



June 10, 2010

Mr. Richard Garrett, LG
Catlin Engineers and Scientists, Inc
P.O. Box 10279
Wilmington, NC 28404-0279

RE: State Project: R-2633B
 WBS Element: 34491.1.2
 County: Brunswick
 Description: US 17 – Wilmington Bypass

**Subject: Project 09210013.23, Report on Geophysical Surveys
 Parcel 59A, Navassa, North Carolina**

Dear Mr. Garrett:

SCHNABEL ENGINEERING SOUTH, PC (Schnabel) is pleased to present this report on the geophysical surveys we conducted on the subject property. We understand this letter report will be included as an appendix in your report to the NCDOT. The report includes two 11x17 color figures and two 8.5x11 color figures.

INTRODUCTION

The work described in this report was conducted on April 19 and 20, 2010, by Schnabel under our 2009 contract with the NCDOT. The proposed survey areas were not accessible upon our arrival at the site due to tall, thick vegetation. After discussions with Catlin and the NCDOT, our original scope was modified to add clearing of the area around the building for the EM61 survey and to delete the EM31 survey of the area to the west of the road. Pictures of the site before and after the clearing was completed are shown on Figure 1.

The work was conducted within the accessible areas of a 30-foot wide perimeter around the main building as indicated by Catlin to support their environmental assessment of Parcel 59A (D&G Properties of Wilmington, LLC). The purpose of the geophysical surveys was to locate possible metal underground storage tanks (UST's) and associated metal product lines in the accessible areas of the proposed survey area.

The geophysical investigation consisted of electromagnetic (EM) induction surveys using a Geonics EM61-MK2 instrument. The EM61 metal detector is used to locate metal objects buried up to about eight feet below ground surface. Ground-penetrating radar (GPR) investigations of selected EM61 anomalies were conducted using a Geophysical Survey Systems SIR-3000 system equipped with a 400 MHz antenna. Photographs of the equipment used are shown on Figure 2.

FIELD METHODOLOGY

Locations of geophysical data points were obtained using a sub-meter Trimble Pro-XRS DGPS system. 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, with units in US survey feet. The locations of existing site features (building, metallic objects, trees, etc.) were recorded for later correlation with the geophysical data and for location references to the NCDOT drawings.

The EM61 data were collected along parallel survey lines spaced approximately 2.5 feet apart. The EM61 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 one to two feet apart in two orthogonal directions over anomalous EM readings not attributed to cultural features. 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.

Preliminary results for Parcel 59A were sent to Ben Ashba and Richard Garrett of Catlin and Terry Fox of the NCDOT on May 21, 2010.

DISCUSSION OF RESULTS

The contoured EM61 data for Parcel 59A are shown on Figures 3 and 4. The EM61 early time gate results are plotted on Figure 3. The early time gate data provide the more sensitive detection of metal objects. Figure 4 shows the difference between the response of the top and bottom coils of the EM61 instrument (differential response). The difference is taken to remove the effect of surface and very shallowly buried metallic objects. Typically, the differential response emphasizes anomalies from deeper and larger objects such as UST's.

The early time gate and differential results show anomalies apparently caused by buried utilities or known site features (Figures 3 and 4). The GPR data collected over selected differential EM61 anomalies do not indicate the presence of metallic UST's within the accessible portions of the survey area (Figures 3 and 4).

CONCLUSIONS

Our evaluation of the geophysical data collected on Parcel 59A on Project R-2633B in Navassa, NC indicates the following:

The geophysical data do not indicate the presence of metallic UST's in the areas surveyed on Parcel 59A.

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.

We appreciate the opportunity to have provided these services. Please call if you need additional information or have any questions.

Sincerely,

SCHNABEL ENGINEERING SOUTH, PC



Jeremy S Strohmeyer, LG
Project Manager



Edward D Billington, LG
Senior Vice President

JW:JS:NB

Attachments: Figures (4)

FILE: G:\2009 PROJECTS\09210013 (NCDOT 2009 GEOTECH UNIT SERVICES)\09210013.23 (R-2633B, BRUNSWICK COUNTY)\REPORT\SCHNABEL GEOPHYSICS REPORT.DOCX



Parcel 59A – D&G Properties of Wilmington, LLC, looking southwest prior to clearing



Parcel 59A – D&G Properties of Wilmington, LLC, looking southeast after clearing



Geonics EM61-MK2



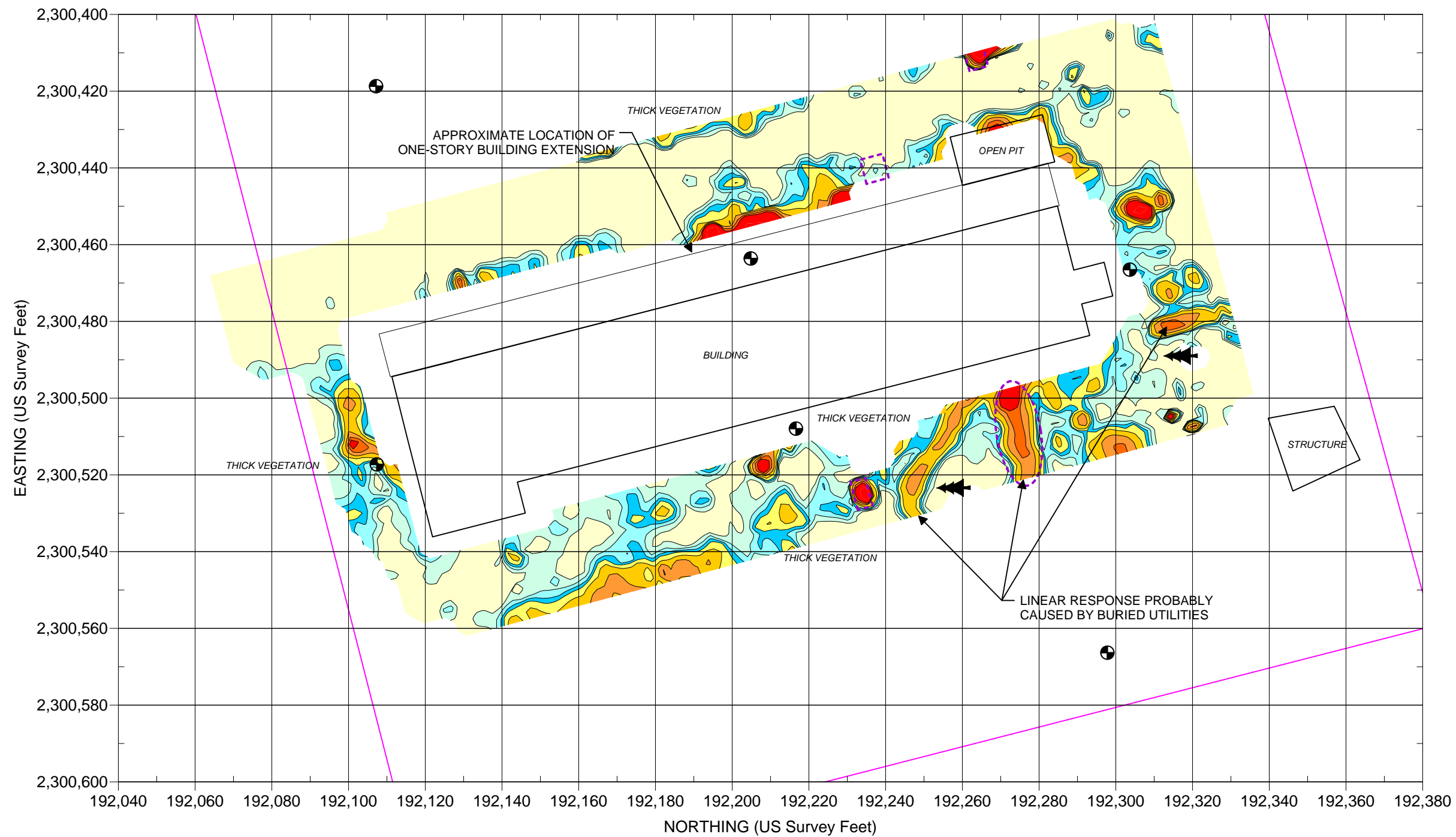
GSSI SIR-3000



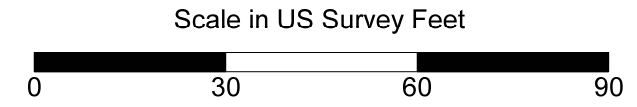
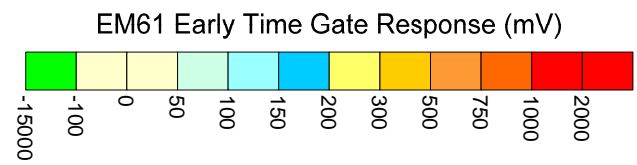
STATE PROJECT R-2633B
BRUNSWICK CO., NORTH CAROLINA
NC DEPT. OF TRANSPORTATION
PROJECT NO. 09210013.23

PHOTOS OF
GEOPHYSICAL
EQUIPMENT USED

FIGURE 2

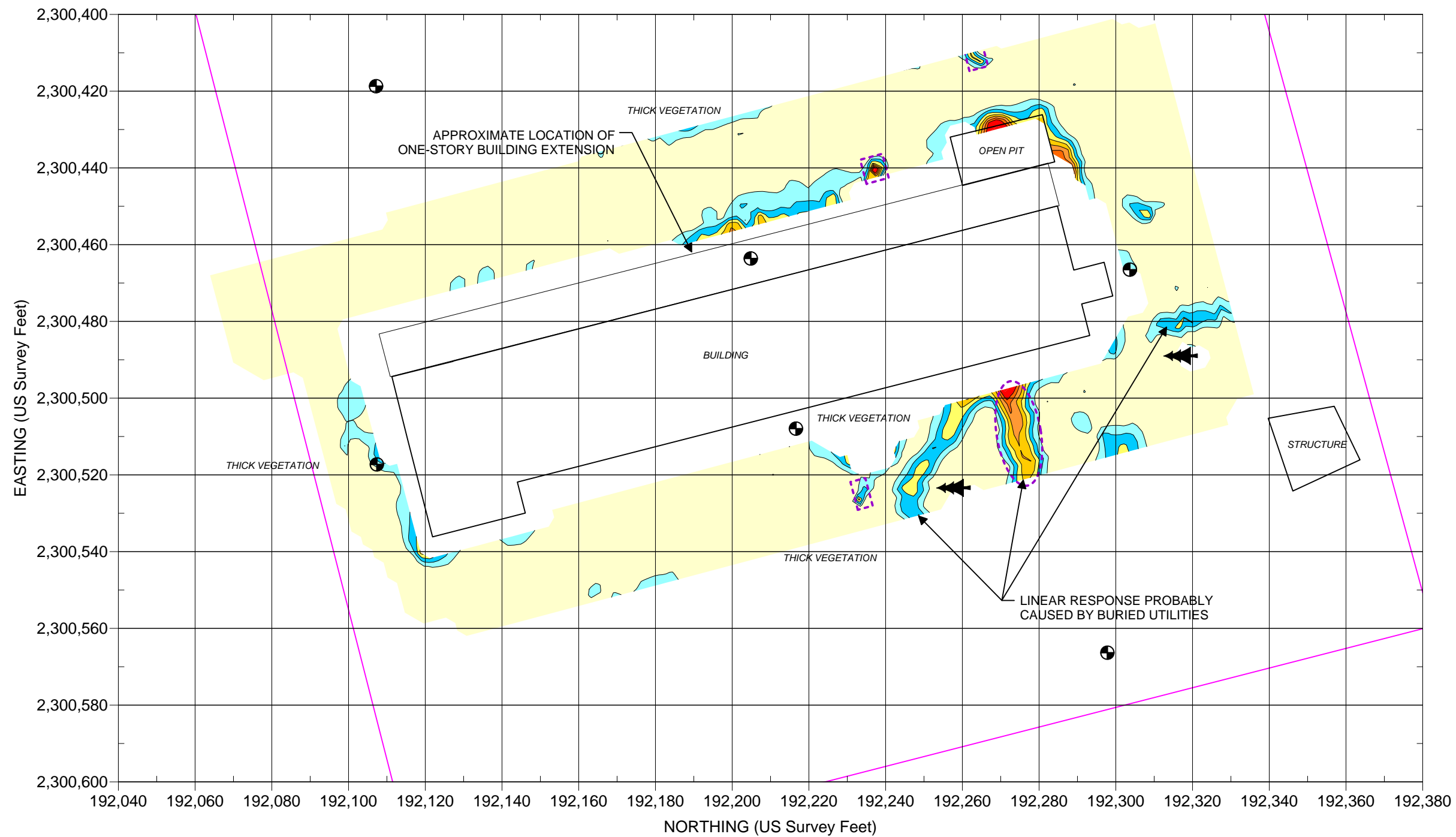


EXPLANATION	
	PROPERTY LINE
	PROPOSED BORING (CATLIN)
	TREE
	GPR SURVEY AREA

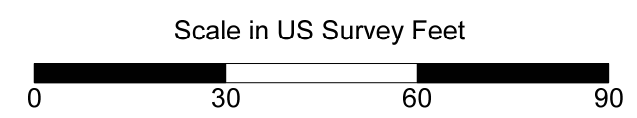
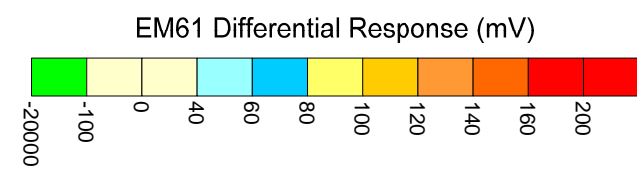


Note: The contour plot shows the earliest and most sensitive time gate of the EM61 bottom coil/channel in millivolts (mV). The EM data were collected on May 19 and 20, 2010, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey was provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina Zone 3200, using the NAD 1983 datum. GPR data were acquired on May 20, 2010, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

	STATE PROJECT R-2633B BRUNSWICK COUNTY, NORTH CAROLINA NC DEPARTMENT OF TRANSPORTATION PROJECT NO. 09210013.23	PARCEL 59A EM61 EARLY TIME GATE RESPONSE FIGURE 3
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EXPLANATION	
	PROPERTY LINE
	PROPOSED BORING (CATLIN)
	TREE
	GPR SURVEY AREA



Note: The contour plot shows the difference, in millivolts (mV), between the readings from the top and bottom coils of the EM61. The difference is taken to reduce the effect of shallow metal objects and emphasize anomalies caused by deeper metallic objects, such as drums and tanks. The EM data were collected on May 19 and 20, 2010, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey was provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 1983 datum. GPR data were acquired on May 20, 2010, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

	STATE PROJECT R-2633B	PARCEL 59A
	BRUNSWICK COUNTY, NORTH CAROLINA	EM61 DIFFERENTIAL RESPONSE
	NC DEPARTMENT OF TRANSPORTATION	
	PROJECT NO. 09210013.23	FIGURE 4