PRELIMINARY SITE ASSESSMENT
PARCEL 70, DELIA LASSITER PROPERTY
RICHMOND COUNTY, NORTH CAROLINA
WBS ELEMENT: 34438.1.1; NCDOT PROJECT: R-2502A

Prepared for:
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Solutions-IES Project No. 3260.06A3.NDOT

September 5, 2006

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1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) is widening the existing alignment of U.S. Highway 1 near the towns of Marston and Hoffman, located in Richmond County, North Carolina. Acquisition of properties within the right-of-way is necessary prior to road construction. On July 19, 2006, Solutions-IES submitted a proposal (NC06554P) to conduct Preliminary Site Assessments (PSAs) on ten parcels of land located within the proposed right-of-way that are of concern to the NCDOT. This report summarizes the results of field activities conducted during the PSA for a portion of the property identified by NCDOT as Parcel 70, Delia Lassiter Property (**Figure 1**). The right-of-way portion of this site (Study Area) is more clearly identified on **Figure 2.** The scope of work executed at the site was performed in general accordance with Solutions-IES proposal NC06554P and was initiated based on a Notice to Proceed issued by the NCDOT Geotechnical Engineering Unit on July 20, 2006 under contract 7000007053, dated June 5, 2006.

2.0 BACKGROUND AND SITE DESCRIPTION

The subject property is located on the north side of US 1 approximately 425 feet east of Hart Road in Richmond County, North Carolina (site). According to field observations, an abandoned block building is located on the site. The surface of the site is covered with a mixture of concrete, asphalt, gravel and grass. Numerous utilities including buried storm sewer, water, and telecommunication lines as well as overhead electric lines were present within the right-of-way. Photographs of the Study Area at the site are presented in **Appendix A**. According to information provided by the NCDOT, the property may have operated as a gas station in the past. If a fueling station was operated at the site in the past, petroleum fuels were likely used on the property. Therefore, there is a possibility that these constituents may have been released from a potential underground storage tank (UST) system to the subsurface in the vicinity of the proposed right-of-way.

3.0 FIELD ACTIVITIES

Prior to mobilizing to the site to conduct the PSA, Solutions-IES contacted North Carolina One Call to locate underground utilities within the proposed right-of-way. Pyramid Environmental & Engineering, P.C. (Pyramid) was contracted to perform an electromagnetic survey of the subsurface in the proposed right-of-way and easement area. Pyramid surveyed the site on July 27, July 28 and August 14, 2006. The electromagnetic survey equipment (EM61) identified various magnetic anomalies within the study area.

Pyramid returned to the site to perform a ground penetrating radar (GPR) survey utilizing a "Geophysical Survey Systems SIR 2000" instrument. Results of the surveys did not suggest the presence of buried metallic tanks such as USTs. The EM61 images are included in **Appendix B**, Figures 16 and 17. A GPR image was not included in the geophysical report for the site.

After reviewing the background information and geophysical data, Solutions-IES elected to analyze soil samples collected at designated locations within the Study Area for total petroleum hydrocarbons (TPH). These activities were conducted on August 23, 2006. No evidence of a UST system (e.g., vent pipes and/or pump islands) was observed within the right-of-way. A total of 11 soil borings (designated P70-B1 through P70-B11) were advanced at the site in the locations depicted on **Figure 3**. These borings were labeled with the prefix "P70" to identify their location on Parcel 70. Each of these borings was advanced to a total depth of 8 feet below ground surface (ft bgs) with a truck-mounted Geoprobe®.

Soil samples were obtained from each boring using a MacroCore® sampler fitted with single-use, disposable polyvinyl chloride (PVC) liners. Each liner was 4 feet in length. Upon retrieval, a portion of each 2-foot interval was placed in separate resealable plastic bags. These bags were sealed and placed at ambient temperature for field screening with a flame ionization detector (FID). The remaining portion of each 2-foot interval was left in the PVC liner, wrapped in plastic and placed on ice for possible laboratory analysis.

Volatile organic compounds (VOCs) were allowed to accumulate in the headspace of each bag for approximately 20 minutes, after which time the headspace of each sealed bag was scanned with the FID. The FID readings were recorded in the field logbook along with the soil description and indications of staining or odors, if present. Logs for each boring are presented in **Appendix C.** Soils from the borings within the right-of-way of Parcel 70 generally consisted of fine silty sand (SM). The GPS coordinates for the borings are provided in **Appendix D.**

Headspace screening of the soil samples with the FID did not indicate the presence of high concentrations of volatile vapors in any of the samples. Concentrations ranged from none detected to 1 part per million in sample P70-B5 0-2 ft bgs. These measurements are presented in **Table 1**. No distinguishable odors were noted in the soil samples.

Soil samples for laboratory analysis were obtained from each boring at the sample intervals identified in **Table 1**. These samples were selected for analysis as they presented the highest FID measurements

within the borings, or, if no volatile vapors were present, were obtained from the 6 – 8 ft bgs depth interval. The samples were placed in laboratory-supplied containers and stored on ice pending shipment to Prism Laboratories, Inc. (Prism) in Charlotte, NC. Sample information was recorded on the chain-of-custody and the samples were submitted for chemical analysis of TPH gasoline range organics (GRO) by Modified EPA Method 5030/8015 and TPH diesel range organics (DRO) by Modified EPA Method 3545/8015.

4.0 SAMPLING RESULTS

TPH DRO was detected in soil sample P50-B5 (0-2 ft bgs) at a concentration of 9.1 mg/kg. Results from the remaining samples submitted for analysis did not reveal the presence of TPH GRO or TPH DRO at levels above the laboratory reporting limits. These data are summarized in **Table 2**. Laboratory reports associated with these samples are presented in **Appendix E**.

5.0 DISCUSSION AND CONCLUSIONS

The geophysical survey at the site did not indicate the presence of buried metallic equipment such as USTs within the Study Area that would impact proposed work within the right-of-way. Solutions-IES installed 11 soil borings (P70-Bl through P70-B11) to determine the presence or absence of petroleum contamination within the Study Area, as well as to document soil conditions.

According to the laboratory analytical results, neither TPH GRO nor TPH DRO were detected in the soil samples at concentrations exceeding the action level of 10 milligrams per kilogram described for tank closure (*Guidelines for Tank Closure, North Carolina Underground Storage Tank Section (Guidelines)*, September 2003). However, TPH DRO was detected in one soil sample (P70-B5 0-2 ft bgs) at a concentration greater than the method detection limit, which, according to the *Guidelines*, is a "reportable concentration". Analytical results for the remaining soil samples showed no TPH GRO or TPH DRO at concentrations above the method detection limit.

The presence of TPH DRO in soil is typically associated with a release of petroleum hydrocarbons such as diesel fuel. Because the soil sample collected from soil boring P70-B5 contained TPH DRO at a concentration greater than the laboratory reporting limit, proper transportation and disposal practices should be used in handling soil that may be excavated in the vicinity of these borings. During roadway

construction, the NCDOT transportation/disposal contractor may use different criteria for estimating impacted soil, however, based on current information, additional assessment is not recommended.

TABLES

TABLE 1
SUMMARY OF FIELD SCREENING RESULTS FOR SOIL
Parcel 70, Delia Lassiter Property
Richmond County, North Carolina
WBS Element: 34438.1.1; NCDOT Project: R-2502A
August 23, 2006

Sample Depth Below Ground Surface	Soil Borings										
	P70-B1	P70-B2	P70-B3	P70-B4	P70-B5	P70-B6	P70-B7	P70-B8	P70-B9	P70-B10	P70-B11
	FID Reading (ppm)										
0 - 2 feet	ND	ND	ND	ND	0.7	ND	ND	ND	ND	ND	0.1
2 - 4 feet	ND	ND	ND	ND	0.1	ND	ND	ND	ND	0.4	0.1
4 - 6 feet	ND	0.2	ND	ND	ND	ND	ND	0.1	ND	ND	0.1
6 - 8 feet	ND	0.1	0.1	ND	ND	ND	ND	0.2	ND	ND	0.5

Notes:

1. Samples denoted by shaded cells were submitted for laboratory analysis.
2. FID readings were obtained with a Photovac MicroFID Flame Ionization Detector.
3. ND = not detected
4. FID Readings rounded to nearest whole number on boring logs
5. ppm = parts per million

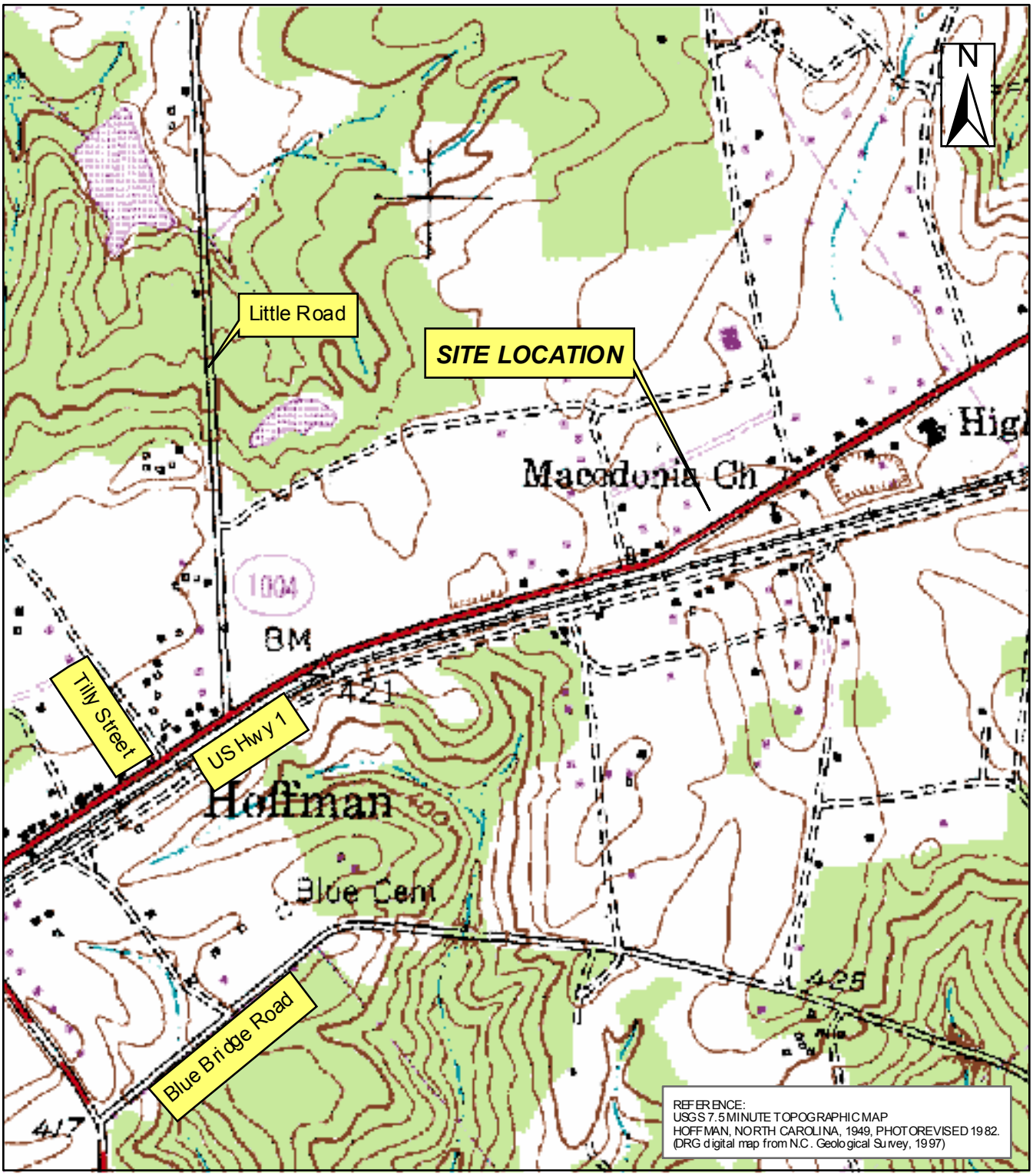
TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS
Parcel 70, Delia Lassiter Property
Richmond County, North Carolina
WBS Element: 34438.1.1; NCDOT Project: R-2502A
August 23, 2006

Sample Information		Total Petroleum Hydrocarbons	
Boring Number	**Depth (ft bgs)**	**Gasoline Range[1] (mg/kg)**	**Diesel Range[2] (mg/kg)**
P70-B1	6-8	< 7.4	< 7.4
P70-B2	6-8	< 7.6	< 7.6
P70-B3	6-8	< 7.3	< 7.3
P70-B4	6-8	< 7.4	< 7.4
P70-B5	0-2	< 7.4	**9.1**
P70-B6	6-8	< 7.5	< 7.5
P70-B7	6-8	< 8.5	< 8.5
P70-B8	6-8	< 7.6	< 7.6
P70-B9	6-8	< 7.5	< 7.5
P70-B10	2-4	< 7.4	< 7.4
P70-B11	6-8	< 7.2	< 7.2

Notes:

1. Total Petroleum Hydrocarbons (TPH) Method 5030/8015MOD - Gasoline Range Hydrocarbons
2. Total Petroleum Hydrocarbons (TPH) Method 3545/8015MOD - Diesel Range Hydrocarbons
3. Bold values indicate detected concentrations
4. mg/kg = milligrams per kilogram
5. ft bgs = feet below ground surface

FIGURES



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SITE LOCATION MAP
PARCEL 70
DELIA LASSITER PROPERTY
RICHMOND COUNTY, NORTH CAROLINA
STATE PROJECT NO. R-2502 A, WBS ELEMENT# 34438.1.1

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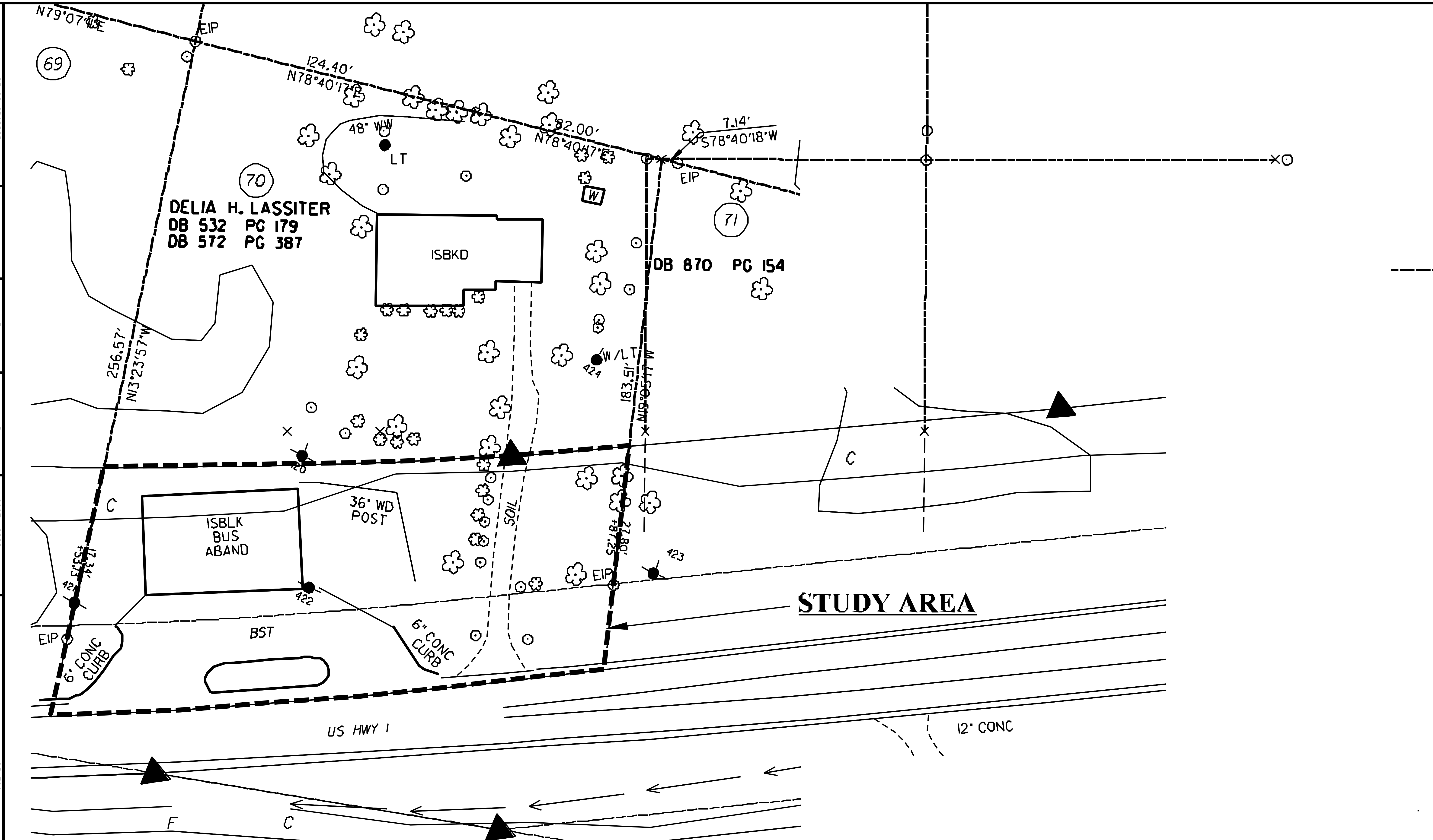
Created by:	RT	Project:	3260.06A3.NDOT
Checked by:	SK	Date:	SEPTEMBER 2006
File:	Figure 1.mxd		
Software:	ESRI ArcMap 9.1	FIGURE	1



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NOTES:

0 40 80
SCALE IN FEET

NOTE: BASEMAP PROVIDED BY NCDOT

PARCEL 70
DELIA LASSITER PROPERTY
RICHMOND COUNTY, NORTH CAROLINA
STATE PROJECT NO. R-2502 A
WBS ELEMENT: 34438.1.1

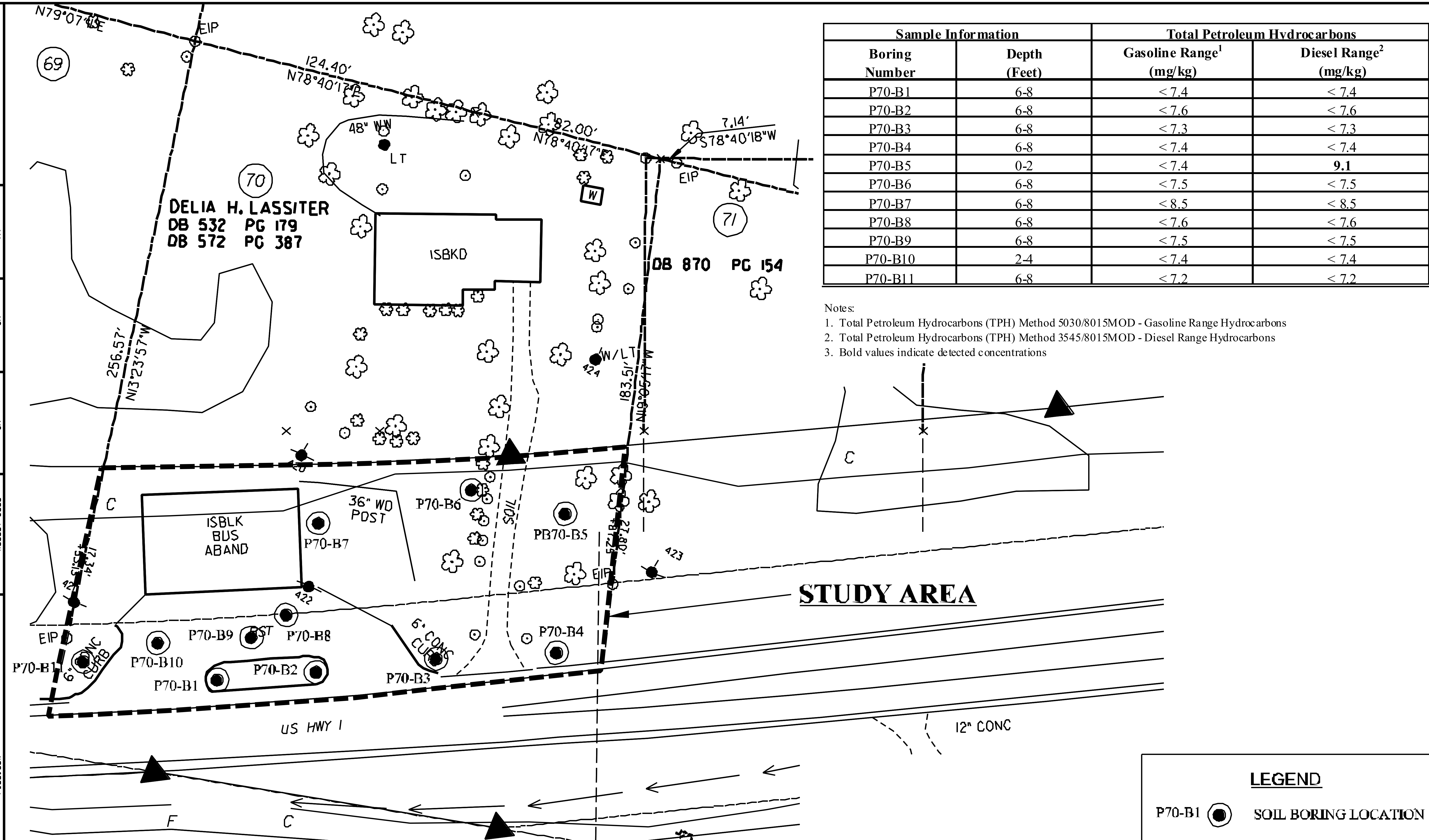
SITE MAP

FIGURE: 2

PROJECT NUMBER 3260.0643.NDOT
DRAFTER RT
CHECKED BY SK
PROJECT MANAGER SK
DATE AUGUST 2006
FILE FIG2.DGN

Sample Information		Total Petroleum Hydrocarbons	
Boring Number	Depth (Feet)	Gasoline Range[1] (mg/kg)	Diesel Range[2] (mg/kg)
P70-B1	6-8	< 7.4	< 7.4
P70-B2	6-8	< 7.6	< 7.6
P70-B3	6-8	< 7.3	< 7.3
P70-B4	6-8	< 7.4	< 7.4
P70-B5	0-2	< 7.4	**9.1**
P70-B6	6-8	< 7.5	< 7.5
P70-B7	6-8	< 8.5	< 8.5
P70-B8	6-8	< 7.6	< 7.6
P70-B9	6-8	< 7.5	< 7.5
P70-B10	2-4	< 7.4	< 7.4
P70-B11	6-8	< 7.2	< 7.2

Notes:
1. Total Petroleum Hydrocarbons (TPH) Method 5030/8015MOD - Gasoline Range Hydrocarbons
2. Total Petroleum Hydrocarbons (TPH) Method 3545/8015MOD - Diesel Range Hydrocarbons
3. Bold values indicate detected concentrations



NOTES:

0 40 80

SCALE IN FEET

NOTE: BASEMAP PROVIDED BY NCDOT

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PARCEL 70
DELIA LASSITER PROPERTY
RICHMOND COUNTY, NORTH CAROLINA
STATE PROJECT NO. R-2502 A
WBS ELEMENT: 34438.1.1

SOIL BORING LOCATIONS

FIGURE: 3

PROJECT NUMBER 3260.0643.NCDOT
DRAFTER RT
CHECKED BY SK
PROJECT MANAGER SK
DATE AUGUST 2006
FILE FIG3.DGN

APPENDIX A

PHOTOGRAPHS

Photograph 1 – Looking west at Parcel 70. Borings locations are marked with pink flags.

Photograph 2 – Advancing a soil boring with the Geoprobe®.

APPENDIX B

GEOPHYSICAL INVESTIGATION

Pyramid Project # 2006200

GEOPHYSICAL INVESTIGATION REPORT

GEOPHYSICAL SURVEYS FOR THE DETECTION OF METALLIC USTS

US 1 from SR 1001 to the Richmond County Line
Richmond, North Carolina
State Project Number U-3459

September 1, 2006

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GEOPHYSICAL SURVEYS FOR THE DETECTION OF METALLIC USTS
US 1 from SR 1001 to the Richmond County Line
State Project Number U-3456

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FIGURES

FIGURES (continued)

1.0 INTRODUCTION

Pyramid Environmental & Engineering, PC conducted geophysical investigations for Solutions IES during the period of July 26 through August 28, 2006, within the proposed Right-of-Way (ROW) areas at 10 sites located in Richmond County, North Carolina. The work was done as part of the North Carolina Department of Transportation (NCDOT) road-widening project under State Project number U-3459. The sites are located along the northern or western sides of US 1 from SR 1001 to the Richmond County Line. The geophysical surveys were conducted to determine if unknown metallic underground storage tanks (UST's) were present beneath the proposed ROW area of each site.

Solutions IES representative Ms. Sheri Knox, PE provided maps during the week of July 24, 2006 that outlined the geophysical survey area of each site. Ms. Knox also provided project management during the geophysical investigation of the sites. Geophysical surveys were conducted within the proposed ROW areas at the following 10 sites that are listed from the southern-most site to the northern-most site.

Property Owner	Parcel	Present Use of Property
Hillary McKay Property	(Parcel 6)	Grass-covered lot with garage
K.J. Lewis Property	(Parcel 9)	Vacant, wooded lot
James Brigman Property	(Parcel 21)	Vacant, grass-covered Lot
Roy Barry Bostick Property	(Parcel 48)	Grass-covered lot and garage
Pansy Ernest Property	(Parcel 50)	Grass-covered lot with vacant store
Church of Deliverance Prop.	(Parcel 51)	Asphalt lot with active church
Cooper & Brown Inc. Prop.	(Parcel 61)	Vacant lot and commercial building

Delia Lassiter Property	(Parcel 70)	Vacant lot and building
Ivey Little Property	(Parcel 22)	Vacant lot and building
James Pugh Property	(Parcel 68)	Vacant, wooded lot

Photographs of the above sites along with photographs of the geophysical equipment used for this project are presented in **Figure 1**.

2.0 FIELD METHODOLOGY

Prior to conducting the geophysical investigations, a 10-foot by 10-foot or 10-foot by 20-foot survey grid was established across the proposed ROW areas of the 10 sites using water-based marking paint or pin flags. These marks were used as X-Y coordinates for location control when collecting the geophysical data and establishing base maps for the geophysical results.

The geophysical investigations consisted of electromagnetic (EM) induction-metal detection surveys and ground penetrating radar (GPR) surveys. The EM surveys were performed using a Geonics EM61-MK1 metal detection instrument. According to the instrument specifications, the EM61 can detect a metal drum down to a maximum depth of approximately 8 feet. The EM61 data were digitally collected at each site along parallel northerly-southerly or easterly-westerly trending survey lines spaced five feet apart. The data were downloaded to a computer and reviewed in the filed and office using the Geonics DAT61W and Surfer for Windows Version 7.0 software programs.

Contour plots of the EM61 bottom coil results and the EM61 differential results for each site are included in this report. The bottom coil results represent the most sensitive component of the EM61 instrument and detect metal objects regardless of size. The bottom coil response can be used to

delineate metal conduits or utility lines, small, isolated metal objects, and areas containing insignificant metal debris.

The differential results are obtained from the difference between the top and bottom coils of the EM61 instrument. The differential results focus on the larger metal objects such as drums and USTs and ignore the smaller insignificant metal objects.

GPR surveys were conducted across selected EM61 differential anomalies and steel-reinforced concrete using a GSSI SIR-2000 unit equipped with a 400 MHz antenna. Surveys were also performed across several areas where parked vehicles that obstructed the EM61 survey had since been removed. GPR data were digitally collected in a continuous mode along X and/or Y survey lines, spaced two to five feet apart using a vertical scan of 512 samples, at a rate of 48 scans per second. An 80 MHz high pass filter and an 800 MHz low pass filter were used during data acquisition with the 400 MHz antenna. GPR data were collected down to a maximum depth of approximately five feet, based on an estimated two-way travel time of 9 nanoseconds per foot.

The GPR data were downloaded to a field computer and later reviewed in the office using Radprint and Radan 5.0 software programs. The locations of GPR survey areas or individual GPR survey lines are shown as solid, purple polygons or solid purple lines, respectively, on the EM61 differential contour plots. The approximate perimeters of probable or possible USTs, based on the geophysical results, were marked and labeled in the field using orange, water-based marking paint and pin flags (when possible). The approximate locations of probable or possible USTs are shown as magenta-colored rectangles on the EM61 bottom coil and differential contour plots.

During the weeks of August 7, August 14, and August 28, preliminary contour plots of the EM61 bottom coil and the differential results were emailed to Ms. Knox.

3.0 DISCUSSION OF RESULTS

3.1 Parcel 6 – Hillary McKay Property

The Hillary McKay Property (Parcel 6) contains a former auto repair garage and a vacant wooden building. The ROW area consists of a flat-lying grass surface. The bottom coil results and the differential results are presented in **Figures 2 and 3**, respectively. GPR surveys conducted around the perimeter of the garage and wooden building, suggest that the EM61 anomalies surrounding the two buildings are in response to the structures and perhaps buried miscellaneous metal debris. The remaining EM61 anomalies are probably in response to buried miscellaneous metal debris. The geophysical results suggest that the proposed ROW area at Parcel 6 does not contain metallic UST's.

3.2 Parcel 9 – K.J. Lewis Property

The K.J. Lewis property (Parcel 9) is located immediately north of the Mercer Road and US 1 intersection, approximately 200 feet northeast of Parcel 6. The property consists of an abandoned building along the edge of US 1, which is surrounded by dense wooded terrain. A former pump island area is located in front of the building. The EM61 bottom coil results and the differential results are presented in **Figures 4 and 5**, respectively. Due to limited access to the site, the geophysical investigation was limited to the front portion of the property that is located along US 1.

The geophysical investigation detected the probable presence of two USTs located adjacent to the pump island area. The first UST is centered near grid coordinates X=84 Y=27, and buried approximately 1.5 feet below surface. The second UST is centered near grid coordinates X=103 Y=27, and is buried approximately 2.0 feet below surface. This latter UST appears to be lie partially beneath the former pump island area. The approximate locations of the USTs are shown as magenta-colored rectangles in Figures 4 and 5. Based on the GPR results, the probable USTs are approximately 10 feet long and 4 feet wide. A photograph showing the approximate locations of the two probable USTs and the image of GPR survey lines Y=27.5, which intersects the probable USTs, are presented in **Figure 6**.

The EM61 differential anomaly centered near grid coordinates X=118 Y=29, may possibly be in response to a UST or large metal object. However, GPR surveys could not be conducted across this EM anomaly due to the limited access caused by the dense wooded terrain. The approximate location of this possible UST is shown as a dashed, magenta-colored rectangle in Figures 4 and 5, and in the site photograph that is presented in Figure 6.

The remaining portion of the geophysical survey area does not appear to contain significant, buried, metal objects.

3.3 Parcel 21 – James Brigman Property

The James Brigman property (Parcel 21) consists of an open, grass and asphalt-covered lot located along the western side of US 1. The EM61 bottom coil results and the differential results are presented in **Figures 7 and 8**, respectively.

GPR surveys conducted across the linear, EM61 bottom coil anomalies that intersect grid coordinates X=62 Y=70, X=66 Y=94, X=84 Y=94, and X=87.5 Y=75, suggest the anomalies are probably in response to buried utility lines or conduits. GPR data also suggest that the high amplitude anomalies centered near grid coordinates X=77 Y=84, and X=93 Y=66, are probably in response to buried miscellaneous metal objects or junction areas for the conduits or utility lines.

GPR surveys conducted across the large, high amplitude anomaly centered near X=45 Y=75, detected the probable presence of four metallic USTs. The four probable USTs are centered near grid coordinates X=43 Y=80, X=50 Y=80, X=42 Y=73, and X=48 Y=73. Based on the GPR data, the USTs appear to be approximately 9 feet long and 3.5 to 4 feet wide and buried approximately 1.5 to 2.0 feet below surface. The approximate locations of the probable USTs are shown as magenta-colored rectangles in Figures 7 and 8. A photograph showing the approximate locations of the four probable USTs and the image of GPR survey lines Y=80, which intersects the two probable USTs centered near X=43 Y=80, and X=50 Y=80, are presented in **Figure 9**.

The remaining EM61 anomalies recorded within the proposed ROW area are probably in response to miscellaneous metal debris.

3.4 Parcel 48 – Roy Barry Bostick Property

The Roy Barry Bostick property (Parcel 48) consists of a red, brick building surrounded by flat-lying grass-covered terrain. The parcel is located along the northwestern side of US 1 approximately 300 feet southwest of the US 1 and Tilley Street intersection. The EM61 bottom coil results and the differential results are presented in **Figure 10**.

GPR surveys conducted across the EM61 anomaly centered near grid coordinates X=295 Y=60, suggest that the anomaly is probably in response to one or more large diameter (12 or more inches) conduits buried approximately 1.0 feet below surface. There is a possibility (although unlikely) that the anomaly may be in response to a very small UST centered near grid coordinates X=290 Y=59. The location of the possible, but unlikely UST is shown as a magenta-colored square in Figure 10.

GPR surveys conducted along the edge of the brick building suggest that the EM61 anomalies recorded in this area are probably in response to the building and/or buried miscellaneous debris. The remaining EM61 anomalies recorded within the proposed ROW area at Parcel 48 are probably in response to known cultural features and/or buried miscellaneous debris.

3.5 Parcel 50 – Pansy Ernest Property

The Pansy Ernest property (Parcel 50) is located on the western corner of the Tilley Street and US1 intersection. The parcel contains the former Little Grace's Variety store surrounded by a flay-lying grass-covered, terrain. An occupied house is located immediately west of the property. The EM61 bottom coil results and the differential results are presented in **Figures 11 and 12**, respectively. Please note that Figures 11 and 12 also contain the EM61 results for Church of Deliverance property (Parcel 51).

GPR surveys conducted across the backyard of Parcel 50 suggest the linear EM61 bottom coil anomalies intersecting grid coordinates X=570 Y=115, X=570 Y=126, X=580 Y=90, and X=586 Y=125, are probable in response to buried conduits or lines. Similarly, the locations of the linear EM61 anomalies intersecting grid coordinates X= 622 Y=80, X=622 Y=120, and X=640 Y=35, suggest these anomalies are probably in response to buried utility lines.

GPR surveys conduct across the high amplitude anomalies centered near grid coordinates X=575 Y=105, and X=590 Y=113, suggest the anomalies are probably in response to the "junction" of conduits and/or other miscellaneous objects. Although not confirmed by the GPR results, the EM61 anomaly located at X=575 Y=105, may be in response to a possible septic tank.

GPR surveys conducted across the EM61 anomaly centered near grid coordinates X=567 Y=55, detected the probably presence of two USTs buried approximately 0.75 feet below surface. The approximate locations of the probably USTs are shown as magenta-colored rectangles in Figures 11 and 12 and each UST appears to be approximately eight feet long and three feet wide. A photograph showing the approximate locations of the two probable USTs and the image of GPR survey line Y=55, which intersects the probable USTs, are presented in **Figure 13**.

The remaining EM61 anomalies recorded within the proposed ROW area at Parcel 50 are probably in response to known cultural features or buried miscellaneous metal debris.

3.6 Parcel 51 – Church of Deliverance Property

The Church of Deliverance property (Parcel 51) contains an active church building surrounded by a grass, gravel or asphalt-covered parking area. The property is located on the northern corner of the Tilley Street and US 1 intersection immediately across the street from the Pansy Ernest property (Parcel 50). The EM61 bottom coil results and the differential results for Parcel 51 are presented in **Figures 11 and 12**, respectively along with the EM61 results for Parcel 50.

The linear EM61 bottom coil anomalies intersecting grid coordinates X=670 Y=50, X=700 Y=30, and X=700 Y=65, are probably in response to buried utility lines or conduits. GPR surveys conducted across the EM61 differential anomaly centered near X=705 Y=105, and along the front edge of the church building suggest the anomalies are probably in response to miscellaneous debris and the building, respectively.

The remaining EM61 anomalies recorded within the proposed ROW area at Parcel 51 are probably in response to know cultural features or miscellaneous buried debris. The geophysical results also suggest that the proposed ROW area does not contain metallic USTs.

3.7 Parcel 61 – Cooper & Brown Inc. Property

The Cooper & Brown Inc. property (Parcel 61) is located on the western side of the US 1 and Little Road intersection. The proposed ROW area of Parcel 61 contains a vacant business building surrounded by flat-lying, grass or asphalt surfaces. A concrete pad is located in front of the building and probably identifies the former pump island area. An occupied house lies to the northwest of the proposed ROW area.

The EM61 bottom coil results and the differential results are presented in **Figures 14 and 15**, respectively. The linear EM61 bottom coil anomalies intersecting grid coordinates X=130 Y=34, X=142 Y=105, X=186 Y=100, X=210 Y=42, and X=213 Y=83, are probably in response to buried utility lines or conduits. The high amplitude anomalies centered near grid coordinates X=75 Y=67, and X=80 Y=50, are probably in response to steel reinforced concrete. GPR surveys conducted across these two areas did not detect the presence of USTs.

GPR surveys conducted across the high amplitude anomaly centered near X=226 Y=116, suggest the anomaly is probably in response to steel reinforced concrete and/or to the metal conduits that are visible at the surface. GPR surveys conducted along the perimeter of the building suggest that the EM61 anomalies are probably in response to the building and/or to miscellaneous debris. The remaining EM61 anomalies are probably in response to known cultural features and/or to buried miscellaneous metal debris.

The geophysical results suggest that the proposed ROW area at Parcel 61 does not contain metallic USTs.

3.8 Parcel 70 – Delia Lassiter Property

The Delia Lassiter Property (Parcel 70) contains a vacant building surrounded primarily by grass yard and an asphalt driveway. An occupied house lies immediately north of the proposed ROW area. The EM61 bottom coil results and the differential results are presented in **Figures 16 and 17**, respectively.

The linear EM61 anomaly intersecting grid coordinates X=90 Y=110, is probably in response to a buried utility line or conduit. The remaining EM anomalies are probably in response to known cultural features or to buried miscellaneous debris. The geophysical results suggest that the proposed ROW area at the Delia Lassiter property does not contain metallic USTs.

3.9 Parcel 22 – Ivey Little Property

The Ivey Little property (Parcel 22) is located along the northwest side of US 1 and consists of a vacant building surrounded by a gravel-covered driveway and grass-covered fields. The EM61 bottom coil results and the differential results are presented in **Figures 18 and 19**, respectively.

The linear EM61 anomaly intersecting grid coordinates X=354 Y=35, is probably in response to a buried utility line or conduit. The remaining EM anomalies are probably in response to known cultural features or to buried miscellaneous debris. The geophysical results suggest that the proposed ROW area at the Ivey Little property does not contain metallic USTs.

3.10 Parcel 68 – James Pugh Property

The James Pugh Property (Parcel 68) is a former gas station site located on the northern side of US 1, approximately 0.25 miles west of the US 1 and Special Forces Way intersection. The site consists primarily of grass, trees and brush with a former pump island pad located near the edge of US 1. The EM61 bottom coil results and the differential results are presented in **Figure 20**.

GPR surveys conducted across the EM61 anomalies centered grid coordinates X=305 Y=35, and X=321 Y=37, suggest the anomalies are probably in response to the pump island pad and to the

buried pump island-related equipment. GPR surveys conducted across the EM61 anomaly centered near grid coordinates X=534 Y=92, suggest the anomaly is probably in response to buried miscellaneous debris or object. The remaining EM61 anomalies are probably in response to known cultural features and miscellaneous metal debris.

The geophysical investigation conducted at Parcel 68 suggests that the proposed ROW area does not contain metallic USTs.

4.0 SUMMARY & CONCLUSIONS

Our evaluation of the EM61 and GPR data collected across the proposed ROW areas at the 10 sites along US 1 in Richmond County, North Carolina provides the following summary and conclusions:

- The EM61 and GPR surveys provided reliable results for the detection of metallic USTs within the surveyed portions of the proposed ROW areas of each site.

- GPR surveys were conducted across selected EM61 differential anomalies and across areas containing steel reinforced concrete.

- Linear EM61 anomalies at the 10 sites are probably in response to buried utility lines and/or conduits. The majority of non-linear anomalies are probably in response to known cultural features or miscellaneous metal objects.

- The geophysical results suggest the proposed ROW areas at the following properties do not contain metallic USTs:

Hillary McKay Property	(Parcel 6)
Church of Deliverance Property	(Parcel 51)
Cooper & Brown Inc. Property	(Parcel 61)
Delia Lassiter Property	(Parcel 70)
Ivey Little Property	(Parcel 22)
James Pugh Property	(Parcel 68)

- K.J. Lewis Property (Parcel 9): Geophysical results suggest the probable presence of two USTs located adjacent to the pump island area. The first UST is centered near grid coordinates X=84 Y=27, and buried approximately 1.5 feet below surface. The second UST is centered near grid coordinates X=103 Y=27, and is buried approximately 2.0 feet below surface. The EM61 differential anomaly centered near grid coordinates X=118 Y=29, may possibly be in response to a UST or large metal object. However, GPR surveys could not be conducted across this EM anomaly due to the limited access caused by the dense wooded terrain.

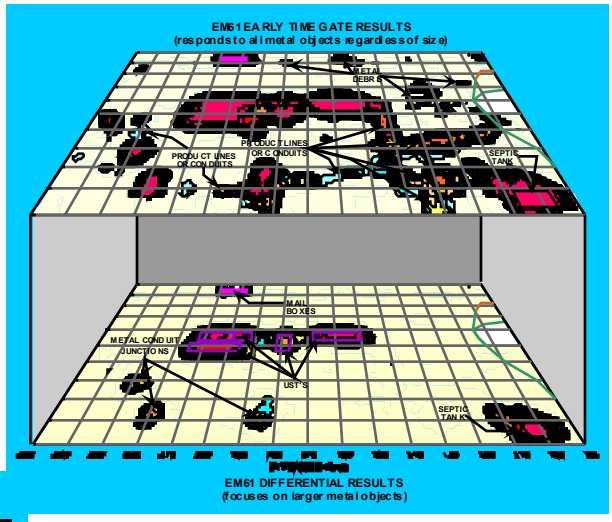
- James Brigman Property (Parcel 21): Geophysical results detected the probable presence of four metallic USTs centered near grid coordinates X=43 Y=80, X=50 Y=80, X=42 Y=73, and X=48 Y=73. Based on the GPR data, the USTs appear to be approximately 9 feet long and 3.5 to 4 feet wide and buried approximately 1.5 to 2.0 feet below surface.

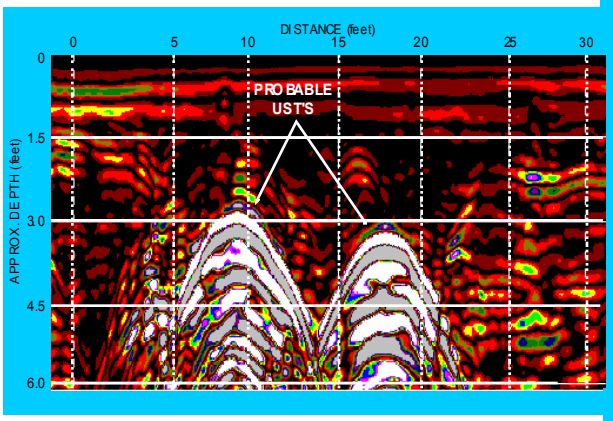
- Roy Barry Bostick Property (Parcel 48): GPR surveys conducted across the EM61 anomaly centered near grid coordinates X=295 Y=60, suggest that the anomaly is probably in response to one or more large diameter (12 or more inches) conduits buried approximately 1.0 feet below surface. There is a possibility (although unlikely) that the anomaly may be in response to a very small UST centered near grid coordinates X=290 Y=59.

- Pansy Ernest Property (Parcel 50): Geophysical results suggest the probable presence of two USTs centered near grid coordinates X=567 Y=55, and buried approximately 0.75 feet below surface. The USTs appear to be approximately eight feet long and three feet wide.

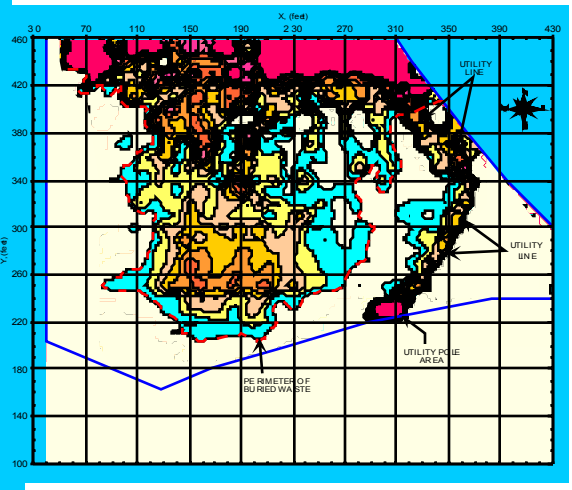
5.0 LIMITATIONS

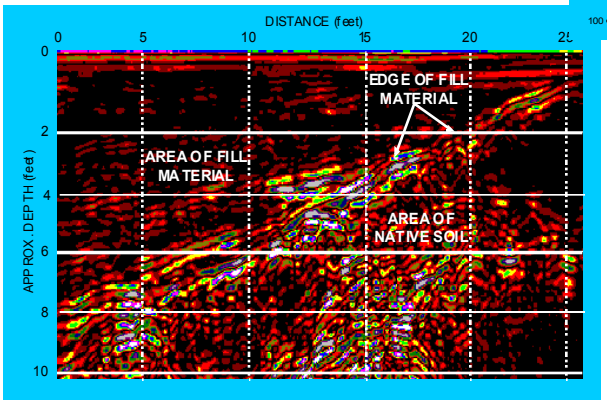
EM61 and GPR surveys have been performed and this report prepared for Solutions IES in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the EM61 and GPR are non-unique and may not represent actual subsurface conditions. The EM61 and GPR results obtained for this project do not conclusively define the locations of all metallic USTs but only suggest where some of the metallic USTs may be present. The EM61 and GPR anomalies, interpreted as probable or possible USTs or tanks, may be attributed to other surface or subsurface conditions or cultural interference.


EM61 EARLY TIME GATE RESULTS
(responds to all metal objects regardless of size)
METAL DEBRIS
PRODUCT LINES OR CONDUITS
PRODUCT LINES OR CONDUITS
SEPTIC TANK
MAIL BOXES
METAL CONDUIT JUNCTIONS
UST'S
SEPTIC TANKS
EM61 DIFFERENTIAL RESULTS
(focuses on larger metal objects)


DISTANCE (feet)
0
5
10
15
20
25
30
APPROX. DEPTH (feet)
0
1.5
3.0
4.5
6.0
PROBABLE UST'S

FIGURES


X (feet)
30
70
110
150
190
230
270
310
350
390
430
Y (feet)
460
420
380
340
300
260
220
180
140
100
UTILITY LINE
UTILITY LINE
UTILITY POLE AREA
PERIMETER OF BURIED WASTE


DISTANCE (feet)
0
5
10
15
20
APPROX. DEPTH (feet)
0
2
4
6
8
10
EDGE OF FILL MATERIAL
AREA OF FILL MATERIAL
AREA OF NATIVE SOIL

Parcel 6 - Hillary McKay Property

Parcel 9 - K.J. Lewis Property

Parcel 21 - James Brigman Property

Parcel 48 - Roy Barry Bostick Property

Parcel 50 - Pansy Earnest Property

Parcel 51 - Church of Deliverance Property

Parcel 61 - Cooper & Brown Property

Parcel 70 - Delia Lassiter Property

Parcel 22 - Ivey Little Property

Parcel 68 - James Pugh Property

GEOPHYSICAL EQUIPMENT

The photo shows the Geonics EM61 metal detector that was used to conduct the metal detection survey at the sites in Richmond County, North Carolina.

The photos show the SIR-2000 GPR system equipped with a 400 MHz antenna that was used to conduct the ground penetrating radar investigation at the sites in Richmond County, North Carolina.

SITE PHOTOGRAPHS

This figure shows the photographs of the ten sites located near Marston and Hoffman, North Carolina where geophysical investigations were conducted within the ROW areas for the detection of metallic USTs.

SITE PHOTOS

FIGURE 1

GRAPHIC SCALE IN FEET

DRWN	CHK'D		FIGURE
MJD			
DATE	LAY	DWG	J.NO.
08/31/06			2006-200

CLIENT: SOLUTIONS IES

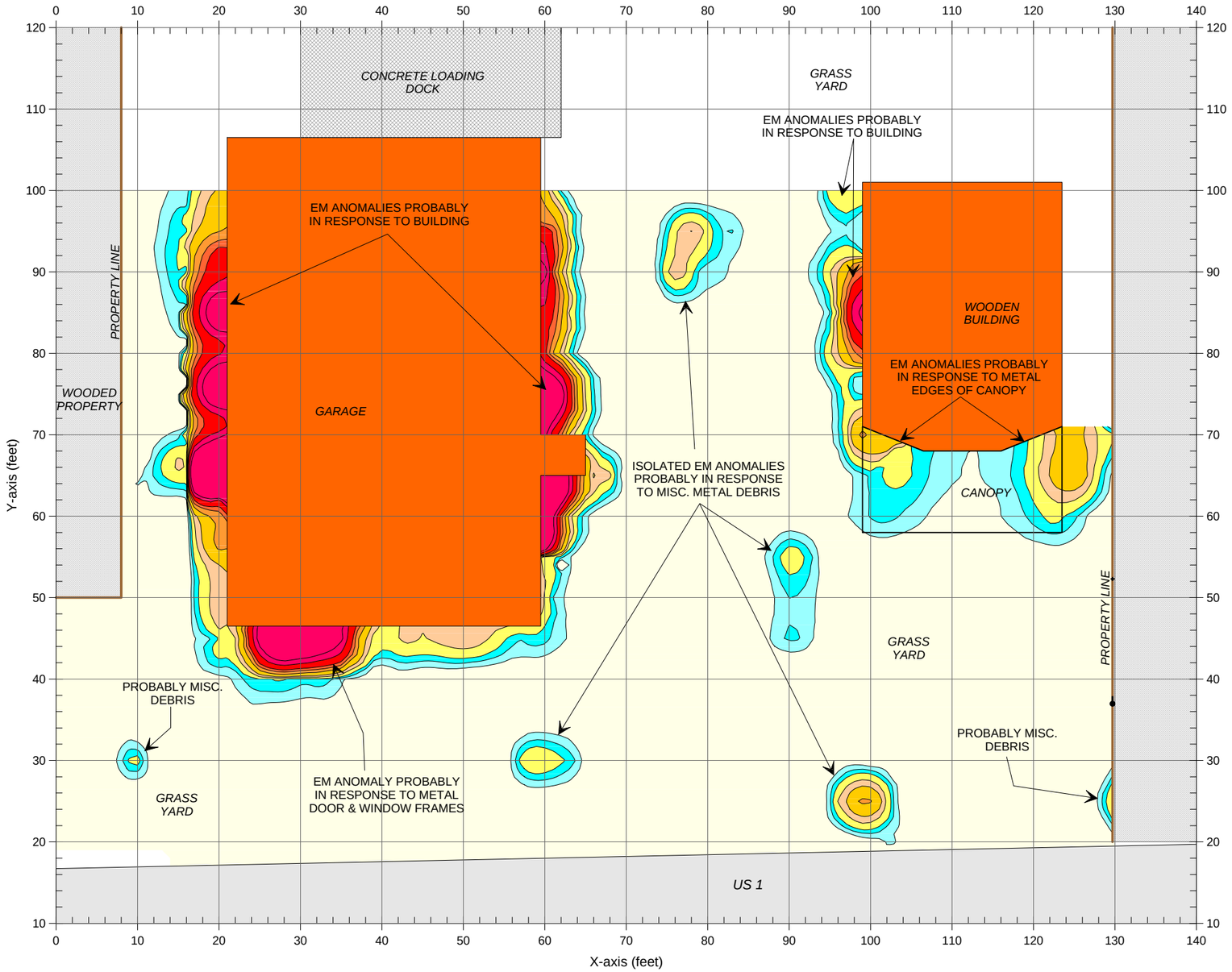
SITE: US 1 - RICHMOND COUNTY SITES

CITY: MARSTON & HOFFMAN

STATE: NORTH CAROLINA

TITLE: GEOPHYSICAL RESULTS

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.



APPROXIMATE NORTH

LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTHEAST-SOUTHWEST TRENDING LINES SPACED 5 FEET APART
- PROPERTY LINE (APPROX.)
- GUY WIRE
- UTILITY POLE

EM61 BOTTOM COIL RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -80 45 50 75 100 150 200 300 400 500 750 1000

Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The EM metal detection data were collected on July 27, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on August 16, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

The geophysical investigation suggests that the survey area does not contain metallic USTs.

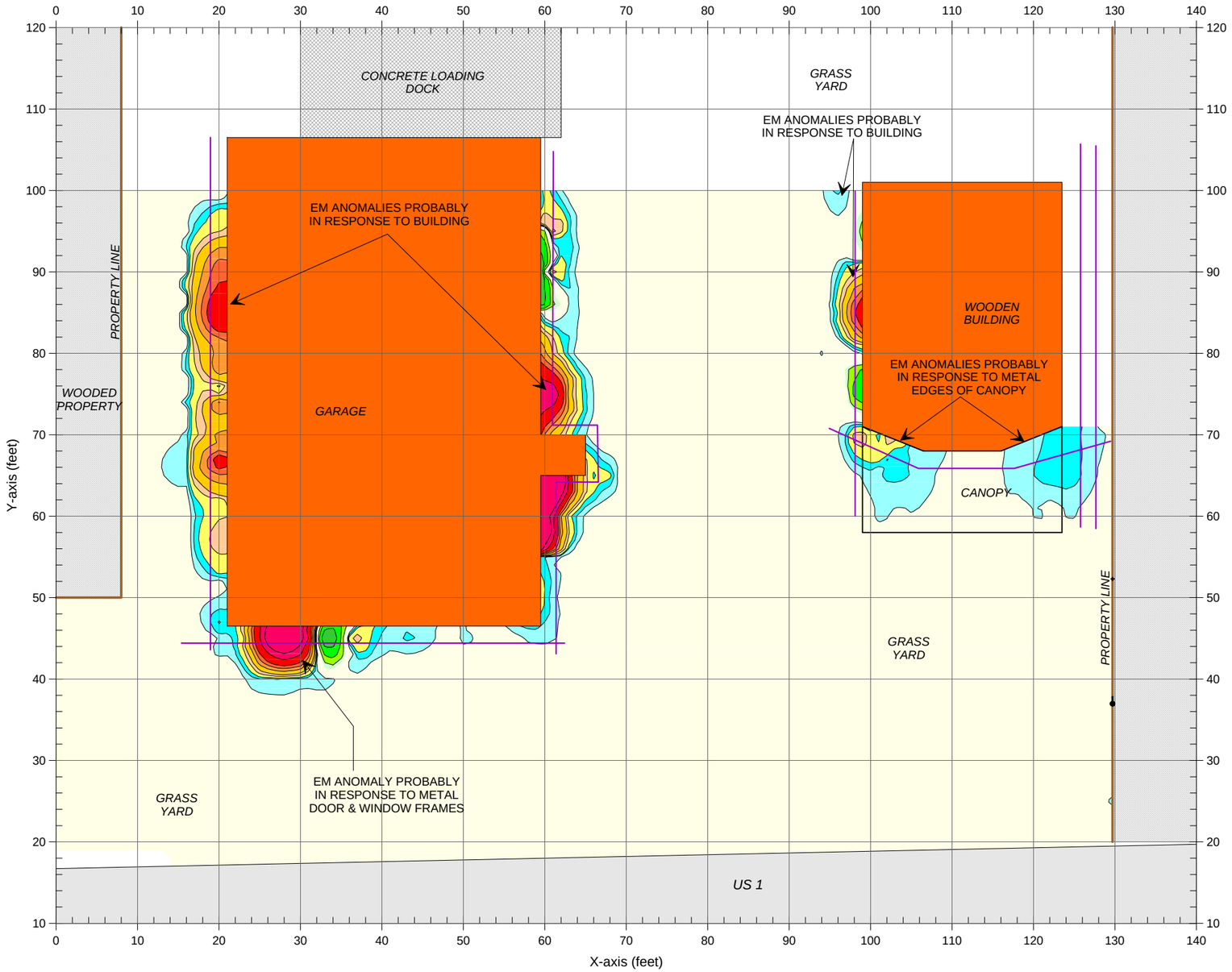
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES	DATE	08/01/06	DRWN	MJD
SITE	PARCEL 6 - HILLARY MCKAY PROPERTY	LAY		CHKD	
CITY	MARSTON	STATE	NORTH CAROLINA	DWG	
TITLE	GEOPHYSICAL RESULTS	J-NO.	2006-200	FIGURE	

GRAPHIC SCALE IN FEET

EM61 BOTTOM COIL RESULTS

FIGURE 2



APPROXIMATE NORTH

LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTHEAST-SOUTHWEST TRENDING LINES SPACED 5 FEET APART
- PROPERTY LINE (APPROX.)
- GUY WIRE
- UTILITY POLE
- APPROX. LOCATION OF GPR SURVEY LINE

EM61 DIFFERENTIAL RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -80 45 50 75 100 150 200 300 400 500 750 1000

Note: The contour plot shows the differential results of the EM61 metal detection survey in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and USTs and ignores smaller miscellaneous, buried, metal debris. The EM metal detection data were collected on July 27, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on August 16, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

The geophysical investigation suggests that the survey area does not contain metallic USTs.

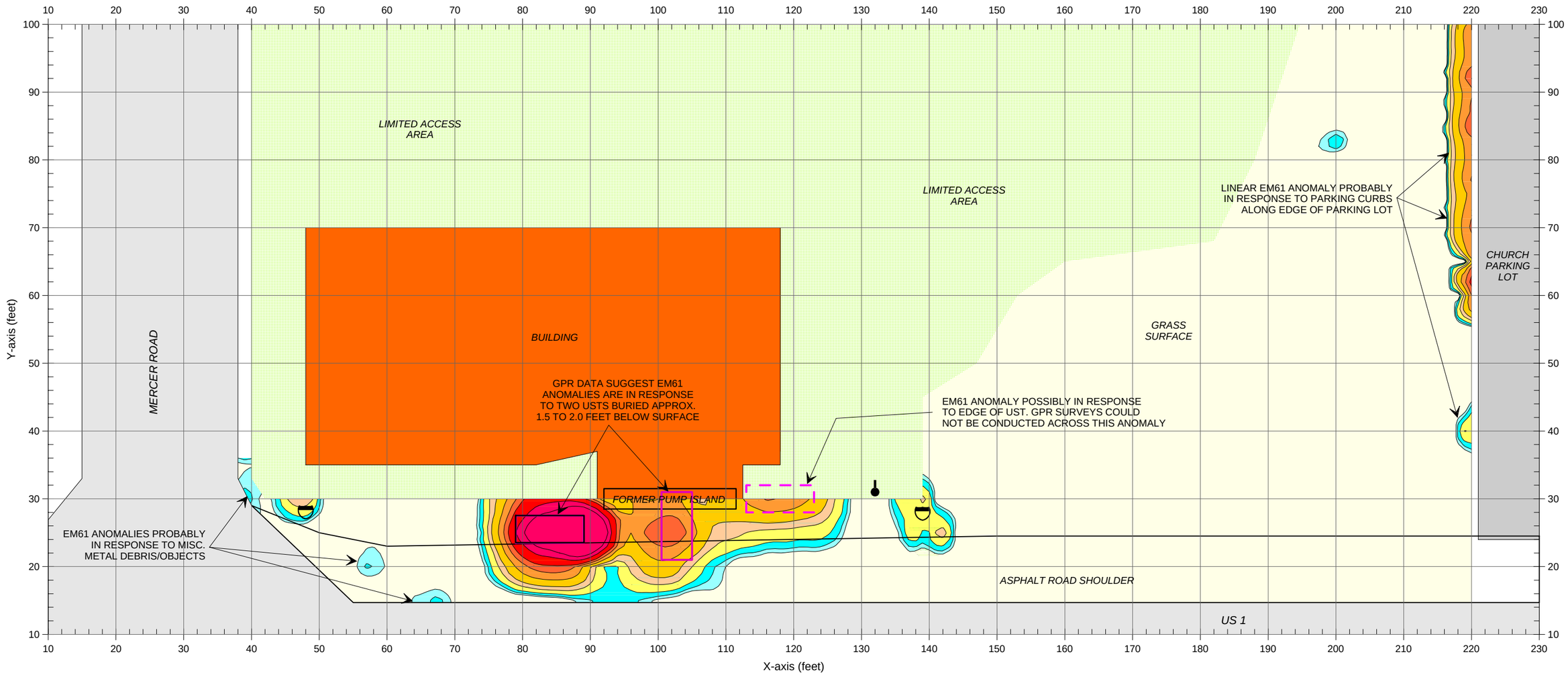
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES		DATE	08/01/06	DRWN MJD
SITE	PARCEL 6 - HILLARY MCKAY PROPERTY		LAY		CHKD
CITY	MARSTON	STATE NORTH CAROLINA	DWG		
TITLE	GEOPHYSICAL RESULTS		J-NO.	2006-200	FIGURE

GRAPHIC SCALE IN FEET

EM61 DIFFERENTIAL RESULTS

FIGURE 3



EM61 BOTTOM COIL RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -90 55 60 75 100 150 200 300 400 500 750 1000

LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EASTERLY-WESTERLY OR NORTHERLY- SOUTHERLY TRENDING LINES SPACED 5 FEET APART
- UTILITY POLE
- TRAFFIC SIGN
- POSSIBLE UST, AS SUGGESTED BY EM61 ANOMALY
- PROBABLE UST, AS SUGGESTED BY GPR SURVEYS

N W E S

APPROXIMATE NORTH

Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The EM metal detection data were collected on August 15, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on August 16, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

GPR surveys suggest that the EM61 anomalies recorded adjacent to the former pump island area are probably in response to metallic USTs.

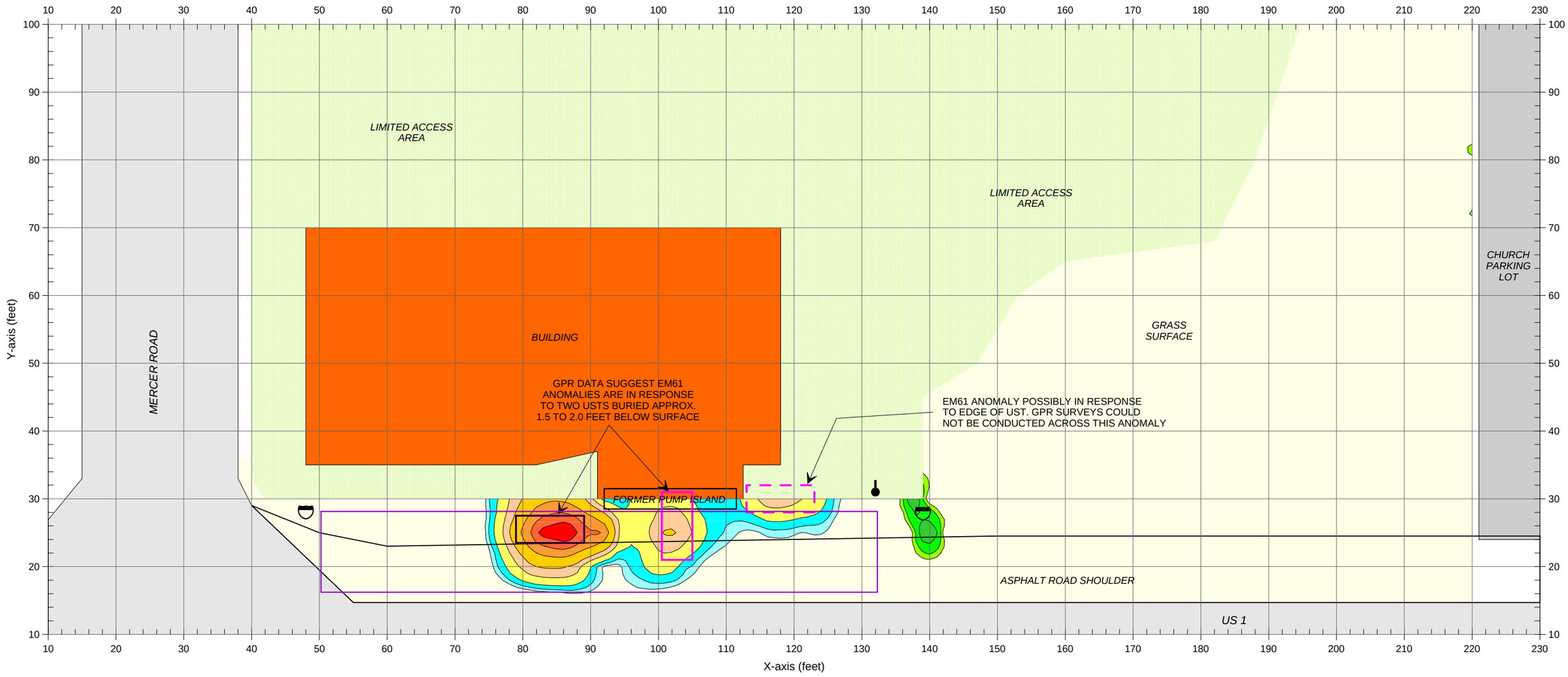
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES	DATE	08/17/06	DRWN	MJD
SITE	PARCEL 9 - K. J. LEWIS PROPERTY	LAY		CHKD	
CITY	MARSTON	STATE	NORTH CAROLINA	DWG	
TITLE	GEOPHYSICAL RESULTS	J-NO.	2006-200	FIGURE	

GRAPHIC SCALE IN FEET

EM61 BOTTOM COIL RESULTS

FIGURE 4



LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EASTERLY-WESTERLY OR NORTHERLY- SOUTHERLY TRENDING LINES SPACED 5 FEET APART
- UTILITY POLE
- TRAFFIC SIGN
- GPR SURVEY AREA
- POSSIBLE UST, AS SUGGESTED BY EM61 ANOMALY
- PROBABLE UST, AS SUGGESTED BY GPR SURVEYS

EM61 DIFFERENTIAL RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -90 55 60 75 100 150 200 300 400 500 750 1000

N W E S

APPROXIMATE NORTH

Note: The contour plot shows the differential results of the EM61 metal detection survey in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and USTs and ignores smaller miscellaneous, buried, metal debris. The EM metal detection data were collected on August 15, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on August 16, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

GPR surveys suggest that the EM61 anomalies recorded adjacent to the former pump island area are probably in response to metallic USTs.

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

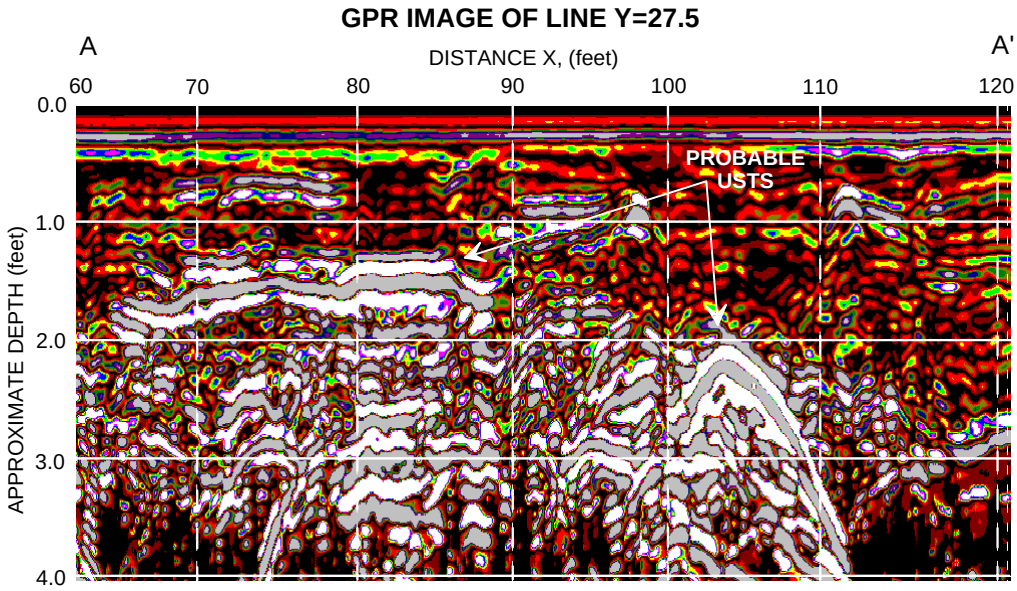
CLIENT	SOLUTIONS IES		DATE	08/17/06	DRWN MJD
SITE	PARCEL 9 - K. J. LEWIS PROPERTY		LAY		CHKD
CITY	MARSTON	STATE NORTH CAROLINA	DWG		
TITLE	GEOPHYSICAL RESULTS		J-NO.	2006-200	FIGURE

GRAPHIC SCALE IN FEET

EM61 DIFFERENTIAL RESULTS

FIGURE 5

The photograph shows the locations of two probable USTs and one possible UST buried 1.5 to 2.0 feet below surface, as suggested by the geophysical results at Parcel 9.



The GPR image obtained along a portion of survey line Y=27.5, shows the anomalies that are probably in response to USTs near X=84 and X=103, and buried approximately 1.5 and 2.0 feet below surface, respectively. The location of this GPR image is shown with a solid purple line in the above photograph.

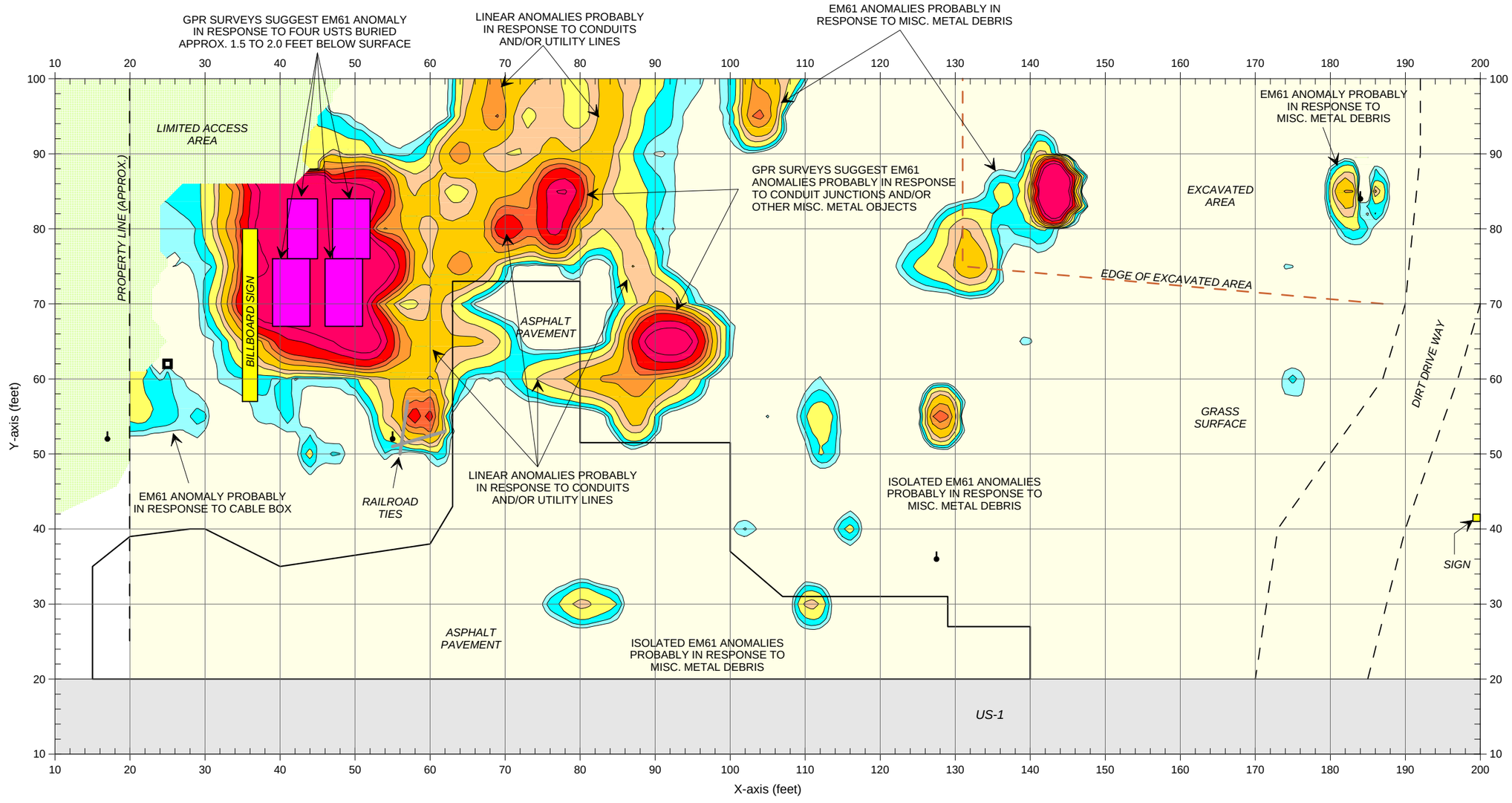
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES		DATE	08/26/05	DRWN
SITE	PARCEL 9 - K. J. LEWIS PROPERTY		LAY		CHKD
CITY	MARSTON	STATE NORTH CAROLINA	DWG		
TITLE	GEOPHYSICAL RESULTS		JOB	2006-200	FIGURE

GRAPHIC SCALE IN FEET

PHOTO & GPR IMAGE OF UST LOCATIONS (Parcel 9)

FIGURE 6



LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTHERLY- SOUTHERLY TRENDING LINES SPACED 5 FEET APART
- UTILITY POLE
- CABLE BOX
- PROBABLE UST, AS SUGGESTED BY GPR SURVEYS

APPROXIMATE NORTH

EM61 BOTTOM COIL RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -90 -55 -60 -75 -100 -150 -200 -300 -400 -500 -750 -1000

Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The EM metal detection data were collected on August 15, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on August 16, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

GPR surveys suggest that the large, high amplitude, EM61 anomaly in the southwest portion of the survey area is probably in response to four metallic USTs.

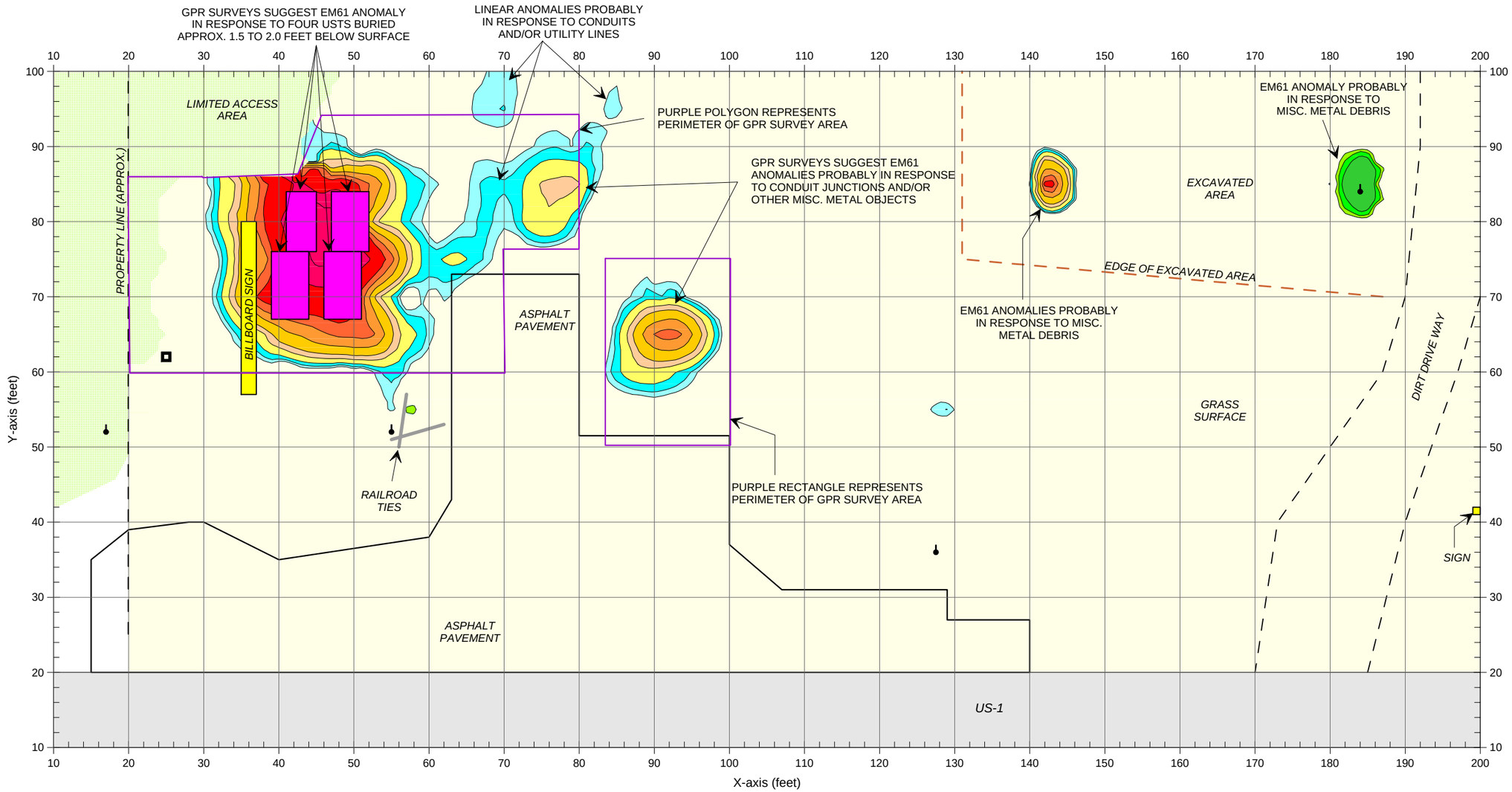
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES	DATE	08/17/06	DRWN	MJD
SITE	PARCEL 21 - JAMES BRIGMAN PROPERTY	LAY		CHKD	
CITY	MARSTON	STATE	NORTH CAROLINA	DWG	
TITLE	GEOPHYSICAL RESULTS	J-NO.	2006-200	FIGURE	

GRAPHIC SCALE IN FEET

EM61 BOTTOM COIL RESULTS

FIGURE 7



LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTHERLY- SOUTHERLY TRENDING LINES SPACED 5 FEET APART
- UTILITY POLE
- CABLE BOX
- PROBABLE UST, AS SUGGESTED BY GPR SURVEYS

APPROXIMATE NORTH

EM61 DIFFERENTIAL RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -90 55 60 75 100 150 200 300 400 500 750 1000

Note: The contour plot shows the differential results of the EM61 metal detection survey in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and USTs and ignores smaller miscellaneous, buried, metal debris. The EM metal detection data were collected on August 15, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on August 16, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

GPR surveys suggest that the large, high amplitude, EM61 anomaly in the southwest portion of the survey area is probably in response to four metallic USTs.

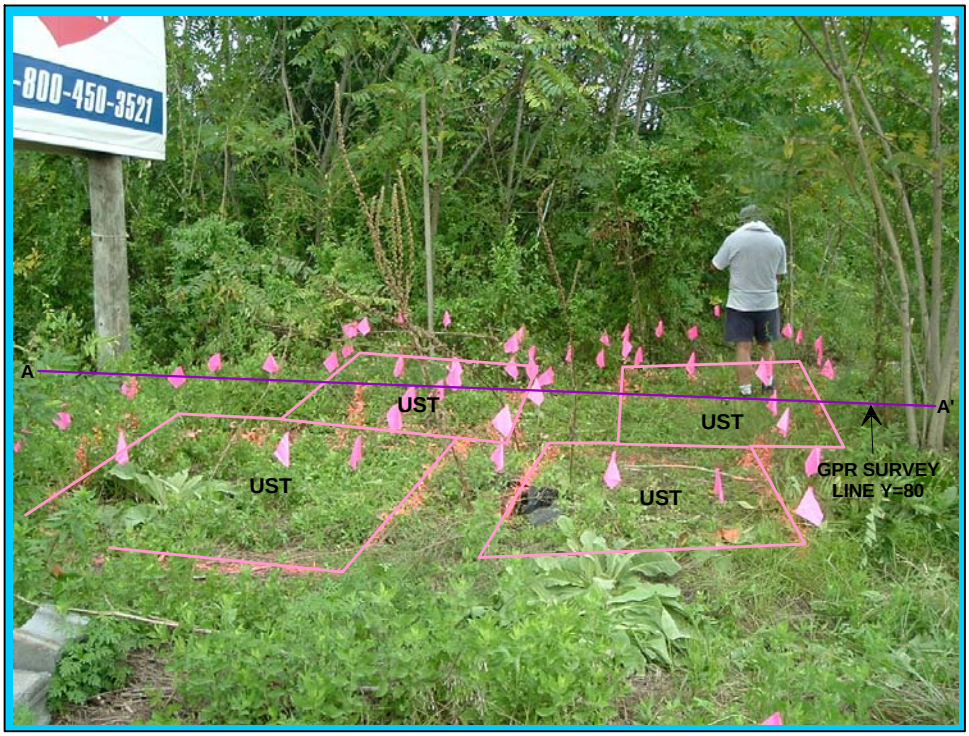
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES	DATE	08/17/06	DRWN	MJD
SITE	PARCEL 21 - JAMES BRIGMAN PROPERTY	LAY		CHKD	
CITY	MARSTON	STATE	NORTH CAROLINA	DWG	
TITLE	GEOPHYSICAL RESULTS	J.NO.	2006-200	FIGURE	

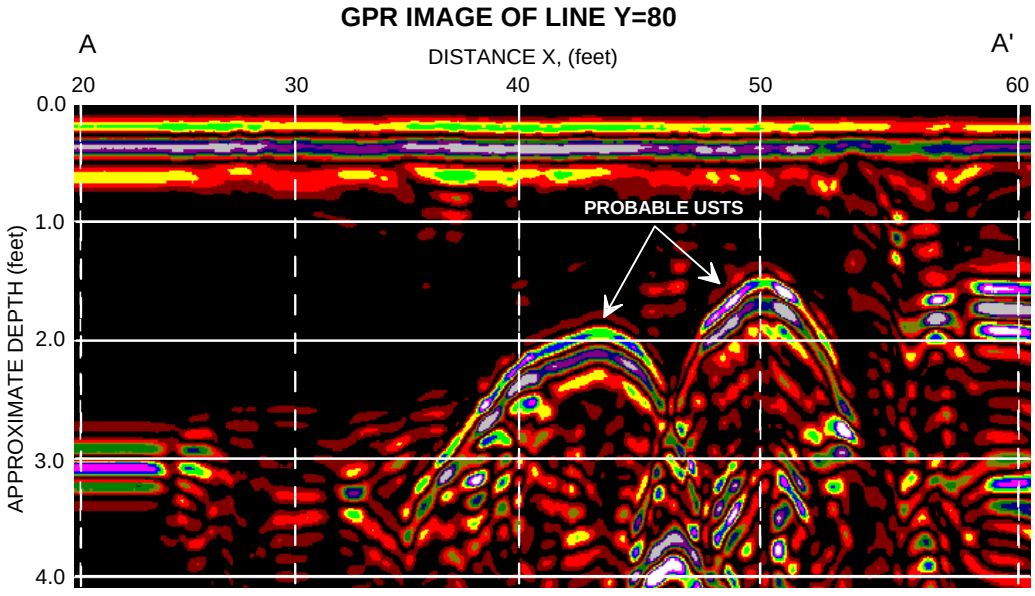
GRAPHIC SCALE IN FEET

EM61 DIFFERENTIAL RESULTS

FIGURE 8



The photograph shows the location of four probable USTs buried 1.75 to 2.0 feet below surface, as suggested by the geophysical results at Parcel 21.



The GPR image obtained along a portion of survey line Y=80, shows the anomalies that are probably in response to USTs near X=43 and X=50, and buried approximately 2.0 and 1.5 feet below surface, respectively. The location of this GPR image is shown with a solid purple line in the above photograph.

PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES		DATE	08/26/05	DRWN
SITE	PARCEL 21 - JAMES BRIGMAN PROPERTY		LAY		CHKD
CITY	MARSTON	STATE NORTH CAROLINA	DWG		
TITLE	GEOPHYSICAL RESULTS		JNO	2006-200	FIGURE

GRAPHIC SCALE IN FEET

PHOTO & GPR IMAGE
OF UST LOCATIONS

FIGURE 9

BOTTOM COIL RESULTS

THICK BRUSH
(AREA NOT SURVEYED)

GRASS SURFACE

EM61 ANOMALY PROBABLY IN RESPONSE TO MISC. DEBRIS

PROPANE TANK

GPR SURVEYS SUGGEST EM61 ANOMALY PROBABLY IN RESPONSE TO BUILDING

BUILDING

GPR SURVEYS SUGGEST EM61 ANOMALIES PROBABLY IN RESPONSE TO BUILDING

EM61 ANOMALY PROBABLY IN RESPONSE TO MISC. OBJECT

GRASS SURFACE

LINEAR EM61 ANOMALY PROBABLY IN RESPONSE TO BURIED CONDUIT OR UTILITY LINE

EM61 ANOMALY PROBABLY IN RESPONSE TO MISC. DEBRIS

GPR SURVEYS SUGGEST EM61 ANOMALY PROBABLY IN RESPONSE TO LARGE-DIAMETER CONDUCT(S) OR POSSIBLY, VERY SMALL UST BURIED APPROX. 1 FOOT BELOW SURFACE

EM61 ANOMALY PROBABLY IN RESPONSE TO MISC. OBJECT

US-1

DIFFERENTIAL RESULTS

THICK BRUSH
(AREA NOT SURVEYED)

GRASS SURFACE

EM61 ANOMALY PROBABLY IN RESPONSE TO MISC. DEBRIS

PROPANE TANK

GPR SURVEYS SUGGEST EM61 ANOMALY PROBABLY IN RESPONSE TO BUILDING

BUILDING

GPR SURVEYS SUGGEST EM61 ANOMALIES PROBABLY IN RESPONSE TO BUILDING

GRASS SURFACE

PURPLE RECTANGLE REPRESENTS PERIMETER OF GPR SURVEY AREA

GPR SURVEY LINE

LINEAR EM61 ANOMALY PROBABLY IN RESPONSE TO BURIED CONDUIT OR UTILITY LINE

GPR SURVEYS SUGGEST EM61 ANOMALY PROBABLY IN RESPONSE TO LARGE-DIAMETER CONDUCT(S) OR POSSIBLY, VERY SMALL UST BURIED APPROX. 1 FOOT BELOW SURFACE

EM61 ANOMALY PROBABLY IN RESPONSE TO MISC. OBJECT

US-1

Y-axis (feet)

X-axis (feet)

LEGEND

- UTILITY CABLE BOX
- GUY WIRE
- UTILITY POLE
- PROBABLE CONDUIT OR POSSIBLE UST

APPROXIMATE NORTH

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -90 -50 -60 -75 -100 -150 -200 -300 -400 -500 -750 -1000

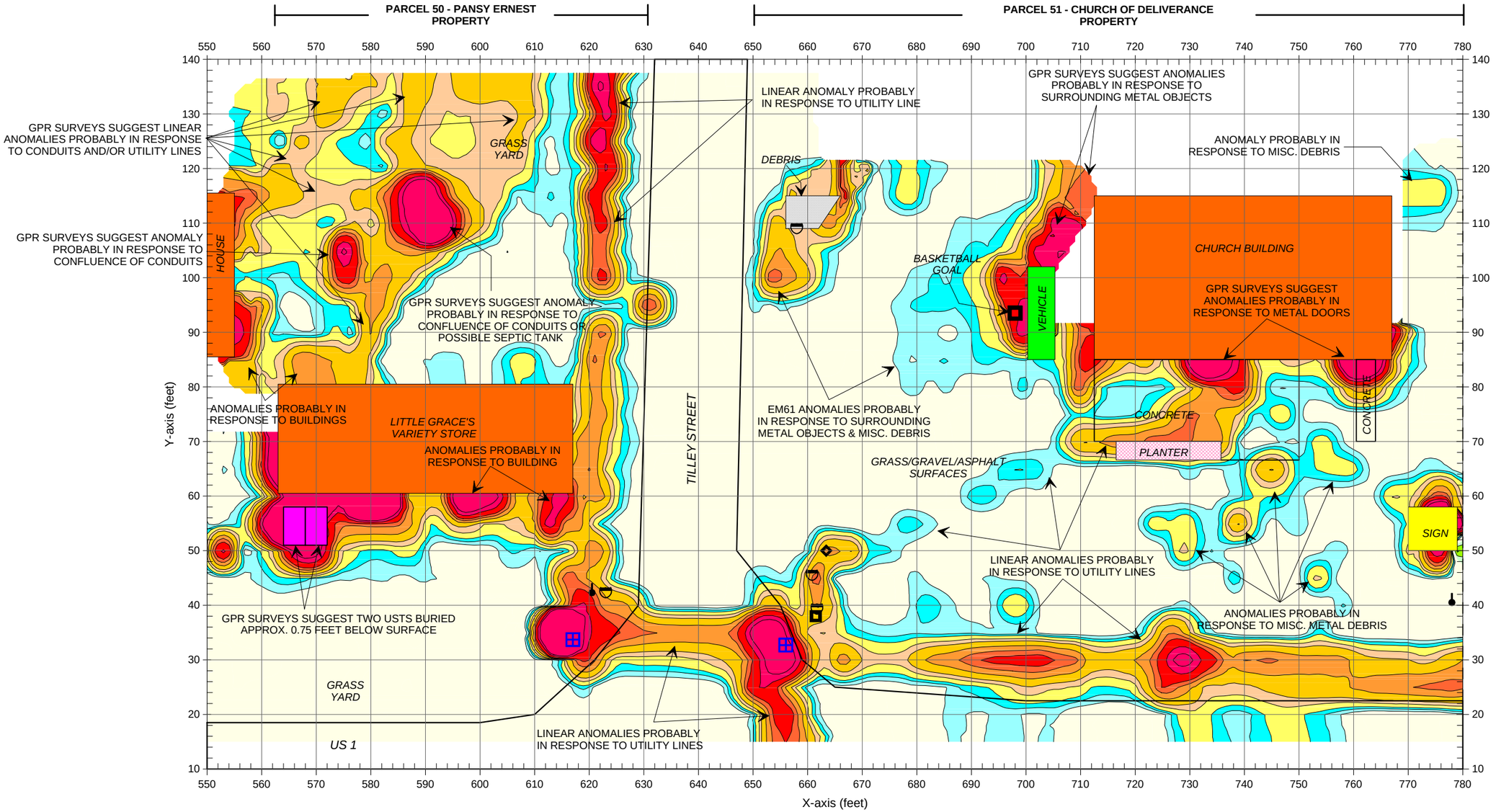
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES	DATE	08/17/06	DRWN	MJD
SITE	PARCEL 48 - ROY BARRY BOSTICK PROPERTY	LAY		CHKD	
CITY	HOFFMAN	STATE	NORTH CAROLINA	DWG	
TITLE	GEOPHYSICAL RESULTS	JAO.	2006-200	FIGURE	

GRAPHIC SCALE IN FEET

EM61 METAL DETECTION RESULTS

FIGURE 10



LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTHEAST-SOUTHWEST TRENDING LINES SPACED 5 FEET APART
- STORM SEWER GRATE
- PHONE CABLE BOX
- GUY WIRE
- UTILITY POLE
- TRAFFIC SIGN
- STORM SEWER GRATE
- VENT/FILL PORT
- METAL POLE
- PROBABLE UST AS SUGGESTED BY THE GEOPHYSICAL RESULTS

APPROXIMATE NORTH

EM61 BOTTOM COIL RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -40 -80 -75 100 150 200 300 400 500 750 1000

Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The EM metal detection data were collected on July 26, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on July 28, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

The majority of linear EM61 bottom coil anomalies shown above, are probably in response to buried utility lines or conduits. Negative EM anomalies (shaded in green) are probably in response to metallic surface objects. The geophysical investigation detected two probable USTs on Parcel 50.

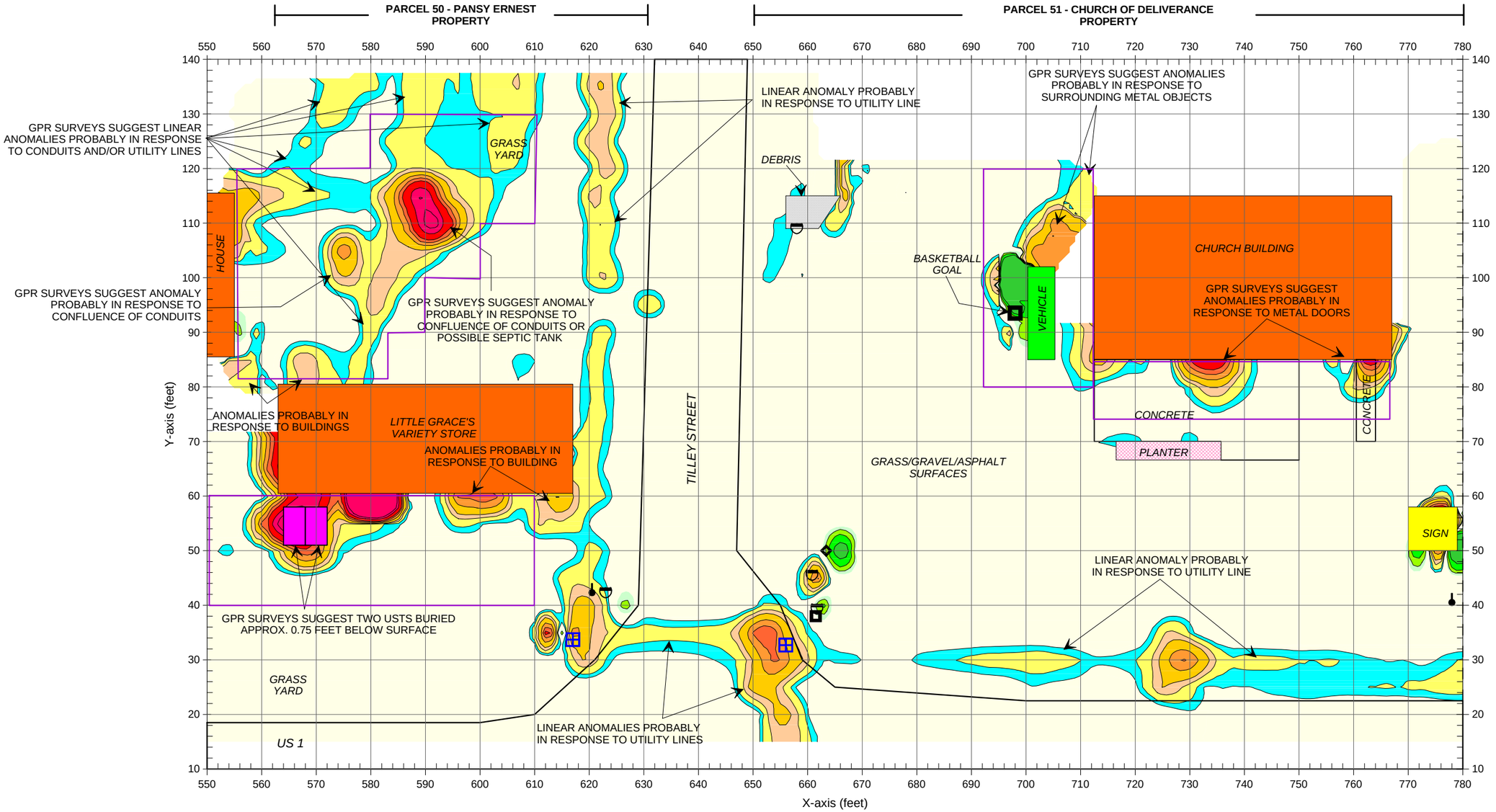
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES	DATE	08/01/06	DRWN	MJD
SITE	PARCELS 50 & 51 (ERNEST & CHURCH PROPERTIES)	LAY		CHKD	
CITY	HOFFMAN	STATE	NORTH CAROLINA	DWG	
TITLE	GEOPHYSICAL RESULTS	J-NO.	2006-200	FIGURE	

GRAPHIC SCALE IN FEET

EM61 BOTTOM COIL RESULTS

FIGURE 11



LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTHEAST-SOUTHWEST TRENDING LINES SPACED 5 FEET APART
- STORM SEWER GRATE
- PHONE CABLE BOX
- GUY WIRE
- UTILITY POLE
- TRAFFIC SIGN
- STORM SEWER GRATE
- VENT/FILL PORT
- METAL POLE
- GPR SURVEY AREA
- PROBABLE UST AS SUGGESTED BY THE GEOPHYSICAL RESULTS

APPROXIMATE NORTH

EM61 DIFFERENTIAL RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -40 60 75 100 150 200 300 400 500 750 1000

Note: The contour plot shows the differential results of the EM61 metal detection survey in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and USTs and ignores smaller miscellaneous, buried, metal debris. The EM metal detection data were collected on July 26, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on July 28, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

The majority of linear EM61 bottom coil anomalies shown above, are probably in response to buried utility lines or conduits. Negative EM anomalies (shaded in green) are probably in response to metallic surface objects. The geophysical investigation detected two probable USTs on Parcel 50.

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

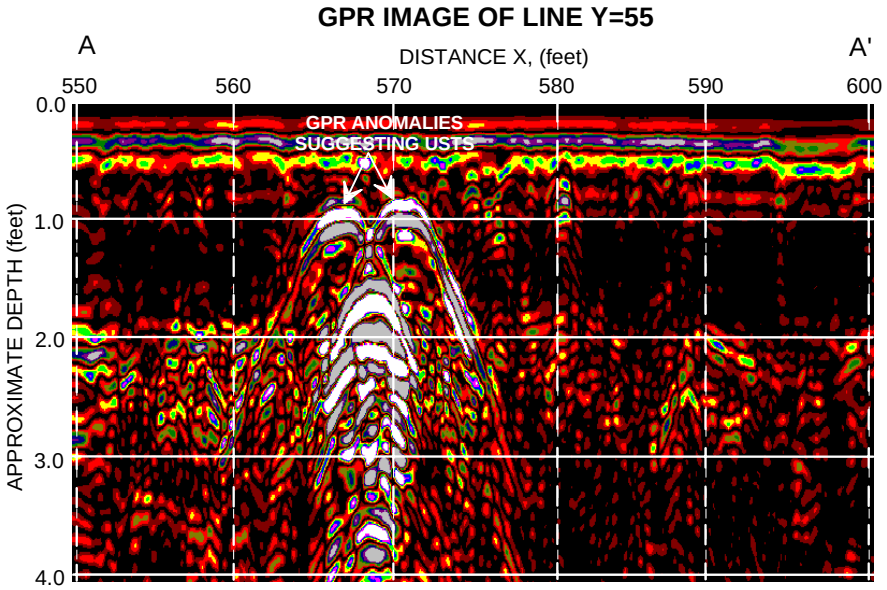
CLIENT	SOLUTIONS IES	DATE	08/01/06	DRWN	MJD
SITE	PARCELS 50 & 51 (ERNEST & CHURCH PROPERTIES)	LAY		CHKD	
CITY	HOFFMAN	STATE	NORTH CAROLINA	DWG	
TITLE	GEOPHYSICAL RESULTS	J-NO.	2006-200	FIGURE	

GRAPHIC SCALE IN FEET

EM61 DIFFERENTIAL RESULTS

FIGURE 12

The photograph shows the location of two probable USTs buried approx. 0.75 feet below surface, as suggested by the geophysical results at Parcel 50.



The GPR image obtained along survey line Y=55 shows the anomalies that are probably in response to USTs near X=566 and X=570, and buried approximately 0.75 feet below surface. The location of this GPR image is shown with a solid purple line in the above photograph.

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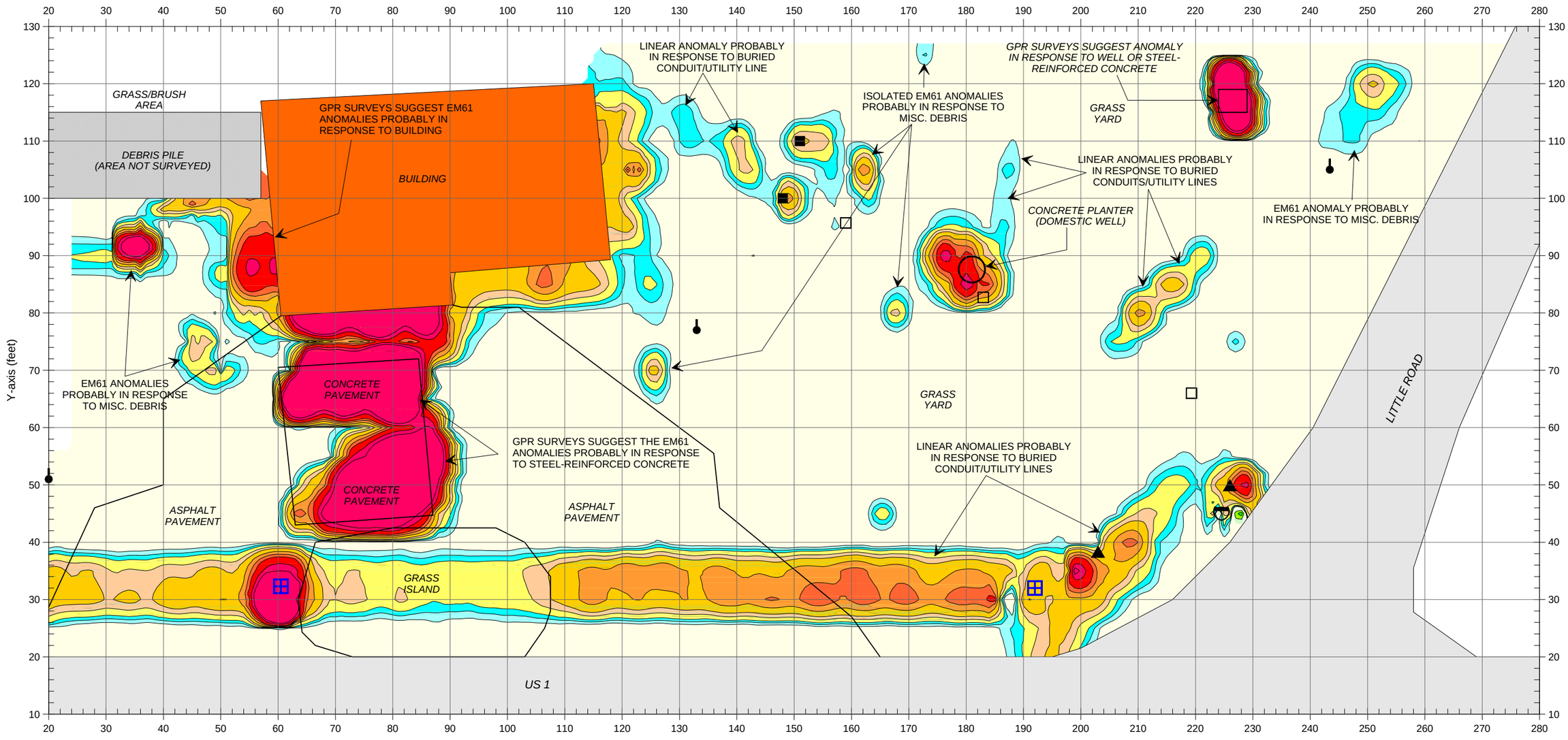
CLIENT	SOLUTIONS IES		DATE	08/26/05	DRWN
SITE	PARCEL 50 (PANSY ERNEST PROPERTY)		LAY		CHKD
CITY	MARSTON	STATE NORTH CAROLINA	DWG		
TITLE	GEOPHYSICAL RESULTS		J.NO.	2006-200	FIGURE

GRAPHIC SCALE IN FEET

PHOTO & GPR IMAGE
OF UST LOCATIONS

FIGURE 13



EM61 BOTTOM COIL RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -80 -45 -90 -75 -100 -150 -200 -300 -400 -500 -750 -1000

Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The EM metal detection data were collected on July 27, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on August 16, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

The geophysical results suggest that the proposed ROW area does not contain metallic USTs.

LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTHEAST-SOUTHWEST TRENDING LINES SPACED 5 FEET APART
- STORM SEWER GRATE
- CONCRETE BLOCK
- GUY WIRE
- UTILITY POLE
- TRAFFIC SIGN
- EDGE OF CULVERT
- CONCRETE ABUTMENT

APPROXIMATE NORTH

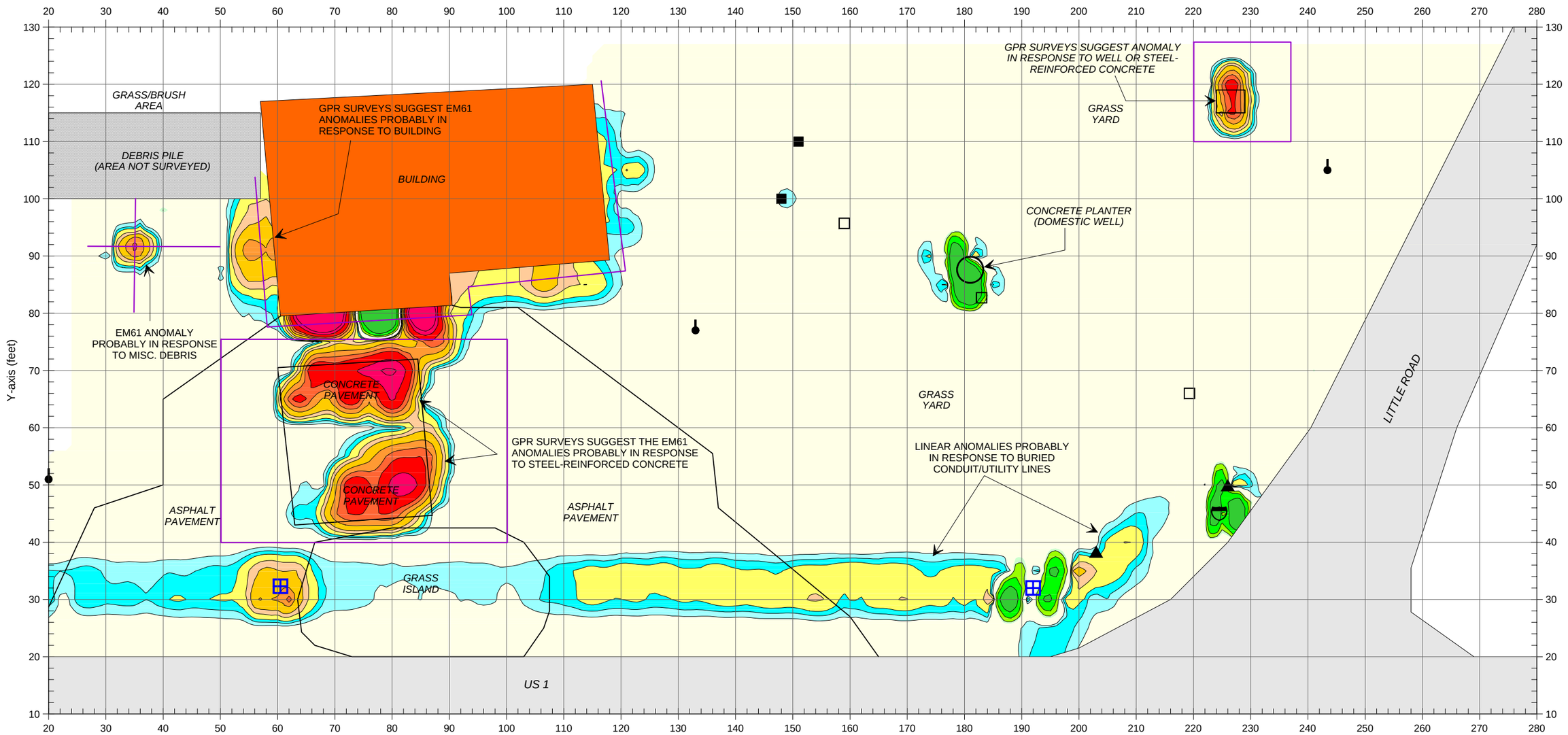
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES	DATE	08/01/06	DRWN	MJD
SITE	PARCEL 61 - COOPER & BROWN INC. PROPERTY	LAY		CHKD	
CITY	HOFFMAN	STATE	NORTH CAROLINA	DWG	
TITLE	GEOPHYSICAL RESULTS	J.NO.	2006-200	FIGURE	

GRAPHIC SCALE IN FEET

EM61 BOTTOM COIL RESULTS

FIGURE 14



LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTHEAST-SOUTHWEST TRENDING LINES SPACED 5 FEET APART
- STORM SEWER GRATE
- CONCRETE BLOCK
- GUY WIRE
- UTILITY POLE
- TRAFFIC SIGN
- EDGE OF CULVERT
- CONCRETE ABUTMENT
- GPR SURVEY LINE
- GPR SURVEY AREA

EM61 DIFFERENTIAL RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -50 -45 -50 75 100 150 200 300 400 500 750 1000

APPROXIMATE NORTH

Note: The contour plot shows the differential results of the EM61 metal detection survey in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and USTs and ignores smaller miscellaneous, buried, metal debris. The EM metal detection data were collected on July 27, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on August 16, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

The geophysical results suggest the proposed ROW area does not contain metallic USTs.

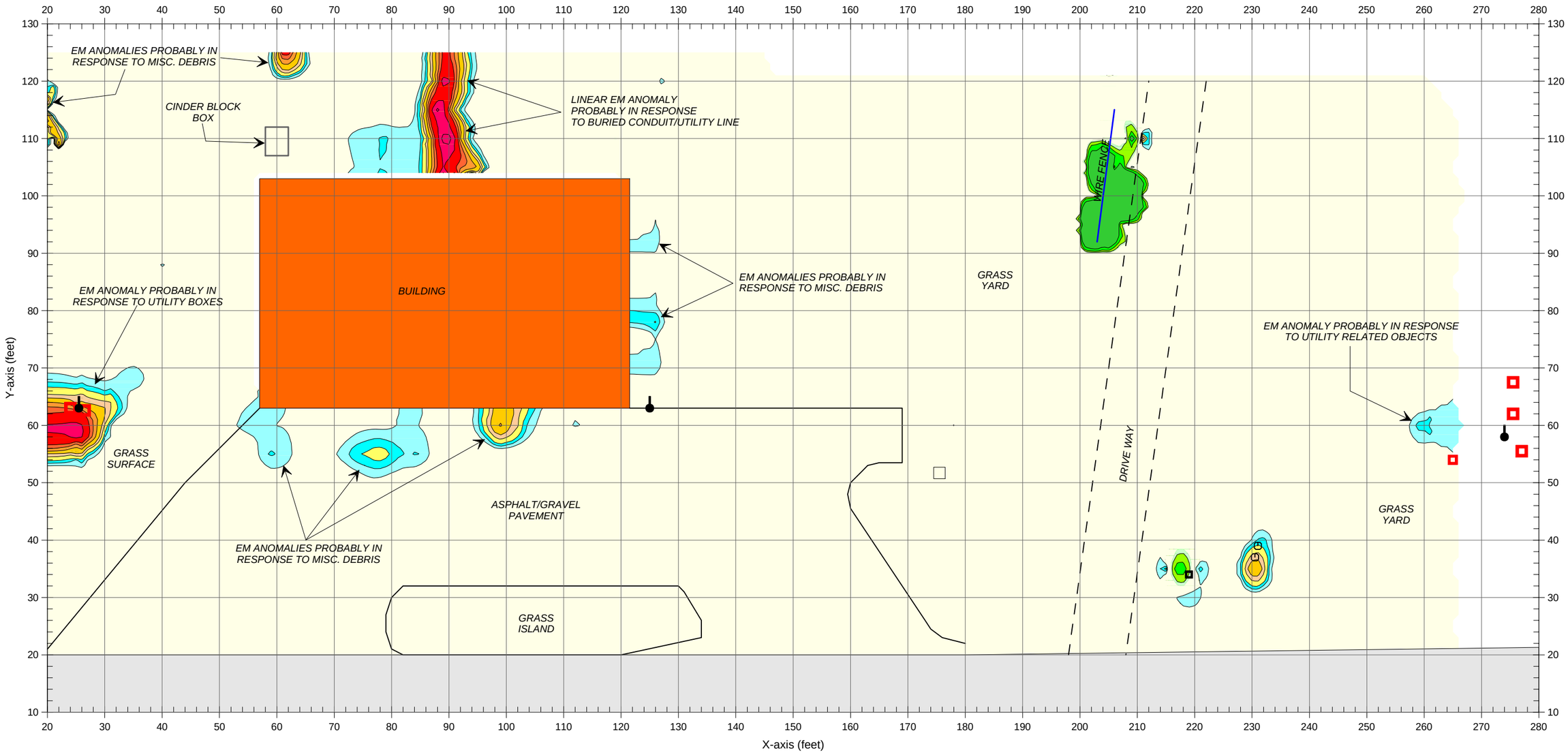
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES	DATE	08/01/06	DRWN	MJD
SITE	PARCEL 61 - COOPER & BROWN INC. PROPERTY	LAY		CHKD	
CITY	HOFFMAN	STATE	NORTH CAROLINA	DWG	
TITLE	GEOPHYSICAL RESULTS	J-NO.	2006-200	FIGURE	

GRAPHIC SCALE IN METERS

EM61 DIFFERENTIAL RESULTS

FIGURE 15



LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTHERLY-SOUTHERLY TRENDING LINES SPACED 5 FEET APART
- ELECTRICAL OR UTILITY BOX
- WATER METER OR VALVE COVER
- GUY WIRE
- UTILITY POLE
- TRAFFIC SIGN
- MAIL BOX

N W E S

APPROXIMATE NORTH

EM61 BOTTOM COIL RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -50 -45 50 75 100 150 200 300 400 500 750 1000

Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The EM metal detection data were collected on July 27 and August 14, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on July 28, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

The geophysical investigation suggests that the survey area does not contain metallic USTs.

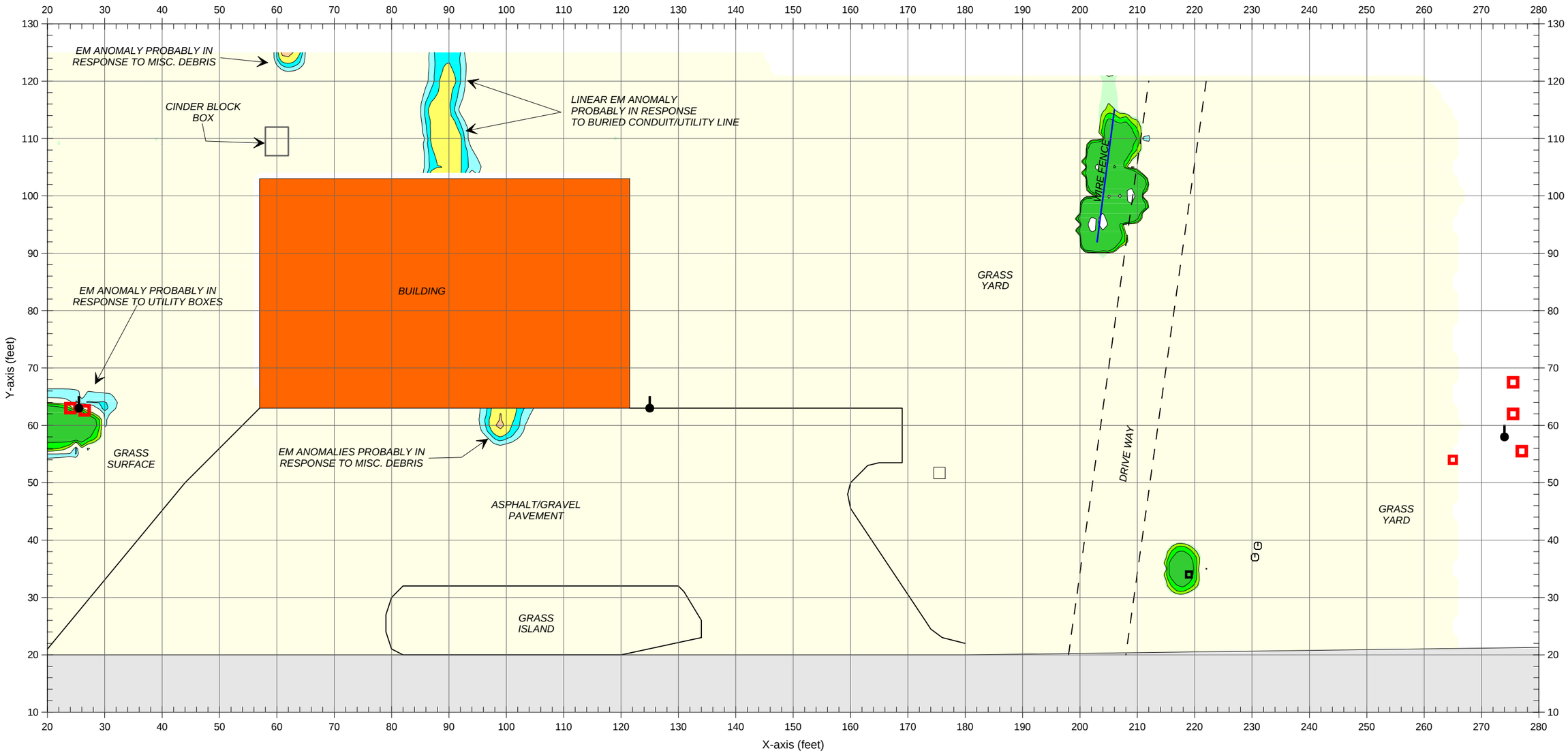
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES	DATE	08/17/06	DRWN	MJD
SITE	PARCEL 70 - DELIA LASSITER PROPERTY	LAY		CHKD	
CITY	HOFFMAN	STATE	NORTH CAROLINA	DWG	
TITLE	GEOPHYSICAL RESULTS	J-NO.	2006-200	FIGURE	

GRAPHIC SCALE IN FEET

EM61 BOTTOM COIL RESULTS

FIGURE 16



LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTHERLY-SOUTHERLY TRENDING LINES SPACED 5 FEET APART
- ELECTRICAL OR UTILITY BOX
- WATER METER OR VALVE COVER
- GUY WIRE
- UTILITY POLE
- TRAFFIC SIGN
- MAIL BOX

APPROXIMATE NORTH

EM61 DIFFERENTIAL RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -50 45 50 75 100 150 200 300 400 500 750 1000

Note: The contour plot shows the differential results of the EM61 metal detection survey in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and USTs and ignores smaller miscellaneous, buried, metal debris. The EM metal detection data were collected on July 27 and August 14, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on July 28, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

The geophysical investigation suggests that the survey area does not contain metallic USTs.

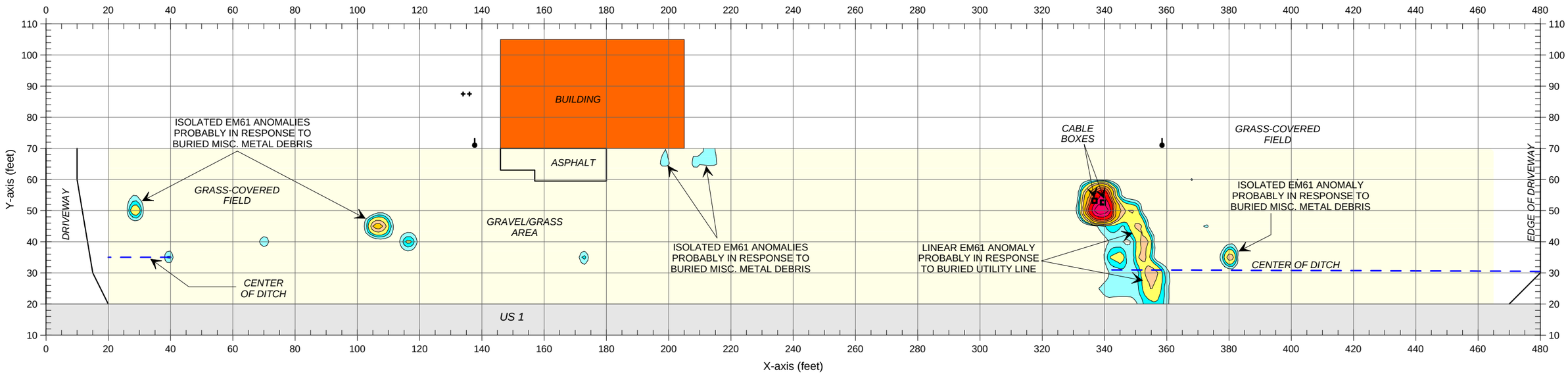
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES	DATE	08/17/06	DRWN	MJD
SITE	PARCEL 70 - DELIA LASSITER PROPERTY	LAY		CHKD	
CITY	HOFFMAN	STATE	NORTH CAROLINA	DWG	
TITLE	GEOPHYSICAL RESULTS	J-NO.	2006-200	FIGURE	

GRAPHIC SCALE IN FEET

EM61 DIFFERENTIAL RESULTS

FIGURE 17



LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTHEAST-SOUTHWEST TRENDING LINES SPACED 5 FEET APART
- PHONE CABLE BOX
- GUY WIRE
- UTILITY POLE

APPROXIMATE NORTH

EM61 BOTTOM COIL RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -80 -45 -50 -75 -100 -150 -200 -300 -400 -500 -750 -1000

Note: The contour plot shows the bottom coil (most sensitive) response of the EM61 instrument in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The EM metal detection data were collected on July 27, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on July 28, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

The geophysical investigation suggests that the survey area does not contain metallic USTs.

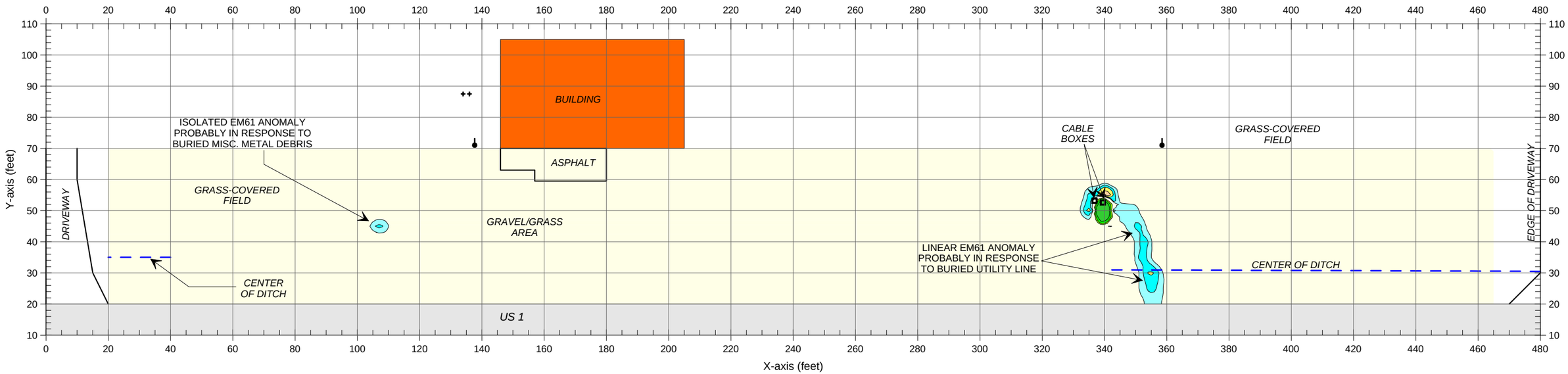
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES	DATE	08/01/06	DRWN	MJD
SITE	PARCEL 22 - IVEY LITTLE PROPERTY	LAY		CHKD	
CITY	HOFFMAN	STATE	NORTH CAROLINA	DWG	
TITLE	GEOPHYSICAL RESULTS	J-NO.	2006-200	FIGURE	

GRAPHIC SCALE IN FEET

EM61 BOTTOM COIL RESULTS

FIGURE 18



LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG NORTHEAST-SOUTHWEST TRENDING LINES SPACED 5 FEET APART
- PHONE CABLE BOX
- GUY WIRE
- UTILITY POLE

APPROXIMATE NORTH

EM61 DIFFERENTIAL RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -80 -45 -50 -75 -100 -150 -200 -300 -400 -500 -750 -1000

Note: The contour plot shows the differential results of the EM61 metal detection survey in millivolts (mV). The differential response focuses on larger, buried metallic objects such as drums and USTs and ignores smaller miscellaneous, buried, metal debris. The EM metal detection data were collected on July 27, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on July 28, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

The geophysical investigation suggests that the survey area does not contain metallic USTs.

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

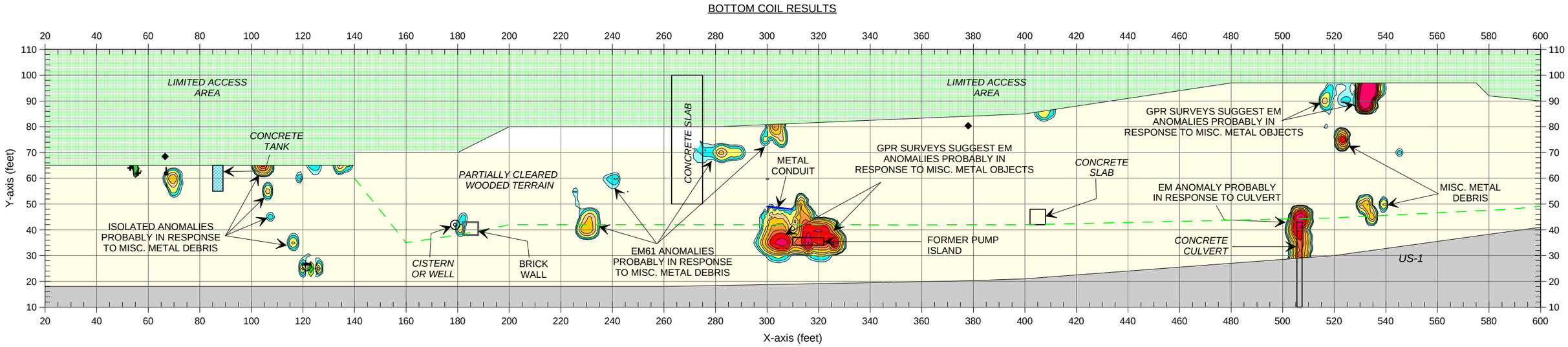
CLIENT	SOLUTIONS IES		DATE	08/01/06	DRWN MJD
SITE	PARCEL 22 - IVEY LITTLE PROPERTY		LAY		CHKD
CITY	HOFFMAN	STATE NORTH CAROLINA	DWG		
TITLE	GEOPHYSICAL RESULTS		J-NO.	2006-200	FIGURE

GRAPHIC SCALE IN METERS

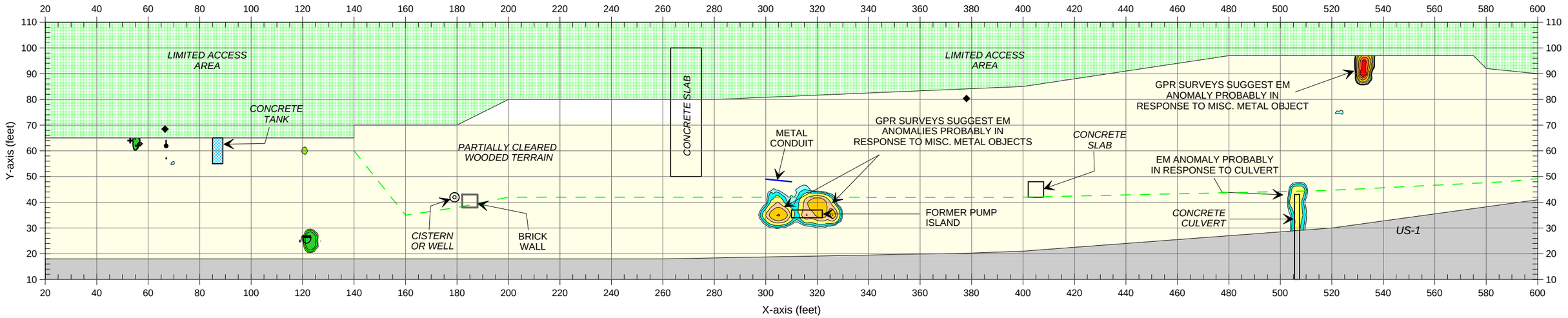
EM61 DIFFERENTIAL RESULTS

FIGURE 19

BOTTOM COIL RESULTS



DIFFERENTIAL RESULTS



Note: The contour plots show the bottom coil (most sensitive) response of the EM61 instrument and the differential response in millivolts (mV). The bottom coil response shows buried metallic objects regardless of size. The differential response focuses on larger, buried metallic objects such as drums and USTs and ignores smaller miscellaneous, buried, metal debris.The EM metal detection data were collected on August 14 & 28, 2006 using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were acquired on August 15 & 28, 2006 using a Geophysical Survey Systems SIR 2000 instrument with a 400 MHz antenna.

The geophysical investigation suggests that the survey area does not contain metallic USTs.

LEGEND

- EM61 SURVEY AREA: EM DATA ACQUIRED ALONG EASTERLY-WESTERLY TRENDING LINES SPACED 5 FEET APART
- RIGHT-OF-WAY MARKER
- GUY WIRE
- UTILITY POLE
- TRAFFIC SIGN

EM61 METAL DETECTION RESPONSE (MILLIVOLTS)

-5000 -400 -200 -100 -90 -55 -60 -75 -100 -150 -200 -300 -400 -500 -750 -1000

N W E S

APPROXIMATE NORTH

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT	SOLUTIONS IES	DATE	08/17/06	DRWN	MJD
SITE	PARCEL 68 - JAMES PUGH PROPERTY	LAY		CHKD	
CITY	HOFFMAN	STATE	NORTH CAROLINA	DWG	
TITLE	GEOPHYSICAL RESULTS	J.NO.	2006-200	FIGURE	

GRAPHIC SCALE IN FEET

EM61 METAL DETECTION RESULTS

FIGURE 20

APPENDIX C

BORING LOGS

Log of Soil Boring: P70-B1

Project: Richmond County PSA's
Solutions-IES Project No.: 3260.06A3.NDOT
Boring Number: 1
Client: NCDOT
WBS # 34438.1.1
Initial Water Level: NA
State Project # R-2502A
County: Richmond
Stabilized Water Level: NA
Drilling Method: Direct Push
Boring Date: 08/23/06
Cave In Depth: NA
Sampler Type: Macro Core
Site: Parcel 70
Logged By: K.B
Checked By: JD
Total Depth of Boring: 8' bgs

Depth ft. bgs	USCS Symbol	Description	Sample Interval	% Recovery	PID Field Screen ppm 250 500 750 / FID Field Screen ppm 250 500 750	Lab Sample Depth	Well Data
0		Ground Surface					
0		***FILL*** Moist, brown, fine silty sand (FILL)					
1		Asphalt		100	0		
2		***SM*** Moist, brown and orange, fine silty sand					
3		***SM*** Moist to damp, orange and tan, fine silty sand		100	0		
4							
5				100	0		
6							
7		***SM*** Damp, orange, fine silty sand		100	0		
8							
9							
10							
11							
12							
13							
14							
15							
16							

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Log of Soil Boring: P70-B2

Project: Richmond County PSA's | *Solutions-IES Project No.:* 3260.06A3.NDOT | *Boring Number:* 2

Client: NCDOT

WBS # 34438.1.1 | *Initial Water Level:* NA

State Project # R-2502A | *County:* Richmond | *Stabilized Water Level:* NA

Drilling Method: Direct Push | *Boring Date:* 08/23/06 | *Cave In Depth:* NA

Sampler Type: Macro Core | *Site:* Parcel 70

Logged By: K.B | *Checked By:* | *Total Depth of Boring:* 8' bgs

SUBSURFACE PROFILE			SAMPLE				
Depth ft. bgs	USCS Symbol	Description	Sample Interval	% Recovery	PID Field Screen ppm 250 500 750 / FID Field Screen ppm 250 500 750	Lab Sample Depth	Well Data
0		Ground Surface					
1	SM	Moist, tan and brown, fine silty sand		100	0		
2	SM	Moist to damp, orange and tan, fine silty sand					
3				100	0		
4							
5				100	0		
6	SM	Moist to damp, orange, fine silty sand					
7				100	0		
8							
9							
10							
11							
12							
13							
14							
15							
16							

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Log of Soil Boring: P70-B3

Project: Richmond County PSA's | *Solutions-IES Project No.:* 3260.06A3.NDOT | *Boring Number:* 3

Client: NCDOT

WBS # 34438.1.1 | *Initial Water Level:* NA

State Project # R-2502A | *County:* Richmond | *Stabilized Water Level:* NA

Drilling Method: Direct Push | *Boring Date:* 08/23/06 | *Cave In Depth:* NA

Sampler Type: Macro Core | *Site:* Parcel 70

Logged By: K.B | *Checked By:* | *Total Depth of Boring:* 8' bgs

Depth ft. bgs	USCS Symbol	Description	Sample Interval	% Recovery	PID Field Screen • ppm • 250 500 750 / FID Field Screen ■ ppm ■ 250 500 750	Lab Sample Depth	Well Data
0		Ground Surface					
0		***FILL*** Dry, tan and brown, fine silty sand (FILL)					
1		Asphalt		100	0		
2		***SM*** Moist, brown, fine silty sand					
3		***SM*** Moist, orange, fine silty sand		100	0		
4							
5				100	0		
6		***SM*** Moist to damp, orange, fine silty sand					
7				100	0		
8							
9							
10							
11							
12							
13							
14							
15							
16							

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Log of Soil Boring: P70-B4

Project: Richmond County PSA's
Solutions-IES Project No.: 3260.06A3.NDOT
Boring Number: 4
Client: NCDOT
WBS # 34438.1.1
Initial Water Level: NA
State Project # R-2502A
County: Richmond
Stabilized Water Level: NA
Drilling Method: Direct Push
Boring Date: 08/23/06
Cave In Depth: NA
Sampler Type: Macro Core
Site: Parcel 70
Logged By: K.B
Checked By:
Total Depth of Boring: 8' bgs

SUBSURFACE PROFILE			SAMPLE				
Depth ft. bgs	USCS Symbol	Description	Sample Interval	% Recovery	PID Field Screen • ppm 250 500 750 / FID Field Screen ■ ppm 250 500 750	Lab Sample Depth	Well Data
0		Ground Surface					
0–2	*SM*	Dry, brown, fine silty sand		100	0		
2–7	*SM*	Moist, orange and brown, fine silty sand		100	0		
7–8	*SM*	Moist, tan and orange, fine silty sand		100	0		

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Log of Soil Boring: P70-B5

Project: Richmond County PSA's
Solutions-IES Project No.: 3260.06A3.NDOT
Boring Number: 5
Client: NCDOT
WBS # 34438.1.1
Initial Water Level: NA
State Project # R-2502A
County: Richmond
Stabilized Water Level: NA
Drilling Method: Direct Push
Boring Date: 08/23/06
Cave In Depth: NA
Sampler Type: Macro Core
Site: Parcel 70
Logged By: K.B
Checked By:
Total Depth of Boring: 8' bgs

SUBSURFACE PROFILE			SAMPLE				
Depth ft. bgs	USCS Symbol	Description	Sample Interval	% Recovery	PID Field Screen ppm 250 500 750 / FID Field Screen ppm 250 500 750	Lab Sample Depth	Well Data
0		Ground Surface					
1	SM	Moist, brown, fine silty sand		100	1		
2							
3	SM	Moist to damp, brown and orange, fine silty sand		100	0		
4							
5				100	0		
6	SM	Moist, orange, fine silty sand					
7				100	0		
8							
9							
10							
11							
12							
13							
14							
15							
16							

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Log of Soil Boring: P70-B6

Project: Richmond County PSA's
Solutions-IES Project No.: 3260.06A3.NDOT
Boring Number: 6
Client: NCDOT
WBS # 34438.1.1
Initial Water Level: NA
State Project # R-2502A
County: Richmond
Stabilized Water Level: NA
Drilling Method: Direct Push
Boring Date: 08/23/06
Cave In Depth: NA
Sampler Type: Macro Core
Site: Parcel 70
Logged By: K.B
Checked By:
Total Depth of Boring: 8' bgs

Depth ft. bgs	USCS Symbol	Description	Sample Interval	% Recovery	PID Field Screen (ppm 250 500 750) / FID Field Screen (ppm 250 500 750)	Lab Sample Depth	Well Data
0		Ground Surface					
0–2	SM	Moist, brown, fine silty sand		100	0		
2–6	SM	Moist, brown and orange, fine silty sand		100	0		
4–6				100	0		
6–8	SM	Moist, orange, fine silty sand		100	0		
8–16							

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Log of Soil Boring: P70-B7

Project: Richmond County PSA's | *Solutions-IES Project No.:* 3260.06A3.NDOT | *Boring Number:* 7

Client: NCDOT

WBS # 34438.1.1 | *Initial Water Level:* NA

State Project # R-2502A | *County:* Richmond | *Stabilized Water Level:* NA

Drilling Method: Direct Push | *Boring Date:* 08/23/06 | *Cave In Depth:* NA

Sampler Type: Macro Core | *Site:* Parcel 70

Logged By: K.B | *Checked By:* | *Total Depth of Boring:* 8' bgs

Depth ft. bgs	USCS Symbol	Description	Sample Interval	% Recovery	PID Field Screen ppm 250 500 750 / FID Field Screen ppm 250 500 750	Lab Sample Depth	Well Data
0		Ground Surface					
1	SM	Moist, brown, fine silty sand		100	0		
2	SM	Moist, tan and orange, fine silty sand		100	0		
3							
4	SM	Moist, orange, fine silty sand		100	0		
5							
6				100	0		
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

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Log of Soil Boring: P70-B8

Project: Richmond County PSA's
Solutions-IES Project No.: 3260.06A3.NDOT
Boring Number: 8
Client: NCDOT
WBS # 34438.1.1
Initial Water Level: NA
State Project # R-2502A
County: Richmond
Stabilized Water Level: NA
Drilling Method: Direct Push
Boring Date: 08/23/06
Cave In Depth: NA
Sampler Type: Macro Core
Site: Parcel 70
Logged By: K.B
Checked By:
Total Depth of Boring: 8' bgs

Depth ft. bgs	USCS Symbol	Description	Sample Interval	% Recovery	PID Field Screen ppm 250 500 750 / FID Field Screen ppm 250 500 750	Lab Sample Depth	Well Data
0		Ground Surface					
0		Asphalt					
1	SM	Dry, orange, fine silty sand		100	0		
2	SM	Dry, tan and orange, fine silty sand					
3	SM	Moist, orange, fine silty sand		100	0		
4							
5				100	0		
6	SM	Moist, tan, fine silty sand					
7	SM	Moist, tan and orange, fine silty sand		100	0		
8							
9							
10							
11							
12							
13							
14							
15							
16							

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Log of Soil Boring: P70-B9

Project: Richmond County PSA's
Solutions-IES Project No.: 3260.06A3.NDOT
Boring Number: 9
Client: NCDOT
WBS # 34438.1.1
Initial Water Level: NA
State Project # R-2502A
County: Richmond
Stabilized Water Level: NA
Drilling Method: Direct Push
Boring Date: 08/23/06
Cave In Depth: NA
Sampler Type: Macro Core
Site: Parcel 70
Logged By: K.B
Checked By:
Total Depth of Boring: 8' bgs

SUBSURFACE PROFILE			SAMPLE				
Depth ft. bgs	USCS Symbol	Description	Sample Interval	% Recovery	PID Field Screen • ppm 250 500 750 / FID Field Screen ■ ppm 250 500 750	Lab Sample Depth	Well Data
0		Ground Surface					
0		Asphalt					
1	SM	Dry, orange, fine silty sand		100	0		
2	SM	Moist, tan and orange, fine silty sand					
3	SM	Moist, orange, fine silty sand		100	0		
4							
5	SM	Moist, tan and orange, fine silty sand		100	0		
6							
7	SM	Moist, orange, fine silty sand		100	0		
8							
9							
10							
11							
12							
13							
14							
15							
16							

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Raleigh, NC 27607
(919) 873-1060

Solutions-IES
Industrial & Environmental Services

Log of Soil Boring: P70-B10

Project: Richmond County PSA's
Solutions-IES Project No.: 3260.06A3.NDOT
Boring Number: 10
Client: NCDOT
WBS # 34438.1.1
Initial Water Level: NA
State Project # R-2502A
County: Richmond
Stabilized Water Level: NA
Drilling Method: Direct Push
Boring Date: 08/23/06
Cave In Depth: NA
Sampler Type: Macro Core
Site: Parcel 70
Logged By: K.B
Checked By:
Total Depth of Boring: 8' bgs

Depth ft. bgs	USCS Symbol	Description	Sample Interval	% Recovery	PID Field Screen ppm 250 500 750 / FID Field Screen ppm 250 500 750	Lab Sample Depth	Well Data
0		Ground Surface					
0		Asphalt					
1	SM	Dry, orange, fine silty sand		100	0		
2	SM	Moist, orange and brown, fine silty sand					
3				100	0		
4							
5				100	0		
6							
7	SM	Moist, orange, fine silty sand		100	0		
8							
9							
10							
11							
12							
13							
14							
15							
16							

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Log of Soil Boring: P70-B11

Project: Richmond County PSA's | *Solutions-IES Project No.:* 3260.06A3.NDOT | *Boring Number:* 11

Client: NCDOT

WBS # 34438.1.1 | *Initial Water Level:* NA

State Project # R-2502A | *County:* Richmond | *Stabilized Water Level:* NA

Drilling Method: Direct Push | *Boring Date:* 08/23/06 | *Cave In Depth:* NA

Sampler Type: Macro Core | *Site:* Parcel 70

Logged By: K.B | *Checked By:* | *Total Depth of Boring:* 8' bgs

Depth ft. bgs	USCS Symbol	Description	Sample Interval	% Recovery	PID Field Screen (ppm 250 500 750) / FID Field Screen (ppm 250 500 750)	Lab Sample Depth	Well Data
0		Ground Surface					
1	SP	Dry, tan, fine sand		100	0		
2	SM	Moist, orange, fine silty sand					
3	SM	Moist, tan, fine silty sand		100	0		
4	SM	Moist, orange, fine silty sand					
5				100	0		
6							
7	SM	Moist, tan and orange, fine silty sand		100	1		
8							
9							
10							
11							
12							
13							
14							
15							
16							

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APPENDIX D

GPS COORDINATES AT BORING LOCATIONS

Appendix D
GPS Coordinates of Boring Locations
Parcel 70, Delia Lassiter Property
Richmond County, North Carolina
WBS Element: 34438.1.1; NCDOT Project R-2502A

Boring Identification	Northing	Easting
P70-B1	35.03663546	-79.53655025
P70-B2	35.03663764	-79.53654455
P70-B3	35.03666162	-79.53648152
P70-B4	35.03675742	-79.53632696
P70-B5	35.03683504	-79.53614105
P70-B6	35.03707283	-79.53627499
P70-B7	35.03697527	-79.53640918
P70-B8	35.03689279	-79.53646953
P70-B9	35.03675742	-79.5365049
P70-B10	35.0367114	-79.53658269
P70-B11	35.03670202	-79.53660674

Notes:

Coordinates referenced to North American Datum, 1983.

APPENDIX E

LABORATORY ANALYTICAL REPORTS

PRISM
LABORATORIES,INC.

Case Narrative

Date: 08/30/06
Company: N. C. Department of Transportation
Contact: Sheri Knox
Address: c/o Solution - IES
1101 Nowell Road
Raleigh, NC 27607

Client Project ID: NCDOT Parcel 70
Prism COC Group No: G0806705
Collection Date(s): 08/23/06
Lab Submittal Date(s): 08/23/06

Client Project Name Or No: Richmond Co. WBS# 34438.1.1

This data package contains the analytical results for the project identified above and includes a Case Narrative, Laboratory Report and Quality Control Data totaling 13 pages. A chain-of-custody is also attached for the samples submitted to Prism for this project.

Data qualifiers are flagged individually on each sample. A key reference for the data qualifiers appears at the end of this case narrative. Quality control statements and/or sample specific remarks are included in the sample comments section of the laboratory report for each sample affected.

Semi Volatile Analysis

No Anomalies Reported

Volatile Analysis

No Anomalies Reported

Metals Analysis

N/A

Wet Lab and Micro Analysis

N/A

Please call if you have any questions relating to this analytical report.

Date Reviewed by: Paula A. Gilleland
Signature: Paula A. Gilleland
Review Date: 08/30/06

Project Manager: Angela D. Overcash
Signature:
Approval Date: 08/30/06

Data Qualifiers Key Reference:

B: Compound also detected in the method blank.
#: Result outside of the QC limits.
DO: Compound diluted out.
E: Estimated concentration, calibration range exceeded.
J: The analyte was positively identified but the value is estimated below the reporting limit.
H: Estimated concentration with a high bias.
L: Estimated concentration with a low bias.
M: A matrix effect is present.

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NC Certification No. 402
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NC Drinking Water Cert. No. 37735

Laboratory Report

08/30/06

N. C. Department of Transportation
Attn: Sheri Knox
c/o Solution - IES
1101 Nowell Road
Raleigh, NC 27607

Project Name: Richmond Co.
Project ID: NCDOT Parcel 70
Project No.: WBS# 34438.1.1
Sample Matrix: Soil

Client Sample ID: P70.B1 6-8
Prism Sample ID: 159227
COC Group: G0806705
Time Collected: 08/23/06 9:25
Time Submitted: 08/23/06 15:10

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Percent Solids Determination									
Percent Solids	**95.0**	%			1	SM2540 G	08/24/06 14:10	lbrown	
Diesel Range Organics (DRO) by GC-FID									
Diesel Range Organics (DRO)	**BRL**	mg/kg	7.4	1.8	1	8015B	08/27/06 11:22	jvogel	Q17323
Sample Preparation:			50.03	g /	2 mL	3550B	08/25/06 10:00	Jvogel	P16206

Surrogate	% Recovery	Control Limits
o-Terphenyl	107	48 - 130

Sample Weight Determination									
Weight 1	**5.54**	g			1	GRO	08/28/06 0:00	lbrown	
Weight 2	**5.16**	g			1	GRO	08/28/06 0:00	lbrown	
Gasoline Range Organics (GRO) by GC-FID									
Gasoline Range Organics (GR	**BRL**	mg/kg	7.4	2.9	50	8015B	08/28/06 22:26	grappaccioli	Q17340

Surrogate	% Recovery	Control Limits
aaa-TFT	111	55 - 129

Sample Comment(s):

BRL = Below Reporting Limit

J = Estimated value between the Reporting Limit and the MDL

The results in this report relate only to the samples submitted for analysis and meet state certification requirements other than NELAC certification except for those instances indicated in the case narrative and/or test comments.

All results are reported on a dry-weight basis

Angela D. Overcash, V.P. Laboratory Services

449 Springbrook Road - P.O. Box 240543 - Charlotte, NC 28224-0543
Phone: 704/529-6364 - Toll Free Number: 1-800/529-6364 - Fax: 704/525-0409

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Laboratory Report

08/30/06

N. C. Department of Transportation
Attn: Sheri Knox
c/o Solution - IES
1101 Nowell Road
Raleigh, NC 27607

Project Name: Richmond Co.
Project ID: NCDOT Parcel 70
Project No.: WBS# 34438.1.1
Sample Matrix: Soil

Client Sample ID: P70.B2 6-8
Prism Sample ID: 159228
COC Group: G0806705
Time Collected: 08/23/06 9:35
Time Submitted: 08/23/06 15:10

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Percent Solids Determination									
Percent Solids	**92.1**	%			1	SM2540 G	08/24/06 14:10	lbrown	
Diesel Range Organics (DRO) by GC-FID									
Diesel Range Organics (DRO)	**BRL**	mg/kg	7.6	1.8	1	8015B	08/25/06 20:10	jvogel	Q17323
Sample Preparation:			50.23	g /	2 mL	3550B	08/25/06 10:00	Jvogel	P16206

Surrogate	% Recovery	Control Limits
o-Terphenyl	113	48 - 130

Sample Weight Determination									
Weight 1	**5.33**	g			1	GRO	08/28/06 0:00	lbrown	
Weight 2	**5.31**	g			1	GRO	08/28/06 0:00	lbrown	
Gasoline Range Organics (GRO) by GC-FID									
Gasoline Range Organics (GR	**BRL**	mg/kg	7.6	3.0	50	8015B	08/28/06 23:04	grappaccioli	Q17340

Surrogate	% Recovery	Control Limits
aaa-TFT	97	55 - 129

Sample Comment(s):

BRL = Below Reporting Limit

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Laboratory Report

08/30/06

N. C. Department of Transportation
Attn: Sheri Knox
c/o Solution - IES
1101 Nowell Road
Raleigh, NC 27607

Project Name: Richmond Co.
Project ID: NCDOT Parcel 70
Project No.: WBS# 34438.1.1
Sample Matrix: Soil

Client Sample ID: P70.B3 6-8
Prism Sample ID: 159229
COC Group: G0806705
Time Collected: 08/23/06 9:45
Time Submitted: 08/23/06 15:10

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Percent Solids Determination									
Percent Solids	**96.4**	%			1	SM2540 G	08/24/06 14:10	lbrown	
Diesel Range Organics (DRO) by GC-FID									
Diesel Range Organics (DRO)	**BRL**	mg/kg	7.3	1.8	1	8015B	08/25/06 20:47	jvogel	Q17323
Sample Preparation:			49.81	g /	2 mL	3550B	08/25/06 10:00	Jvogel	P16206

Surrogate	% Recovery	Control Limits
o-Terphenyl	103	48 - 130

Sample Weight Determination									
Weight 1	**5.34**	g			1	GRO	08/28/06 0:00	lbrown	
Weight 2	**5.63**	g			1	GRO	08/28/06 0:00	lbrown	
Gasoline Range Organics (GRO) by GC-FID									
Gasoline Range Organics (GR	**BRL**	mg/kg	7.3	2.8	50	8015B	08/28/06 23:43	grappaccioli	Q17340

Surrogate	% Recovery	Control Limits
aaa-TFT	120	55 - 129

Sample Comment(s):

BRL = Below Reporting Limit
J = Estimated value between the Reporting Limit and the MDL
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Laboratory Report

08/30/06

N. C. Department of Transportation
Attn: Sheri Knox
c/o Solution - IES
1101 Nowell Road
Raleigh, NC 27607

Project Name: Richmond Co.
Project ID: NCDOT Parcel 70
Project No.: WBS# 34438.1.1
Sample Matrix: Soil

Client Sample ID: P70.B4 6-8
Prism Sample ID: 159230
COC Group: G0806705
Time Collected: 08/23/06 9:55
Time Submitted: 08/23/06 15:10

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Percent Solids Determination									
Percent Solids	**94.4**	%			1	SM2540 G	08/24/06 14:10	lbrown	
Diesel Range Organics (DRO) by GC-FID									
Diesel Range Organics (DRO)	**BRL**	mg/kg	7.4	1.8	1	8015B	08/25/06 21:24	jvogel	Q17323
Sample Preparation:			49.68 g	/	2 mL	3550B	08/25/06 10:00	Jvogel	P16206

Surrogate	% Recovery	Control Limits
o-Terphenyl	105	48 - 130

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Sample Weight Determination									
Weight 1	**5.41**	g			1	GRO	08/28/06 0:00	lbrown	
Weight 2	**5.60**	g			1	GRO	08/28/06 0:00	lbrown	
Gasoline Range Organics (GRO) by GC-FID									
Gasoline Range Organics (GR	**BRL**	mg/kg	7.4	2.9	50	8015B	08/29/06 0:21	grappaccioli	Q17340

Surrogate	% Recovery	Control Limits
aaa-TFT	115	55 - 129

Sample Comment(s):

BRL = Below Reporting Limit

J = Estimated value between the Reporting Limit and the MDL

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Laboratory Report

08/30/06

N. C. Department of Transportation
Attn: Sheri Knox
c/o Solution - IES
1101 Nowell Road
Raleigh, NC 27607

Project Name: Richmond Co.
Project ID: NCDOT Parcel 70
Project No.: WBS# 34438.1.1
Sample Matrix: Soil

Client Sample ID: P70.B5 0-2
Prism Sample ID: 159231
COC Group: G0806705
Time Collected: 08/23/06 10:15
Time Submitted: 08/23/06 15:10

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Percent Solids Determination									
Percent Solids	**94.3**	%			1	SM2540 G	08/24/06 14:10	lbrown	
Diesel Range Organics (DRO) by GC-FID									
Diesel Range Organics (DRO)	**9.1**	mg/kg	7.4	1.8	1	8015B	08/25/06 22:01	jvogel	Q17323
Sample Preparation:			49.88 g	/	2 mL	3550B	08/25/06 10:00	Jvogel	P16206

Surrogate	% Recovery	Control Limits
o-Terphenyl	108	48 - 130

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Sample Weight Determination									
Weight 1	**5.45**	g			1	GRO	08/28/06 0:00	lbrown	
Weight 2	**5.39**	g			1	GRO	08/28/06 0:00	lbrown	
Gasoline Range Organics (GRO) by GC-FID									
Gasoline Range Organics (GR	**BRL**	mg/kg	7.4	2.9	50	8015B	08/29/06 1:00	grappaccioli	Q17340

Surrogate	% Recovery	Control Limits
aaa-TFT	123	55 - 129

Sample Comment(s):

BRL = Below Reporting Limit

J = Estimated value between the Reporting Limit and the MDL

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All results are reported on a dry-weight basis

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NC Certification No. 402
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NC Drinking Water Cert. No. 37735

Laboratory Report

08/30/06

N. C. Department of Transportation
Attn: Sheri Knox
c/o Solution - IES
1101 Nowell Road
Raleigh, NC 27607

Project Name: Richmond Co.
Project ID: NCDOT Parcel 70
Project No.: WBS# 34438.1.1
Sample Matrix: Soil

Client Sample ID: P70.B6 6-8
Prism Sample ID: 159232
COC Group: G0806705
Time Collected: 08/23/06 10:20
Time Submitted: 08/23/06 15:10

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Percent Solids Determination									
Percent Solids	**93.1**	%			1	SM2540 G	08/24/06 14:10	lbrown	
Diesel Range Organics (DRO) by GC-FID									
Diesel Range Organics (DRO)	**BRL**	mg/kg	7.5	1.8	1	8015B	08/25/06 22:38	jvogel	Q17323
Sample Preparation:			50.4 g / 2 mL			3550B	08/25/06 10:00	Jvogel	P16206

Surrogate	% Recovery	Control Limits
o-Terphenyl	108	48 - 130

Sample Weight Determination									
Weight 1	**5.61**	g			1	GRO	08/28/06 0:00	lbrown	
Weight 2	**5.56**	g			1	GRO	08/28/06 0:00	lbrown	
Gasoline Range Organics (GRO) by GC-FID									
Gasoline Range Organics (GR	**BRL**	mg/kg	7.5	2.9	50	8015B	08/29/06 2:55	grappaccioli	Q17340

Surrogate	% Recovery	Control Limits
aaa-TFT	127	55 - 129

Sample Comment(s):

BRL = Below Reporting Limit

J = Estimated value between the Reporting Limit and the MDL

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NC Certification No. 402
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NC Drinking Water Cert. No. 37735

Laboratory Report

08/30/06

N. C. Department of Transportation
Attn: Sheri Knox
c/o Solution - IES
1101 Nowell Road
Raleigh, NC 27607

Project Name: Richmond Co.
Project ID: NCDOT Parcel 70
Project No.: WBS# 34438.1.1
Sample Matrix: Soil

Client Sample ID: P70.B7 6-8
Prism Sample ID: 159233
COC Group: G0806705
Time Collected: 08/23/06 10:25
Time Submitted: 08/23/06 15:10

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Percent Solids Determination									
Percent Solids	**82.6**	%			1	SM2540 G	08/24/06 14:10	lbrown	
Diesel Range Organics (DRO) by GC-FID									
Diesel Range Organics (DRO)	**BRL**	mg/kg	8.5	2.1	1	8015B	08/25/06 23:15	jvogel	Q17323
Sample Preparation:			51.51	g /	2 mL	3550B	08/25/06 10:00	Jvogel	P16206

Surrogate	% Recovery	Control Limits
o-Terphenyl	101	48 - 130

Sample Weight Determination									
Weight 1	**5.37**	g			1	GRO	08/28/06 0:00	lbrown	
Weight 2	**5.81**	g			1	GRO	08/28/06 0:00	lbrown	
Gasoline Range Organics (GRO) by GC-FID									
Gasoline Range Organics (GR	**BRL**	mg/kg	8.5	3.3	50	8015B	08/28/06 20:31	grappaccioli	Q17340

Surrogate	% Recovery	Control Limits
aaa-TFT	105	55 - 129

Sample Comment(s):

BRL = Below Reporting Limit

J = Estimated value between the Reporting Limit and the MDL

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All results are reported on a dry-weight basis

Angela D. Overcash, V.P. Laboratory Services

PRISM LABORATORIES, INC.
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NC Certification No. 402
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Laboratory Report

08/30/06

N. C. Department of Transportation
Attn: Sheri Knox
c/o Solution - IES
1101 Nowell Road
Raleigh, NC 27607

Project Name: Richmond Co.
Project ID: NCDOT Parcel 70
Project No.: WBS# 34438.1.1
Sample Matrix: Soil

Client Sample ID: P70.B8 6-8
Prism Sample ID: 159234
COC Group: G0806705
Time Collected: 08/23/06 10:30
Time Submitted: 08/23/06 15:10

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Percent Solids Determination									
Percent Solids	**92.5**	%			1	SM2540 G	08/24/06 14:10	lbrown	
Diesel Range Organics (DRO) by GC-FID									
Diesel Range Organics (DRO)	**BRL**	mg/kg	7.6	1.8	1	8015B	08/26/06 0:29	jvogel	Q17323
Sample Preparation:			50.35	g /	2 mL	3550B	08/25/06 10:00	Jvogel	P16206

Surrogate	% Recovery	Control Limits
o-Terphenyl	107	48 - 130

Sample Weight Determination									
Weight 1	**5.08**	g			1	GRO	08/28/06 0:00	lbrown	
Weight 2	**5.22**	g			1	GRO	08/28/06 0:00	lbrown	
Gasoline Range Organics (GRO) by GC-FID									
Gasoline Range Organics (GR	**BRL**	mg/kg	7.6	2.9	50	8015B	08/29/06 3:33	grappaccioli	Q17340

Surrogate	% Recovery	Control Limits
aaa-TFT	113	55 - 129

Sample Comment(s):

BRL = Below Reporting Limit

J = Estimated value between the Reporting Limit and the MDL

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Angela D. Overcash, V.P. Laboratory Services

449 Springbrook Road - P.O. Box 240543 - Charlotte, NC 28224-0543

Phone: 704/529-6364 - Toll Free Number: 1-800/529-6364 - Fax: 704/525-0409

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Laboratory Report

08/30/06

N. C. Department of Transportation
Attn: Sheri Knox
c/o Solution - IES
1101 Nowell Road
Raleigh, NC 27607

Project Name: Richmond Co.
Project ID: NCDOT Parcel 70
Project No.: WBS# 34438.1.1
Sample Matrix: Soil

Client Sample ID: P70.B9 6-8
Prism Sample ID: 159235
COC Group: G0806705
Time Collected: 08/23/06 10:40
Time Submitted: 08/23/06 15:10

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Percent Solids Determination									
Percent Solids	**93.9**	%			1	SM2540 G	08/28/06 16:30	lthao	
Diesel Range Organics (DRO) by GC-FID									
Diesel Range Organics (DRO)	**BRL**	mg/kg	7.5	1.8	1	8015B	08/26/06 1:06	jvogel	Q17323
Sample Preparation:			50.04 g /		2 mL	3550B	08/25/06 10:00	Jvogel	P16206

Surrogate	% Recovery	Control Limits
o-Terphenyl	105	48 - 130

Sample Weight Determination									
Weight 1	**5.45**	g			1	GRO	08/28/06 0:00	lbrown	
Weight 2	**5.36**	g			1	GRO	08/28/06 0:00	lbrown	
Gasoline Range Organics (GRO) by GC-FID									
Gasoline Range Organics (GR	**BRL**	mg/kg	7.5	2.9	50	8015B	08/29/06 4:12	grappaccioli	Q17340

Surrogate	% Recovery	Control Limits
aaa-TFT	109	55 - 129

Sample Comment(s):

BRL = Below Reporting Limit

J = Estimated value between the Reporting Limit and the MDL

The results in this report relate only to the samples submitted for analysis and meet state certification requirements other than NELAC certification except for those instances indicated in the case narrative and/or test comments.

All results are reported on a dry-weight basis

Angela D. Overcash, V.P. Laboratory Services

449 Springbrook Road - P.O. Box 240543 - Charlotte, NC 28224-0543

Phone: 704/529-6364 - Toll Free Number: 1-800/529-6364 - Fax: 704/525-0409

PRISM LABORATORIES, INC.
Full Service Analytical & Environmental Solutions

NC Certification No. 402
SC Certification No. 99012
NC Drinking Water Cert. No. 37735

Laboratory Report

08/30/06

N. C. Department of Transportation
Attn: Sheri Knox
c/o Solution - IES
1101 Nowell Road
Raleigh, NC 27607

Project Name: Richmond Co.
Project ID: NCDOT Parcel 70
Project No.: WBS# 34438.1.1
Sample Matrix: Soil

Client Sample ID: P70.B10 2-4
Prism Sample ID: 159236
COC Group: G0806705
Time Collected: 08/23/06 10:50
Time Submitted: 08/23/06 15:10

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Percent Solids Determination									
Percent Solids	**94.8**	%			1	SM2540 G	08/28/06 16:30	lthao	
Diesel Range Organics (DRO) by GC-FID									
Diesel Range Organics (DRO)	**BRL**	mg/kg	7.4	1.8	1	8015B	08/26/06 1:43	jvogel	Q17323
Sample Preparation:			49.84 g	/	2 mL	3550B	08/25/06 10:00	Jvogel	P16206

Surrogate	% Recovery	Control Limits
o-Terphenyl	113	48 - 130

Sample Weight Determination									
Weight 1	**5.15**	g			1	GRO	08/28/06 0:00	lbrown	
Weight 2	**5.28**	g			1	GRO	08/28/06 0:00	lbrown	
Gasoline Range Organics (GRO) by GC-FID									
Gasoline Range Organics (GR	**BRL**	mg/kg	7.4	2.9	50	8015B	08/29/06 4:50	grappaccioli	Q17340

Surrogate	% Recovery	Control Limits
aaa-TFT	117	55 - 129

Sample Comment(s):

BRL = Below Reporting Limit

J = Estimated value between the Reporting Limit and the MDL

The results in this report relate only to the samples submitted for analysis and meet state certification requirements other than NELAC certification except for those instances indicated in the case narrative and/or test comments.

All results are reported on a dry-weight basis

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PRISM LABORATORIES, INC.
Full Service Analytical & Environmental Solutions

NC Certification No. 402
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NC Drinking Water Cert. No. 37735

Laboratory Report

08/30/06

N. C. Department of Transportation
Attn: Sheri Knox
c/o Solution - IES
1101 Nowell Road
Raleigh, NC 27607

Project Name: Richmond Co.
Project ID: NCDOT Parcel 70
Project No.: WBS# 34438.1.1
Sample Matrix: Soil

Client Sample ID: P70.B11 6-8
Prism Sample ID: 159237
COC Group: G0806705
Time Collected: 08/23/06 10:50
Time Submitted: 08/23/06 15:10

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Percent Solids Determination									
Percent Solids	**97.7**	%			1	SM2540 G	08/28/06 16:30	lthao	
Diesel Range Organics (DRO) by GC-FID									
Diesel Range Organics (DRO)	**BRL**	mg/kg	7.2	1.7	1	8015B	08/26/06 2:21	jvogel	Q17323
Sample Preparation:			49.9	g /	2 mL	3550B	08/25/06 10:00	Jvogel	P16206

Surrogate	% Recovery	Control Limits
o-Terphenyl	111	48 - 130

Sample Weight Determination									
Weight 1	**5.28**	g			1	GRO	08/28/06 0:00	lbrown	
Weight 2	**5.29**	g			1	GRO	08/28/06 0:00	lbrown	
Gasoline Range Organics (GRO) by GC-FID									
Gasoline Range Organics (GR	**BRL**	mg/kg	7.2	2.8	50	8015B	08/29/06 5:29	grappaccioli	Q17340

Surrogate	% Recovery	Control Limits
aaa-TFT	108	55 - 129

Sample Comment(s):

BRL = Below Reporting Limit

J = Estimated value between the Reporting Limit and the MDL

The results in this report relate only to the samples submitted for analysis and meet state certification requirements other than NELAC certification except for those instances indicated in the case narrative and/or test comments.

All results are reported on a dry-weight basis

Angela D. Overcash, V.P. Laboratory Services

449 Springbrook Road - P.O. Box 240543 - Charlotte, NC 28224-0543

Phone: 704/529-6364 - Toll Free Number: 1-800/529-6364 - Fax: 704/525-0409

PRISM LABORATORIES, INC
Full Service Analytical & Environmental Solutions

NC Certification No. 402
SC Certification No. 99012
NC Drinking Water Cert. No. 37735

Level II QC Report

8/30/06

N. C. Department of Transportation
Attn: Sheri Knox
c/o Solution - IES
1101 Nowell Road
Raleigh, NC 27607

Project Name: Richmond Co.
Project ID: NCDOT Parcel 70
Project No.: WBS# 34438.1.1

COC Group Number: G0806705
Date/Time Submitted: 8/23/06 15:10

Diesel Range Organics (DRO) by GC-FID, method 8015B

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Diesel Range Organics (DRO)	ND	7	<3.5	mg/kg	Q17323

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Diesel Range Organics (DRO)	40.41	40	mg/kg	101	53 - 118	Q17323

Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
159234	Diesel Range Organics (DRO)	35.86	40	mg/kg	90	52 - 119	Q17323

Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
159234	Diesel Range Organics (DRO)	31.83	40	mg/kg	80	52 - 119	12	0 - 25	Q17323

Gasoline Range Organics (GRO) by GC-FID, method 8015B

Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Gasoline Range Organics (GRO)	ND	7	<3.5	mg/kg	Q17340

Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Gasoline Range Organics (GRO)	48.4	50	mg/kg	97	67 - 116	Q17340

Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
159233	Gasoline Range Organics (GRO)	50.4	50	mg/kg	101	57 - 113	Q17340

Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
159233	Gasoline Range Organics (GRO)	50.65	50	mg/kg	101	57 - 113	0	0 - 23	Q17340

#-See Case Narrative

449 Springbrook Road - P.O. Box 240543 - Charlotte, NC 28224-0543
Phone: 704/529-6364 - Toll Free Number: 1-800/529-6364 - Fax: 704/525-0409

CHAIN OF CUSTODY RECORD

PRISM LABORATORIES, INC.

Full Service Analytical & Environmental Solutions

449 Springbrook Road • P.O. Box 240543 • Charlotte, NC 28224-0543
Phone: 704/529-6364 • Fax: 704/525-0409

PAGE 1 OF 2 QUOTE # TO ENSURE PROPER BILLING: _____

Project Name: NCDOT - PARKER 70 - RICHMOND CO
Short Hold Analysis: (Yes) (No) UST Project: (Yes) (No)
*Please ATTACH any project specific reporting (QC LEVEL I II III IV) provisions and/or QC Requirements
Invoice To: NCDOT - WBS# 34438.1.1
Address: STATE PROJECT U-2502 A & B

Client Company Name: SOLUTIONS-IES
Report To/Contact Name: SHERI KNOX
Reporting Address: 1101 NOWELL RD. RALEIGH, NC 27607
Phone: 919 873 1060 Fax (Yes) (No): 919 873 1074
Email (Yes) (No) Email Address SKNOX@SOLUTIONS-IES
EDD Type: PDF____ Excel____ Other____
Site Location Name: NCDOT PARKER 70
Site Location Physical Address: RICHMOND CO, NC

Purchase Order No./Billing Reference 3260.06A3.NDOT
Requested Due Date ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days ☐ 5 Days (Rush Work Must Be Pre-Approved)
"Working Days" ☐ 6-9 Days ☐ Standard 10 days
Samples received after 15:00 will be processed next business day.
Turnaround time is based on business days, excluding weekends and holidays.
(SEE REVERSE FOR TERMS & CONDITIONS REGARDING SERVICES RENDERED BY PRISM LABORATORIES, INC. TO CLIENT)

LAB USE ONLY

	YES	NO	N/A
Samples INTACT upon arrival?	✓		
Received ON WET ICE? Temp 3.2	✓		
PROPER PRESERVATIVES indicated?	✓		
Received WITHIN HOLDING TIMES?	✓		
CUSTODY SEALS INTACT?			✓
VOLATILES rec'd W/OUT HEADSPACE?	✓		✓
PROPER CONTAINERS used?	✓		

TO BE FILLED IN BY CLIENT/SAMPLING PERSONNEL
Certification: NELAC____ USACE____ FL____ NC ✓
SC____ OTHER____ N/A____
Water Chlorinated: YES____ NO____
Sample Iced Upon Collection: YES____ NO____

CLIENT SAMPLE DESCRIPTION	DATE COLLECTED	TIME COLLECTED MILITARY HOURS	MATRIX (SOIL, WATER OR SLUDGE)	SAMPLE CONTAINER *TYPE SEE BELOW	SAMPLE CONTAINER NO.	SAMPLE CONTAINER SIZE	PRESERVATIVES	ANALYSES REQUESTED GRO	ANALYSES REQUESTED DRO	REMARKS	PRISM LAB ID NO.
P70.B1.6.8	8/23/06	0925	SOIL	G	3	40ml 802	METHANOL NONE	X	X		159227
P70.B2.6.8	8/23/06	0935		G	3			X	X		159228
P70.B3.6.8	8/23/06	0945		G	3			X	X		159229
P70.B4.6.8	8/23/06	0955		G	3			X	X		159230
P70.B5.0.2	8/23/06	1015		G	3			X	X		159231
P70.B6.6.8	8/23/06	1020		G	3			X	X		159232
P70.B7.6.8	8/23/06	1025		G	3			X	X		159233
P70.B8.6.8	8/23/06	1030		G	3			X	X		159234
P70.B9.6.8	8/23/06	1040		G	3			X	X		159235
P70.B10.2.4	8/23/06	1050		G	3			X	X		159236

Sampler's Signature: _____ Sampled By (Print Name) KEVIN BUCHANAN Affiliation SOLUTIONS-IES

PRESS DOWN FIRMLY - 3 COPIES

Upon relinquishing, this Chain of Custody is your authorization for Prism to proceed with the analyses as requested above. Any changes must be submitted in writing to the Prism Project Manager. There will be charges for any changes after analyses have been initialized.

		Date	Military/Hours
Relinquished By: (Signature)	Received By: (Signature)	8/24/06	1515
Relinquished By: (Signature)	Received By: (Signature)	Date	
Relinquished By: (Signature)	Received For Prism Laboratories By:	8/24/06	1510

Method of Shipment: NOTE: ALL SAMPLE COOLERS SHOULD BE TAPED SHUT WITH CUSTODY SEALS FOR TRANSPORTATION TO THE LABORATORY. SAMPLES ARE NOT ACCEPTED AND VERIFIED AGAINST COC UNTIL RECEIVED AT THE LABORATORY.

☐ Fed Ex ☐ UPS ☐ Hand-delivered ☐ Prism Field Service ☐ Other _____

COC Group No. G9806705

Additional Comments:

PRISM USE ONLY

Site Arrival Time:	
Site Departure Time:	
Field Tech Fee:	
Mileage:	

NPDES:	UST:	GROUNDWATER:	DRINKING WATER:	SOLID WASTE:	RCRA:	CERCLA	LANDFILL	OTHER:
☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____	☐ NC ☐ SC ☐ _____

*CONTAINER TYPE CODES: A = Amber C = Clear G = Glass P = Plastic TL = Teflon-Lined Cap VOA = Volatile Organics Analysis (Zero Head Space)

SEE REVERSE FOR TERMS & CONDITIONS

ORIGINAL

CHAIN OF CUSTODY RECORD

PRISM LABORATORIES, INC.

Full Service Analytical & Environmental Solutions

449 Springbrook Road • P.O. Box 240543 • Charlotte, NC 28224-0543
Phone: 704/529-6364 • Fax: 704/525-0409

PAGE 2 OF 2 QUOTE # TO ENSURE PROPER BILLING: _____

Project Name: NCDOT - PARCEL 70 - RICHMOND CO.
Short Hold Analysis: (Yes) (No) UST Project: (Yes) (No)
*Please ATTACH any project specific reporting (QC LEVEL I II III IV) provisions and/or QC Requirements
Invoice To: NCDOT WBS # 34438.1.1
Address: STATE PROJECT # U-2502 A&B

Client Company Name: SOLUTIONS - IES
Report To/Contact Name: SHERI KNOX
Reporting Address: 1101 NOWELL ROAD
RALEIGH, NC 27607
Phone: 919 873 1066 Fax (Yes) (No): 919 873 1074
Email (Yes) (No) Email Address SKNOX@SOLUTIONS-IES
EDD Type: PDF ___ Excel ___ Other ___
Site Location Name: NCDOT PARCEL 70
Site Location Physical Address: Richmond Co. NC

Purchase Order No./Billing Reference 3260.06A3. NDOT
Requested Due Date ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days (5 Days)
"Working Days" ☐ 6-9 Days ☐ Standard 10 days ☐ Rush Work Must Be Pre-Approved
Samples received after 15:00 will be processed next business day.
Turnaround time is based on business days, excluding weekends and holidays.
(SEE REVERSE FOR TERMS & CONDITIONS REGARDING SERVICES RENDERED BY PRISM LABORATORIES, INC. TO CLIENT)

LAB USE ONLY

	YES	NO	N/A
Samples INTACT upon arrival?	✓		
Received ON WET ICE? Temp 3.2	✓		
PROPER PRESERVATIVES indicated?	✓		
Received WITHIN HOLDING TIMES?	✓		
CUSTODY SEALS INTACT?			✓
VOLATILES rec'd W/OUT HEADSPACE?			✓
PROPER CONTAINERS used?	✓		

TO BE FILLED IN BY CLIENT/SAMPLING PERSONNEL

Certification: NELAC ___ USACE ___ FL ___ NC ✓
SC ___ OTHER ___ N/A ___
Water Chlorinated: YES ___ NO ___
Sample Iced Upon Collection: YES ___ NO ___

CLIENT SAMPLE DESCRIPTION	DATE COLLECTED	TIME COLLECTED MILITARY HOURS	MATRIX (SOIL, WATER OR SLUDGE)	SAMPLE CONTAINER *TYPE SEE BELOW	NO.	SIZE	PRESERVATIVES	ANALYSES REQUESTED GRO	DRO					REMARKS	PRISM LAB ID NO.
P70.B11.6.8	8/23/06	1050	SOIL	G	3	40 ML 8OZ	MEOH NONE	X	X						159237

Sampler's Signature _____ Sampled By (Print Name) KEVIN BUCHANAN Affiliation SOLUTIONS-IES

PRESS DOWN FIRMLY - 3 COPIES

Upon relinquishing, this Chain of Custody is your authorization for Prism to proceed with the analyses as requested above. Any changes must be submitted in writing to the Prism Project Manager. There will be charges for any changes after analyses have been initialized.

		Date	Military/Hours
Relinquished By: (Signature)	Received By: (Signature)	8/23/06	1240
Relinquished By: (Signature)	Received By: (Signature)	Date	
Relinquished By: (Signature)	Received For Prism Laboratories By:	8/23/06	1570

Method of Shipment: NOTE: ALL SAMPLE COOLERS SHOULD BE TAPED SHUT WITH CUSTODY SEALS FOR TRANSPORTATION TO THE LABORATORY. SAMPLES ARE NOT ACCEPTED AND VERIFIED AGAINST COC UNTIL RECEIVED AT THE LABORATORY.

☐ Fed Ex ☐ UPS ☐ Hand-delivered ☐ Prism Field Service ☐ Other _____

COC Group No. G9806705

Additional Comments:

PRISM USE ONLY

Site Arrival Time:
Site Departure Time:
Field Tech Fee:
Mileage:

NPDES:	UST:	GROUNDWATER:	DRINKING WATER:	SOLID WASTE:	RCRA:	CERCLA	LANDFILL	OTHER:
☐ NC ☐ SC ☐ ___	☐ NC ☐ SC ☐ ___	☐ NC ☐ SC ☐ ___	☐ NC ☐ SC ☐ ___	☐ NC ☐ SC ☐ ___	☐ NC ☐ SC ☐ ___	☐ NC ☐ SC ☐ ___	☐ NC ☐ SC ☐ ___	☐ NC ☐ SC ☐ ___

*CONTAINER TYPE CODES: A = Amber C = Clear G = Glass P = Plastic TL = Teflon-Lined Cap VOA = Volatile Organics Analysis (Zero Head Space)

SEE REVERSE FOR TERMS & CONDITIONS

ORIGINAL