location Notes	Location Notes	Location Notes	Location Notes	Location Notes	Location Notes	Location Notes
Base	250000							
250000	300000							
300000	500000							
500000	700000							
700000	900000							
900000	900000							

ZEBRA MIP Field Book

EARTH TECH	MILLER BREWING					
Number of Days MIP	5	2				
Weather		Cool				
DEPTH for DAY		**194**				
DATE		4/29/2008	4/29/2008	4/29/2008	4/29/2008	4/29/2008
DS12969						
Number of locations	23	EMIP8	EMIP9	EMIP10	EMIP11	EMIP12
MIP Unit		gator	gator	gator	gator	gator
	0					
Probe #H654	701	45	48	37	34	30
Probe #H679	0					
	0					
Total Depth	701					
Response Test Result	10ul TCE	Good	Good	Good	Good	Good
PID MAX		50061	83028	130647	145299	118437
ECD MAX		991453	507937	1003663	357753	991453
FID MAX		1001221	1001221	836386	1001221	15873
Water						
PID Lamp Percentage		50	50	50	50	50
Mass Flow		40	40	40	40	40
ECD		**Location Notes**	**Location Notes**	**Location Notes**	**Location Notes**	**Location Notes**
Base	250000					
250000	300000					
300000	500000					
500000	700000					
700000	900000					
900000	900000					

ZEBRA MIP Field Book

EARTH TECH	**MILLER BREWING**			
Number of Days MIP	**5**	3		
Weather		fair		
DEPTH for DAY		**75**		
DATE		4/30/2008	4/30/2008	4/30/2008
DS12969				
Number of locations	**23**	EMIP13	EMIP14	EMIP15
MIP Unit		gator	gator	gator
	0			
Probe #H654	**701**	27	22	26
Probe #H679	**0**			
	0			
Total Depth	**701**			
Response Test Result	**10ul TCE**	Good	Good	Good
PID MAX		196581	64713	68376
ECD MAX		991453	410256	991453
FID MAX		142857	168498	58608
Water				
PID Lamp Percentage		50	50	50
Mass Flow		40	40	40
ECD		**Location Notes**	**Location Notes**	**Location Notes**
Base	250000			
250000	300000			
300000	500000			
500000	700000			
700000	900000			
900000	900000			

ZEBRA MIP Field Book

EARTH TECH	MILLER BREWING					
Number of Days MIP	5	4				
Weather		fair				
DEPTH for DAY		175				
DATE		5/1/2008	5/1/2008	5/1/2008	5/1/2008	5/1/2008
DS12969						
Number of locations	23	EMIP16	EMIP17	EMIP18	EMIP19	EMIP20
MIP Unit		gator	gator	gator	gator	gator
	0					
Probe #H654	701	30	24	29	42	50
Probe #H679	0					
	0					
Total Depth	701					
Response Test Result	10ul TCE	Good	Good	Good	Good	Good
PID MAX		101343	79365	158730	90354	68376
ECD MAX		991453	991453	991453	840049	991453
FID MAX		238095	17094	115995	1004884	13431
Water						
PID Lamp Percentage		50	50	50	50	50
Mass Flow		40	40	40	40	40
ECD		Location Notes	Location Notes	Location Notes	Location Notes	Location Notes
Base	250000					
250000	300000					
300000	500000					
500000	700000					
700000	900000					
900000	900000					

ZEBRA MIP Field Book

EARTH TECH	**MILLER BREWING**			
Number of Days MIP	**5**	5		
Weather				
DEPTH for DAY		**97**		
DATE		52/2008	52/2008	52/2008
DS12969				
Number of locations	**23**	EMIP21	EMIP22	EMIP23
MIP Unit		gator	gator	gator
	0			
Probe #H654	**701**	34	35	28
Probe #H679	**0**			
	0			
Total Depth	**701**			
Response Test Result	**10ul TCE**	Good	Good	Good
PID MAX		52503	45177	48840
ECD MAX		484738	991453	189255
FID MAX		764347	13431	17094
Water				
PID Lamp Percentage		50	50	50
Mass Flow		40	40	40
ECD		**Location Notes**	**Location Notes**	**Location Notes**
Base	250000			
250000	300000			
300000	500000			
500000	700000			
700000	900000			
900000	900000			

MIP Field Book

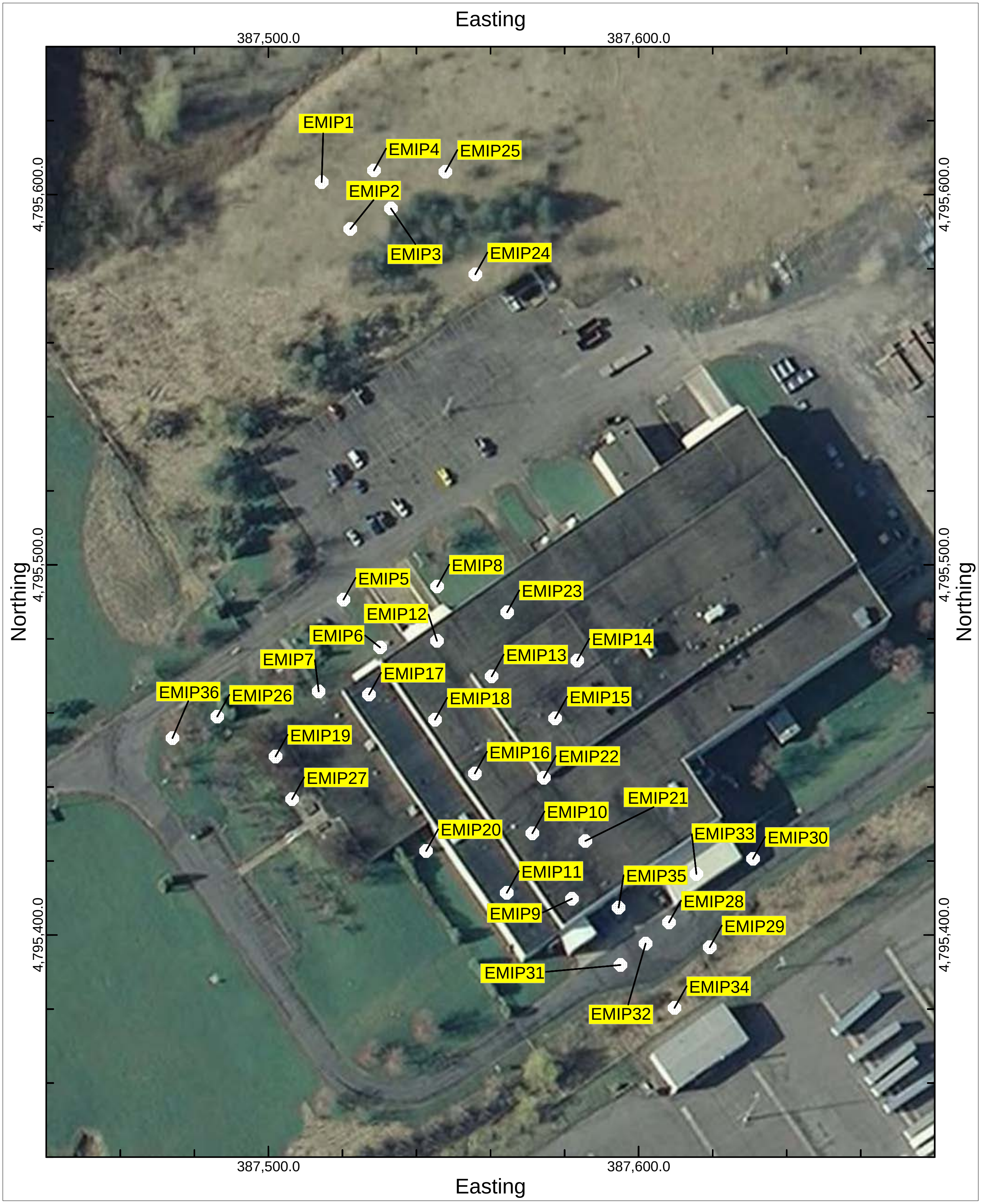
EARTH TECH	MILLER BREWING							
Number of Days MIP	1	1						
Weather		fair						
DEPTH for DAY		249						
DATE		5/29/2008	5/29/2008	5/29/2008	5/29/2008	5/29/2008	5/29/2008	5/29/2008
DS12969								
Number of locations	13	EMIP24	EMIP25	EMIP26	EMIP27	EMIP28	EMIP29	EMIP30
MIP Unit		gator	gator	gator	gator	gator	gator	gator
Probe #H679	435	30	26	54	50	33	29	27
	0							
Total Depth	249							
Response Test	10ul TCE	Good	Good	Good	Good	Good	Good	Good
PID MAX		73260	20757	72354	48840	107448	53724	46398
ECD MAX		400488	247863	991453	406593	991453	991453	299145
FID MAX		587302	451770	1004884	18315	12210	1000000	1000000
Water								
PID Lamp Percentage		50	50	50	50	50	50	50
Mass Flow		40	40	40	40	40	40	40
ECD		Location Notes	Location Notes	Location Notes	Location Notes	Location Notes	Location Notes	Location Notes
Base	250000							
250000	300000							
300000	500000							
500000	700000							
700000	900000							
900000	900000							

MIP Field Book

EARTH TECH	MILLER BREWING						
Number of Days MIP	1	1					
Weather		fair					
DEPTH for DAY		186					
DATE		5/30/2008	5/30/2008	5/30/2008	5/30/2008	5/30/2008	5/30/2008
DS12969							
Number of locations	13	EMIP31	EMIP32	EMIP33	EMIP34	EMIP35	EMIP36
MIP Unit		gator	gator	gator	gator	gator	gator
Probe #H679	435	25	22	23	30	27	59
	0						
Total Depth	249						
Response Test	10ul TCE	Good	Good	Good	Good	Good	Good
PID MAX		56166	48840	47619	62271	50061	46398
ECD MAX		428571	233211	251526	990232	315018	120879
FID MAX		1004884	1001221	50061	1001221	170940	579976
Water							
PID Lamp Percentage		50	50	50	50	50	50
Mass Flow		40	40	40	40	40	40
ECD		Location Notes	Location Notes	Location Notes	Location Notes	Location Notes	Location Notes
Base	250000						
250000	300000						
300000	500000						
500000	700000						
700000	900000						
900000	900000						

Earth Tech, Inc.
Site Investigation Report
Former Miller Brewing Company Facility
Fulton, NY

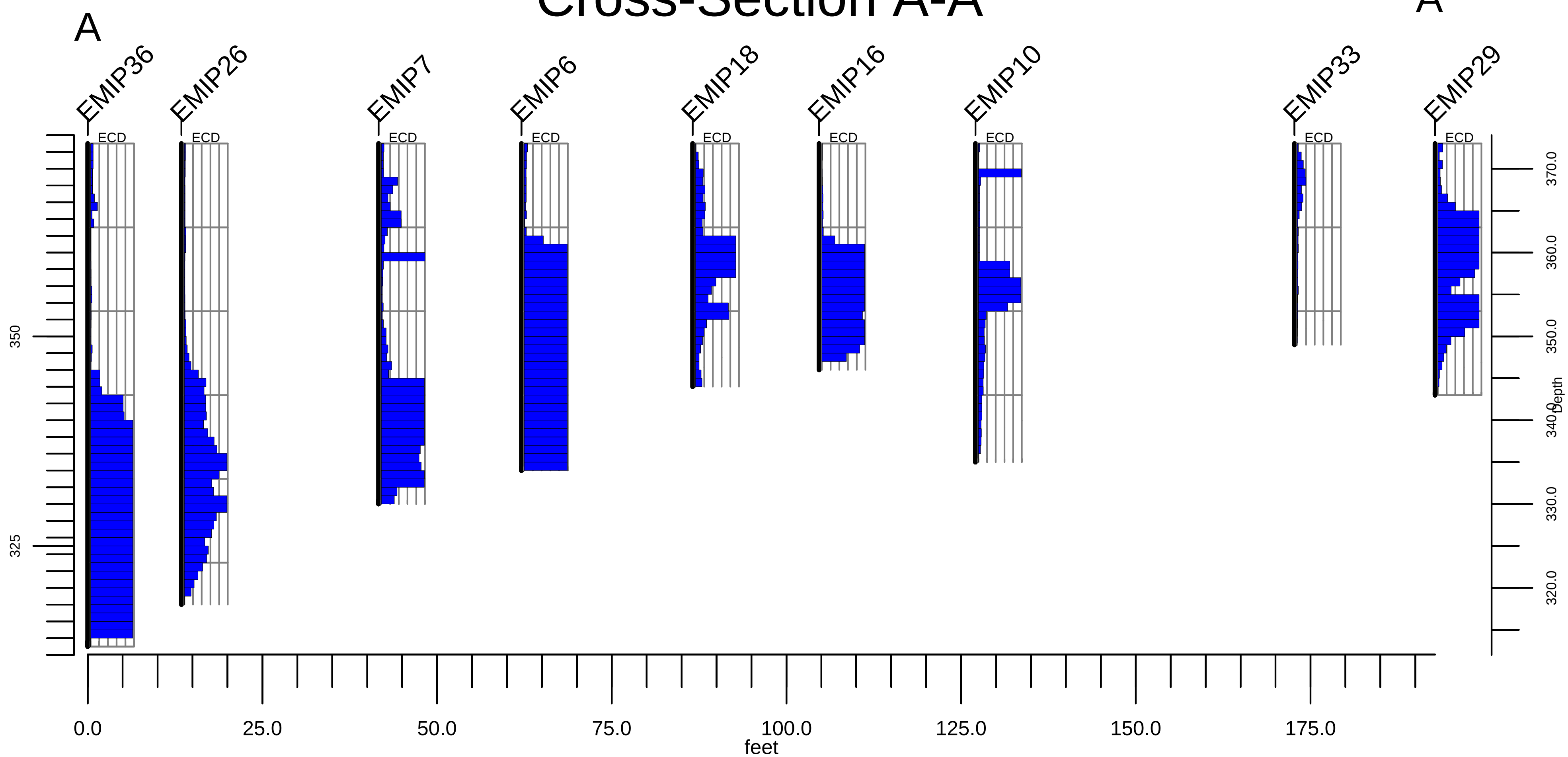
Borehole Location Map



EARTH TECH
MILLER BREWING
FULTON, NEW YORK

Cross-Section

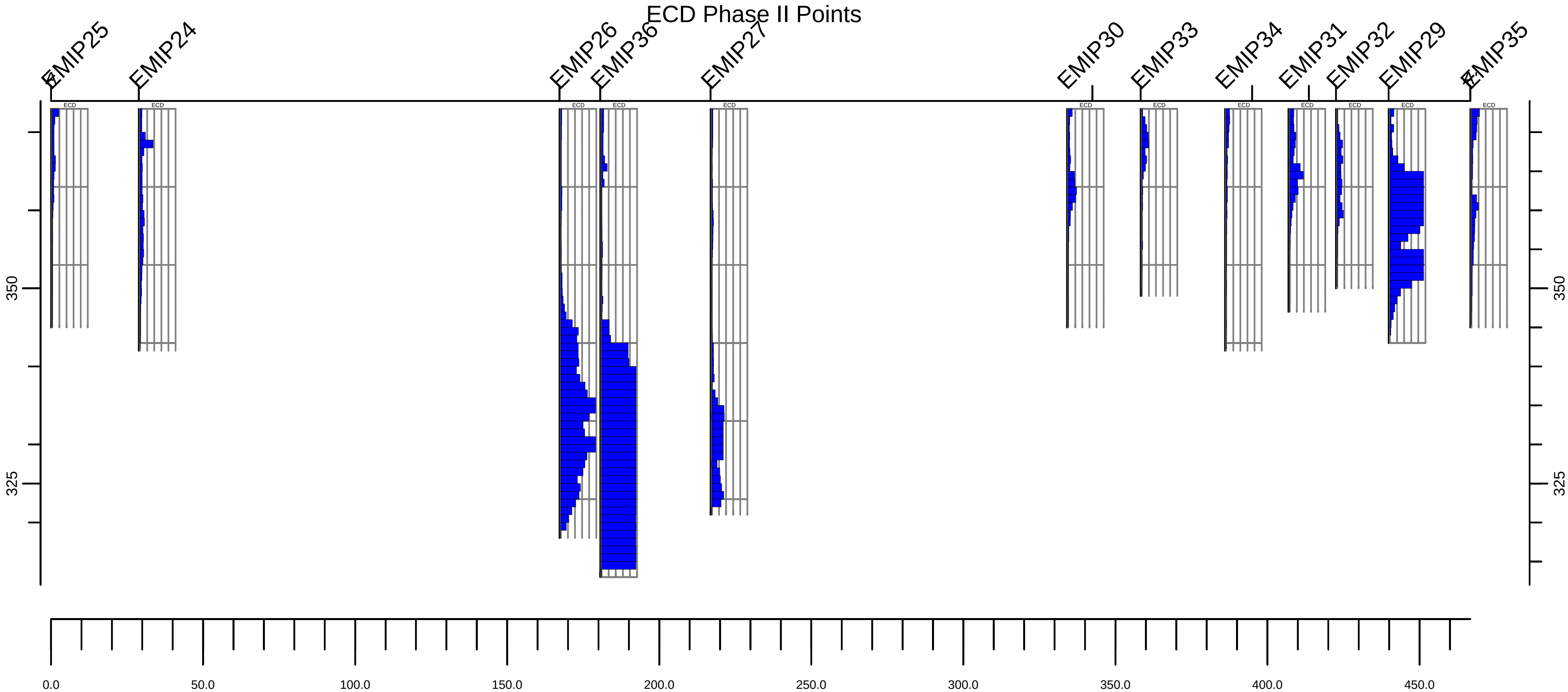
Cross-Section A-A'



EARTH TECH
MILLER BREWING
FULTON, NEW YORK

Cross-Section

EarthTech
A tyco International Ltd. Company

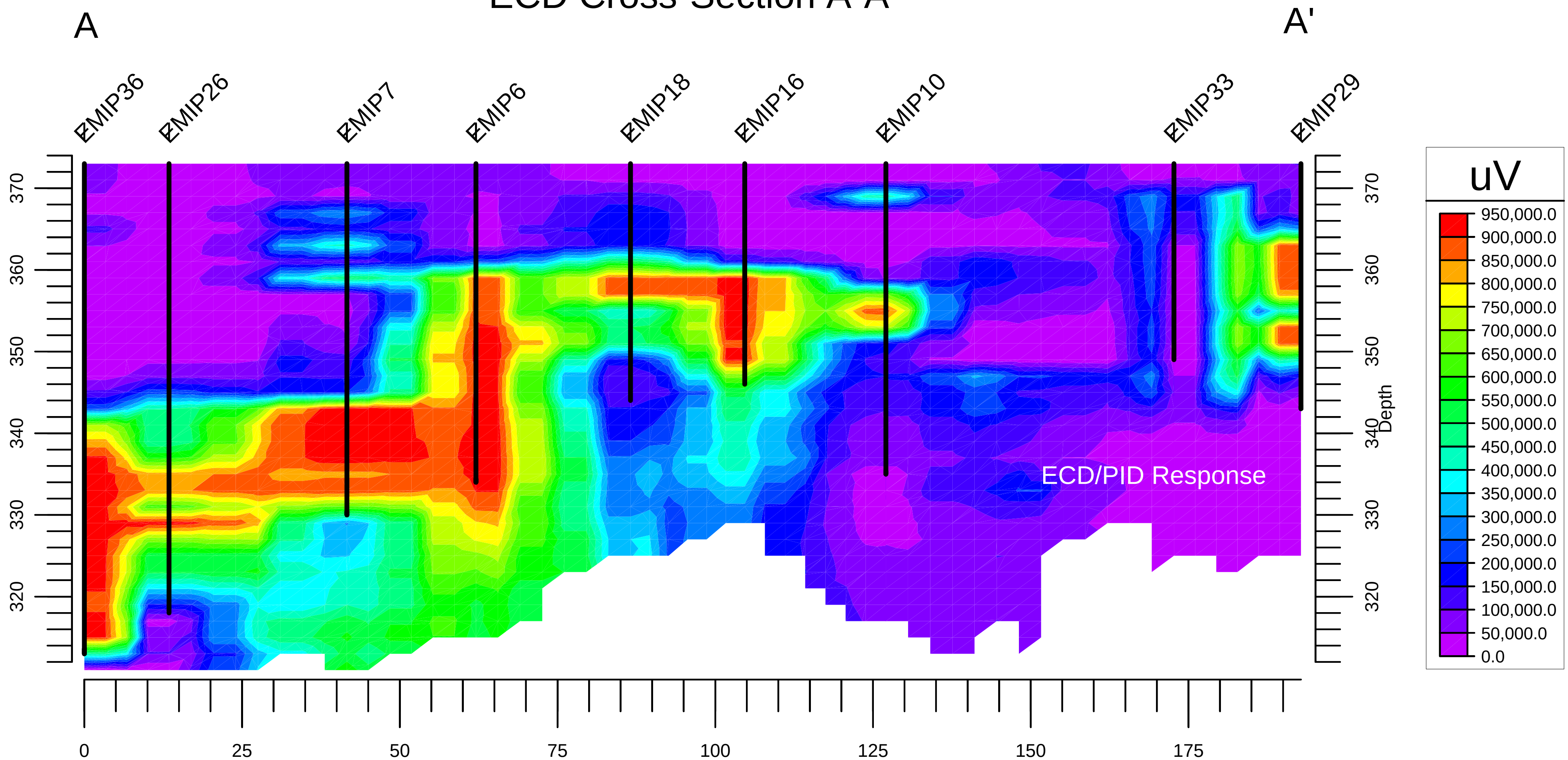


EARTH TECH
MILLER BREWING
FULTON, NEW YORK

Cross-Section

EarthTech
A tyco International Ltd. Company

ECD Cross-Section A-A'

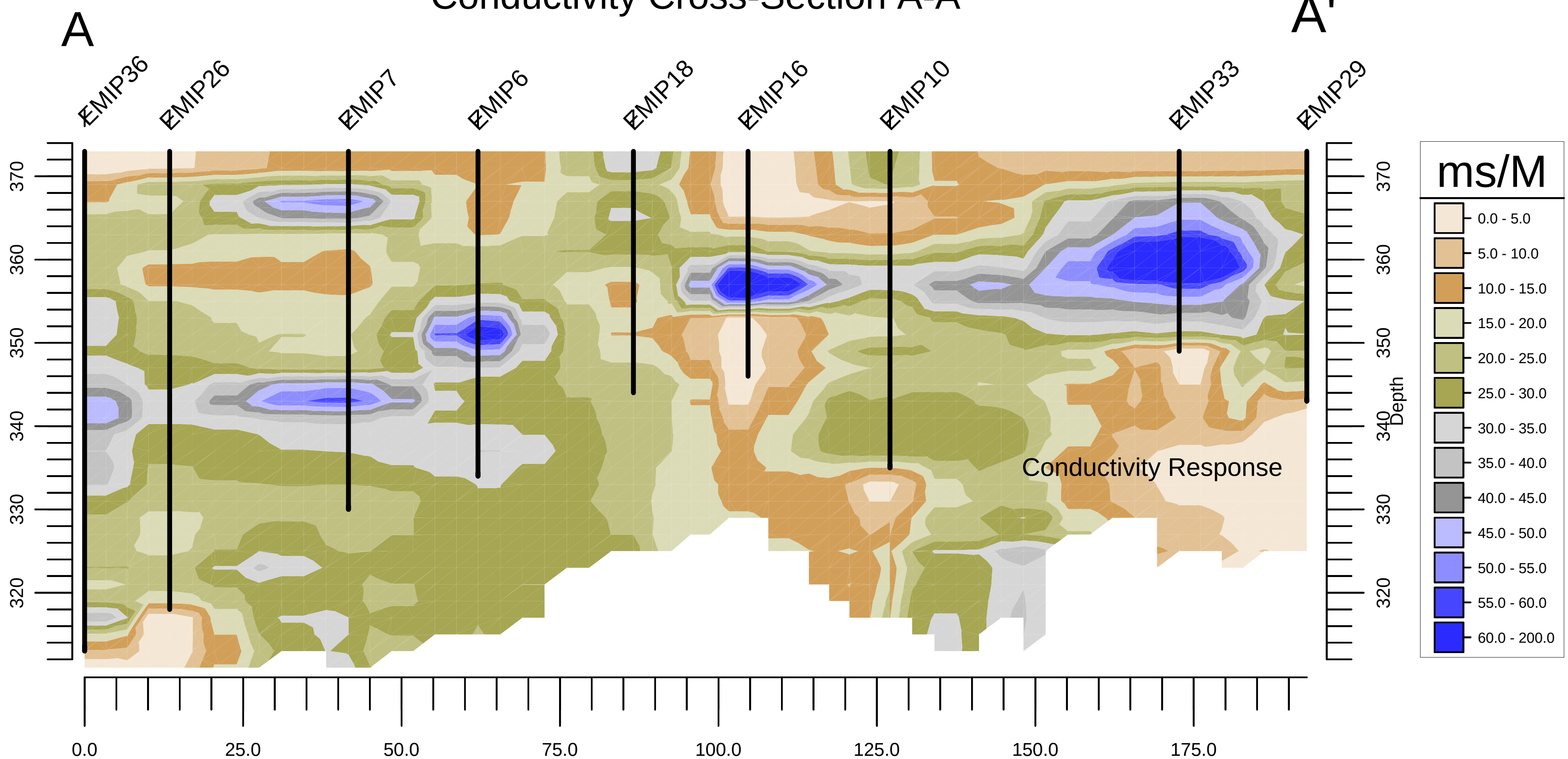


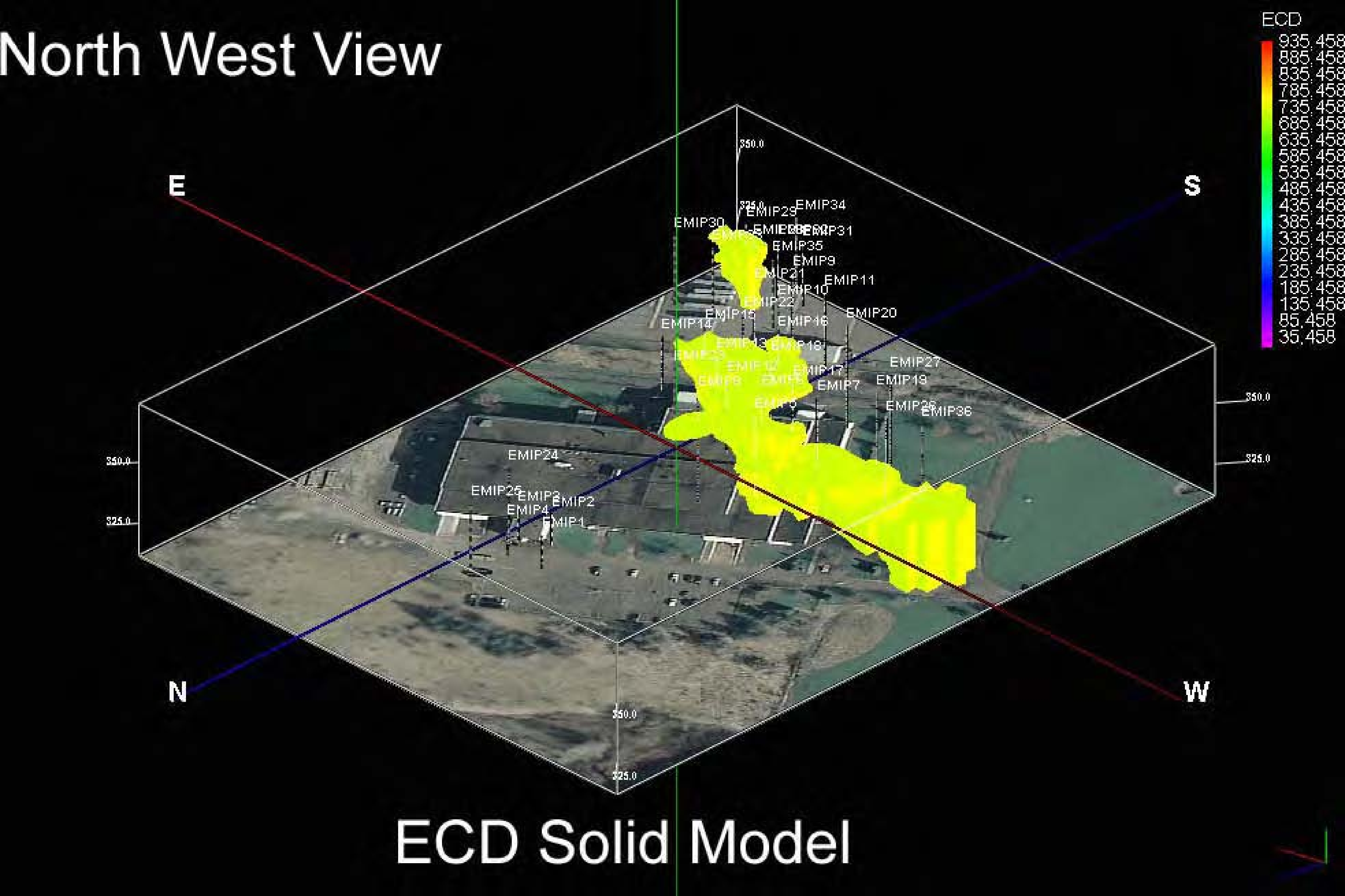
EARTH TECH
MILLER BREWING
FULTON, NEW YORK

Cross-Section

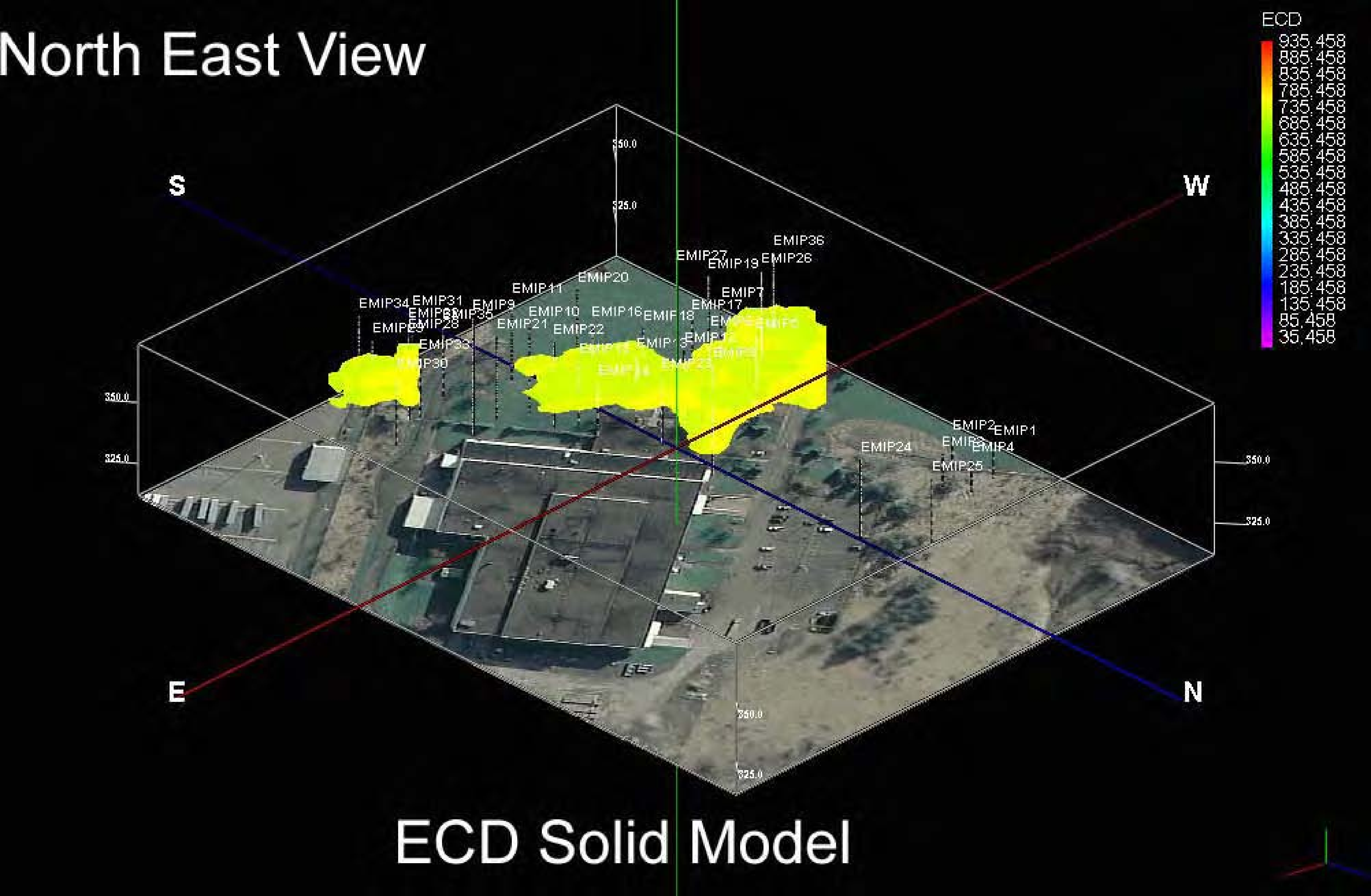
Earth Tech
A tyco International Ltd. Company

Conductivity Cross-Section A-A'

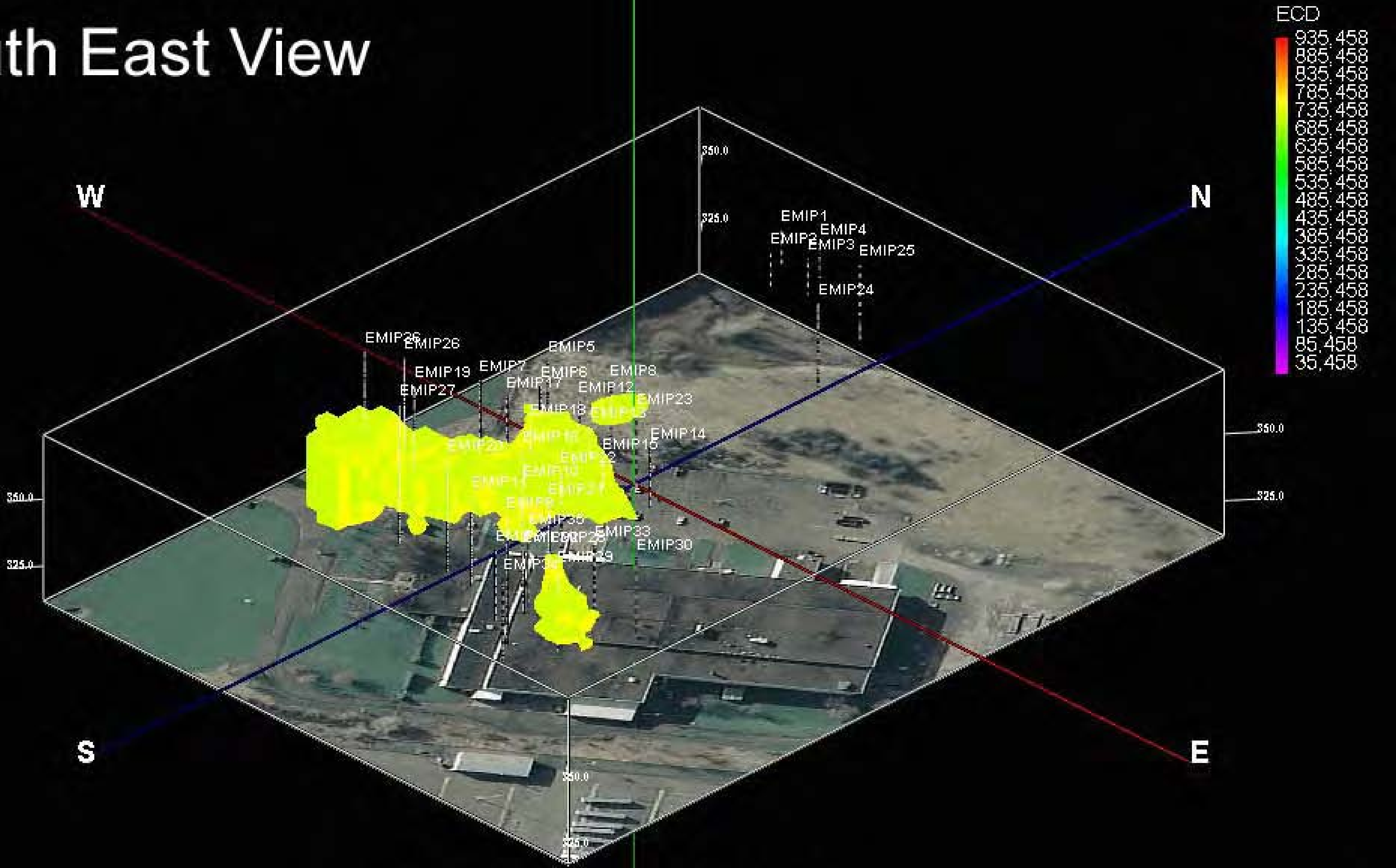




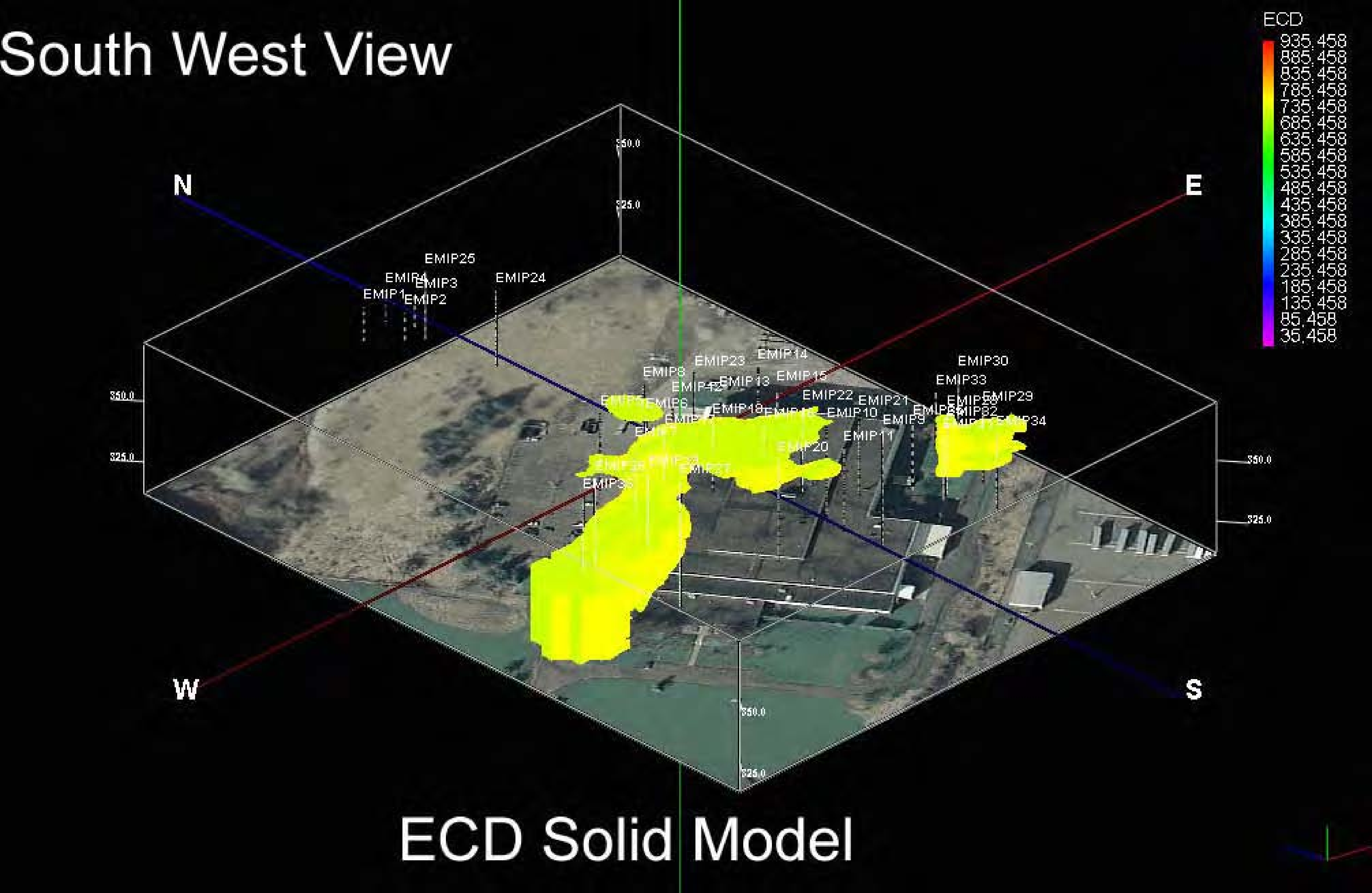
North West View
ECD
935.458
885.458
835.458
785.458
735.458
685.458
635.458
585.458
535.458
485.458
435.458
385.458
335.458
285.458
235.458
185.458
135.458
85.458
35.458
E
S
N
W
350.0
325.0
EMIP34
EMIP29
EMIP30
EMIP31
EMIP35
EMIP9
EMIP21
EMIP11
EMIP10
EMIP22
EMIP20
EMIP15
EMIP16
EMIP14
EMIP18
EMIP27
EMIP17
EMIP7
EMIP19
EMIP26
EMIP36
EMIP24
EMIP25
EMIP3
EMIP2
EMIP4
EMIP1
ECD Solid Model


North East View
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
S
W
E
N
350.0
325.0
EMIP36
EMIP27
EMIP19
EMIP26
EMIP20
EMIP11
EMIP7
EMIP34
EMIP31
EMIP9
EMIP10
EMIP16
EMIP18
EMIP17
EMIP21
EMIP22
EMIP28
EMIP33
EMIP2
EMIP1
EMIP24
EMIP4
EMIP25
ECD Solid Model

South East View



ECD Solid Model



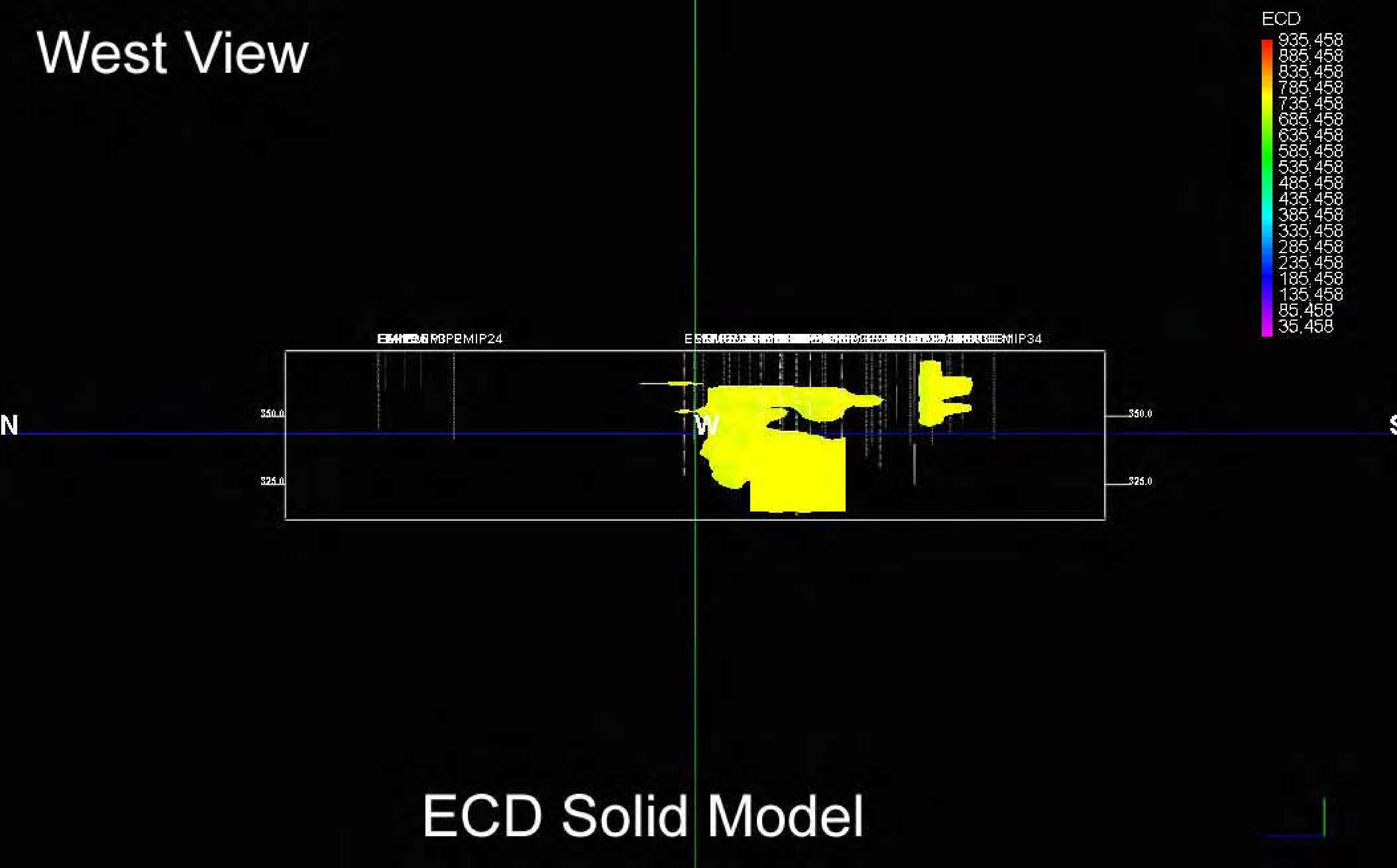
South West View
ECD
935.458
885.458
835.458
785.458
735.458
685.458
635.458
585.458
535.458
485.458
435.458
385.458
335.458
285.458
235.458
185.458
135.458
85.458
35.458
N
E
W
S
EMIP25
EMIP4
EMIP3
EMIP1
EMIP2
EMIP24
EMIP23
EMIP14
EMIP8
EMIP13
EMIP15
EMIP30
EMIP33
EMIP22
EMIP21
EMIP29
EMIP10
EMIP9
EMIP34
EMIP11
EMIP20
EMIP35
350.0
325.0
ECD Solid Model

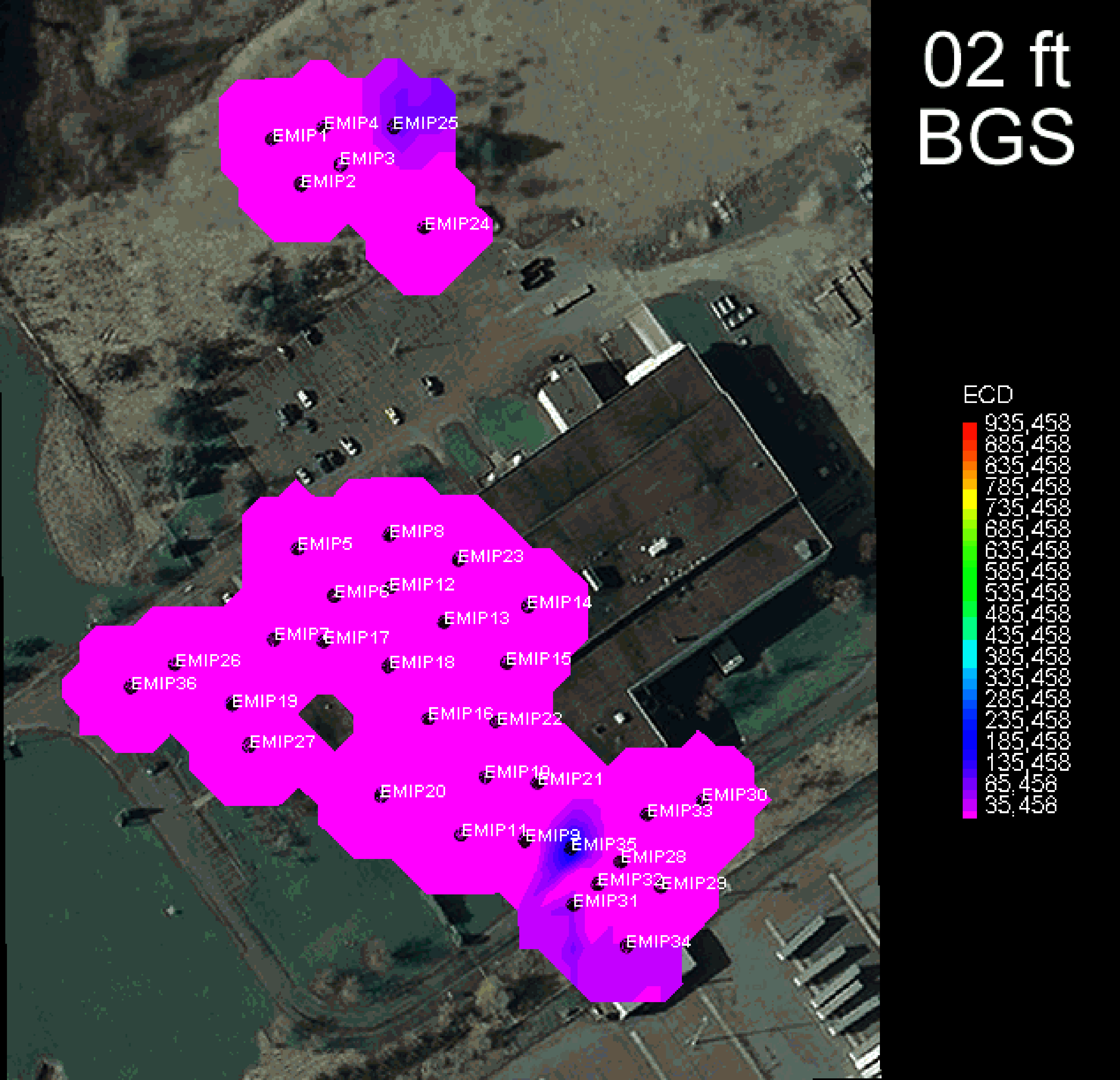

North View
ECD
935.458
885.458
835.458
785.458
735.458
685.458
635.458
585.458
535.458
485.458
435.458
385.458
335.458
285.458
235.458
185.458
135.458
85.458
35.458
EMIP36
E
N
350.0
325.0
350.0
325.0
ECD Solid Model

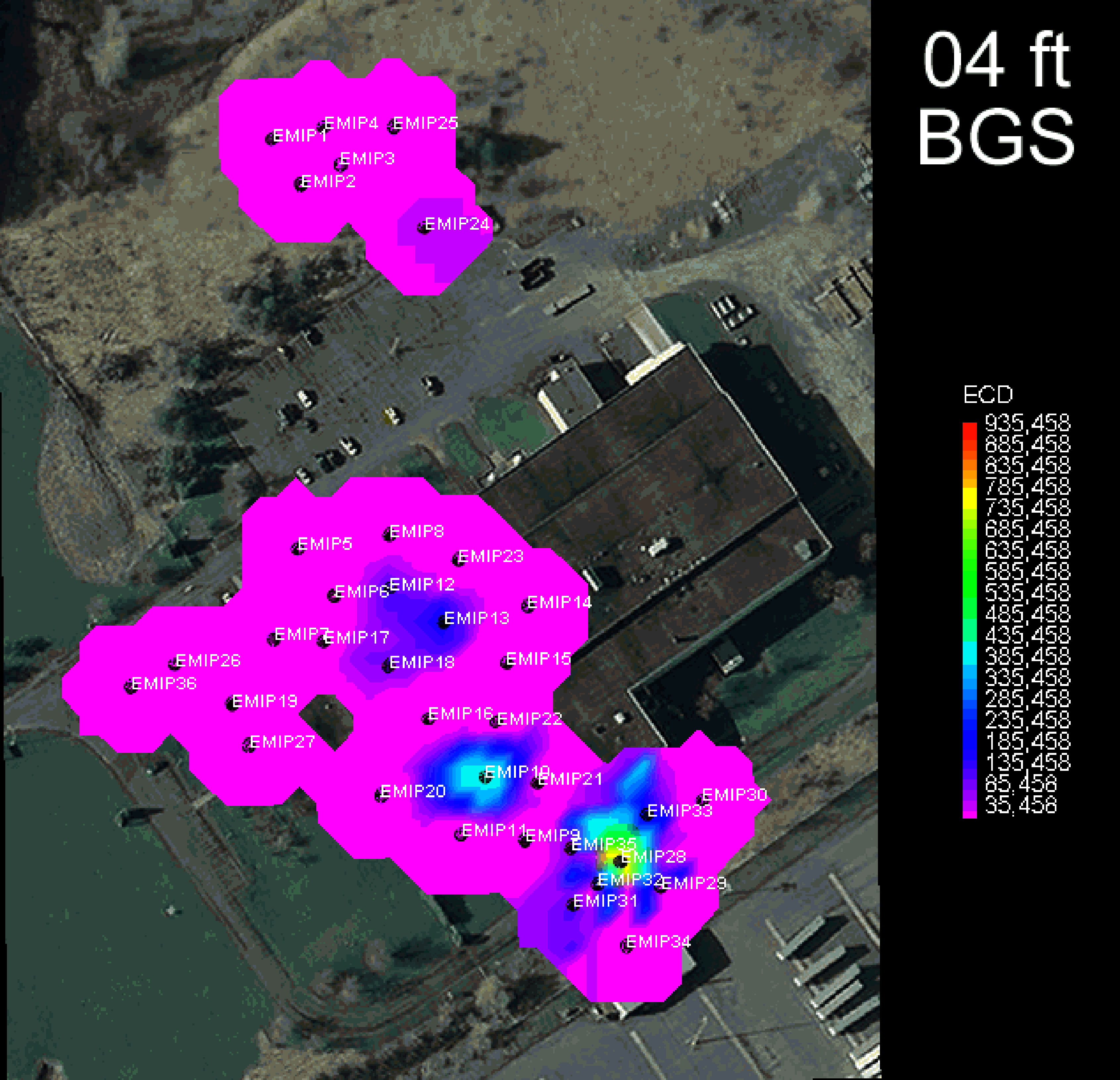
East View

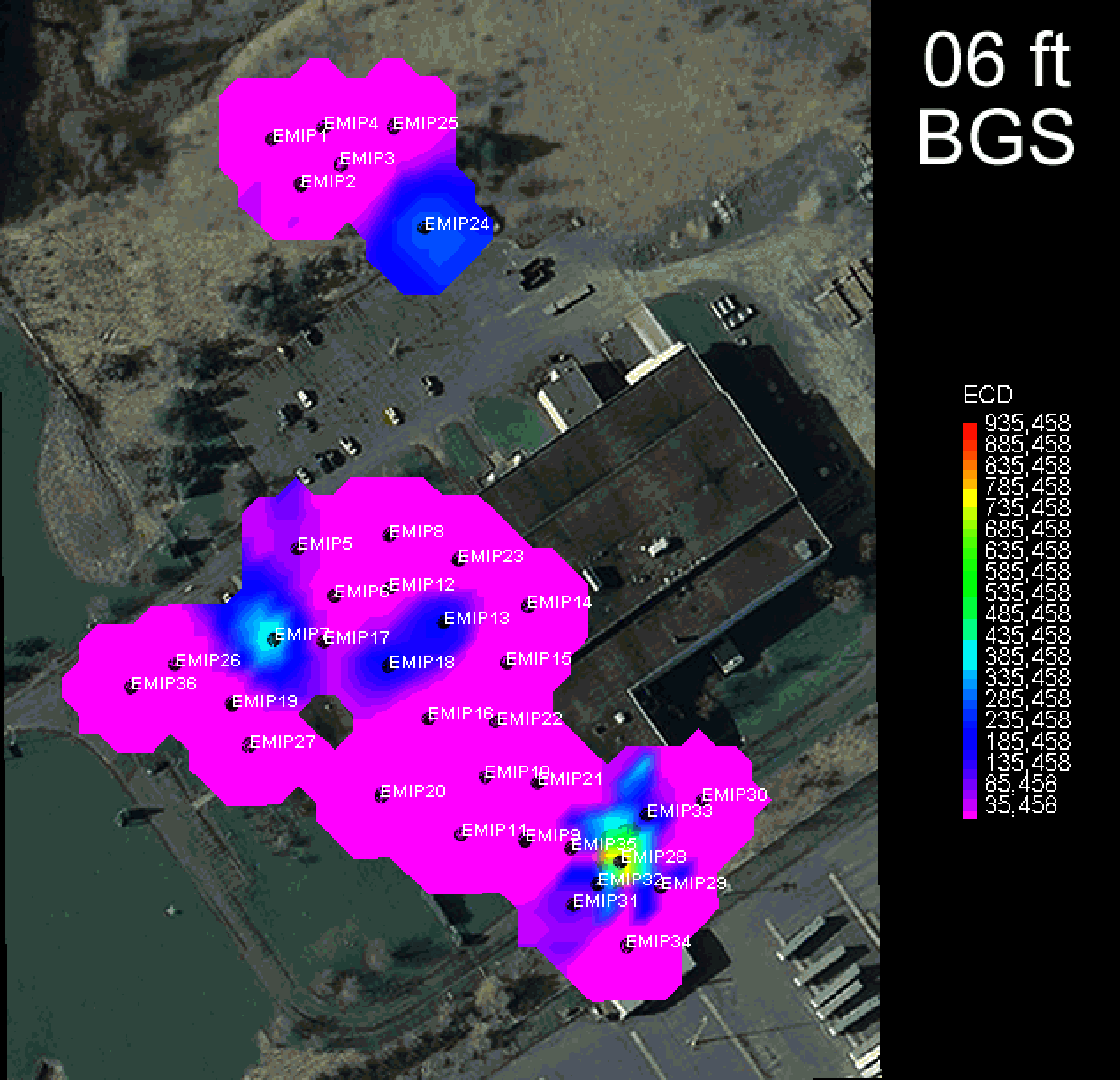
ECD Solid Model


South View
ECD
935.458
885.458
835.458
785.458
735.458
685.458
635.458
585.458
535.458
485.458
435.458
385.458
335.458
285.458
235.458
185.458
135.458
85.458
35.458
W
E
S
350.0
325.0
ECD Solid Model

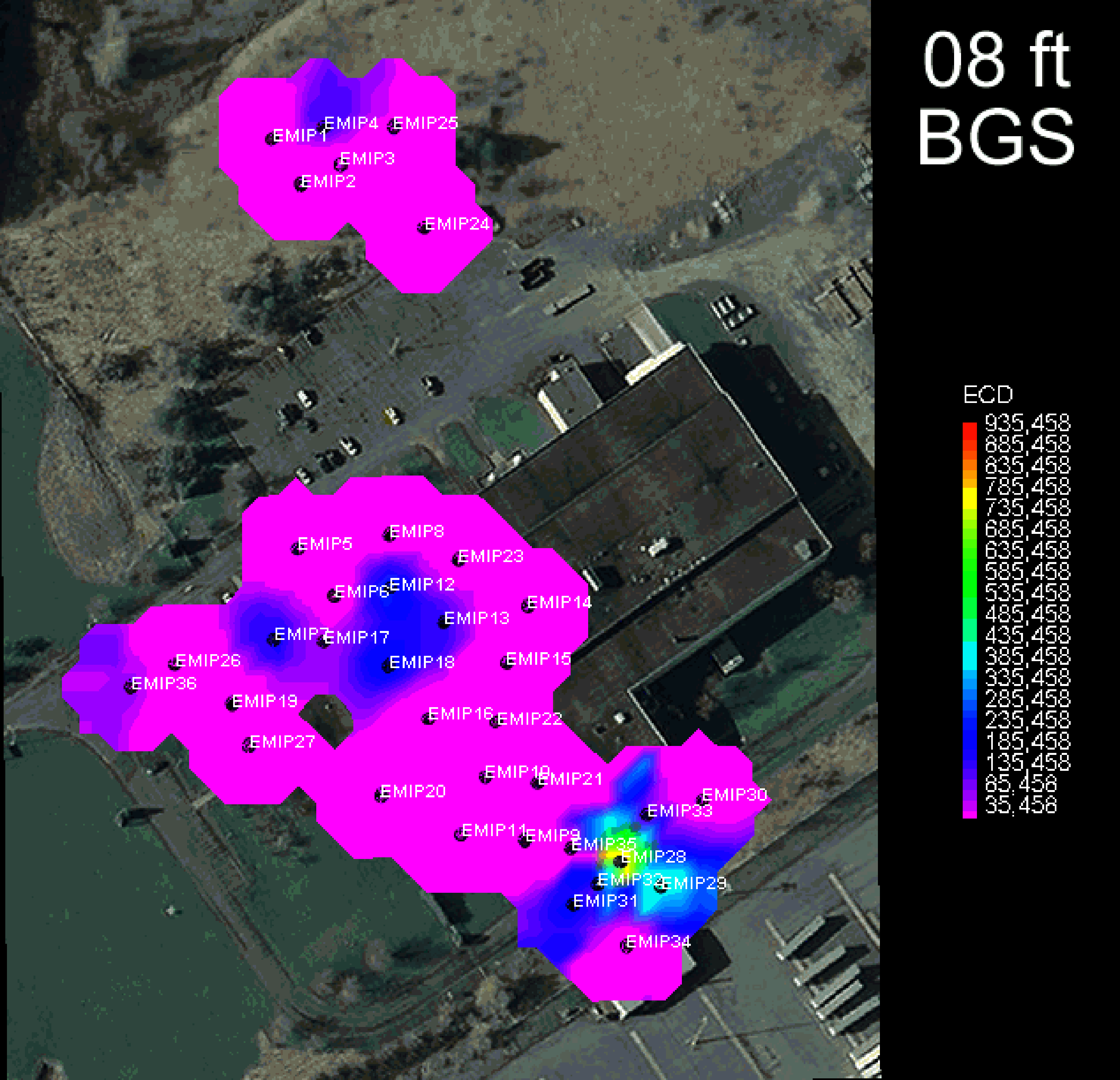

West View
ECD
935.458
885.458
835.458
785.458
735.458
685.458
635.458
585.458
535.458
485.458
435.458
385.458
335.458
285.458
235.458
185.458
135.458
85.458
35.458
N
W
S
350.0
325.0
350.0
325.0
ECD Solid Model

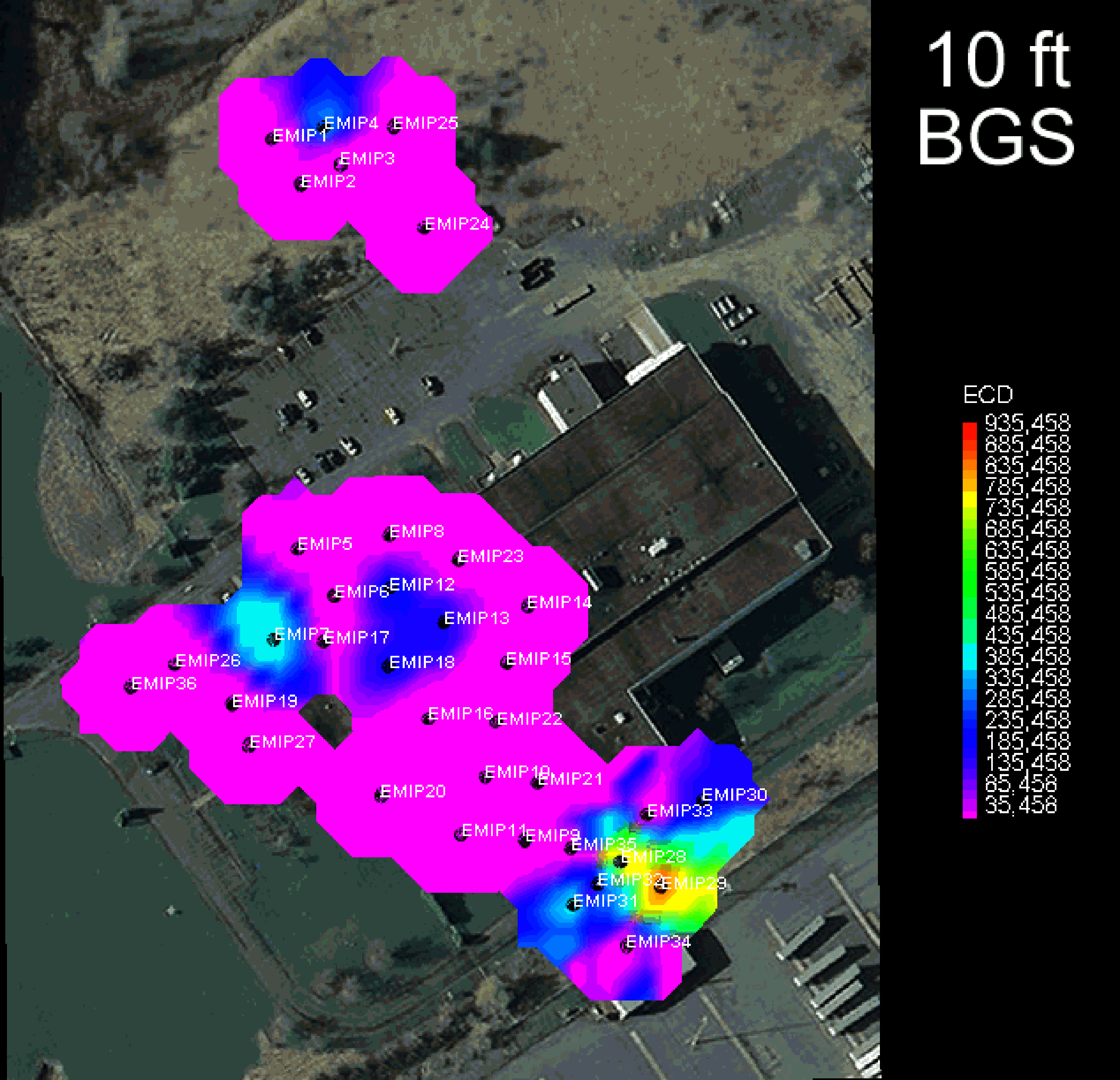

02 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP25
EMIP24
EMIP5
EMIP8
EMIP23
EMIP6
EMIP12
EMIP14
EMIP13
EMIP7
EMIP17
EMIP26
EMIP18
EMIP15
EMIP36
EMIP19
EMIP16
EMIP22
EMIP27
EMIP10
EMIP21
EMIP20
EMIP30
EMIP33
EMIP11
EMIP9
EMIP35
EMIP28
EMIP32
EMIP29
EMIP31
EMIP34

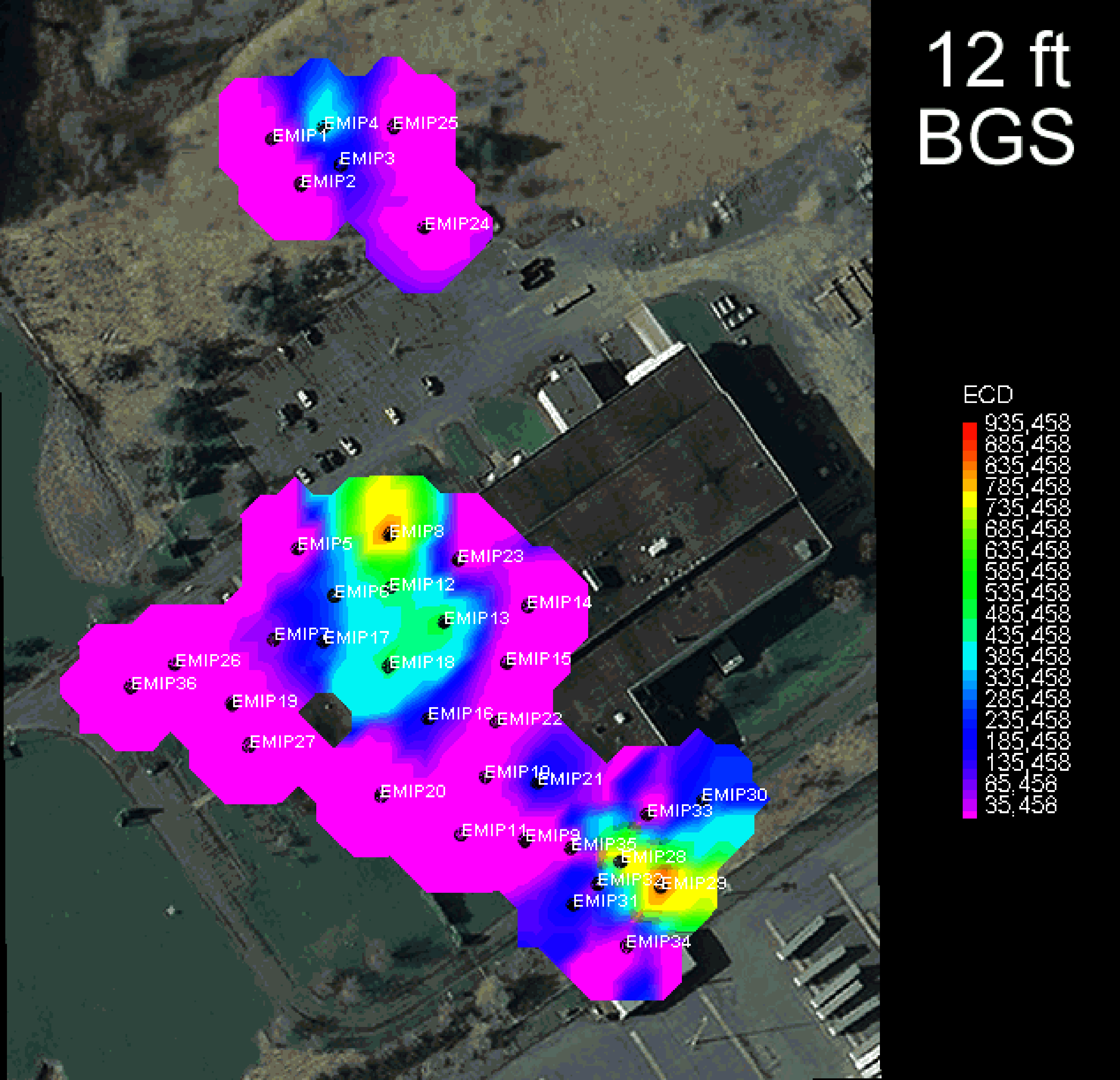

04 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP24
EMIP25
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36

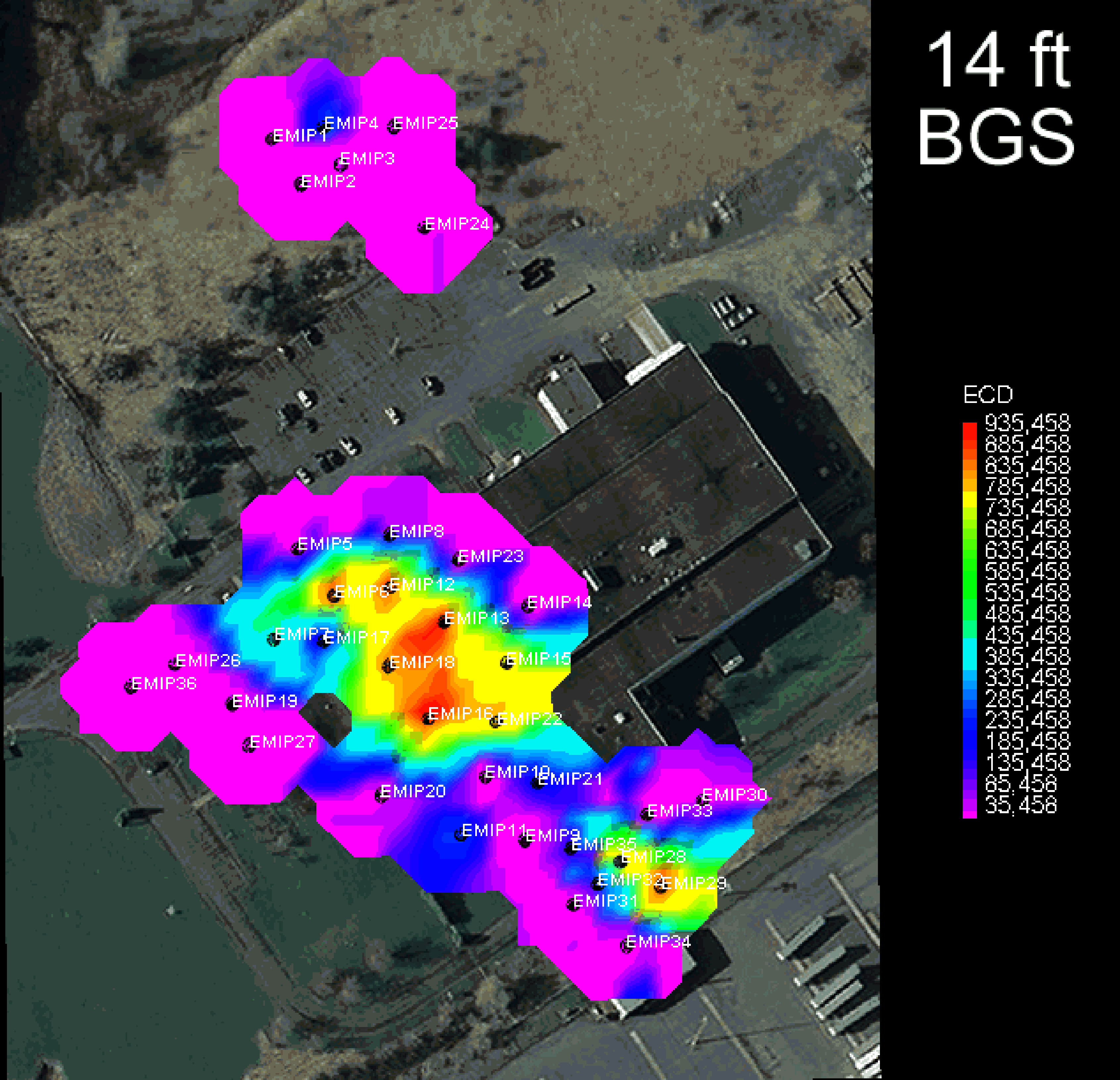


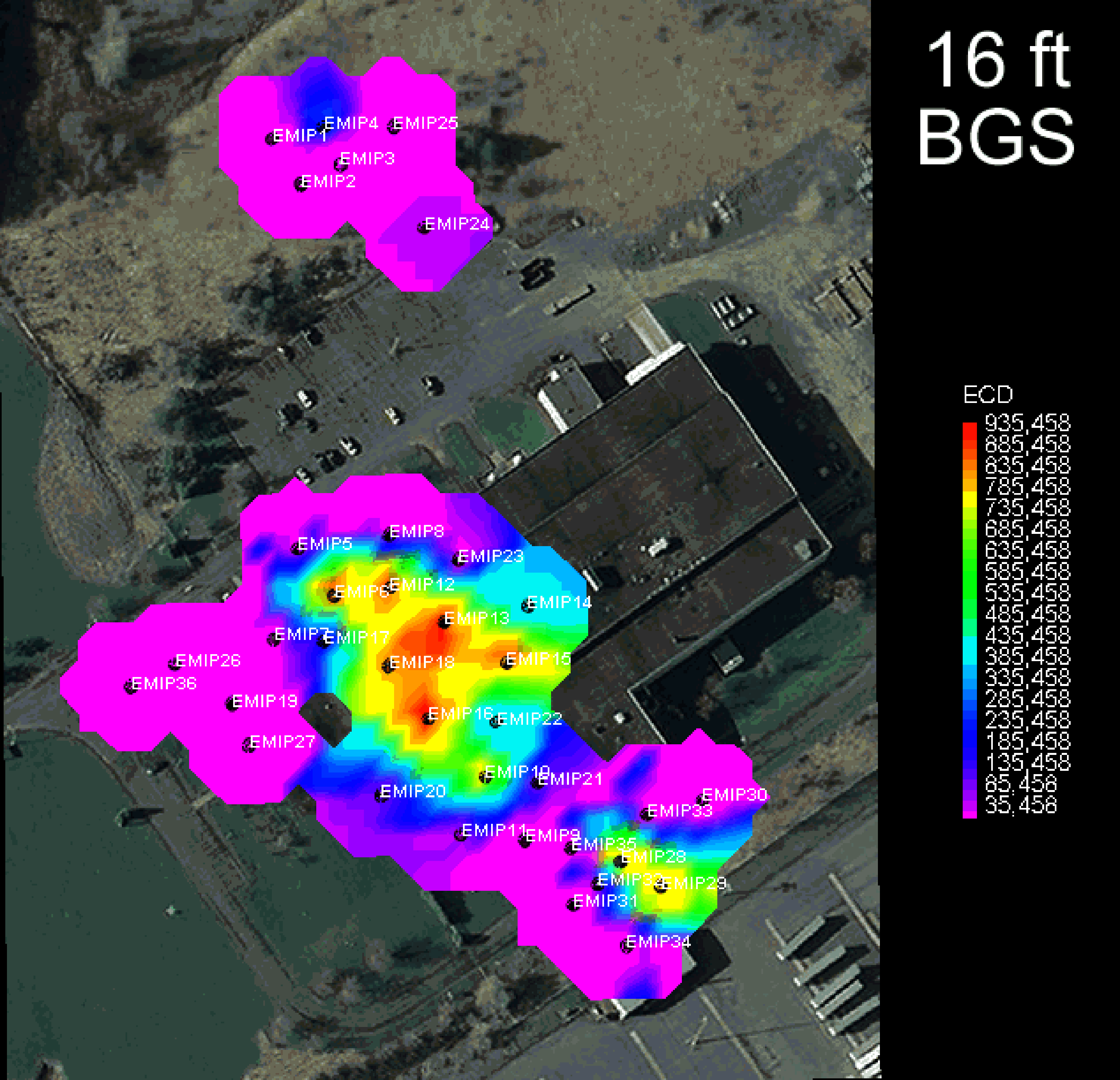
06 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP24
EMIP25
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36

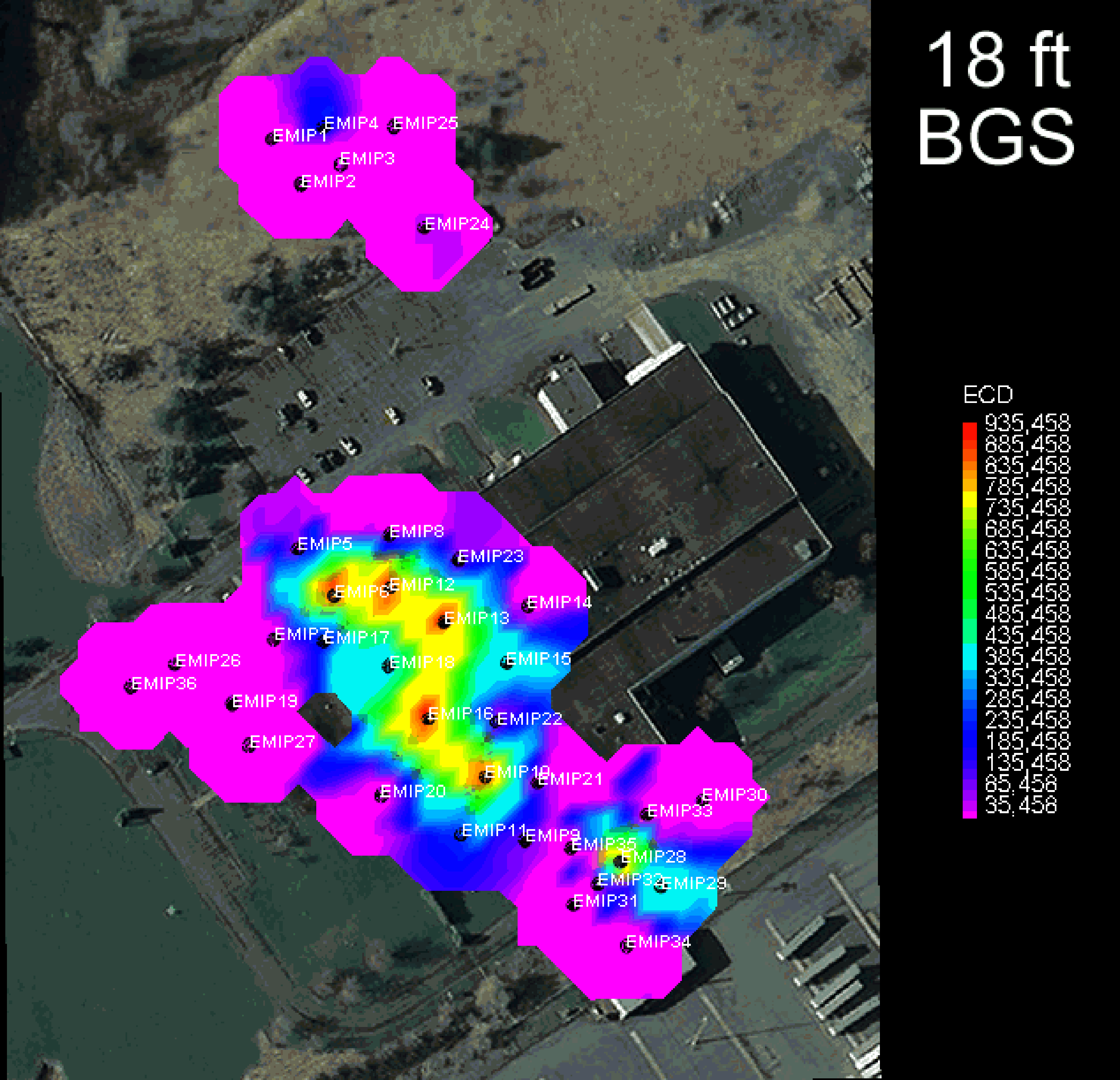

08 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP24
EMIP25
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36


10 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP4
EMIP25
EMIP3
EMIP2
EMIP24
EMIP5
EMIP8
EMIP23
EMIP6
EMIP12
EMIP14
EMIP13
EMIP7
EMIP17
EMIP26
EMIP18
EMIP15
EMIP36
EMIP19
EMIP16
EMIP22
EMIP27
EMIP10
EMIP21
EMIP20
EMIP30
EMIP33
EMIP11
EMIP9
EMIP35
EMIP28
EMIP32
EMIP29
EMIP31
EMIP34

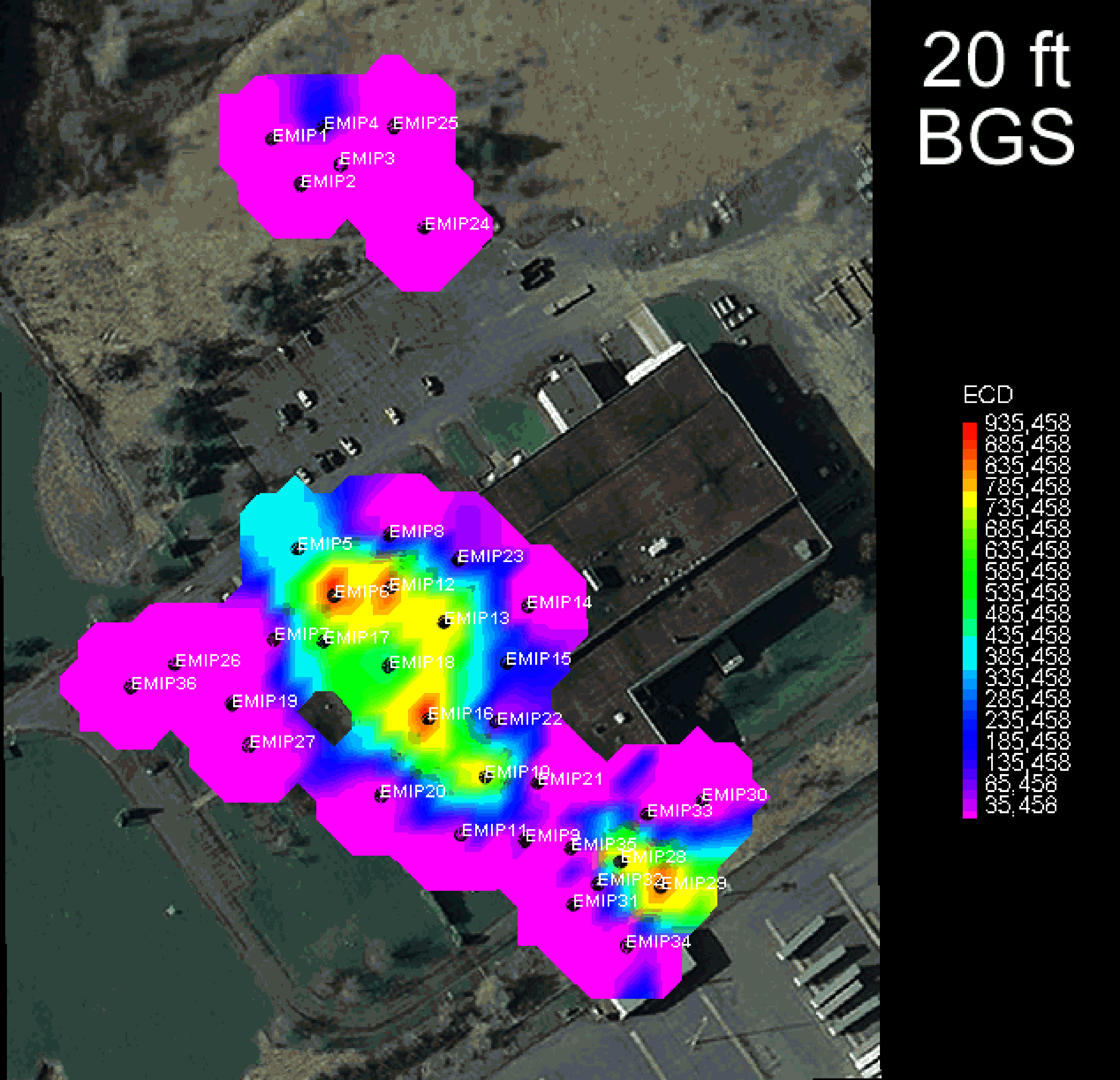

12 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP25
EMIP24
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36

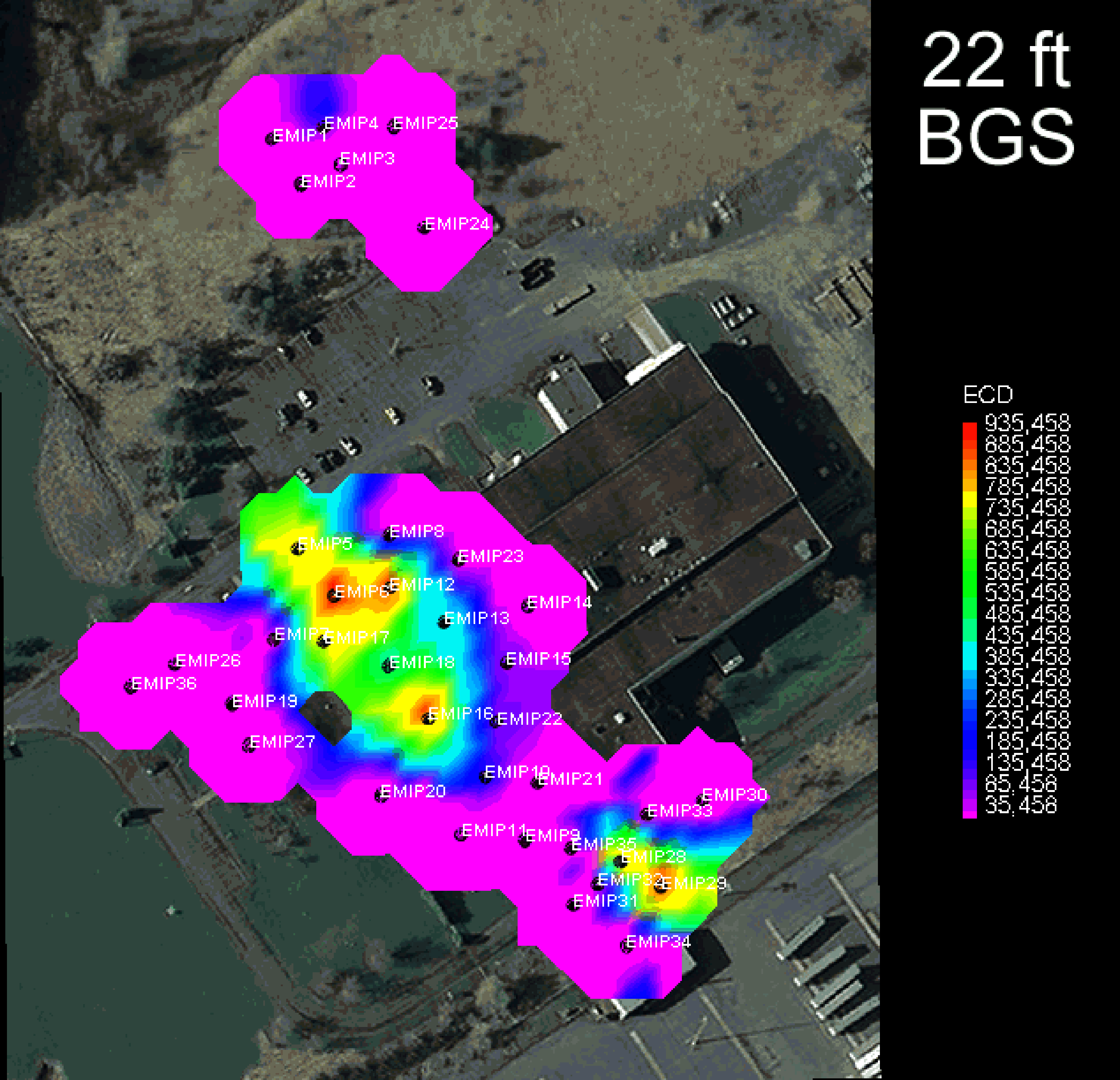

14 ft
BGS
EMIP1
EMIP4
EMIP25
EMIP3
EMIP2
EMIP24
EMIP8
EMIP5
EMIP23
EMIP6
EMIP12
EMIP14
EMIP13
EMIP7
EMIP17
EMIP26
EMIP18
EMIP15
EMIP36
EMIP19
EMIP16
EMIP22
EMIP27
EMIP10
EMIP21
EMIP20
EMIP30
EMIP33
EMIP11
EMIP9
EMIP35
EMIP28
EMIP32
EMIP29
EMIP31
EMIP34
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458


16 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP25
EMIP24
EMIP5
EMIP8
EMIP23
EMIP6
EMIP12
EMIP14
EMIP13
EMIP7
EMIP17
EMIP26
EMIP18
EMIP15
EMIP36
EMIP19
EMIP16
EMIP22
EMIP27
EMIP10
EMIP21
EMIP20
EMIP30
EMIP33
EMIP11
EMIP9
EMIP35
EMIP28
EMIP32
EMIP29
EMIP31
EMIP34

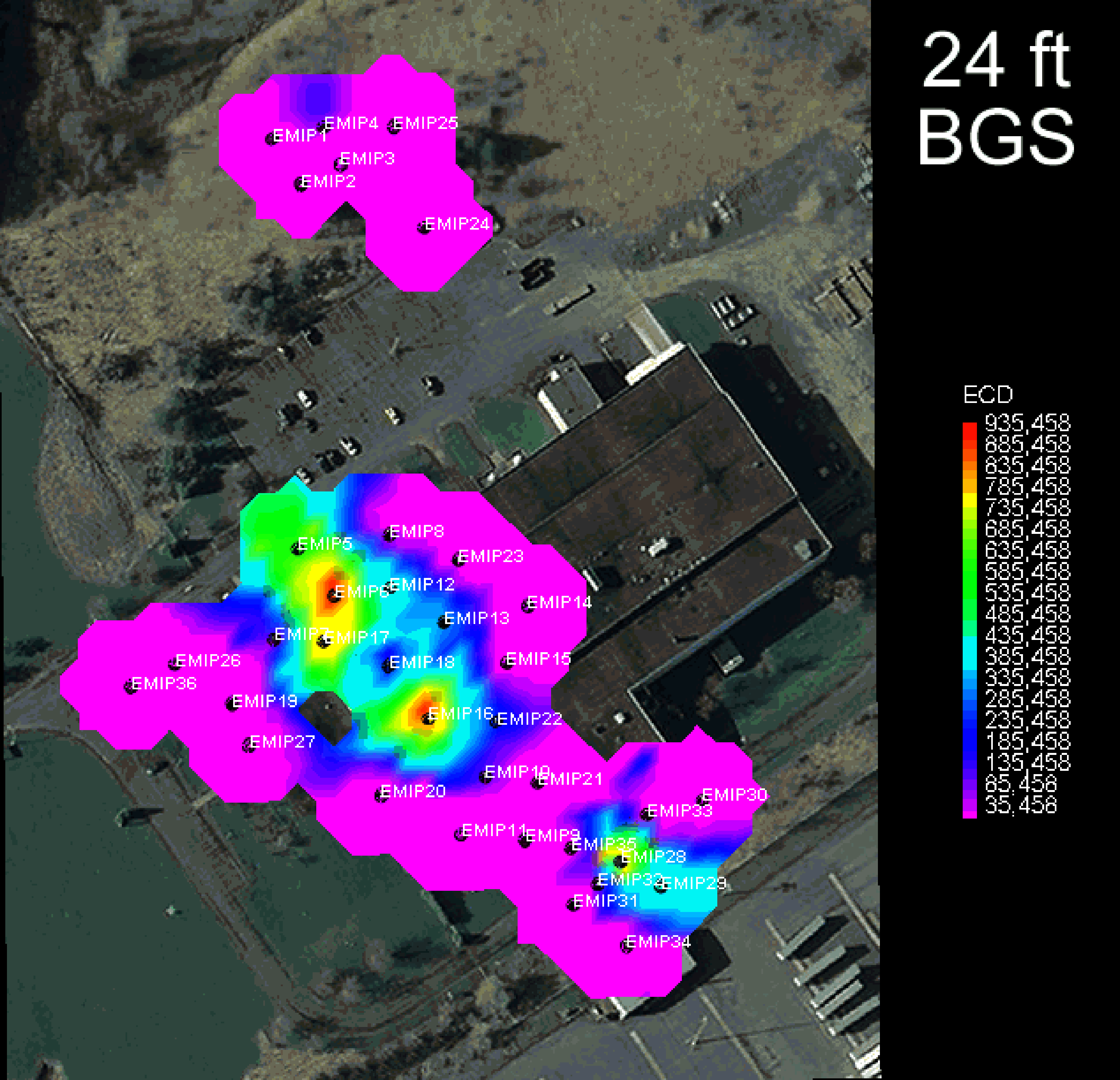


18 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP24
EMIP25
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36

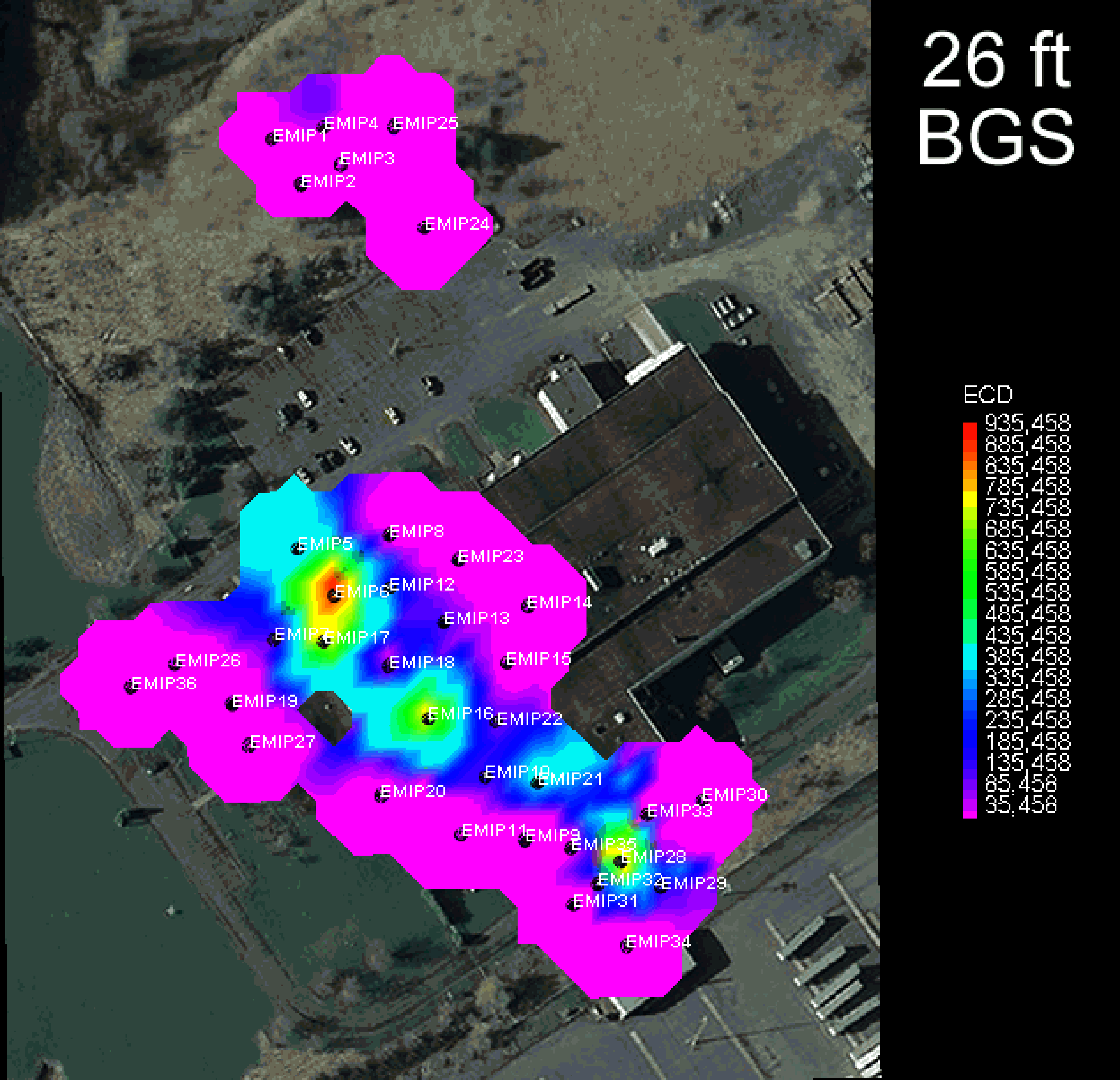

20 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP24
EMIP25
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36

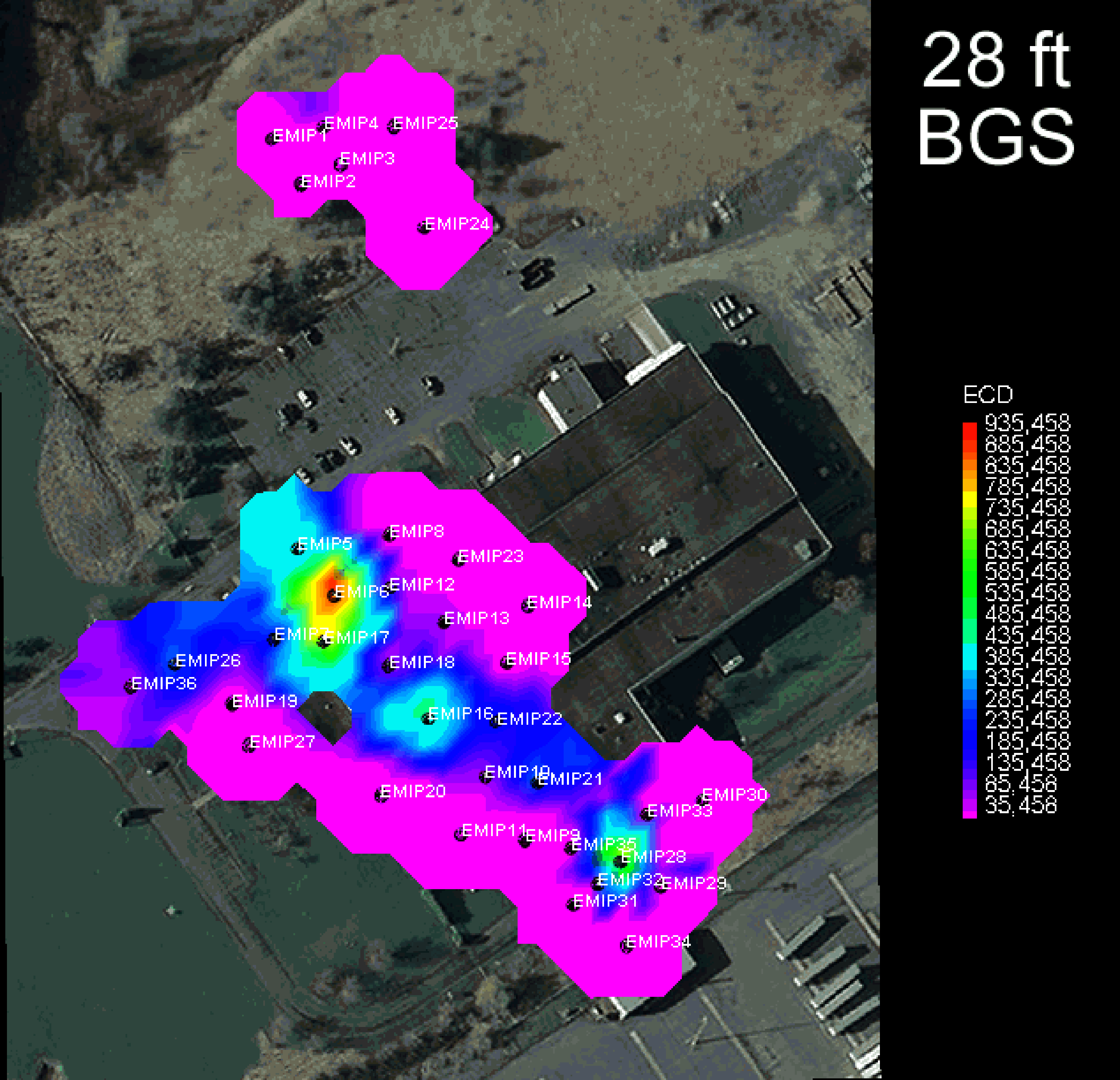


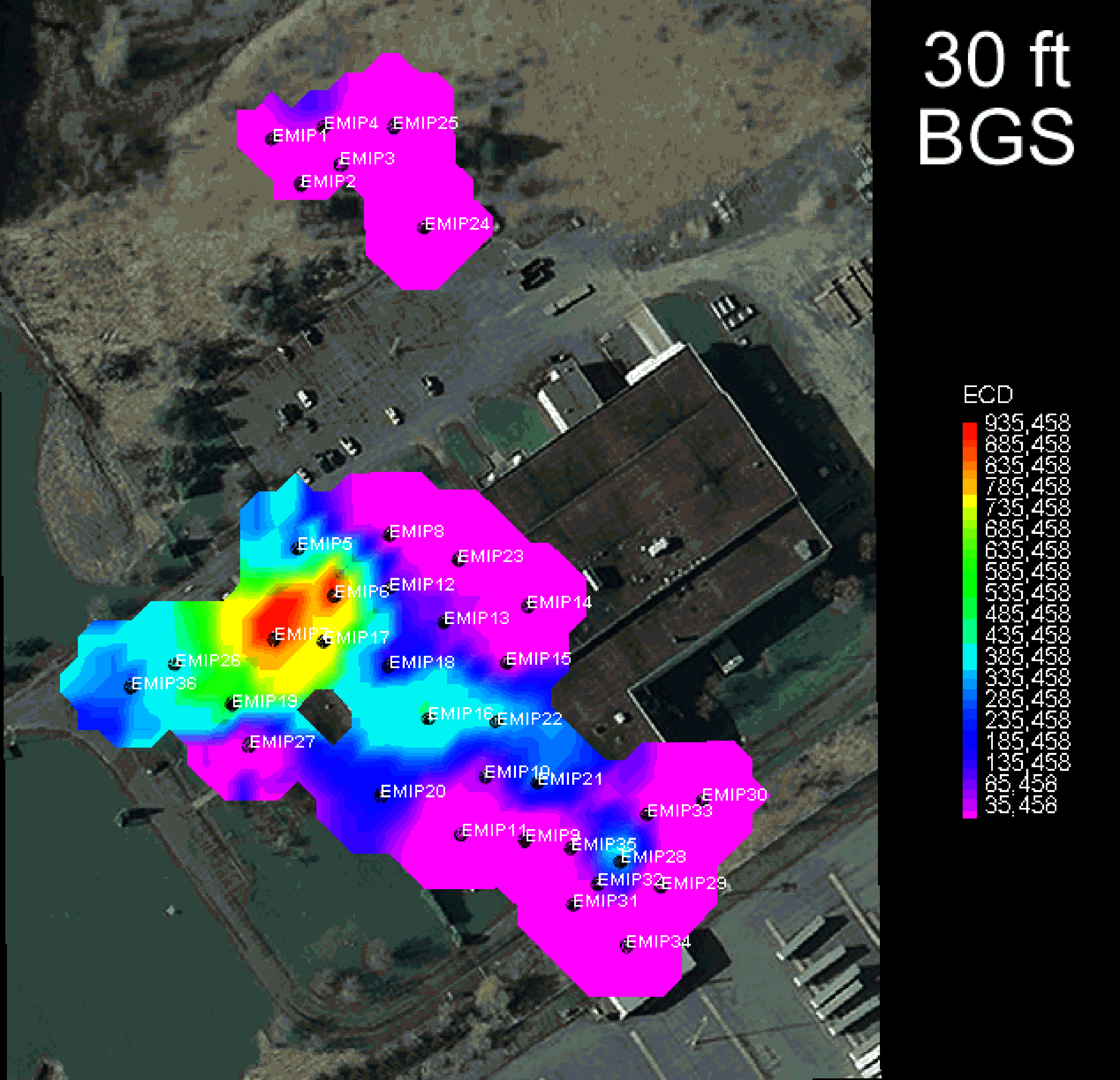
22 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP24
EMIP25
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36

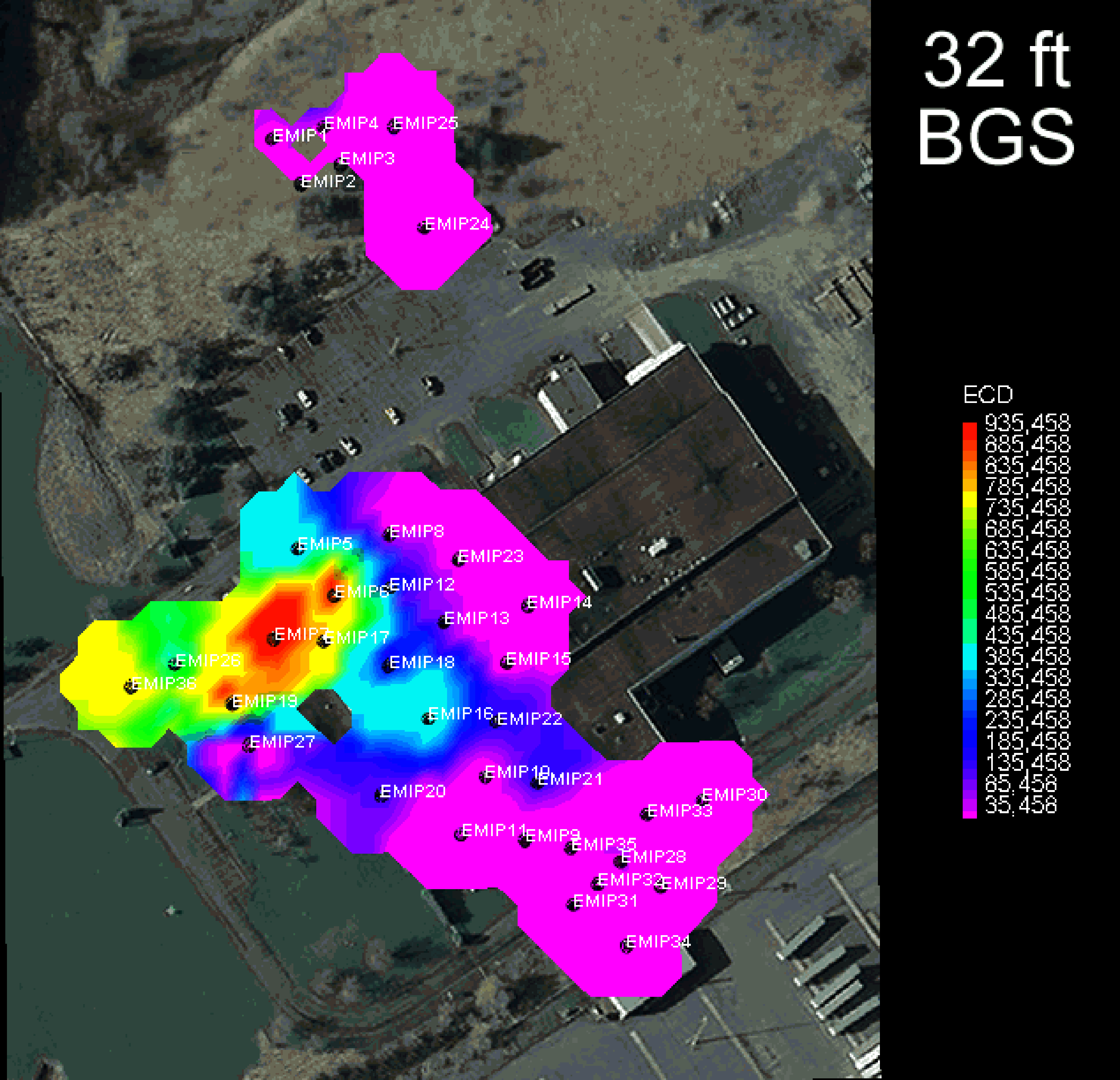


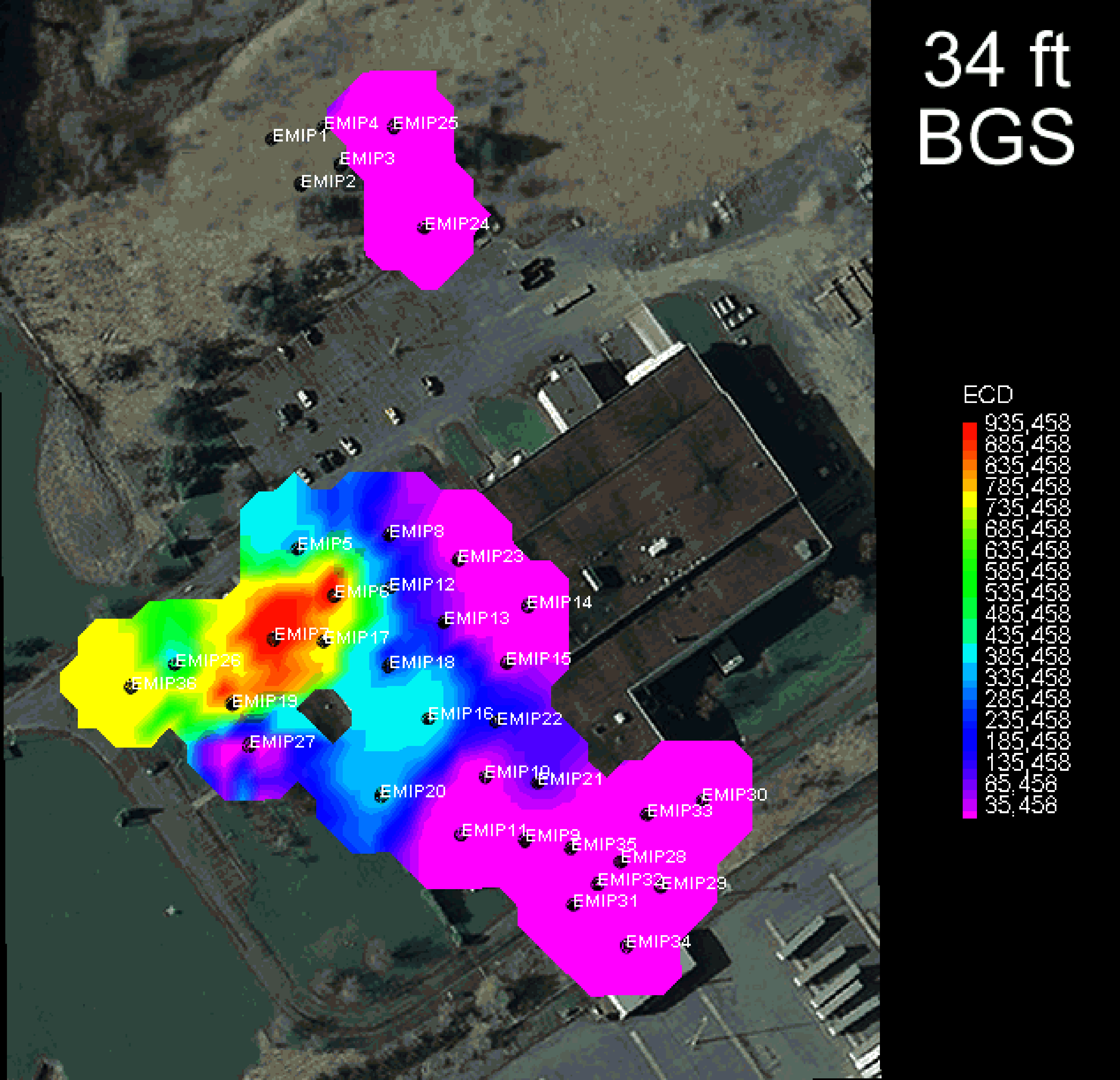
24 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP25
EMIP24
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36

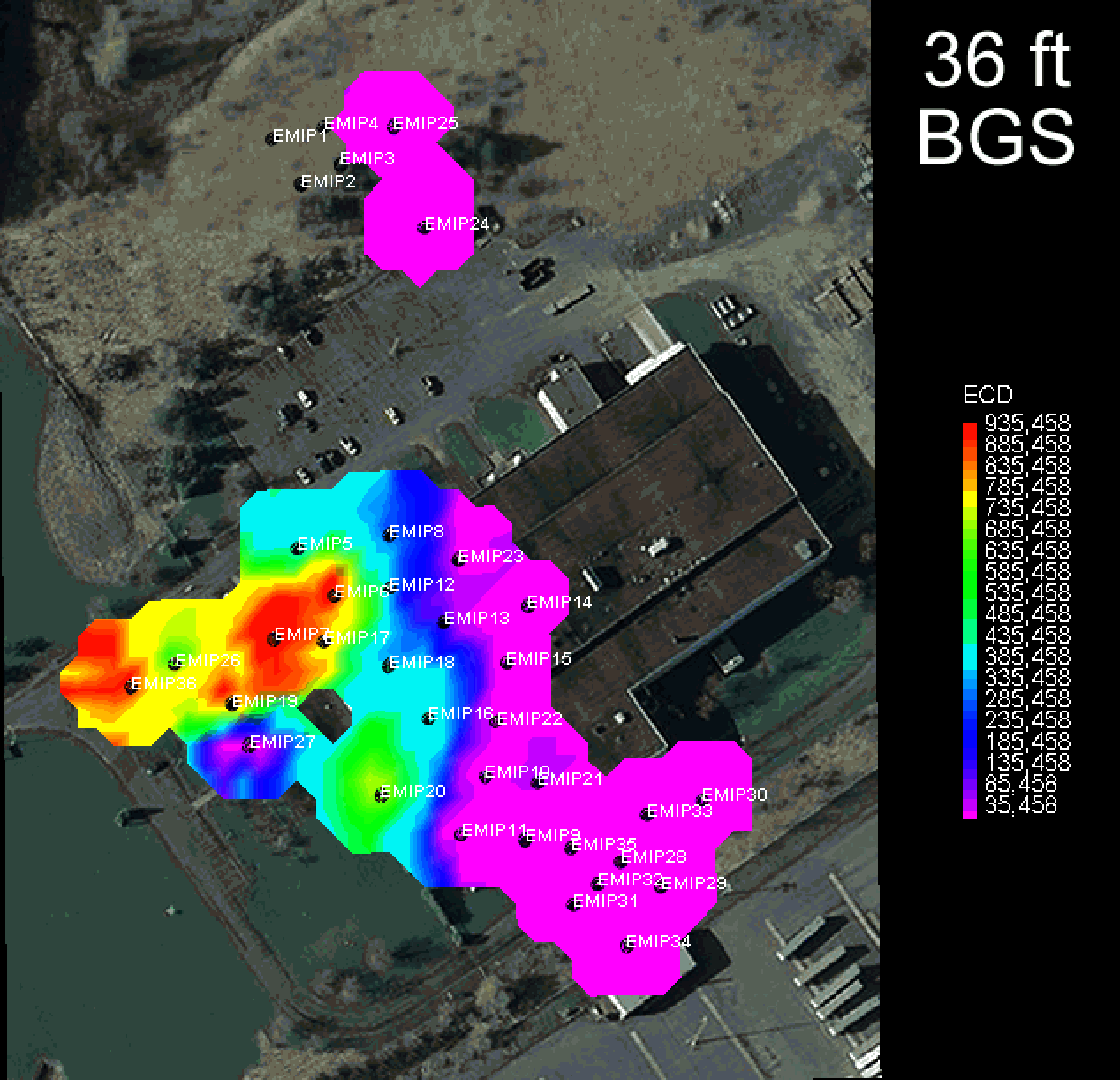

26 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP4
EMIP25
EMIP1
EMIP3
EMIP2
EMIP24
EMIP8
EMIP5
EMIP23
EMIP6
EMIP12
EMIP14
EMIP13
EMIP7
EMIP17
EMIP26
EMIP18
EMIP15
EMIP36
EMIP19
EMIP16
EMIP22
EMIP27
EMIP10
EMIP21
EMIP20
EMIP30
EMIP33
EMIP11
EMIP9
EMIP35
EMIP28
EMIP32
EMIP29
EMIP31
EMIP34

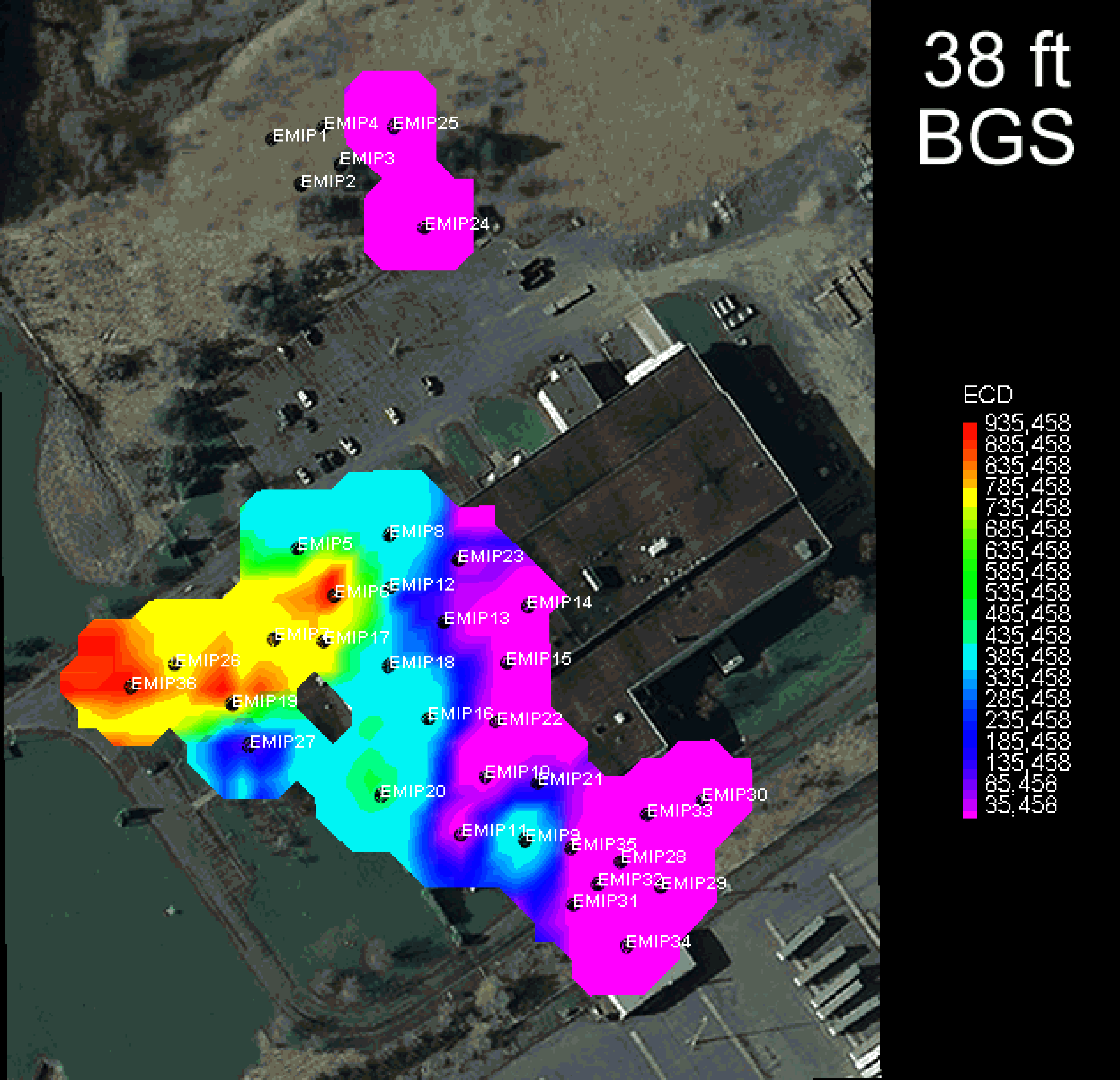

28 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP4
EMIP25
EMIP3
EMIP2
EMIP24
EMIP5
EMIP8
EMIP23
EMIP6
EMIP12
EMIP14
EMIP13
EMIP7
EMIP17
EMIP26
EMIP18
EMIP15
EMIP36
EMIP19
EMIP16
EMIP22
EMIP27
EMIP10
EMIP21
EMIP20
EMIP30
EMIP33
EMIP11
EMIP9
EMIP35
EMIP28
EMIP32
EMIP29
EMIP31
EMIP34


30 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP24
EMIP25
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36

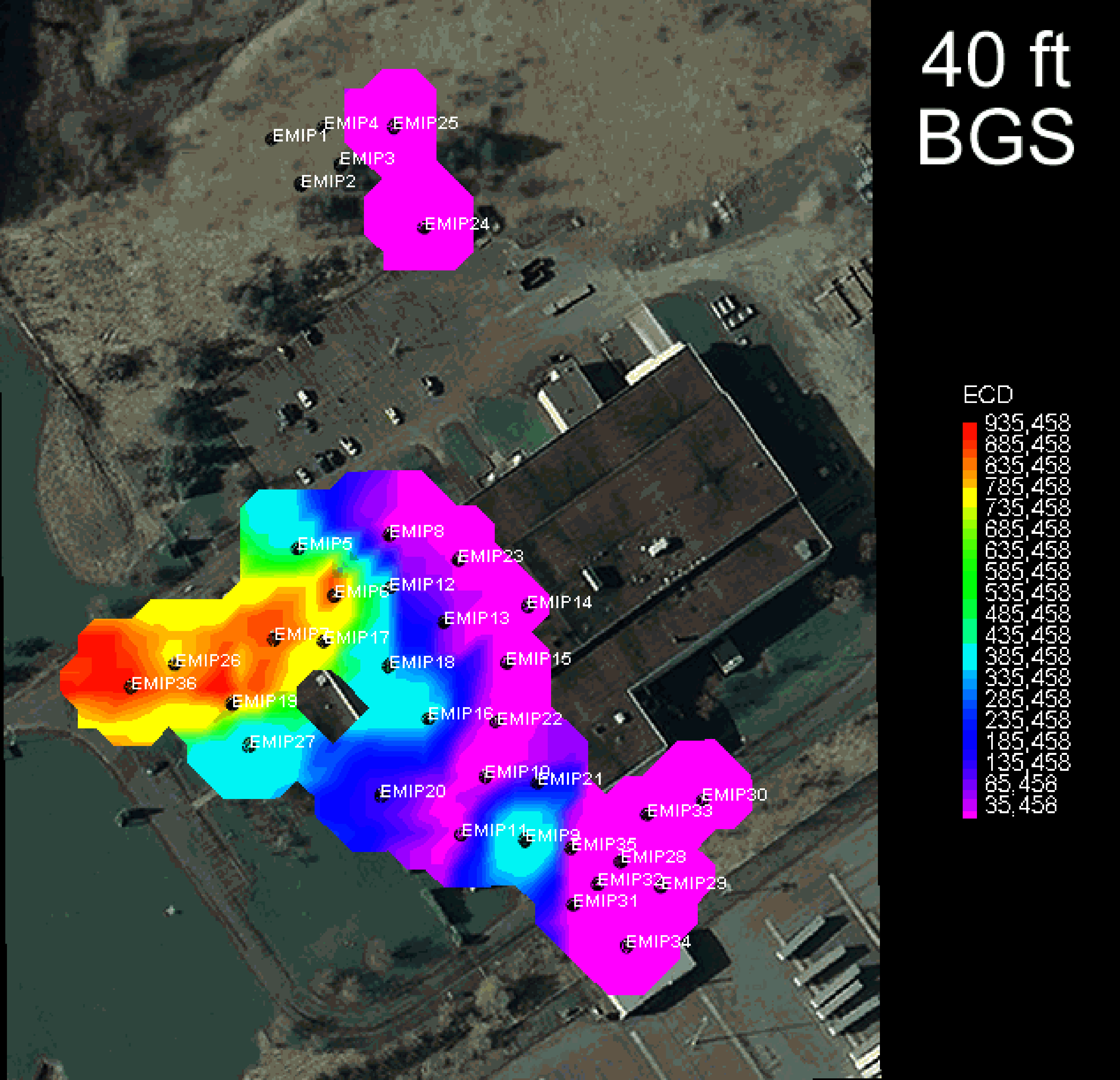

32 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP25
EMIP24
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36

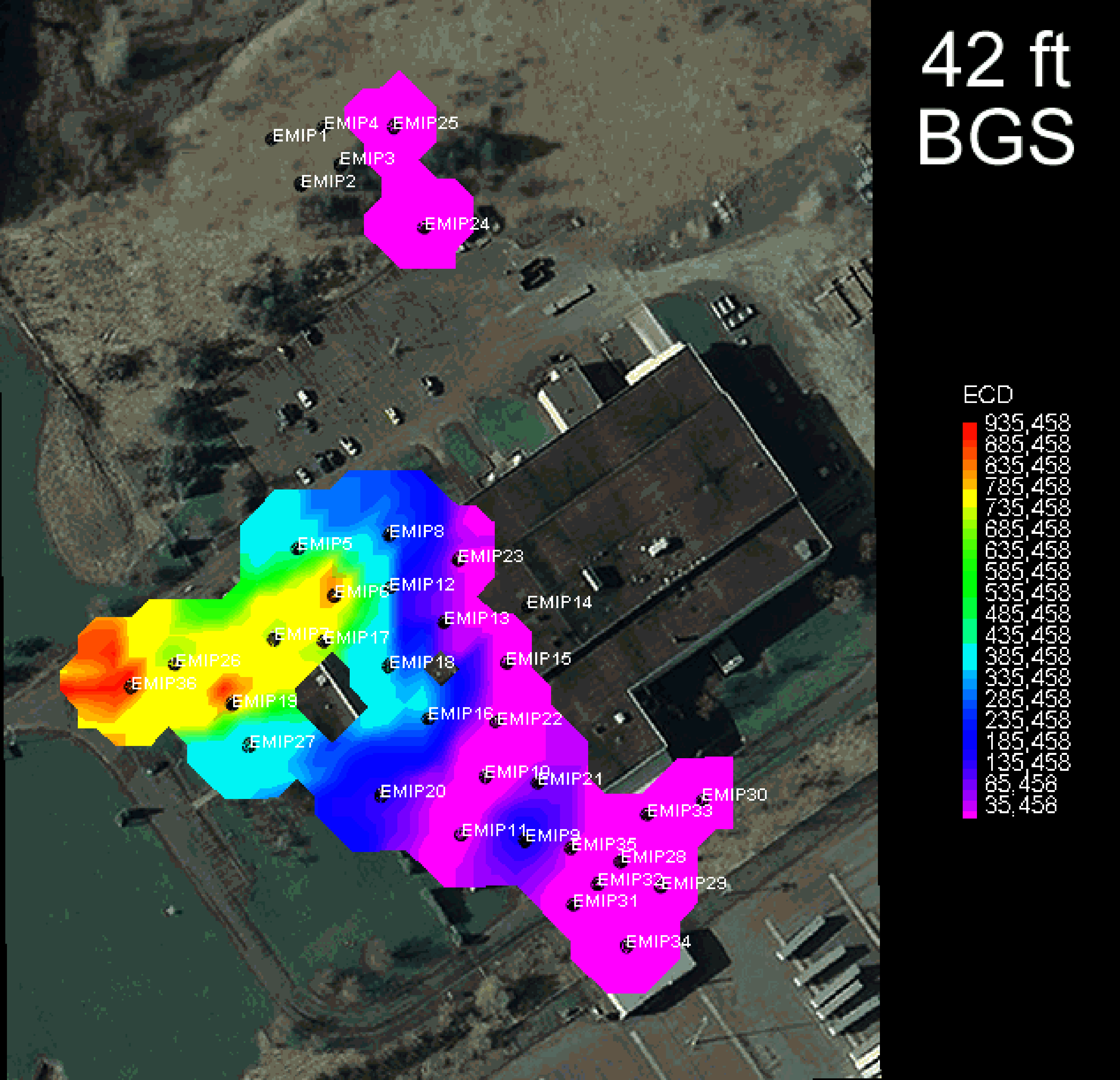

34 ft BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP4
EMIP25
EMIP3
EMIP2
EMIP24
EMIP5
EMIP8
EMIP23
EMIP6
EMIP12
EMIP14
EMIP13
EMIP7
EMIP17
EMIP26
EMIP18
EMIP15
EMIP36
EMIP19
EMIP16
EMIP22
EMIP27
EMIP10
EMIP21
EMIP20
EMIP30
EMIP33
EMIP11
EMIP9
EMIP35
EMIP28
EMIP32
EMIP29
EMIP31
EMIP34


36 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP25
EMIP24
EMIP5
EMIP8
EMIP23
EMIP6
EMIP12
EMIP14
EMIP13
EMIP7
EMIP17
EMIP26
EMIP18
EMIP15
EMIP36
EMIP19
EMIP16
EMIP22
EMIP27
EMIP10
EMIP21
EMIP20
EMIP30
EMIP33
EMIP11
EMIP9
EMIP35
EMIP28
EMIP32
EMIP29
EMIP31
EMIP34

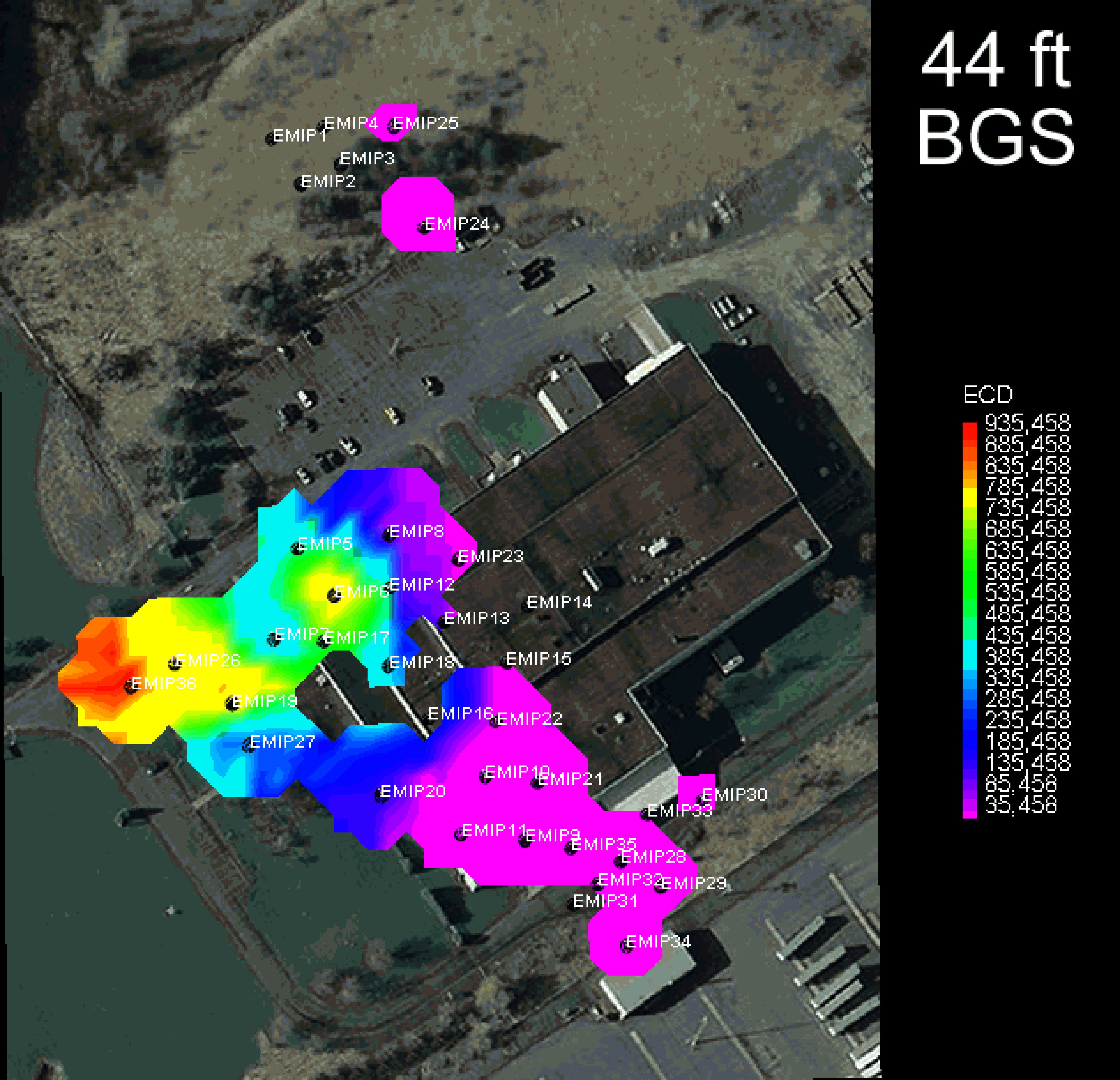


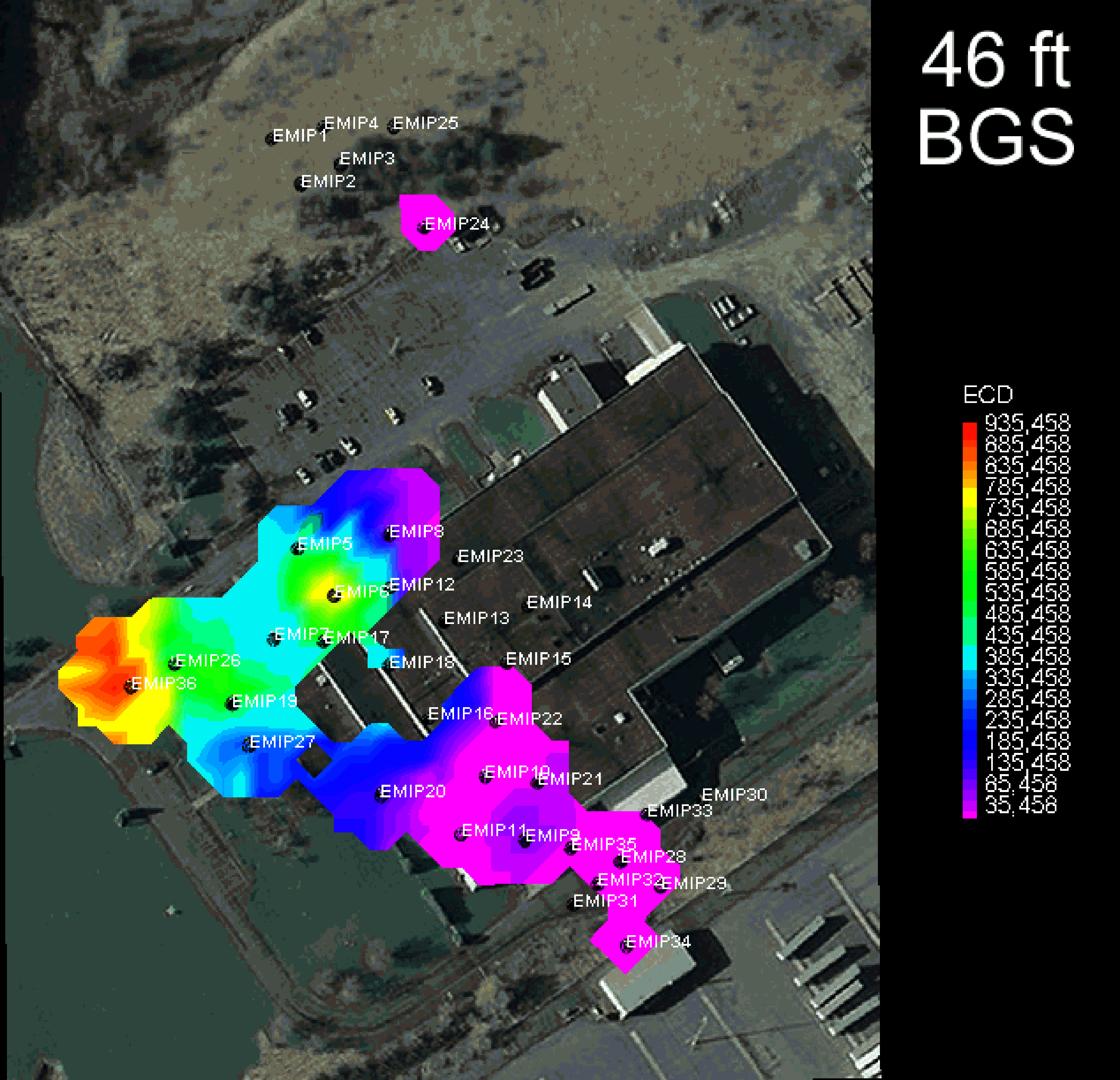
38 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP25
EMIP24
EMIP5
EMIP8
EMIP23
EMIP6
EMIP12
EMIP14
EMIP13
EMIP7
EMIP17
EMIP26
EMIP18
EMIP15
EMIP36
EMIP19
EMIP16
EMIP22
EMIP27
EMIP10
EMIP21
EMIP20
EMIP30
EMIP33
EMIP11
EMIP9
EMIP35
EMIP28
EMIP32
EMIP29
EMIP31
EMIP34

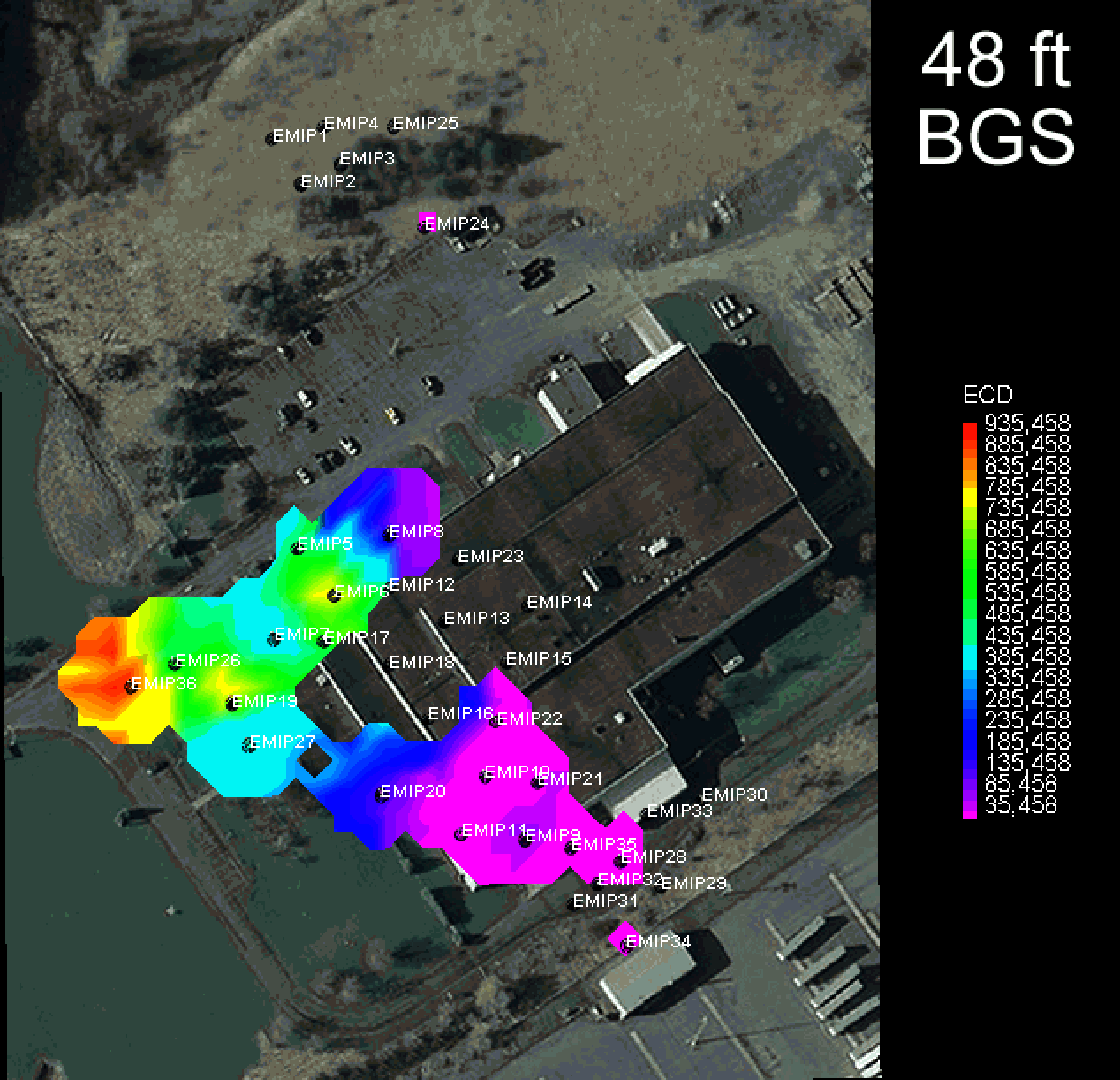

40 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP24
EMIP25
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36

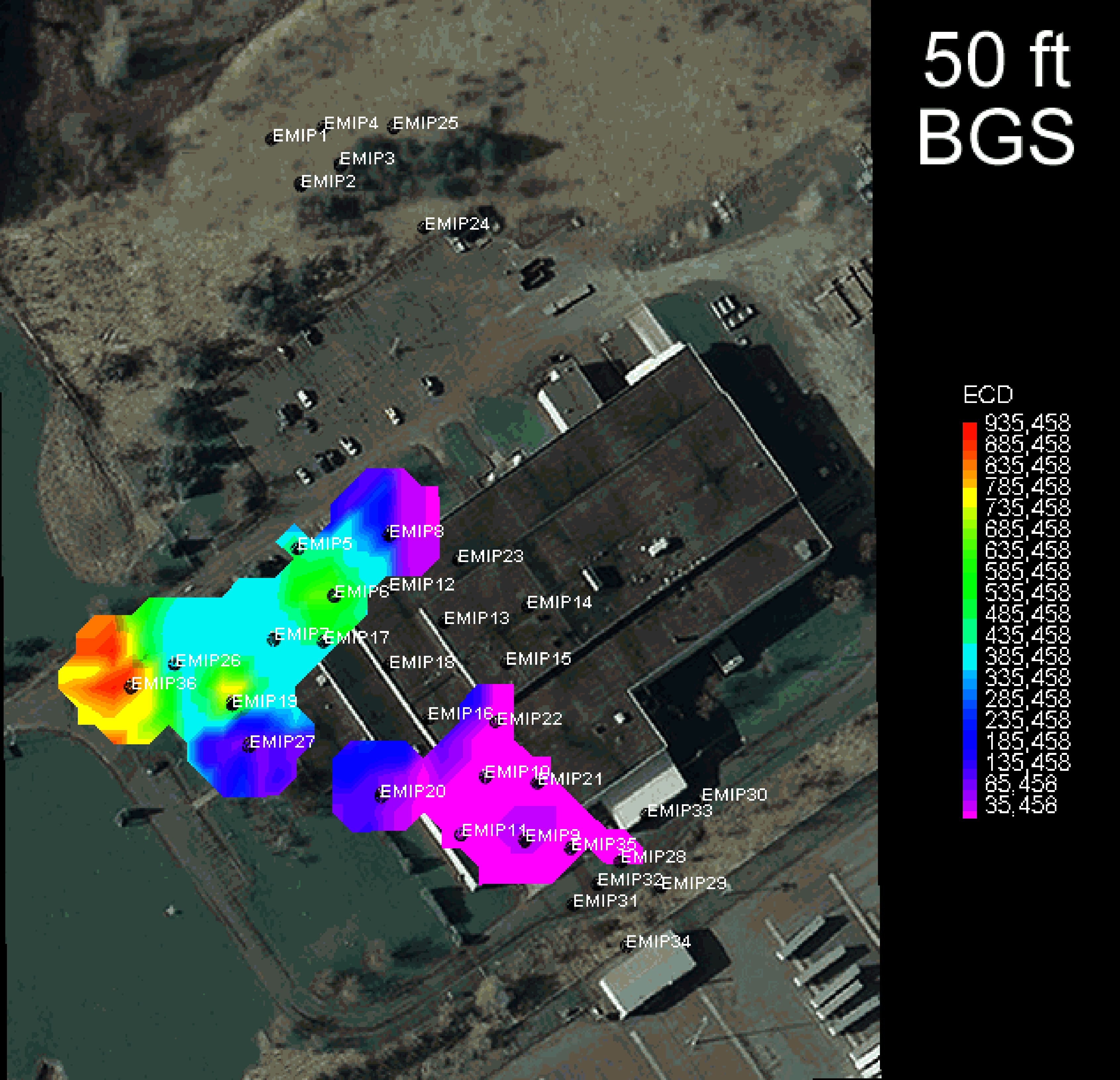


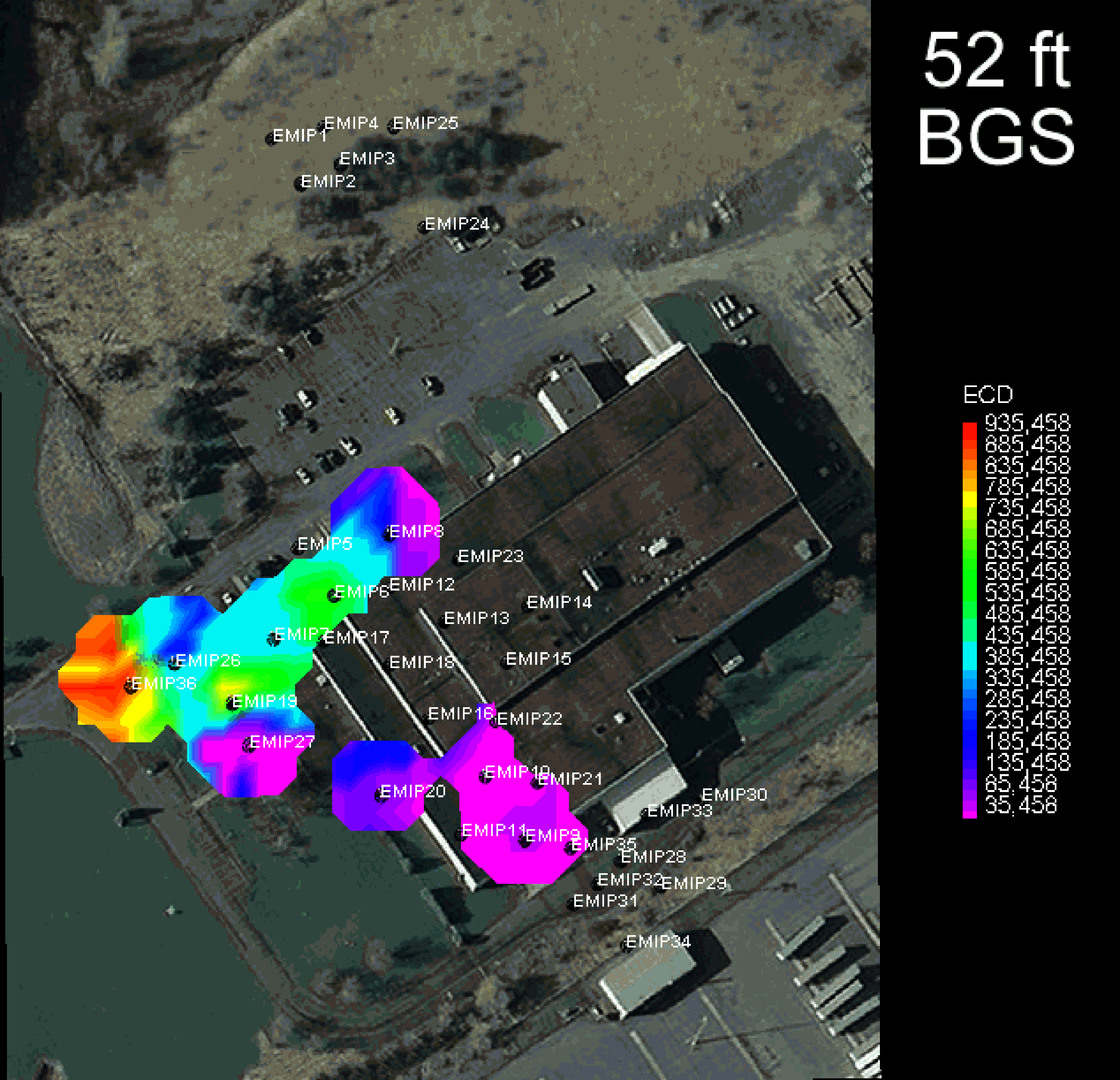
42 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP24
EMIP25
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36

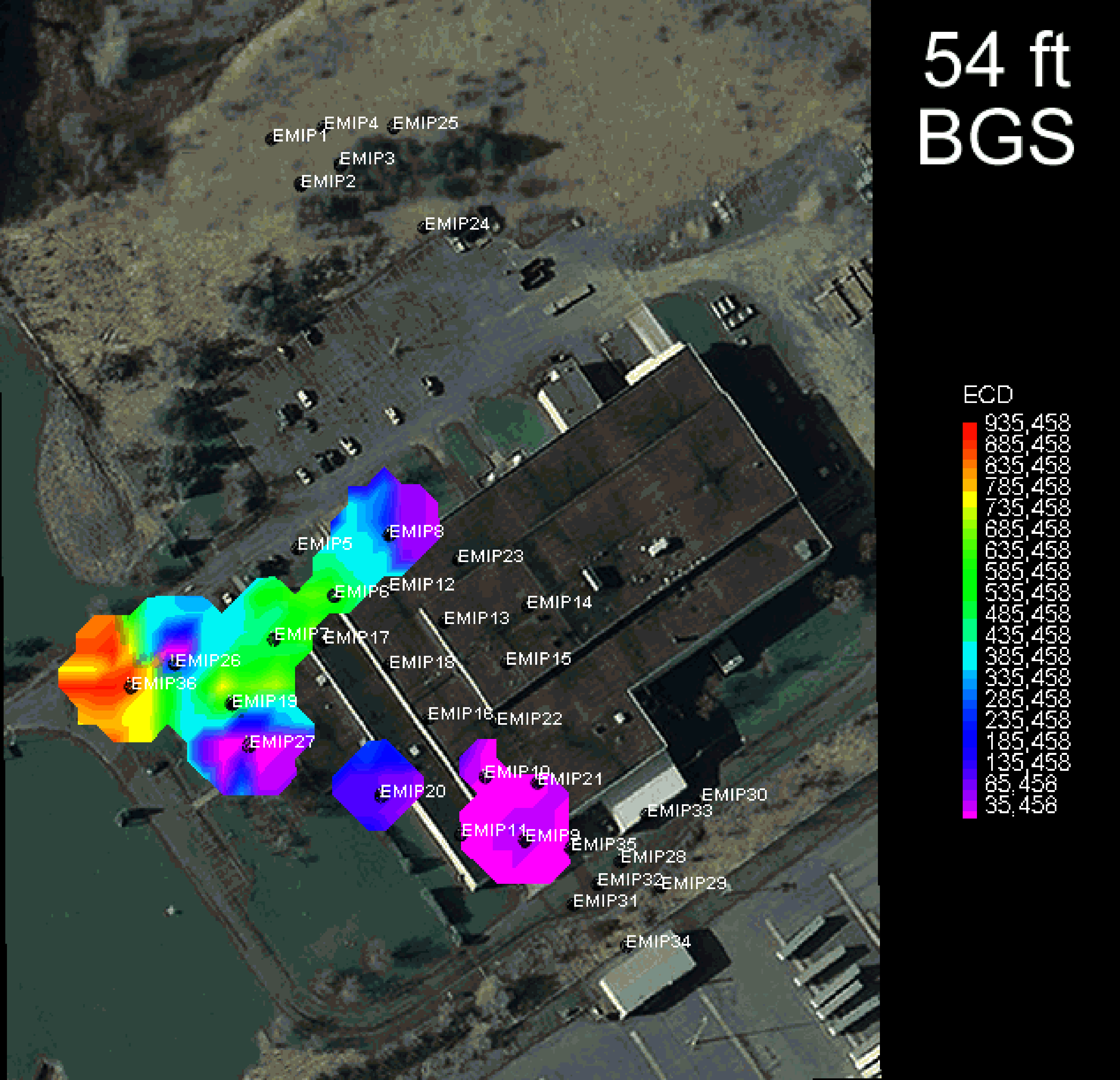

44 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP24
EMIP25
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36


46 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP24
EMIP25
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36

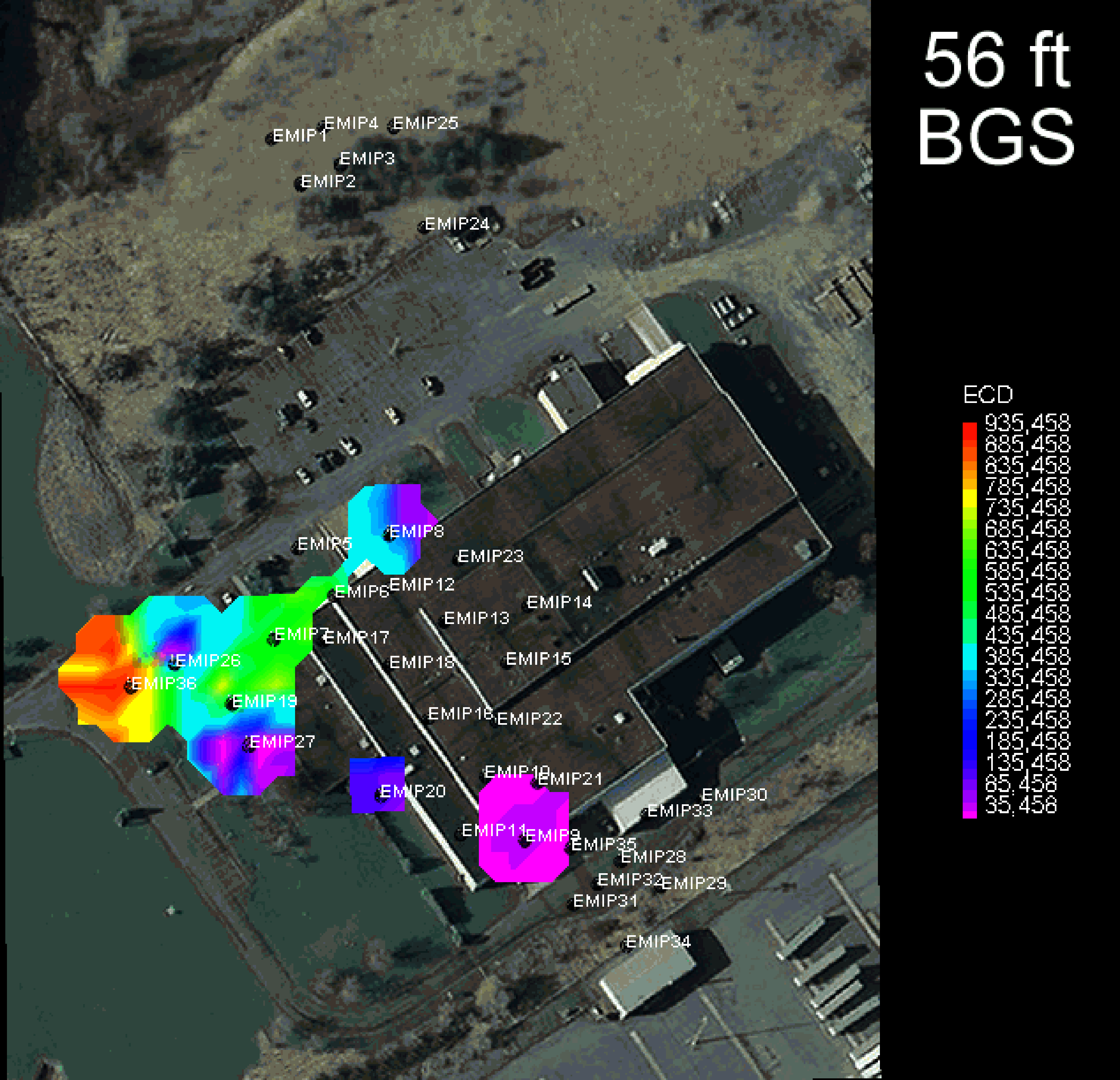

48 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP24
EMIP25
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36

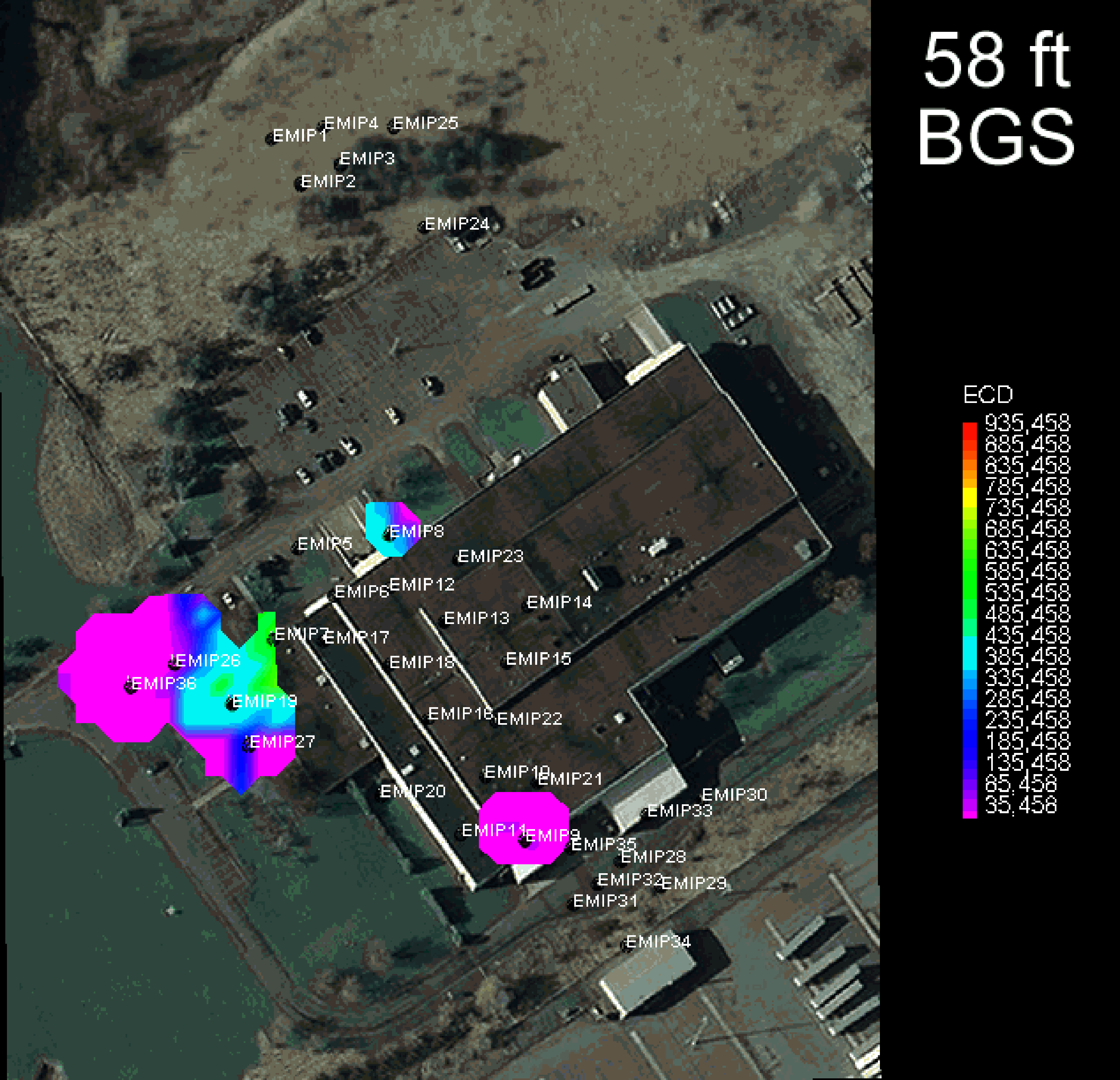

50 ft
BGS
EMIP4
EMIP25
EMIP1
EMIP3
EMIP2
EMIP24
EMIP8
EMIP5
EMIP23
EMIP6
EMIP12
EMIP14
EMIP13
EMIP7
EMIP17
EMIP26
EMIP18
EMIP15
EMIP36
EMIP19
EMIP16
EMIP22
EMIP27
EMIP10
EMIP21
EMIP20
EMIP30
EMIP33
EMIP11
EMIP9
EMIP35
EMIP28
EMIP32
EMIP29
EMIP31
EMIP34
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458


52 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP4
EMIP25
EMIP3
EMIP2
EMIP24
EMIP5
EMIP8
EMIP23
EMIP6
EMIP12
EMIP14
EMIP13
EMIP7
EMIP17
EMIP26
EMIP18
EMIP15
EMIP36
EMIP19
EMIP16
EMIP22
EMIP27
EMIP10
EMIP21
EMIP20
EMIP30
EMIP33
EMIP11
EMIP9
EMIP35
EMIP28
EMIP32
EMIP29
EMIP31
EMIP34



54 ft
BGS
EMIP4
EMIP25
EMIP1
EMIP3
EMIP2
EMIP24
EMIP8
EMIP5
EMIP23
EMIP6
EMIP12
EMIP14
EMIP13
EMIP7
EMIP17
EMIP26
EMIP18
EMIP15
EMIP36
EMIP19
EMIP16
EMIP22
EMIP27
EMIP10
EMIP21
EMIP20
EMIP30
EMIP33
EMIP11
EMIP9
EMIP35
EMIP28
EMIP32
EMIP29
EMIP31
EMIP34
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458

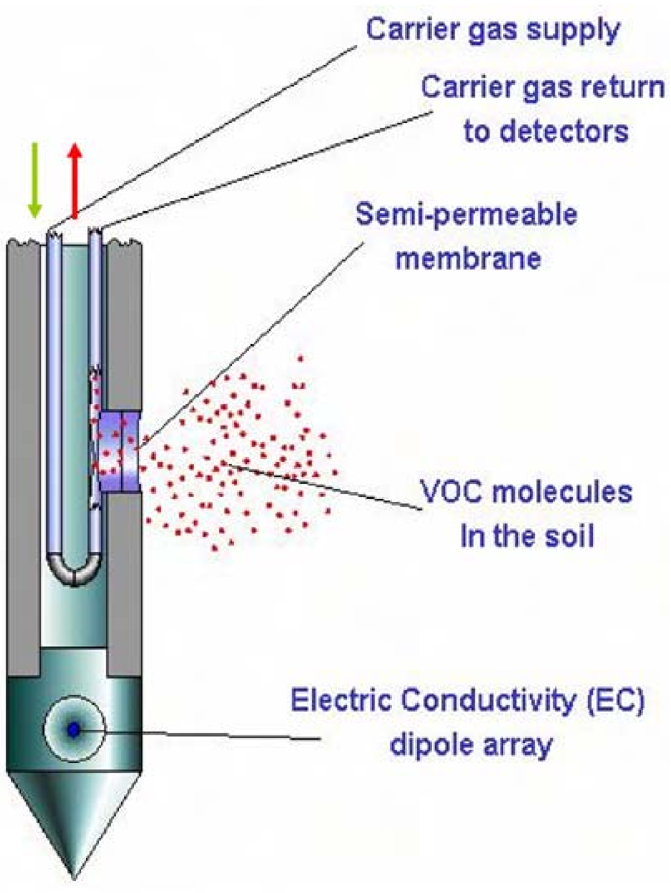

56 ft
BGS
EMIP1
EMIP4
EMIP25
EMIP3
EMIP2
EMIP24
EMIP8
EMIP5
EMIP23
EMIP6
EMIP12
EMIP14
EMIP13
EMIP7
EMIP17
EMIP26
EMIP18
EMIP15
EMIP36
EMIP19
EMIP16
EMIP22
EMIP27
EMIP10
EMIP21
EMIP20
EMIP30
EMIP33
EMIP11
EMIP9
EMIP35
EMIP28
EMIP32
EMIP29
EMIP31
EMIP34
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458


58 ft
BGS
ECD
935,458
885,458
835,458
785,458
735,458
685,458
635,458
585,458
535,458
485,458
435,458
385,458
335,458
285,458
235,458
185,458
135,458
85,458
35,458
EMIP1
EMIP2
EMIP3
EMIP4
EMIP5
EMIP6
EMIP7
EMIP8
EMIP9
EMIP10
EMIP11
EMIP12
EMIP13
EMIP14
EMIP15
EMIP16
EMIP17
EMIP18
EMIP19
EMIP20
EMIP21
EMIP22
EMIP23
EMIP24
EMIP25
EMIP26
EMIP27
EMIP28
EMIP29
EMIP30
EMIP31
EMIP32
EMIP33
EMIP34
EMIP35
EMIP36

How It Works

Understanding the processes that take place at the Membrane Interface is important for providing accurate interpretation of the MIP logging data.

The carrier gas pressure is maintained at 4 to 8 psi on the inner side of the membrane. This prevents the water from breaking through the membrane by maintaining a pressure gradient across the membrane. The presence of the gradient, however, is not interfering with the transfer of the VOC molecules across the membrane in a direction opposite to the pressure gradient. The reason is the mechanism of the VOC transfer: the VOC molecules are NOT transported by the flow of the gas diffusing through the membrane pores (since that flow is actually towards the outside of the probe); instead, they get absorbed into the hydrophobic matrix of the membrane (Teflon TFE) and get desorbed on the other side of the membrane, where they get picked up by the carrier gas flow. The movement of the molecules results from a concentration gradient instead of pressure gradient, much like in osmosis.



The heating of the membrane increases the rate of the transfer, increases vapor pressure for VOCs present in the soil adjacent to the membrane, and volatilizes some of the compounds with low vapor pressures at the ambient temperatures.

Based on our experience, semi-volatile compounds are also transferred across the membrane; however, they usually precipitate in the tubing above the membrane as the carrier gas cools down. The presence of heavier compounds inside of the tubing as a result of precipitation can create secondary hits when a lighter solvent is introduced, (thus the importance of a proper QA/QC and purging).

MIP Channel Overview

The probe is advanced 1 foot + wait 1 minute (Gas Trip Time). Note that the detector output line consists of a number of spikes that represent advancement of the probe and related changes of contaminant transfer across the membrane. Additionally, light (and more volatile) compounds (such as benzene in case of gasoline plume) within the contaminant mixture go across the membrane faster that heavier compounds, creating a leading spike. The scale uses exponential format (also called (scientific notation) to represent output values. 5E+6 means 5 x 10^6 (five times ten to the power of six), so it is 5,000,000 (micro volts). The scale is set to auto-scale by default, modifying the graph to fit the scale as detector response values go up. All detector units are micro Volts (uV) - represents voltage output from electrometer, correlating with contaminant¡¦s concentration (remember, this channel does not show actual concentration, only detector output; you need to know the response factor and dilution factor to figure that out; so the easiest way to do it is to grab a representative sample and establish a correlation for a given site and given contaminant).

Channel Information:

1. Conductivity:
Units of measure are milliSiemens per Meter (ms/M); (remember, actual values are representative within a given geologic formation: silt in Florida may have different electric conductivity than silt in Massachusetts).

2. Speed:
[Speed of probe penetration]. Future use.

3. PID
The PID, Used when delineating a Petroleum Hydrocarbon or Chlorinated site.

4. ECD
Used when delineating chlorinated site. The ECD detector generally is very stable except when entering the water table. Increased water vapor concentration causes the ECD's baseline to drop at the groundwater interface. Additionally, the ECD's baseline has a tendency to slope down as the probe is advanced deeper (noticeable when going below 50-60' BLS), as the amount of water going across the membrane increases with increasing pressure. The same is true for the PID detector, to a smaller extent. Since an in-line dryer was installed on the ZEBRA's MIP units, the water vapor effects become less expressed, with PID remaining largely unaffected by changes in water vapor concentration

5. FID
The FID can detect light hydrocarbons, such as methane or butane, which are out of reach for the PID. You can have a really high response on Detector 2 channel with nothing on Detector 1. In such case the chances are that you¡¦ve run into an area with anaerobic degradation processes present, or you have detected a presence of light gaseous hydrocarbons from some other source. The FID is not affected by water vapor concentration, so generally it's response is not affected by entering the groundwater table.

6. Temperature:
Shows output of a thermocouple built into the MIP probe's heating plate. It is useful for monitoring system performance and for troubleshooting. Each time the probe is advanced to the next depth increment, the temperature graph goes down; as soon as the probe stopped, the temperature starts to go back up until further heating is inhibited by the heat absorption capacity of the formation (on the surface, the relay is set to shut off the heater once it reaches the temperature of 120 C). As per ZEBRA's Standard Operating Procedures, the temperature should be allowed to reach 80 C (in the Low Sensitivity Mode), or to exceed the Boiling Point of the target compound (in the High Sensitivity Mode). The temperature channel is a highly useful quality control tool, as it is possible to check MIP operator's adherence to an established logging protocol on each and every log:

Acronyms and Abbreviations:

MIP - Membrane Interface Probe

PID - Photoionization Detector

FID - Flame Ionization Detector

ECD - Electron Capture Detector

String-pot - Linear transducer utilized for depth measurements within MIP system

Trunkline - An assembly of wires and tubing in a protective jacketing, connecting the down hole portion of the MIP system to the system controller and detectors

Trip Time - A time interval required for the carrier gas to bring a particular VOC from the MIP down-hole membrane to the detectors

System Check - A test performed on the MIP system at the beginning of each day and every time the System's proper operation and performance needs to be verified

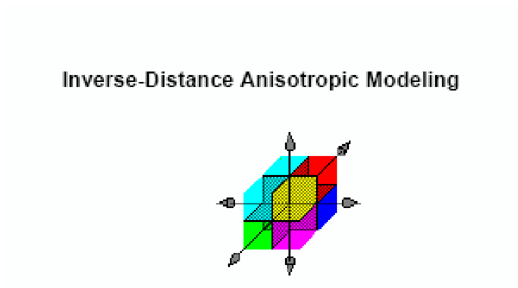
CPT - Cone Penetrometer Testing, an ASTM method and a type of equipment used for determining geotechnical parameters of soils

Earth Tech

Modeling Method Used

Inactive Hazardous Waste Disposal Site #447039

107 Freeman's Bridge Road, Glenville, Schenectady County, NY

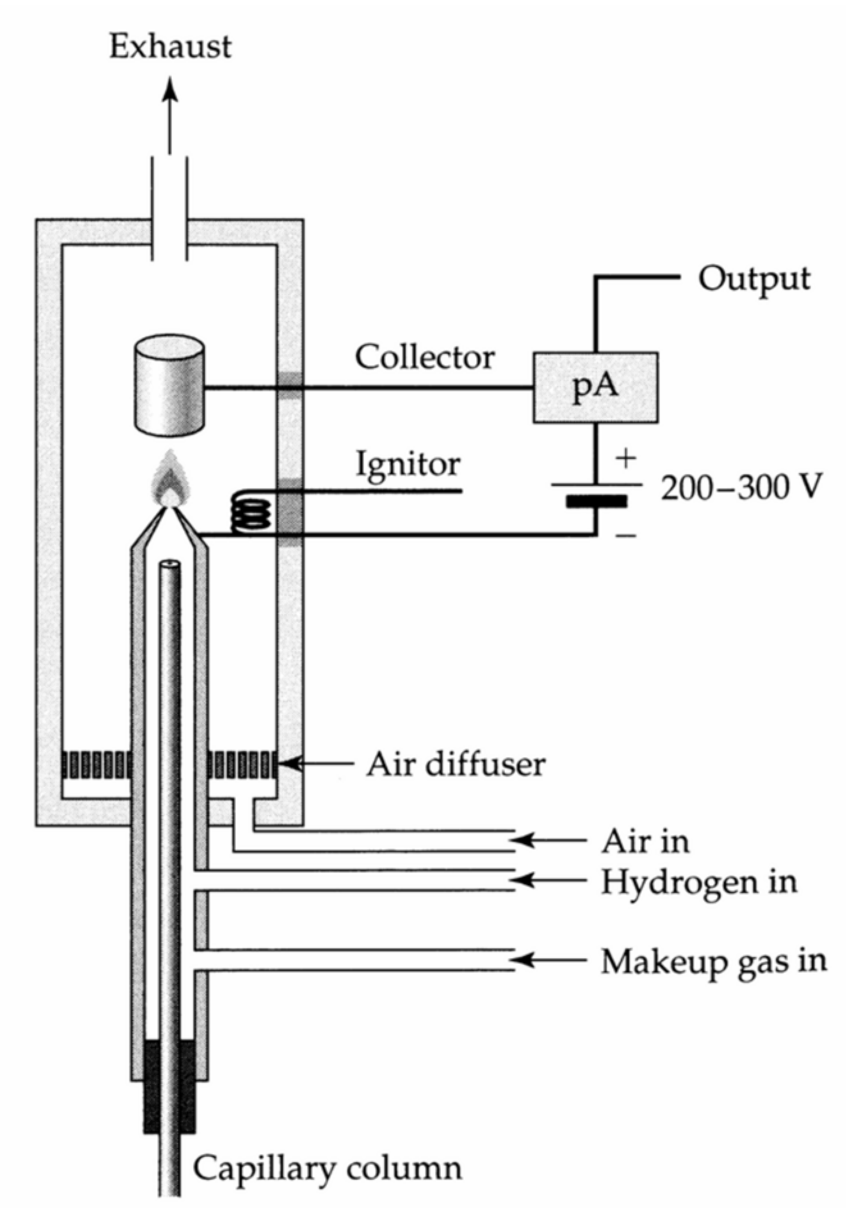


The Inverse-Distance Anisotropic modeling method is a "flavor" of the Inverse-Distance algorithm (there are four Inverse-Distance-based solid modeling algorithms). Using Inverse-Distance in general, a voxel node value is assigned based on the weighted average of neighboring data points, and the value of each data point is weighted according the inverse of its distance from the voxel node, taken to a power (an exponent of 2 = Inverse-Distance squared, 3 = Inverse-Distance cubed, etc). The greater the value of the exponent, the less influence distant control points will have on the assignment of the voxel node value. For more information about Inverse-Distance algorithm.

.

Using the Inverse-Distance Anisotropic method, the program will look for the closest control point in each 90-degree sector around the node. This kind of directional search can improve the interpolation of voxel values that lie between data point clusters, and can be useful for modeling drill-hole based data in stratiform deposits. This option is slower than the Isotropic method since it has to filter neighboring points in assigning node values. For this method, the weighting exponent is also set to 2.

FID Detector Overview



Organic analytes are pyrolyzed in an air/H2 flame

Ions are produced in the plasma around the flame
-proportional to number of carbons present

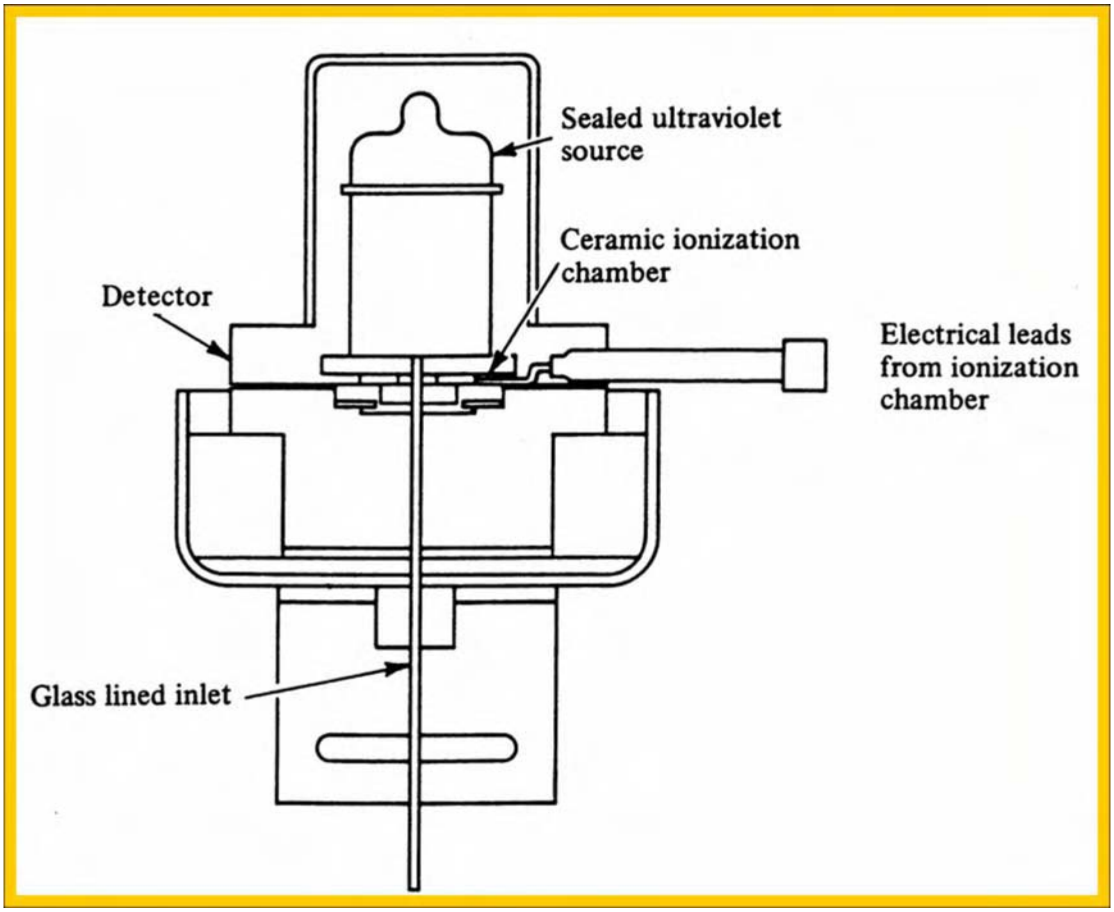
Positive voltage is applied to collector; negative to the flame body

Ions migrate to collector producing a current (signal)

PID Detector Overview

An UV source ionizes all the molecules in the column effluent

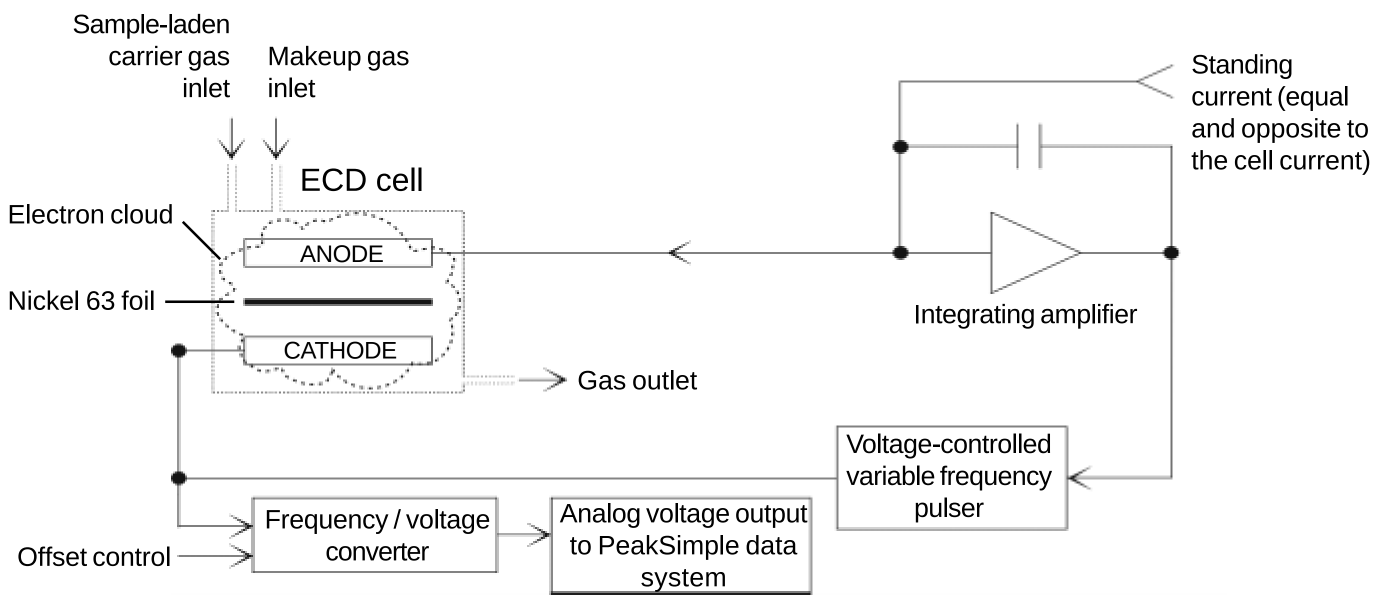
Ions produced are collected resulting in a current flow



Theory of Operation

The radioactive Nickel 63 sealed inside the ECD detector emits electrons (beta particles) which collide with and ionize the make-up gas molecules (either nitrogen or P5). This reaction forms a stable cloud of free electrons in the ECD detector cell. The ECD electronics work to maintain a constant current equal to the standing current through the electron cloud by applying a periodic pulse to the anode and cathode. The standing current value is selected by the operator; the standing current value sets the pulse rate through the ECD cell. A standing current value of 300 means that the detector electronics will maintain a constant current of 0.3 nanoamperes through the ECD cell by periodically pulsing. If the current drops below the set standing current value, the number of pulses per second increases to maintain the standing current.

ECD Detector Operational Diagram



When electronegative compounds enter the ECD cell from the column, they immediately combine with some of the free electrons, temporarily reducing the number remaining in the electron cloud. When the electron population is decreased, the pulse rate is increased to maintain a constant current equal to the standing current. The pulse rate is converted to an analog output, which is acquired by the PeakSimple data system. Unlike other detectors which measure an increase in signal response, the ECD detector electronics measure the pulse rate needed to maintain the standing current.