

**Electromagnetic Survey
NEW YORK STATE
ENERGY & GAS CORPORATION
Manufactured Gas Plant
Binghamton, New York**

June 7th. & 8th, 1999

Preliminary Report

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1. Introduction

An electromagnetic survey was conducted at the property (New York State Electric & Gas (NYSEG), Binghamton, NY). The survey was initiated on June 7, 1999 and completed on June 8th, 1999. The site comprised of approximately four (4) acres was divided into two sections with different scopes of work.

The Western half of the site was surveyed with the Geonics EM61 and EM31 simultaneously with the Trimble Pro XRS differential GPS. The instruments were mounted on Fiberglass carts, and pulled across the survey area with a Polaris 4 track ATV (4 X 4). The intent of the survey on this western half was to locate and identify as many underground anomalies as possible. The EM31 survey was conducted on a five (5) foot parallel line spacing, while the EM61 survey was conducted on three (3) foot parallel lines. The EM61 survey set up is shown in Figure 1, while the EM31 configuration is shown in Figure 2.



Figure 1: The EM61 and DGPS Survey Setup



Figure 2: The EM31 and DGPS Survey Set Up

The Eastern half of the site had predetermined corners for survey purposes, and in addition there were three (3) predetermined lines, line A, B, and C. The entire available area was surveyed utilizing the same method as the western half of the site. In addition each of the lines were surveyed utilizing a grid system on 10 foot by 20 foot grid points. The surveys covering these lines were surveyed as follows.

Line A 125 feet in length by 20 feet in width, the pins were located on line 10 @ "0" and 121 feet east.

1. EM61-HH surveyed on 2.5 foot lines
2. EM31 surveyed on 5 foot lines
3. EM61 surveyed on 3 foot lines
4. EM38 surveyed on 2.5 foot lines

Line B 175 feet in length by 20 feet in width, the pins were on line 10 @ "0" and 172' 2" North.

Surveys conducted same as line "A"

Line C 67 feet in length 15 feet in width, the pins were located on line 10 @ "0" east and beyond the survey area, (our survey was stopped at the chain link fence)

Surveys were conducted same as lines "A & B"

The EM38 survey set up in the area of Line C is shown in Figure 3. The EM61-HH survey set up is presented in Figure 4.



Figure 3: The EM38 Survey Set Up



Figure 4: The EM61-HH Survey Set Up

2. Objectives

The electromagnetic investigations at the site located on Court Street in Binghamton, NY was carried out with the following specific objectives:

- a. to conduct a high resolution EM-31 & EM-61 survey within the eastern and western survey area,
- b. to conduct a high resolution survey utilizing EM31, EM61, EM61-HH, and EM38 over the areas of predetermined survey lines,
- c. to map areas of buried metallic material,
- d. to delineate zones of potentially contaminated soil,
- e. to delineate non metallic lines.

3. The Electromagnetic (inductive) Method

The electromagnetic instrument works on the principle of induction, using two coils (antennas); a transmitter and a receiver. Both coils are fixed in the same plane and are used near the surface of the earth. An alternating voltage applied to the transmitter coil causes electrical eddy currents to be induced in the earth. The electrical currents flowing in the earth are proportional to electrical conductivity of the medium. These currents in turn, generate a secondary magnetic field that is detected and measured by the receiver. Since this technique is a non contact method (i.e. not in contact with the ground) the measurements are very reliable and highly repeatable and therefore suitable for monitoring purposes.

4. Instrumentation

The Geonics EM31-DL electromagnetic induction instrument was used in a vertical dipole mode during the survey. In the vertical dipole mode configuration, the instrument has a depth penetration of approximately 6 meters. Two components of the Secondary Magnetic Field were measured simultaneously. The first, is the quad-phase component which indicates soil electrical conductivity and is measured in millisiemens per meter (mS/m). The second is the Inphase

component which is related to the soil magnetic susceptibility (i.e. the ratio between the Primary and Secondary Magnetic Fields) and is measured in parts per thousand (ppt). Data was recorded using a 16 bit digital data logger.

The Geonics EM38 electromagnetic induction instrument was used in vertical dipole mode. In the vertical dipole mode configuration, the instrument has a depth penetration of approximately 1.5 meters. One component of the secondary magnetic field was measured, this being the quad-phase component which indicates soil electrical conductivity and is measured in millisiemens per meter (mS/m).

The Geonics EM61 is a high sensitivity high resolution time-domain instrument which is used to detect both ferrous and nonferrous metallic objects. It consists of a powerful transmitter that pulses a primary magnetic field, which induces eddy currents in nearby metallic objects. The decay of these currents is measured by two receiver coils mounted on the coil assembly. The responses are recorded and displayed by an integrated digital data logger as two channels of information. By making the measurement at a relatively long time after termination of the primary pulse, the response is practically independent of the electrical conductivity of the ground.

The Geonics EM61-HH is a high sensitivity high resolution time-domain instrument which is used to detect both ferrous and nonferrous metallic objects. It consists of a powerful transmitter that pulses a primary magnetic field, which induces eddy currents in nearby metallic objects. The decay of these currents is measured by two time gates, one relatively early, one relatively late in the receiver coil mounted on the assembly. The responses are recorded and displayed by an integrated digital data logger as two channels of information. By making the measurement at a relatively long time after termination of the primary pulse, the response is practically independent of the electrical conductivity of the ground.

The EM61 can detect a single 200 liter (55 gal) drum at a depth of over 3 meters, while the EM61-HH can potentially detect the same drum at over 2 meters. The EM61 is excellent in pinpointing a target, and can be used in close proximity to metallic fences or buildings. The instrument is equipped with an opto-counter which triggers the instrument every 19 cm.

5. Field Procedures

Prior to taking measurements, a survey grid (10 feet by 20 feet) was prepared in the field over the predetermined lines. The South-West corner of each survey area was selected as a reference point (0,0), and are shown on the map. The survey over the entire area was conducted, utilizing differential GPS data collected simultaneously with the EM31 and EM61 data sets, on specially designed nonmetallic carts that were pulled by an all terrain vehicle. The GPS lines are mapped showing site coverage.

The EM31 data was collected in continuous mode with a time interval of 0.6 seconds, which corresponds to approximately 1 foot between readings. The EM-61 data was collected in automatic mode, collecting four readings per second. The very narrow line separation and fine spacing between the readings resulted in excellent resolution of the computer generated maps.

6. Data Processing

Data files were transferred from the digital data logger to a PC computer and reviewed in the field. The Geonics software programs DAT31, DAT38, and DAT61 were used in data reduction and preparation for contouring. The Geosoft Mapping System was used to process the data points in the production of the final color contour maps of the EM31 & EM61 measurements.

The electromagnetic results for the entire site are presented on the following five maps:

- Map 1 - EM61 Channel B Response map,
- Map 2 - EM61 Differential Channel (Removed Response from Near Surface Objects) map,
- Map 3 - EM31 Quad-phase Conductivity map,
- Map 4 - EM31 Inphase Response map,
- Map 5 - Map of Located Anomalies (depicts results of interpretation).
Anomalies on this map are divided in to eight groups:

Magenta zones	-	indicate possible substantial metallic objects,
Pink zones	-	indicate groups of several various metallic objects or concrete debris,
Blue zones	-	indicate interferences originated by reinforced concrete pads,
Green dashed lines	-	outlines areas of relatively high soil conductivity,
Red lines	-	show possible locations of buried pipes, foundations, or other linear features,
Blue lines	-	indicate location of possible former above ground storage tanks,
Red circle	-	indicates location of a single buried metallic object,
Yellow circle	-	indicates location of a single shallow or on surface metallic object.

These maps were plotted at a scale of 1:360 (1 in = 30 feet). The reduced (46% reduction) copies of these maps are presented in Appendix A of this report.

The electromagnetic results for areas measured at three profiles A, B, and C are presented in Appendix B on the following maps:

Area of Line A-A'

Map A1	-	EM61 Channel B Response map,
Map A2	-	EM61 Differential Channel (Removed Response from Near Surface Objects) map,

Map A3	-	EM61-HH Channel E Response map,
Map A4	-	EM61-HH Channel L Response map,
Map A5	-	EM31 Quad-phase Conductivity map,
Map A6	-	EM31 Inphase Response map,
Map A7	-	EM38 Quad-phase Conductivity map,

Area of Line B'-B

Map B1	-	EM61 Channel B Response map,
Map B2	-	EM61 Differential Channel (Removed Response from Near Surface Objects) map,
Map B3	-	EM61-HH Channel E Response map,
Map B4	-	EM61-HH Channel L Response map,
Map B5	-	EM31 Quad-phase Conductivity map,
Map B6	-	EM31 Inphase Response map,
Map B7	-	EM38 Quad-phase Conductivity map,

Area of Line C-C'

Map B1	-	EM61 Channel B Response map,
Map B2	-	EM61 Differential Channel (Removed Response from Near Surface Objects) map,
Map B3	-	EM61-HH Channel E Response map,
Map B4	-	EM61-HH Channel L Response map,
Map B5	-	EM31 Quad-phase Conductivity map,
Map B6	-	EM31 Inphase Response map,
Map B7	-	EM38 Quad-phase Conductivity map,

Profiles for lines A-A', B'-B, and C-C' were plotted for all employed instruments. These plots are presented as figures in Appendix C.

7. Results

The EM31 conductivity and Inphase results (Maps 3 and 4) indicate highly varying measured parameters, especially in the central and northern portions of the site. Conductivity and Inphase data in the northeastern area are affected by numerous interferences from metallic objects which do not allow for conclusive interpretation of soil parameters in this area.

High conductivity was measured in the central portion of the site. This area is outlined on the East and South by a green dashed line labeled **A** on Map 5. On the West the high conductivity zone is limited by a linear anomaly marked by a red line labeled **S1**, **S2**, **S3**, and **S4** (Map 5). On the North a high conductivity area extends beyond the survey area. Conductivity values measured in this area are above 100 mS/m. Two zones of very high conductivity and one zone of low conductivity were delineated in this area. Very high conductivity areas (above 200 mS/m) are outlined by the green dashed lines labeled **A1** and **A2**, and the low conductivity area is enclosed by an anomaly (blue line **C** on Map 5) indicating the foundations of a former above ground storage tank. In the area located in the western part of the site, West of linear anomalies **S1**, **S2**, **S3**, and **S4** (Maps 3 and 5) as well as in the area enclosed by anomaly **C** (Map 5) the measured conductivity is relatively uniform. Conductivity values obtained in this area are in the range of 15 to 25 mS/m. These values may correspond to fine grain soil, with the possible content of clay material.

It appears that the main source of the possible contamination causing high conductivity readings is located at the center of the site (especially in the area enclosed by the green dashed line **A1**). The high conductivity zone is limited by a pathway created by the sewer line, represented by linear anomalies **S1** to **S4**. A very similar, sharp limitation of the high conductivity area is located along the circular anomaly **C**, which represents the foundations of a former tank. It is possible that the walls of the foundations do not allow conductive material to enter the inner area of the subsurface of the former tank. It should be noted that this effect is not visible in the area of the southwestern tank foundations represented by anomaly **B1** (Map 5).

A relatively well defined limit of high conductivity can also be observed along the southern portion of the outline **A** (Map 5). However, any anomaly that could indicate a possible pathway is not detected in this area..

The EM61 survey revealed a large number of anomalies associated with buried metallic objects. A relatively complicated EM61 response can be seen in the eastern part of the site, especially East of anomalies **P1**, **P2**, and blue zone **E2** (Map 5). The EM61 response in the center of the site is relatively uniform, and density of the detected anomalies increases toward the western limit of the survey area. However, comparison of Channel B response (Map 1) and Differential Channel with removed response from near surface objects (Map 2) indicates that most of the targets detected in the western portion of the site consists of relatively shallow targets.

Several anomalies associated with reinforced concrete pads were detected. These are marked by blue zones on Map 5. The most indicative of these is the anomaly labeled **E**, which is located in the center of anomalies **D1** and **D2** which are associated with the foundation of the former tank. The nature of the four anomalies **E1**, **E2**, **E3**, and **E4** located in the northern portion of the site is very similar and most likely represents similar reinforced concrete pads. A portion of the suspected concrete is visible in the area labeled **E4** (Map 5).

Three locations of former above ground storage tanks were detected. These are marked by blue lines on Map 5. Anomalies labeled **D1** and **D2**, associated with a former tank located in the eastern part of the site, are very well delineated. This anomaly is divided in to two parts (labeled **D1** and **D2**). The portion of the anomaly labeled **D1** appears to contain more metallic targets than the northern portion of this anomaly (Map 1). Anomaly **C** (in the northern portion of the site) is delineated mainly by the EM31 survey. The relatively small response measured by the EM61 survey indicates the non metallic material of the foundation walls. The foundations of the third tank (in the southwestern portion of the site) represented by anomalies **B1** and **B2** are detected by the EM31 and EM61 surveys. However, the EM61 response associated with these two anomalies is not as uniform as the response from anomalies **D1** and **D2**, see Maps 1 and 2.

Several anomalous zones that may contain numerous various metallic objects or concrete debris were delineated. These are marked by pink zones on Map 5. The most substantial appears to be anomalies labeled **G**, **N1**, and **H**. These three anomalies are located in the eastern portion of the study area. Pink anomalies located in the western part of the site, (**N3**, **N4**, **J1**, **J2**, **J4**, **J5**, and

J6) appear to be associated with much smaller amounts and size of metallic targets. Anomalies represented by zones **J2**, **J3**, and **J4** may be associated with the remaining foundations of the former tank.

Several anomalies that may represent significant metallic objects were marked by magenta zones on Map 5. The most substantial appears to be the anomaly labeled **K**, which is located in the center of a former tank foundation (anomaly **C**). This anomaly may represent a significant metallic object or a deeper buried reinforced concrete pad. Anomaly **L** located within the pink zone **H** may be associated with a substantial metallic structure or with a shallower portion of a linear target represented by anomaly **P1** (Maps 1, 2, and 5). Other magenta anomalies may be associated with substantial metallic targets.

Both surveys, and especially the EM61 survey revealed several well delineated linear anomalies. These are marked by solid red lines. The thicker red solid lines indicate very well delineated metallic linear targets. Linear anomalies marked by dashed red lines should be considered as possible locations for linear features.

The most significant appear to be anomalies labeled **S1**, **S2**, **P1**, **P2**, **P3**, **T**, **T2**, **Q1**, **Q2**, **Q3**, **R**, and **Q4** (Map 5).

Anomalies **S1**, **S2**, **S3**, and **S4** are detected mainly by the EM31 survey (Maps 3 and 4). They likely represent a sewer line (shown on the available site plan). Sections **S3** and **S4** are marked by dashed red lines since these sections are poorly delineated. Since this anomaly is shown mainly on the EM31 maps, the buried sewer line pipe likely contains a very small amount of metal.

Similarly, anomaly **T** is shown only on EM31 maps (Maps 3 and 4). It may represent a non metallic pipe or a pipe with a very small amount of metal.

Anomaly **P1** may represent a pipe running West from the building and then turning southward beyond the survey area. Since this anomaly is relatively wide it may indicate multiple pipes. Along its W-E section the feature represented by anomaly **P1** may be very shallow or another structure (marked by magenta anomaly **L**) may be present at this location. Anomaly **P2** appears to be an extension of anomaly **P1**, however the nature of these two anomalies appears to be different, compare Maps 3 and 4 with 1 and 2. It is possible that anomalies **P1** (S-N section) and **P2** have common pipes running S-N, but at the same time anomaly **P1** indicates a stronger EM61 response

and a different nature to the EM31 readings. Linear anomaly **P2** is similar to anomaly **P3**. In summary, while anomalies **P2** and **P3** may be associated with buried pipes, foundation walls, or a buried concrete curb, anomaly **P1** is likely associated with buried multiple pipes.

Linear anomaly **T2** which appears to be connected to **P2** and **P3** is of a much stronger EM61 response and of a different nature, from looking at the EM31 readings. This anomaly also is aligned with the southern limit of anomalous pink zone **G** (Map 5).

Anomaly **Q1** is very well delineated. The shape of this anomaly and its EM61 amplitude, indicate that it may represent relatively shallow foundations. This anomaly may be associated with anomaly **R**. It should be noted that the associated parallel anomaly **R1** was detected only by the high resolution instruments EM61-HH and EM38 (see Maps A3, A4, and A7), and it would not have been resolved based only on the EM61 and EM31 surveys.

Linear anomaly **Q2** is of very high amplitude. It may represent a short section of relatively shallow pipe or a metallic structure of a linear shape.

Anomaly **Q3** is relatively well delineated in its eastern end. The remaining portion located in the area of the southern portion of anomaly **D1** was delineated mainly by the high resolution EM61-HH survey of Profile B'-B (Maps B3 and B4).

Anomaly **Q4** located South of the building, in the area of Profile C-C' is likely associated with buried pipes. The high resolution surveys (EM61-HH and EM38) of the area located at Profile C-C' indicates another associated linear anomaly labeled **Q9**, however the latter one is not so well delineated.

Other linear anomalies marked by red lines on Map 5 are likely associated with buried pipes, cables, or other linear features. Also, some of these anomalies may represent buried foundations.

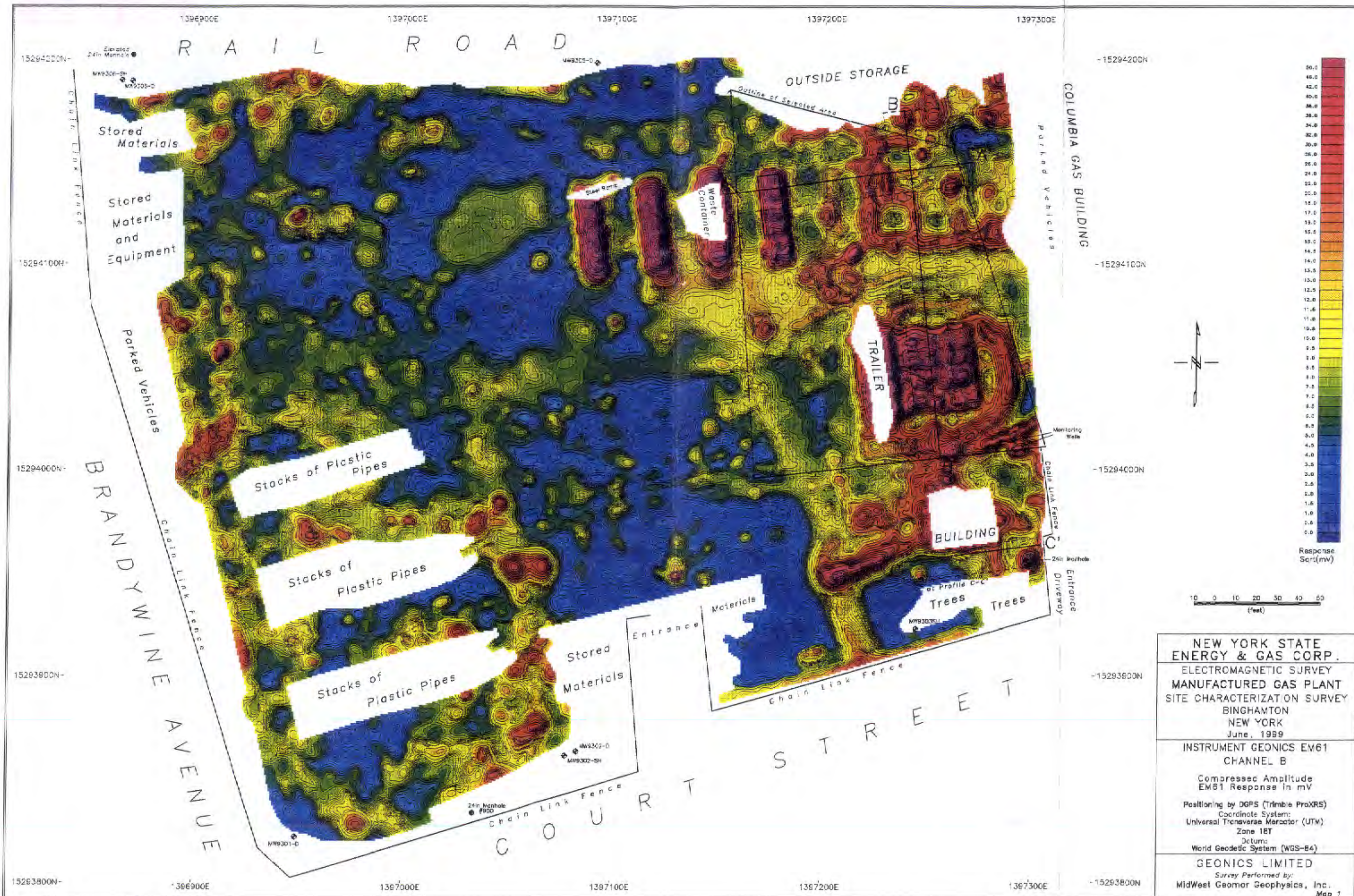
A number of isolated anomalies associated with buried small metallic targets were detected on this site. These are marked by red circles on Map 5. Anomalies that are likely associated with shallow or surface metallic objects were denoted by yellow circles on Map 5. It should be noted that while the most of these anomalies indicate small metallic targets, anomalies that potentially may be associated with more substantial metallic objects are denoted by larger red circles on Map 5.

The detailed surveys conducted at Lines A, B, and C with two other shallower instruments EM61-HH and EM38, as well as with EM61 and EM31 allowed the detection of several linear

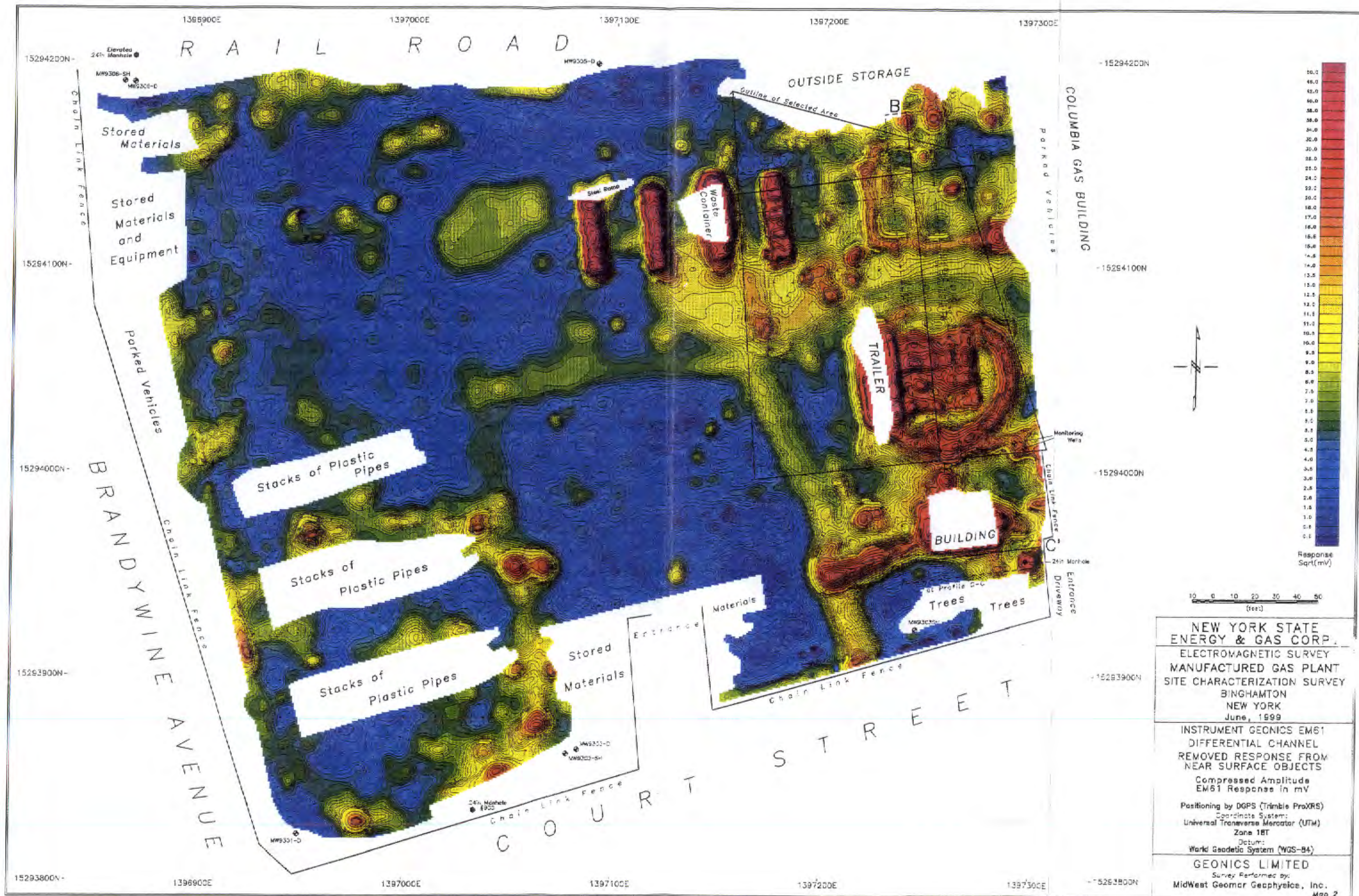
anomalies, which would have been missed if only the EM31 and EM61 were used. The best examples are: anomalies **R1**, **R2**, and **R3** at Profile A-A' (Maps A1 to A7), anomalies **T3**, **Q3**, **Q8**, and **Q7** at Profile B'-B (Maps B1 to B7), and anomaly **Q9** at Profile C-C' (Maps C1 to C7). Other anomalies that were delineated based on the EM61 and EM31 surveys along the entire site are very well confirmed by these additional detailed surveys.

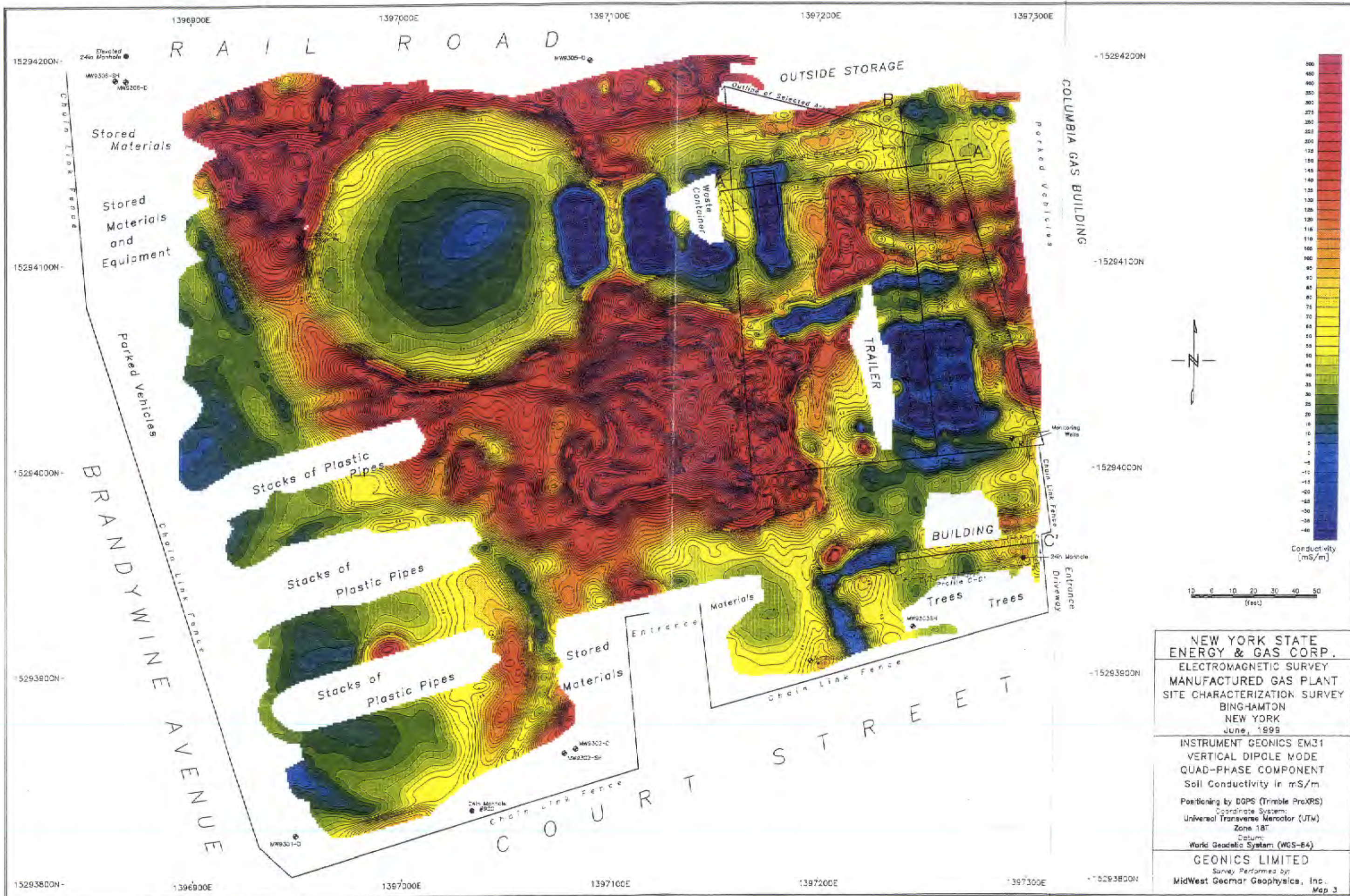
Plots of profiles along lines A, B, C located in Appendix C allow the resolution to be compared of the four instruments used during the survey.

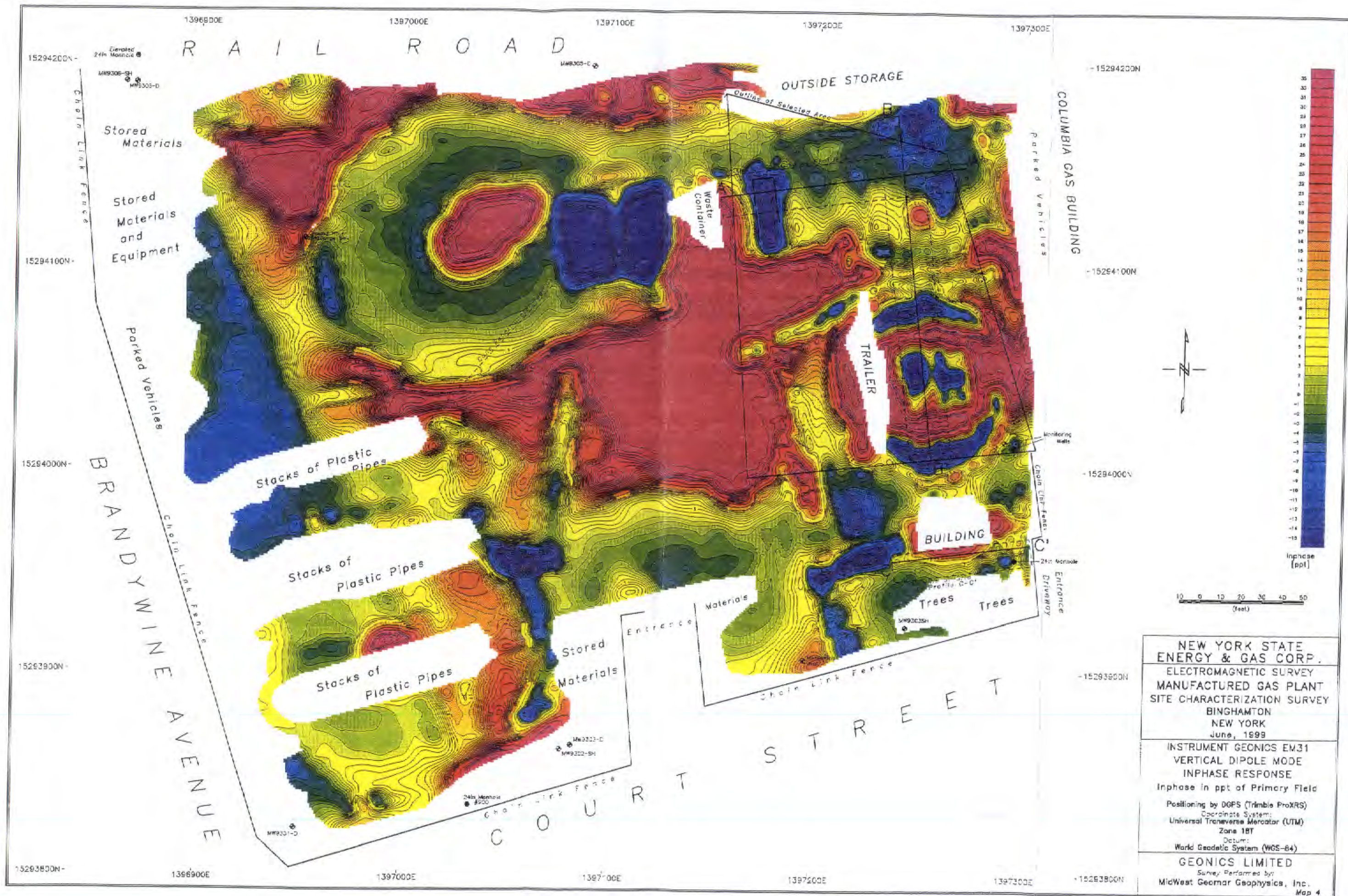
APPENDIX A



NEW YORK STATE
 ENERGY & GAS CORP.
 ELECTROMAGNETIC SURVEY
 MANUFACTURED GAS PLANT
 SITE CHARACTERIZATION SURVEY
 BINGHAMTON
 NEW YORK
 June, 1999
 INSTRUMENT GEONICS EM61
 CHANNEL B
 Compressed Amplitude
 EM81 Response in mV
 Positioning by DGPS (Trimble ProXR5)
 Coordinate System:
 Universal Transverse Mercator (UTM)
 Zone 18T
 Datum:
 World Geodetic System (WGS-84)
 GEONICS LIMITED
 Survey Performed by:
 MidWest Geomorph Geophysics, Inc.
 Map 1





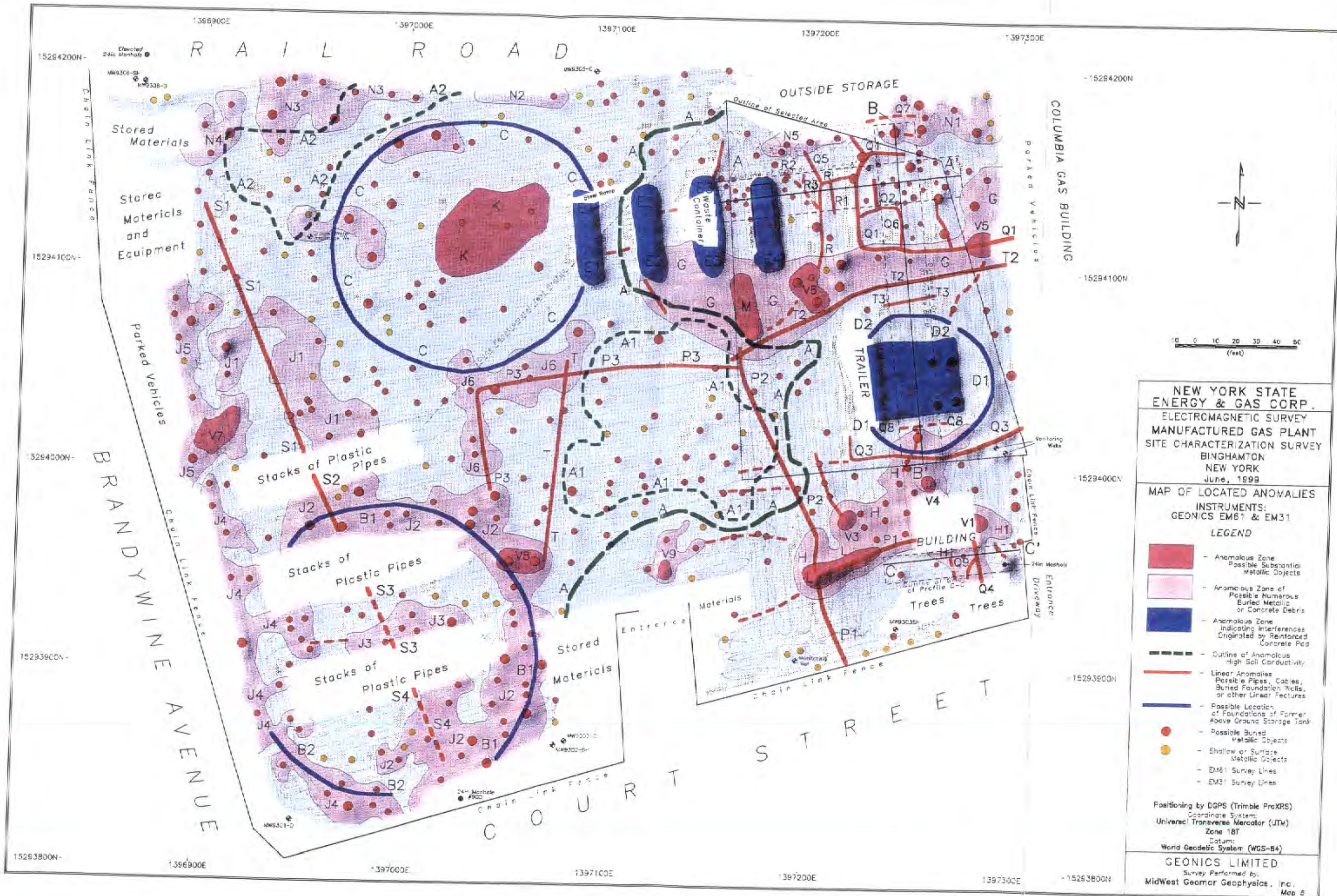


NEW YORK STATE
ENERGY & GAS CORP.
ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
BINGHAMTON
NEW YORK
June, 1999

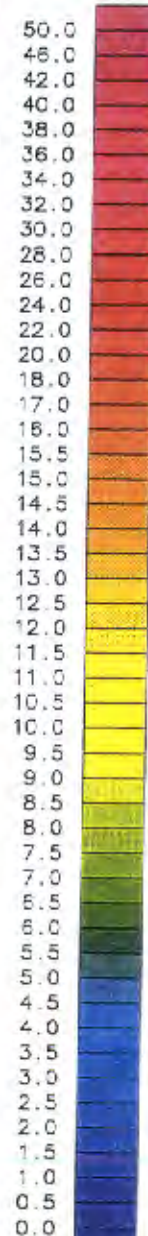
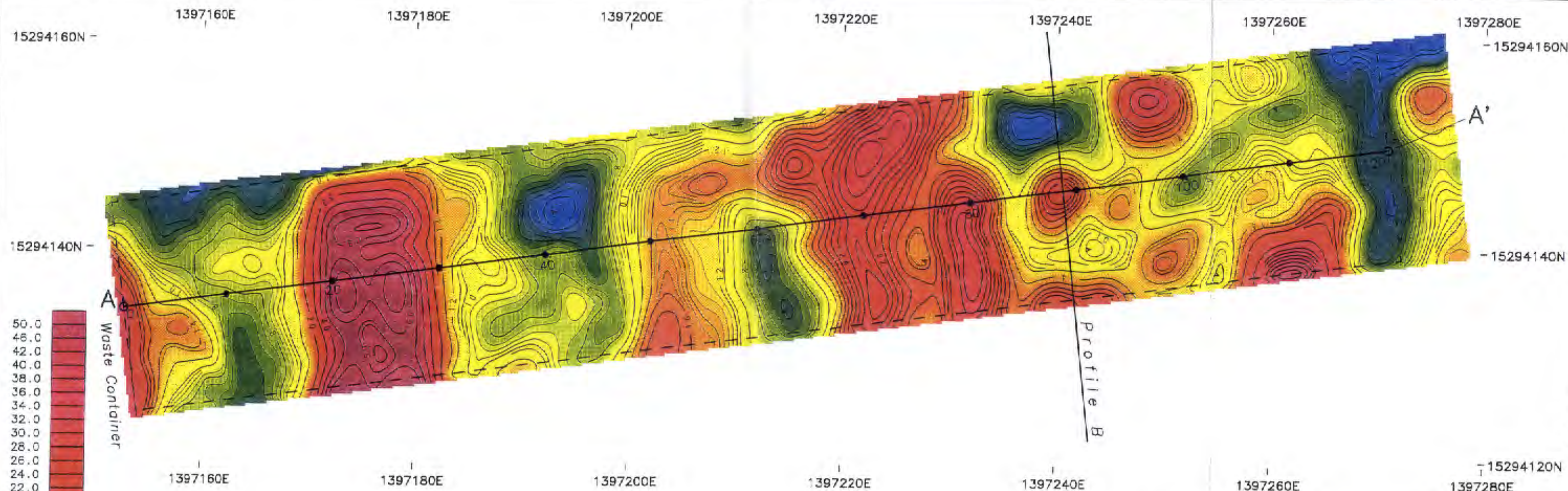
INSTRUMENT GEONICS EM31
VERTICAL DIPOLE MODE
INPHASE RESPONSE
Inphase in ppt of Primary Field

Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T
Datum:
World Geodetic System (WGS-84)

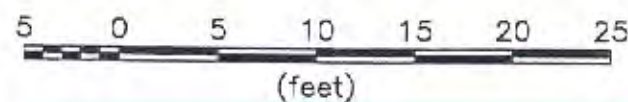
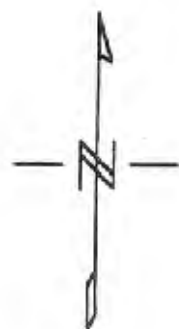
GEONICS LIMITED
Survey Performed by:
MidWest Geomar Geophysics, Inc.
Map 4



APPENDIX B



Response
Sqrt(mV)



NEW YORK STATE ENERGY & GAS CORP.

**ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE A-A'**

BINGHAMTON, NEW YORK

June, 1999

**INSTRUMENT GEONICS EM61
CHANNEL B**

Compressed Amplitude
EM61 Response in Sqrt(mV)

Positioning by DGPS (Trimble ProXRS)

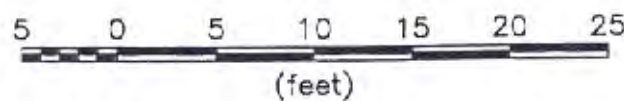
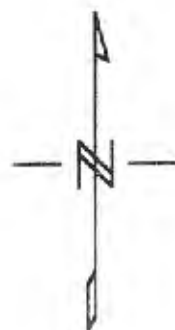
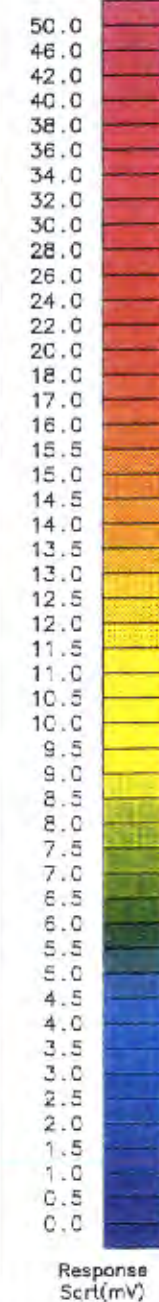
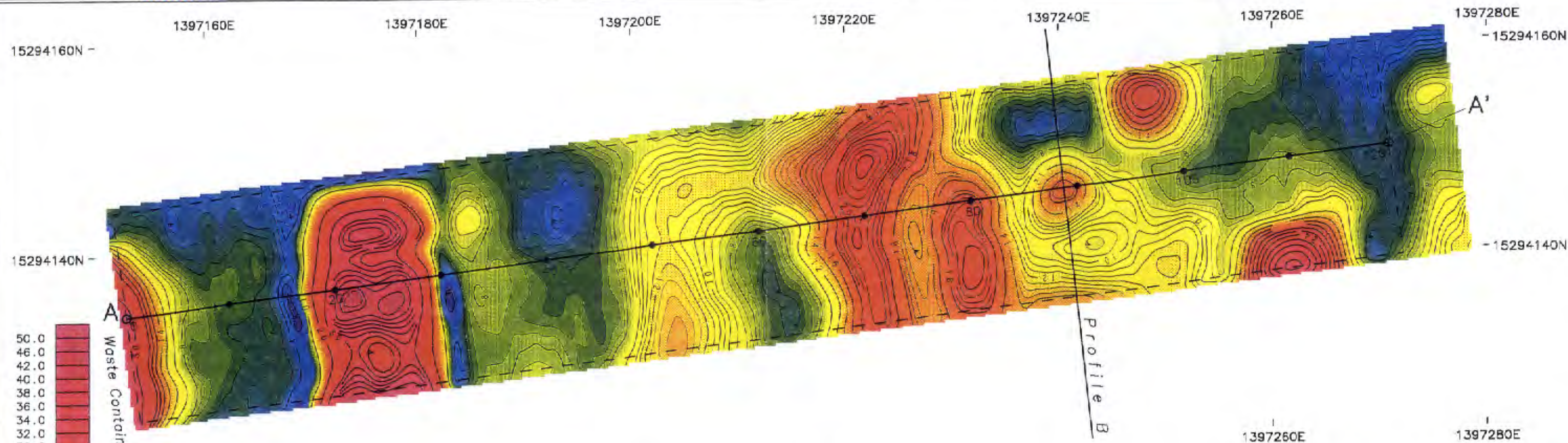
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T

Datum:
World Geodetic System (WGS-84)

GEONICS LIMITED

Survey performed by
MidWest Geomar Geophysics, Inc.

Map A1



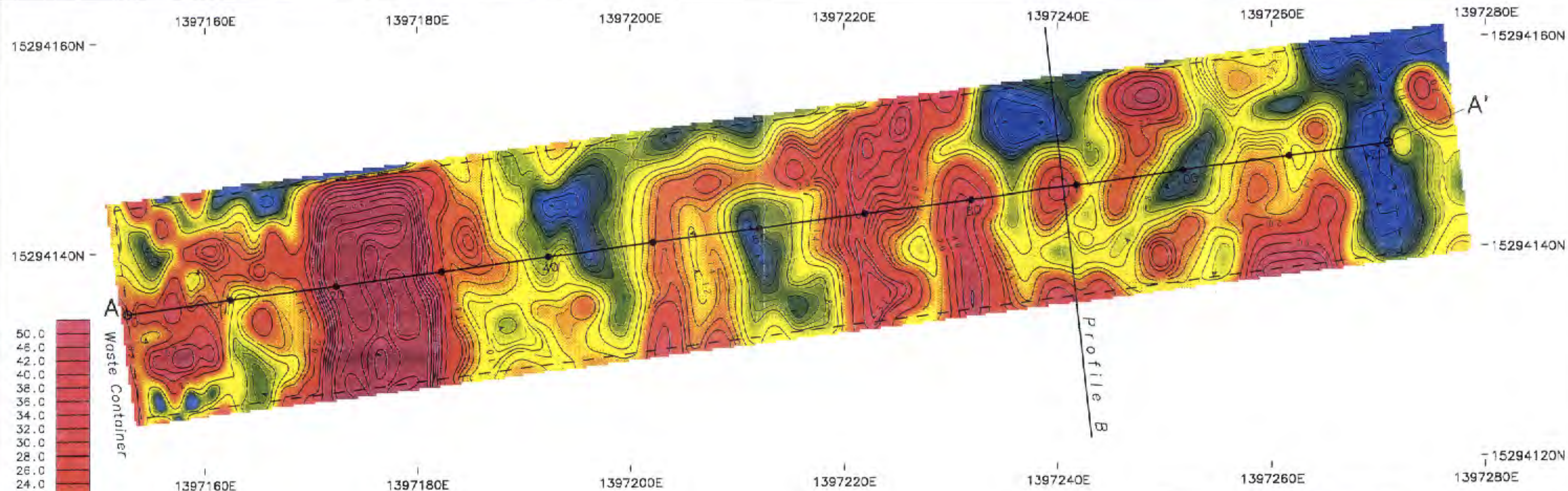
NEW YORK STATE ENERGY & GAS CORP.

**ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE A-A'
BINGHAMTON, NEW YORK
June, 1999**

**INSTRUMENT GEONICS EM61
DIFFERENTIAL CHANNEL
REMOVED RESPONSE FROM
NEAR SURFACE OBJECTS**
Compressed Amplitude
EM61 Response in Sqrt(mV)

Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T
Datum:
World Geodetic System (WGS-84)

GEONICS LIMITED
Survey performed by
MidWest Geomar Geophysics, Inc.
Map A2



NEW YORK STATE ENERGY & GAS CORP.

**ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE A-A'**

BINGHAMTON, NEW YORK

June, 1999

**INSTRUMENT GEONICS EM61-HH
CHANNEL E**

Compressed Amplitude
EM61 Response in Sqrt(mV)

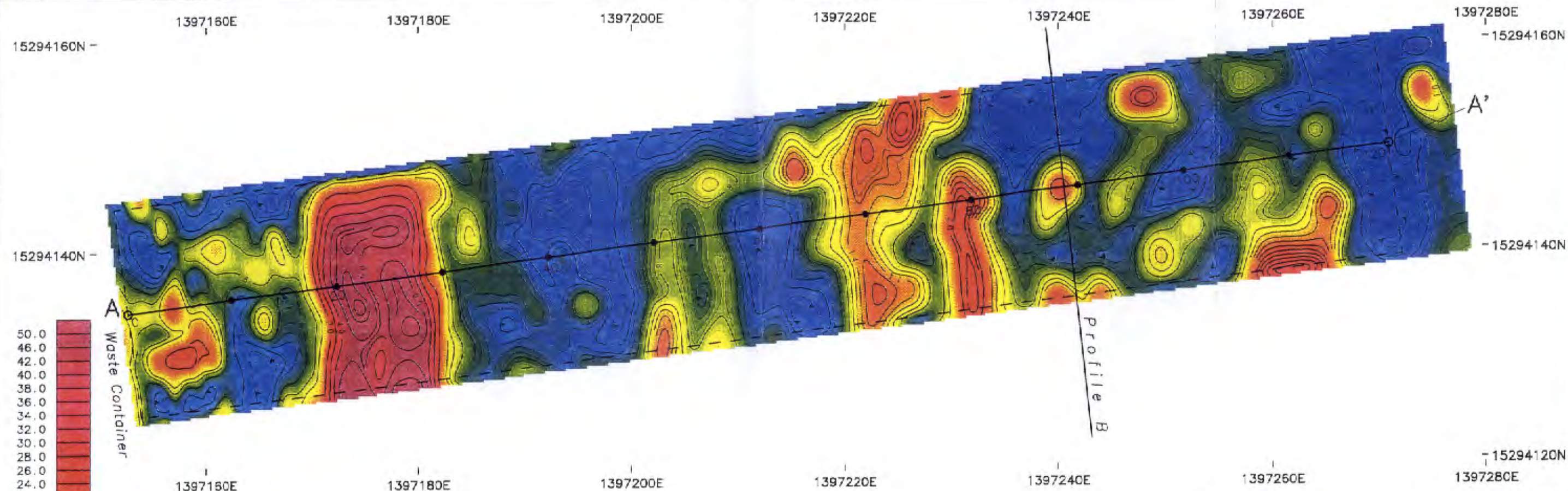
Positioning by DGPS (Trimble ProXRS)

Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T

Datum:
World Geodetic System (WGS-84)

GEONICS LIMITED

Survey performed by
MidWest Geomar Geophysics, Inc.
Map A3



NEW YORK STATE ENERGY & GAS CORP.

**ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE A-A'**

BINGHAMTON, NEW YORK

June, 1999

**INSTRUMENT GEONICS EM61-HH
CHANNEL L**

Compressed Amplitude
EM61 Response in Sqrt(mV)

Positioning by DGPS (Trimble ProXRS)

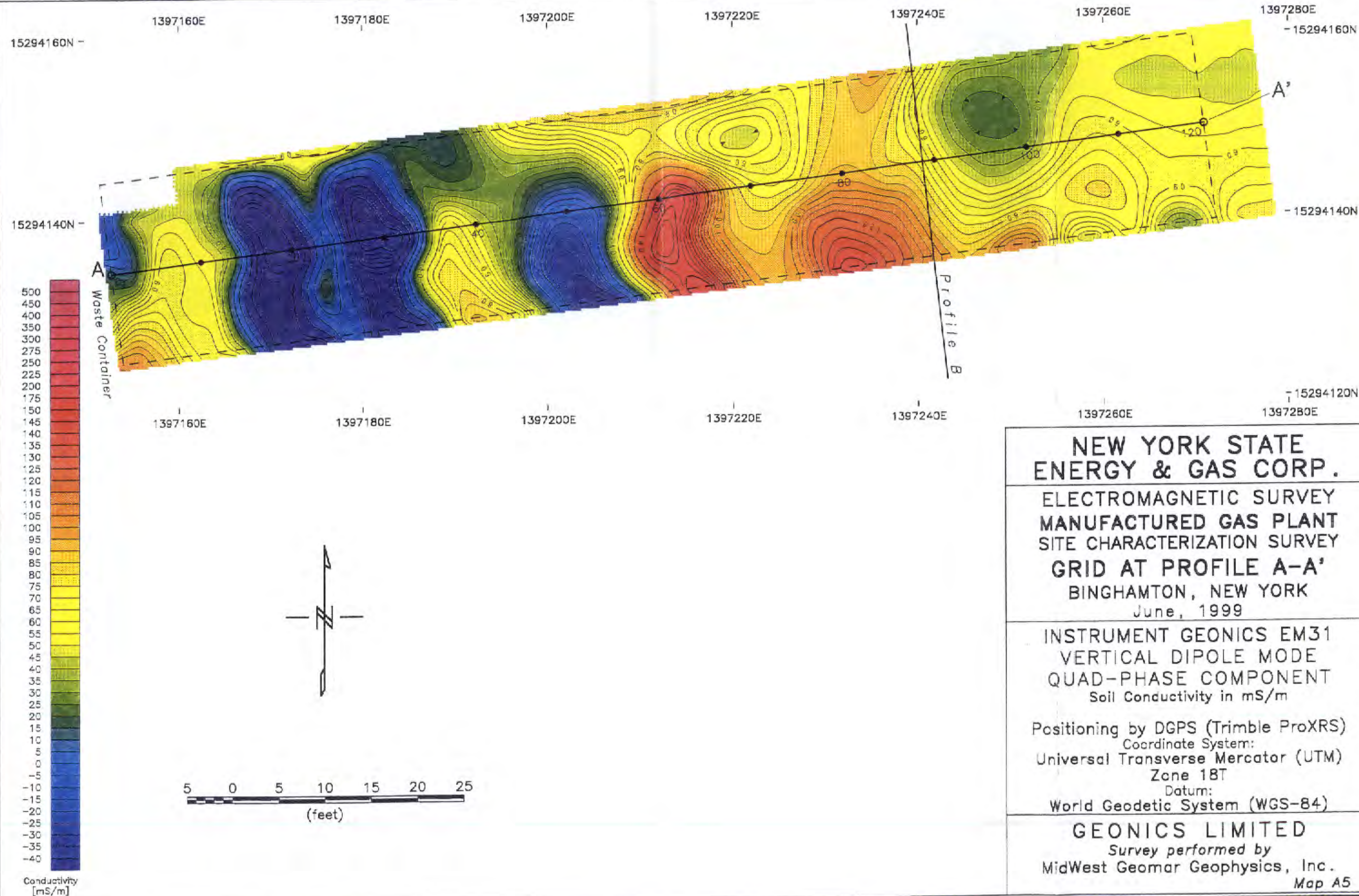
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Zone 18T

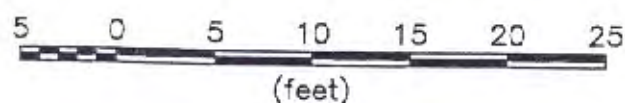
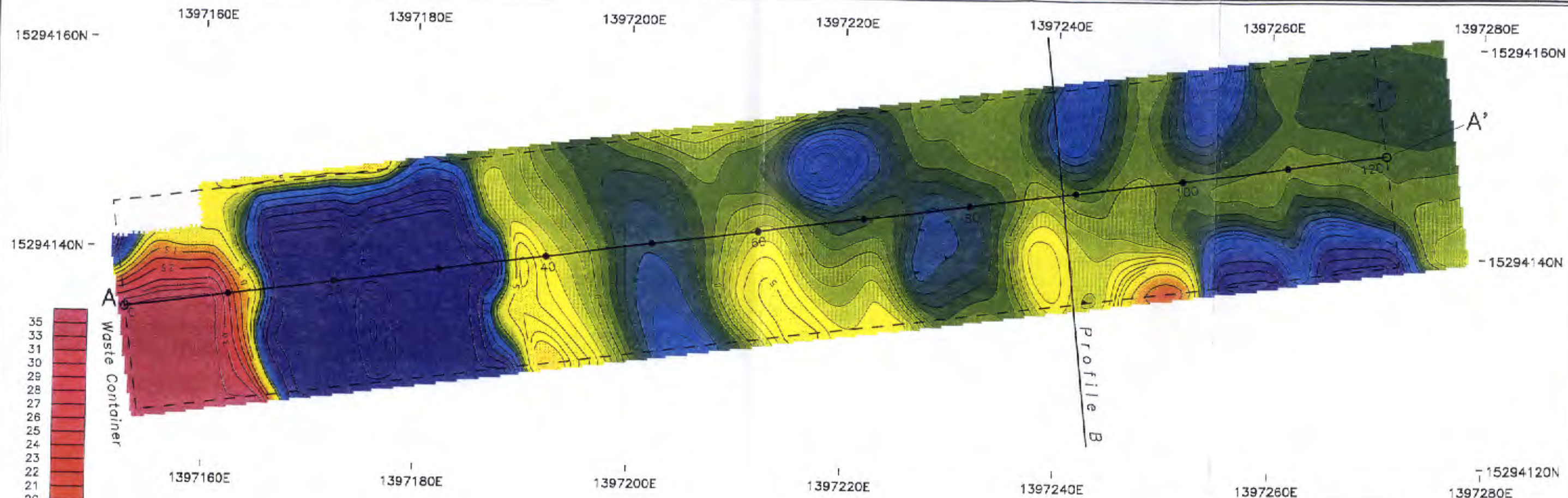
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World Geodetic System (WGS-84)

GEONICS LIMITED

Survey performed by
MidWest Geomar Geophysics, Inc.

Map A4





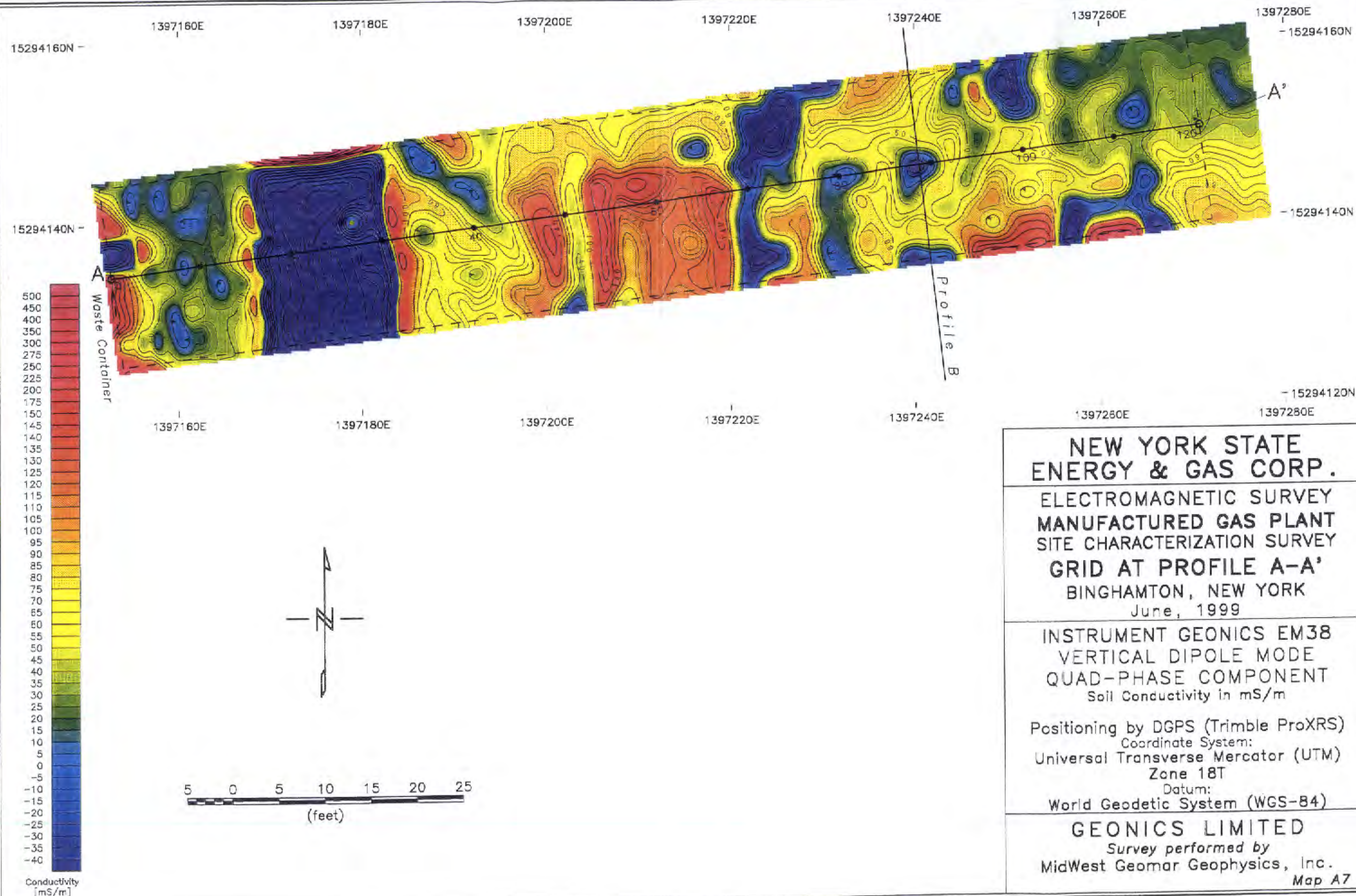
NEW YORK STATE ENERGY & GAS CORP.

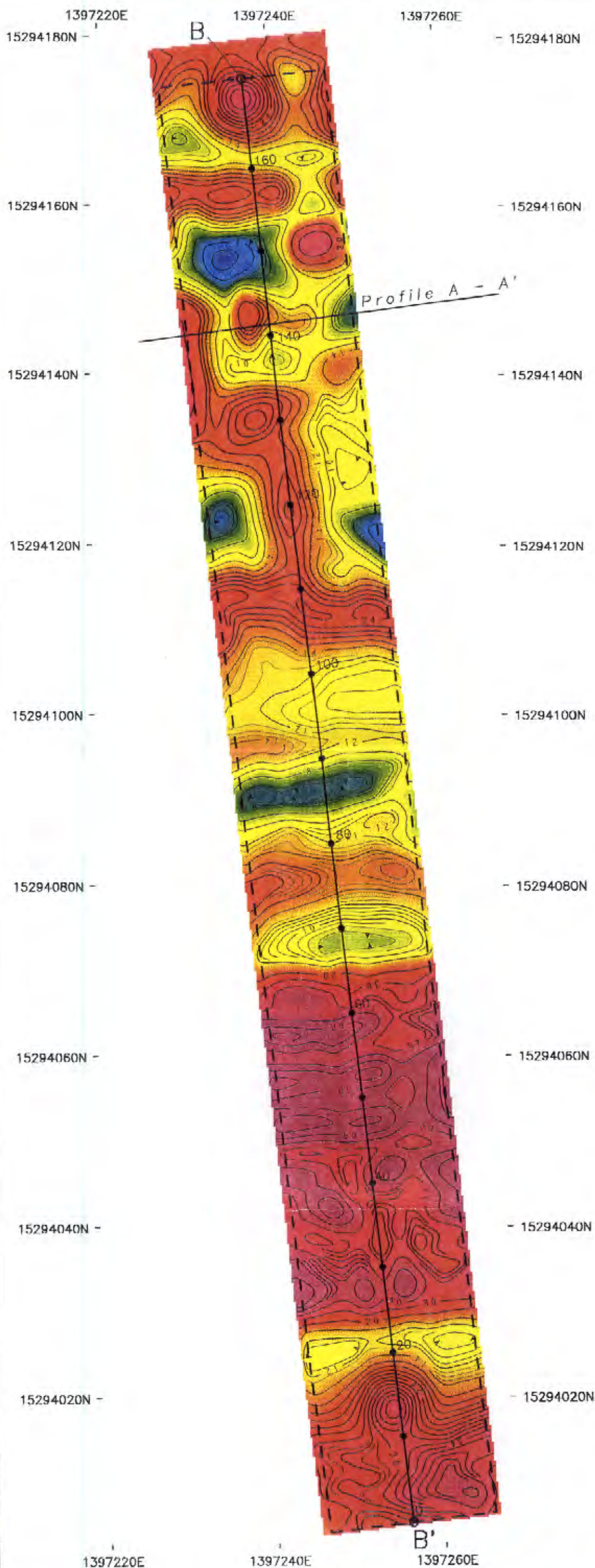
**ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE A-A'
BINGHAMTON, NEW YORK
June, 1999**

**INSTRUMENT GEONICS EM31
VERTICAL DIPOLE MODE
INPHASE RESPONSE
Inphase in ppt of Primary Field**

Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T
Datum:
World Geodetic System (WGS-84)

GEONICS LIMITED
Survey performed by
MidWest Geomar Geophysics, Inc.
Map A6





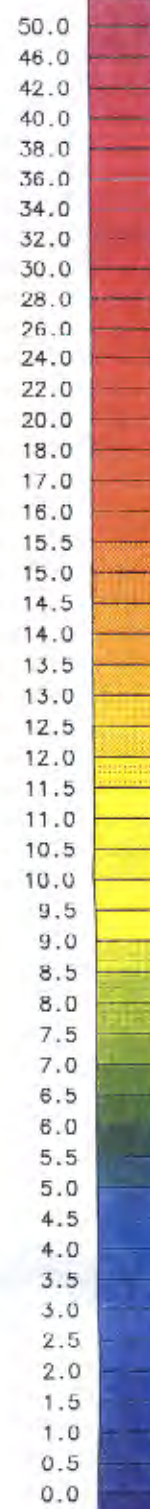
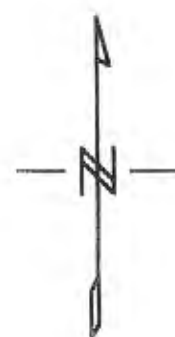
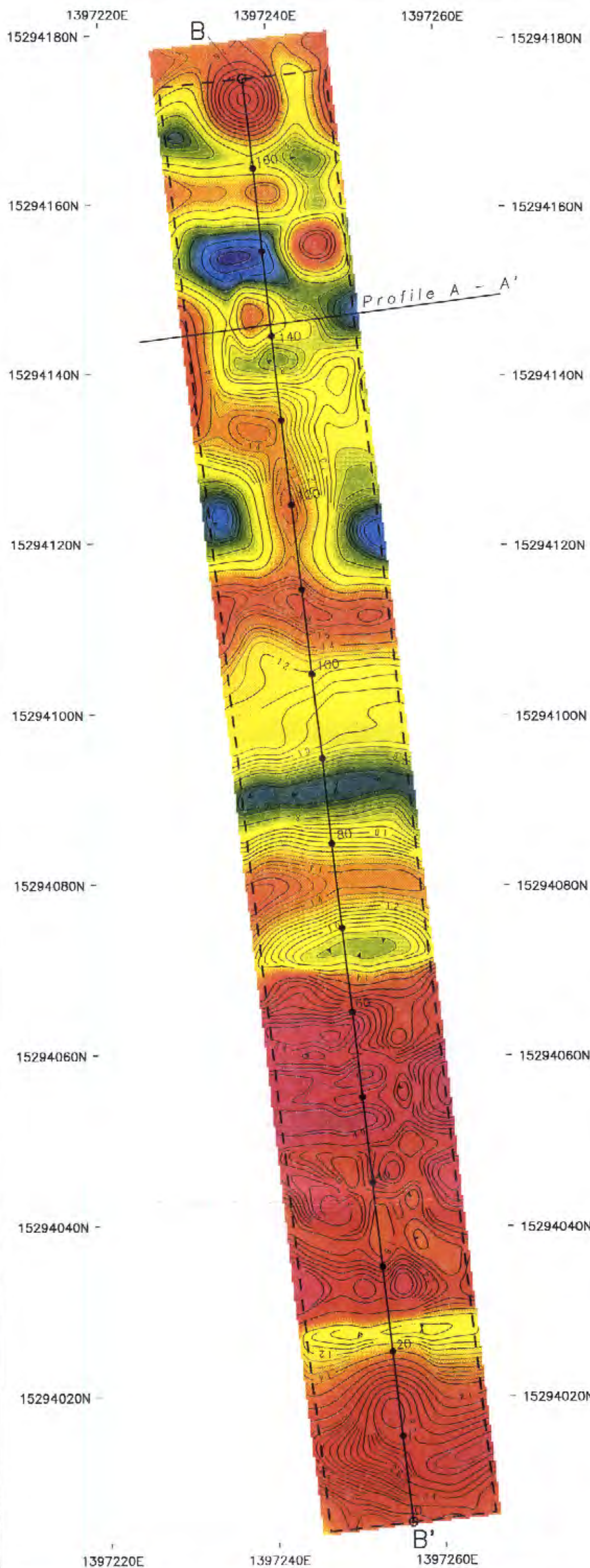
**NEW YORK STATE
ENERGY & GAS CORP.**

**ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE B-B'
BINGHAMTON, NEW YORK
June, 1999**

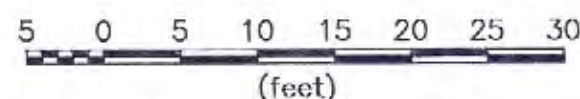
**INSTRUMENT GEONICS EM61
CHANNEL B
Compressed Amplitude
EM61 Response in Sqrt(mV)**

**Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T
Datum:
World Geodetic System (WGS-84)**

**GEONICS LIMITED
Survey performed by
MidWest Geomar Geophysics, Inc.
Map B1**



Response
Sqrt(mV)



NEW YORK STATE ENERGY & GAS CORP.

ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE B-B'
BINGHAMTON, NEW YORK
June, 1999

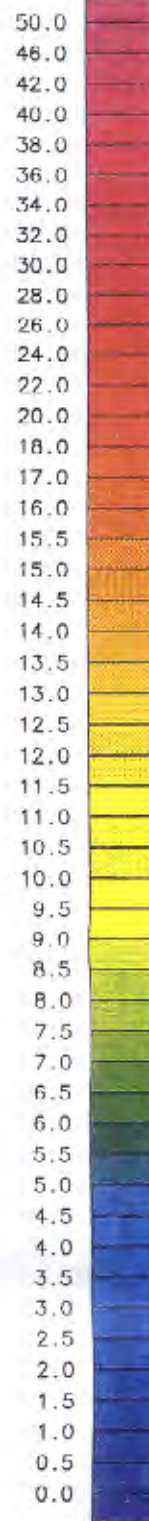
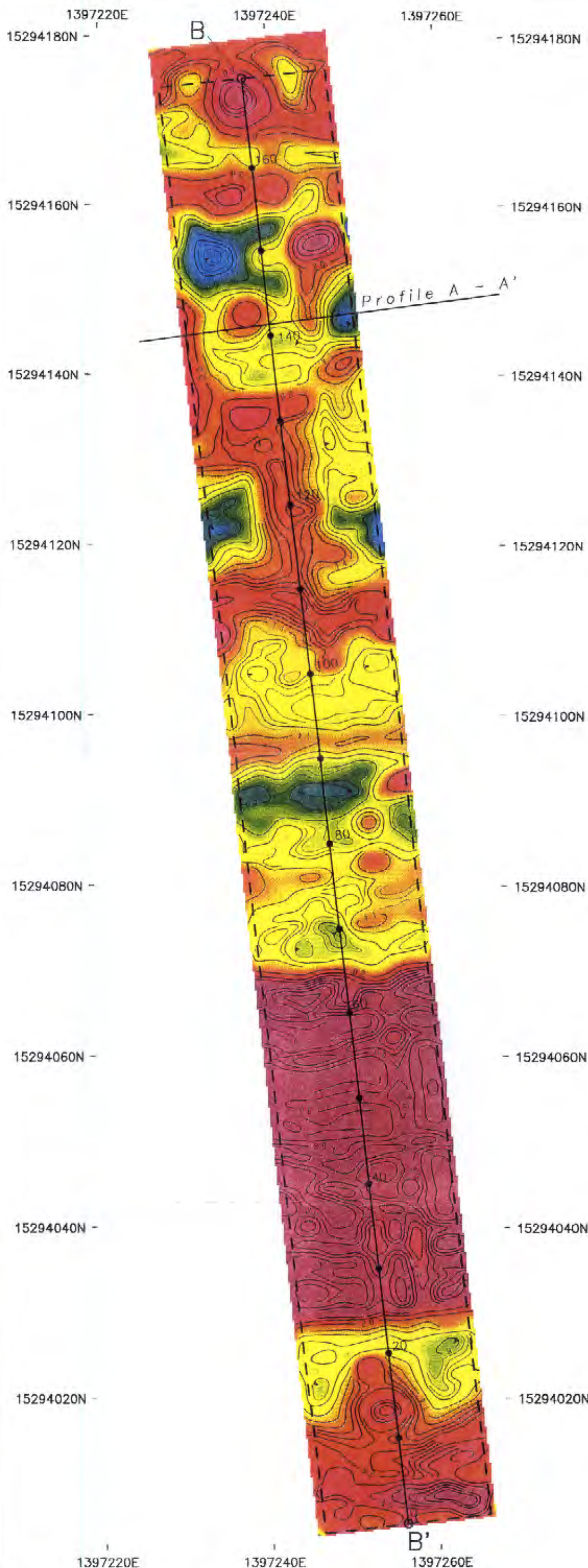
INSTRUMENT GEONICS EM61
DIFFERENTIAL CHANNEL
REMOVED RESPONSE FROM
NEAR SURFACE OBJECTS
Compressed Amplitude
EM61 Response in Sqrt(mV)

Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T
Datum:
World Geodetic System (WGS-84)

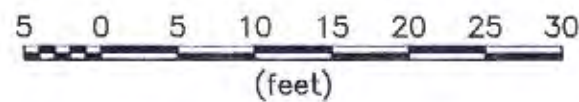
GEONICS LIMITED

Survey performed by
MidWest Geomar Geophysics, Inc.

Map B2



Response
Sqrt(mV)



NEW YORK STATE ENERGY & GAS CORP.

ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE B-B'
BINGHAMTON, NEW YORK
June, 1999

INSTRUMENT GEONICS EM61-HH
CHANNEL E

Compressed Amplitude
EM61 Response in Sqrt(mV)

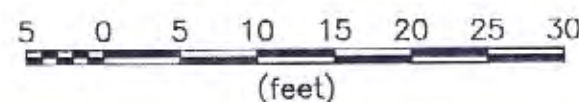
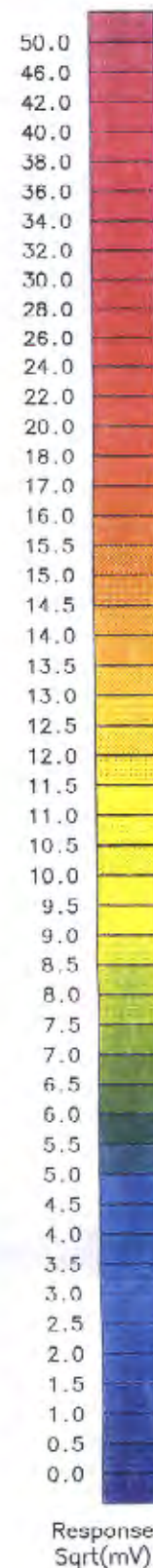
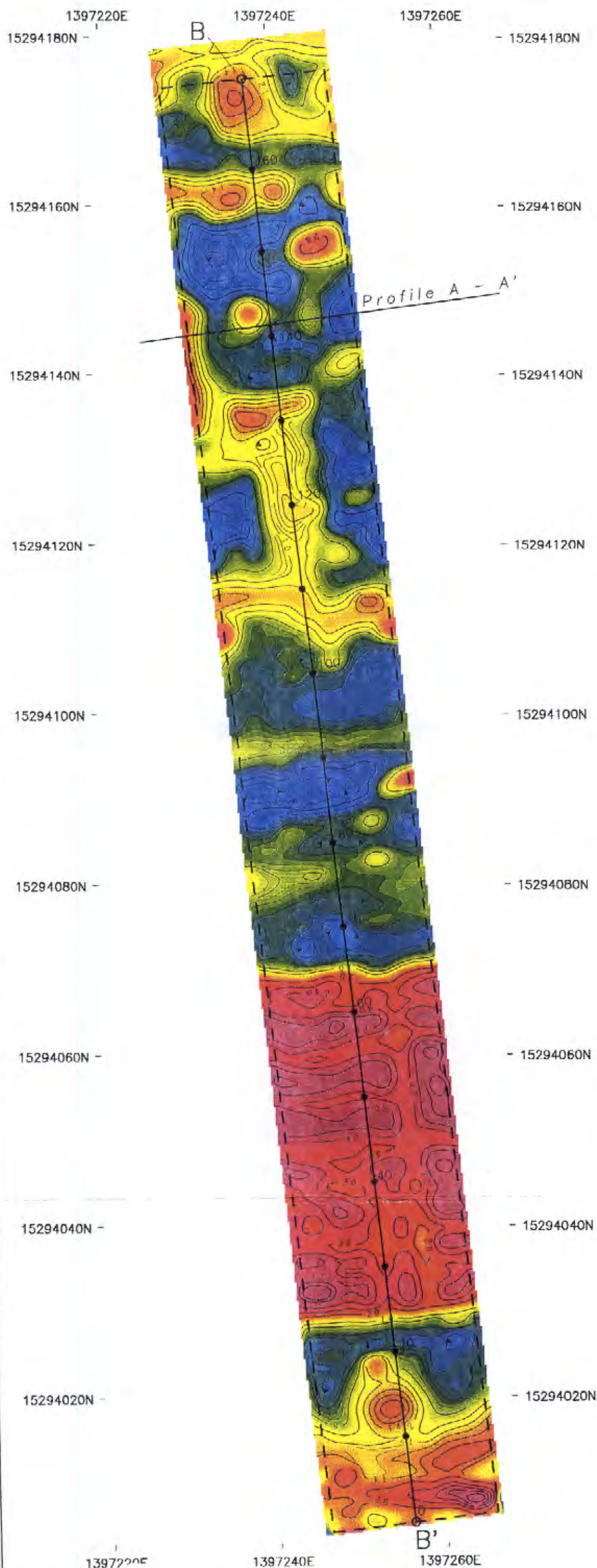
Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T

Datum:
World Geodetic System (WGS-84)

GEONICS LIMITED

Survey performed by
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Map B3



NEW YORK STATE ENERGY & GAS CORP.

ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE B-B'
BINGHAMTON, NEW YORK
June, 1999

INSTRUMENT GEONICS EM61-HH
CHANNEL L

Compressed Amplitude
EM61 Response in Sqrt(mV)

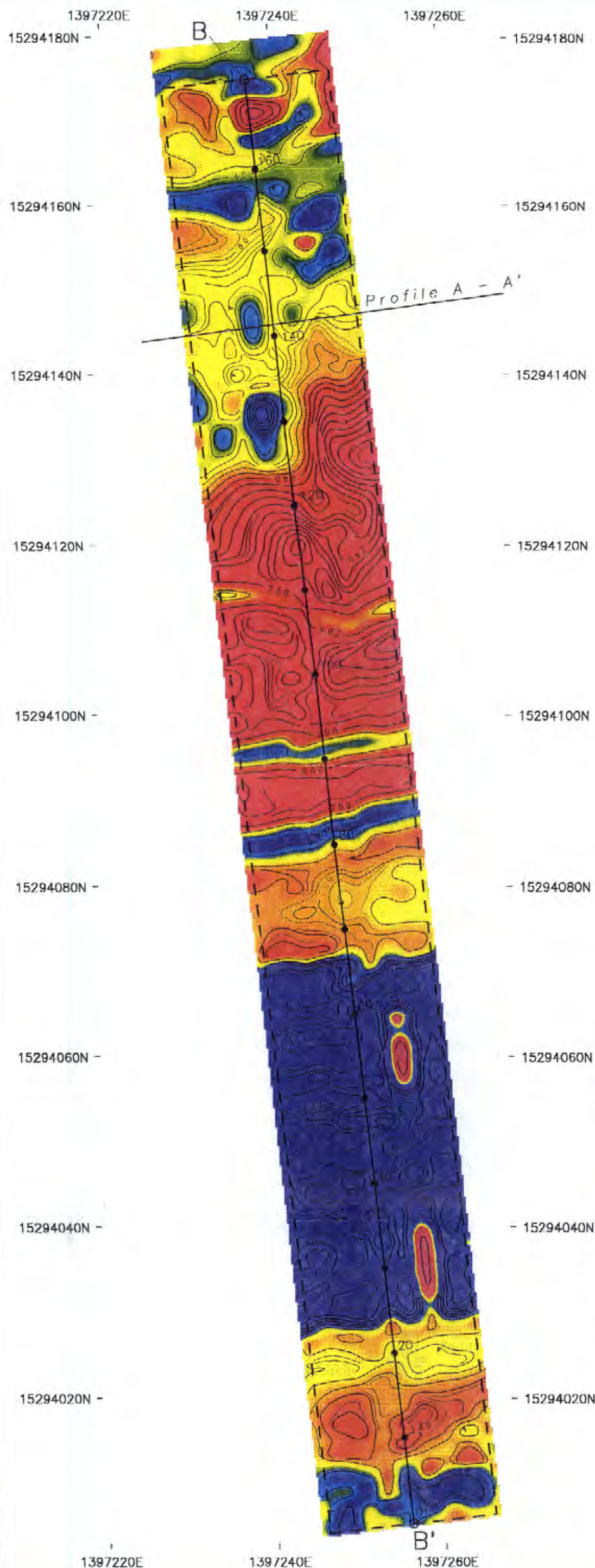
Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T

Datum:
World Geodetic System (WGS-84)

GEONICS LIMITED

Survey performed by
MidWest Geomar Geophysics, Inc.

Map B4



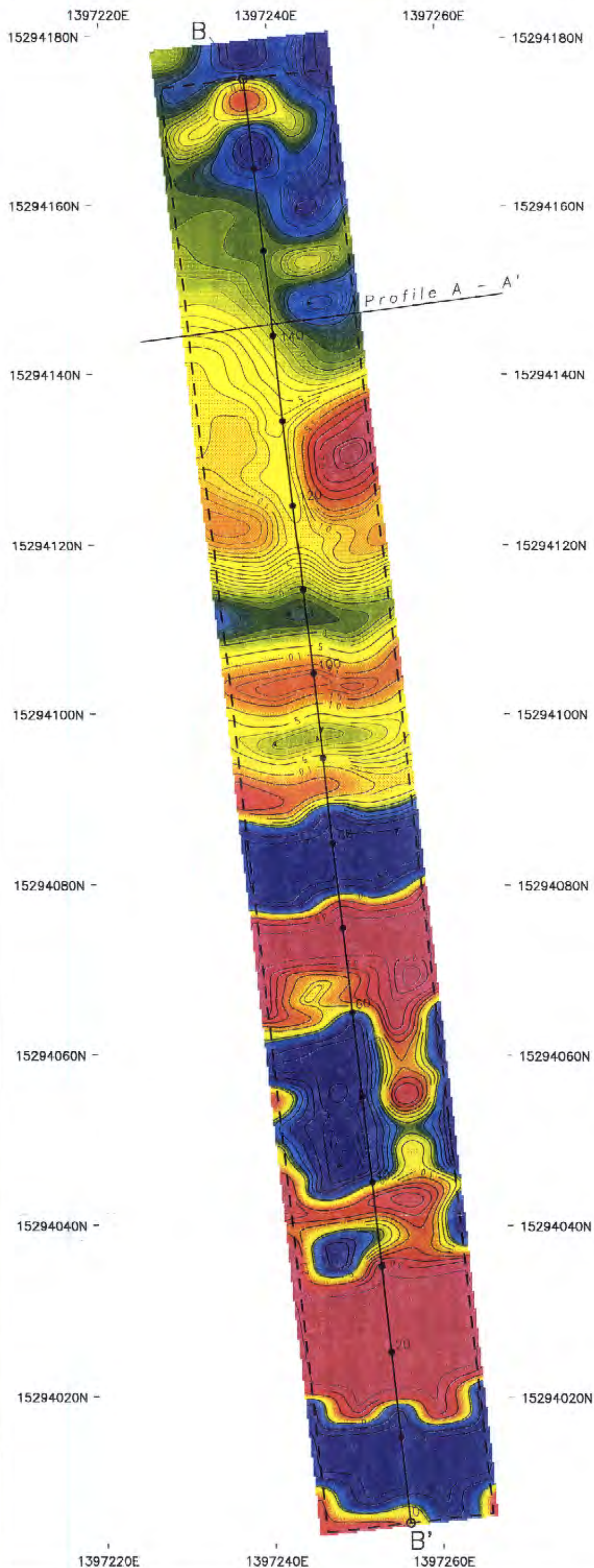
NEW YORK STATE ENERGY & GAS CORP.

**ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE B-B'
BINGHAMTON, NEW YORK
June, 1999**

**INSTRUMENT GEONICS EM38
VERTICAL DIPOLE MODE
QUAD-PHASE COMPONENT
Soil Conductivity in mS/m**

Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T
Datum:
World Geodetic System (WGS-84)

GEONICS LIMITED
Survey performed by
MidWest Geomar Geophysics, Inc.
Map B7



**NEW YORK STATE
ENERGY & GAS CORP.**

**ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY**

**GRID AT PROFILE B-B'
BINGHAMTON, NEW YORK**

June, 1999

**INSTRUMENT GEONICS EM31
VERTICAL DIPOLE MODE
INPHASE RESPONSE**
Inphase in ppt of Primary Field

Positioning by DGPS (Trimble ProXRS)

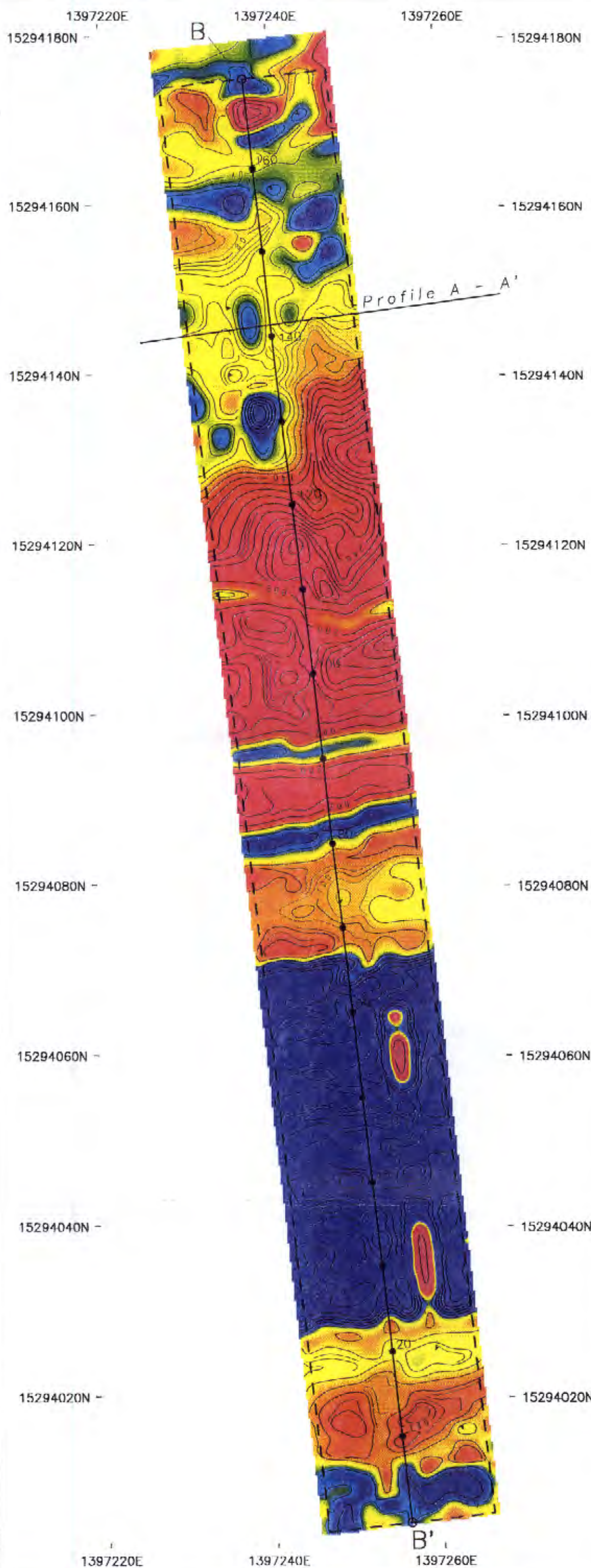
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T

Datum:
World Geodetic System (WGS-84)

GEONICS LIMITED

Survey performed by
MidWest Geomar Geophysics, Inc.

Map B6



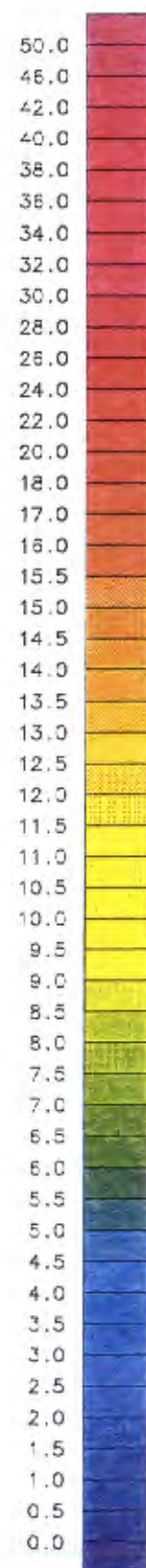
**NEW YORK STATE
ENERGY & GAS CORP.**

**ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE B-B'
BINGHAMTON, NEW YORK
June, 1999**

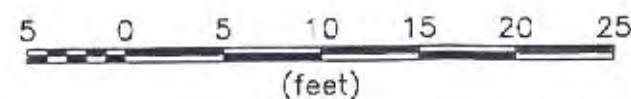
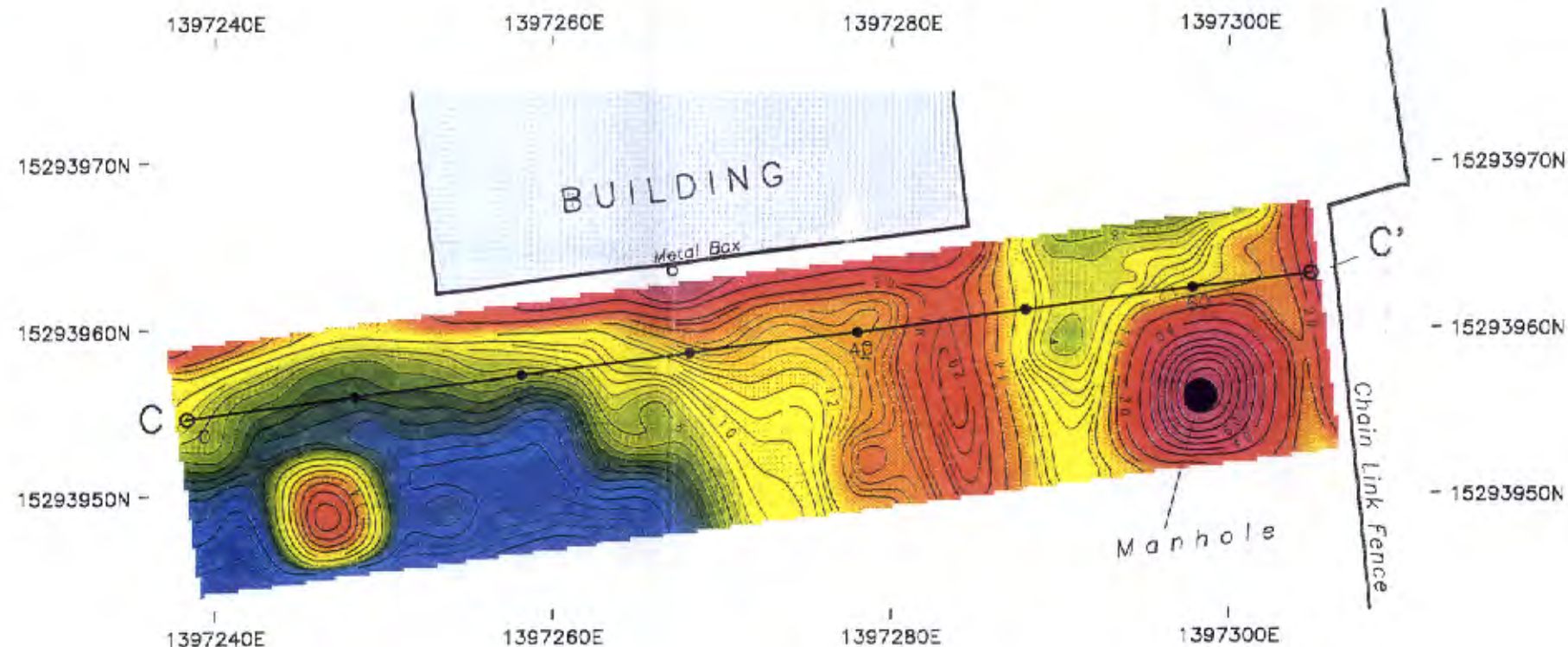
**INSTRUMENT GEONICS EM38
VERTICAL DIPOLE MODE
QUAD-PHASE COMPONENT
Soil Conductivity in mS/m**

Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T
Datum:
World Geodetic System (WGS-84)

GEONICS LIMITED
Survey performed by
MidWest Geomar Geophysics, Inc.
Map B7



Response
Sqrt(mV)



NEW YORK STATE ELECTRIC & GAS CORP.

ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE C-C'
BINGHAMTON, NEW YORK

June, 1999

INSTRUMENT GEONICS EM61
CHANNEL B

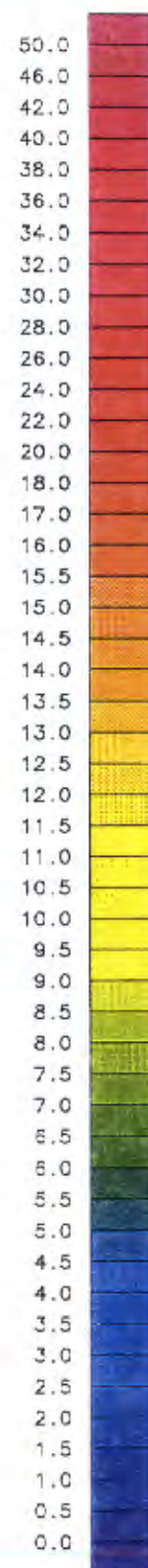
Compressed Amplitude
EM61 Response in Sqrt(mV)

Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T

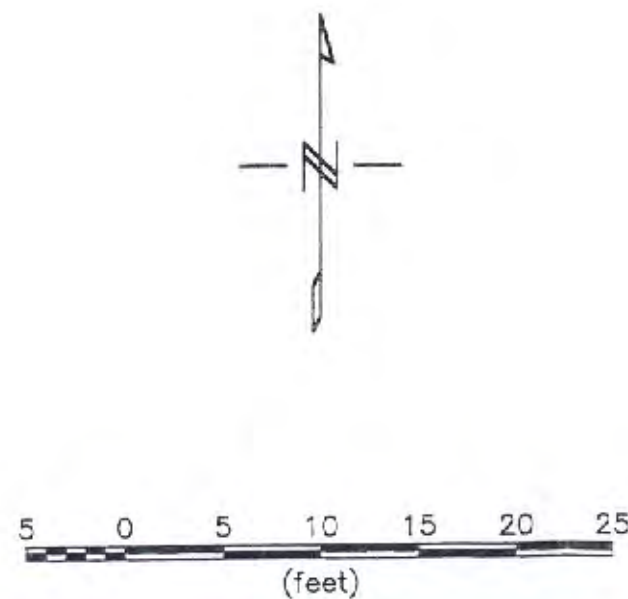
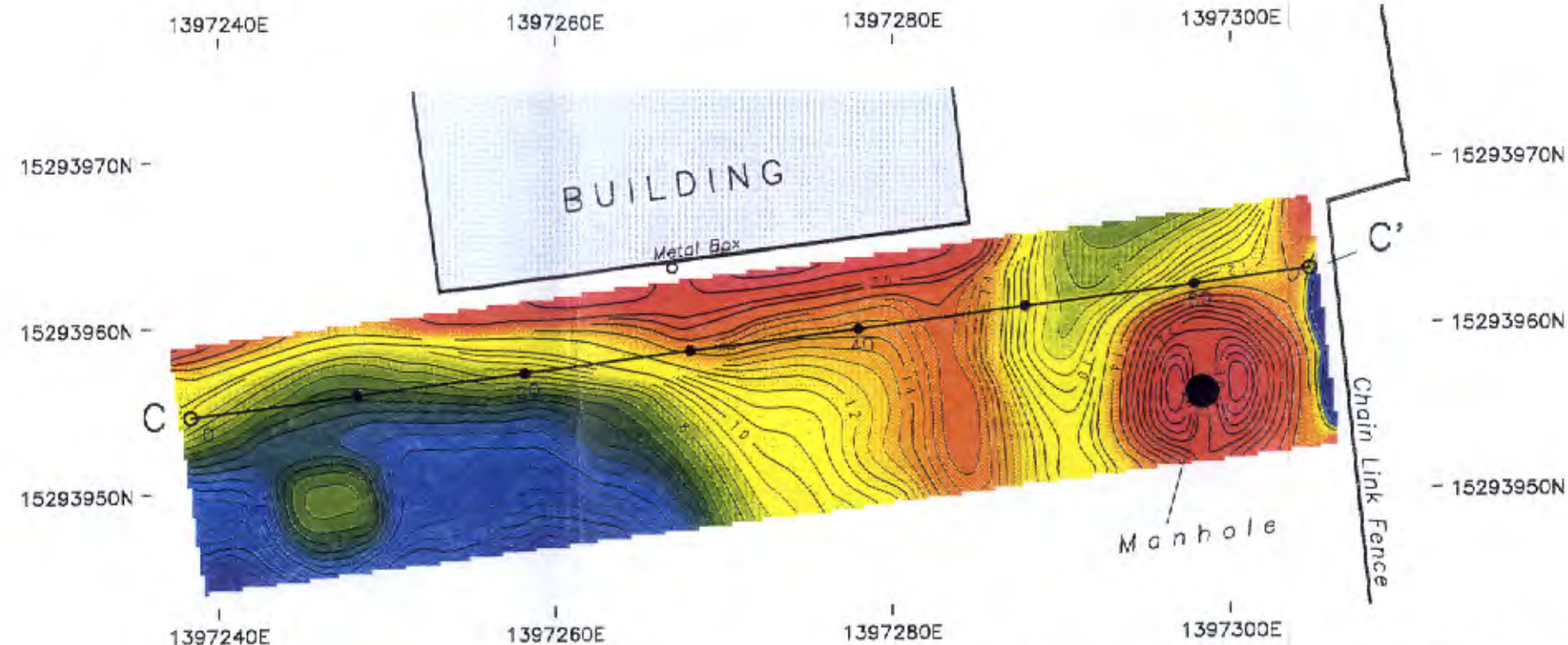
Datum:
World Geodetic System (WGS-84)

GEONICS LIMITED

Survey performed by
MidWest Geomar Geophysics, Inc.
Map C1



Response
Sqrt(mV)



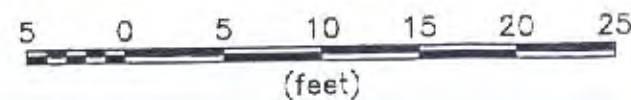
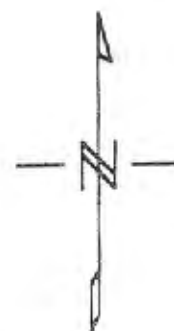
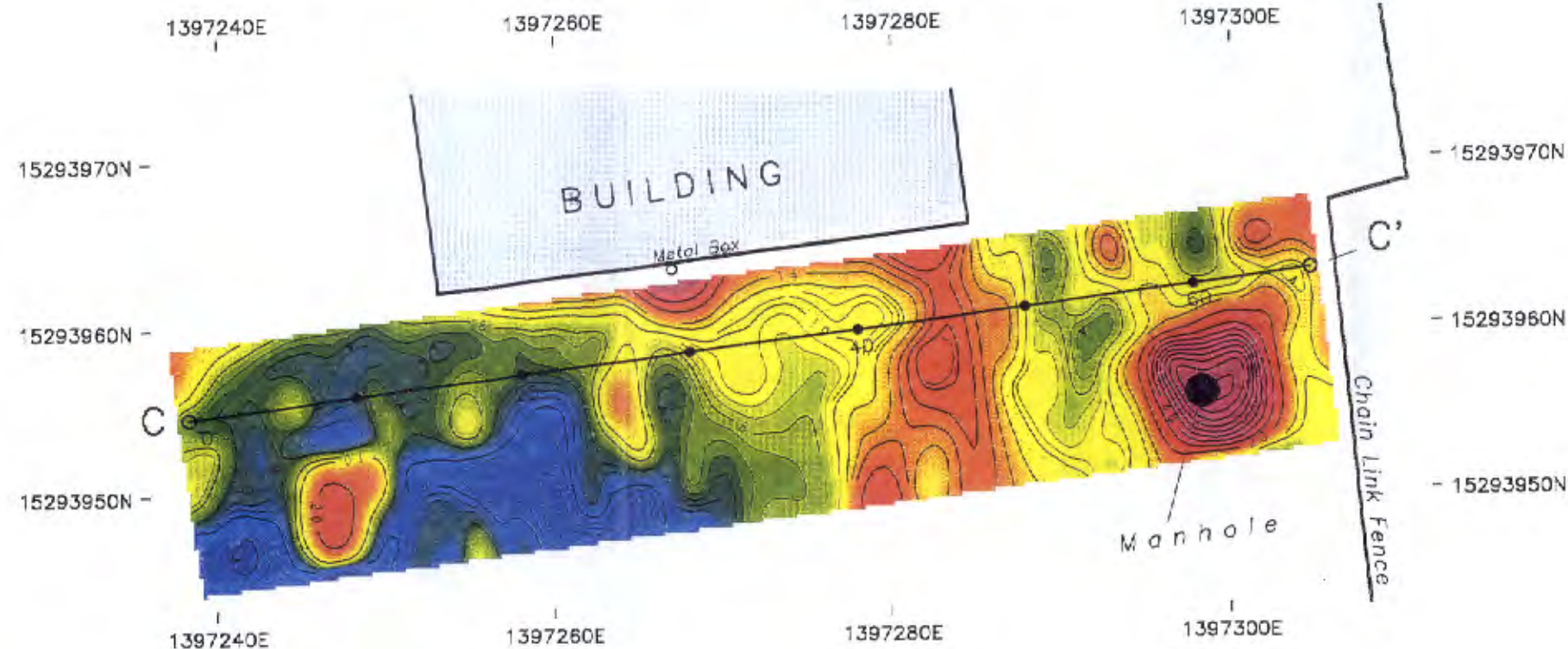
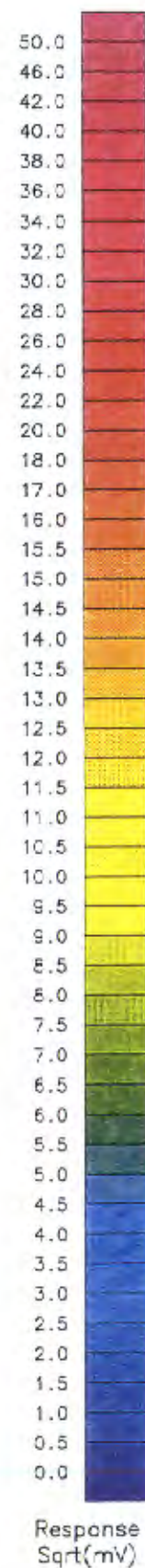
NEW YORK STATE ELECTRIC & GAS CORP.

ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE C-C'
BINGHAMTON, NEW YORK
June, 1999

INSTRUMENT GEONICS EM61
DIFFERENTIAL CHANNEL
REMOVED RESPONSE FROM
NEAR SURFACE OBJECTS
Compressed Amplitude
EM61 Response in Sqrt(mV)

Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T
Datum:
World Geodetic System (WGS-84)

GEONICS LIMITED
Survey performed by
MidWest Geomar Geophysics, Inc.
Map C2



NEW YORK STATE ELECTRIC & GAS CORP.

ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE C-C'
BINGHAMTON, NEW YORK

June, 1999

INSTRUMENT GEONICS EM61
CHANNEL E

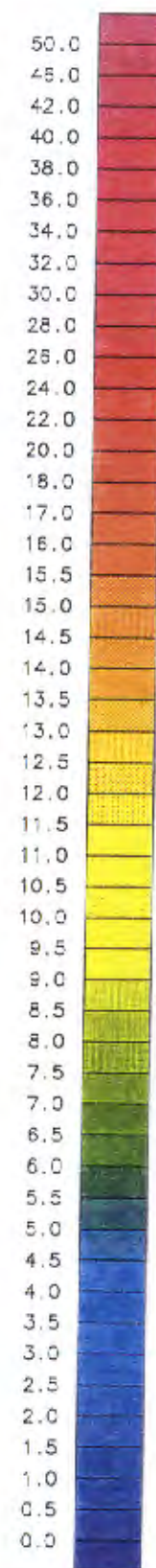
Compressed Amplitude
EM61 Response in Sqrt(mV)

Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T

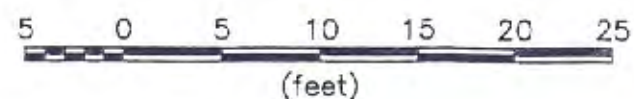
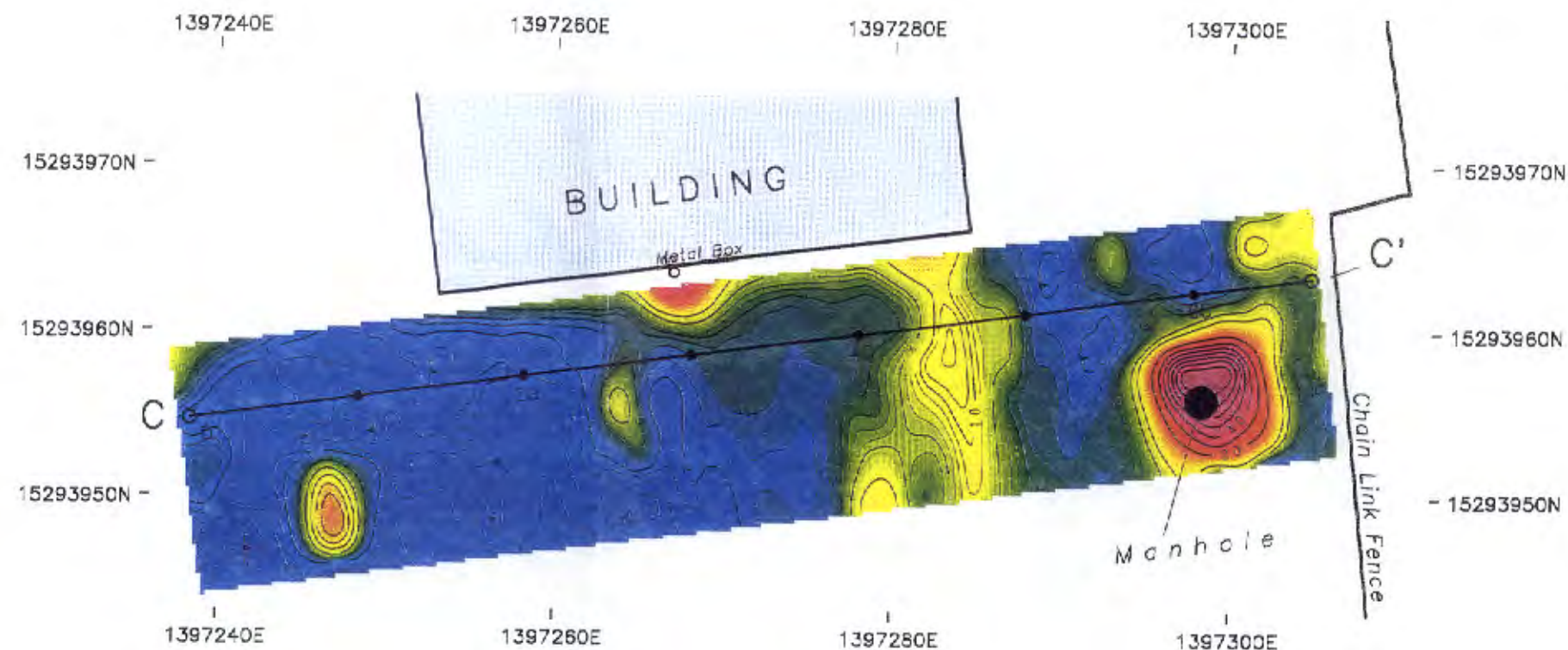
Datum:
World Geodetic System (WGS-84)

GEONICS LIMITED

Survey performed by
MidWest Geomar Geophysics, Inc.
Map C3



Response
Sqrt(mV)



NEW YORK STATE ELECTRIC & GAS CORP.

ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE C-C'
BINGHAMTON, NEW YORK

June, 1999

INSTRUMENT GEONICS EM61
CHANNEL L

Compressed Amplitude
EM61 Response in Sqrt(mV)

Positioning by DGPS (Trimble ProXRS)

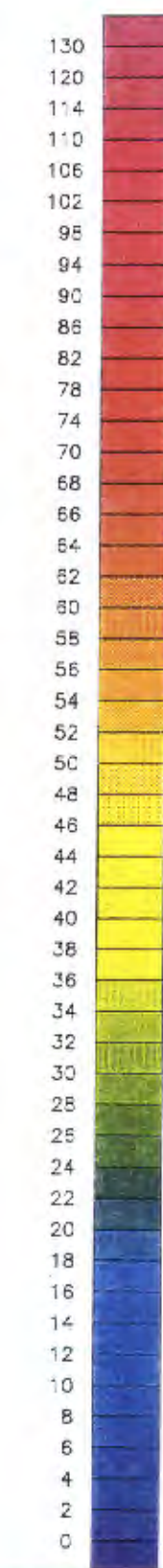
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Universal Transverse Mercator (UTM)
Zone 18T

Datum:
World Geodetic System (WGS-84)

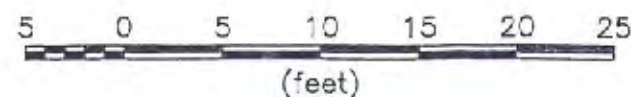
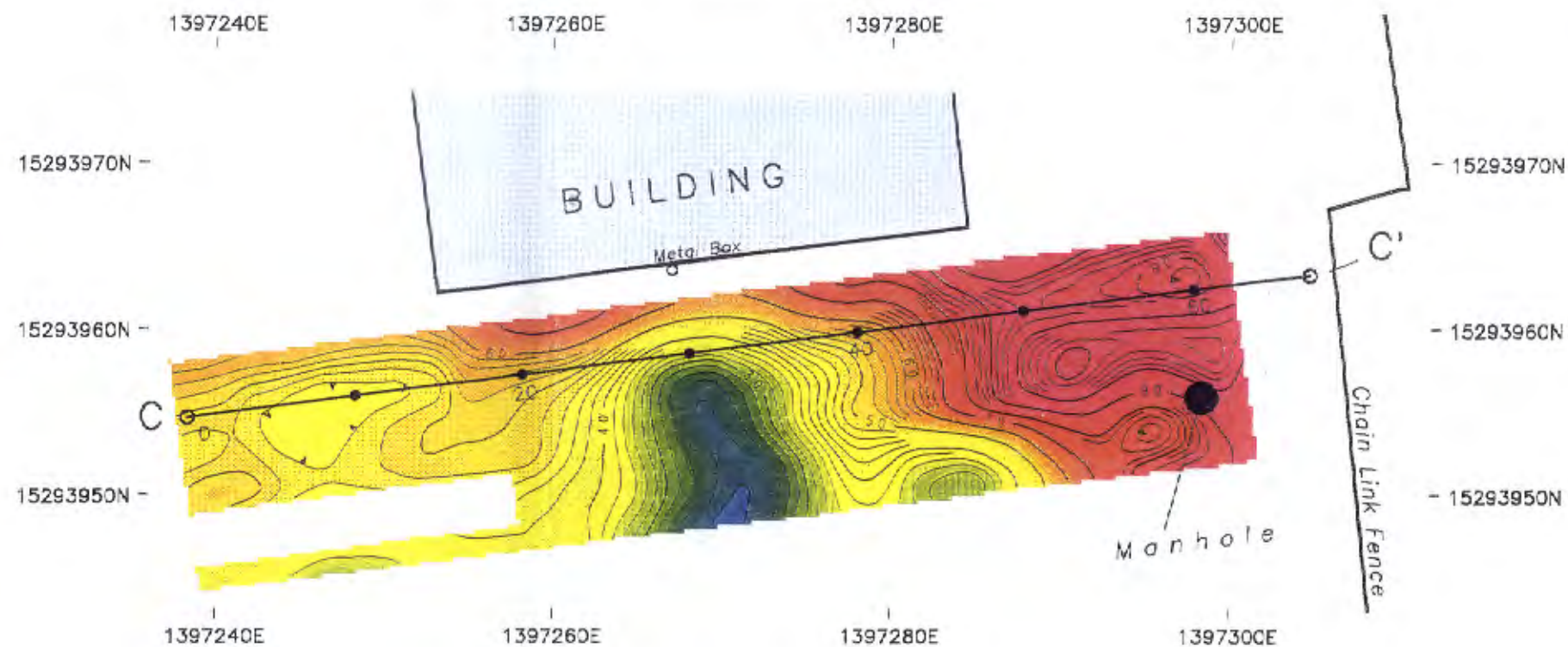
GEONICS LIMITED

Survey performed by
MidWest Geomar Geophysics, Inc.

Map C4



Conductivity
[mS/m]



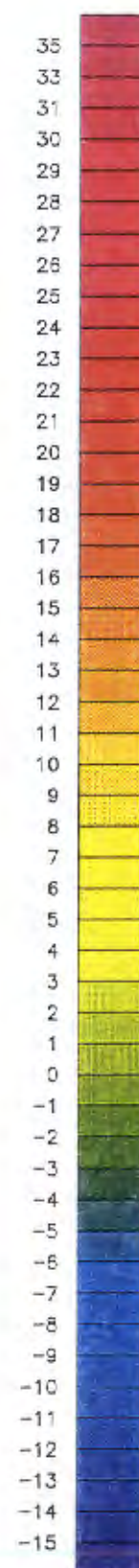
NEW YORK STATE ELECTRIC & GAS CORP.

ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE C-C'
BINGHAMTON, NEW YORK
June, 1999

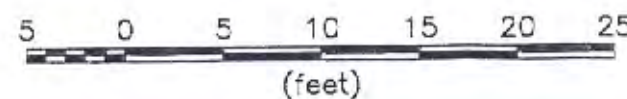
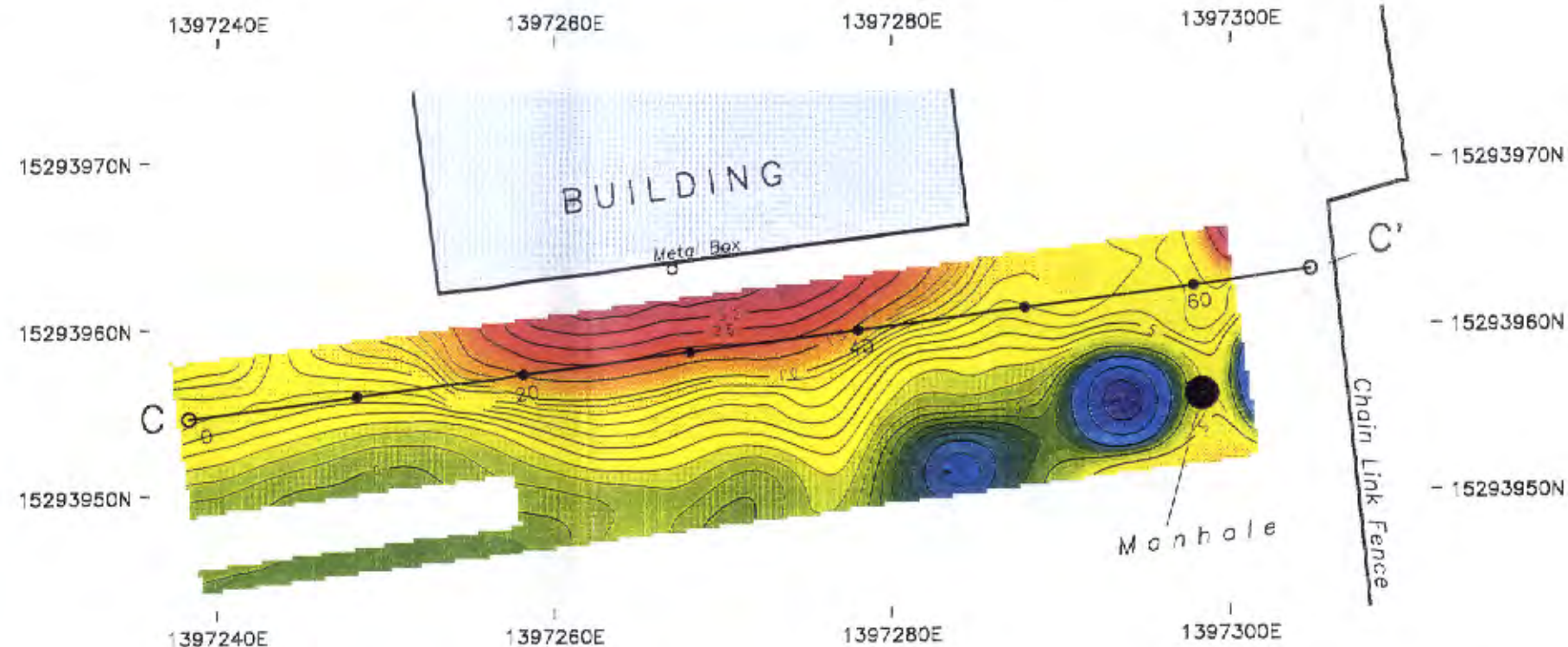
INSTRUMENT GEONICS EM31
VERTICAL DIPOLE MODE
QUAD-PHASE COMPONENT
Soil Conductivity in mS/m

Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T
Datum:
World Geodetic System (WGS-84)

GEONICS LIMITED
Survey performed by
MidWest Geomar Geophysics, Inc.
Map C5



inphase
[ppt]



NEW YORK STATE ELECTRIC & GAS CORP.

ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY

GRID AT PROFILE C-C'

BINGHAMTON, NEW YORK

June, 1999

INSTRUMENT GEONICS EM31

VERTICAL DIPOLE MODE

INPHASE RESPONSE

Inphase in ppt of Primary Field

Positioning by DGPS (Trimble ProXRS)

Coordinate System:

Universal Transverse Mercator (UTM)

Zone 18T

Datum:

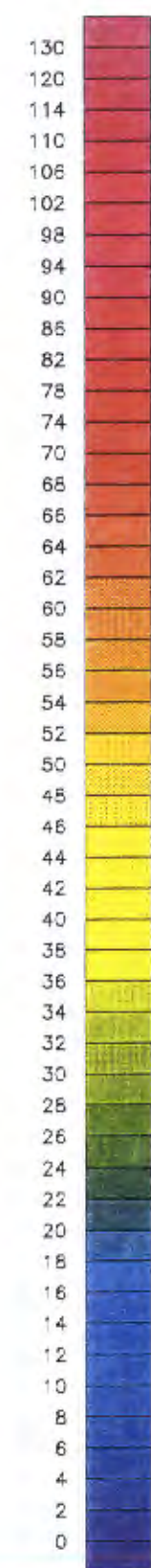
World Geodetic System (WGS-84)

GEONICS LIMITED

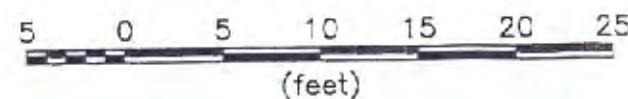
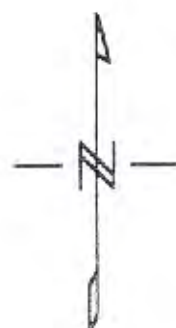
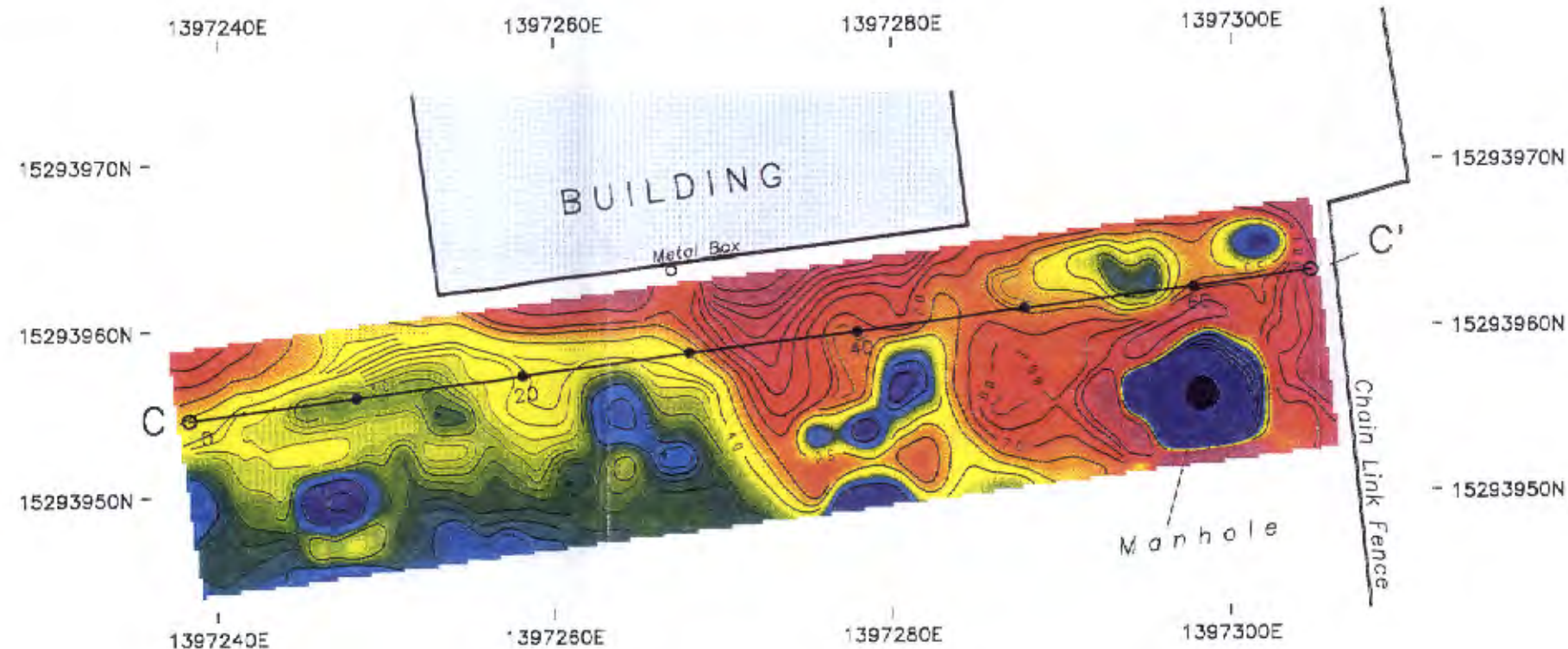
Survey performed by

MidWest Geomar Geophysics, Inc

Map



Conductivity
[mS/m]



NEW YORK STATE ELECTRIC & GAS CORP.

ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE C-C'
BINGHAMTON, NEW YORK

June, 1999

INSTRUMENT GEONICS EM38
VERTICAL DIPOLE MODE
QUAD-PHASE COMPONENT
Soil Conductivity in mS/m

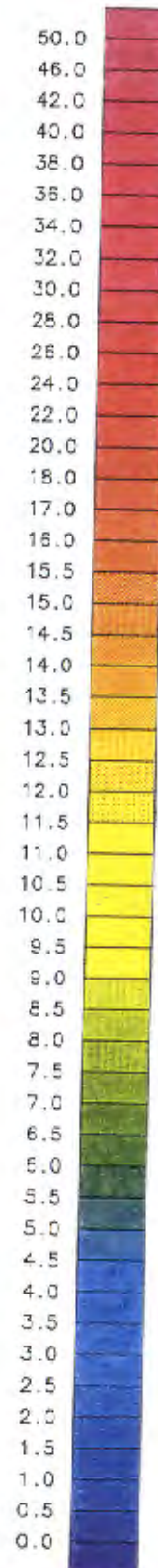
Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T
Datum:

World Geodetic System (WGS-84)

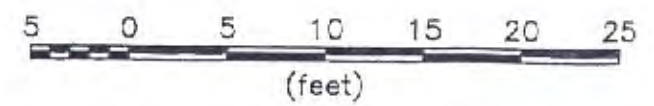
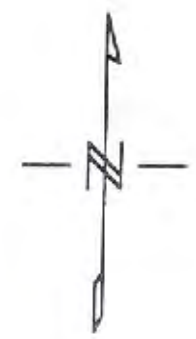
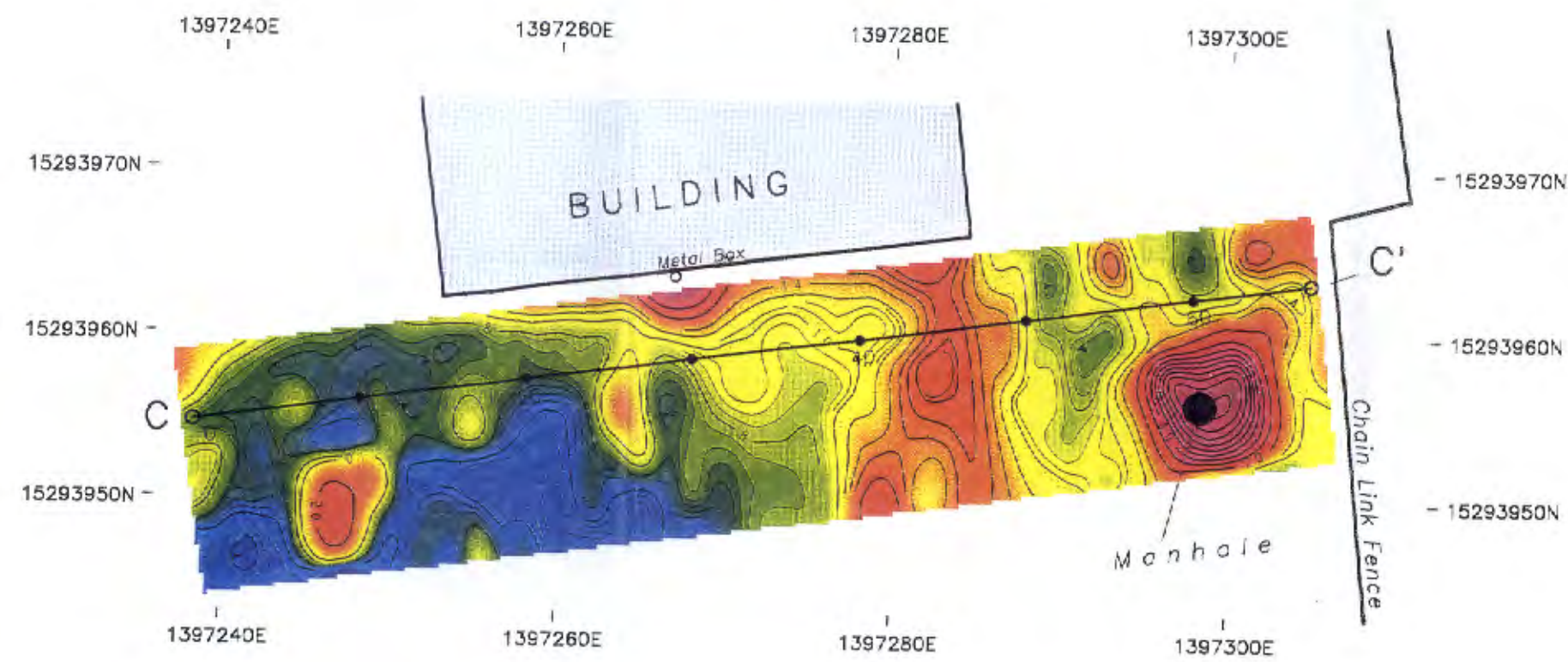
GEONICS LIMITED

Survey performed by
MidWest Geomar Geophysics, Inc.

Map C7



Response
Sqrt(mV)



NEW YORK STATE ELECTRIC & GAS CORP.

ELECTROMAGNETIC SURVEY
MANUFACTURED GAS PLANT
SITE CHARACTERIZATION SURVEY
GRID AT PROFILE C-C'
BINGHAMTON, NEW YORK
June, 1999

INSTRUMENT GEONICS EM61
CHANNEL E

Compressed Amplitude
EM61 Response in Sqrt(mV)

Positioning by DGPS (Trimble ProXRS)
Coordinate System:
Universal Transverse Mercator (UTM)
Zone 18T

Datum:
World Geodetic System (WGS-84)

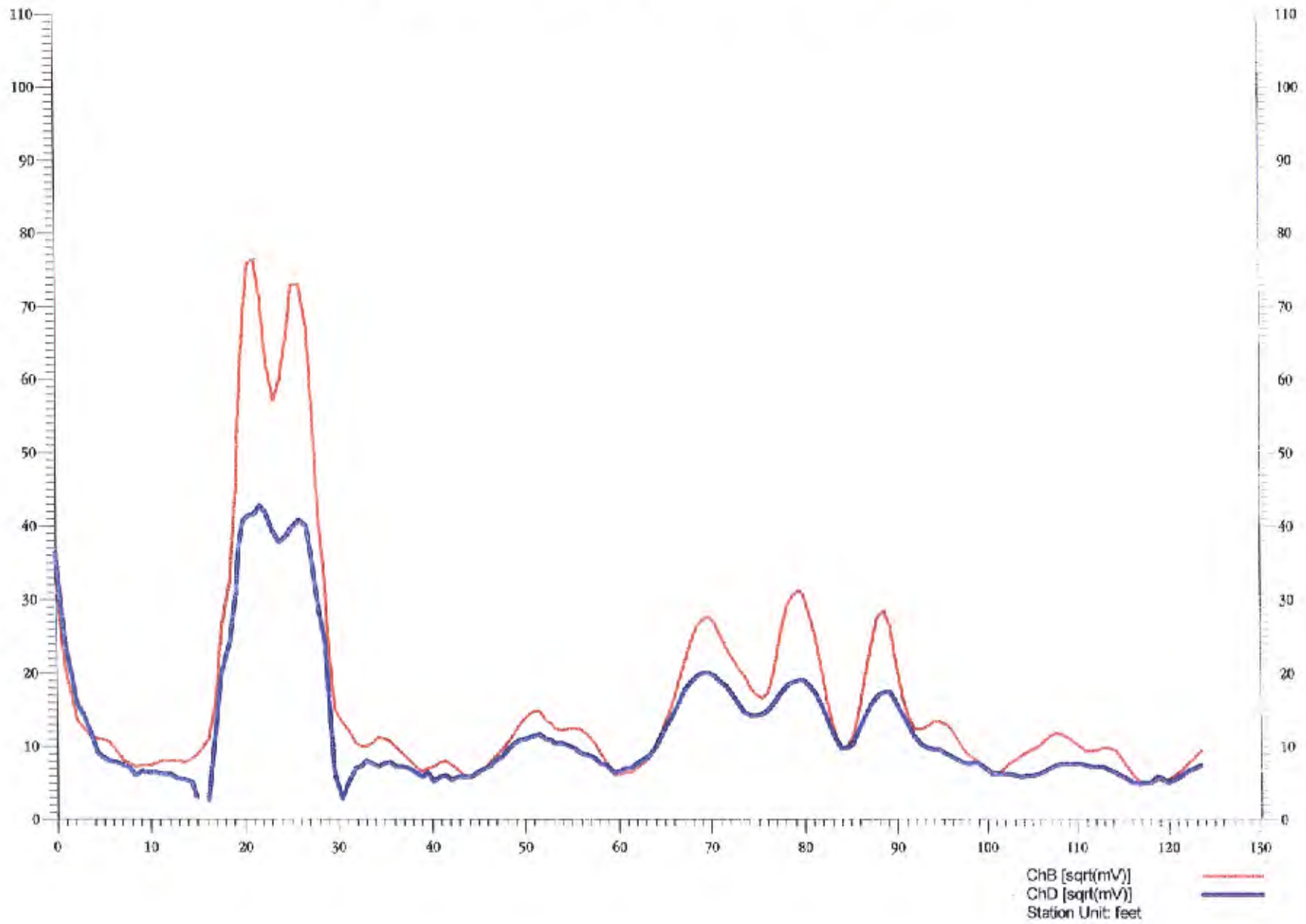
GEONICS LIMITED

Survey performed by
MidWest Geomar Geophysics, Inc.

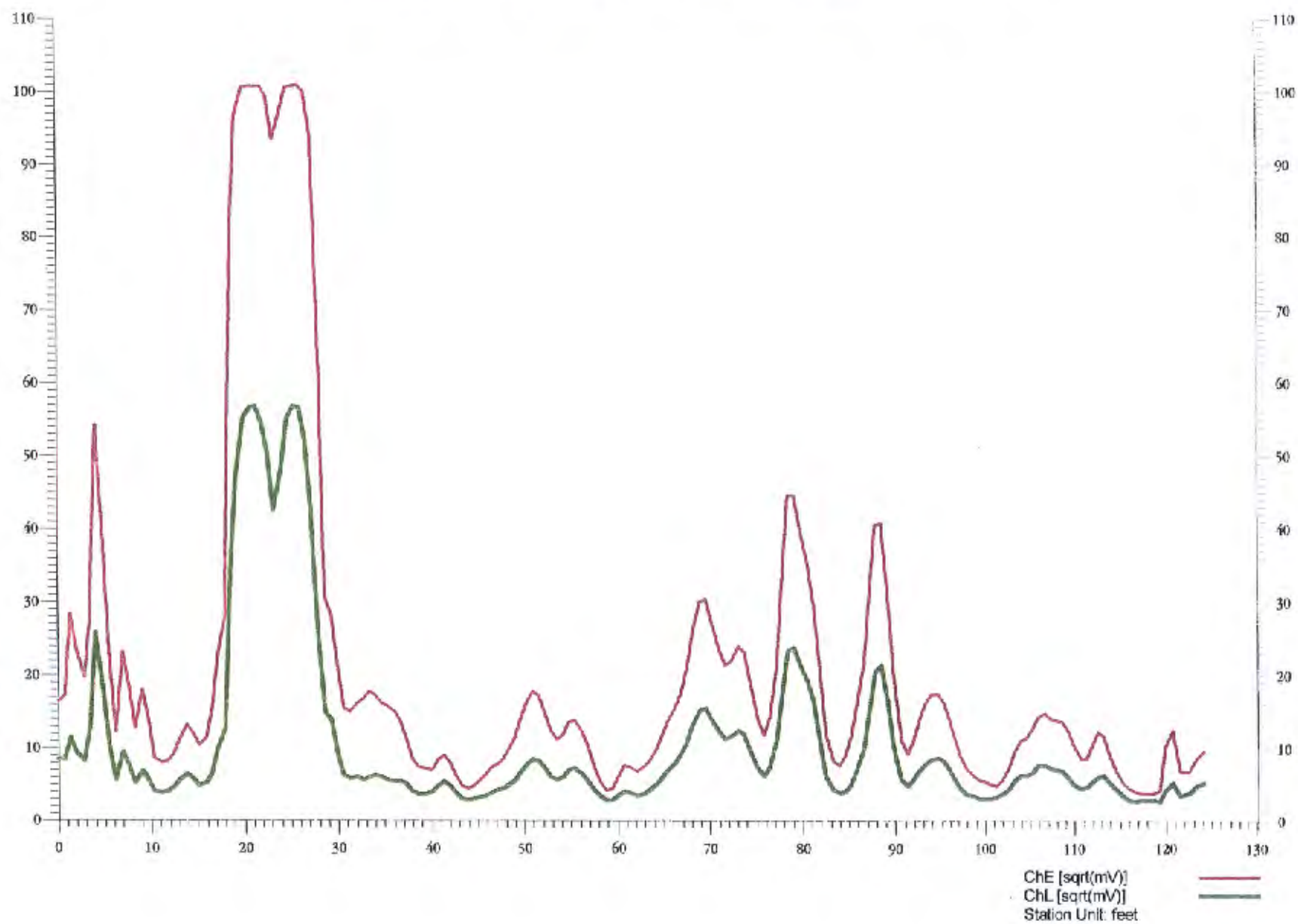
Map C3

APPENDIX C

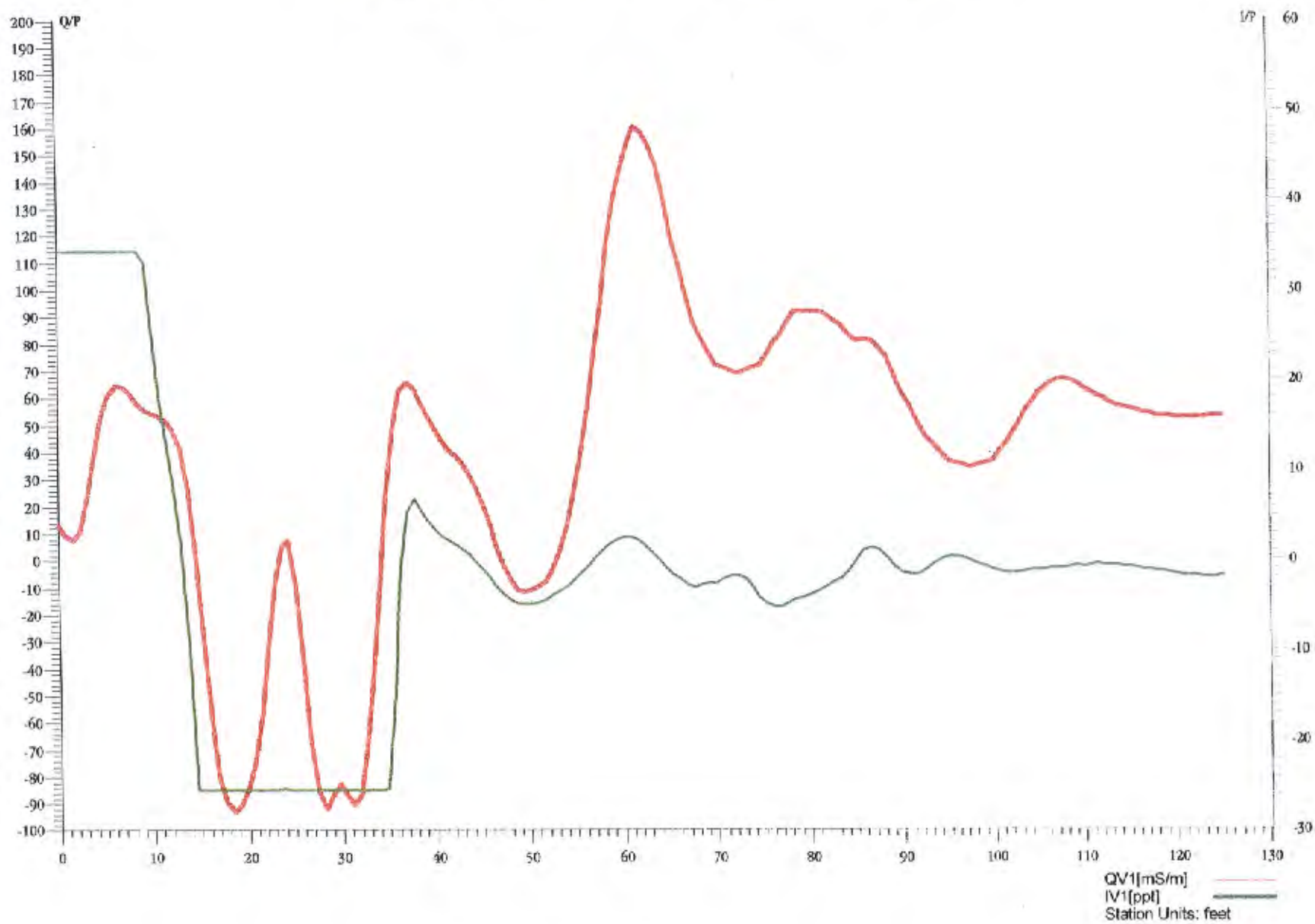
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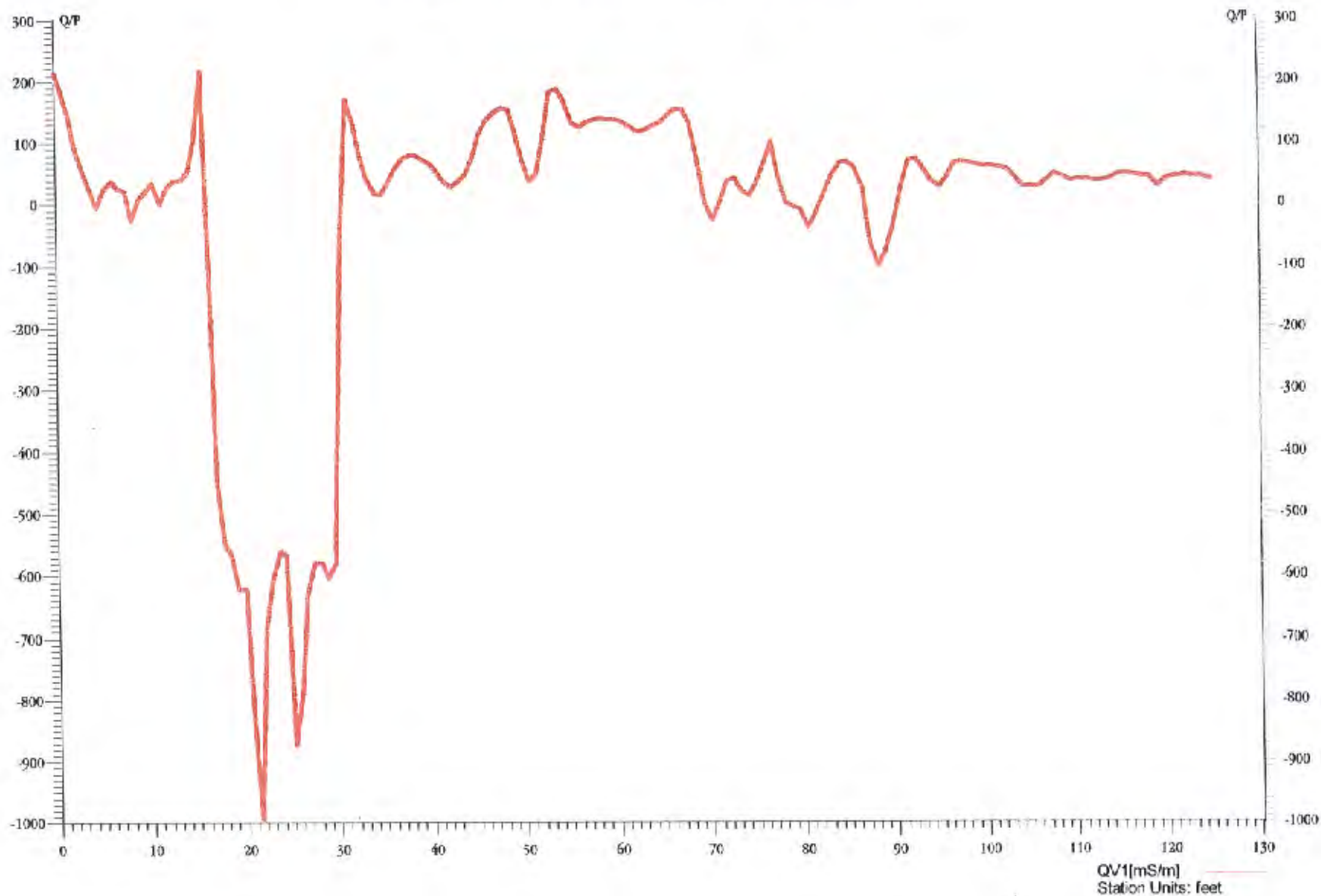
N.Y.S.E.G. Profile A - A' Geonics EM61-HH



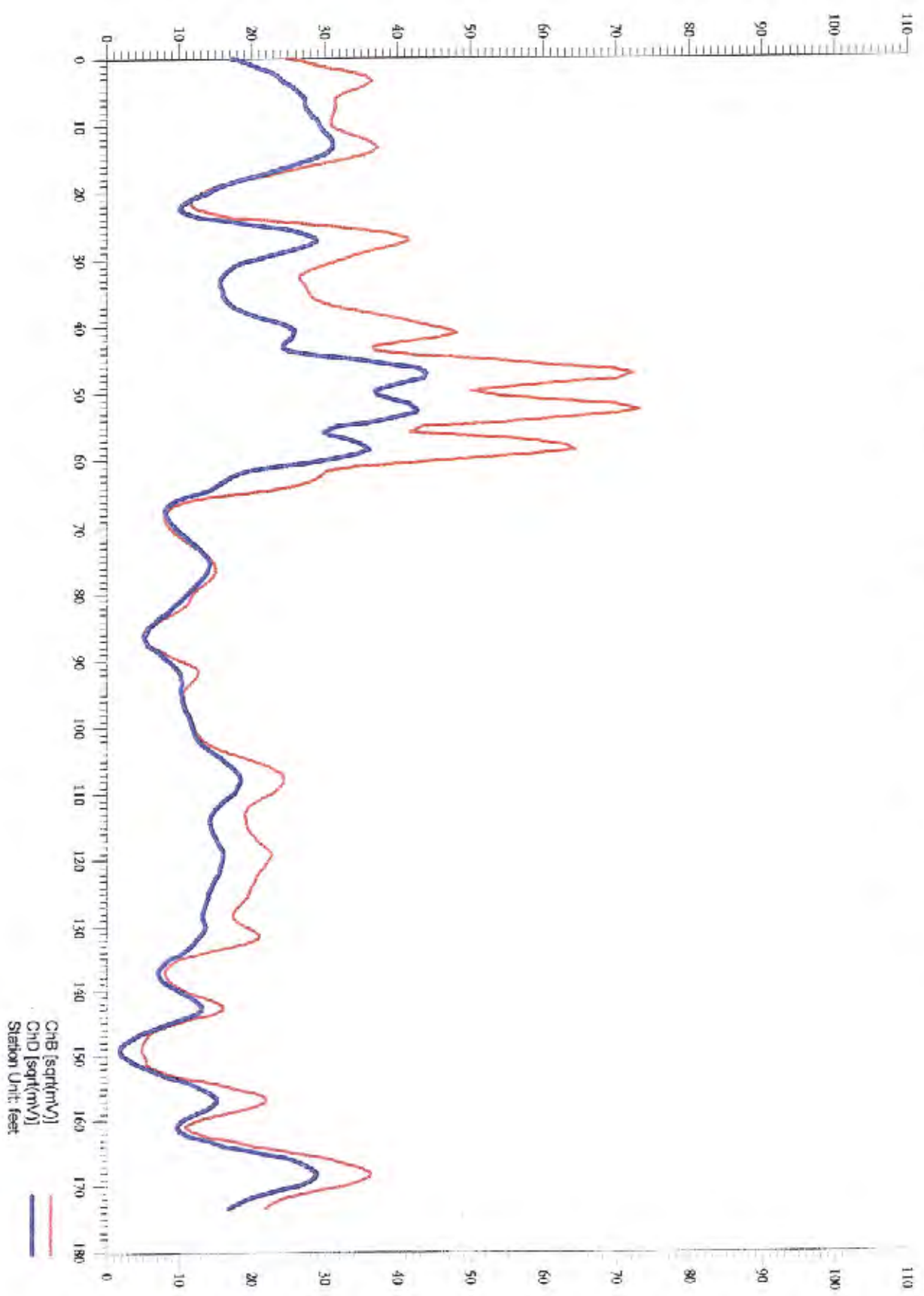
N.Y.S.E.G. Profile A - A' Geonics EM31



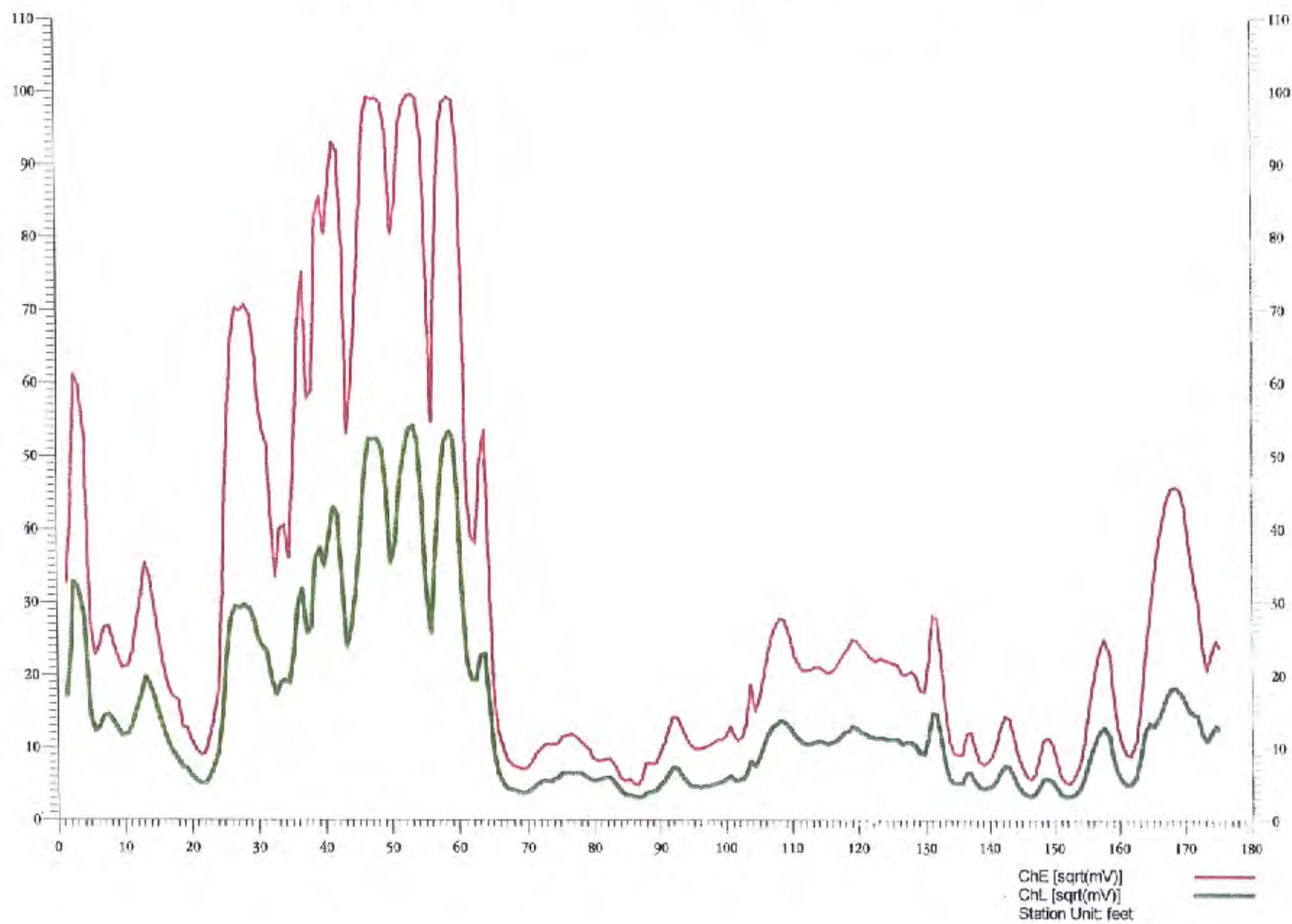
N.Y.S.E.G. Profile A - A' Geonics EM38



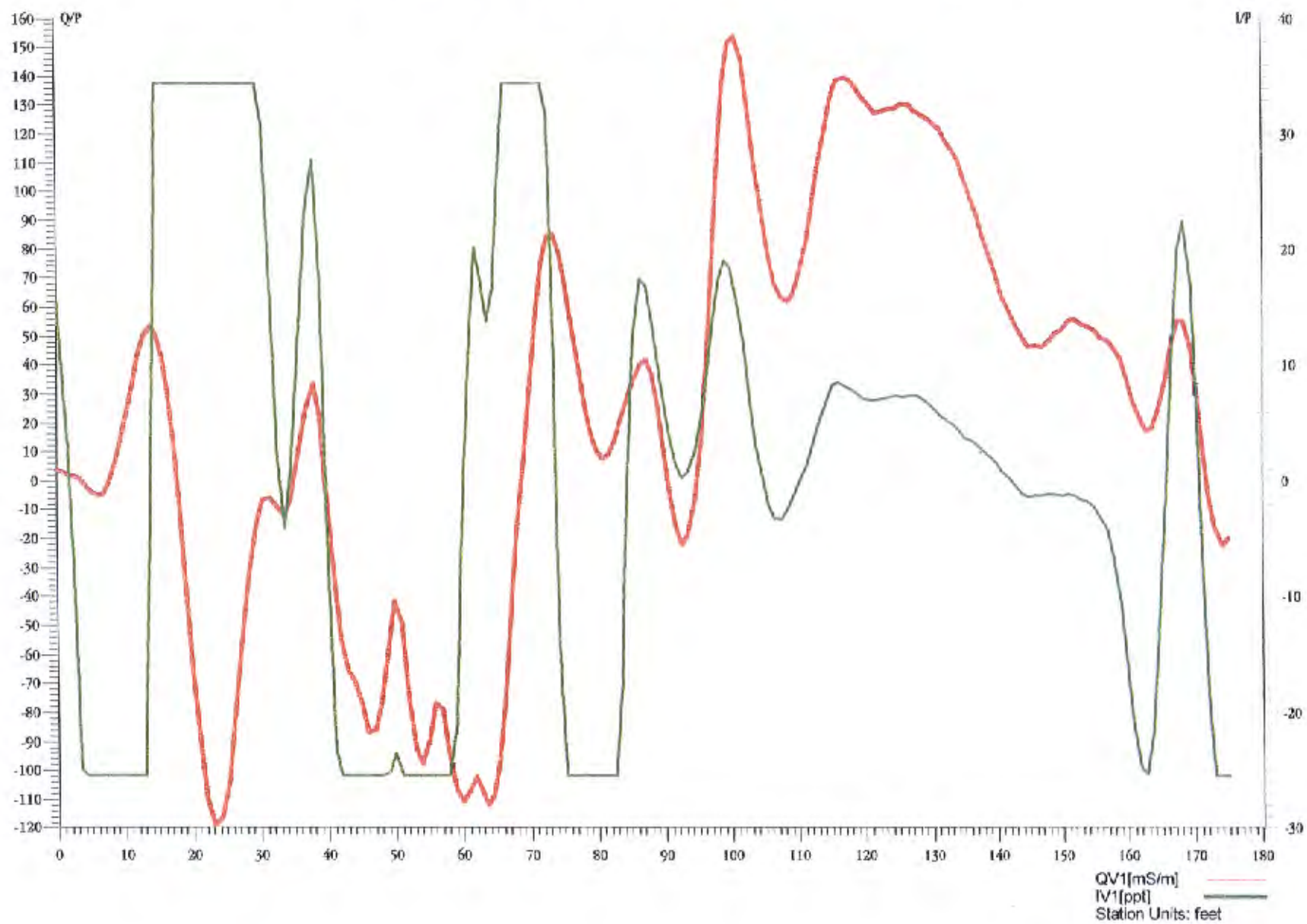
N.Y.S.E.G. Profile B' - B Geonics EM61



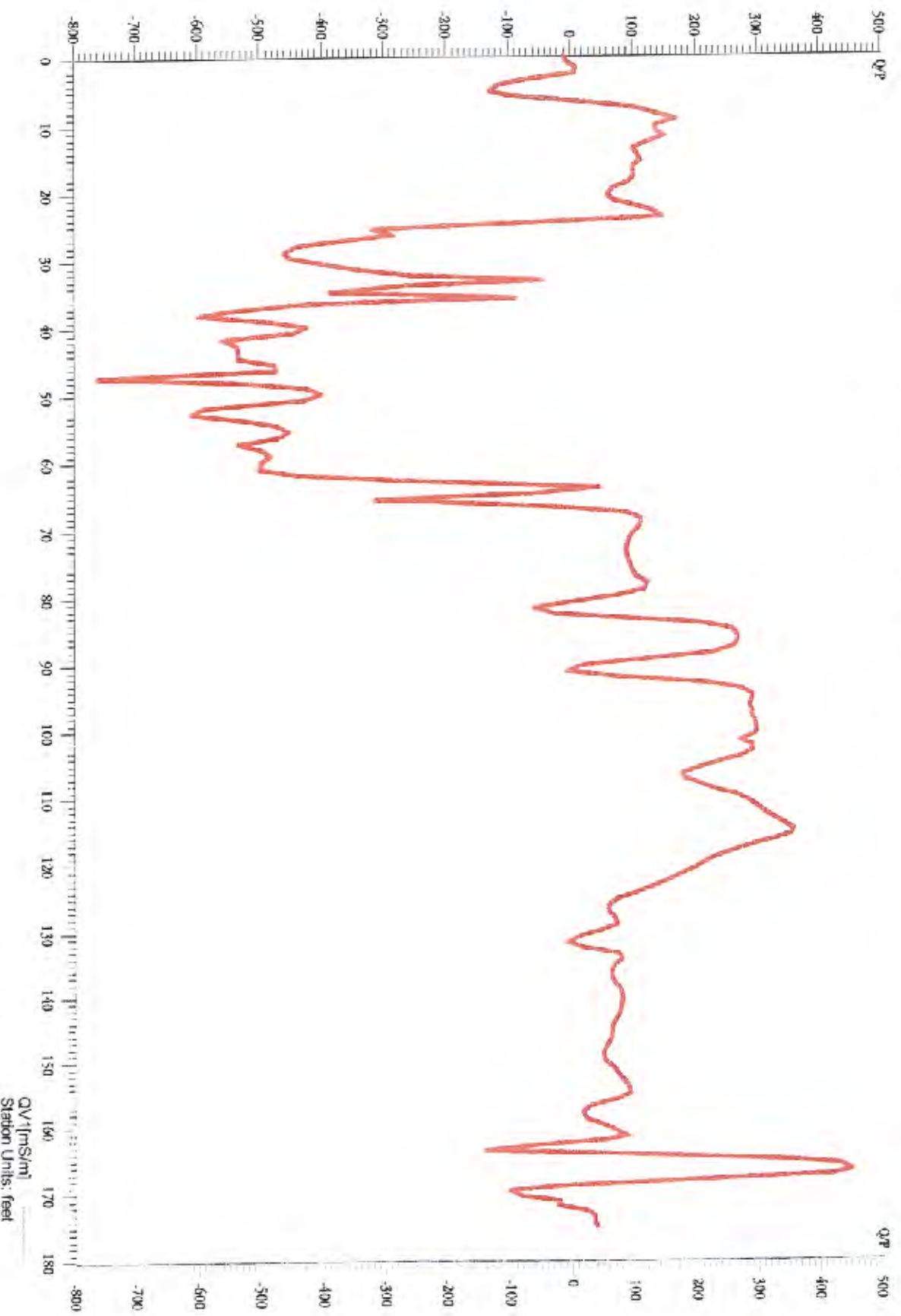
N.Y.S.E.G. Profile B' - B Geonics EM61-HH



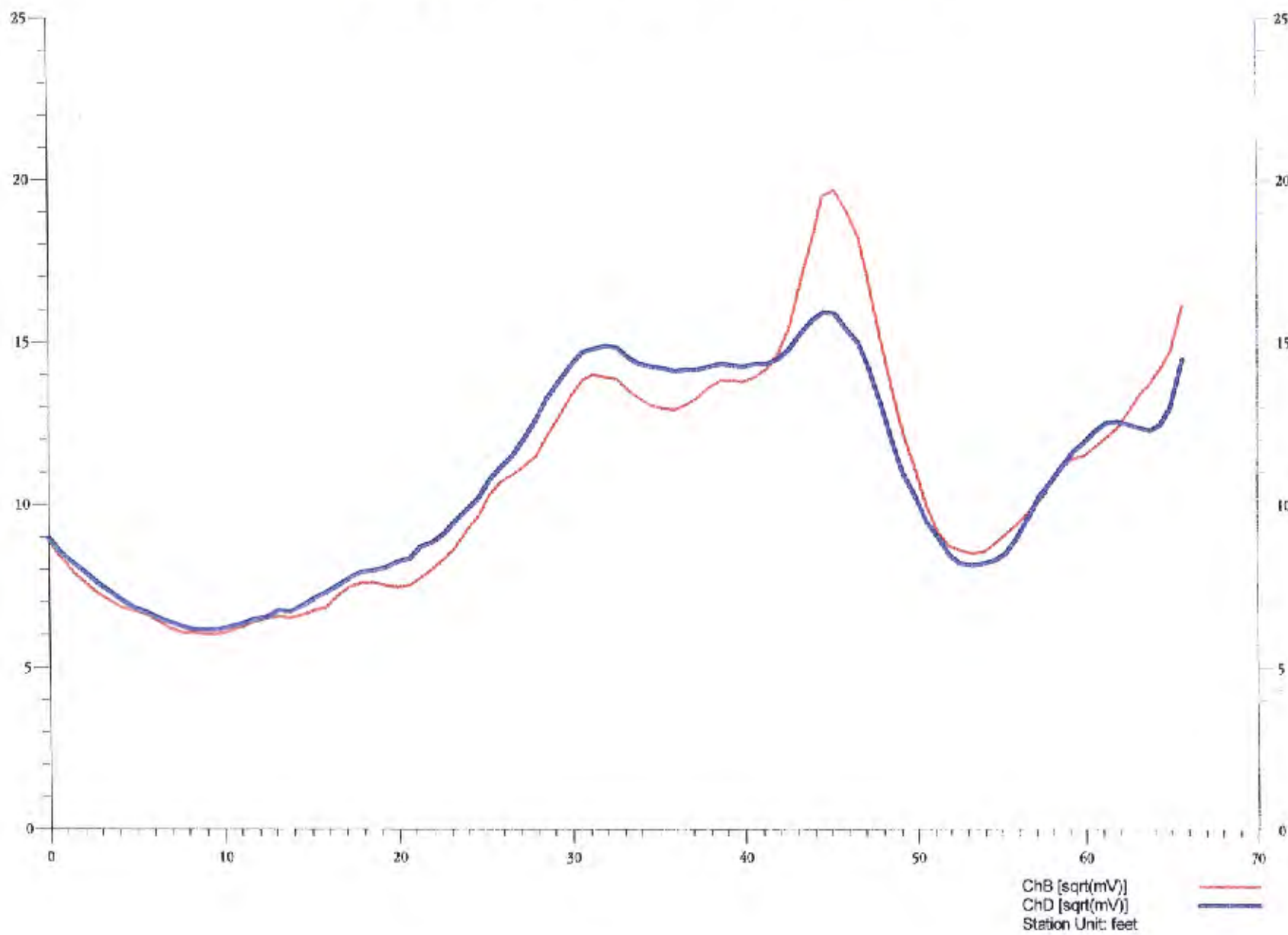
N.Y.S.E.G. Profile B' - B Geonics EM31



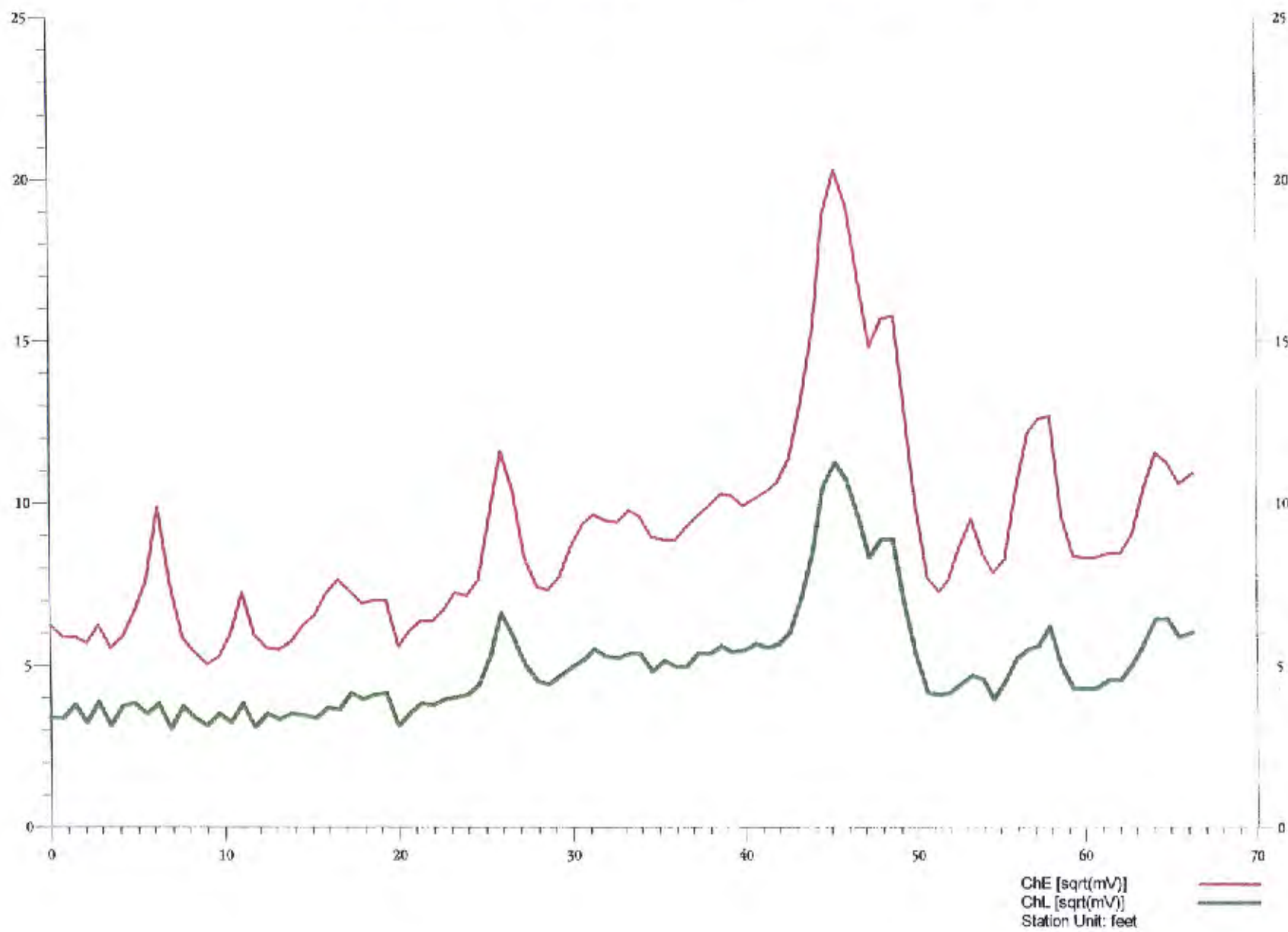
N.Y.S.E.G. Profile B' - B Geonics EM38



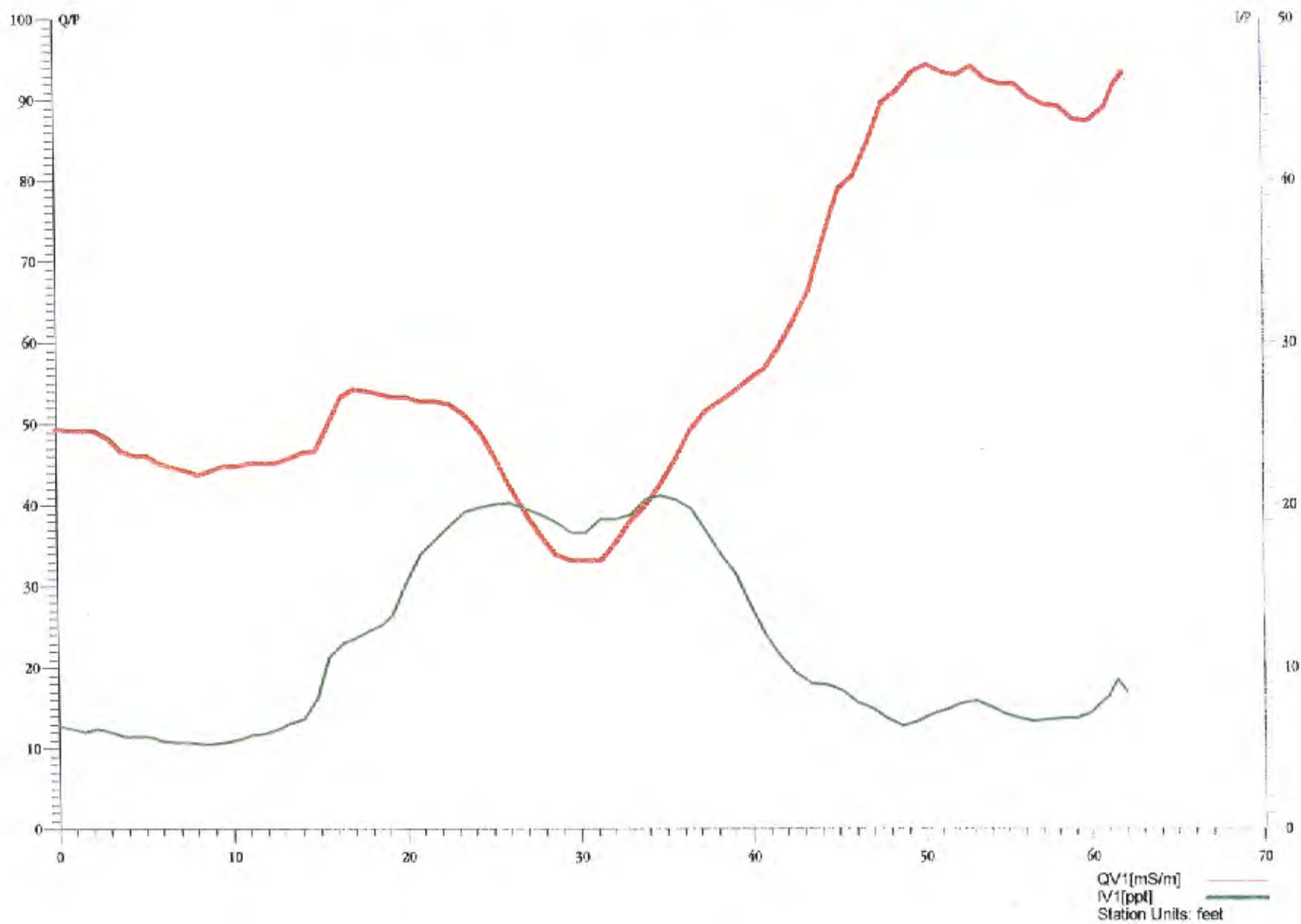
N.Y.S.E.G. Profile C - C' Geonics EM61



N.Y.S.E.G. Profile C - C' Geonics EM61-HH



N.Y.S.E.G. Profile C - C' Geonics EM31



N.Y.S.E.G. Profile C - C' Geonics EM38

