

**North Carolina Department of Transportation**

**GEOPHYSICAL SURVEYS**

**WBS Element 32179, TIP P-3800  
Multi Modal Station - Charlotte  
Mecklenburg County, North Carolina**

August 23, 2005

Project Number 03211019.04-19



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**North Carolina Department of Transportation**  
**GEOPHYSICAL SURVEYS**  
**WBS Element 32179, TIP P-3800, Multi Modal Station - Charlotte**  
**Mecklenburg County, North Carolina**

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## **1.0 INTRODUCTION**

At the request of the NCDOT, Schnabel Engineering South conducted geophysical surveys on March 28 through April 2 to determine UST locations and provide archaeological and environmental information for the proposed archaeological trench lines at the Multi Modal Station - Charlotte in Mecklenburg County, NC. The work consisted of conducting Electromagnetic (EM) and Ground-Penetrating Radar (GPR) surveys. The proposed archaeological line locations are shown on Figure 1. The results of the EM and GPR surveys are shown in Figures 2 through 51.

## **2.0 METHODOLOGY**

### **2.1 Location Control**

Locations of geophysical data points were obtained using a sub-meter Trimble Pro-XRS DGPS system. An X-Y survey grid was set up on the three parcels to aid in the data collection. The start and end points of the proposed archaeological trenches were located using the DGPS system, and a fiberglass tape was stretched between the points for location control. References to direction and location in this report are based on the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 83 datum. The locations of existing site features (building, curbs, signs, etc.) were recorded for later correlation with the geophysical data and for location references to the NCDOT drawings.

### **2.2 Data Collection and Processing**

For parcels 3a, 9, and 14, EM data were collected along parallel survey lines spaced approximately 2.5 feet apart using a Geophex GEM-2 instrument. The GEM-2 and DGPS data were recorded digitally using a field computer and later transferred to a desktop computer for data processing. The GPR data were collected along survey lines spaced two feet apart in orthogonal directions over anomalous EM readings not attributed to cultural features, using a Geophysical Survey Systems SIR-2000 system equipped with a 400 MHz antenna. The GPR data were reviewed in the field to

evaluate the possible presence of UST's. The GPR data also were recorded digitally and later transferred to a desktop computer for further review.

For the proposed archaeological trench lines, GEM-2 and GPR data were recorded along the proposed trench centerlines and along a parallel line offset about 10 feet to either side of the trench alignment, for a total of 3 survey lines along each alignment.

For parcels 3a, 9, and 14, GEM-2 data were processed using the following programs: WinGEM version 1.50, WinGEM version 3.0.0.8, Microsoft Excel 2000, GPS Pathfinder Office version 2.90, and Surfer version 8.01. Processing steps included converting raw data to comma-delimited format, editing the data, converting GPS positions to US State Plane system, applying GPS positioning to the GEM-2 data, making blanking files and base maps, and gridding and contouring the data.

For the proposed archaeological trench lines, GEM-2 data were processed using the following programs: WinGEM version 1.50, WinGEM version 3.0.0.8, Microsoft Excel 2000, and Surfer version 8.01. Processing steps included converting raw data to comma-delimited format, editing the data, and gridding and contouring the data.

GPR data were analyzed using Radan version 5.0, written by Geophysical Survey Systems. Analysis steps included filtering, distance normalization, and gaining, all on an "as needed" basis.

Preliminary figures were posted on Schnabel Engineering's file transfer protocol (ftp) site on May 3, 2005.

### **3.0 DISCUSSION OF RESULTS**

The contoured GEM-2 data are shown on Figures 2 through 32. Parcel 3a is shown on Figures 2 through 5, Parcel 9 is shown on Figures 6 through 9, Parcel 14 is shown on Figures 10 through 13, and the proposed archaeological trench lines are shown on Figures 14 through 32. The in-phase data, which shows anomalies associated with metal objects, are plotted on Figures 2, 3, 6, 7, 10, 11, and 14 through 32. The quadrature data, which shows anomalies related to non-metallic debris or

changes in soil properties (when not associated with an in-phase anomaly), are shown on Figures 4, 5, 8, 9, 12, 13, and 14 through 32. As the frequency of the transmitted electromagnetic energy decreases, the depth of penetration increases. Two frequencies, 1170 Hz and 47010 Hz, are shown for each dataset, and the 1170 Hz data give a greater depth of penetration than the 47010 Hz data. The GPR data from the proposed archaeological trench lines are shown on Figures 33 through 51. The GEM-2 data for Parcels 3a, 9, and 14 are also shown at a scale of 1 inch = 50 feet on Figures 52 through 57.

### **3.1 Parcel 3a**

Parcel 3a is located southwest of the intersection of West 4<sup>th</sup> Street and the Southern Railway Railroad Tracks in Charlotte, NC. The site contains a gravel parking lot. The GEM-2 results for Parcel 3a are shown on Figures 2 and 3 (in-phase) and Figures 4 and 5 (quadrature). The 47010 Hz and the 1170 Hz in-phase results indicate several high amplitude anomalies along the southeastern edge of the parcel, as well as a high amplitude anomaly in the northeastern portion of the parcel (Figures 2 and 3). The anomalies along the southeastern edge of the parcel are probably caused by metallic debris and reinforced concrete on the adjacent property to the southeast. The 47010 Hz quadrature results indicate several linear anomalies, most of which can be attributed to known cultural features or data collection artifacts (Figure 4). A linear anomaly in the western portion of the parcel is probably caused by a buried utility. Most of the observed anomalies are not present in the deeper (1170 Hz) quadrature results (Figure 5). GPR surveys were conducted over the anomaly in the northeastern portion of the parcel. The GPR data did not indicate the presence of UST's in the area surveyed.

### **3.2 Parcel 9**

Parcel 9 is located at the northeast corner of the intersection of West 4<sup>th</sup> Street and Graham Street in Charlotte, NC. The site contains an asphalt parking lot with one small building. The GEM-2 results for Parcel 3a are shown on Figures 6 and 7 (in-phase) and Figures 8 and 9 (quadrature). The 47010 Hz and the 1170 Hz in-phase results indicate several high amplitude anomalies to the south of the building, as well as the southwest portion of the parcel (Figures 6 and 7). The 47010 Hz and 1170 Hz quadrature results indicate several high amplitude anomalies in the same areas as the in-phase

results (Figures 8 and 9). GPR surveys were conducted over the two anomalous areas. The GPR data did not indicate the presence of UST's in the area surveyed. The high amplitude anomalies are probably caused by metallic debris in the fill in these areas.

### 3.3 Parcel 14

Parcel 14 is located at the northeast corner of the intersection of West Trade Street and Wilkes Place in Charlotte, NC. The site contains a gravel parking lot. Areas occupied by bushes and trees could not be surveyed. The GEM-2 results for Parcel 14 are shown on Figures 10 and 11 (in-phase) and Figures 12 and 13 (quadrature). The 47010 Hz and the 1170 Hz in-phase results indicate several high amplitude anomalies; all but one, in the center of the parcel, can be attributed to known cultural features (Figures 10 and 11). The 47010 Hz quadrature results indicate several linear anomalies probably caused by buried utilities (Figure 12). The observed linear anomalies are not present in the deeper (1170 Hz) quadrature results (Figure 13), although several anomalies similar to the in-phase anomalies are observed. GPR surveys were conducted over the anomaly in the center of the parcel. The GPR data did not indicate the presence of UST's in the area surveyed. However, a UST was discovered by others upon excavation at the location of the high amplitude GEM-2 anomaly in the center of the parcel.

### 3.4 Proposed Archaeological Lines

The proposed archaeological line locations are shown on Figure 1. The GEM-2 data from the proposed archaeological lines are shown on Figures 14 through 32. The GPR data from the proposed archaeological trench lines are shown on Figures 33 through 51. Interpretations of GEM-2 anomalies attributed to known cultural features can be found on the figures. Upon excavation by others of an archaeological trench in the vicinity of Archaeological Line 17 on Parcel 3b<sup>\*</sup>, two UST's were uncovered. These two UST's were not discovered during the geophysical investigation because they were not located on the lines where we collected geophysical data.

\*Parcel is more likely to be at Parcel 3C per H&H UST removal document figure H&H 20050815 August 8, 2005 report

#### **4.0 CONCLUSIONS**

Our evaluation of the GEM-2 and GPR data collected for the Multi Modal Station project provides the following observation:

- The GEM-2 data indicated the presence of a UST on Parcel 14.
- The geophysical data did not indicate the presence of UST's in the areas surveyed on Parcels 3a, or 9.

#### **5.0 LIMITATIONS**

These services have been performed and this report prepared for the North Carolina Department of Transportation in accordance with generally accepted guidelines for conducting geophysical surveys. It is generally recognized that the results of geophysical surveys are non-unique and may not represent actual subsurface conditions.





APPROXIMATE  
NORTH

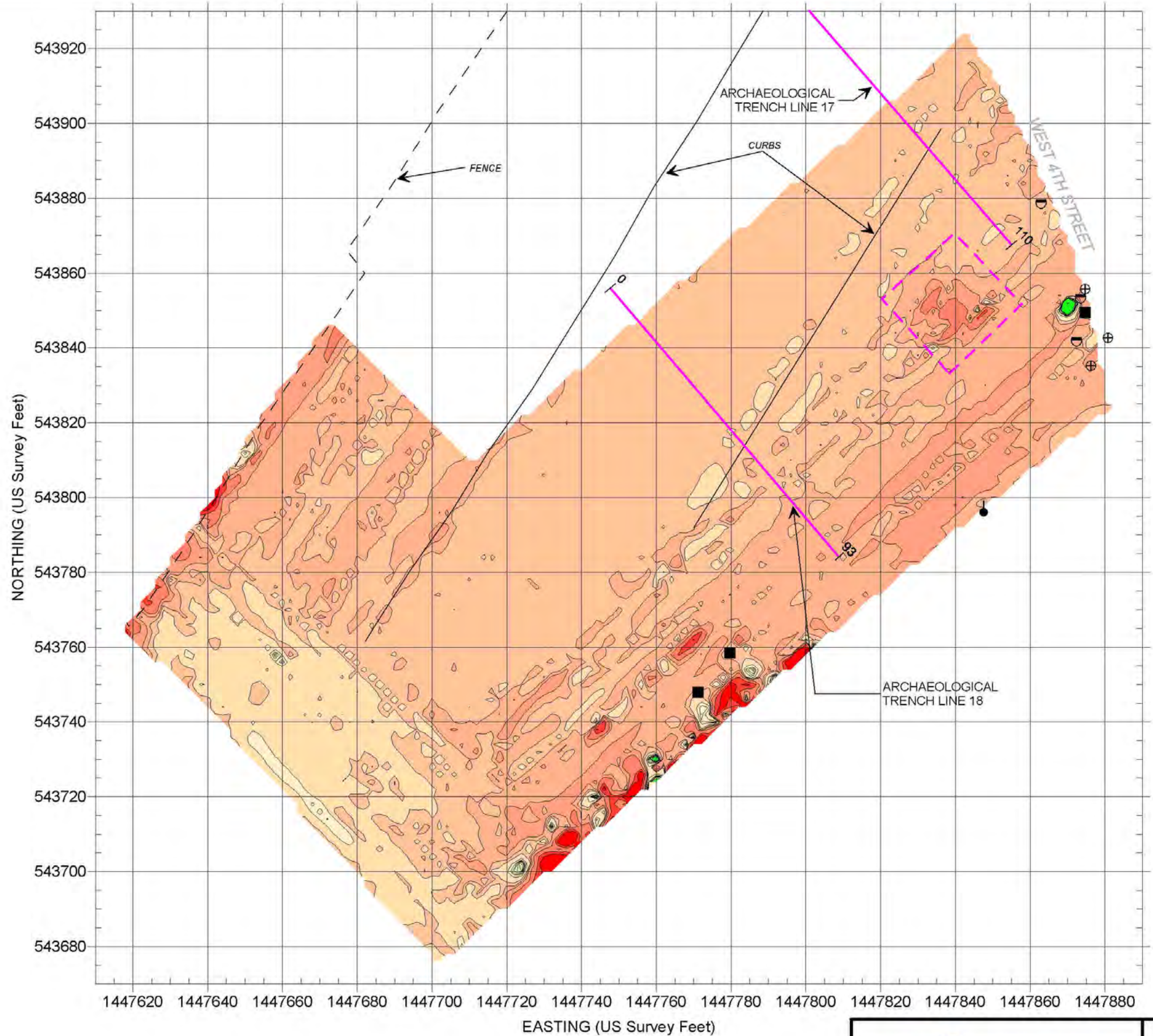


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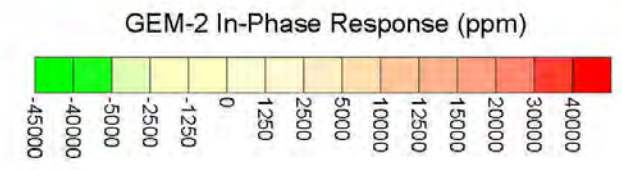
**ARCHAEOLOGICAL  
LINE LOCATIONS**

FIGURE 1



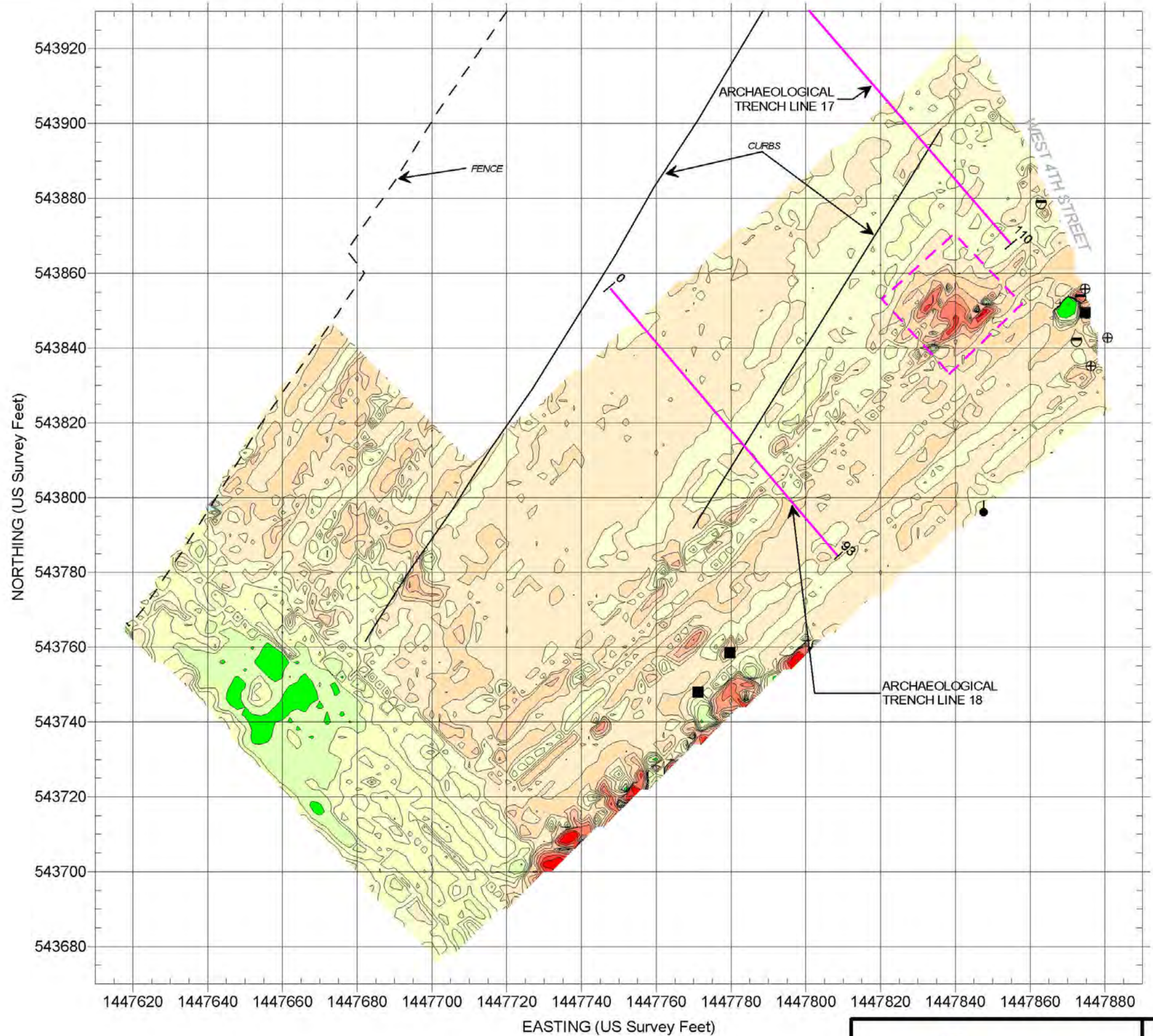
**EXPLANATION**

	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
	UTILITY POLE
	MANHOLE
	SIGN POST
	METALLIC OBJECT
	WATER METER
	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA



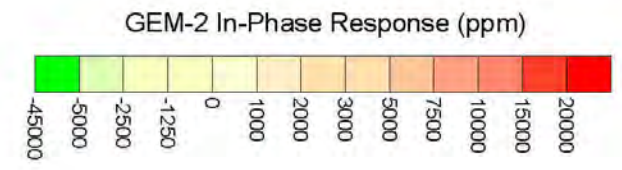
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PARCEL 3A  
 GEM-2 47010 Hz  
 IN-PHASE RESPONSE  
 FIGURE 2



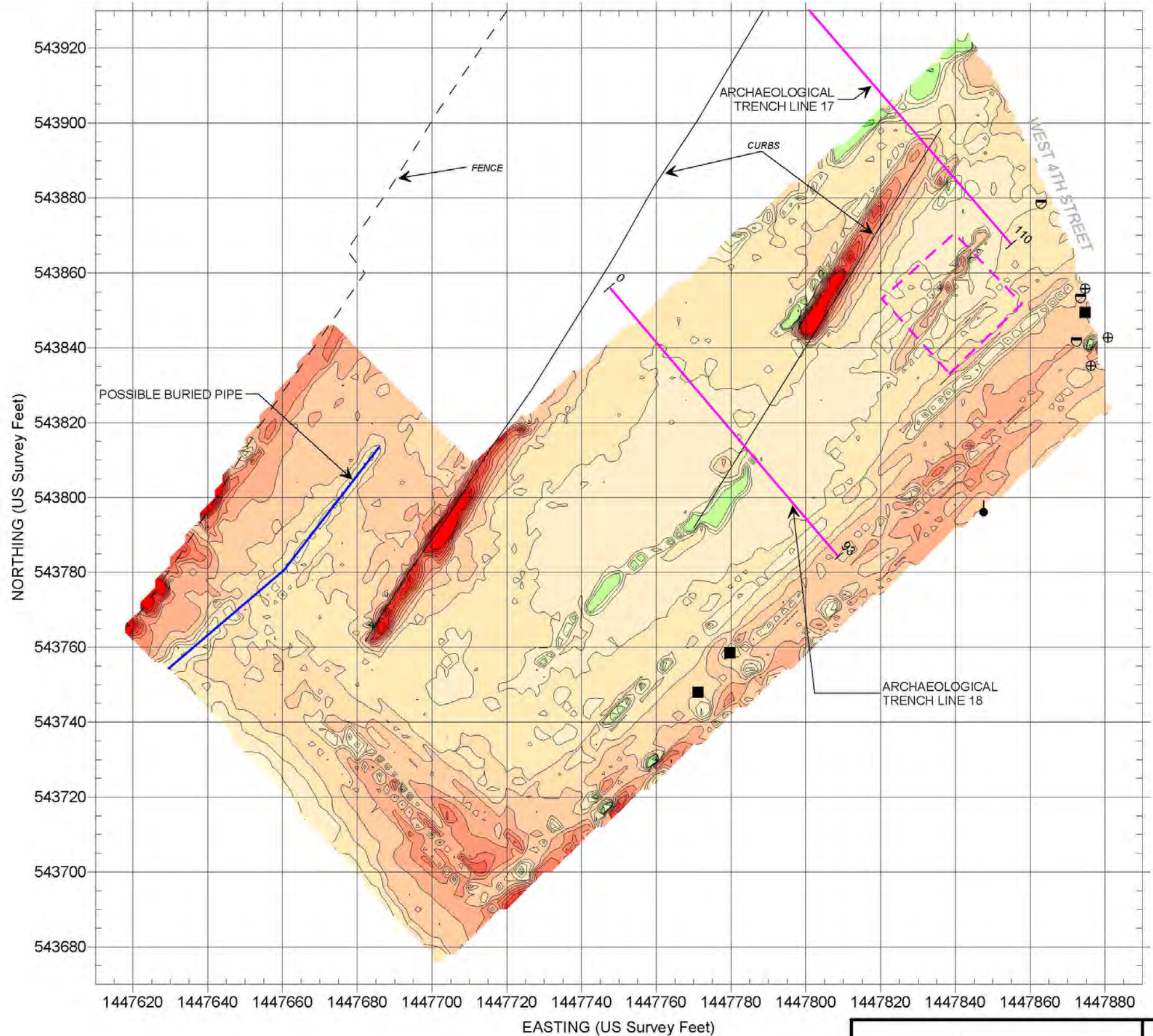
**EXPLANATION**

	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
	UTILITY POLE
	MANHOLE
	SIGN POST
	METALLIC OBJECT
	WATER METER
	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA



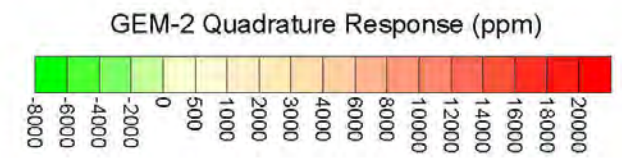
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PARCEL 3A  
 GEM-2 1170 Hz  
 IN-PHASE RESPONSE  
 FIGURE 3



**EXPLANATION**

	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
	UTILITY POLE
	MANHOLE
	SIGN POST
	METALLIC OBJECT
	WATER METER
	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA

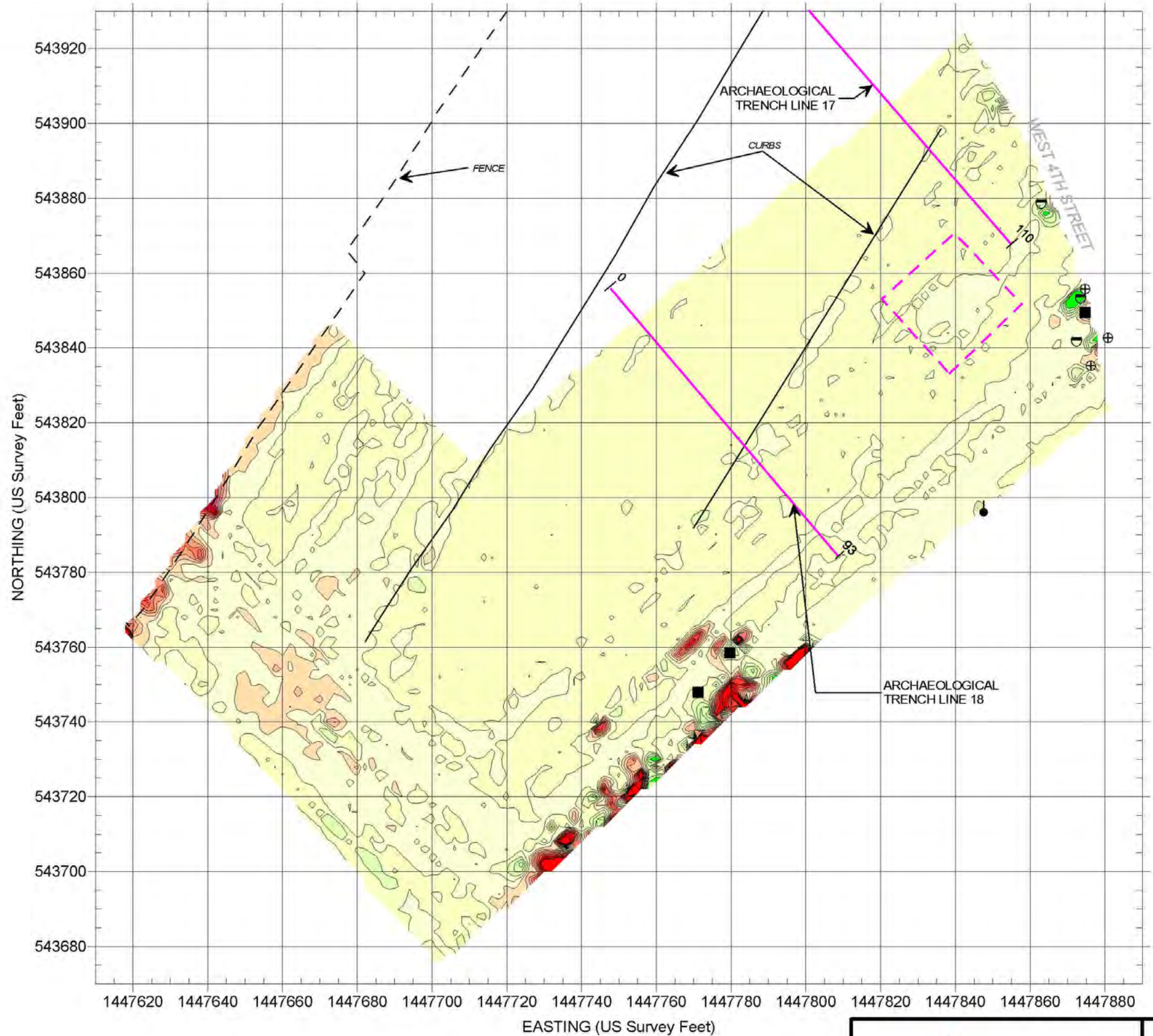


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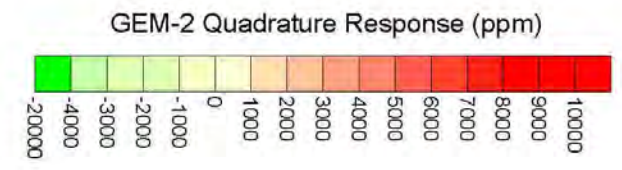
PARCEL 3A  
GEM-2 47010 Hz  
QUADRATURE RESPONSE

FIGURE 4



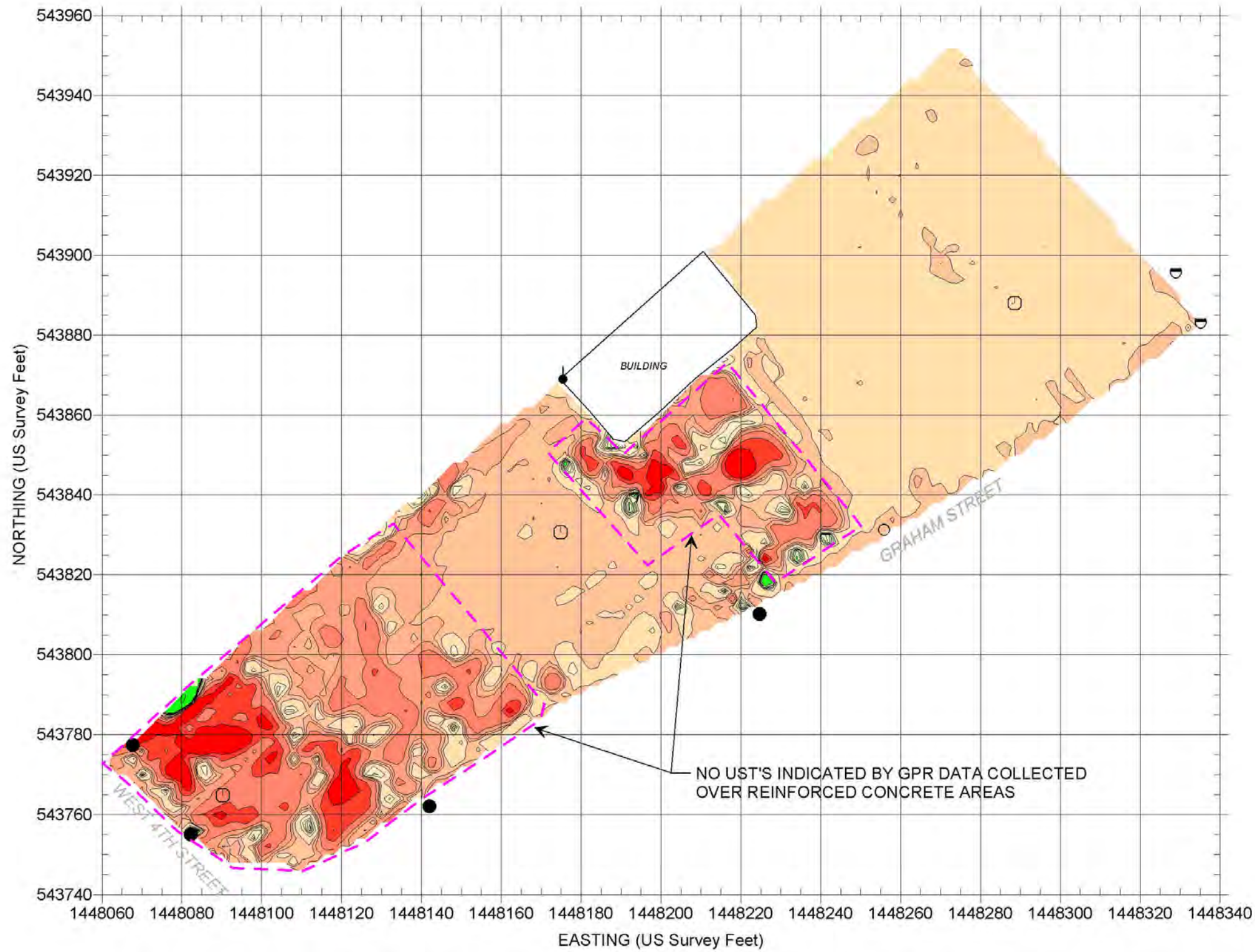
**EXPLANATION**

	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
	UTILITY POLE
	MANHOLE
	SIGN POST
	METALLIC OBJECT
	WATER METER
	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA

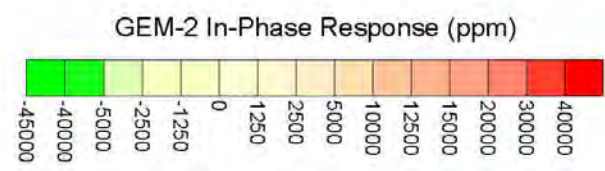


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PARCEL 3A  
GEM-2 1170 Hz  
QUADRATURE RESPONSE  
FIGURE 5

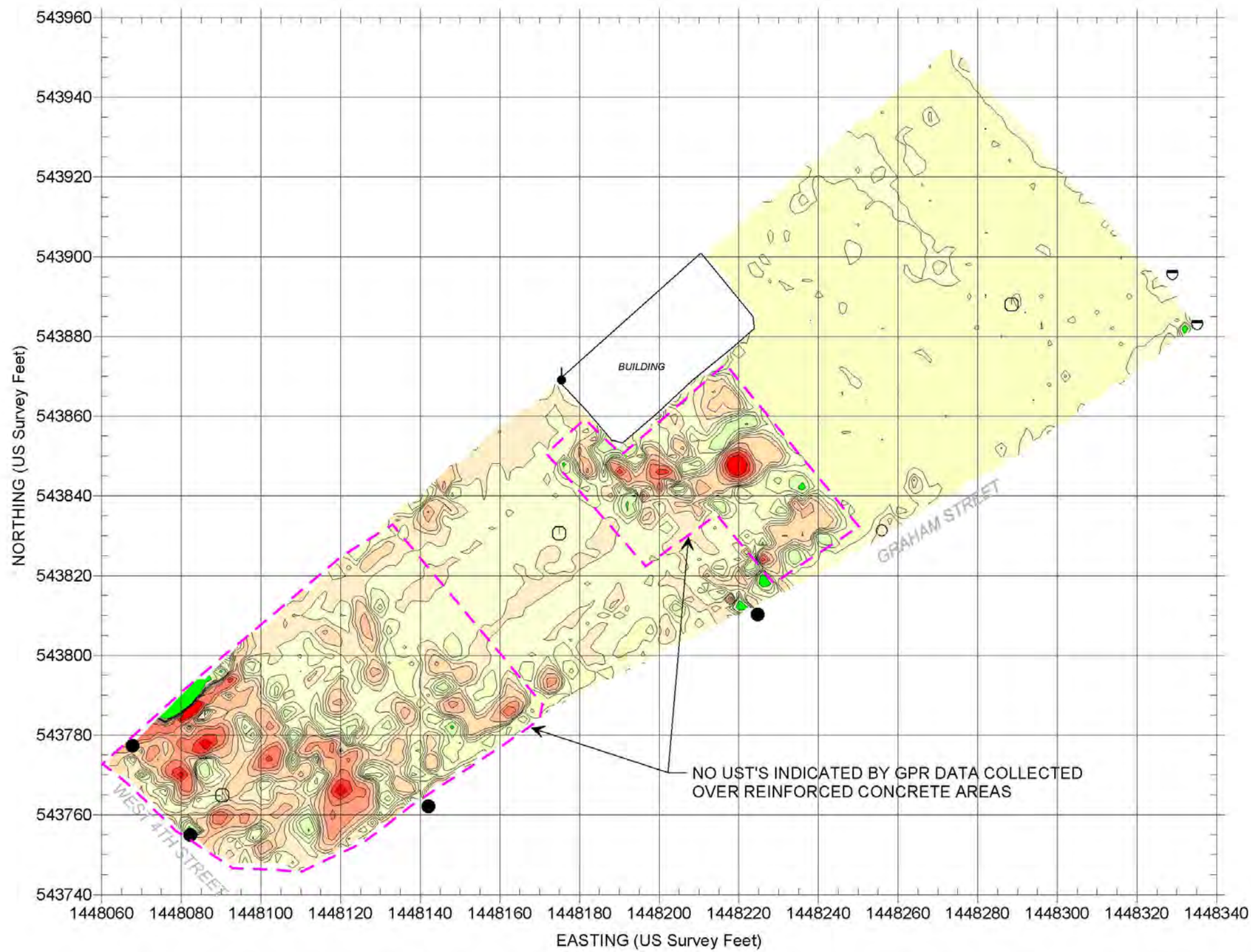


EXPLANATION	
	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
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	MANHOLE
	SIGN POST
	METALLIC OBJECT
	WATER METER
	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA

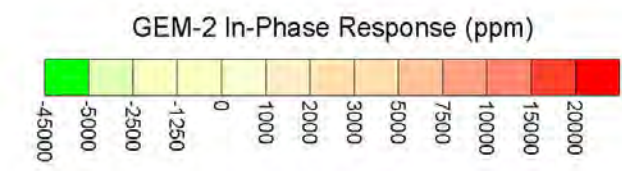


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PARCEL 9  
GEM-2 47010 Hz  
IN-PHASE RESPONSE  
FIGURE 6

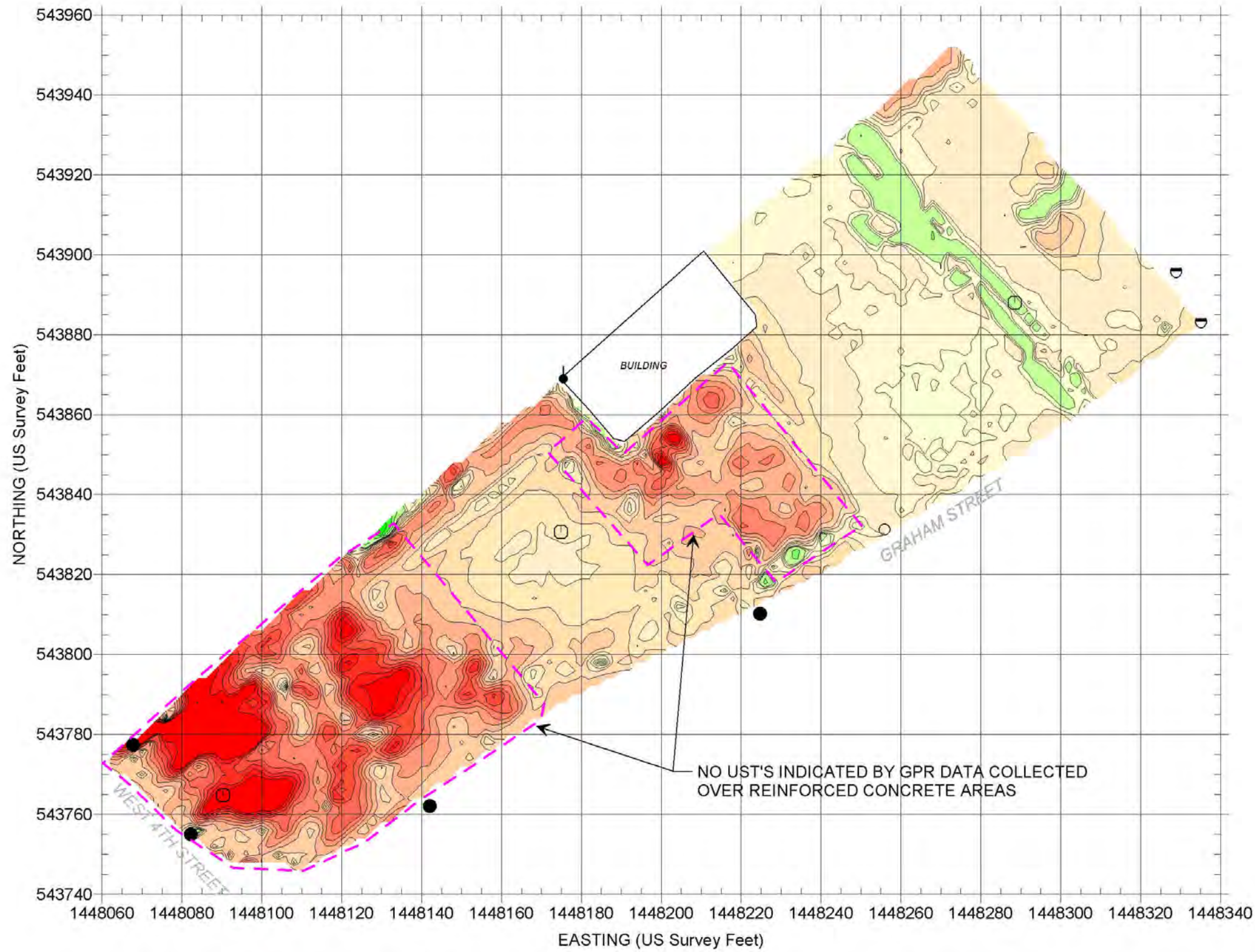


EXPLANATION	
	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
	UTILITY POLE
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	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA

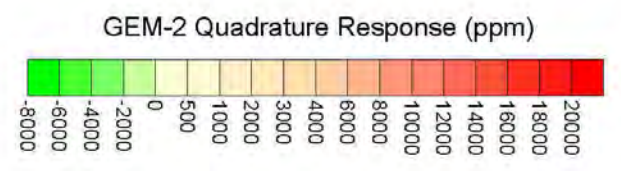


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PARCEL 9  
GEM-2 1170 Hz  
IN-PHASE RESPONSE  
FIGURE 7



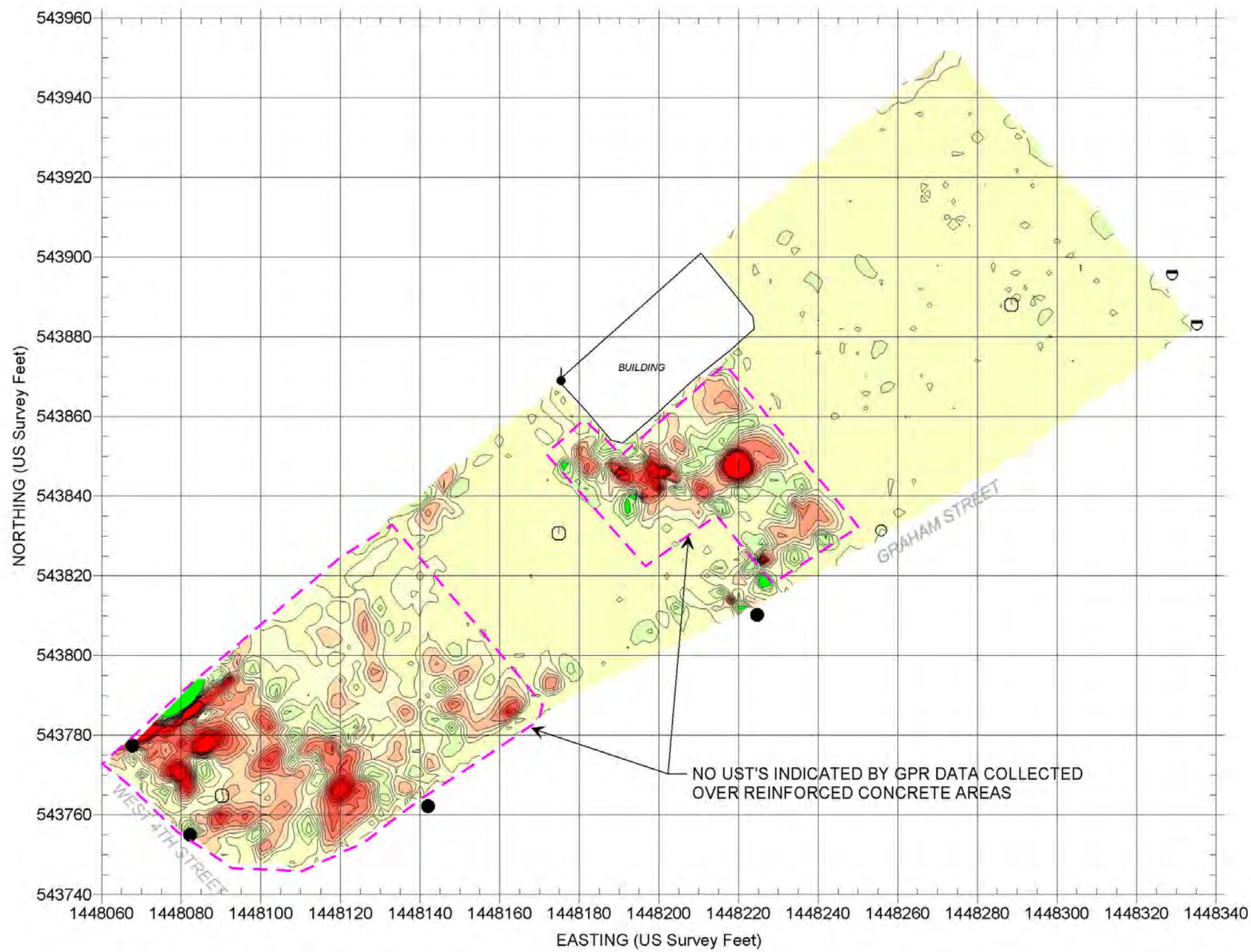
EXPLANATION	
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	WATER METER
	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA



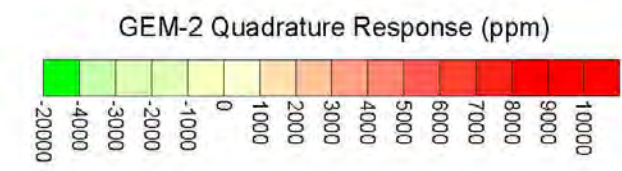
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Mecklenburg County

PARCEL 9  
GEM-2 47010 Hz  
QUADRATURE RESPONSE  
FIGURE 8



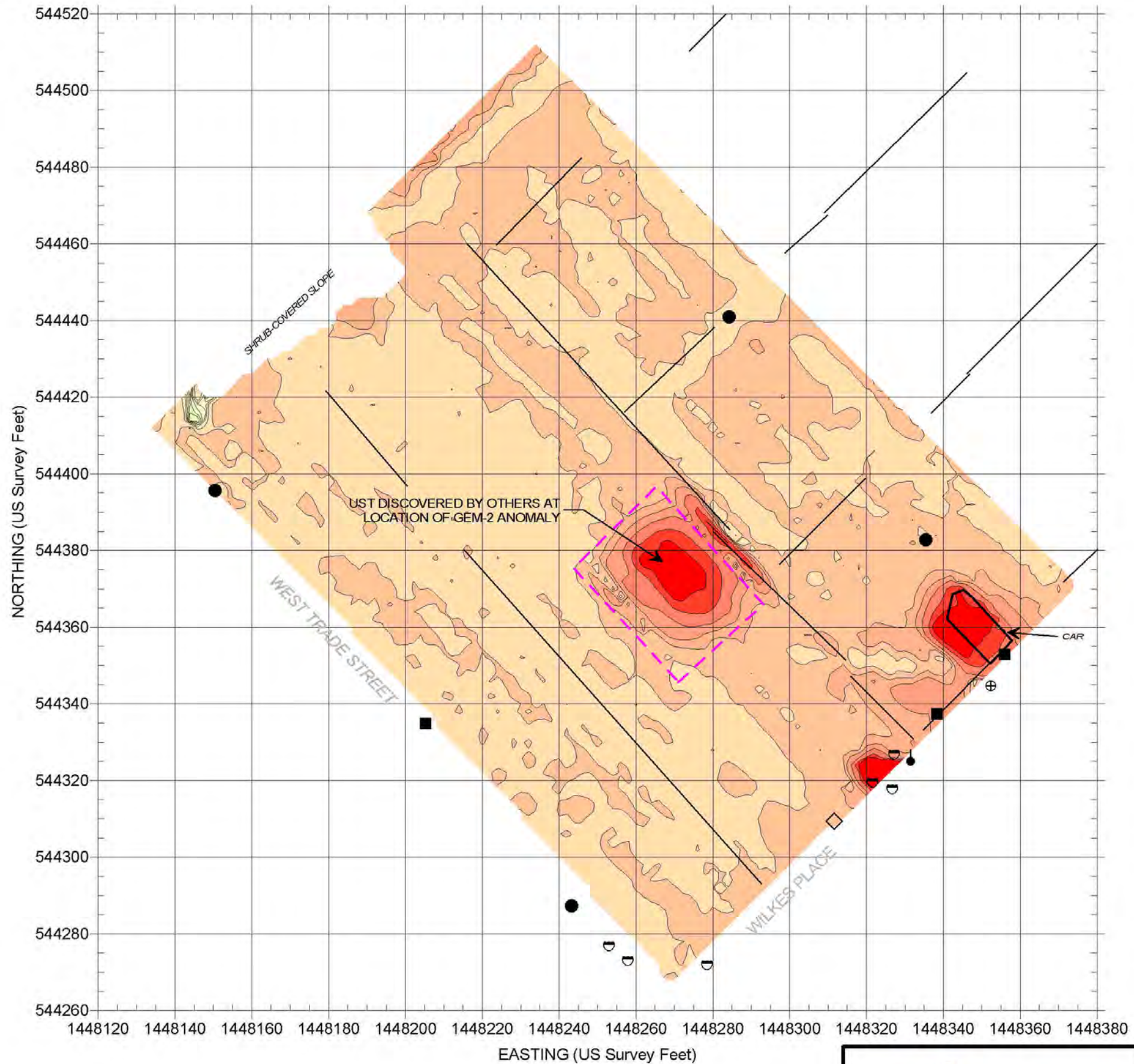


EXPLANATION	
	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
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	LIGHTPOLE
	GPR SURVEY AREA



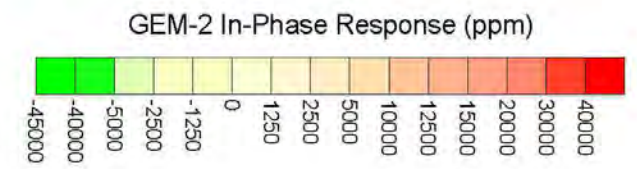
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Mecklenburg County

PARCEL 9  
GEM-2 1170 Hz  
QUADRATURE RESPONSE  
FIGURE 9



**EXPLANATION**

- GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
- UTILITY POLE
- ⊕ MANHOLE
- D SIGN POST
- METALLIC OBJECT
- WATER METER
- ◇ GAS LID
- ⊙ MONITORING WELL
- LIGHTPOLE
- GPR SURVEY AREA
- CURB



EASTING (US Survey Feet)



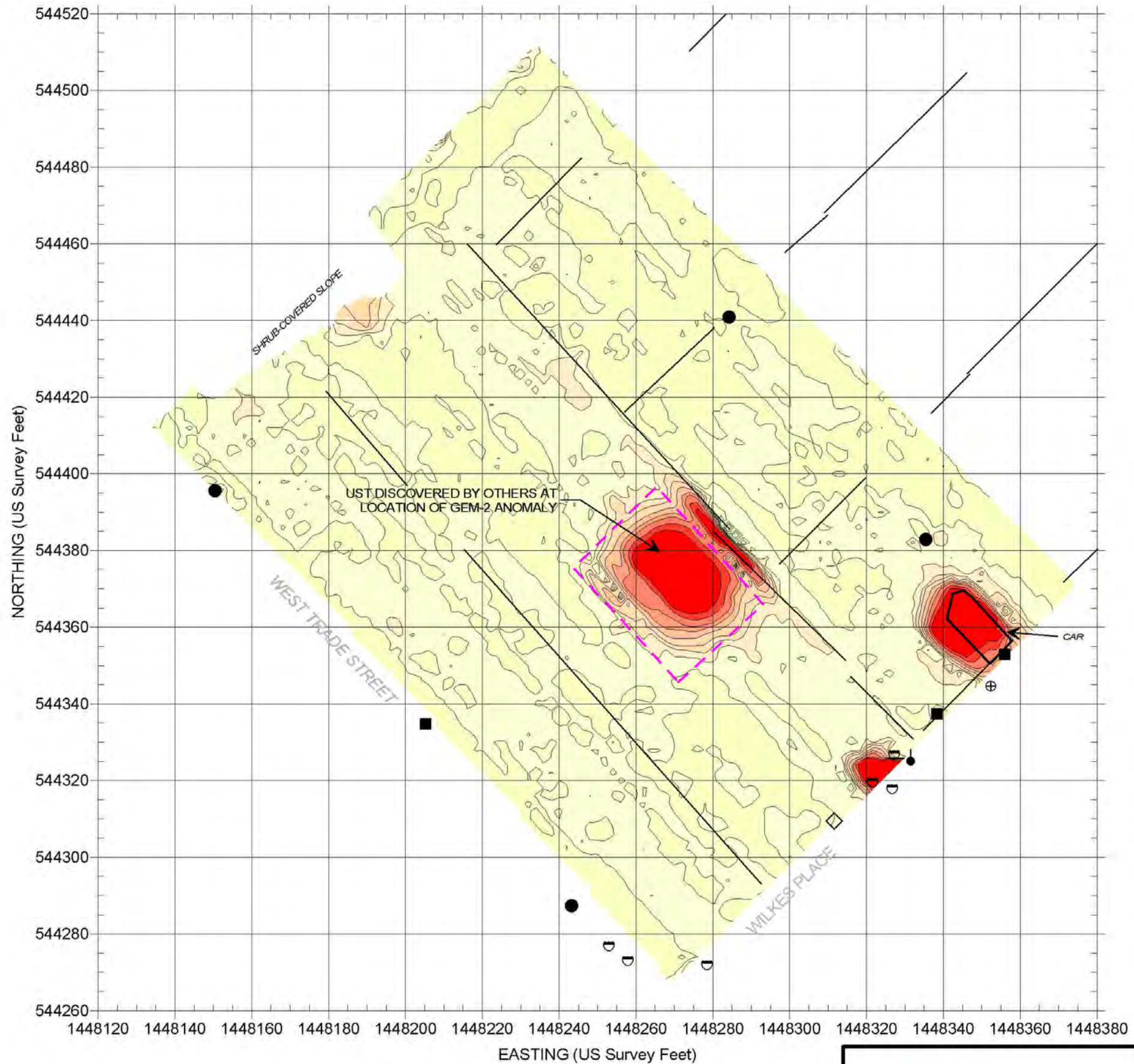
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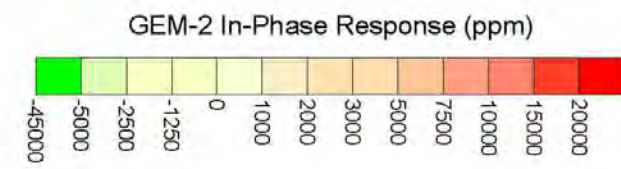
PARCEL 14  
GEM-2 47010 Hz  
IN-PHASE RESPONSE

FIGURE 10



**EXPLANATION**

- GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
- UTILITY POLE
- ⊕ MANHOLE
- D SIGN POST
- METALLIC OBJECT
- WATER METER
- GAS LID
- M MONITORING WELL
- LIGHTPOLE
- GPR SURVEY AREA
- CURB



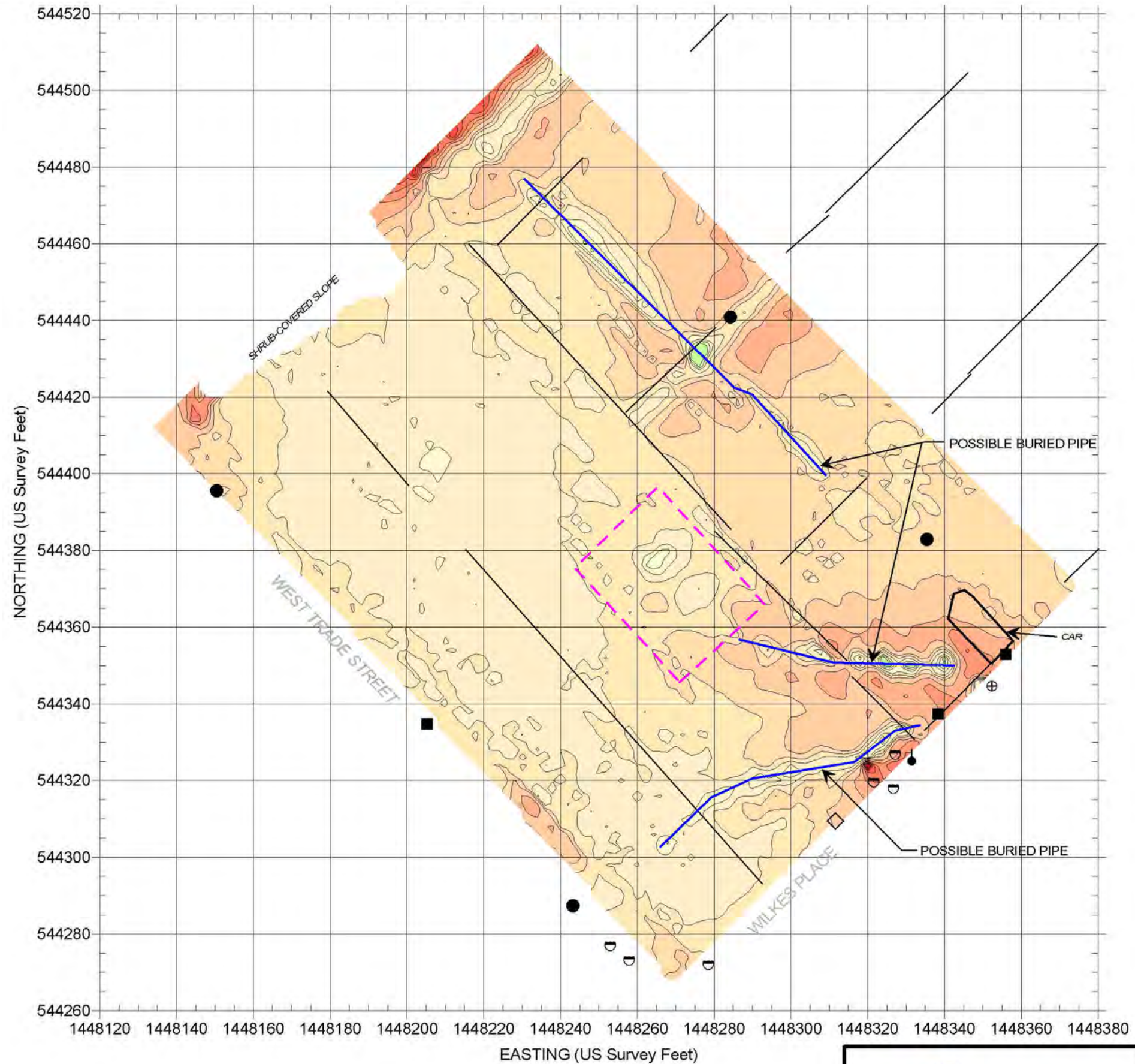
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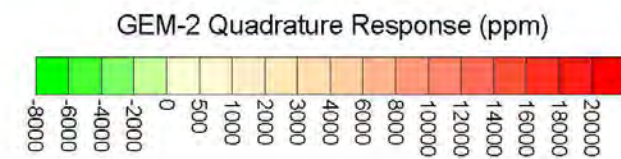
PARCEL 14  
GEM-2 1170 Hz  
IN-PHASE RESPONSE

FIGURE 11



**EXPLANATION**

	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
	UTILITY POLE
	MANHOLE
	SIGN POST
	METALLIC OBJECT
	WATER METER
	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA
	CURB

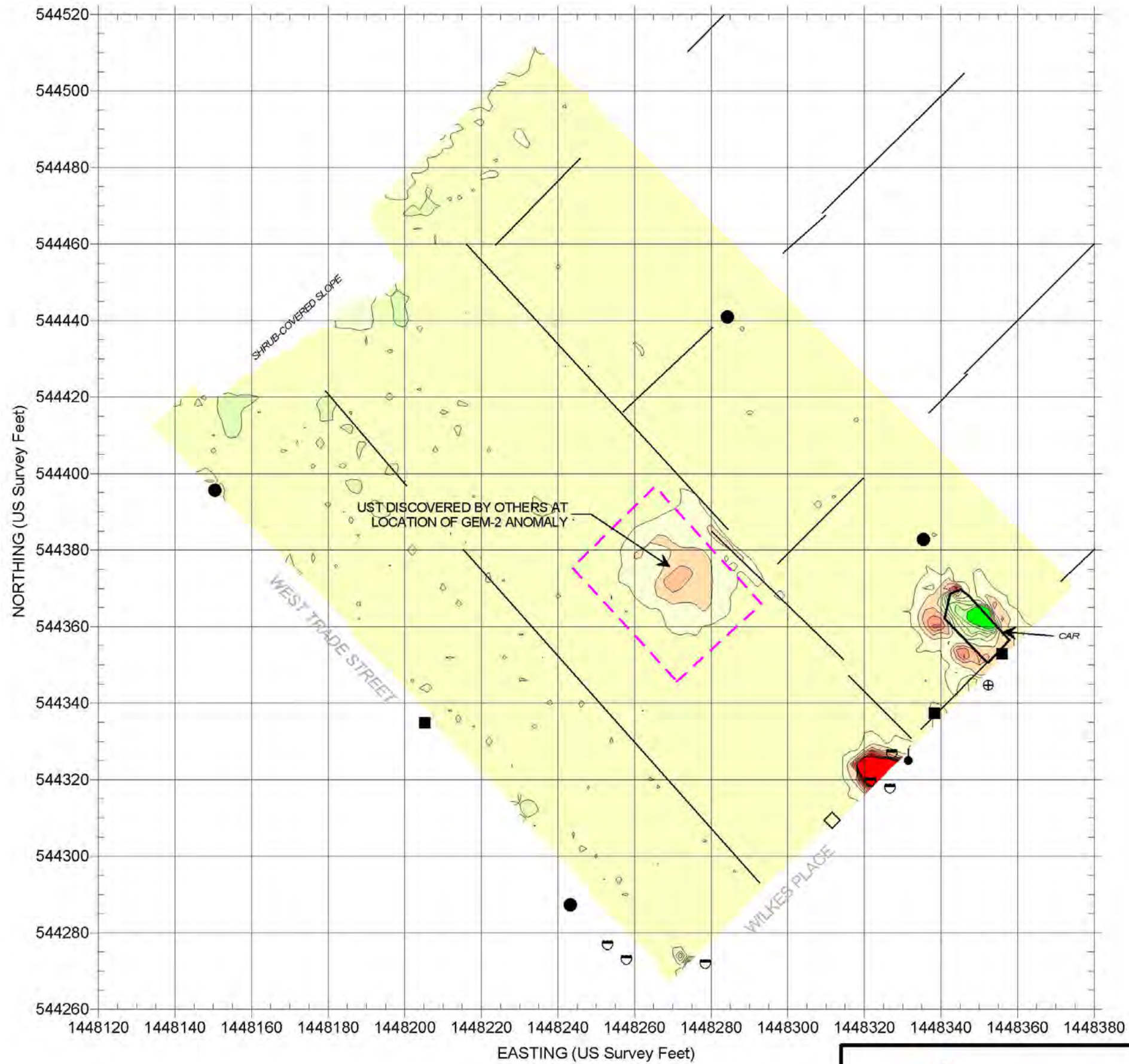


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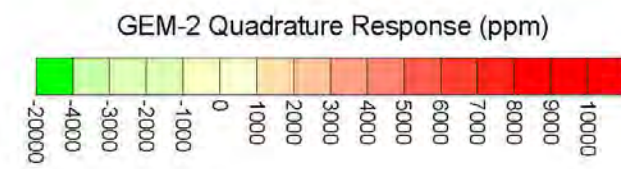
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Mecklenburg County

PARCEL 14  
GEM-2 47010 Hz  
QUADRATURE RESPONSE

FIGURE 12



EXPLANATION	
	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
	UTILITY POLE
	MANHOLE
	SIGN POST
	METALLIC OBJECT
	WATER METER
	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA
	CURB



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Geotechnical Engineering Unit

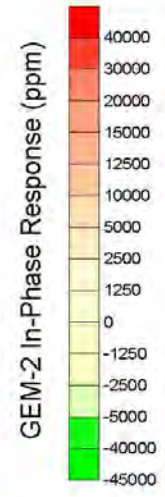
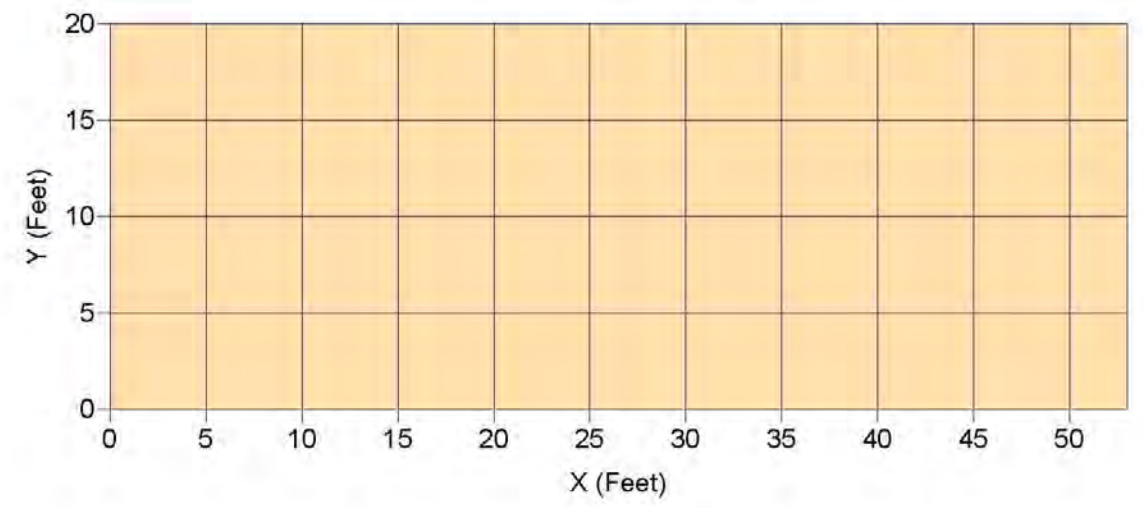
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PARCEL 14  
GEM-2 1170 Hz  
QUADRATURE RESPONSE

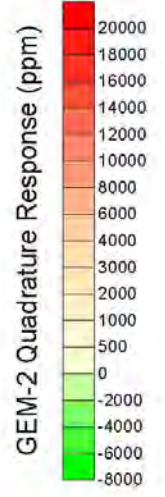
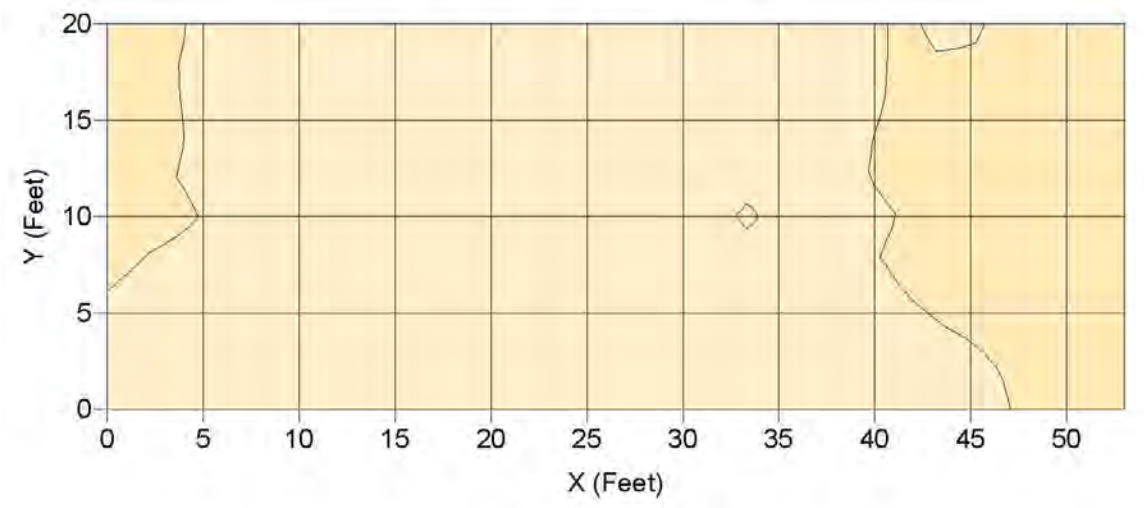
FIGURE 13



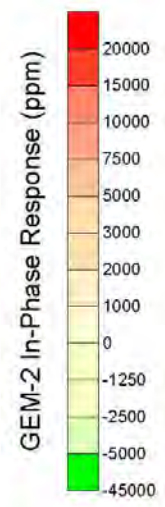
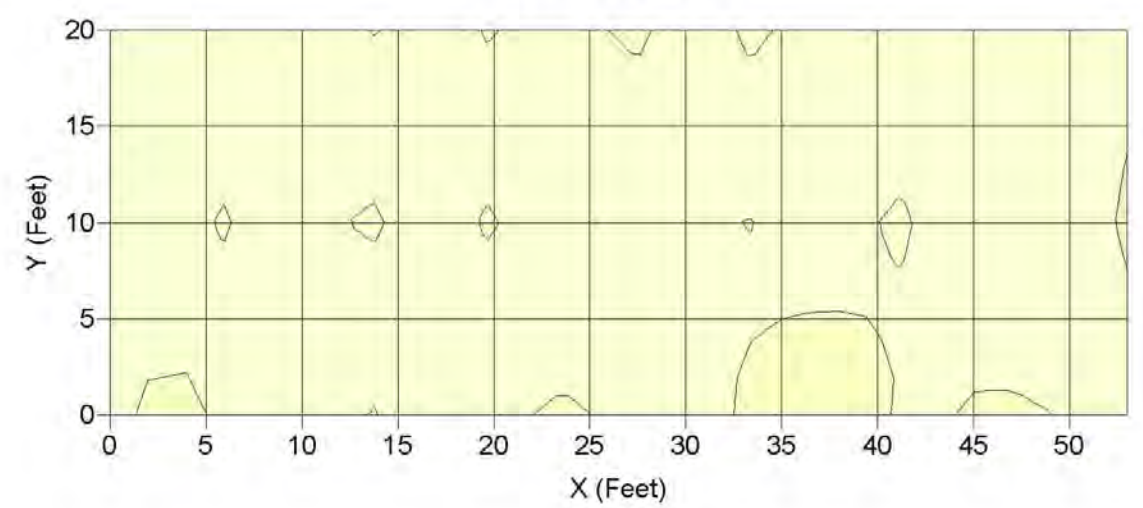
47010 Hz, IN-PHASE



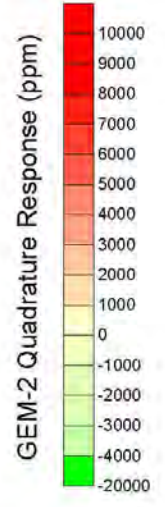
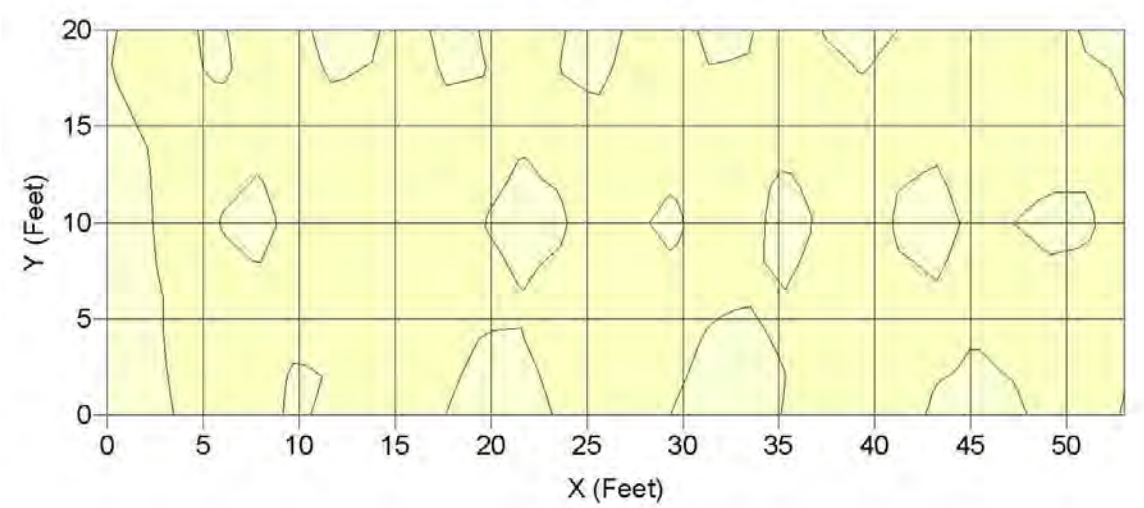
47010 Hz, QUADRATURE



1170 Hz, IN-PHASE



1170 Hz, QUADRATURE

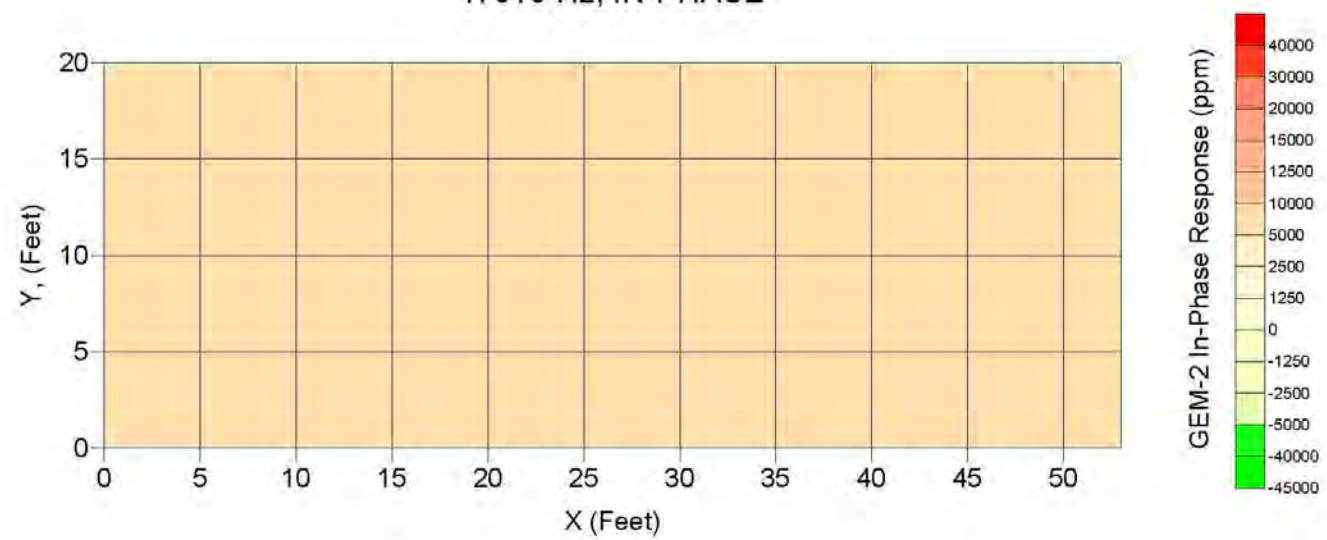


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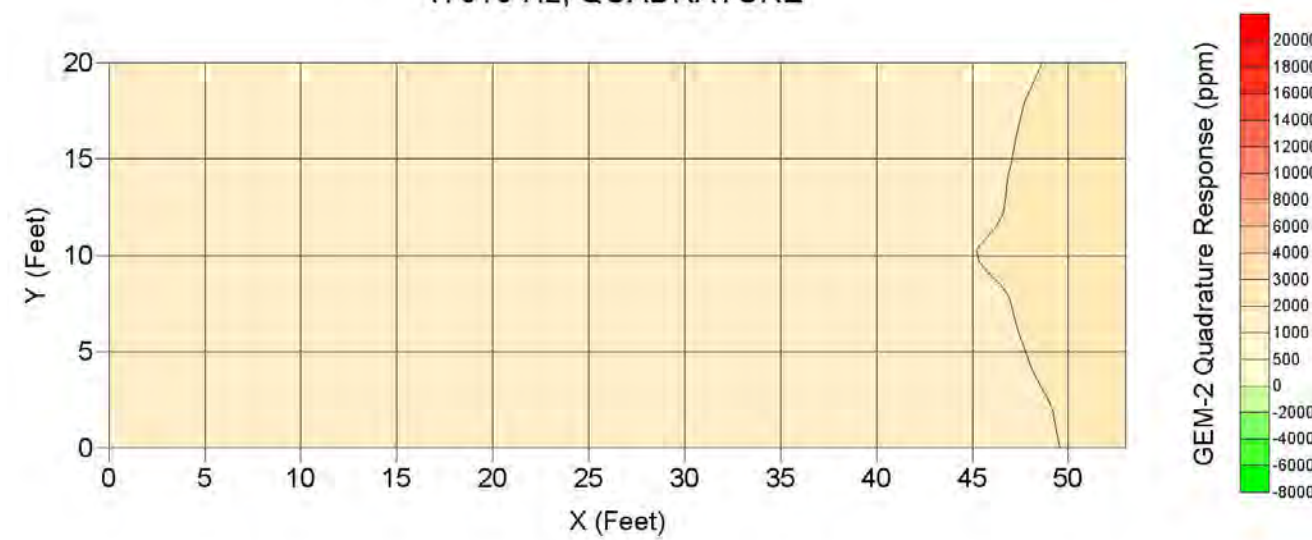
GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 1  
FIGURE 14



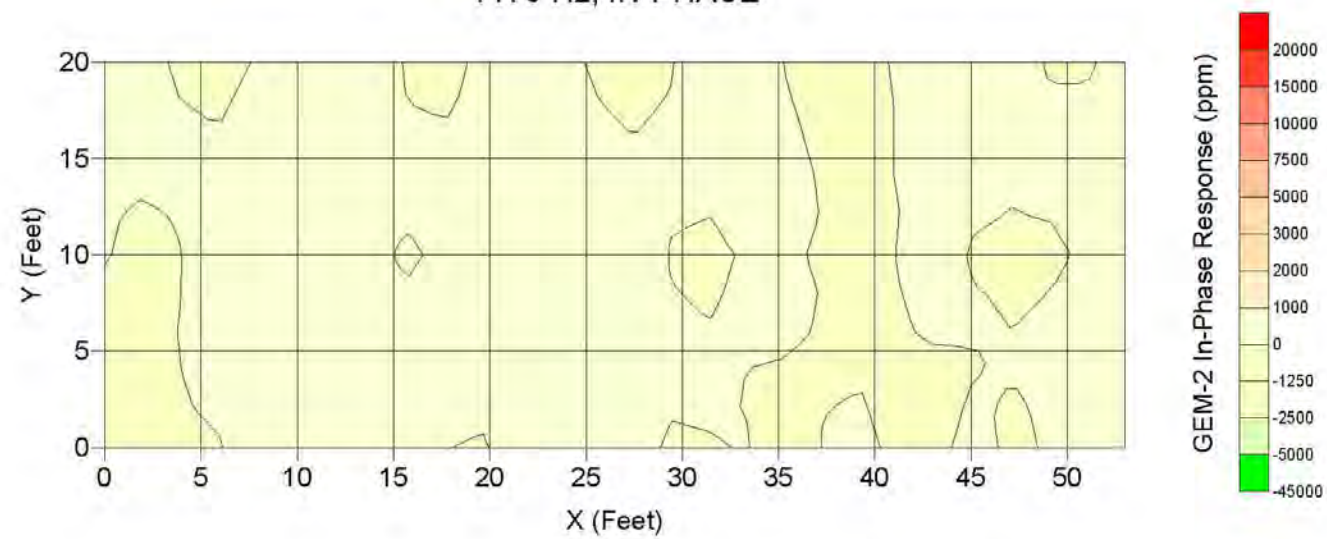
47010 Hz, IN-PHASE



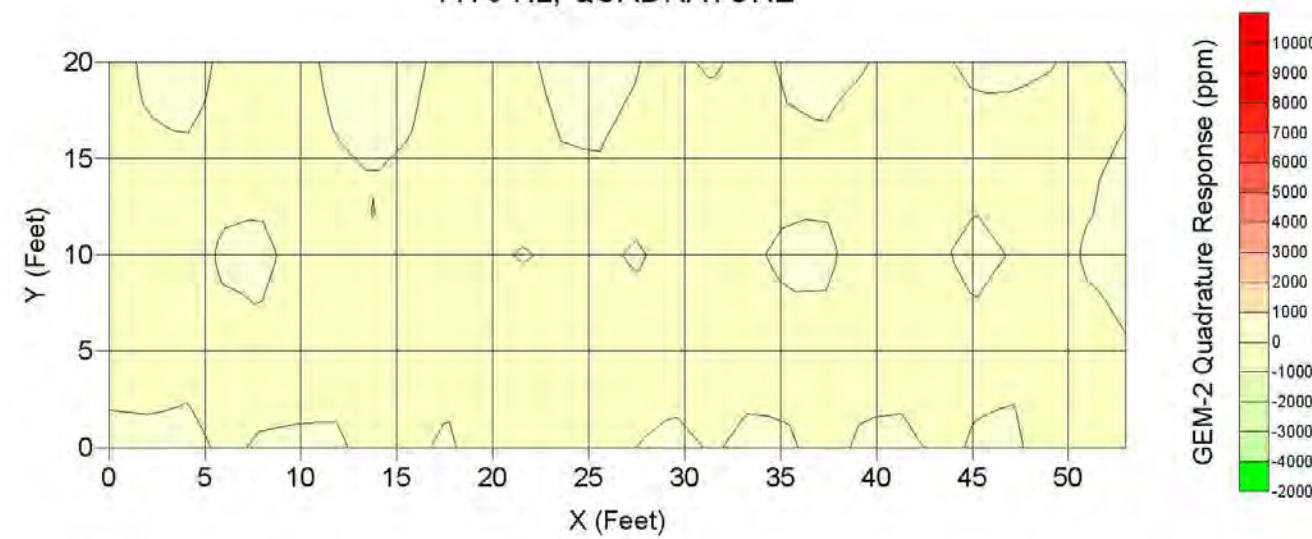
47010 Hz, QUADRATURE



1170 Hz, IN-PHASE



1170 Hz, QUADRATURE



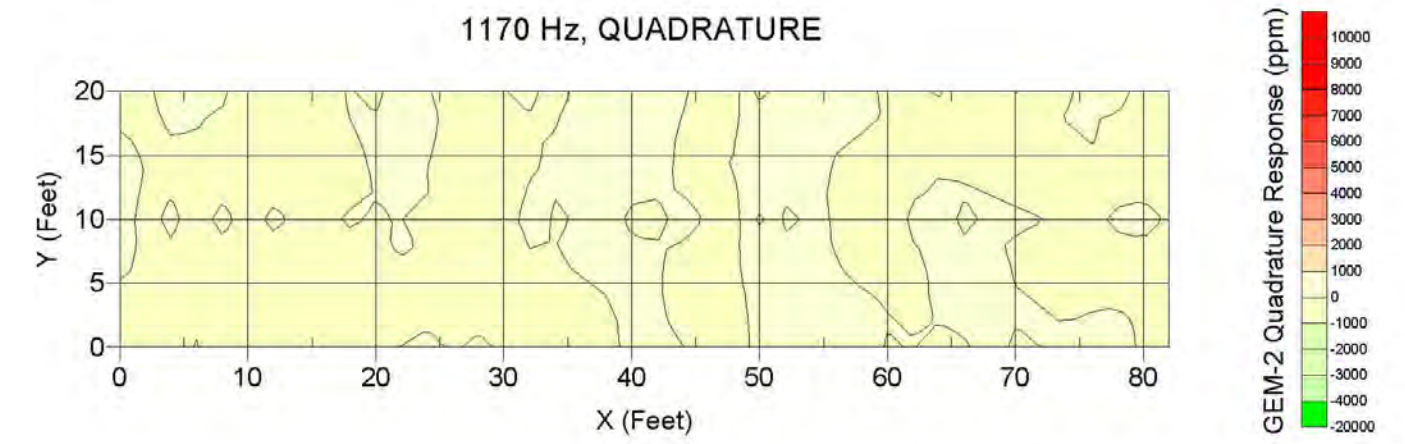
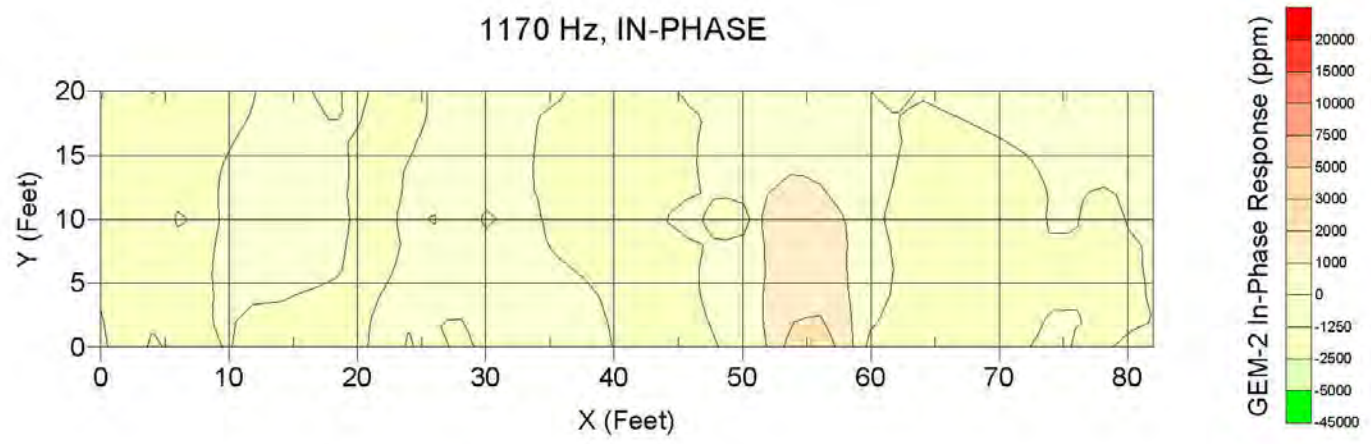
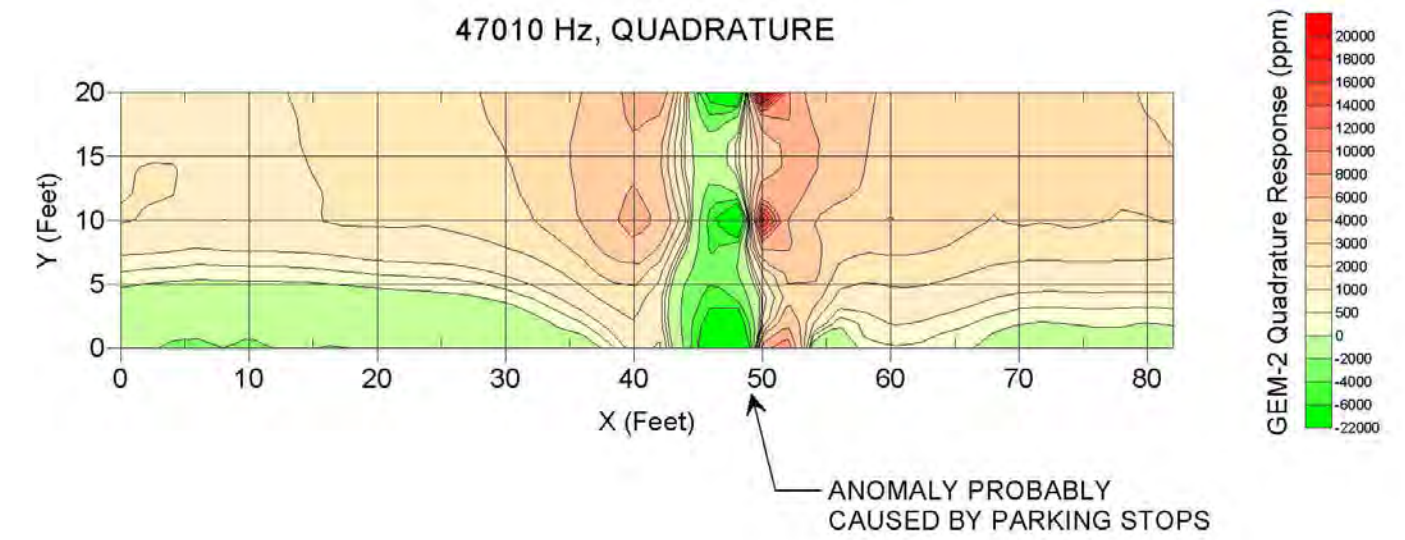
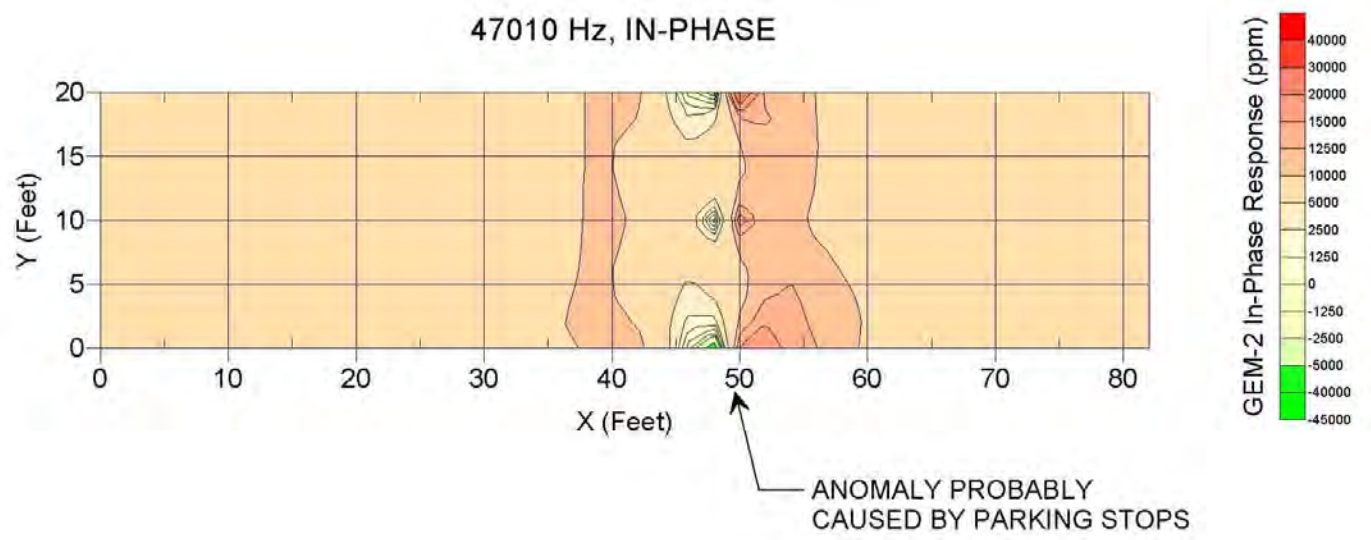
NC Department of Transportation  
Geotechnical Engineering Unit

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GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 2



APPROXIMATE  
NORTH



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Mecklenburg County

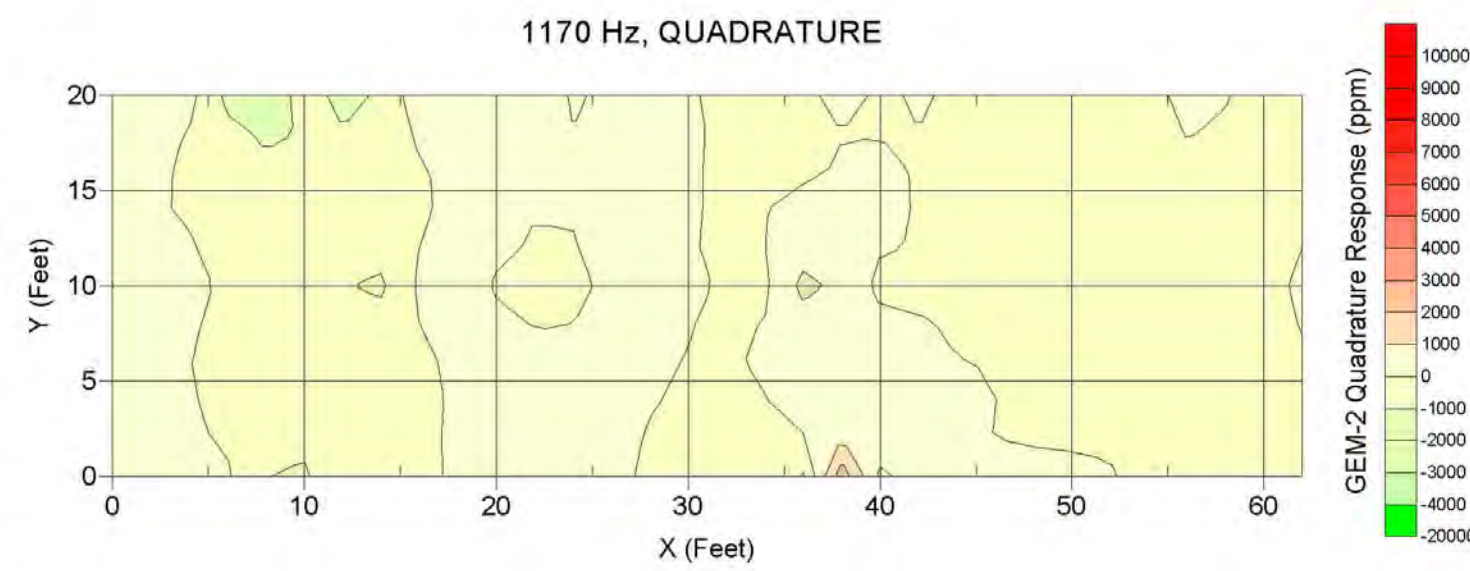
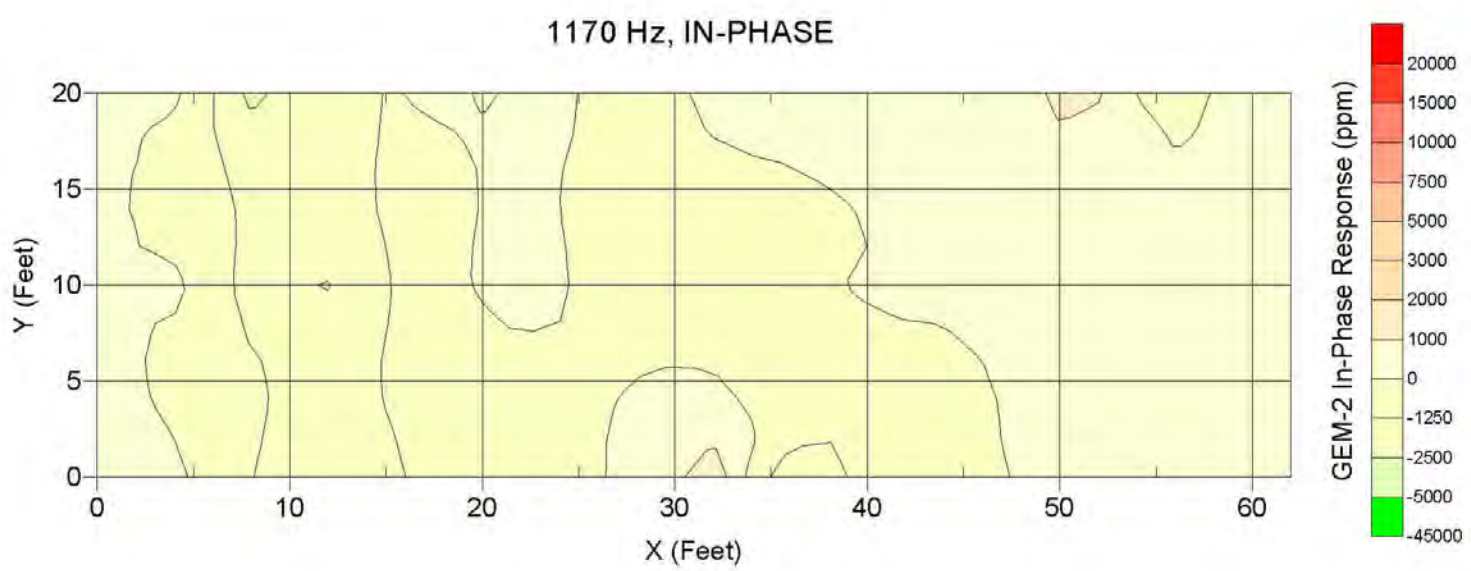
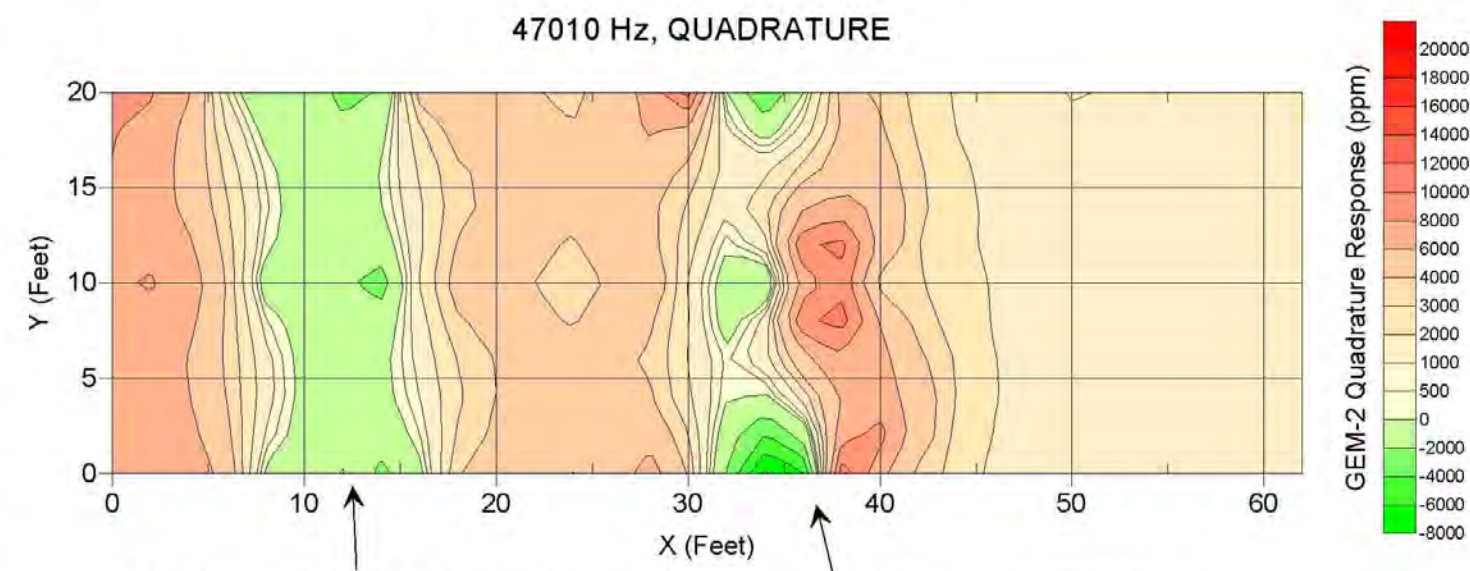
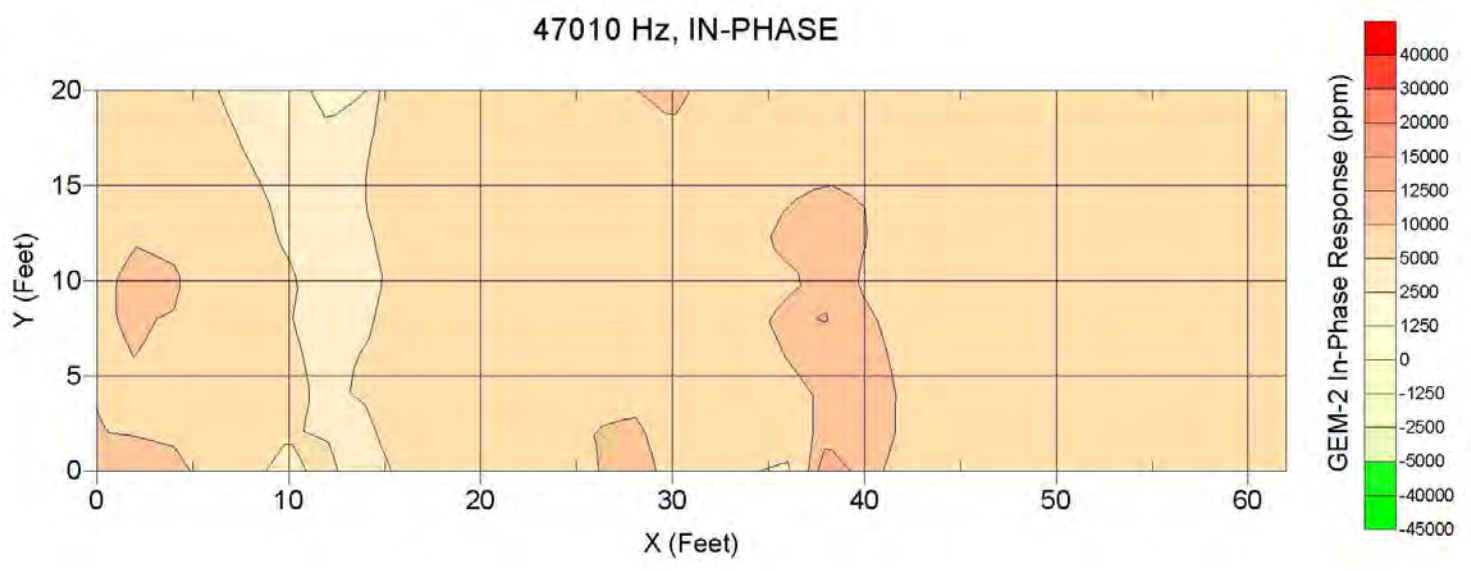
GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 3

FIGURE 16





APPROXIMATE NORTH



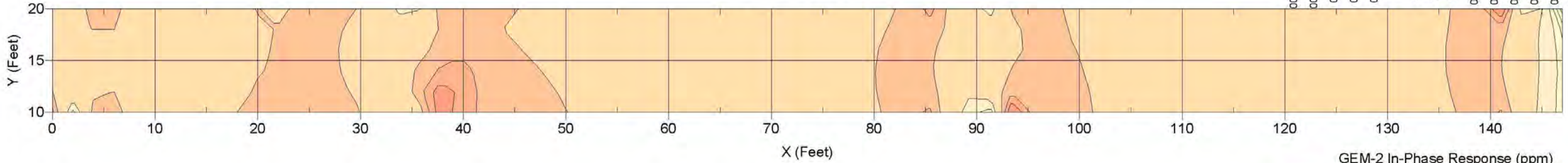
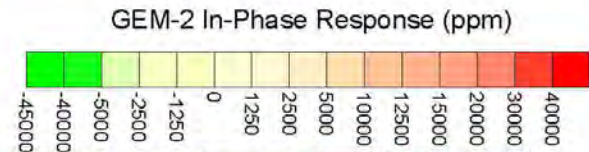
NC Department of Transportation  
Geotechnical Engineering Unit  
WBS Element 32179, TIP P-3800  
Mecklenburg County

GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 4  
FIGURE 17

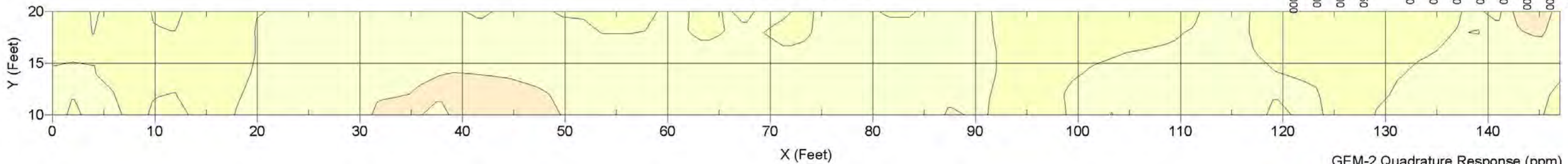
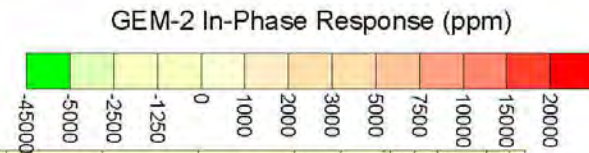


APPROXIMATE  
NORTH

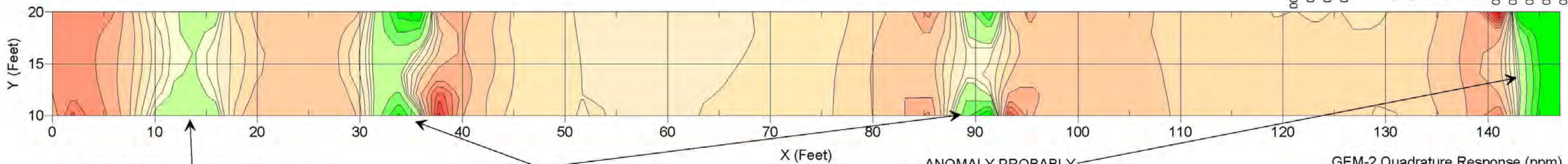
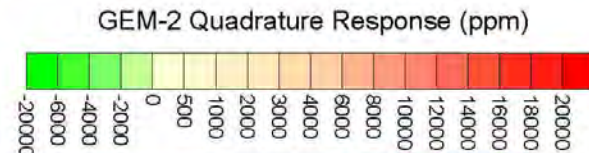
### 47010 Hz, IN-PHASE



### 1170 Hz, IN-PHASE



### 47010 Hz, QUADRATURE

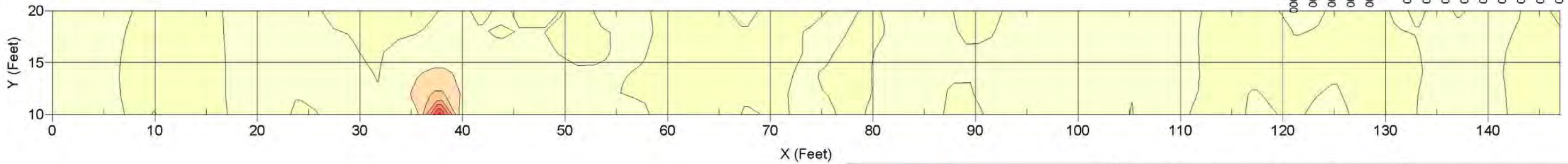
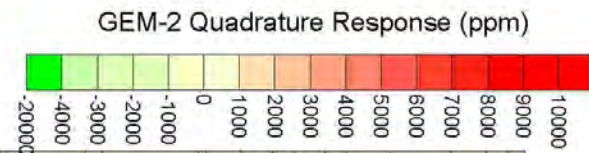


ANOMALY PROBABLY CAUSED BY  
PARTIALLY BURIED RAILROAD TRACKS

ANOMALIES PROBABLY  
CAUSED BY PARKING STOPS

ANOMALY PROBABLY  
CAUSED BY PARKING STOPS

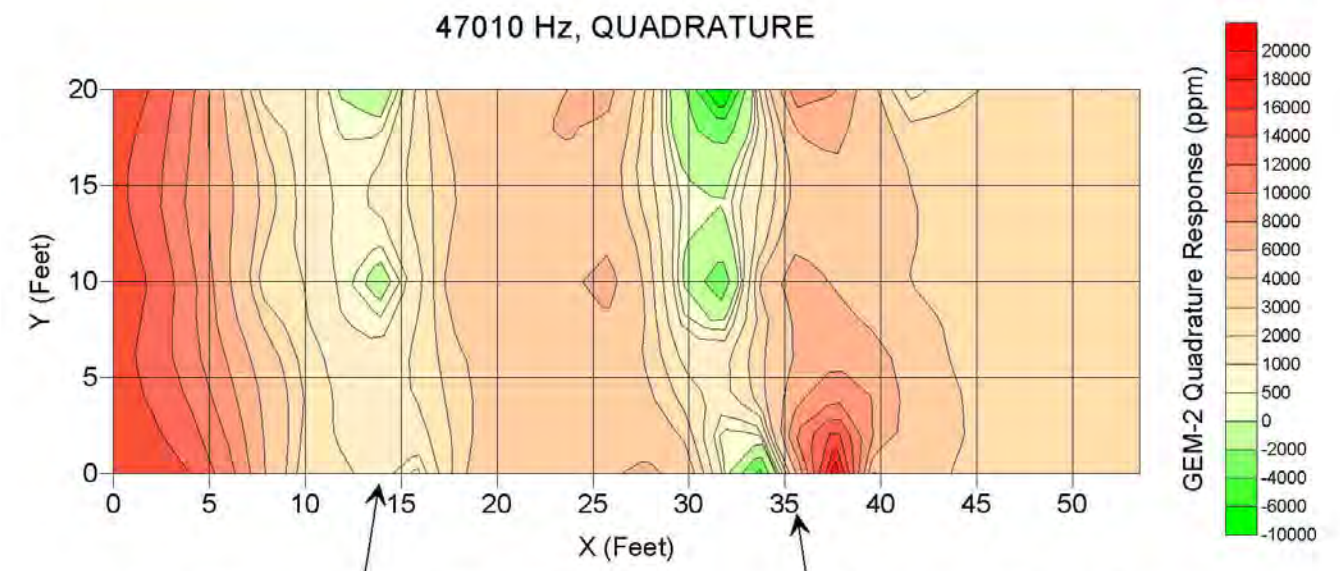
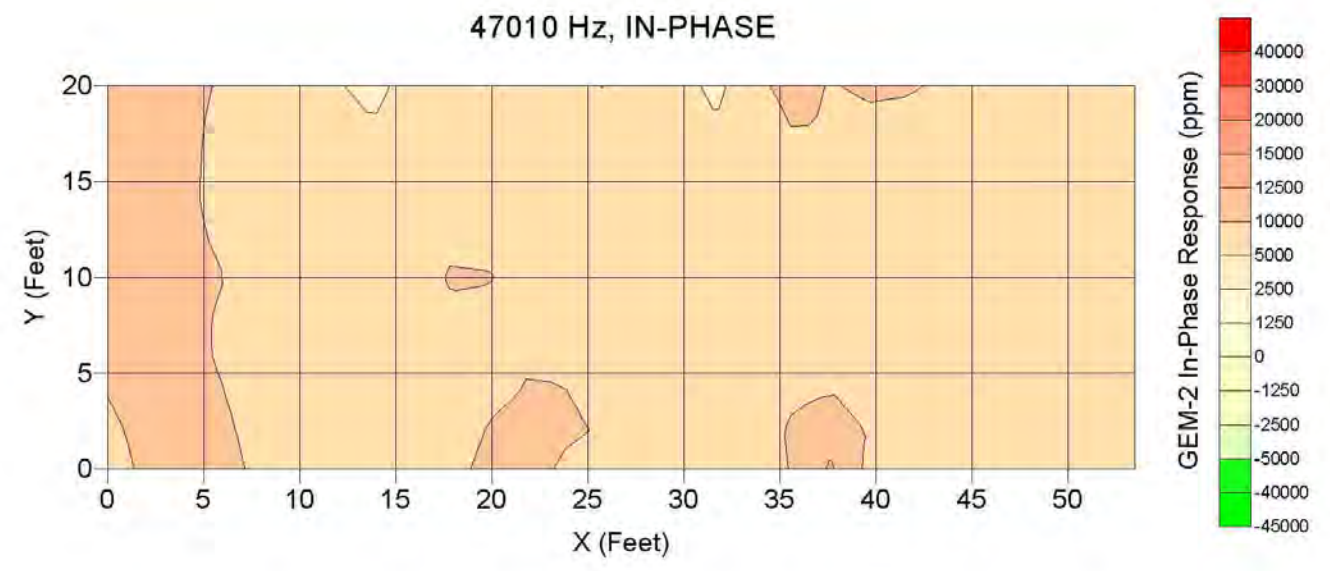
### 1170 Hz, QUADRATURE



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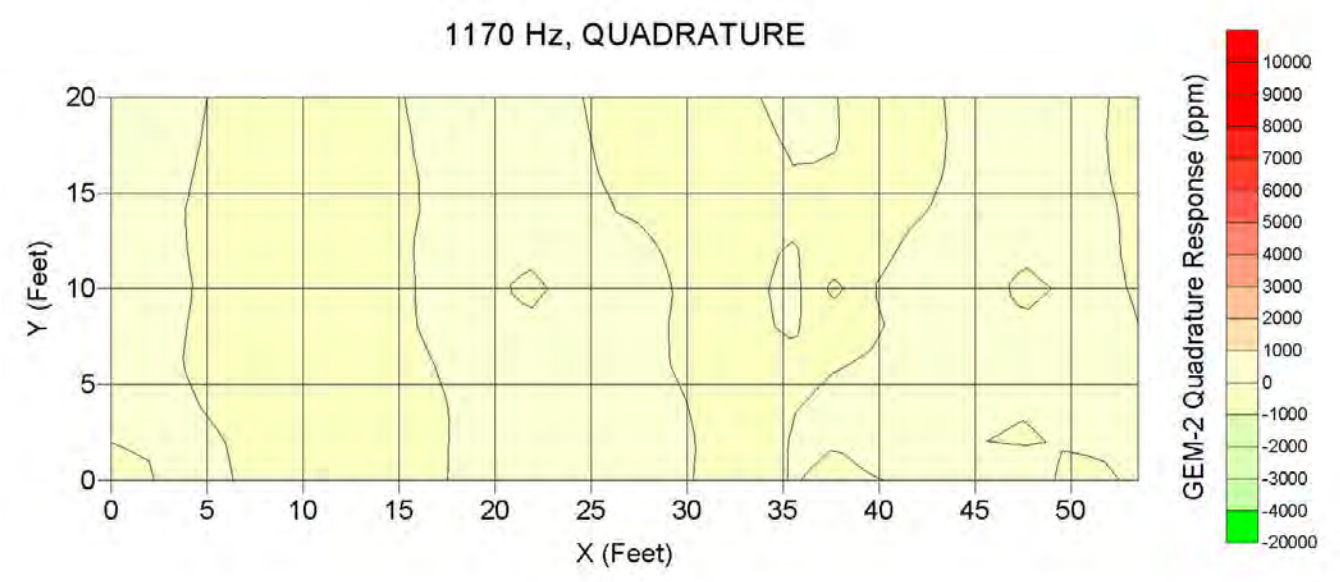
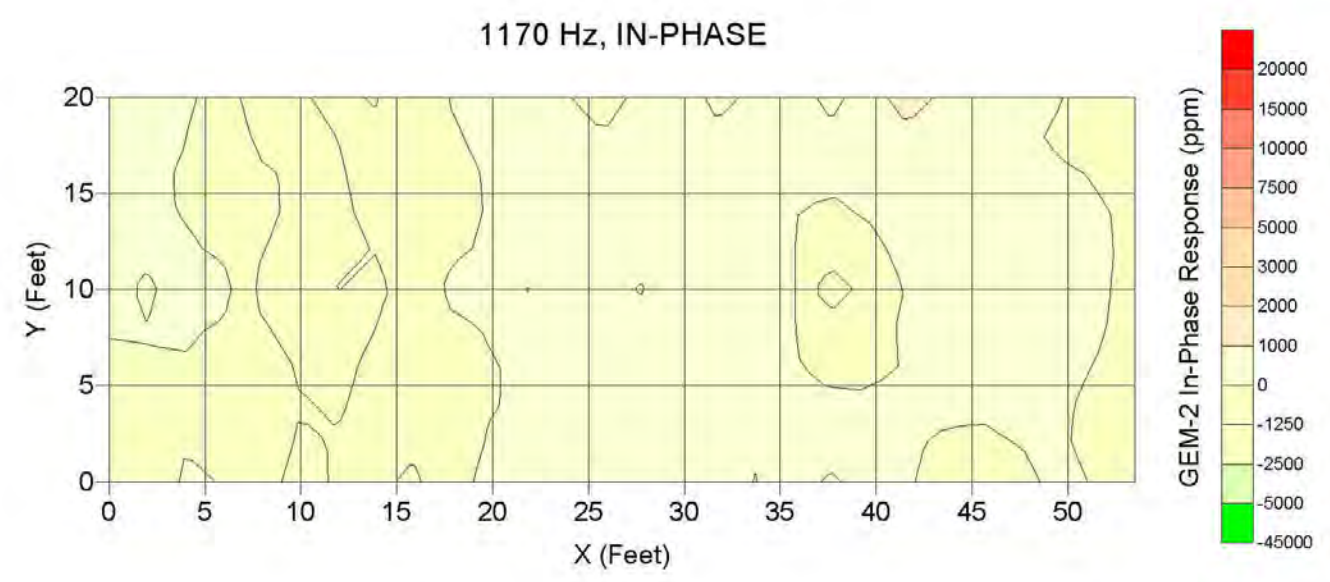
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GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 5



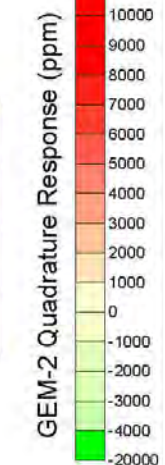
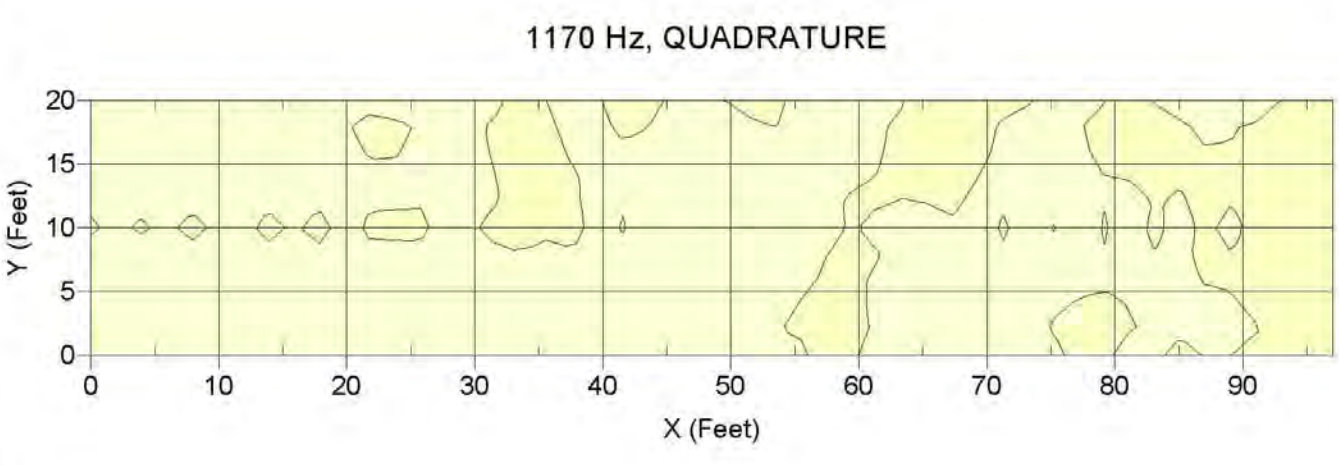
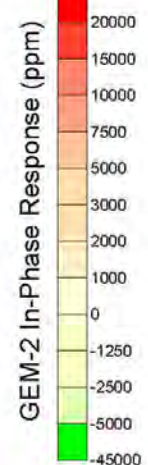
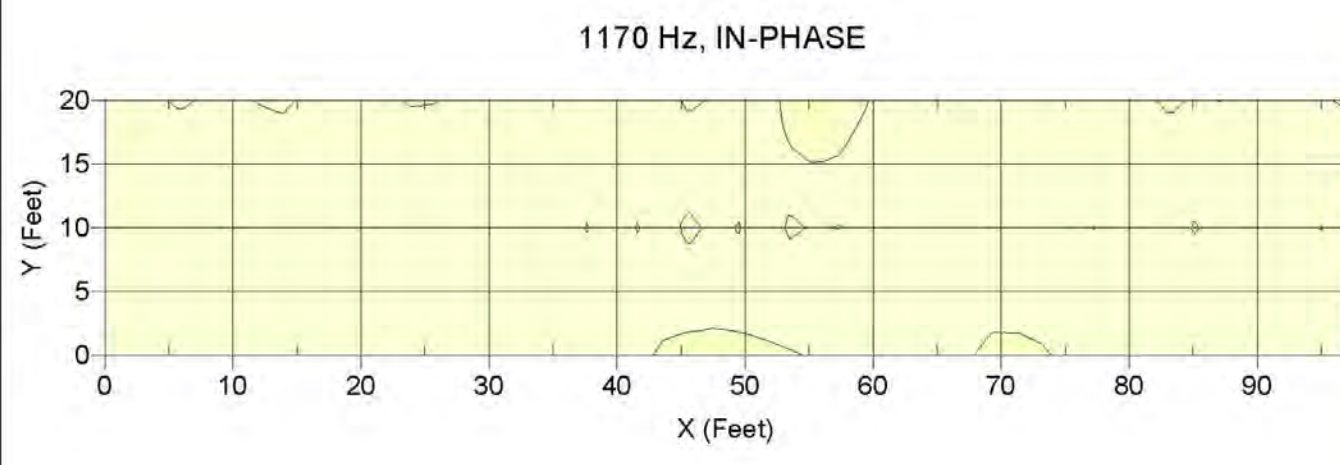
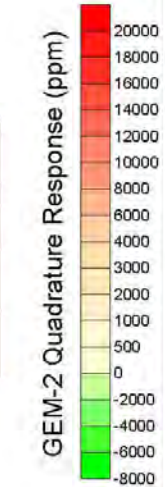
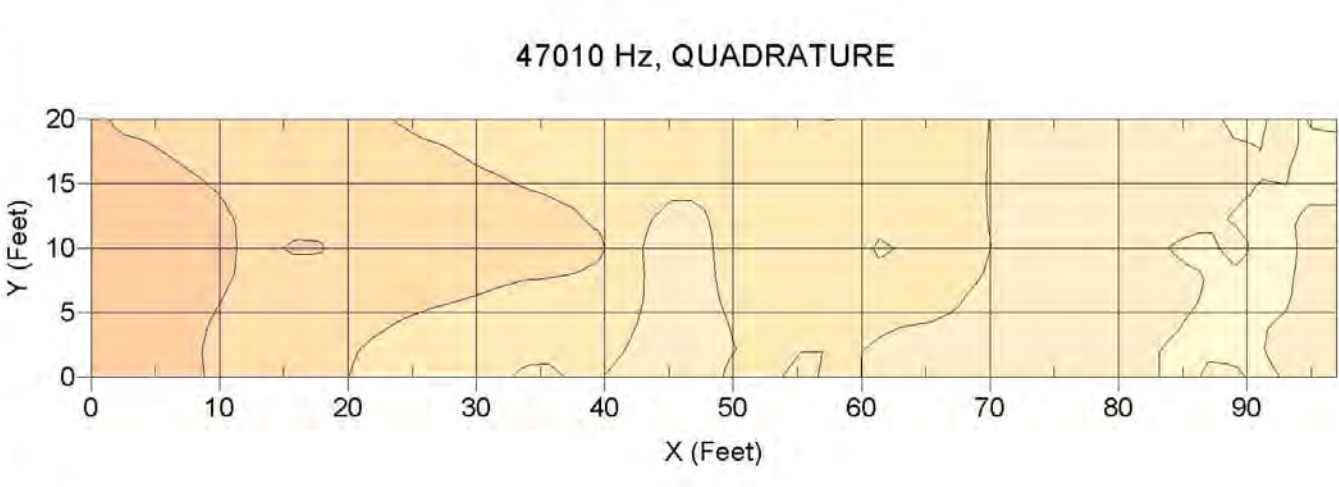
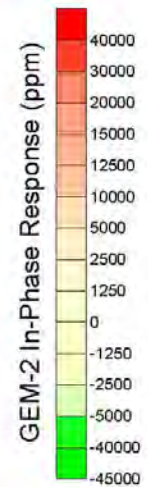
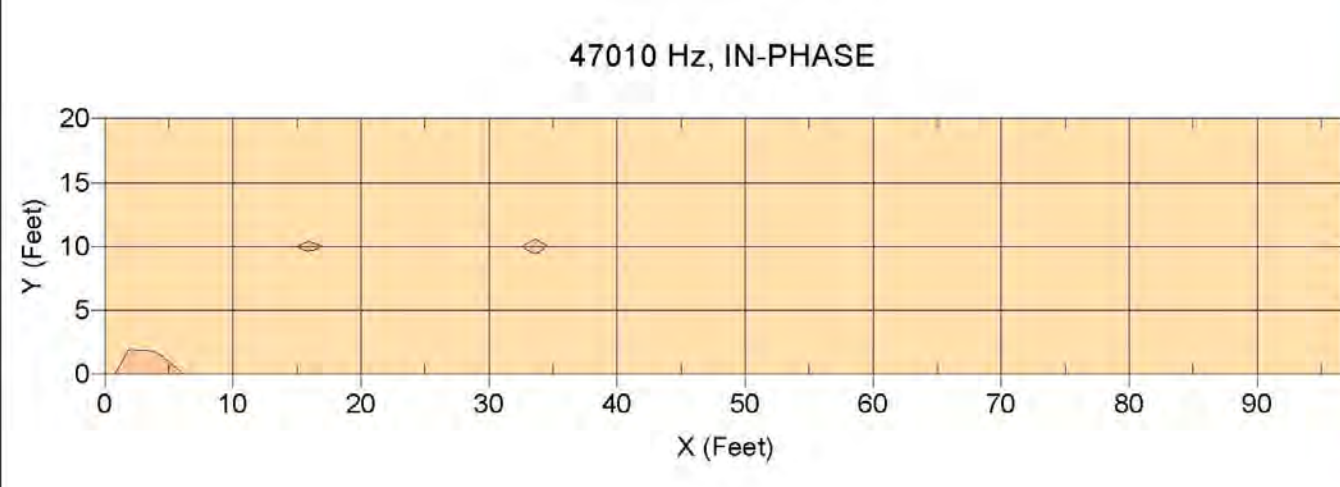
ANOMALY PROBABLY CAUSED BY PARTIALLY BURIED RAILROAD TRACKS

ANOMALY PROBABLY CAUSED BY PARKING STOPS



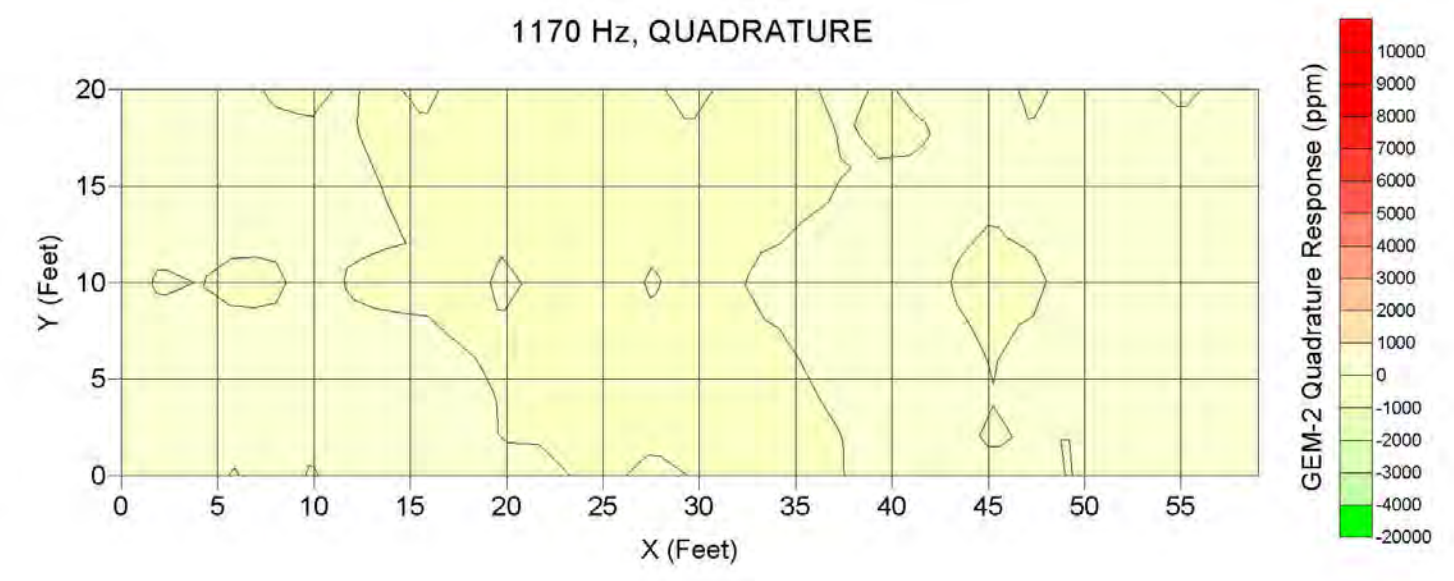
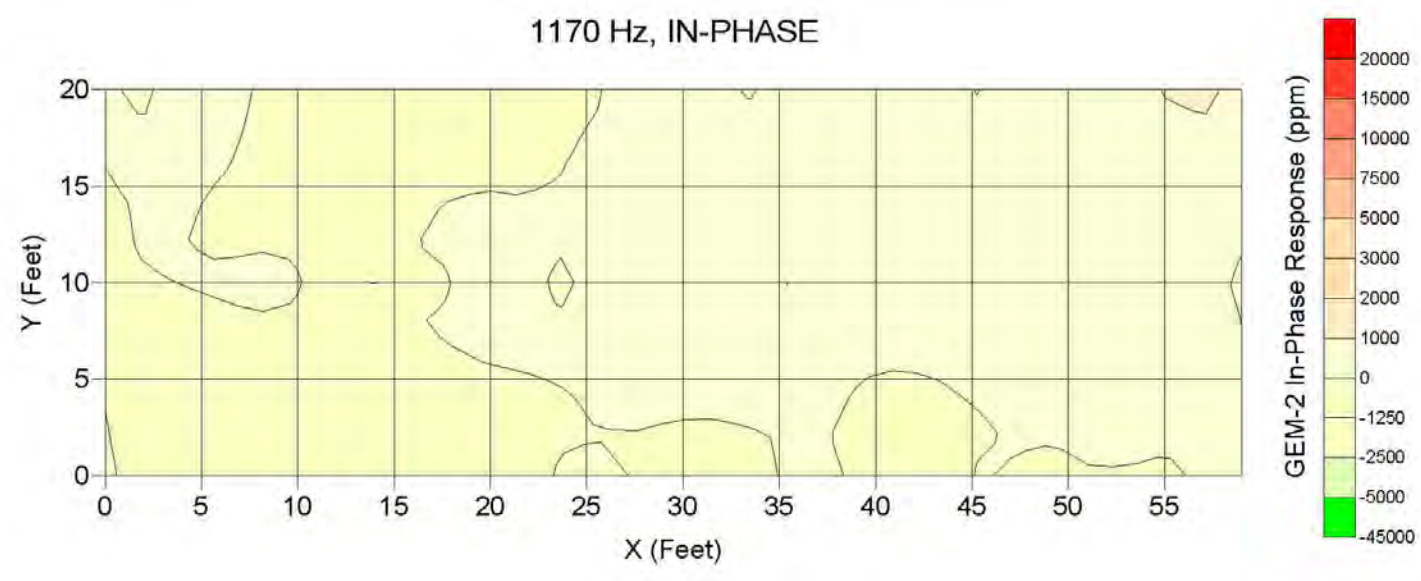
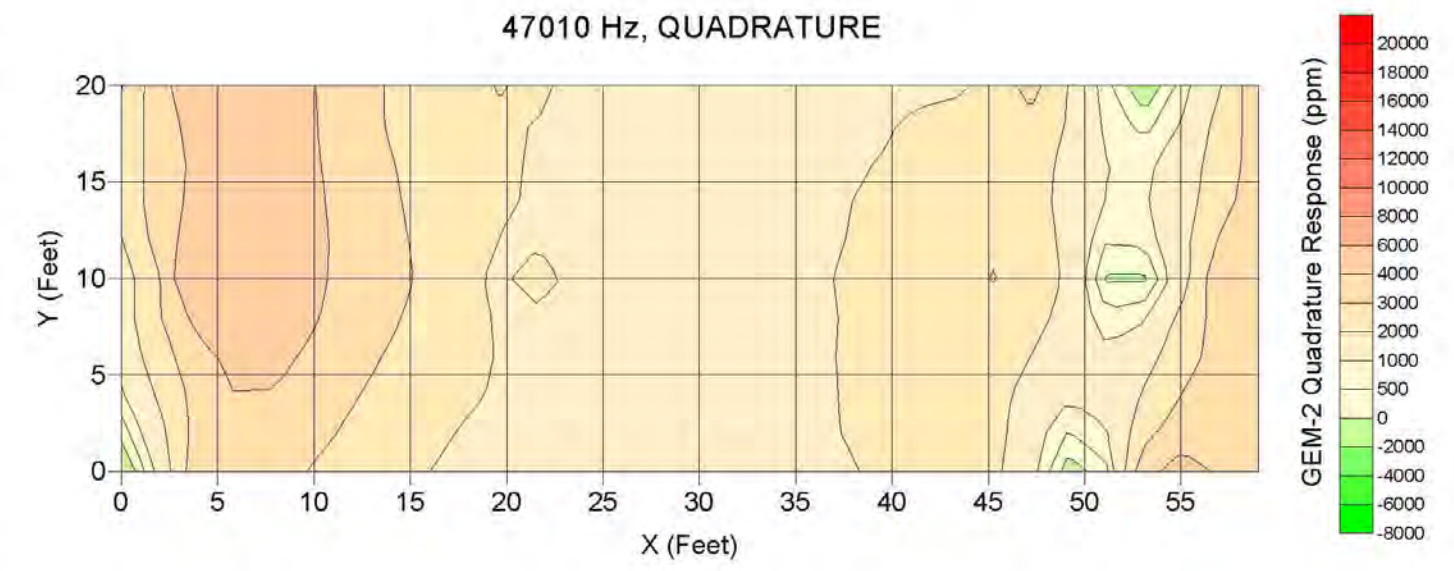
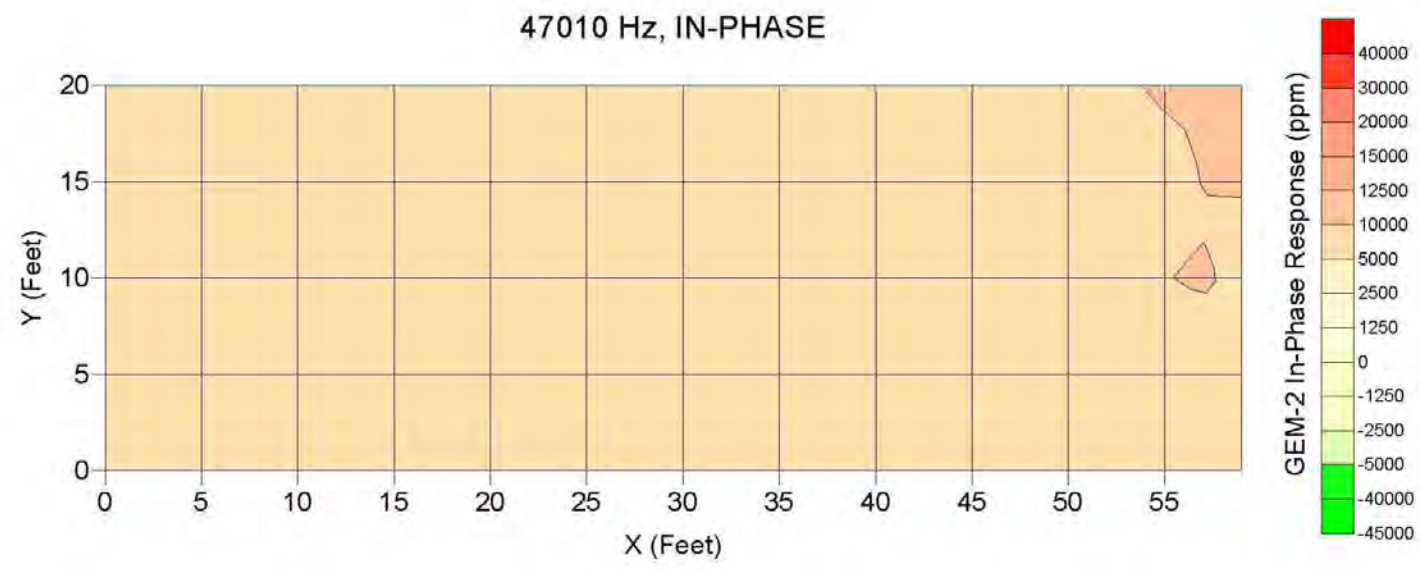
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GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 6  
FIGURE 19



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GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 7  
FIGURE 20

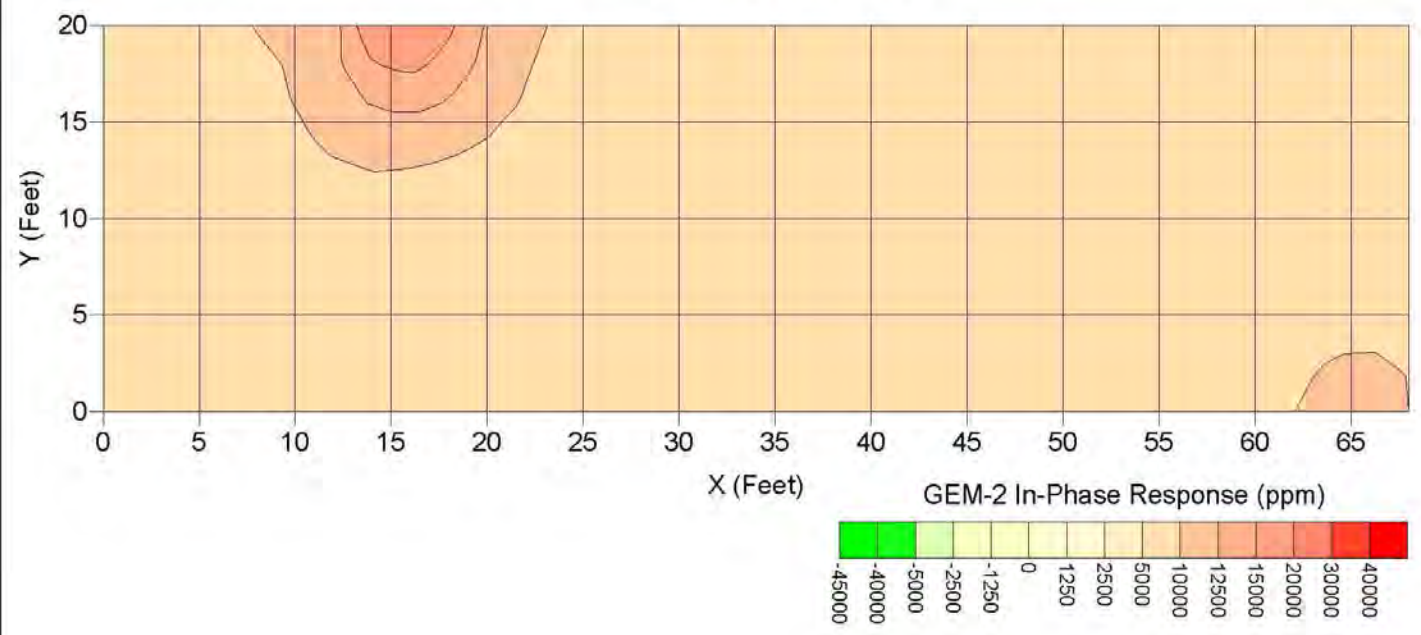


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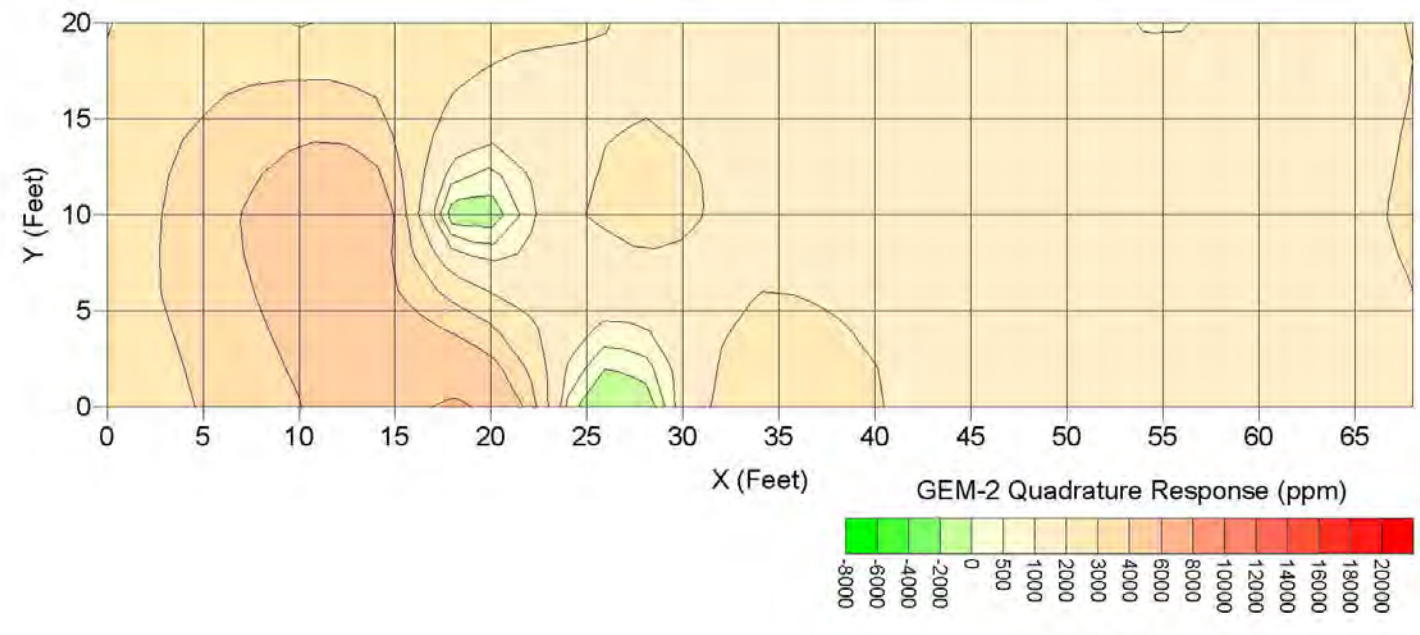
GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 8



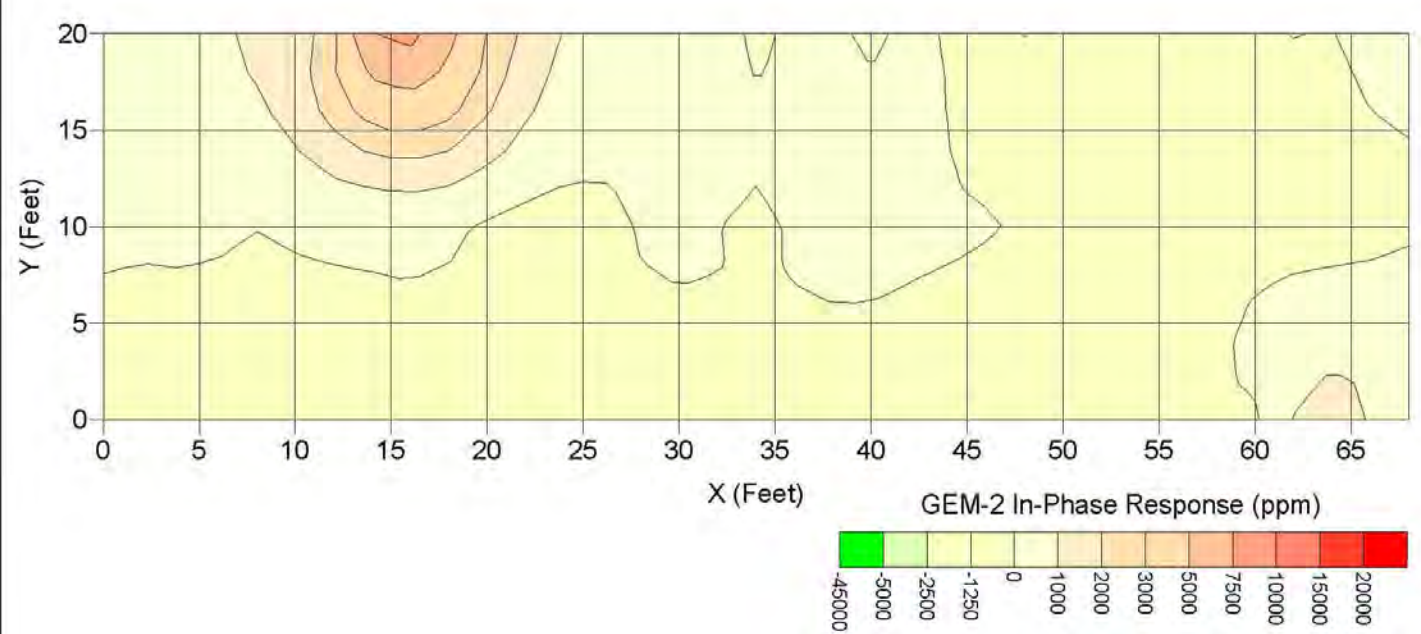
47010 Hz, IN-PHASE



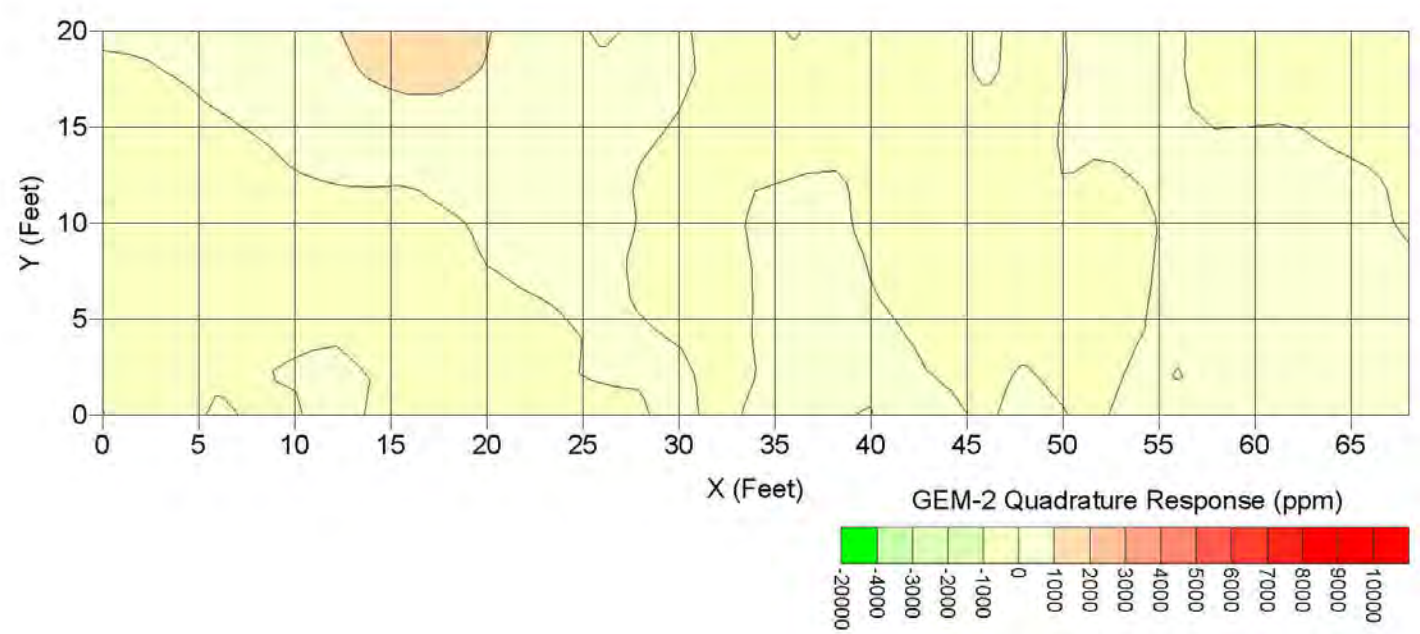
47010 Hz, QUADRATURE



1170 Hz, IN-PHASE



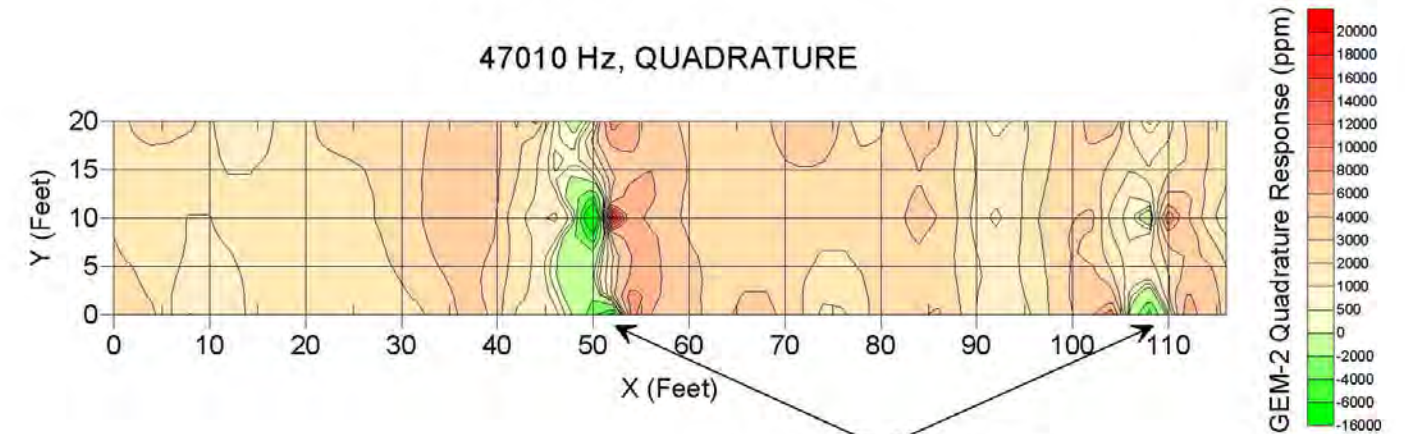
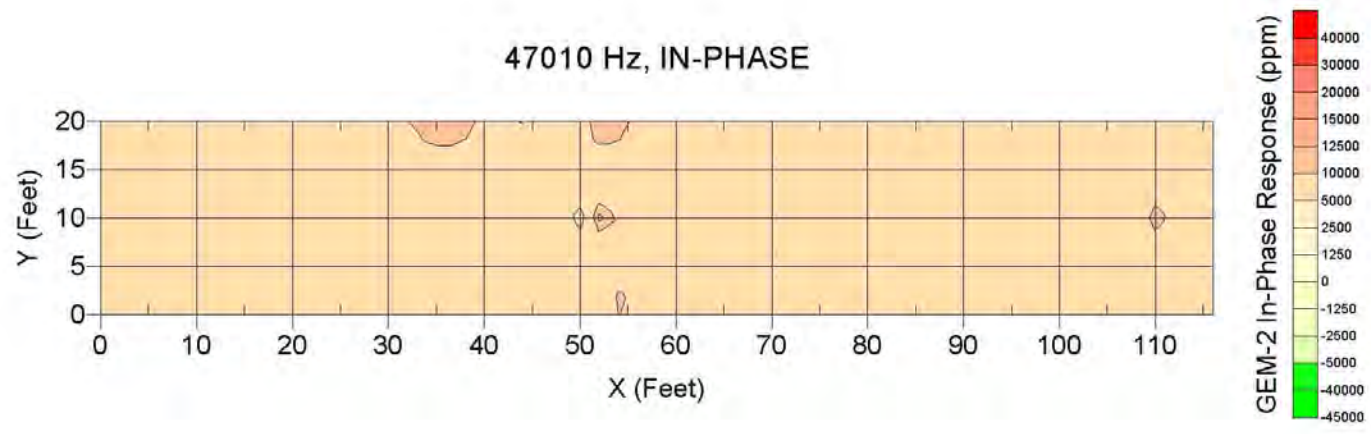
1170 Hz, QUADRATURE



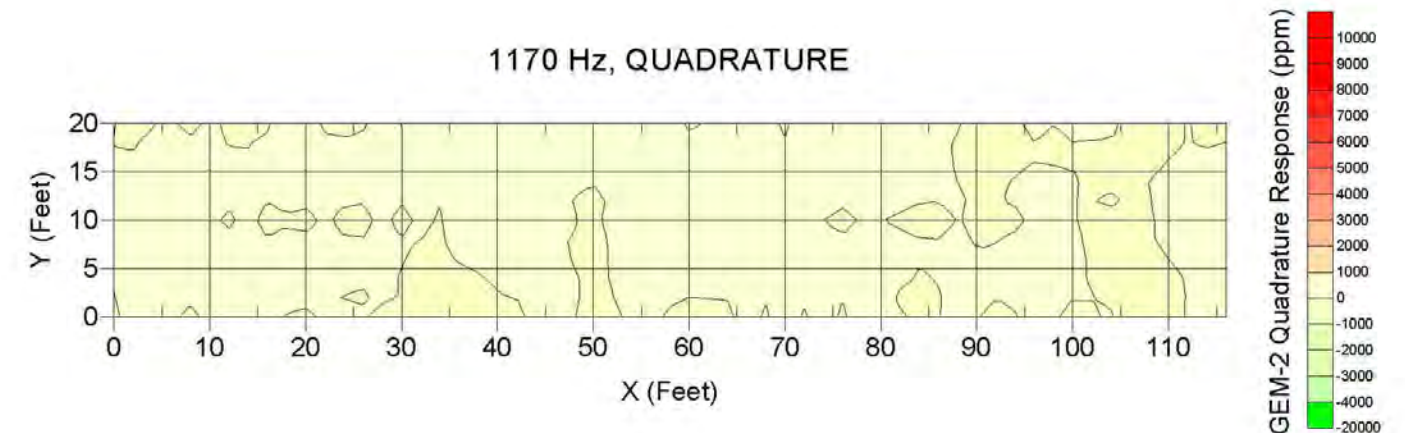
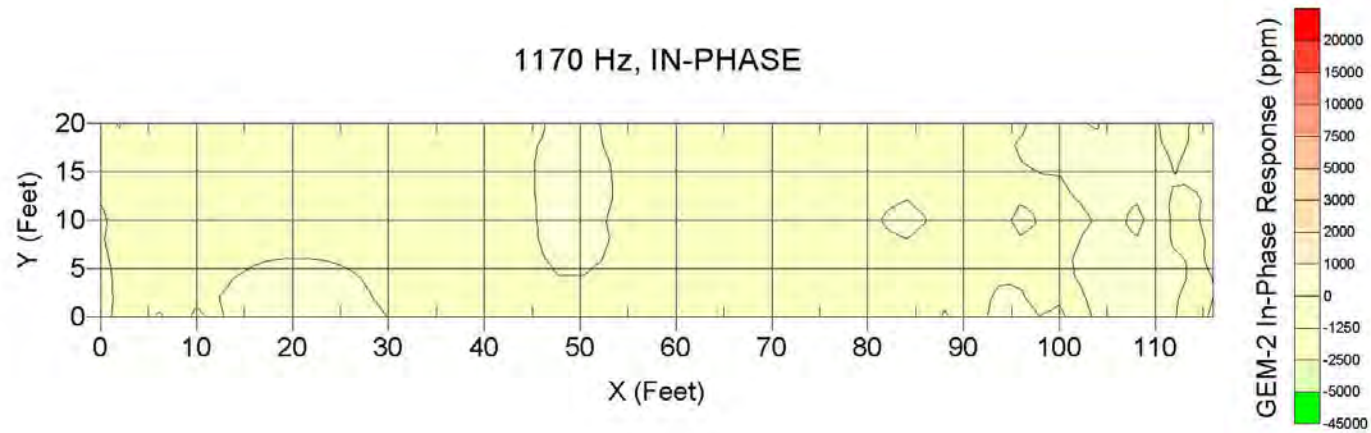
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GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 9



ANOMALIES PROBABLY CAUSED BY PARKING STOPS



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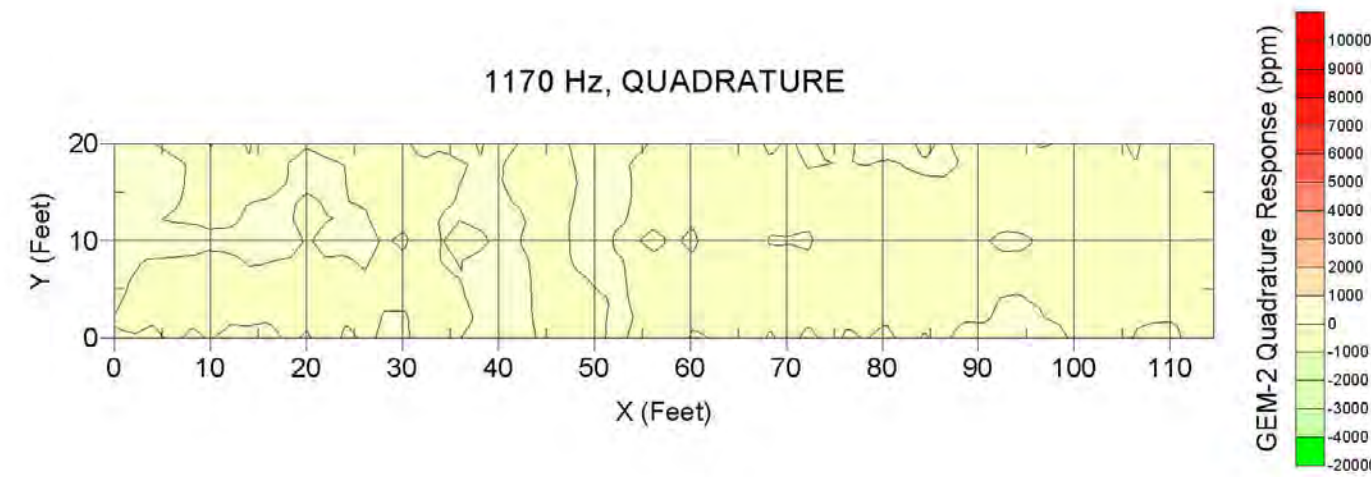
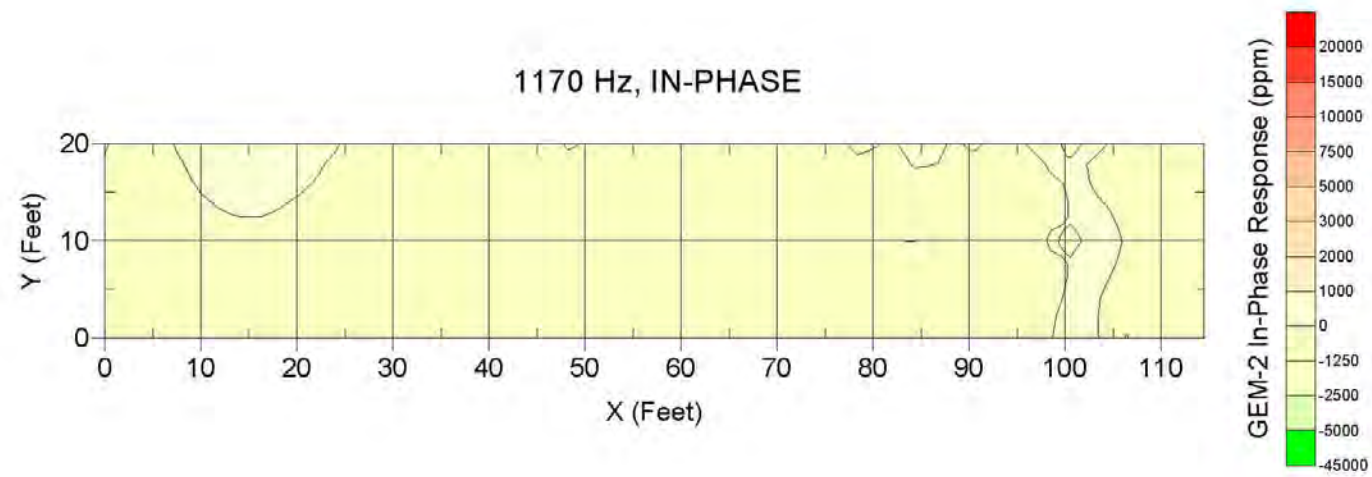
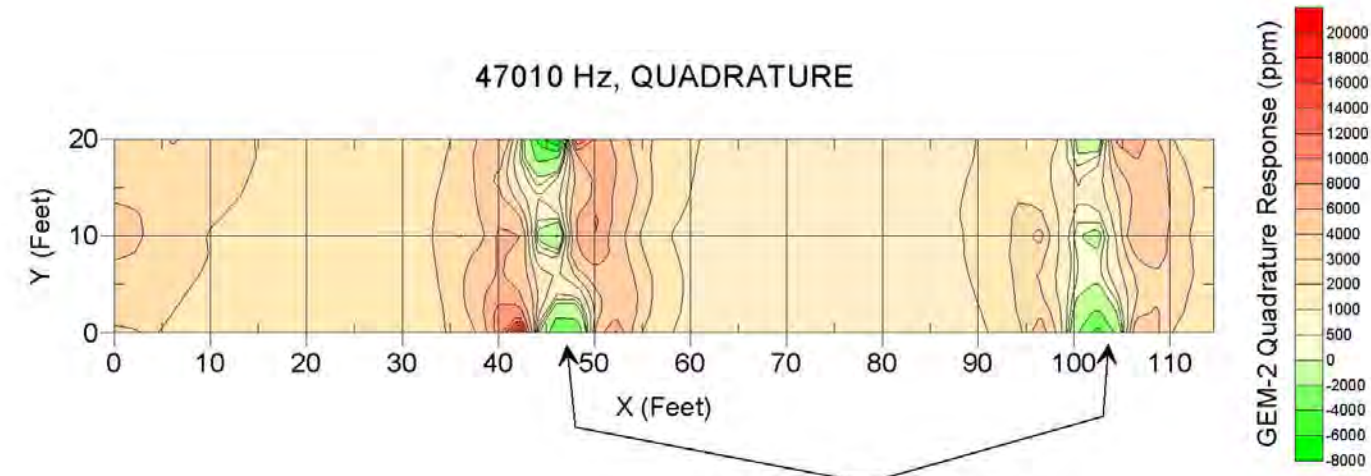
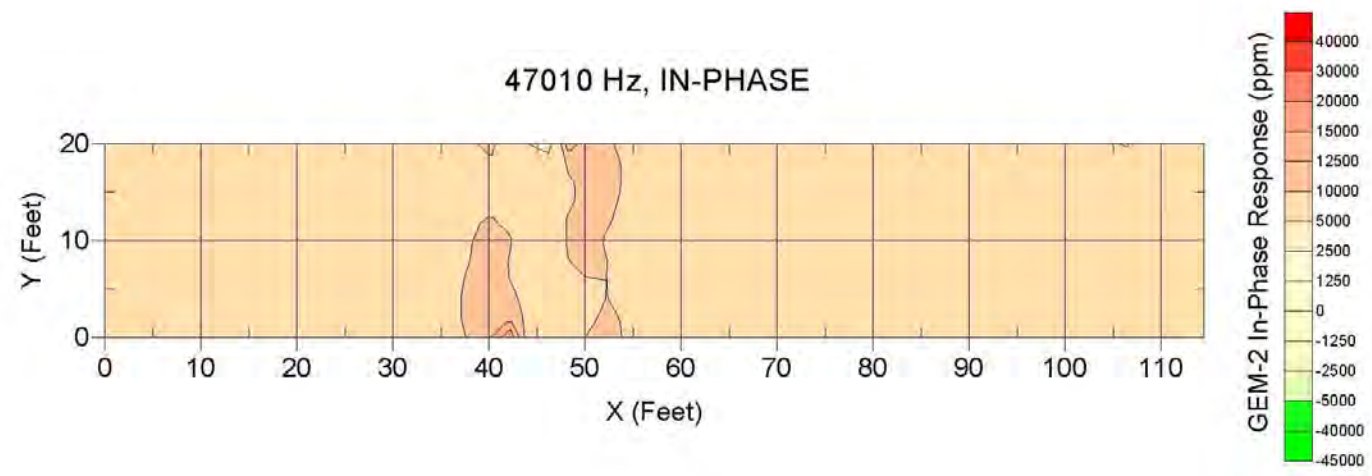
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Mecklenburg County

GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 10

FIGURE 23



APPROXIMATE NORTH



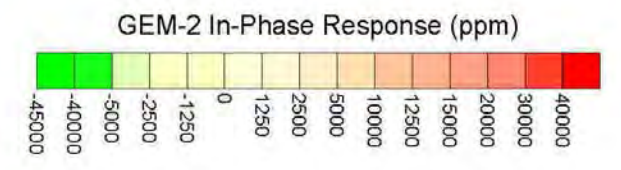
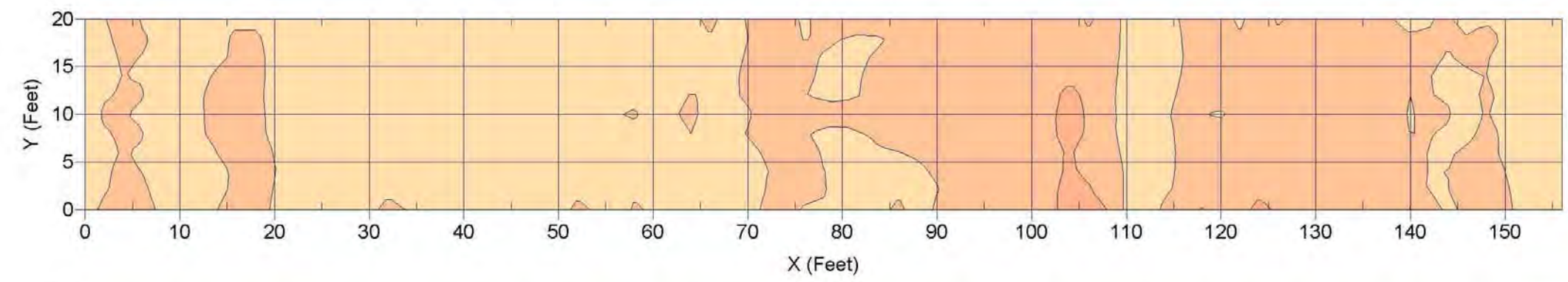
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Mecklenburg County

GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 11  
FIGURE 24

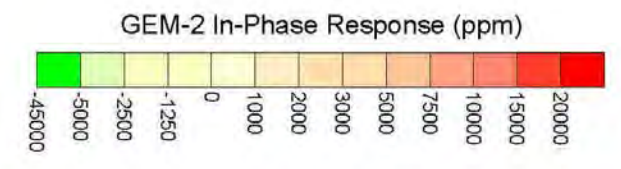
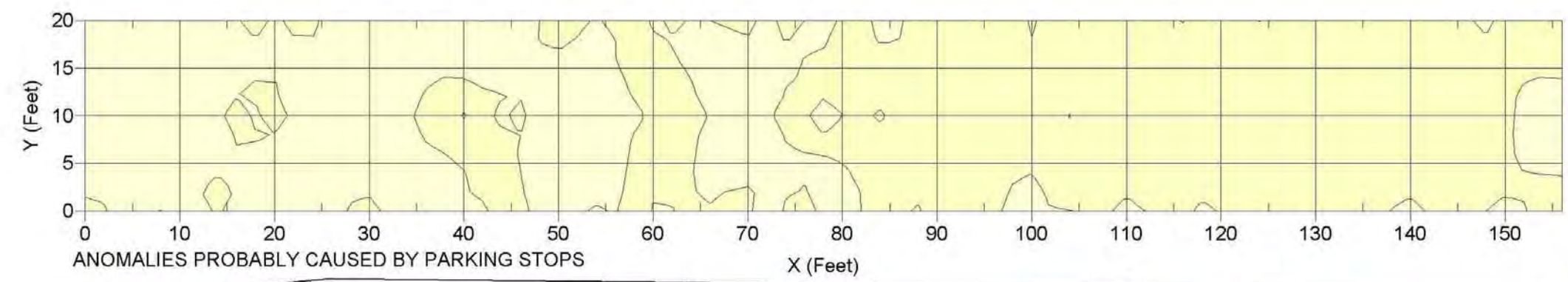




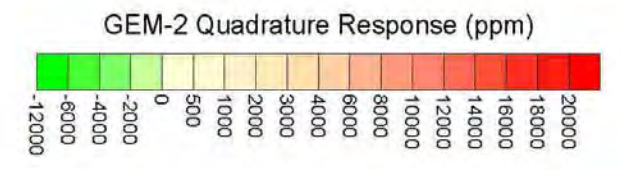
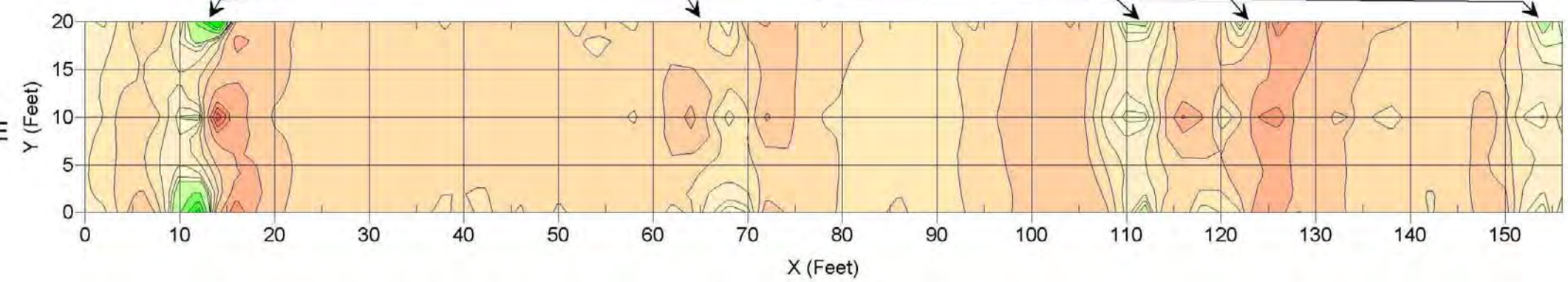
47010 Hz  
IN-PHASE



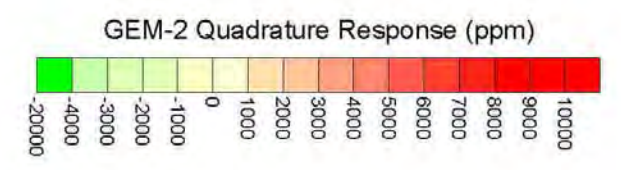
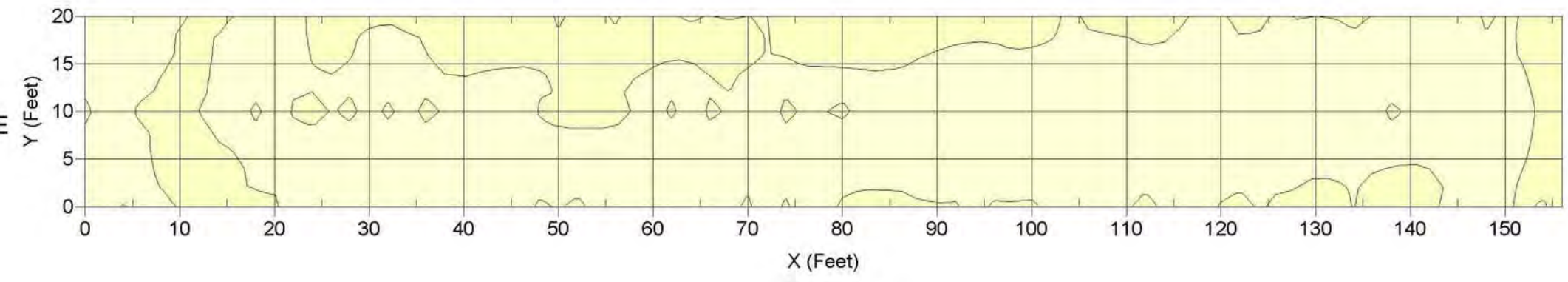
1170 Hz  
IN-PHASE



47010 Hz  
QUADRATURE



1170 Hz  
QUADRATURE



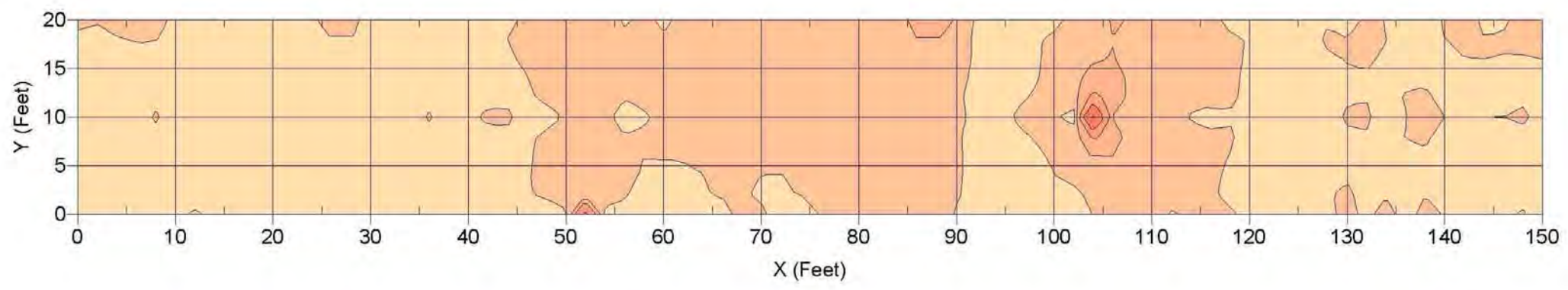
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WBS Element 32179, TIP P-3800  
Mecklenburg County

GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 12  
FIGURE 25

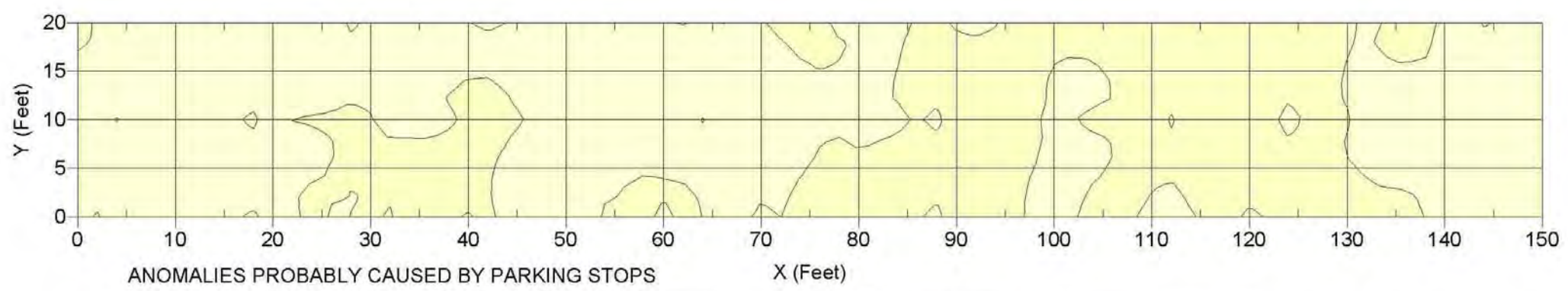


APPROXIMATE NORTH

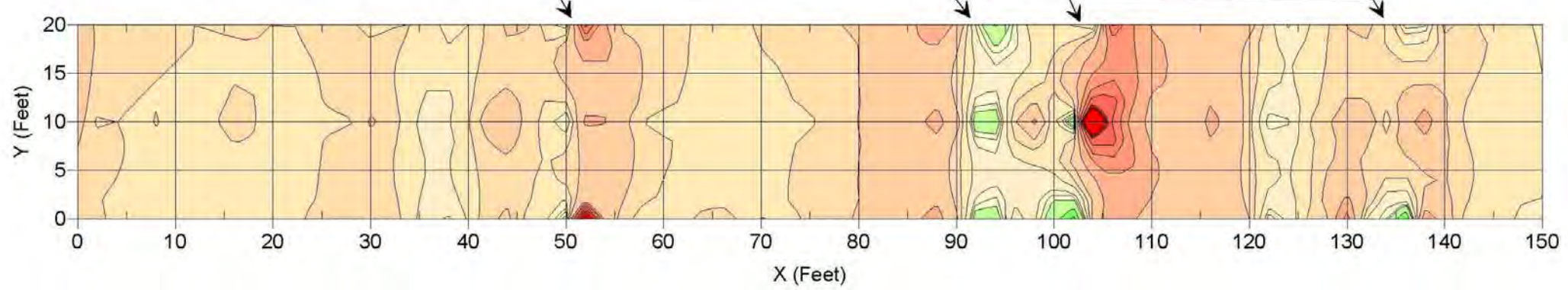
47010 Hz, IN-PHASE



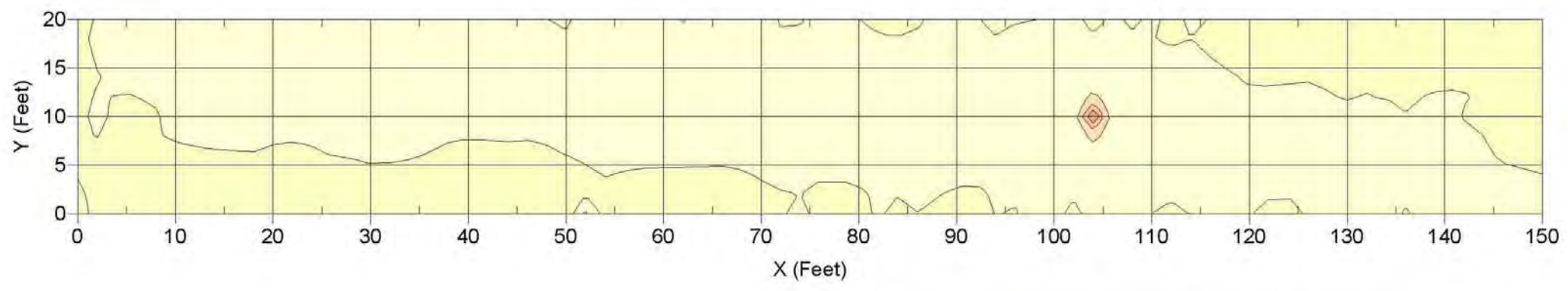
1170 Hz, IN-PHASE



47010 Hz, QUADRATURE



1170 Hz, QUADRATURE



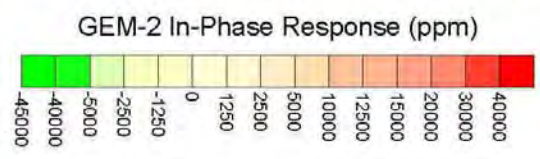
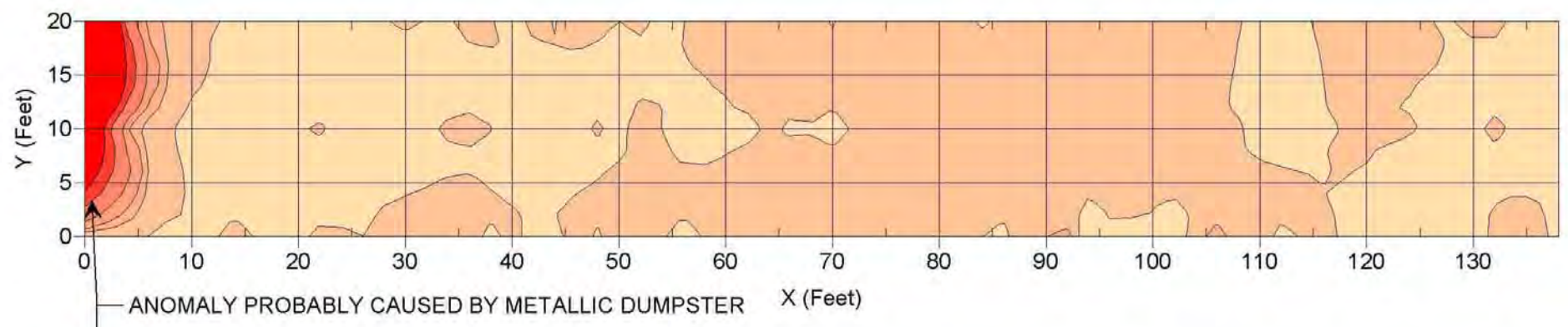
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GEM-2 DATA  
 ARCHAEOLOGICAL  
 LINE 13  
 FIGURE 26

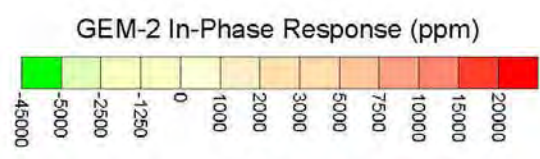
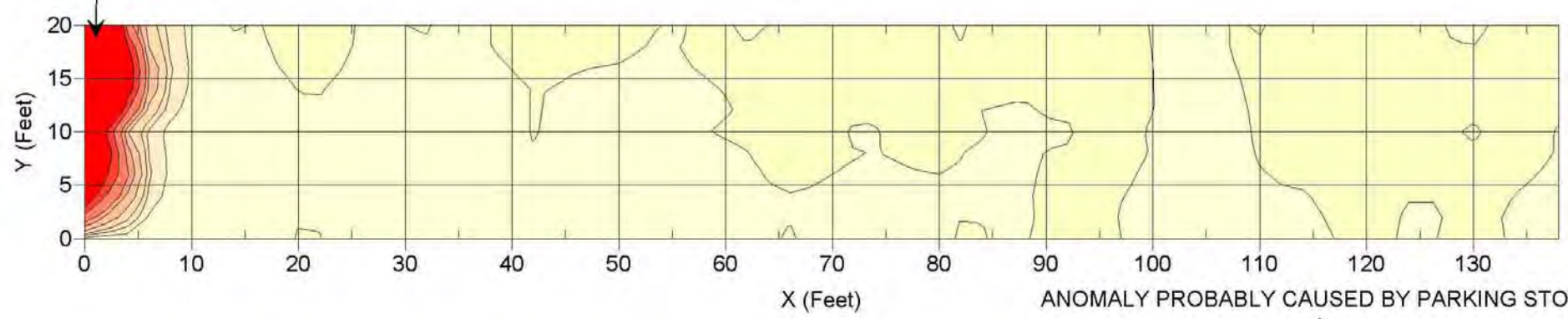


APPROXIMATE NORTH

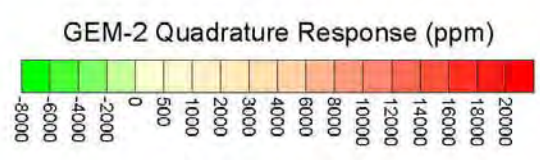
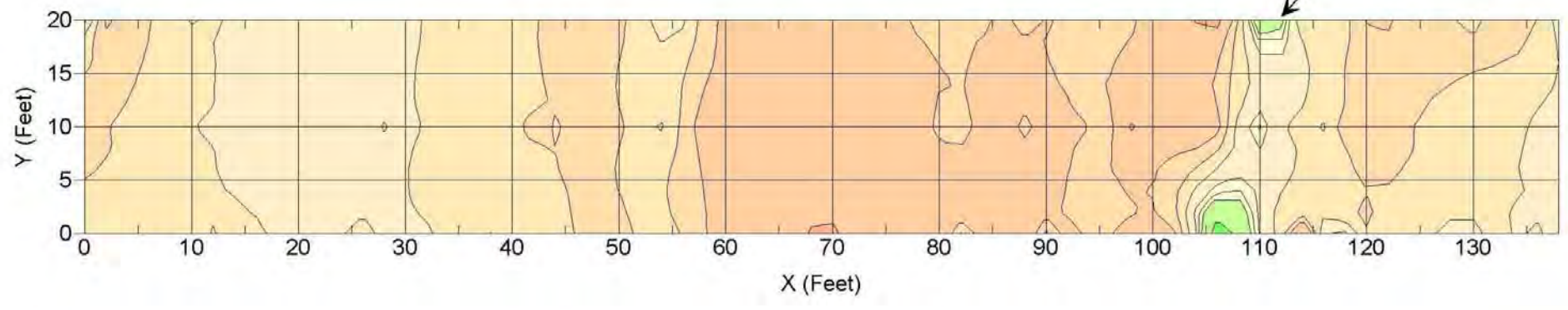
47010 Hz, IN-PHASE



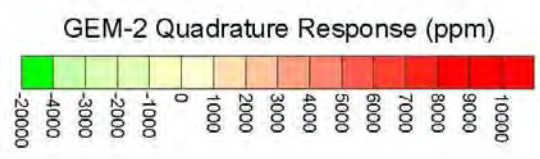
1170 Hz, IN-PHASE




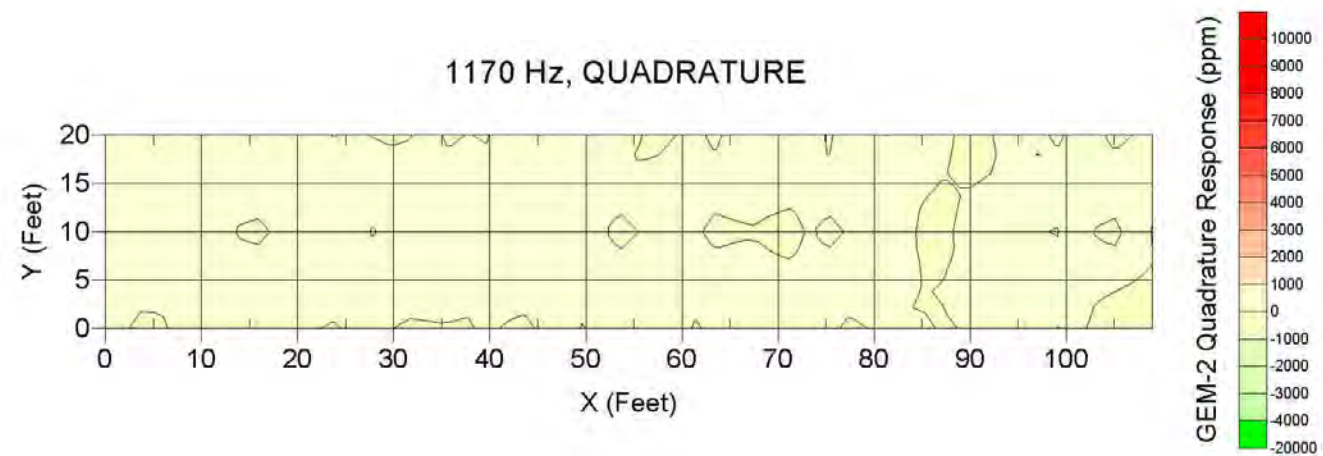
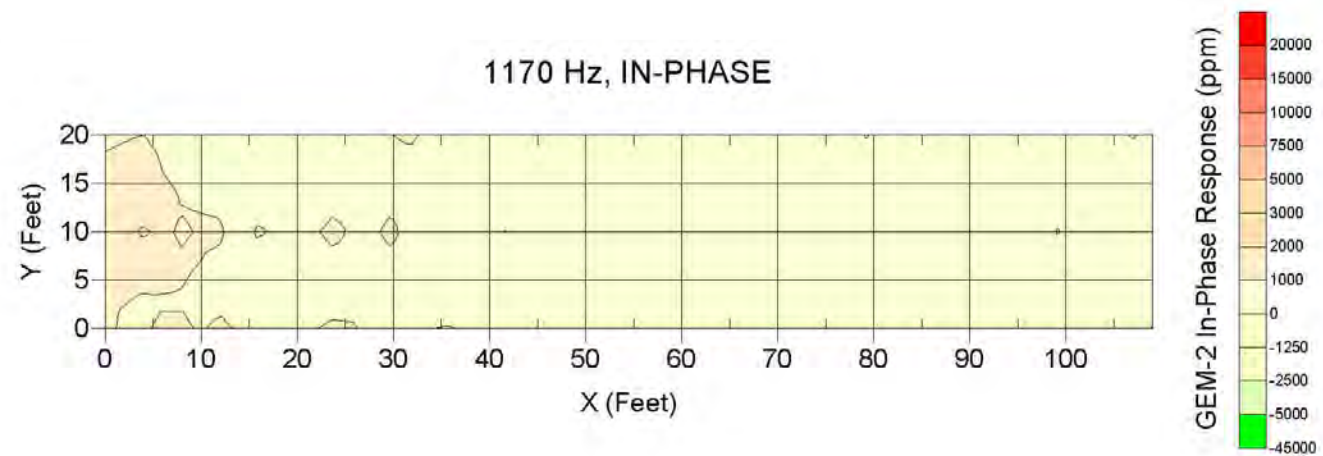
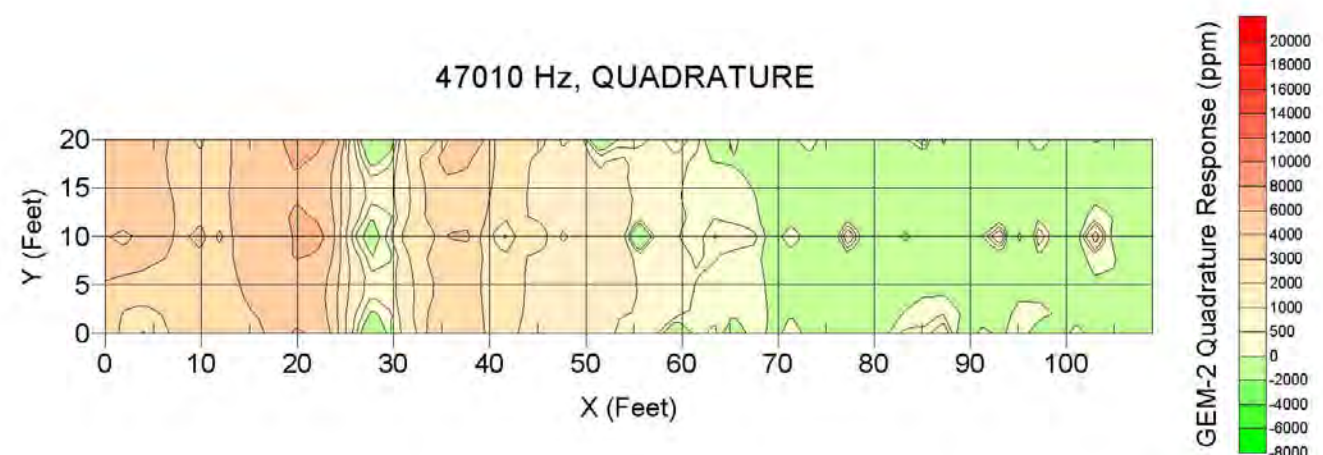
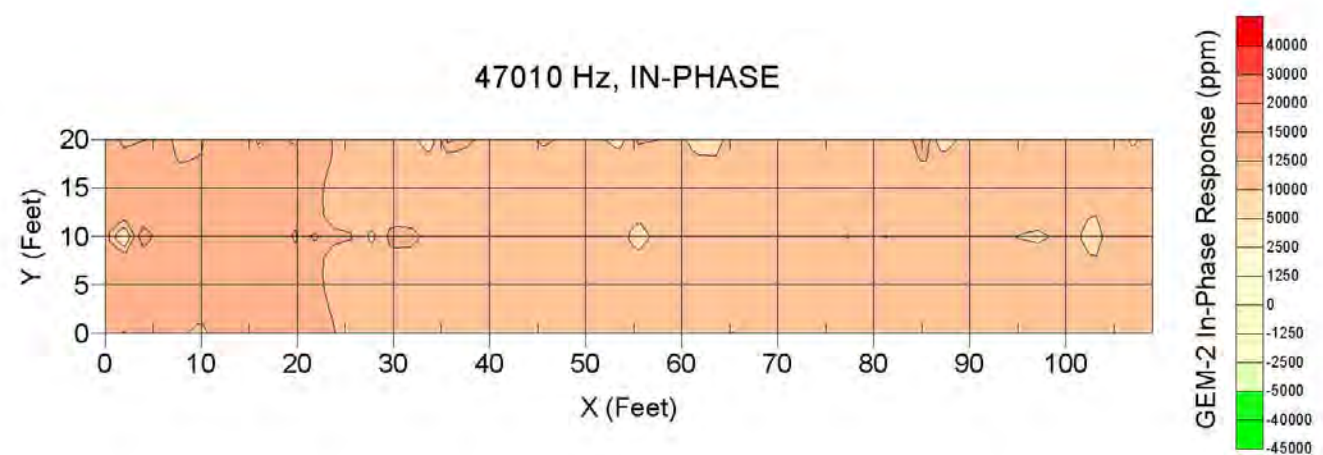
47010 Hz, QUADRATURE



1170 Hz, QUADRATURE

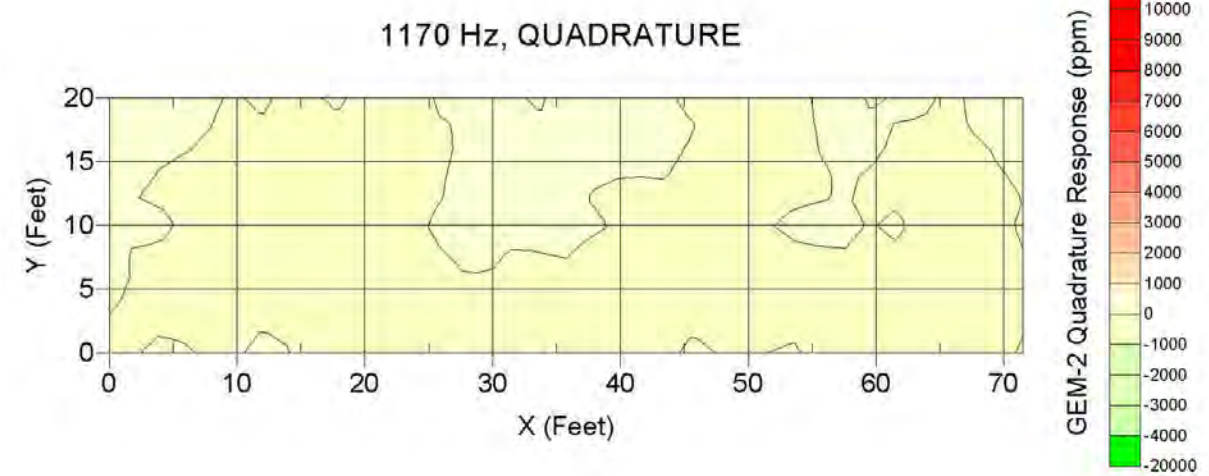
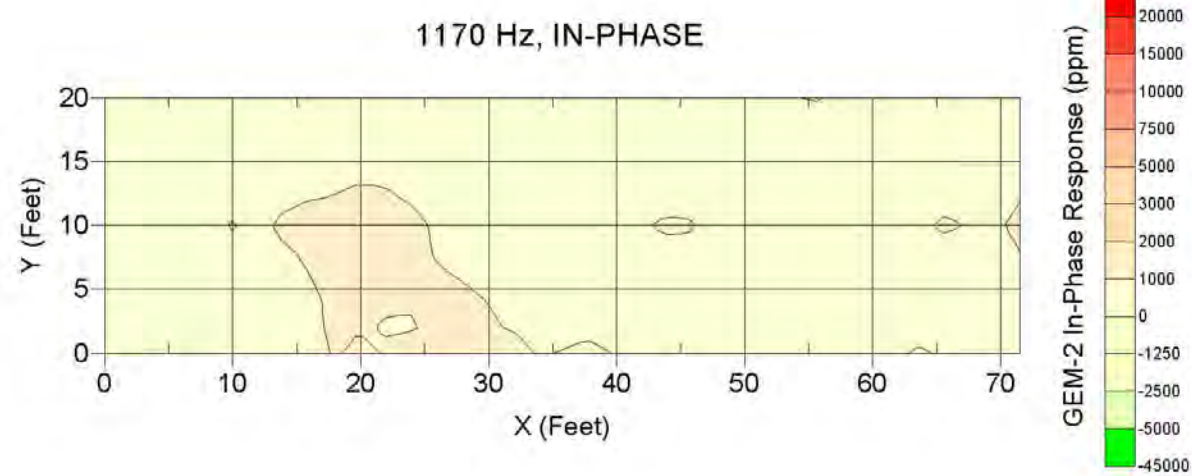
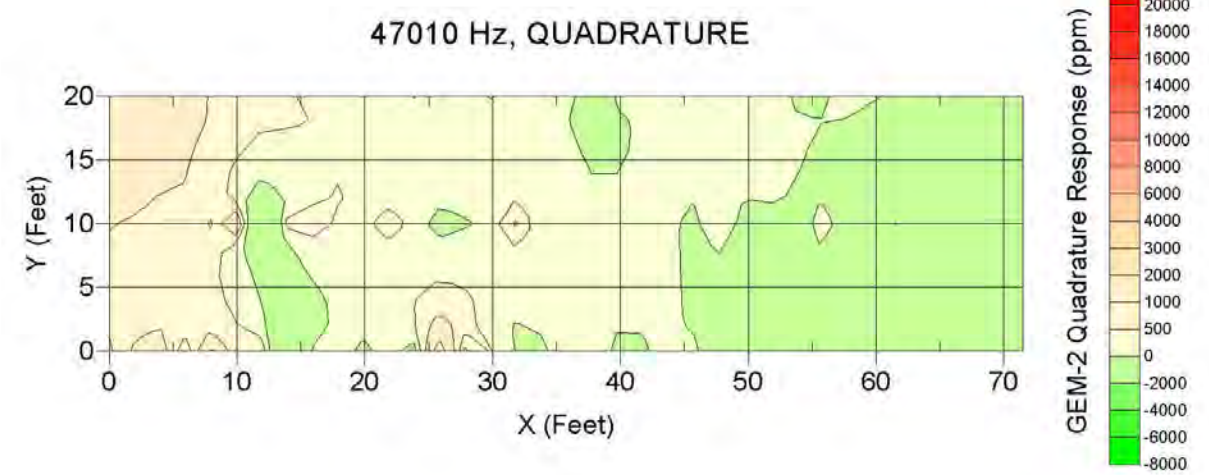
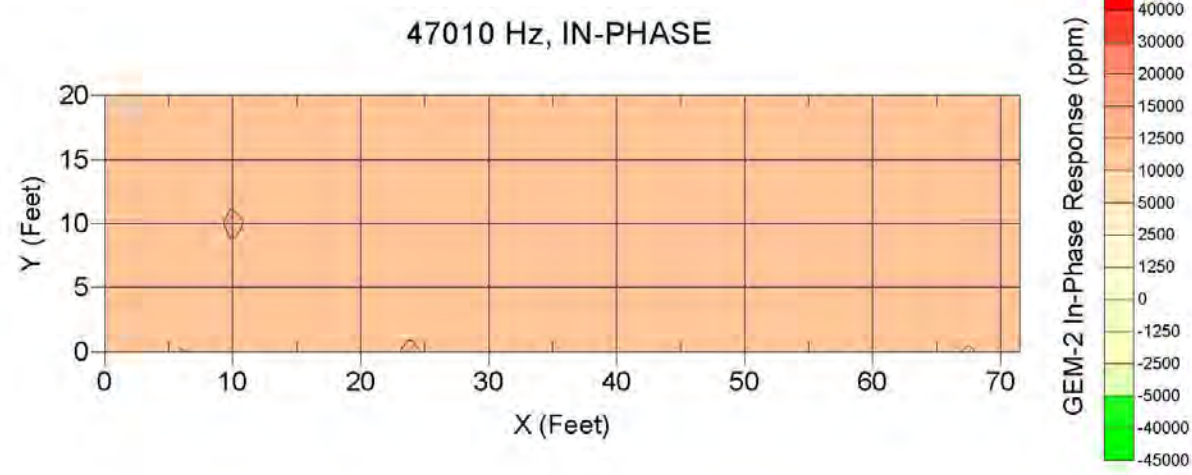


	NC Department of Transportation Geotechnical Engineering Unit	GEM-2 DATA ARCHAEOLOGICAL LINE 14 FIGURE 27
	WBS Element 32179, TIP P-3800 Mecklenburg County	



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Geotechnical Engineering Unit  
WBS Element 32179, TIP P-3800  
Mecklenburg County

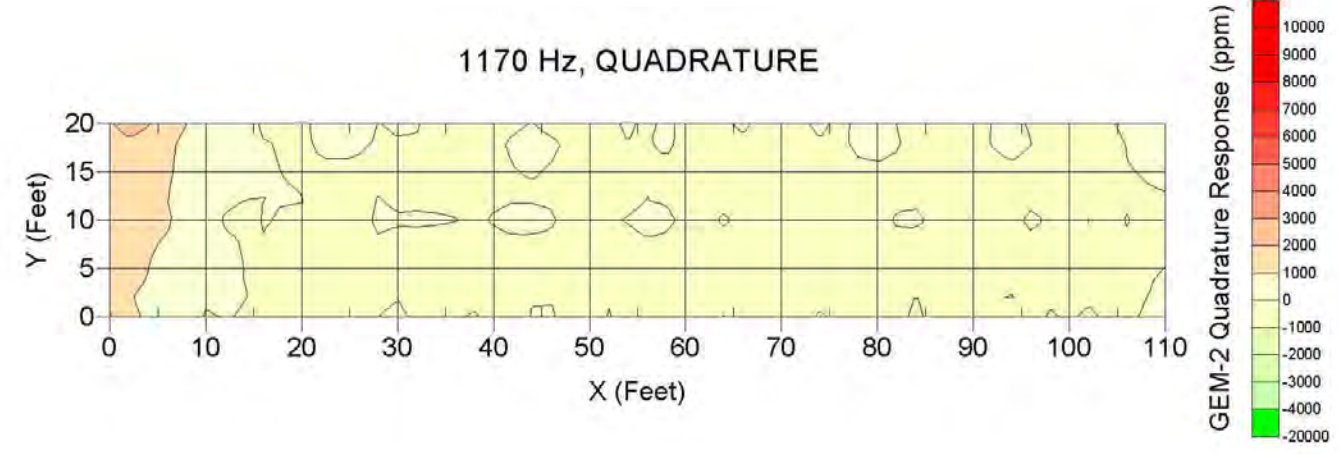
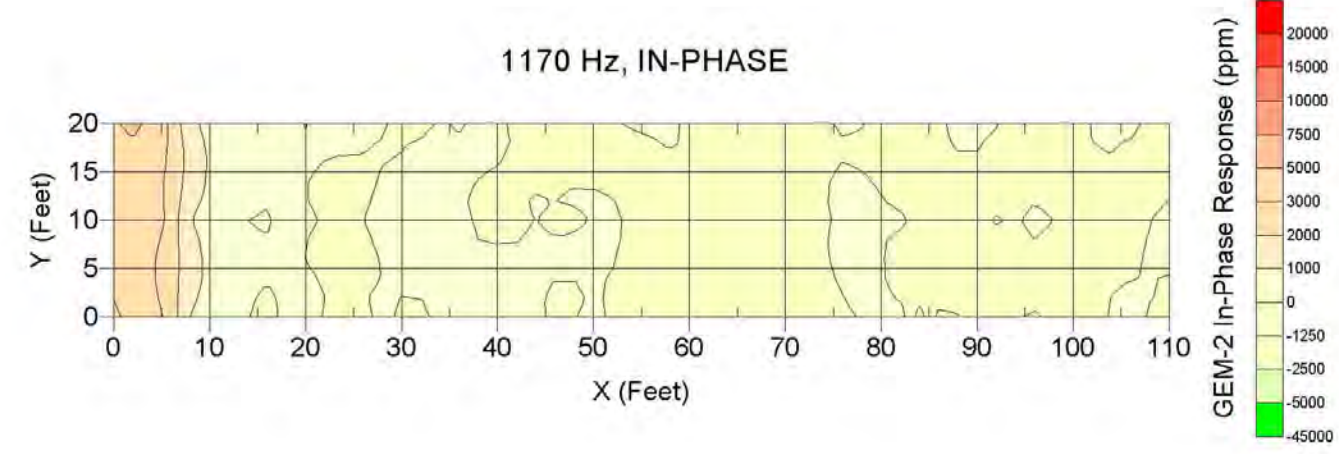
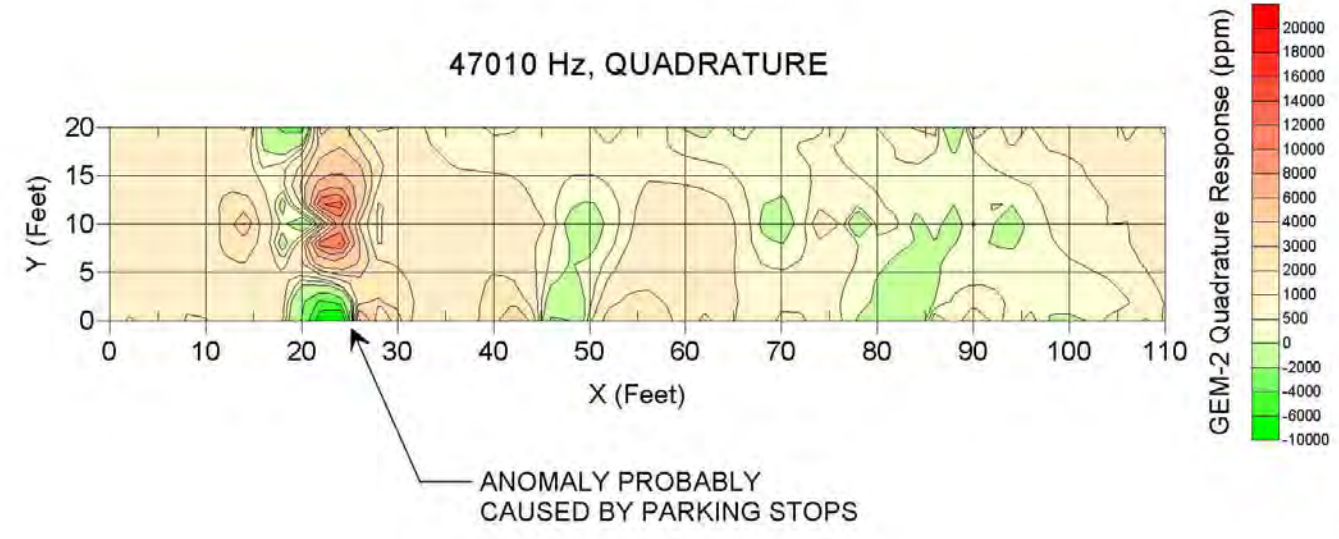
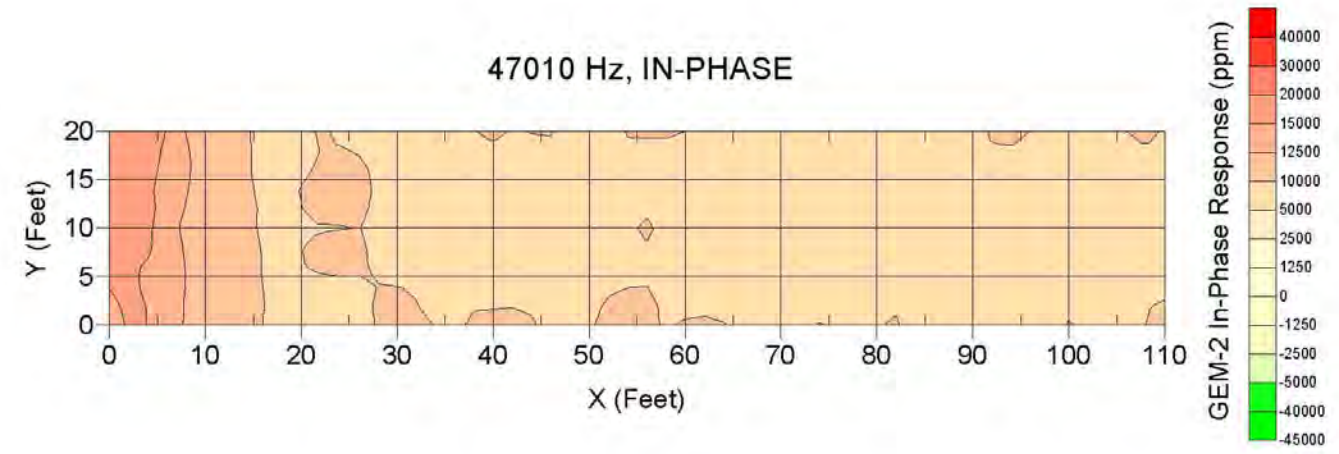
GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 15



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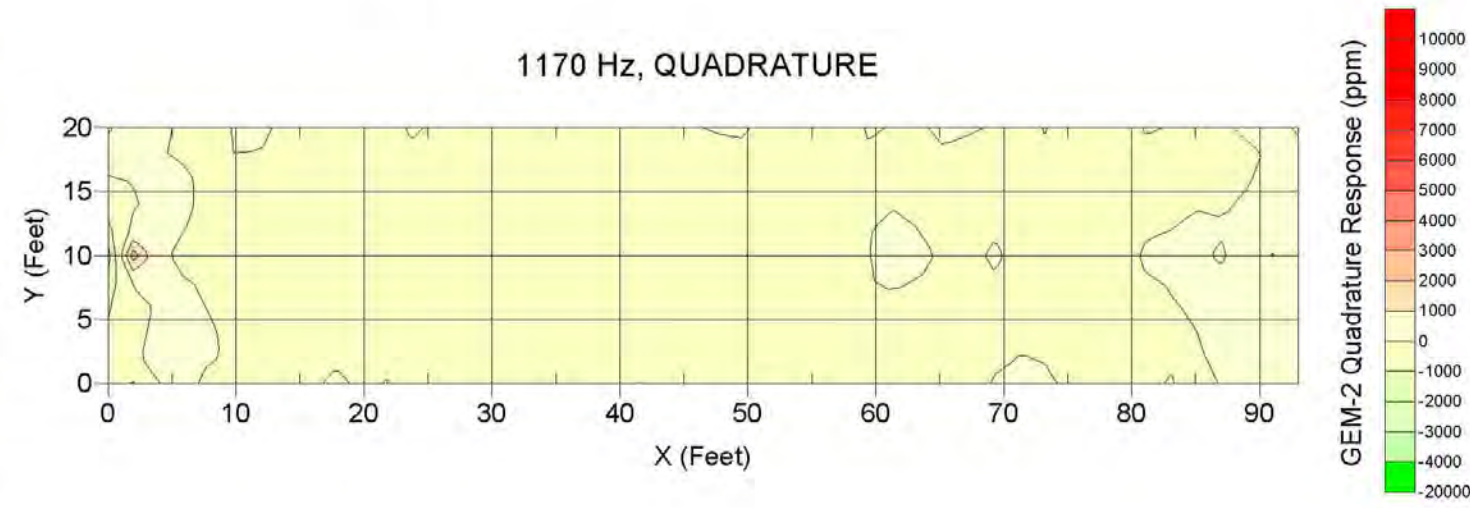
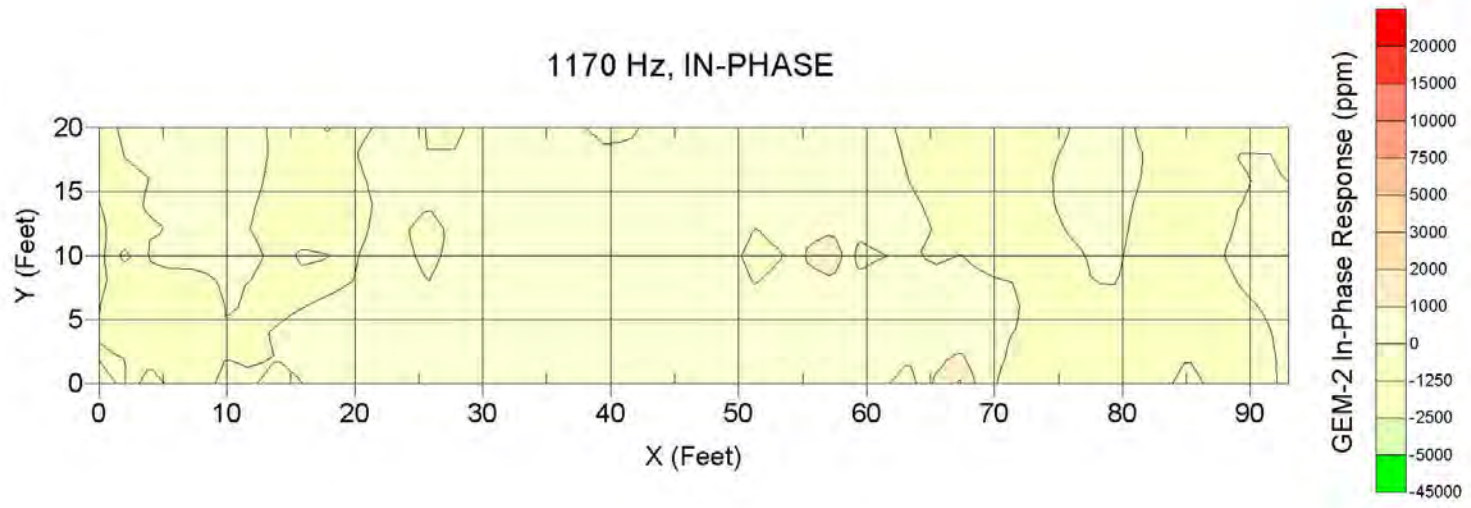
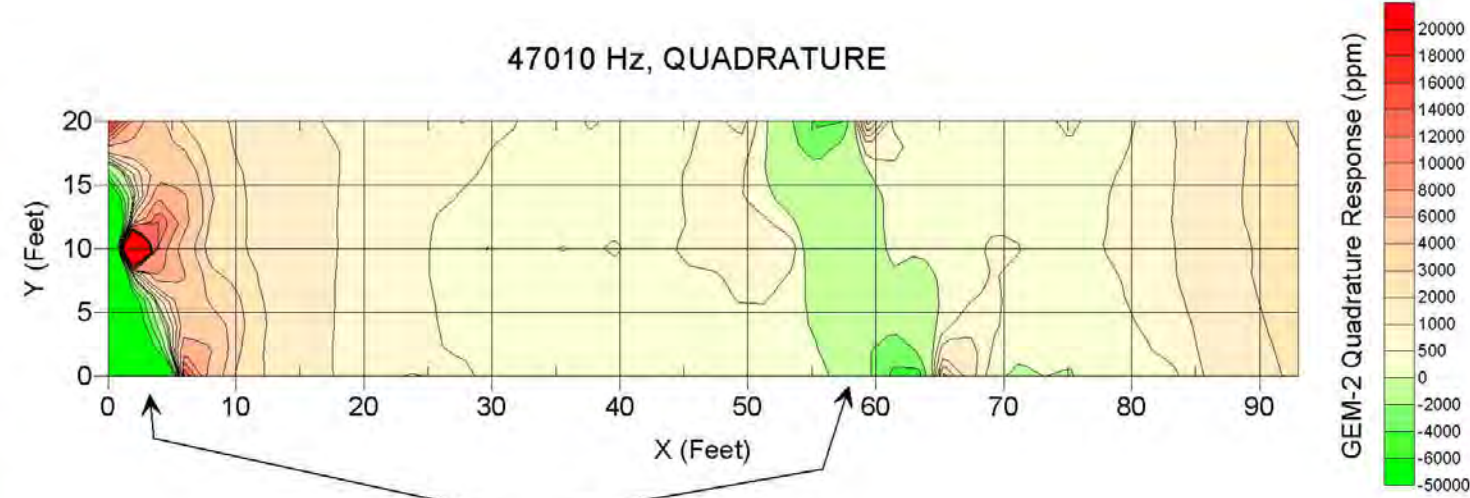
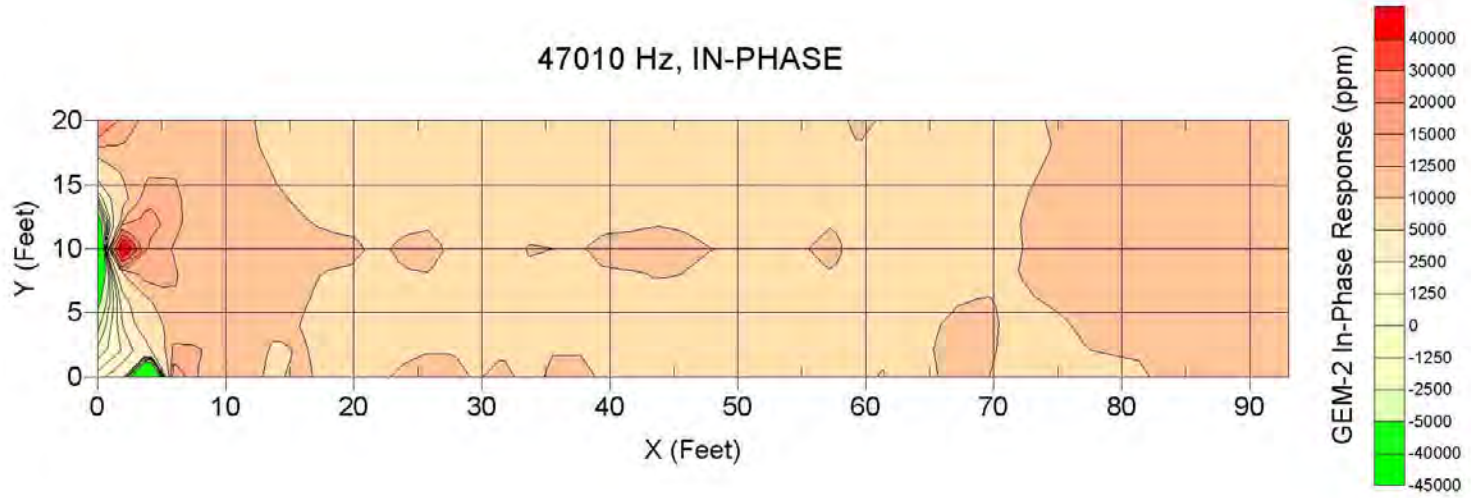
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Mecklenburg County

GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 16



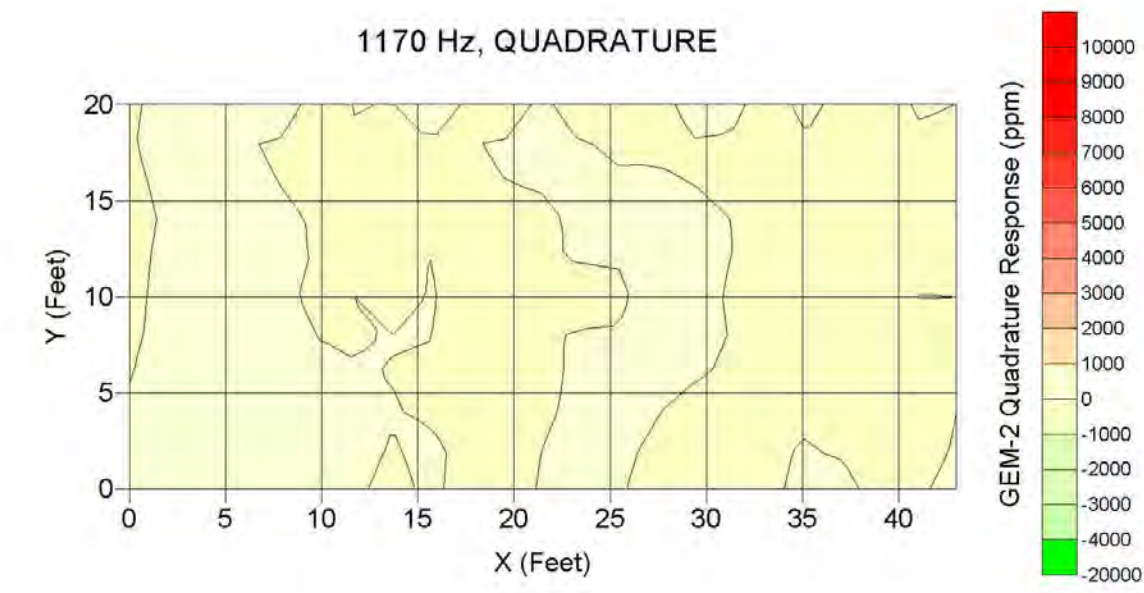
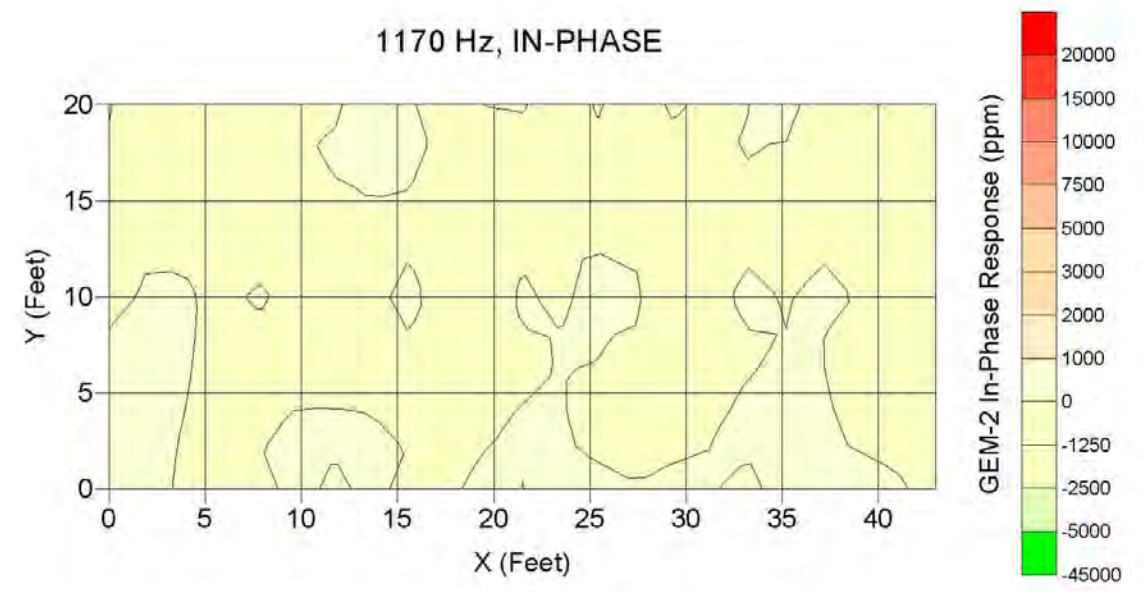
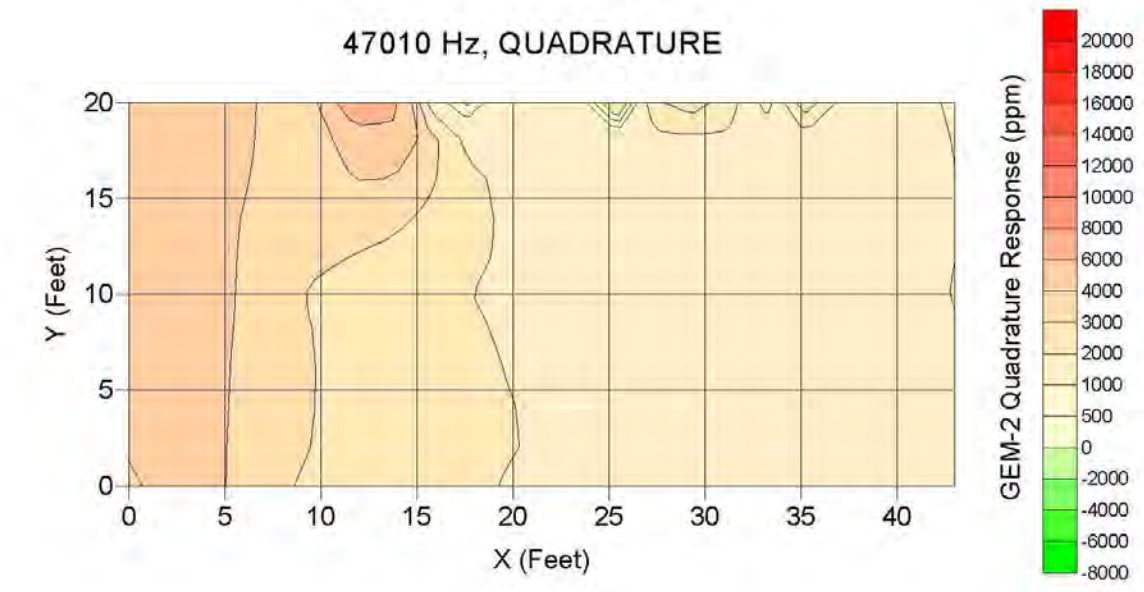
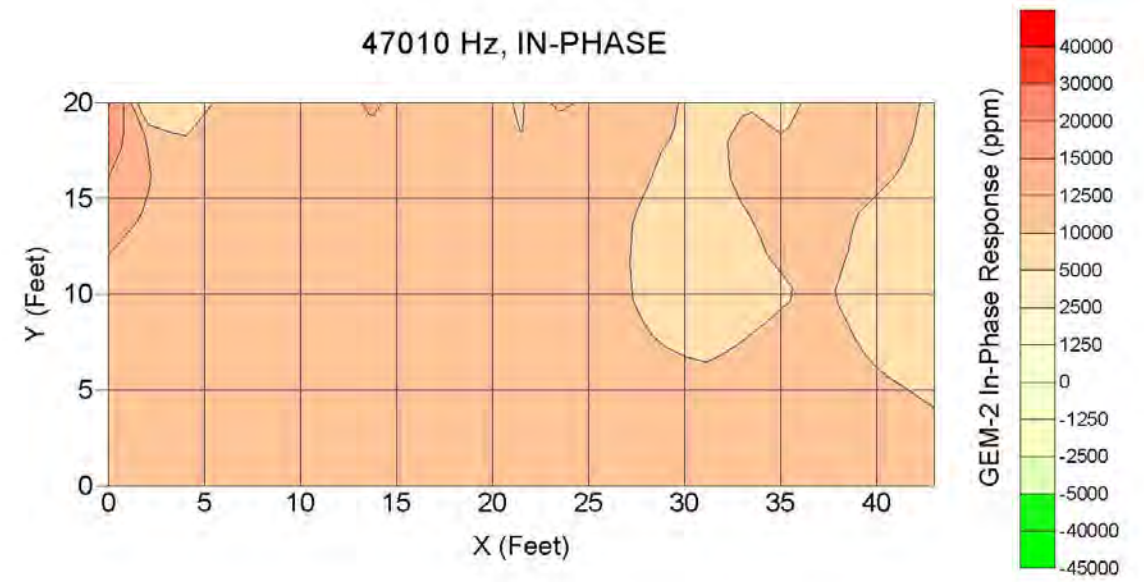
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GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 17



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GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 18  
FIGURE 31

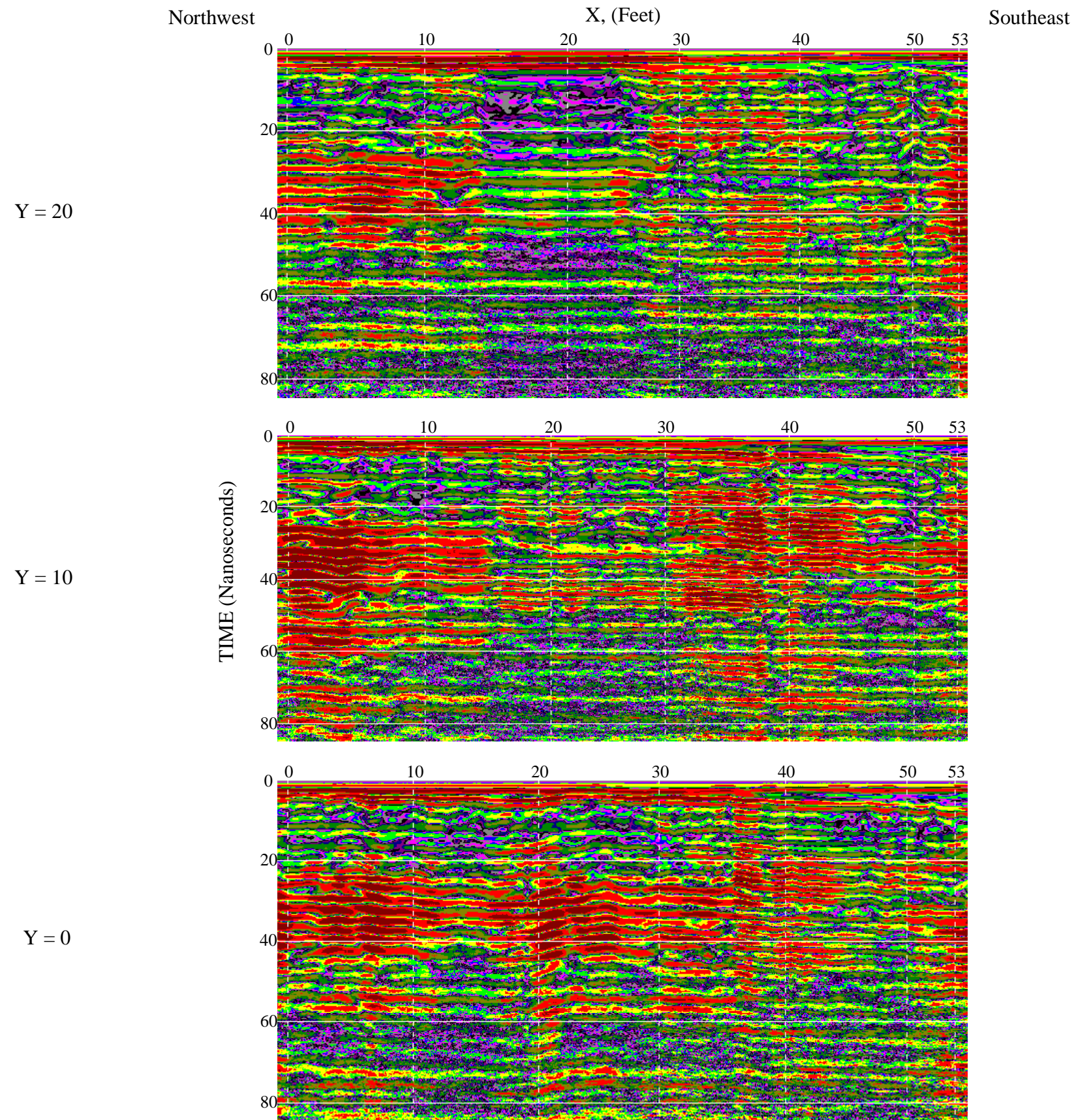


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GEM-2 DATA  
ARCHAEOLOGICAL  
LINE 19



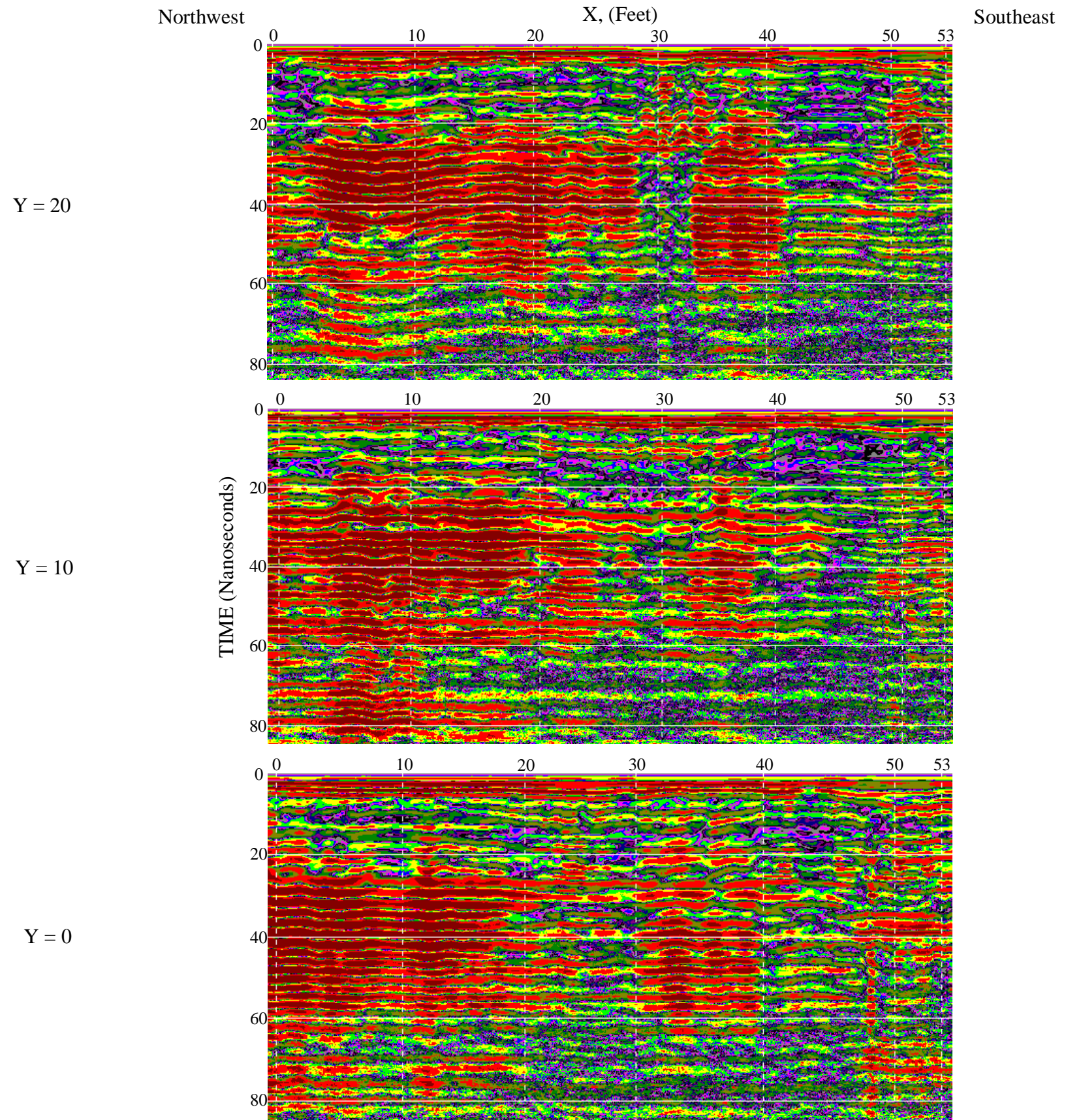


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GPR PROFILES  
ARCHAEOLOGICAL  
LINE 1

FIGURE 33

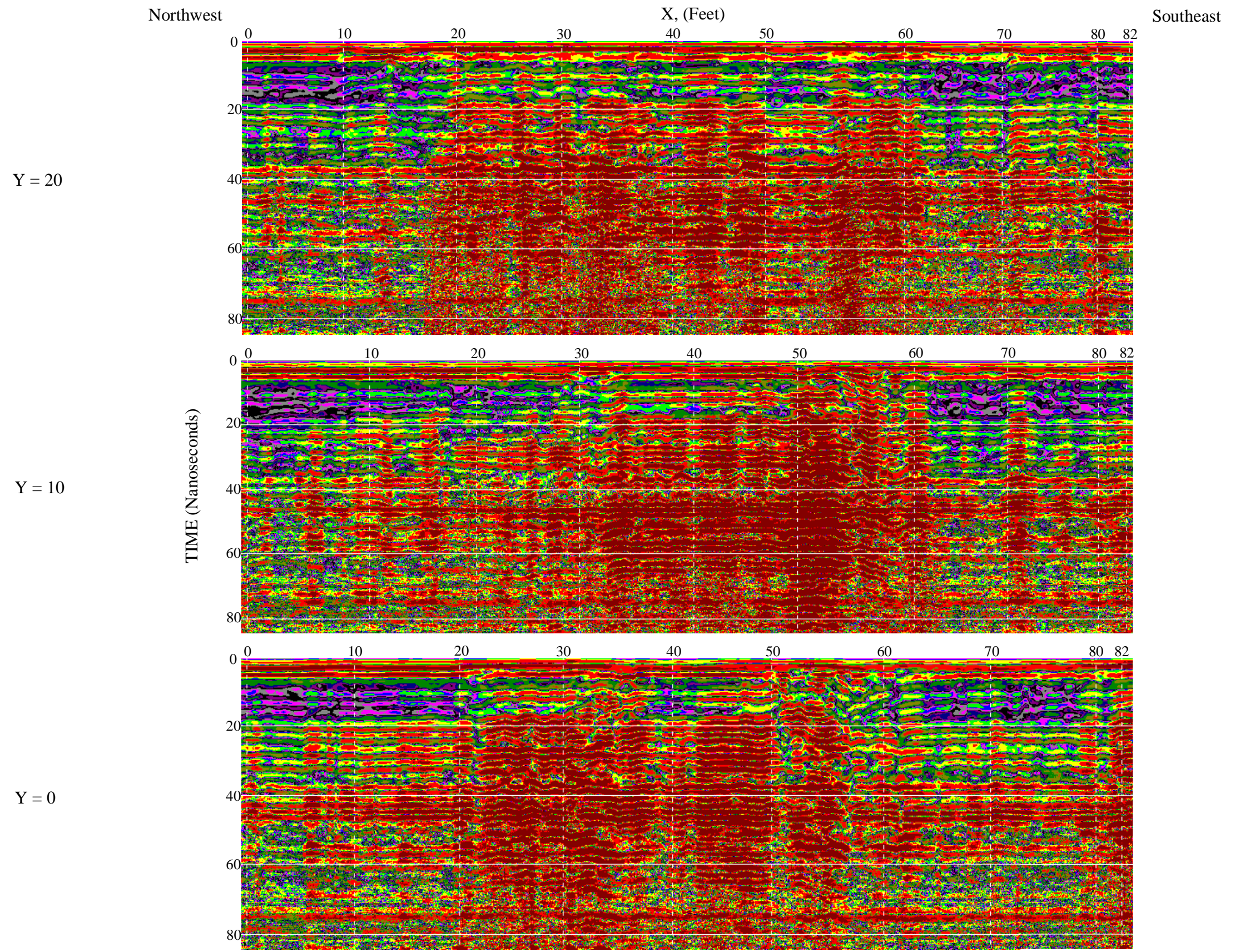


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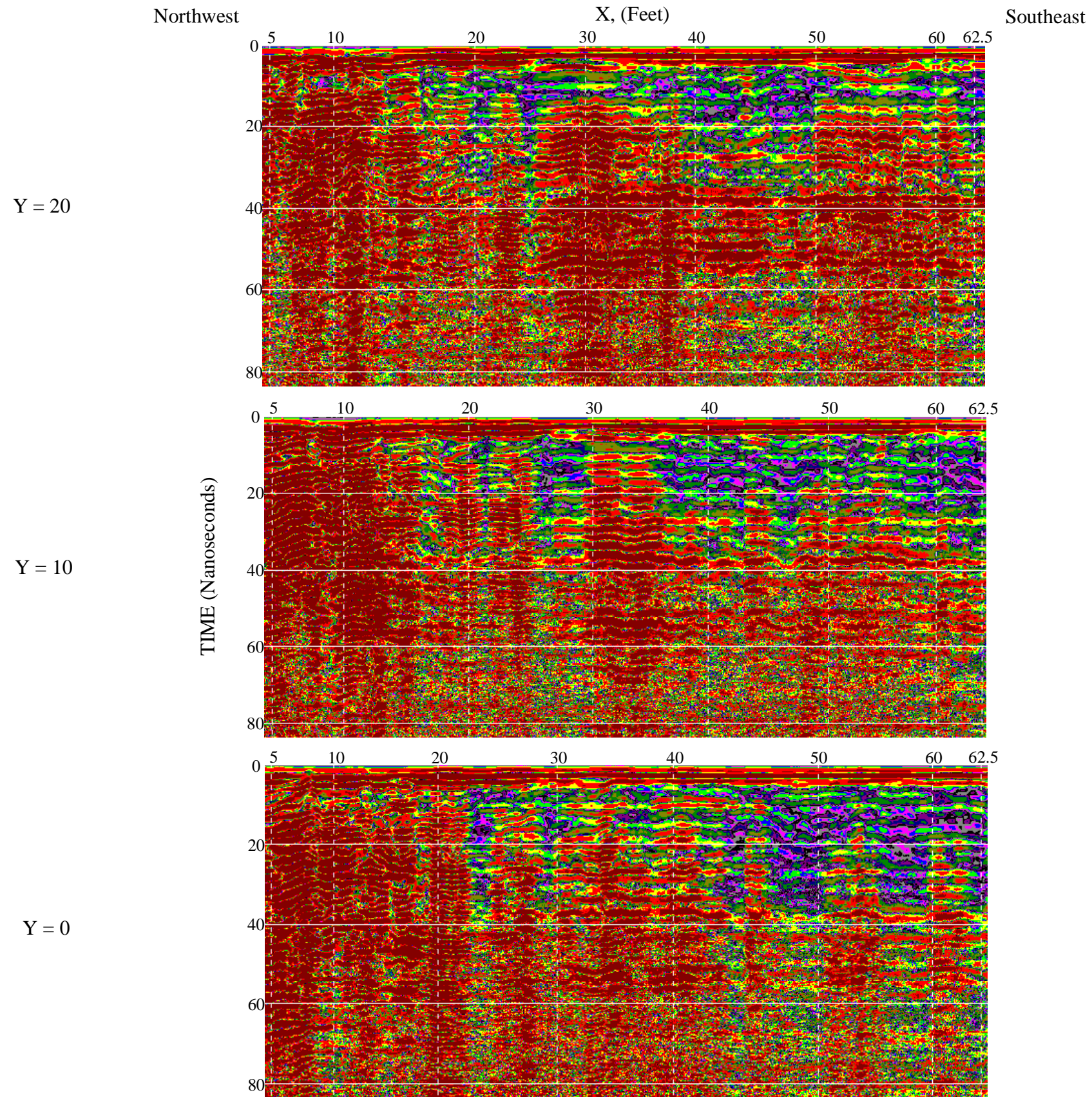
GPR PROFILES  
ARCHAEOLOGICAL  
LINE 2

FIGURE 34



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GPR PROFILES  
 ARCHAEOLOGICAL  
 LINE 3  
 FIGURE 35

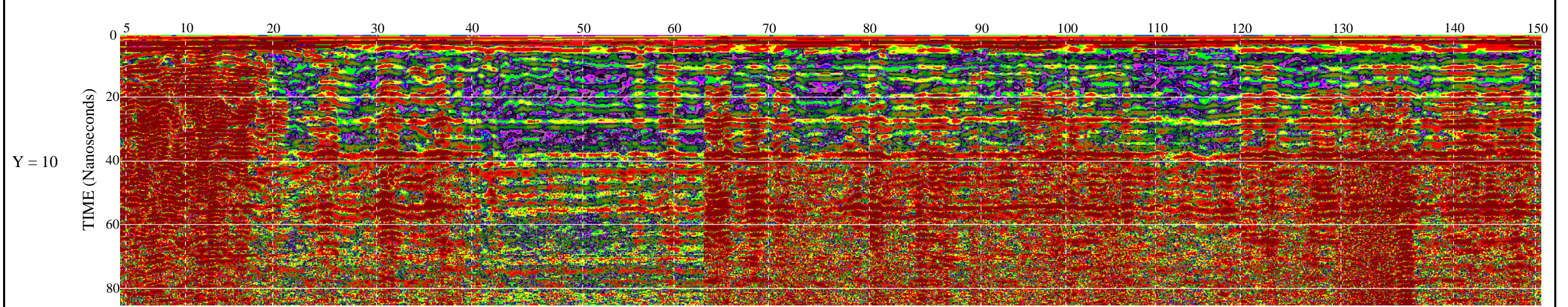
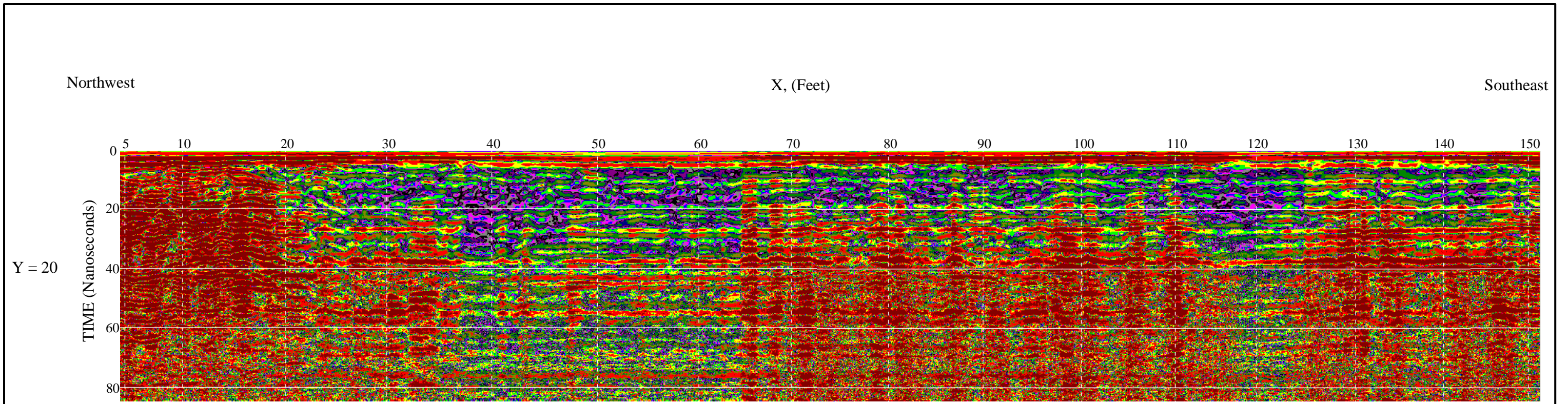


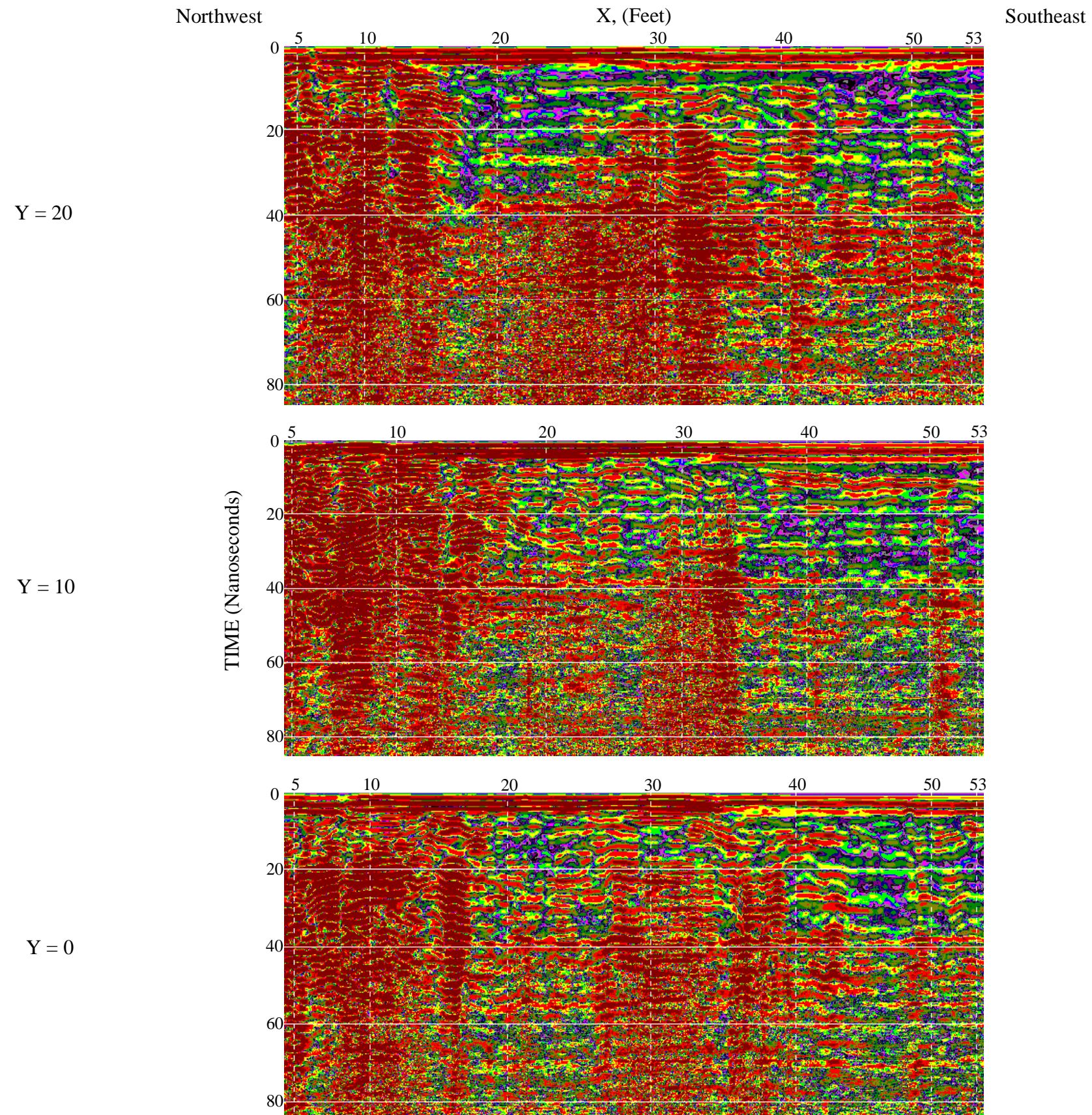
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Mecklenburg County

GPR PROFILES  
ARCHAEOLOGICAL  
LINE 4

FIGURE 36



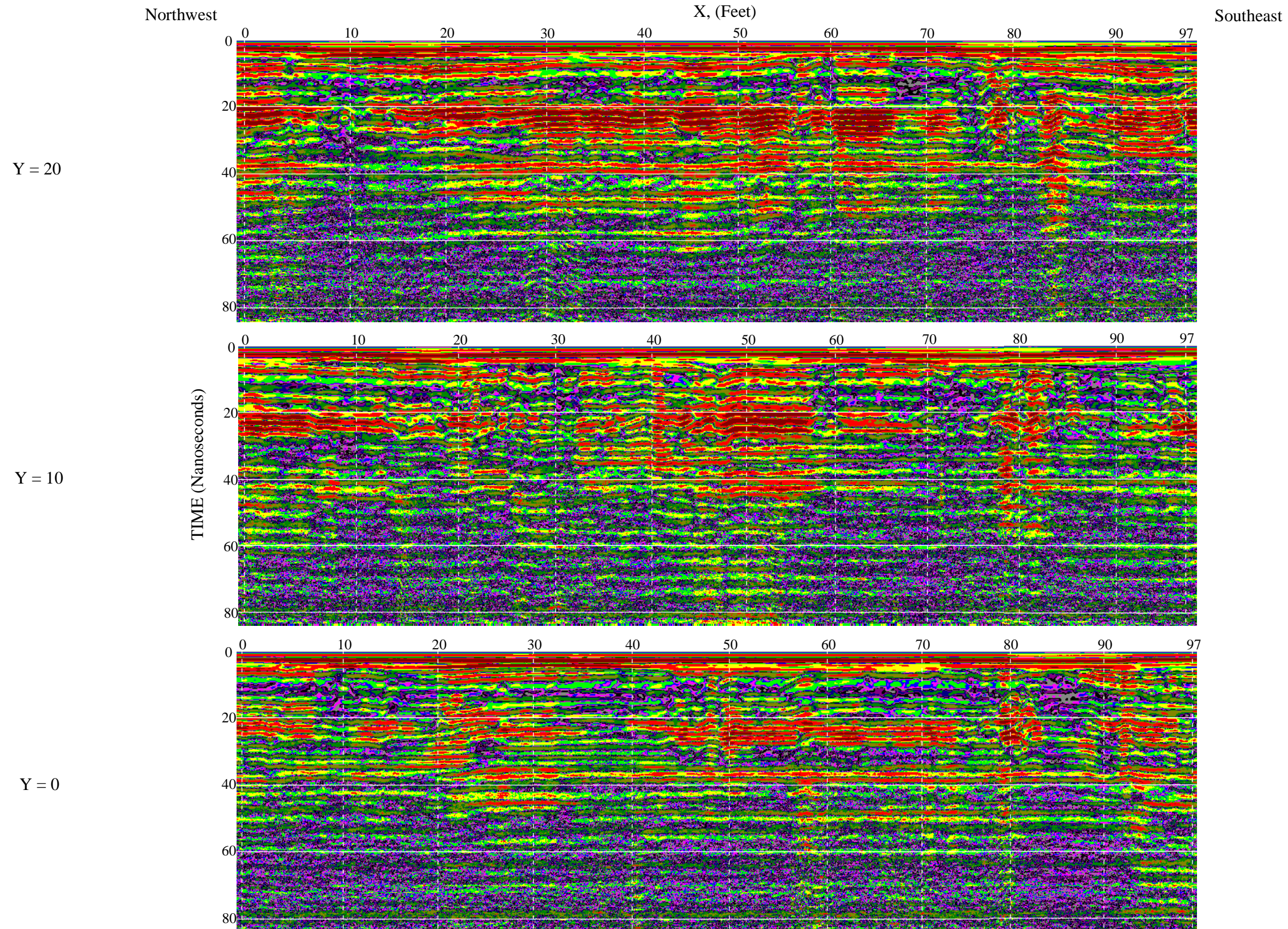


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GPR PROFILES  
ARCHAEOLOGICAL  
LINE 6

FIGURE 38

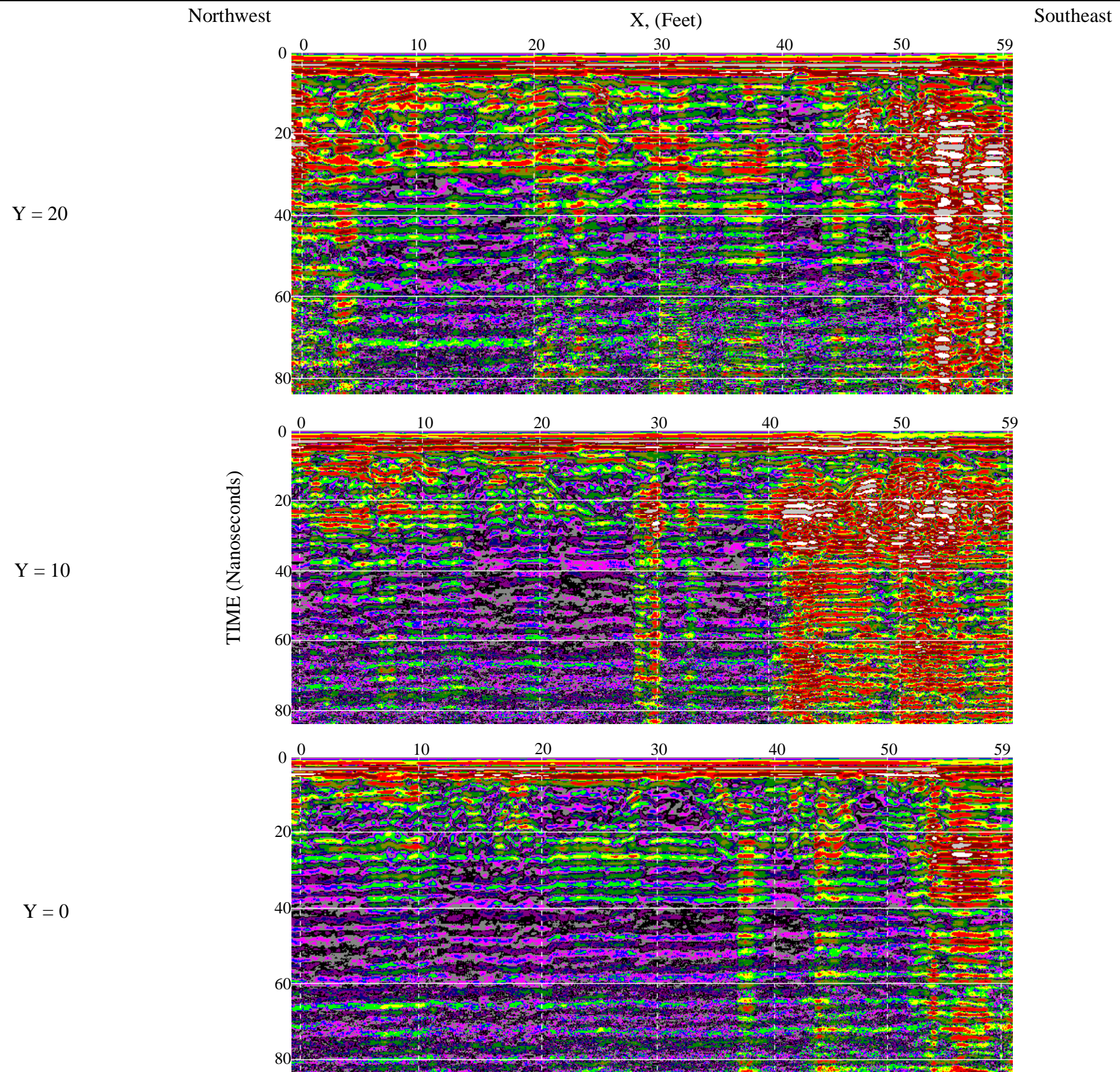


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Mecklenburg County

GPR PROFILES  
ARCHAEOLOGICAL  
LINE 7

FIGURE 39



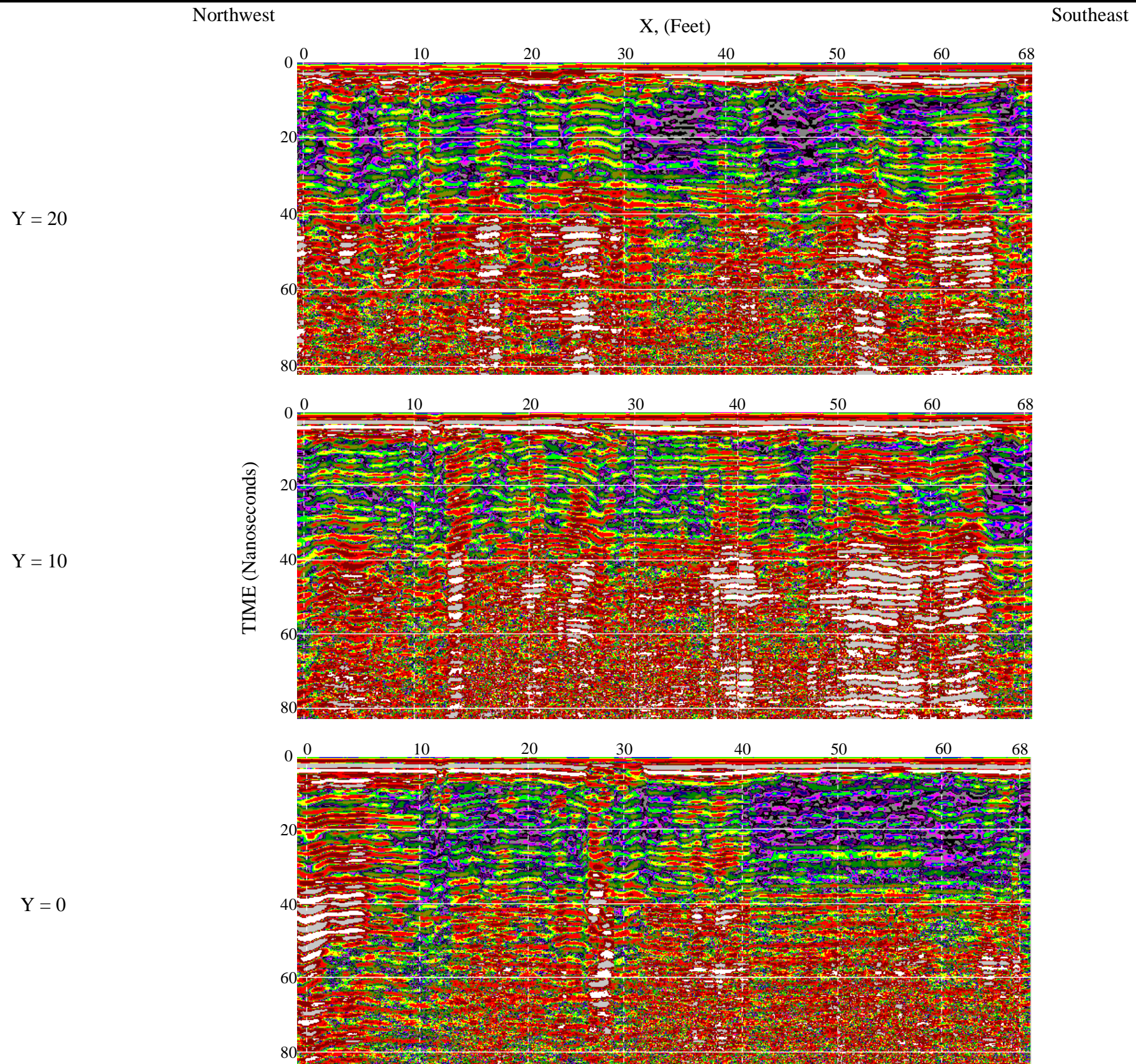
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GPR PROFILES  
ARCHAEOLOGICAL  
LINE 8

FIGURE 40





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GPR PROFILES  
ARCHAEOLOGICAL  
LINE 9

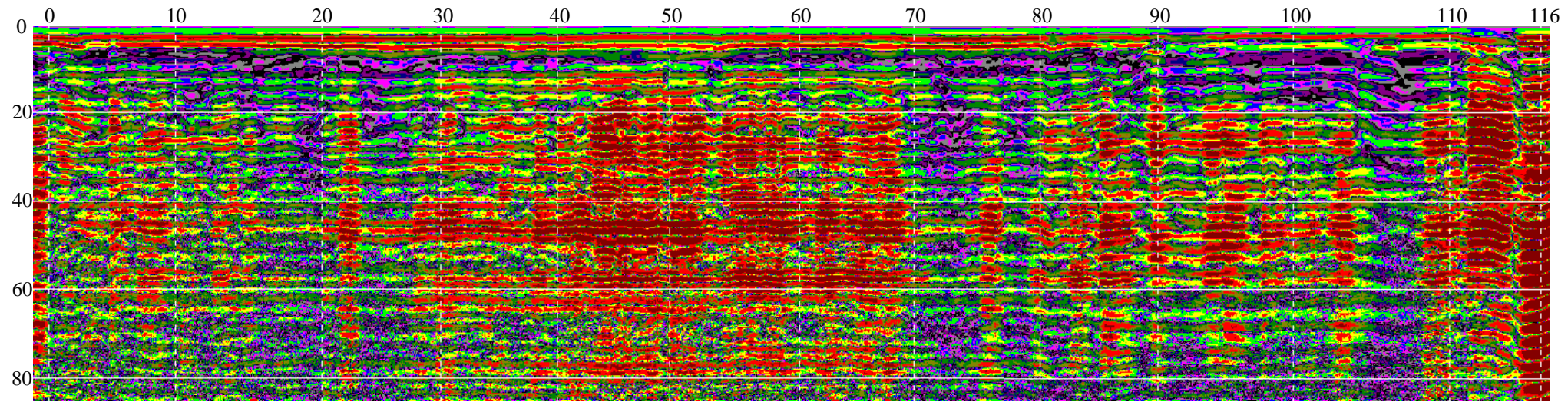
FIGURE 41

Northwest

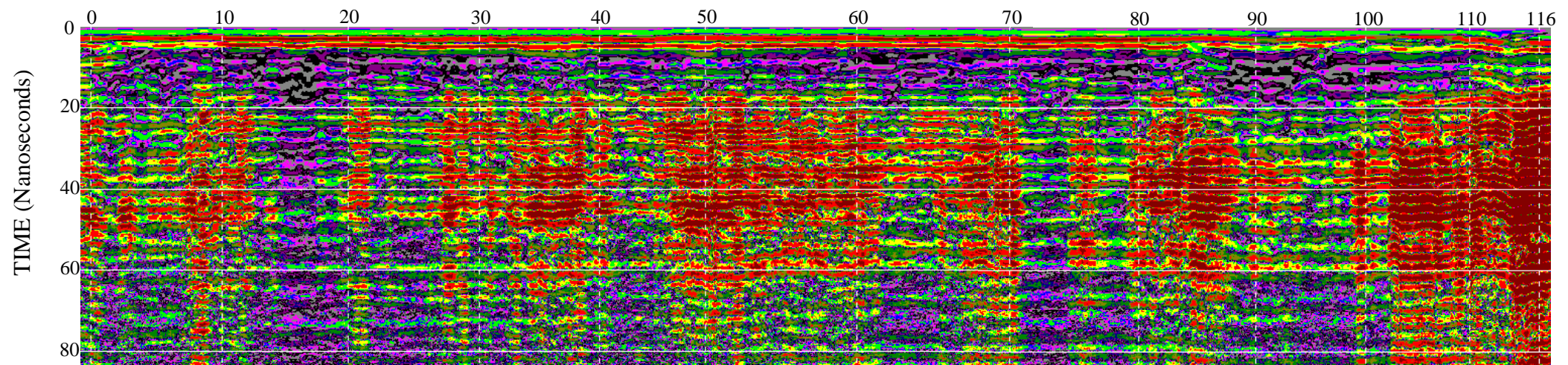
X, (Feet)

Southeast

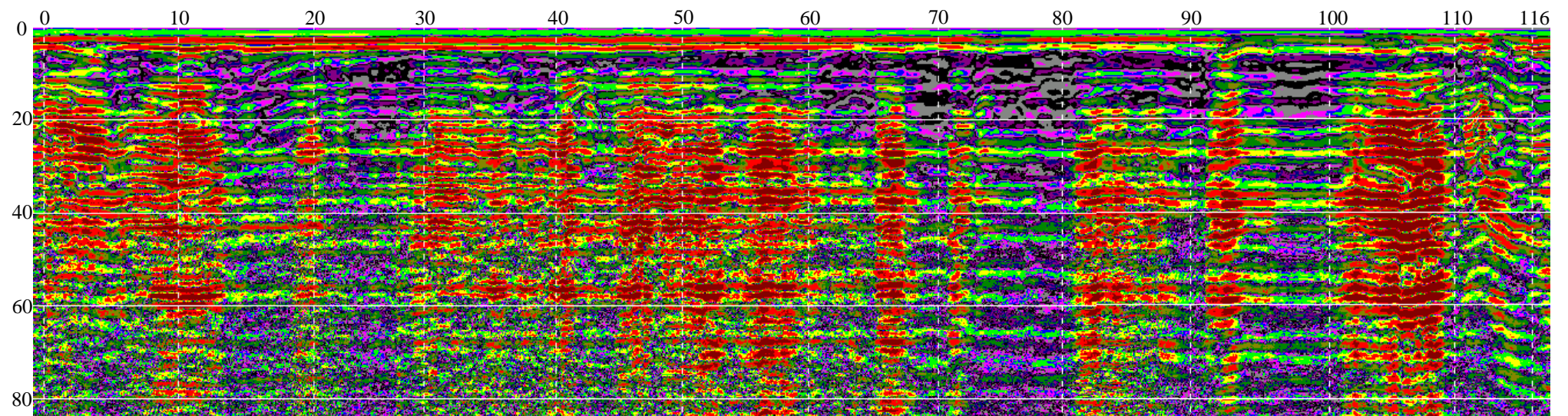
Y = 20



Y = 10



Y = 0



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GPR PROFILES  
ARCHAEOLOGICAL  
LINE 10

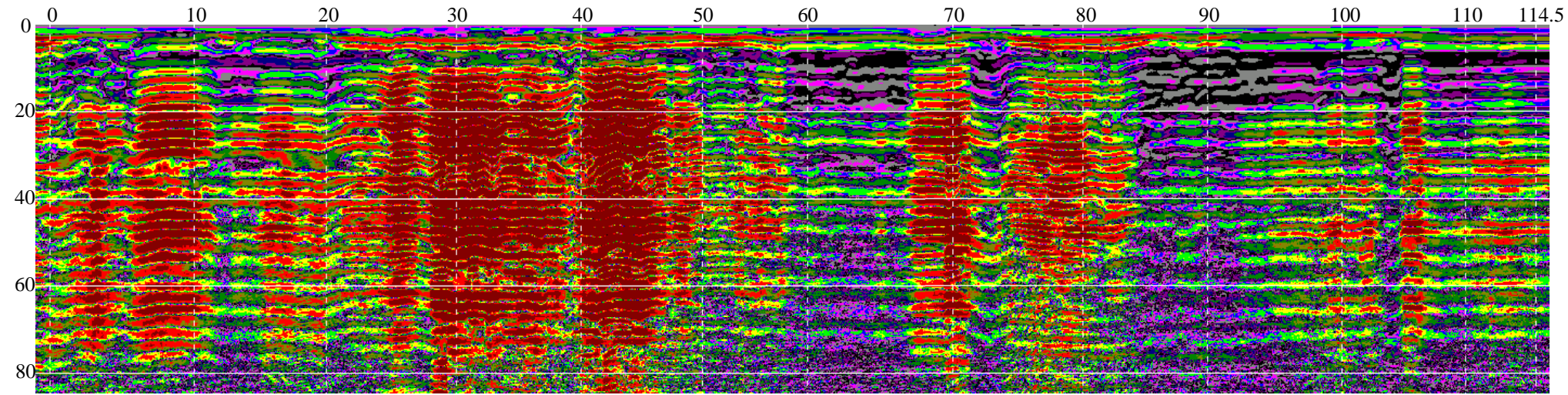
FIGURE 42

Northwest

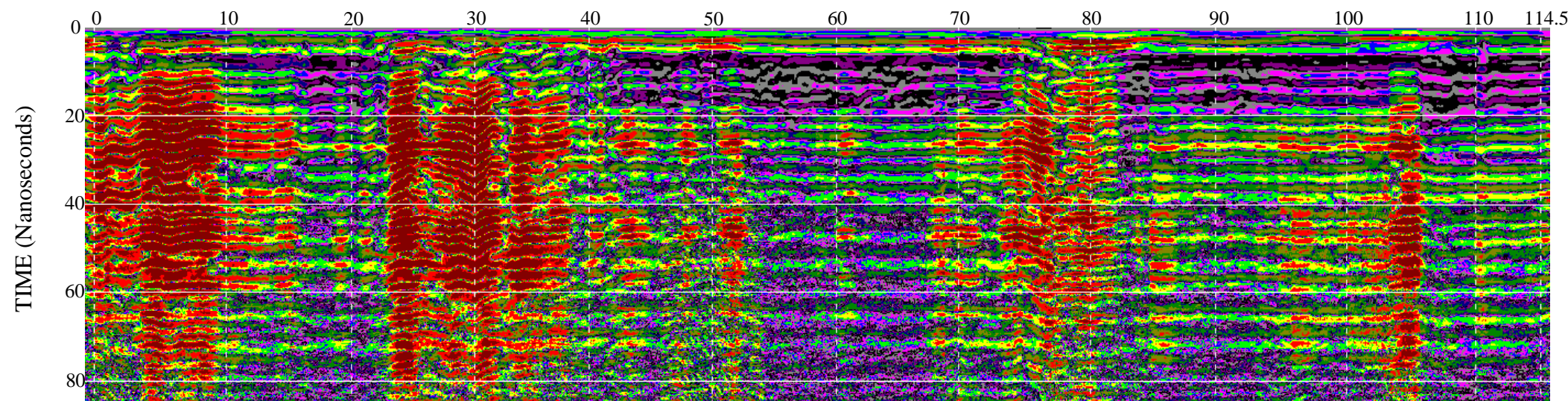
X, (Feet)

Southeast

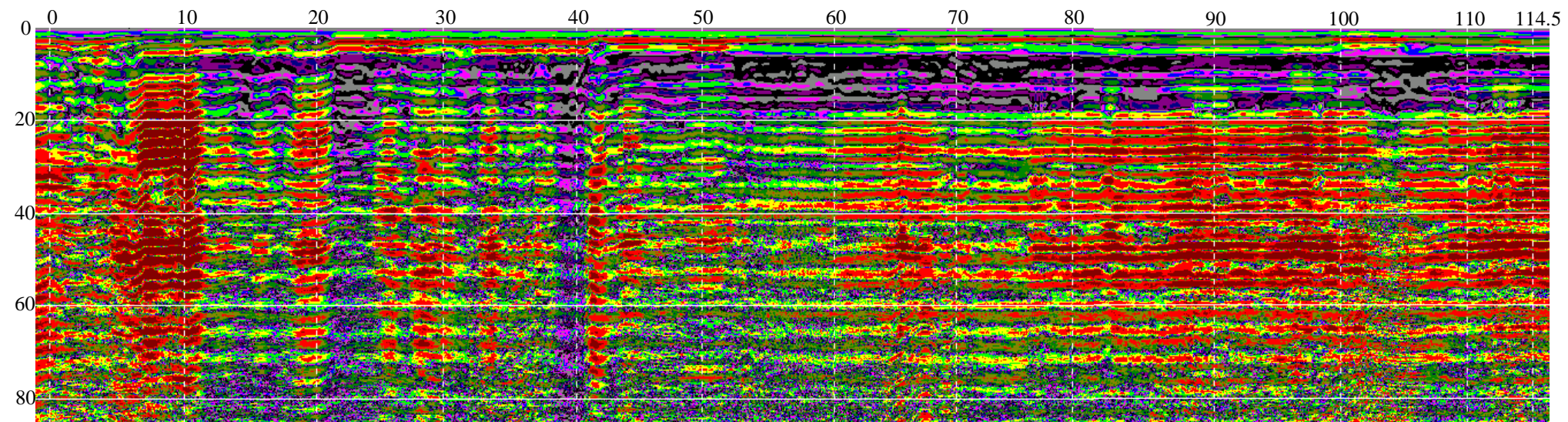
Y = 20



Y = 10



Y = 0

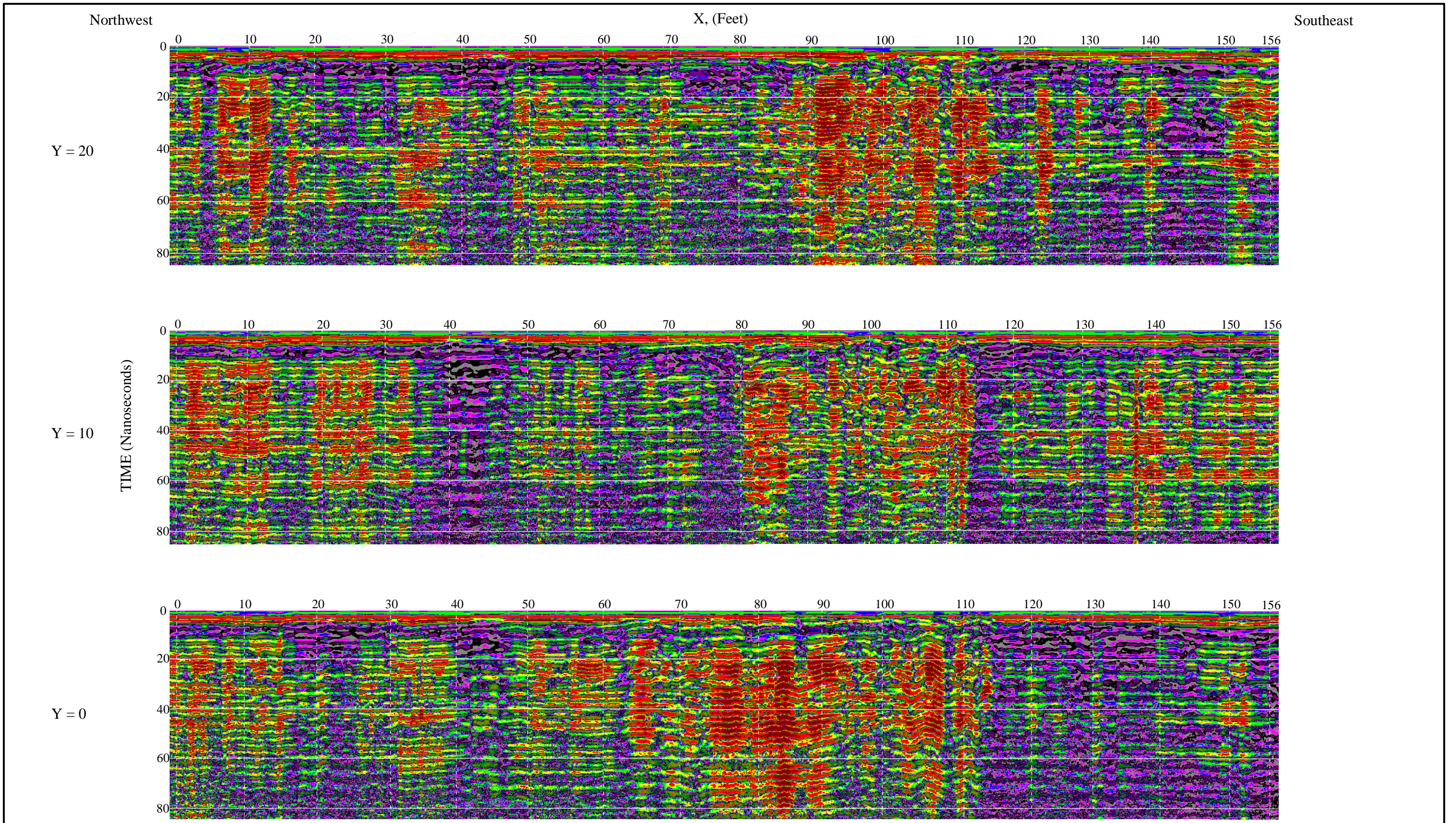


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GPR PROFILES  
ARCHAEOLOGICAL  
LINE 11

FIGURE 43

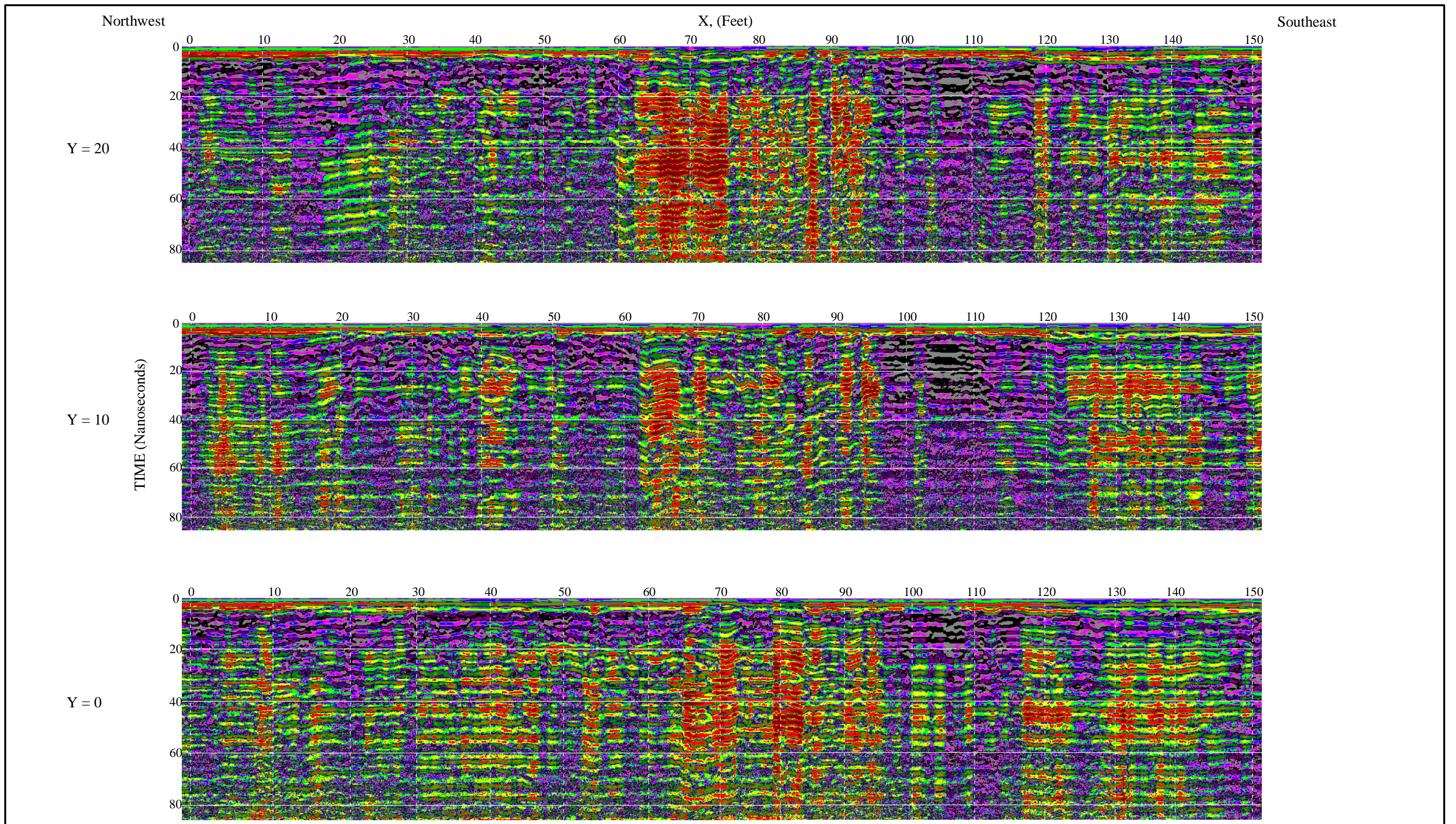


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GPR PROFILES  
ARCHAEOLOGICAL  
LINE 12

FIGURE 44

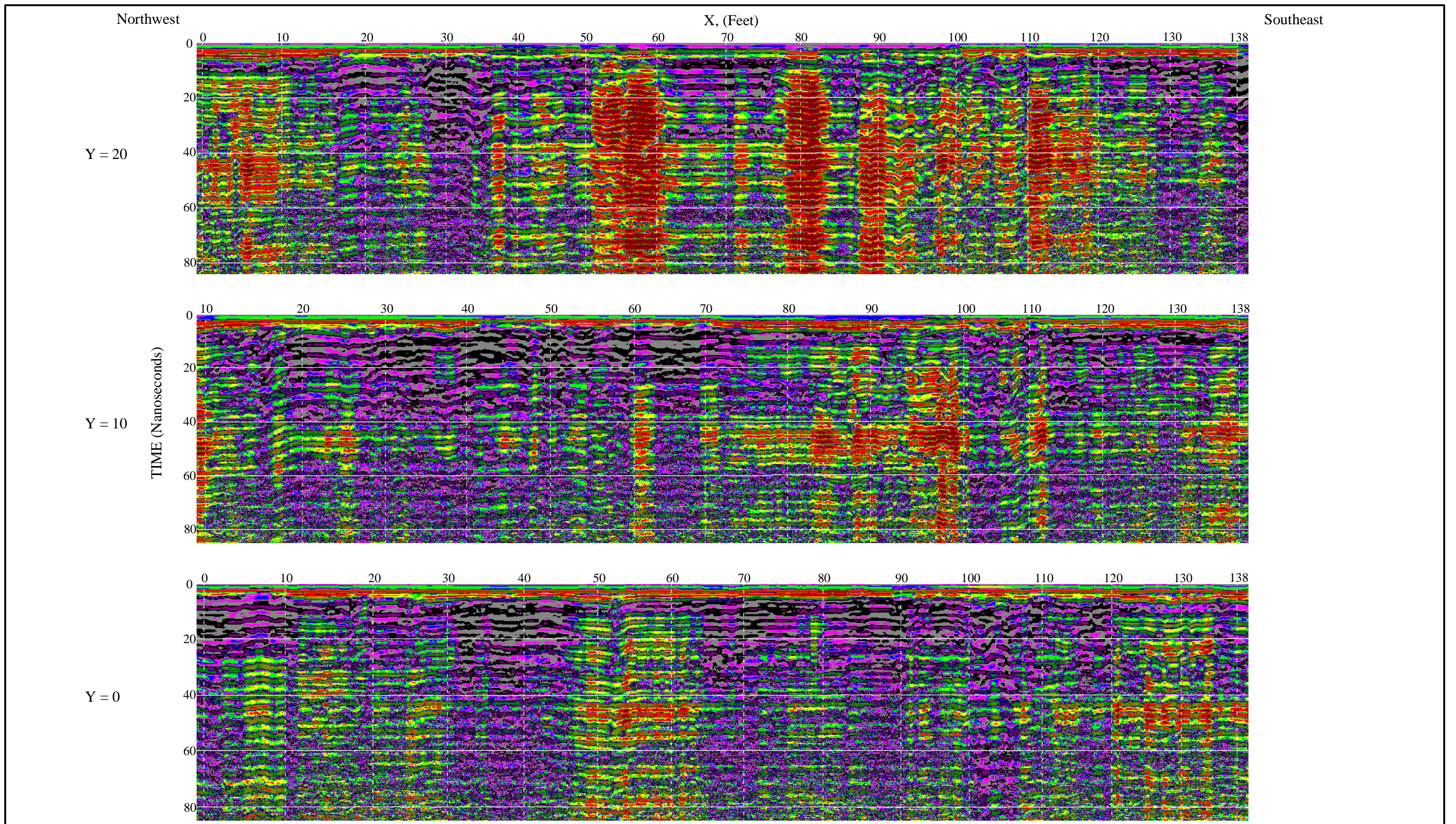


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GPR PROFILES  
ARCHAEOLOGICAL  
LINE 13

FIGURE 45



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GPR PROFILES  
ARCHAEOLOGICAL  
LINE 14

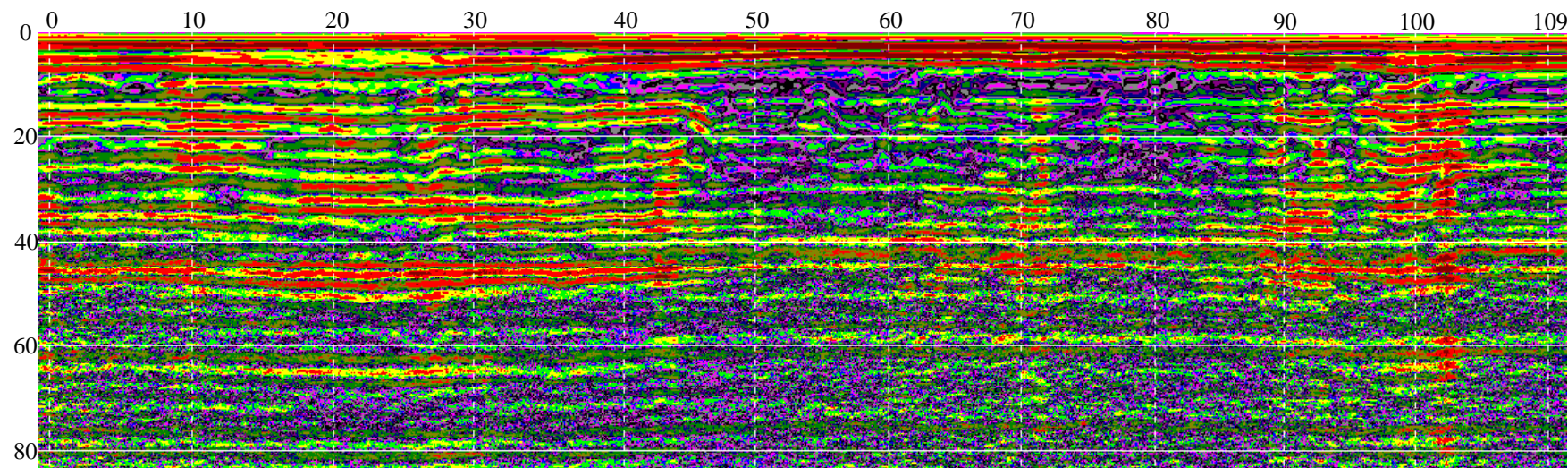
FIGURE 46

Northwest

X, (Feet)

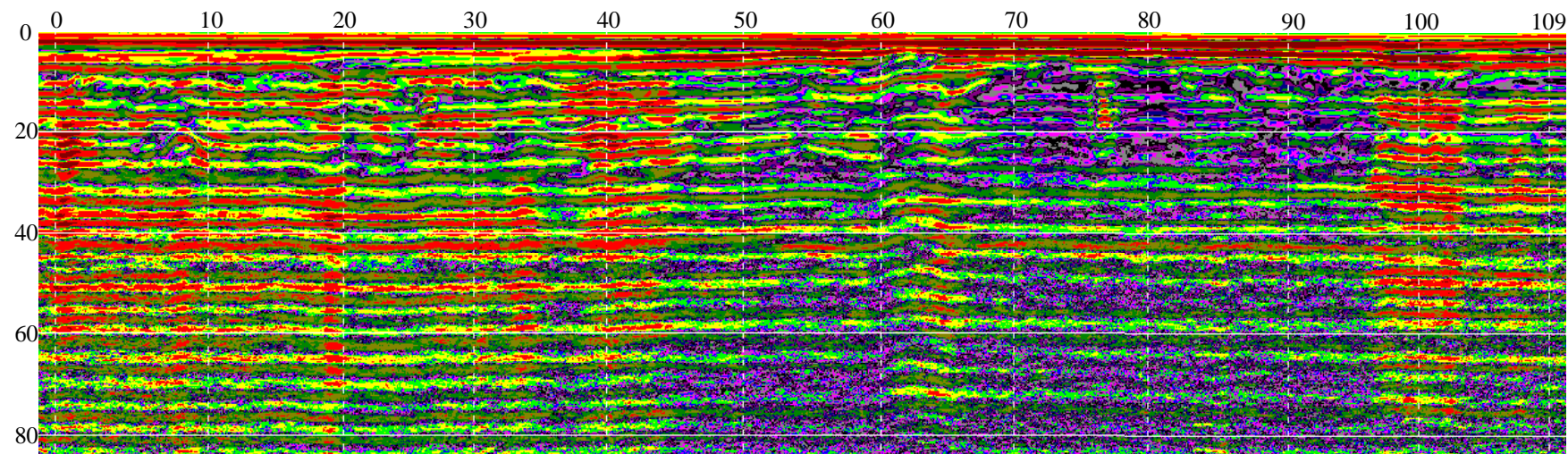
Southeast

Y = 20

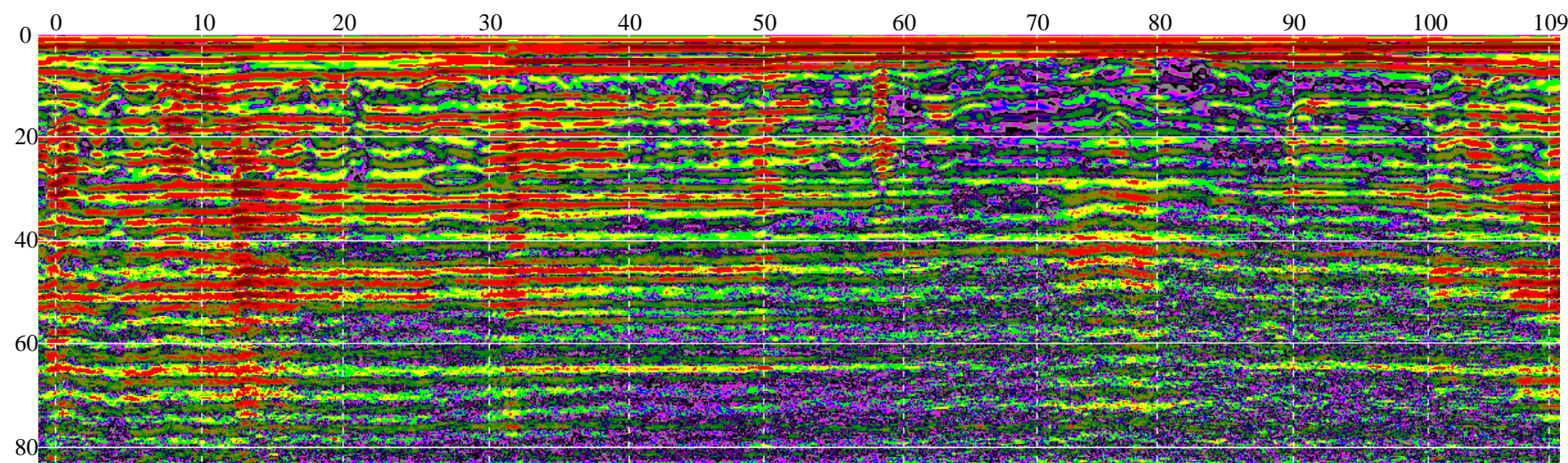


Y = 10

TIME (Nanoseconds)



Y = 0

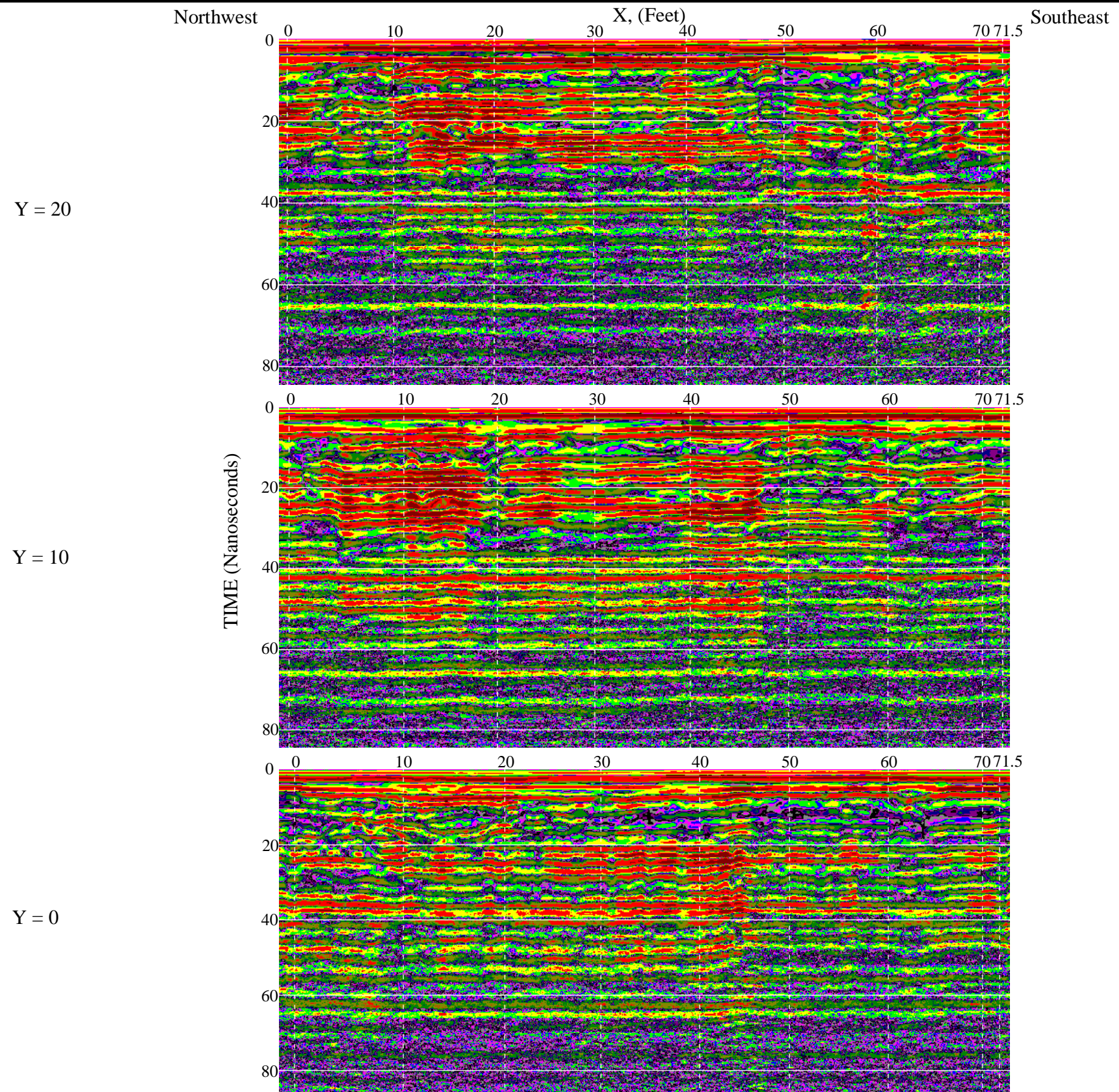


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GPR PROFILES  
ARCHAEOLOGICAL  
LINE 15

FIGURE 47



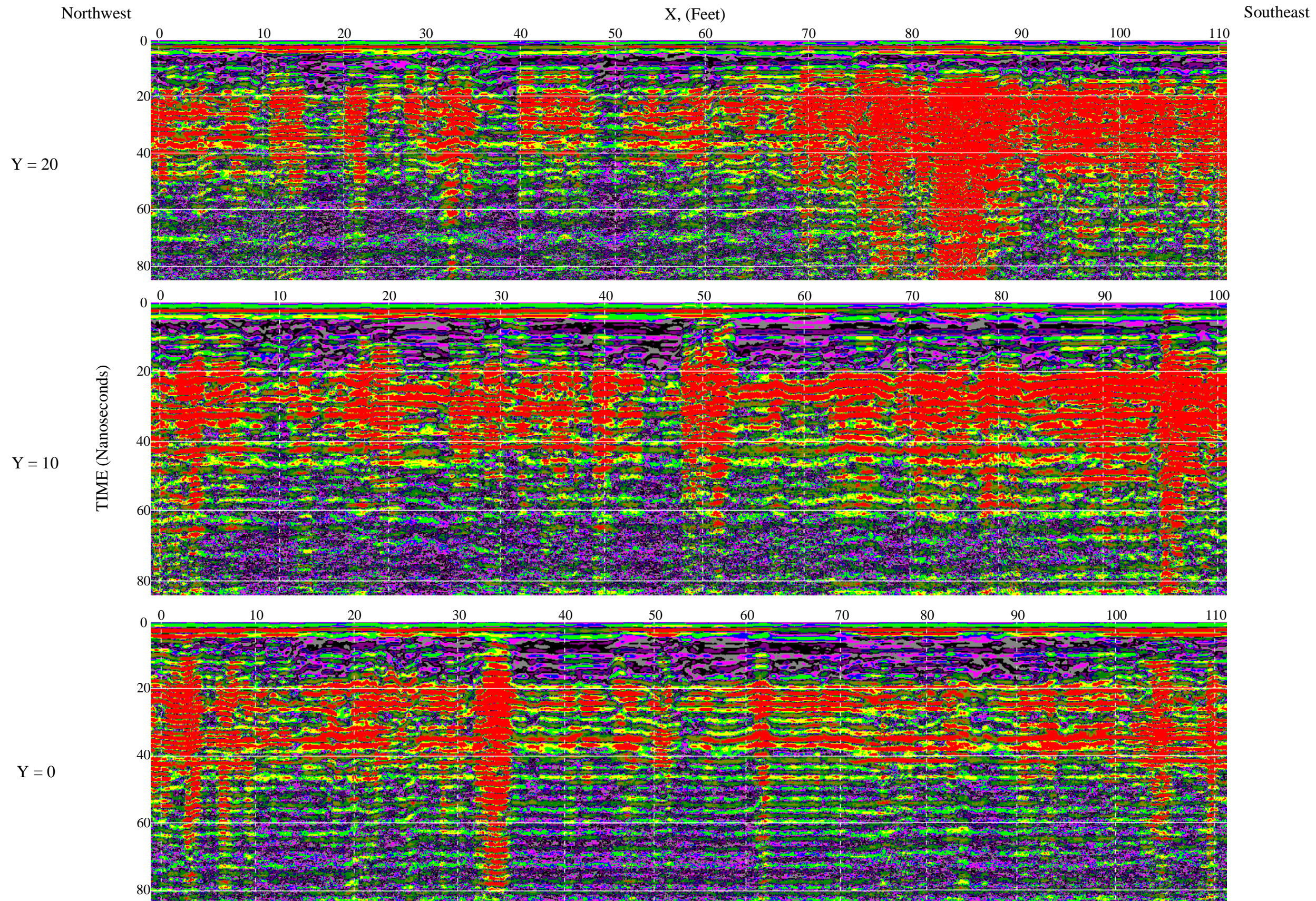
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GPR PROFILES  
ARCHAEOLOGICAL  
LINE 16

FIGURE 48





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Mecklenburg County

GPR PROFILES  
ARCHAEOLOGICAL  
LINE 17

FIGURE 49

Northwest

Southeast

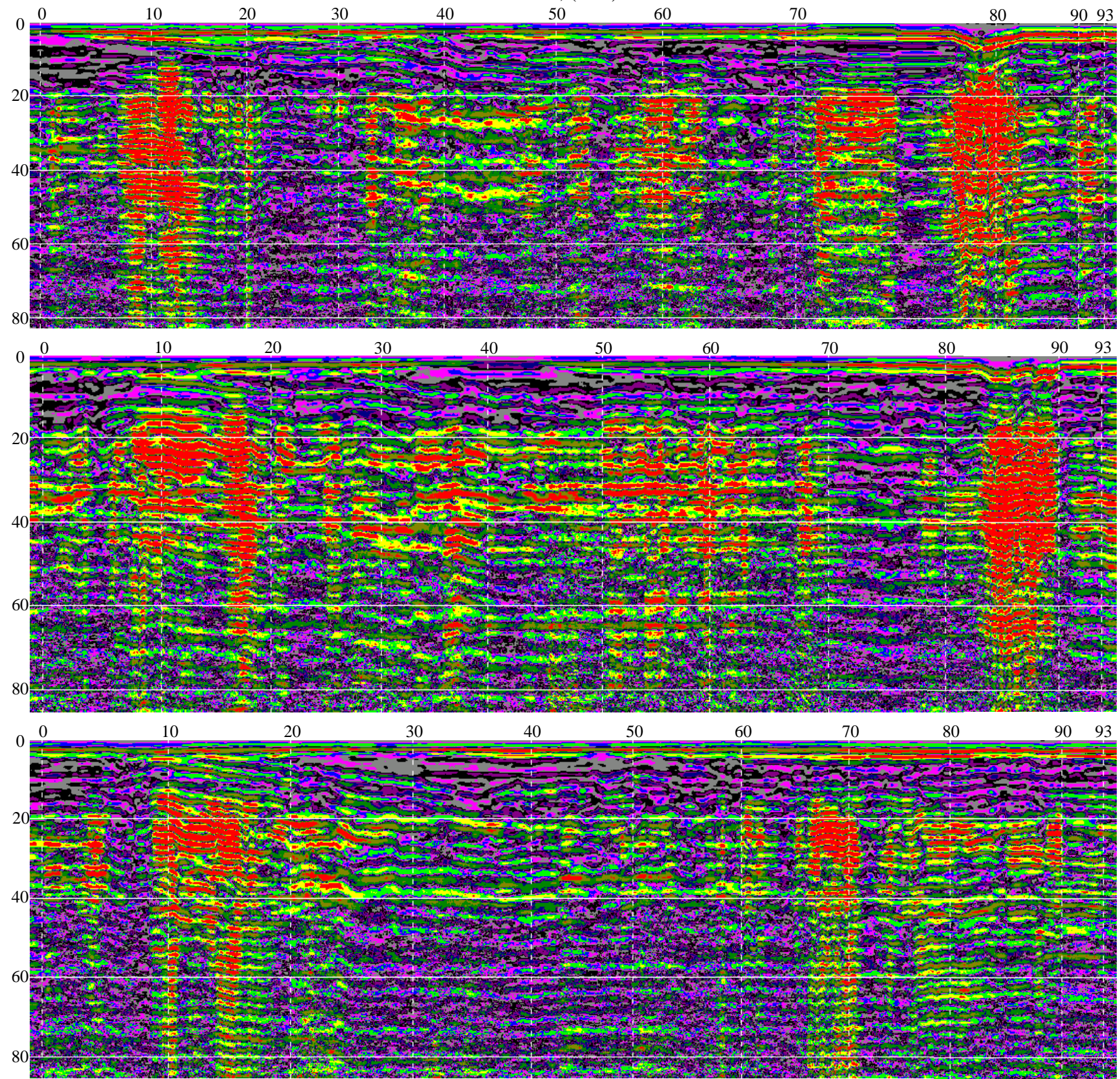
X, (Feet)

Y = 20

Y = 10

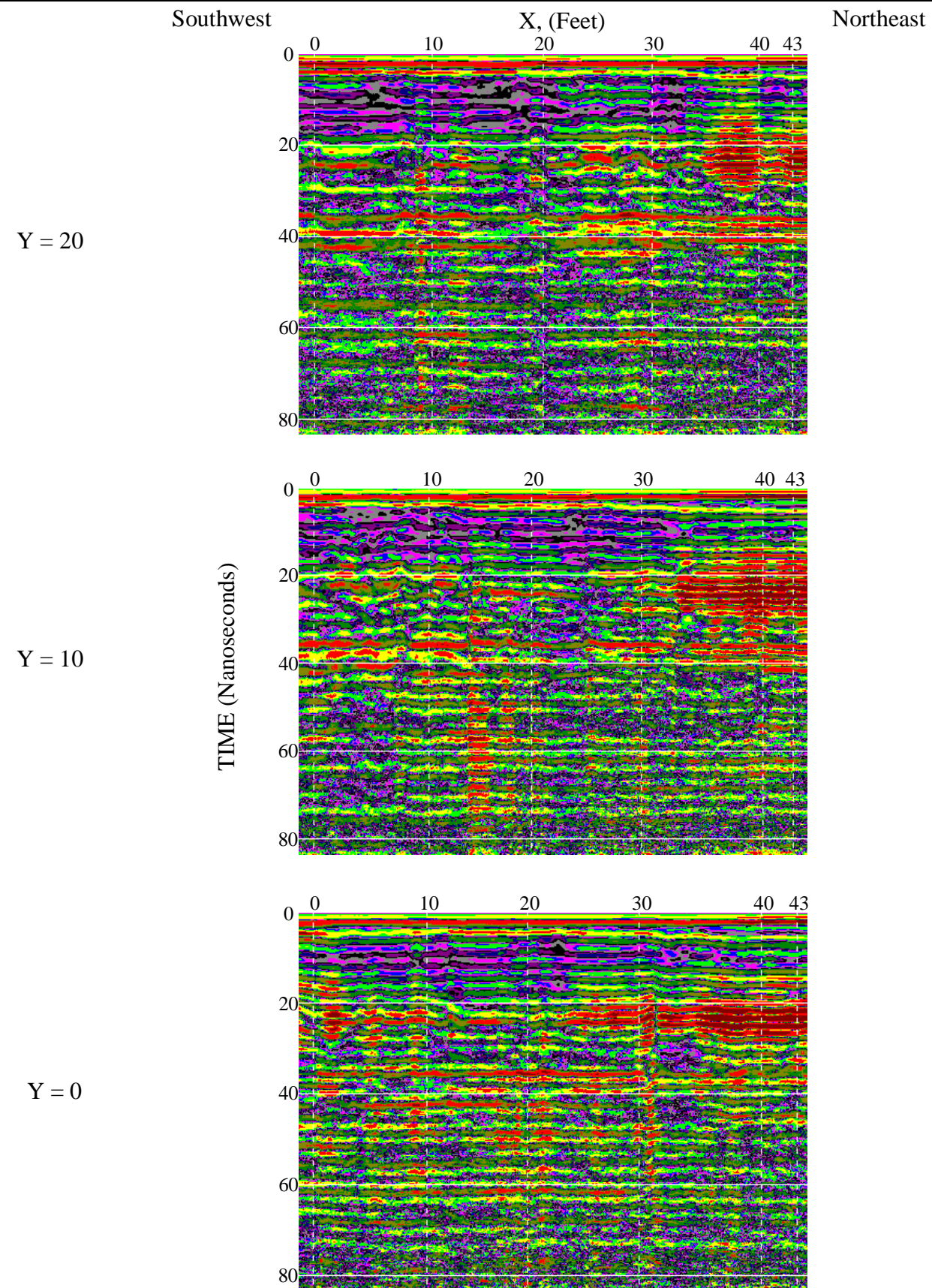
Y = 0

TIME (Nanoseconds)



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GPR PROFILES  
 ARCHAEOLOGICAL  
 LINE 18  
 FIGURE 50



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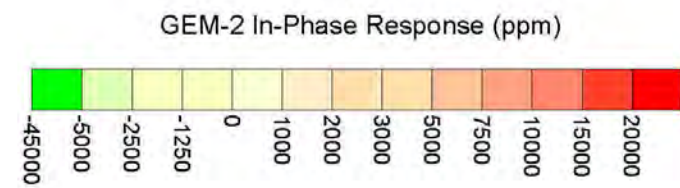
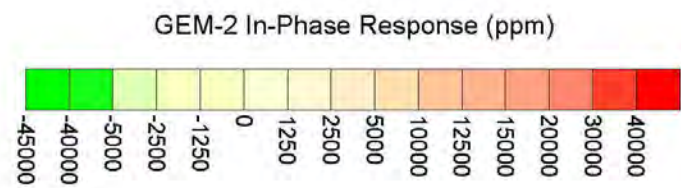
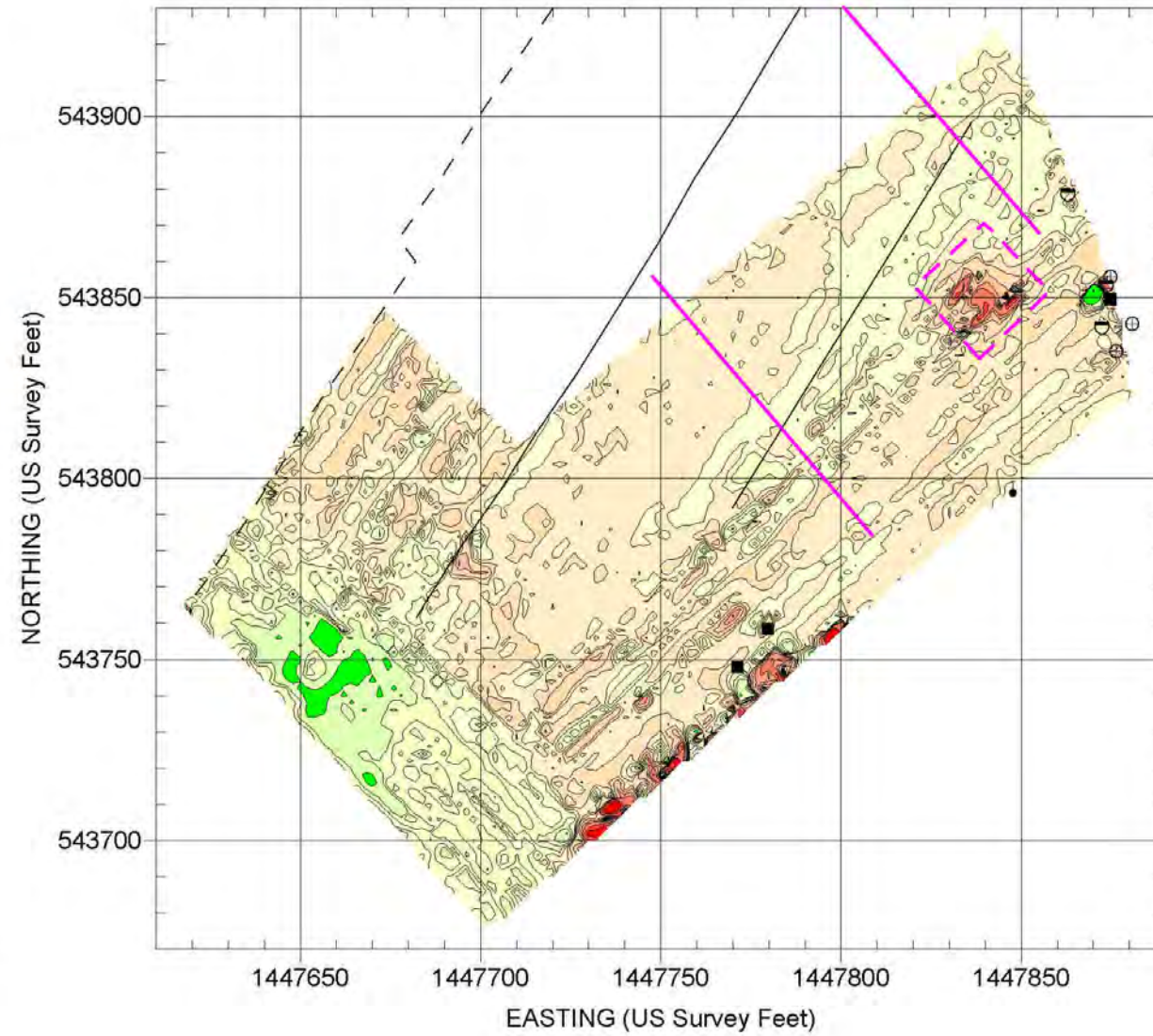
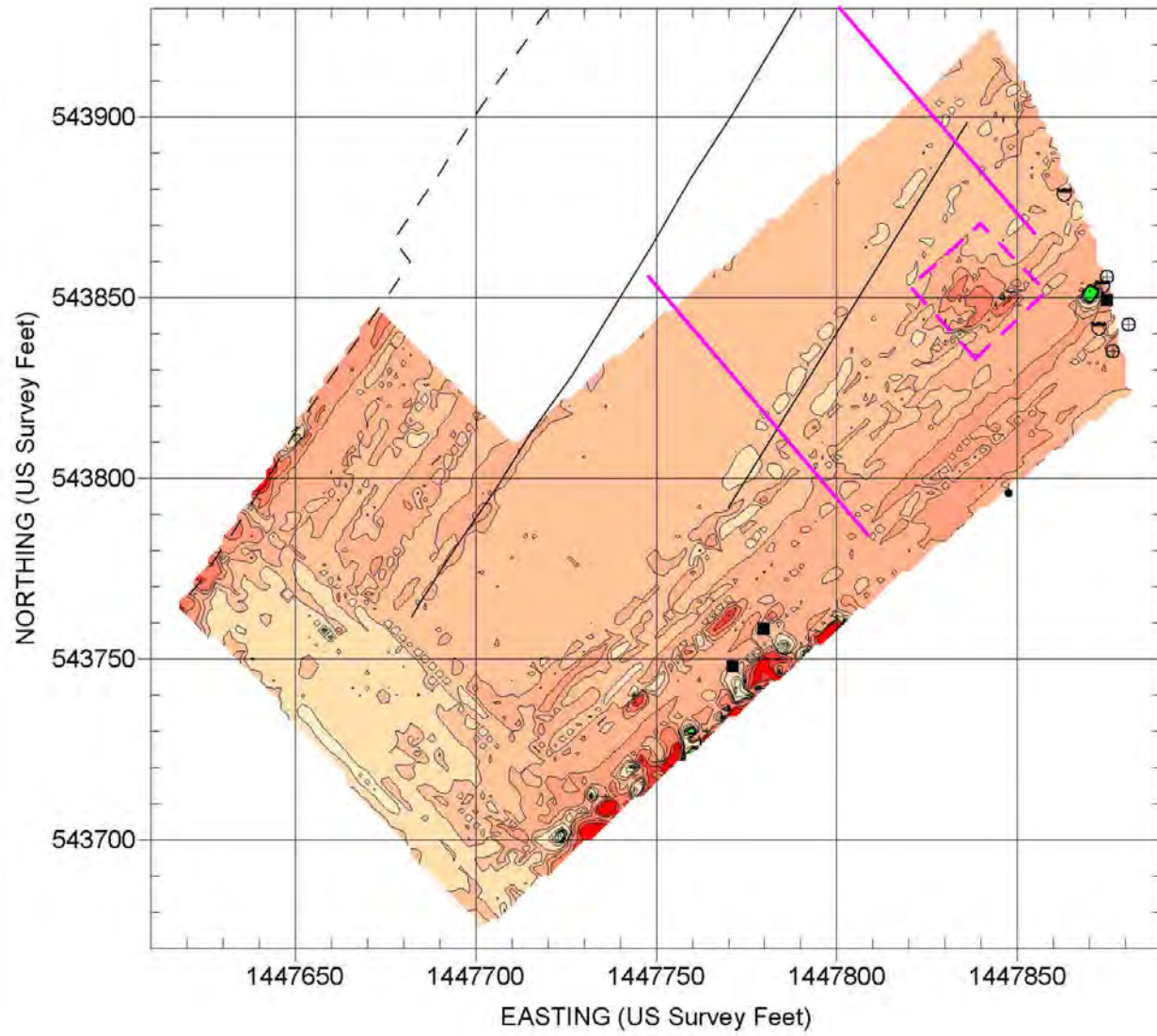
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Mecklenburg County

GPR PROFILES  
ARCHAEOLOGICAL  
LINE 19

FIGURE 51

47010 Hz

1170 Hz



EXPLANATION	
	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
	UTILITY POLE
	MANHOLE
	SIGN POST
	METALLIC OBJECT
	WATER METER
	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA
	CURB



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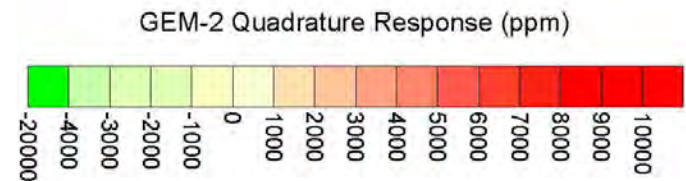
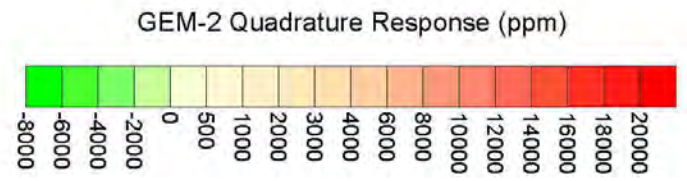
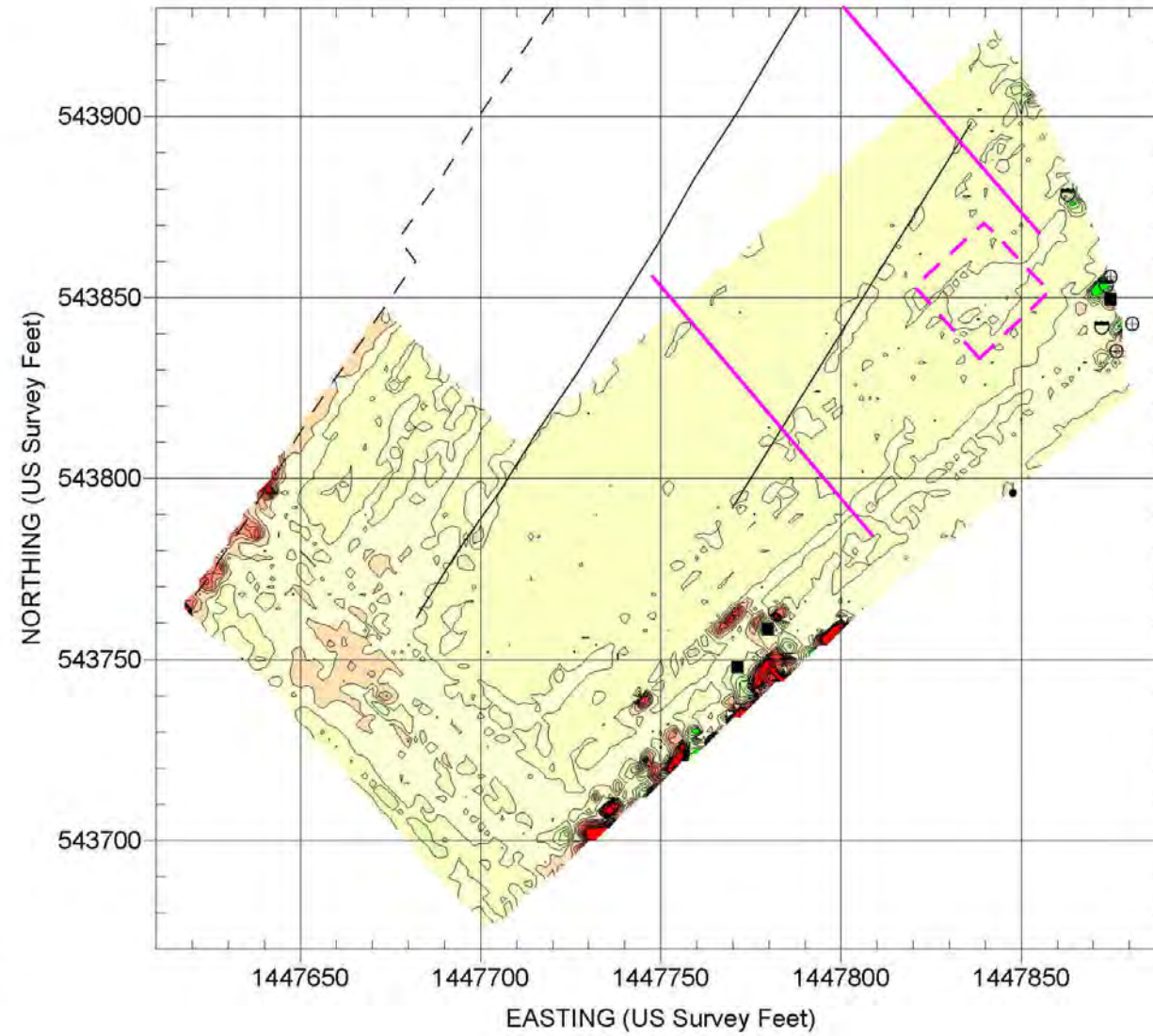
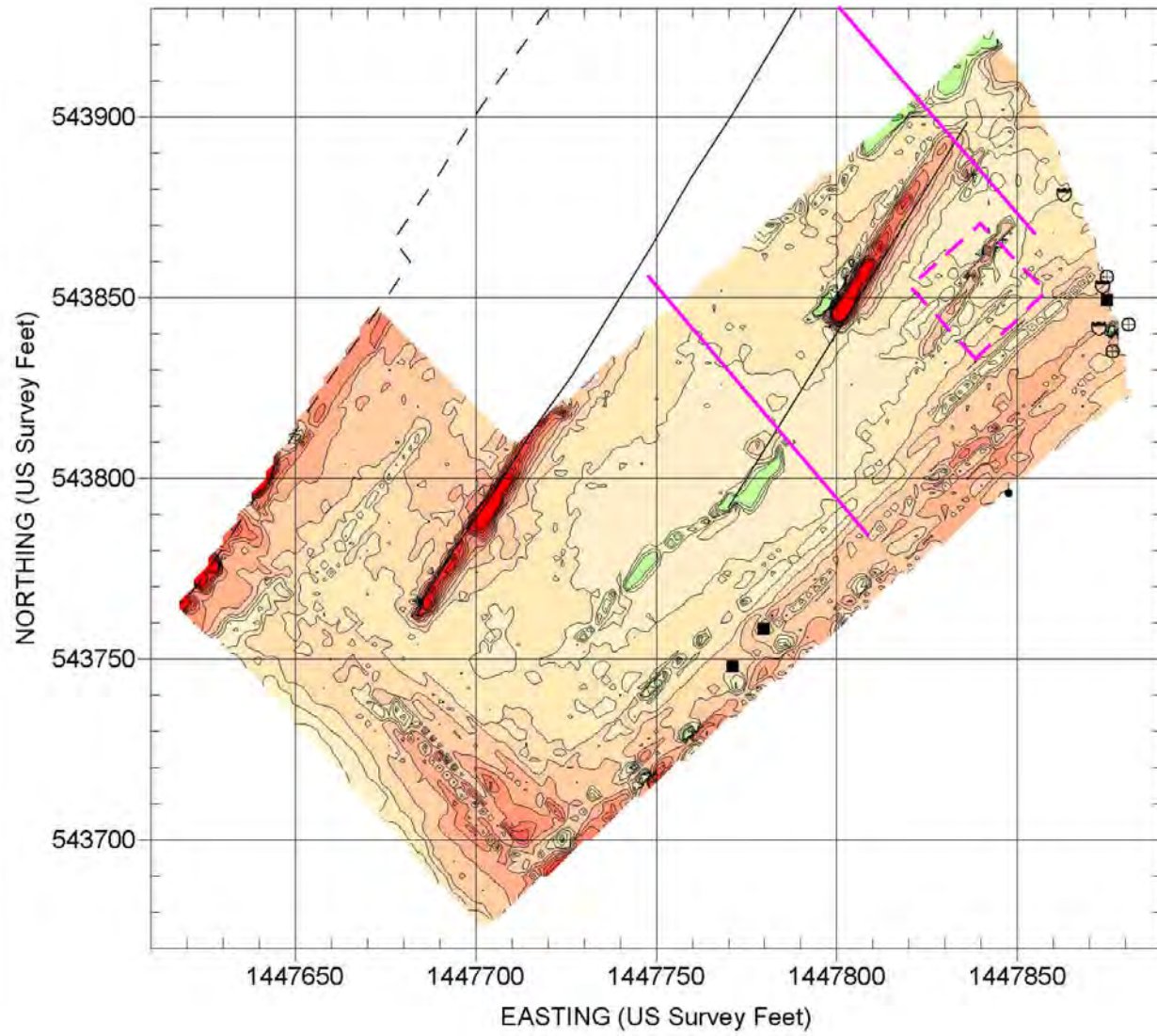
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PARCEL 3A, GEM-2  
IN-PHASE RESPONSE  
1 INCH = 50 FEET

FIGURE 52

47010 Hz

1170 Hz



EXPLANATION	
	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
	UTILITY POLE
	MANHOLE
	SIGN POST
	METALLIC OBJECT
	WATER METER
	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA
	CURB

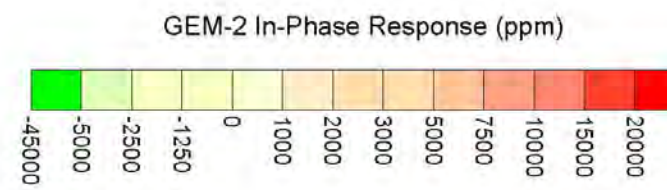
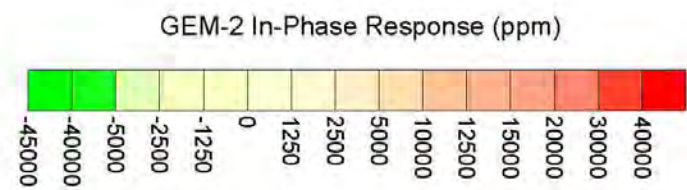
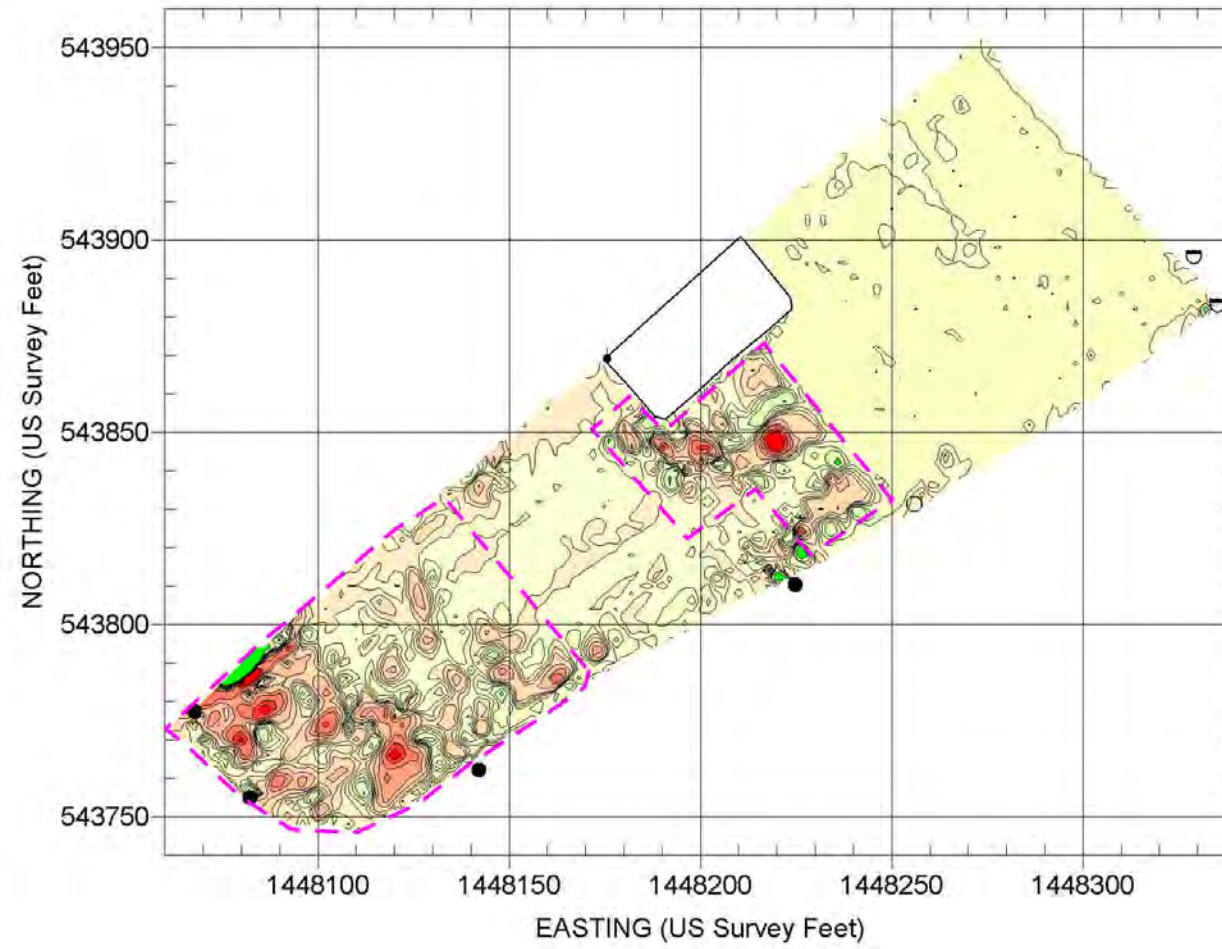
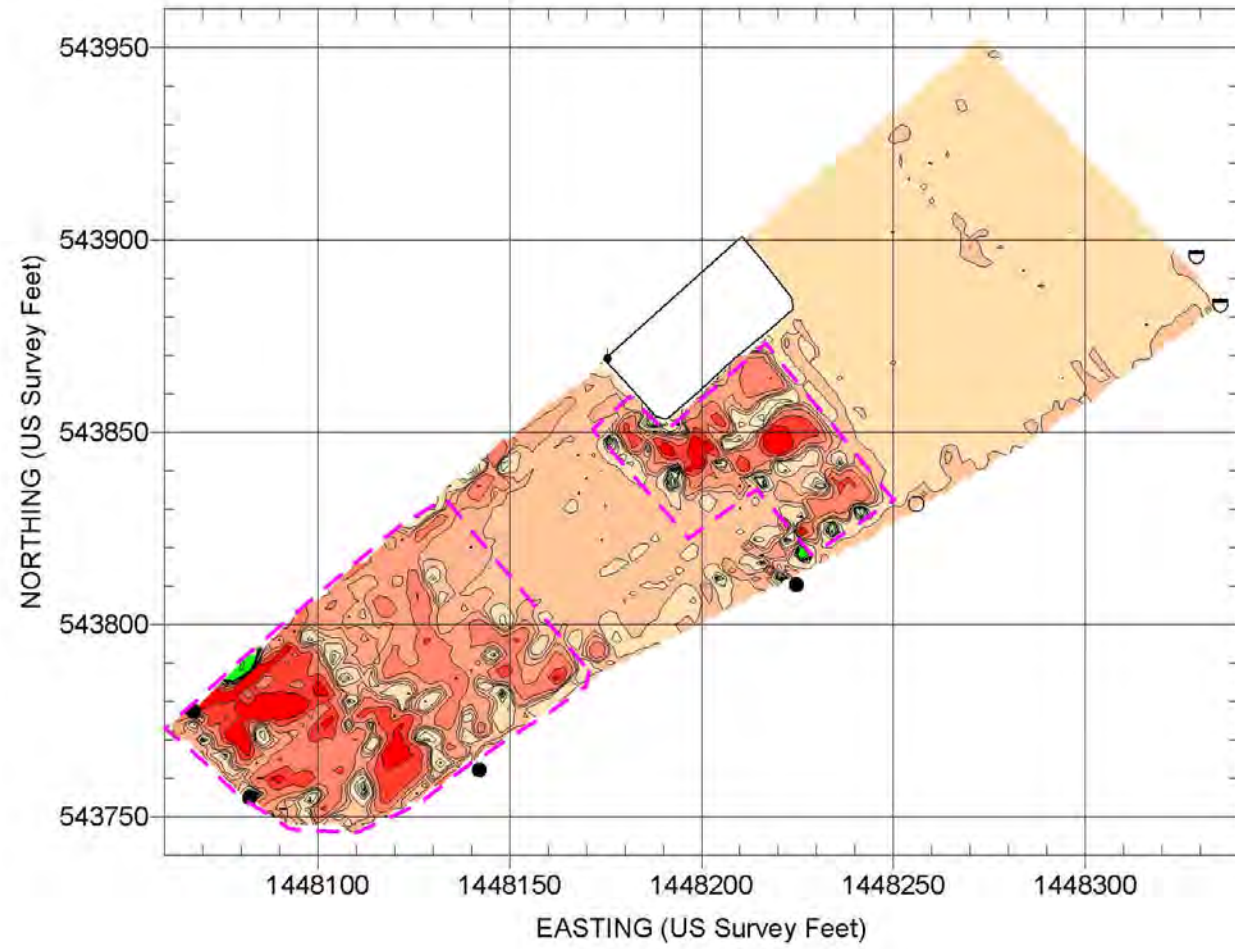


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PARCEL 3A, GEM-2  
QUADRATURE RESPONSE  
1 INCH = 50 FEET  
FIGURE 53

47010 Hz

1170 Hz



EXPLANATION	
	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
	UTILITY POLE
	MANHOLE
	SIGN POST
	METALLIC OBJECT
	WATER METER
	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA
	CURB



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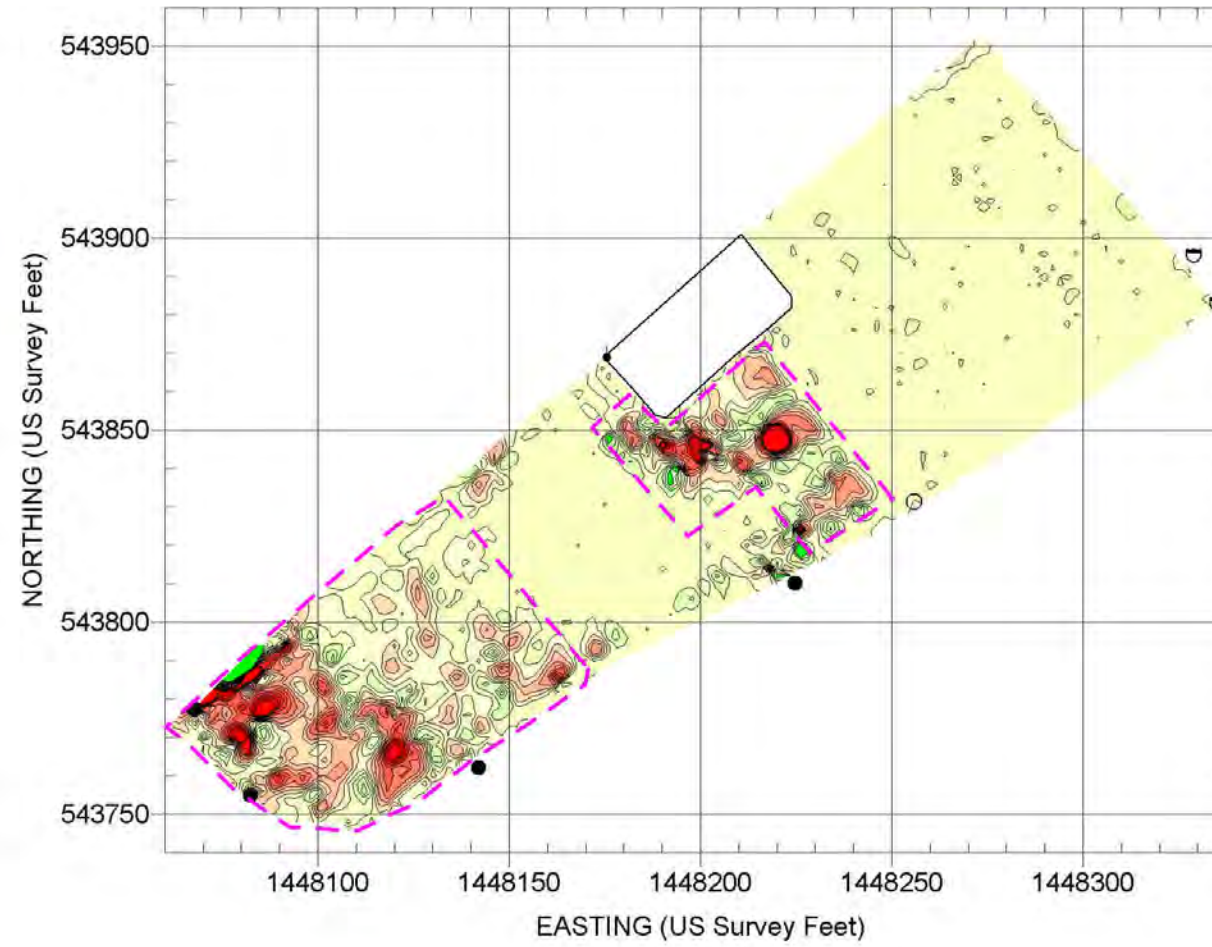
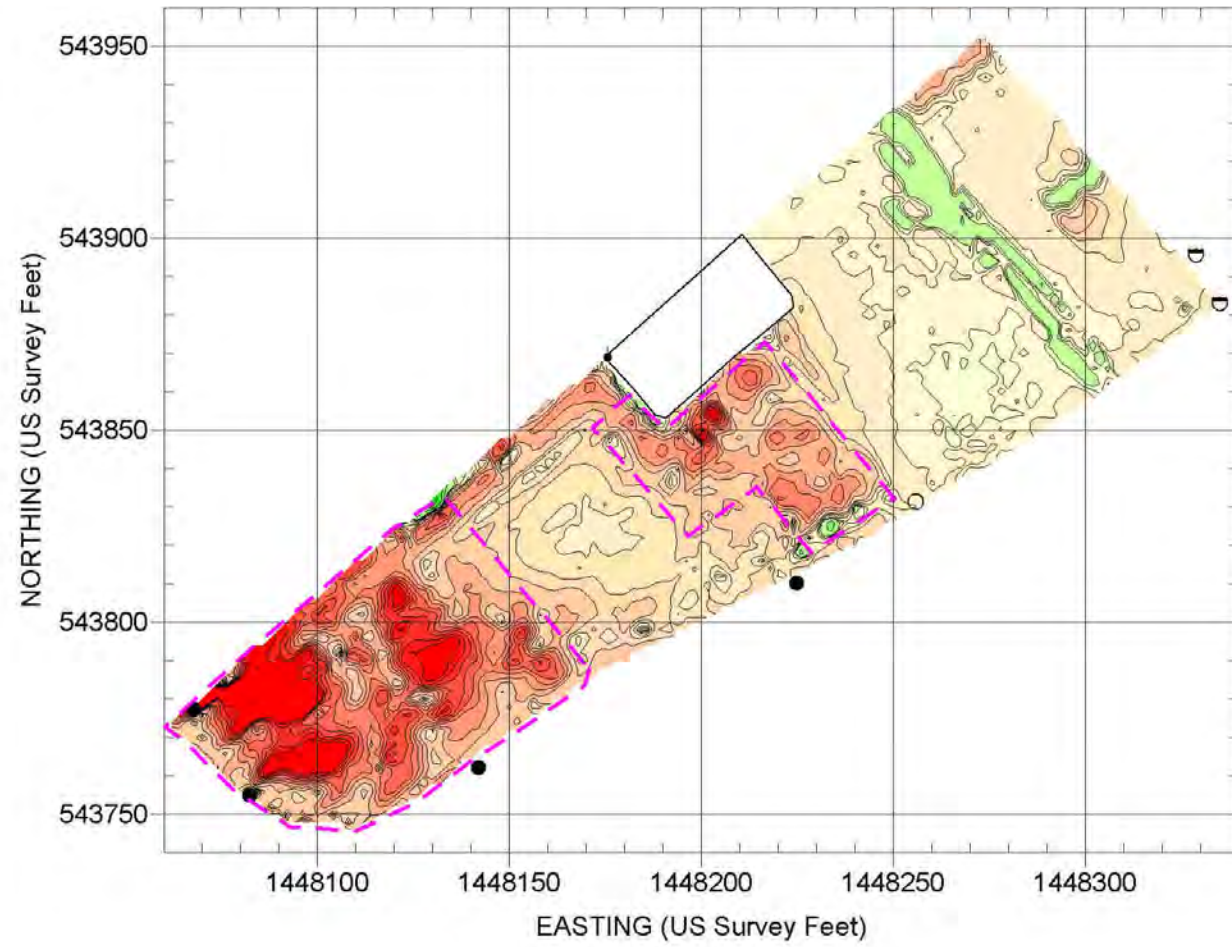
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PARCEL 9, GEM-2  
IN-PHASE RESPONSE  
1 INCH = 50 FEET

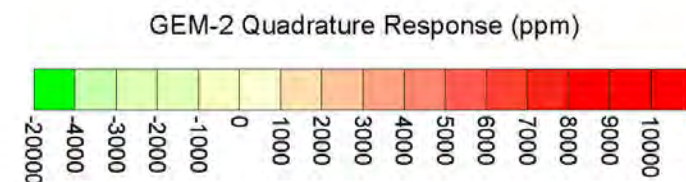
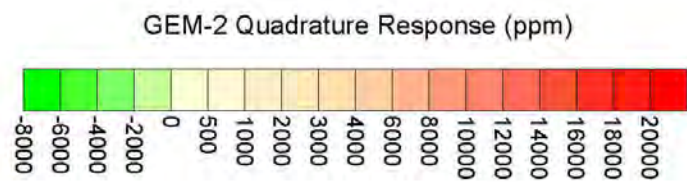
FIGURE 54

47010 Hz

1170 Hz



EXPLANATION	
	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
	UTILITY POLE
	MANHOLE
	SIGN POST
	METALLIC OBJECT
	WATER METER
	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA
	CURB



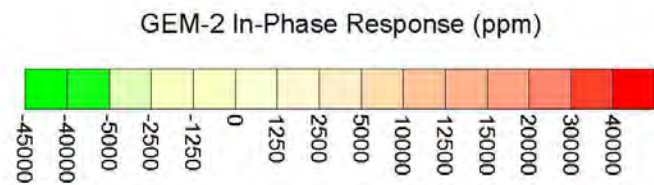
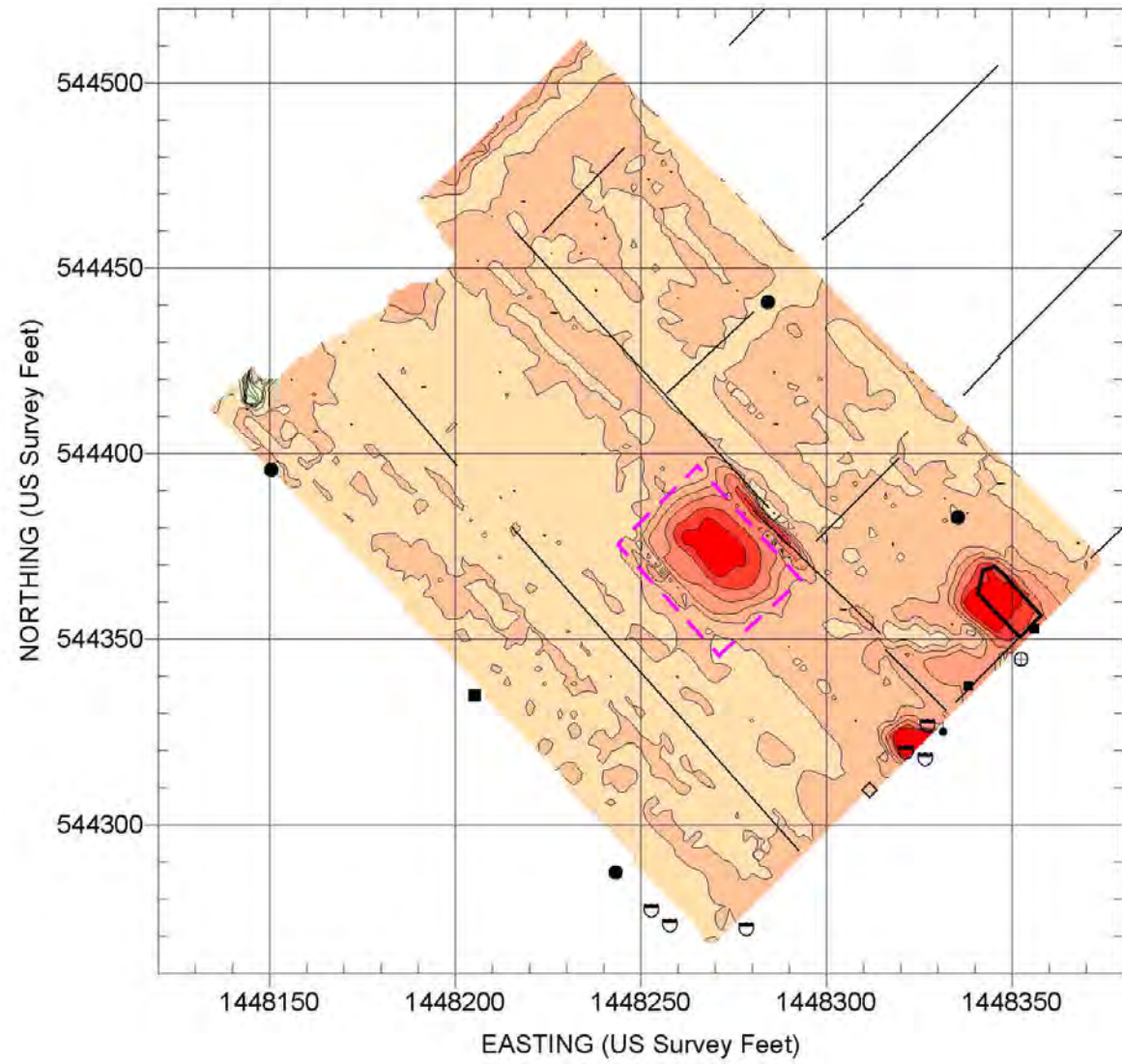
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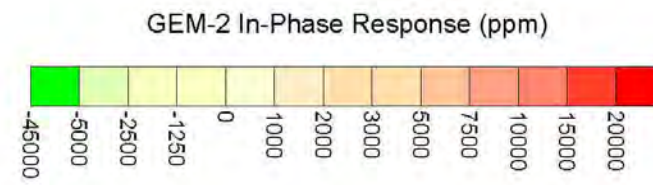
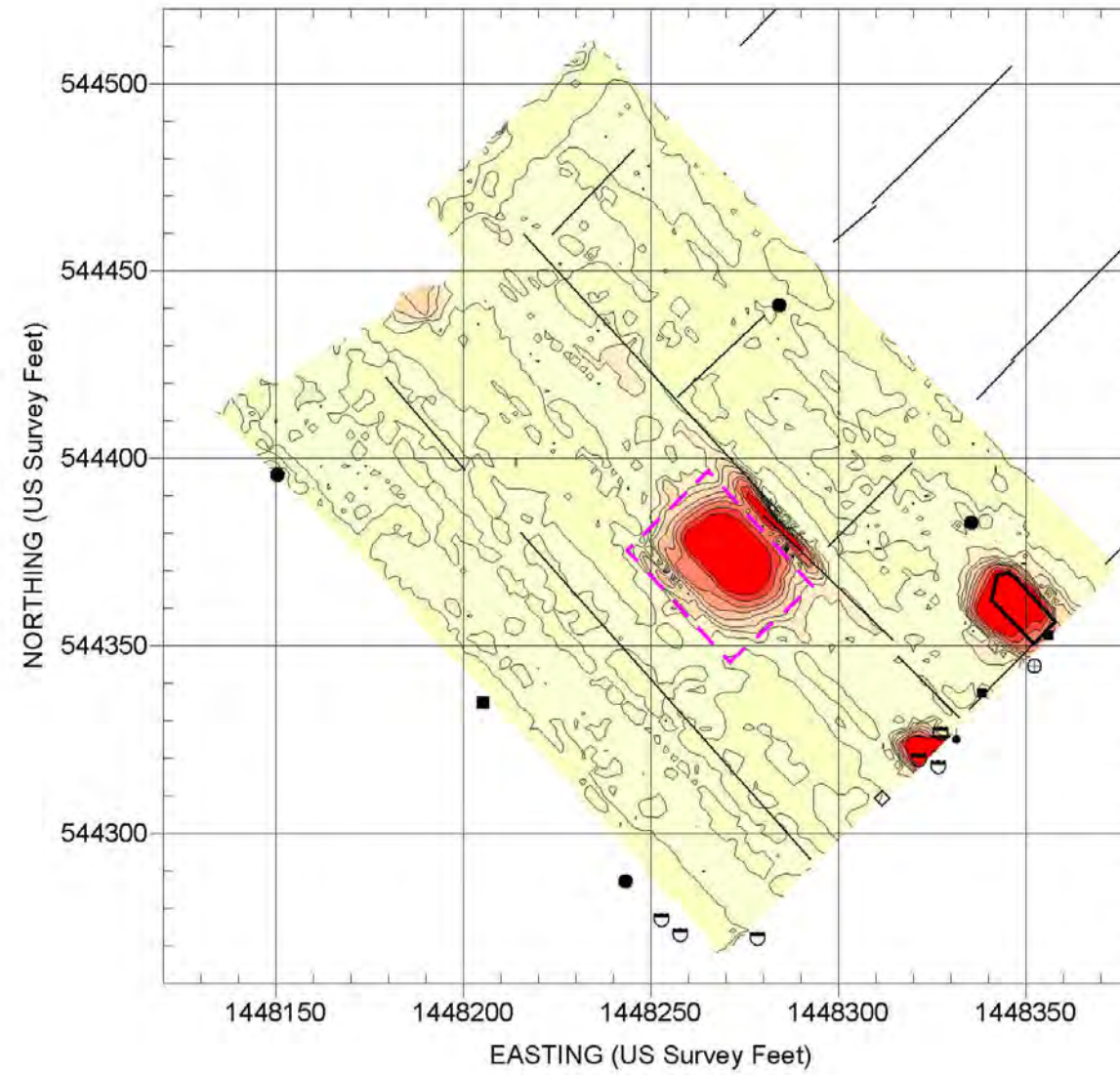
PARCEL 9, GEM-2  
QUADRATURE RESPONSE  
1 INCH = 50 FEET

FIGURE 55

47010 Hz



1170 Hz



EXPLANATION	
	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
	UTILITY POLE
	MANHOLE
	SIGN POST
	METALLIC OBJECT
	WATER METER
	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA
	CURB



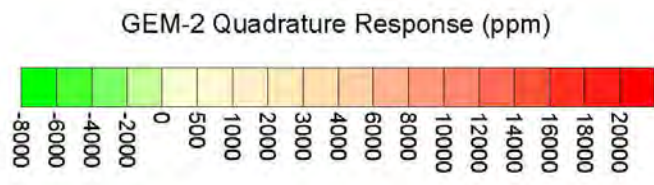
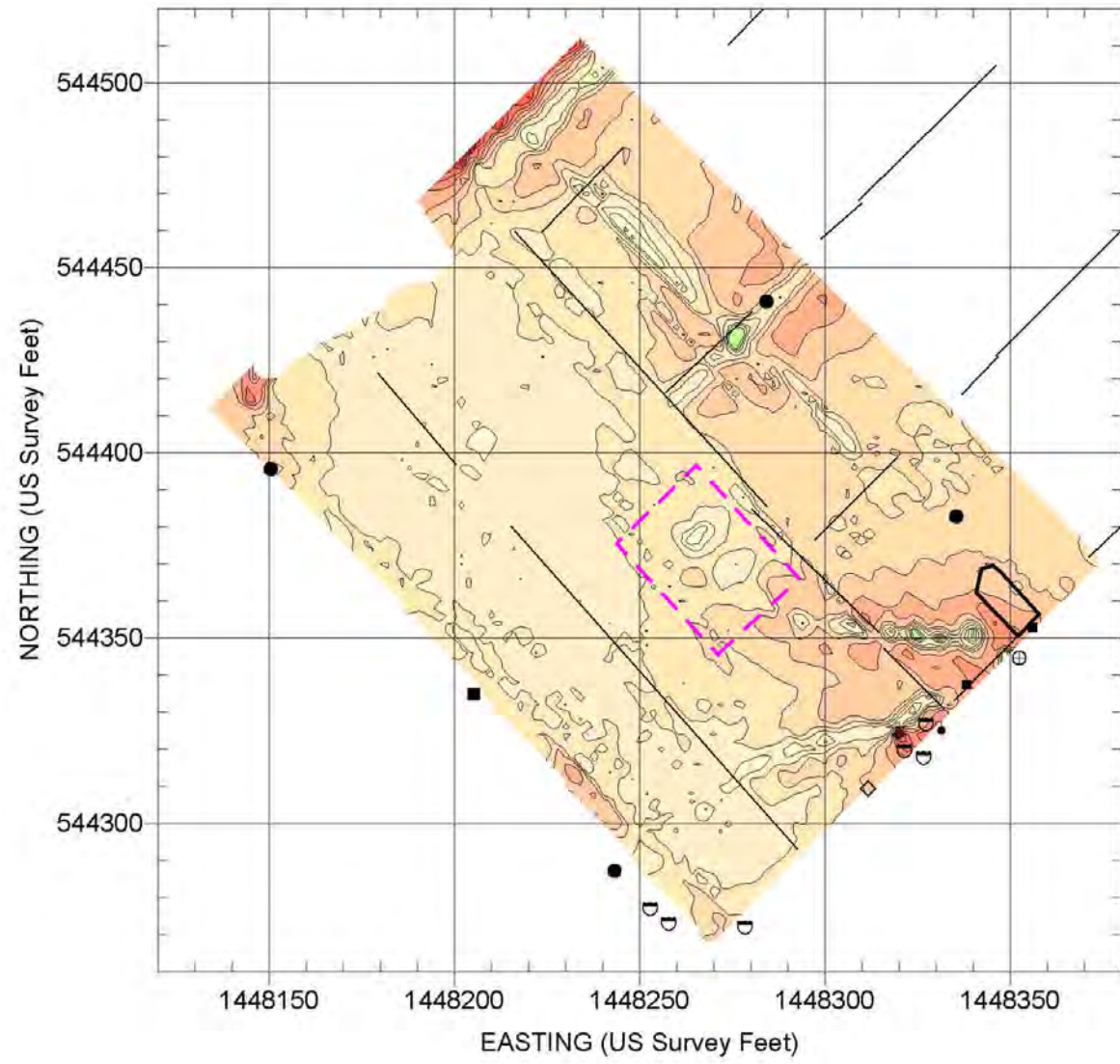
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WBS Element 32179, TIP P-3800  
Mecklenburg County

PARCEL 14, GEM-2  
IN-PHASE RESPONSE  
1 INCH = 50 FEET

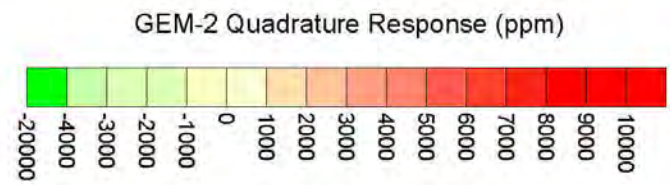
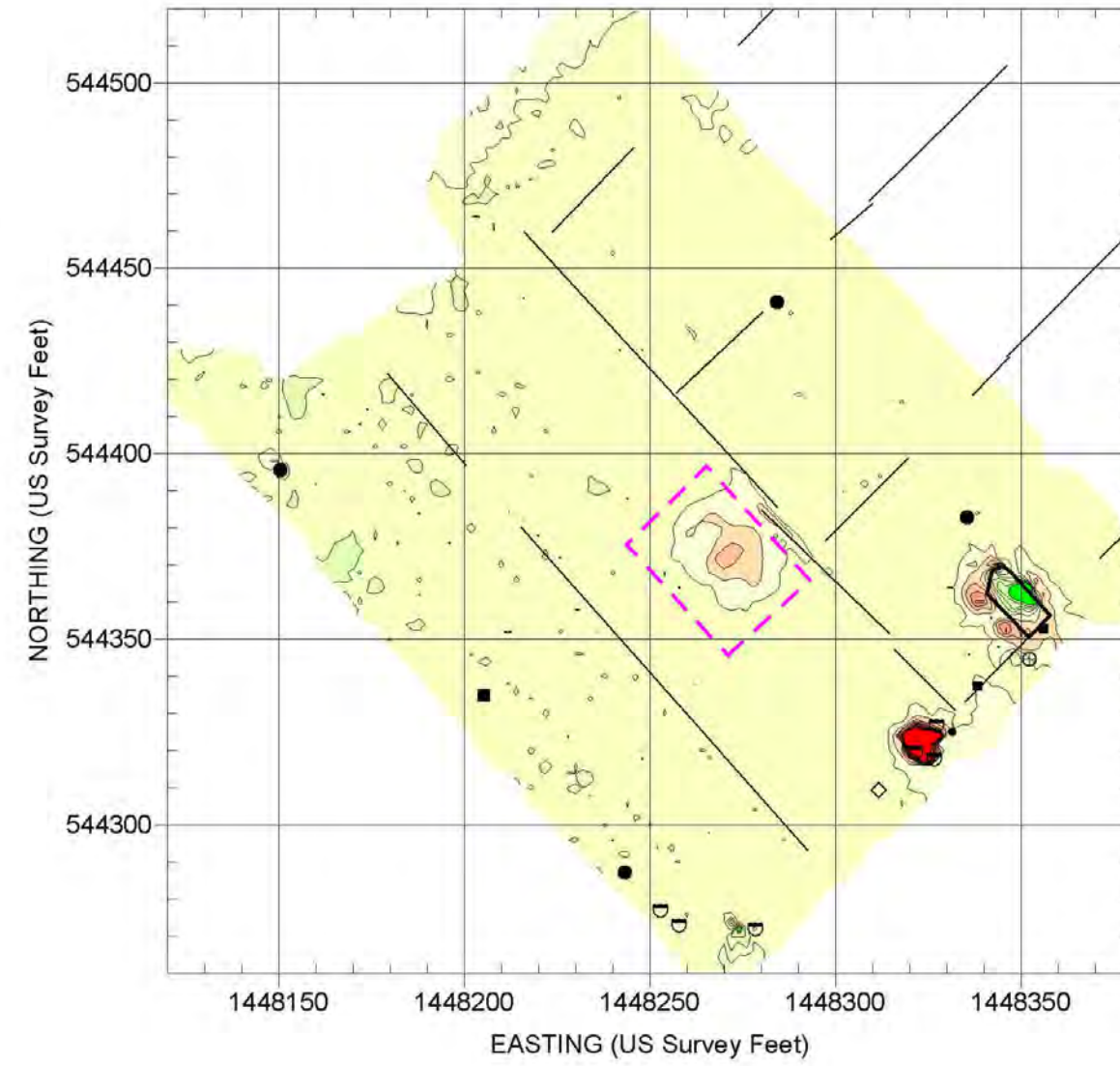
FIGURE 56



47010 Hz



1170 Hz



EXPLANATION	
	GEM-2 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
	UTILITY POLE
	MANHOLE
	SIGN POST
	METALLIC OBJECT
	WATER METER
	GAS LID
	MONITORING WELL
	LIGHTPOLE
	GPR SURVEY AREA
	CURB



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Mecklenburg County

PARCEL 14, GEM-2  
QUADRATURE RESPONSE  
1 INCH = 50 FEET  
FIGURE 57