PRELIMINARY SITE ASSESSMENT

PARCEL 004
CITY OF WILMINGTON PROPERTY
1755 BURNETT BLVD.
WILMINGTON, NEW HANOVER COUNTY, NORTH CAROLINA

INTERSECTION OF SR 1436 / US 421 TRUCK (FRONT STREET) AND SR 1140 (BURNETT BLVD.) SOUTH OF WILLARD STREET
WBS ELEMENT: 17BP.3.R.28

CATLIN PROJECT NO. 214037

PREPARED FOR:

NCDOT GEOTECHNICAL ENGINEERING UNIT-GEOENVIRONMENTAL SECTION
1589 MSC
RALEIGH, NORTH CAROLINA 27699-1589

JUNE 25, 2014

PREPARED BY:

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FOR
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CITY OF WILMINGTON PROPERTY
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WILMINGTON, NEW HANOVER COUNTY, NORTH CAROLINA

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WBS ELEMENT: 17BP.3.R.28

JUNE 25, 2014

1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) is planning construction activities and acquisition of the right-of-way (ROW) is necessary for intersection improvements at the Greenfield Lake Spillway Culvert (above referenced WBS Element 17BP.3.R.28). NCDOT has indicated site investigations are necessary to determine the presence of contaminated groundwater and/or soil at three (3) sites along the proposed construction area.

2.0 PURPOSE OF INVESTIGATION AND DESCRIPTION

Catlin Engineers & Scientists (CATLIN) was retained by the NCDOT Geotechnical Engineering Unit to provide field investigations concluding with Preliminary Site Assessment (PSA) reports for three (3) sites associated with WBS Element 17BP.3.R.28. In response to a Request for Technical and Cost Proposal (RFP) dated March 17, 2014, CATLIN submitted a proposal for conducting PSAs at the three (3) sites. This report documents the investigation at Parcel 004, City of Wilmington Property, 1755 Burnett Blvd., Wilmington, North Carolina 28401. The property is a vacant lot. The general location is illustrated on Sheet 1. CATLIN personnel began a field investigation at the property on May 9, 2014 and concluded on May 16, 2014. This PSA report documents activities and findings.

According to the RFP, the proposed ROW will take this corner parcel immediately north of the Han-Dee-Hugo's #32 gas station (Facility ID# 0-020318) at 1746 Carolina Beach Road. A groundwater incident (#18327) occurred at this location in 1997 and was closed out in 2000.

The requested area of investigation is the entire parcel within the proposed right of way (ROW) and easement between Burnett Blvd. and Carolina Beach Rd. and proposed ROW along Carolina Beach Rd. Borings were proposed within the proposed ROW and along planned drainage features including

catch basins and drainage piping. The NCDOT conventional plan sheet symbols are provided on Sheet 2 and the site layout including proposed features are illustrated on Sheet 3.

The NCDOT has requested an investigation to determine if contamination is present at the site. The purpose of this investigation was to:

- Screen for prior business activity.
- Locate all USTs and determine approximate size and contents (if any).
- Determine if contaminated soils are present.
- If contamination is evident, estimate the quantity of impacted soils and indicate the approximate area of soil contamination on a site map.
- Provide a MicroStation file with the location of USTs, soil contamination and monitoring wells.
- Prepare a report including field activities, findings, and recommendations for this site and submit to this office in triplicate.

3.0 METHODS

Proposed boring/sample locations were illustrated on a Plan Sheet provided by NCDOT and agreed upon before beginning investigations. Borings/samples were approved by NCDOT at proposed drainage catch basin locations and along the proposed drainage features.

CATLIN coordinated geophysical activities Pyramid Environmental and Engineering (Pyramid). The geophysical investigation methods are detailed in the Pyramid geophysical report provided in Appendix A.

CATLIN proposed utilizing QROS On-Site Rapid measurement Techniques and Tools (QED™ Analyzer) to evaluate potential for petroleum impacts to soil in a cost effective manner. Soil samples collected from above the approximate water table depth with concentrations greater than 10 milligrams per kilogram (mg/kg) diesel range organics (DRO) or gasoline range organics (GRO) will be considered contaminated for estimated contaminated vadose soil volume calculations. Contaminated soil volume is estimated from the surface to the water table and/or the midpoint distance between a clean sample location and dirty sample location or the property line and ROW/easement. Saturated soils were encountered two (2) to four (4) feet below land surface (BLS).

Borings advanced during this investigation are identified with the parcel number prefix (“4”) and numbered sequentially “##”. Soil samples for analysis per QROS QED™ Analyzer were identified by parcel number, boring number, and depth [example: 4-01 (2’)].

A Groundwater Incident file review was conducted at the NCDENR Wilmington Regional Office. According to records on file, petroleum impacts to soil and groundwater at Fast Fare #735 (currently Han-Dee-Hugo's #32), 1746 Carolina Beach Rd. (which is adjoining the Parcel 004 property) where revealed during a UST line closure activities on October 16, 1997. A Pollution Incident/UST Leak Reporting Form detailing the release and dated February 25, 1998 is provided in Appendix B. The site was assigned Incident Number 18327. Periodic groundwater monitoring occurred over the years and following submittal of a report dated May 19, 2000 the site was granted Notice of No Further Action (NCDENR letter dated July 27, 2000 provided in Appendix B). As indicated in the letter provided in Appendix B, public notice and monitoring well abandonment were required to satisfy the No Further Action status. No Further Action status was subsequently granted on July 27, 2000.

3.1 FIELD METHODS

All field work was conducted in general accordance with state and federal guidelines and industry standards.

Underground utility locating was coordinated by CATLIN personnel. The North Carolina One Call Center (NC-1-Call) was contacted for underground utility location. The areas around the proposed boring locations were checked and underground utilities were indicated by NC-1-Call personnel.

CATLIN personnel gathered subsurface soil data by Direct Push Technology boring advancement using an AMS PowerProbe^{TM} 9600D (PowerProbe) and a hand auger. When using the PowerProbe, the borings are advanced to depth by static force and a 90-pound hydraulic percussion hammer. Two and one-quarter inch diameter by four-foot length steel is used as casing. Soil samples are continuously collected in one and one-half inch clear liners. Liners are removed from the casing and then cut in half longitudinally to allow for visual/manual classification utilizing the Unified Soil Classification System (USCS). Boring information was recorded on field logs and transferred to Boring Logs (see Appendix C). Soil samples were collected and packed in appropriate glassware for analysis.

New disposable nitrile gloves were worn during sampling activities. Soils selected for QROS QED™ analysis were placed into new glassware provided by QROS. All samples were placed on ice in an insulated cooler for transportation to the laboratory. Sample integrity was maintained by following proper Chain of Custody procedures. A copy of the Chain of Custody is provided following the analytical report in Appendix D.

Boreholes were abandoned to the surface in grassy areas and just below existing asphalt in asphalt areas using three-eighth inch bentonite chips. Bentonite and water were poured into the borehole simultaneously to facilitate hydration. Boreholes in asphalt were finished with asphalt patch to the surface.

3.2 ANALYTICAL TESTING

The QROS QED™ Analyzer methods have been approved by the NCDENR for petroleum contamination determination. Complete QROS QED™ procedures are on file with the NCDENR and are available upon request. The QROS QED™ analysis was conducted by QROS personnel at their laboratory in Wilmington, North Carolina.

QROS QED™ analysis provides total Benzene, Toluene, Ethylbenzene, and Toluene (BTEX), DRO, GRO, total petroleum hydrocarbon (TPH), total aromatics (C-10-C35) and (total) 16 Environmental Protection Agency (EPA) Poly Aromatic Hydrocarbons (PAHs) concentrations. Soil sample DRO and GRO results greater than 10 mg/kg are considered contaminated for this investigation.

4.0 FIELD ACTIVITIES

4.1 CURRENT SITE CONDITIONS AND FIELD OBSERVATIONS

As previously mentioned, the site is a vacant lot adjacent to an active retail fuel sales facility. No signs of USTs were observed within subject parcel. Photographs taken during the geophysical investigation are included in the geophysical report provided in Appendix A.

The site vicinity is illustrated on Sheet 1 and Sheet 3 illustrates the current site map with soil boring and sample locations.

4.2 SOIL SAMPLING

A total of nine (9) borings were installed as part of the investigation. At least one (1) soil sample interval was collected from each boring and submitted for analysis. Boring/sample locations are illustrated on Sheet 3. Boring logs are included in Appendix C.

PowerProbe borings were advanced to approximately four (4) feet deep and terminated in saturated soils. Hand auger borings were advanced to two (2) feet BLS along proposed drainage pipe locations and to four (4) feet BLS at from proposed catch basin (CB) locations. Soils were collected continuously to boring termination. After retrieving the drive, soil was visually/manually classified for USCS classification. Soil samples collected from each boring for analysis were packed in the appropriate glassware, labeled, and placed in a cooler on ice. Soil samples were collected for analysis at two (2) feet BLS along proposed drainage feature locations and also at four (4) feet BLS at CB locations except for CB 0405 and CB 0407 where boring refusal was encountered at approximately two (2) feet BLS. A total of 13 soil samples were submitted to QROS for QED™ analysis. Chain of Custody documentation is included in Appendix D.

4.3 SURVEYING

Boring/sample locations were recorded utilizing a Trimble® global positioning survey instrument and data collector. Boring coordinates are shown on the Boring Logs provided in Appendix C. Borings locations are indicated on plan sheets provided by NCDOT and are included as Sheet 3.

5.0 RESULTS

No historical business activity was identified through review of historical aerial photograph and New Hanover County Tax Records. No monitoring wells were discovered at the site.

Geophysical Investigation

The complete geophysical investigation report is included in Appendix A. As indicated in the Pyramid Report, the investigation did not reveal any evidence of metallic USTs in the survey area.

Soil

Soil sample results from the recent assessment activities utilizing QROS QED™ analysis are provided on Table 1. Soil sample locations, summarized results and estimated extent of TPH impacted soils are illustrated on Sheet 3. The complete QROS QED™ report is provided in Appendix D.

Soils encountered across the site were predominately sands with gravel. Saturated soils were encountered approximately two (2) to three (3) feet BLS. Soils from the surface to two (2) feet BLS are considered vadose zone.

Soil samples collected from all borings at two (2) feet BLS revealed DRO concentrations greater than 10 mg/kg except borings 4-03 and 4-09. The samples collected from four (4) feet BLS at borings 4-02 (CB 0411), 4-04 (CB 0404) and 4-09 (CB 0402) did not reveal DRO or GRO concentrations above 10 mg/kg.

The estimated volume of petroleum impacted soils as illustrated on Sheet 3 includes the area around all borings except borings 4-03 and 4-09. The approximate area is 9,270 feet^2 and the total volume of impacted soils is approximately 690 yds^3. However, based on historical groundwater contamination associated with the adjacent groundwater incident, any saturated soils encountered during construction activities may be considered contaminated.

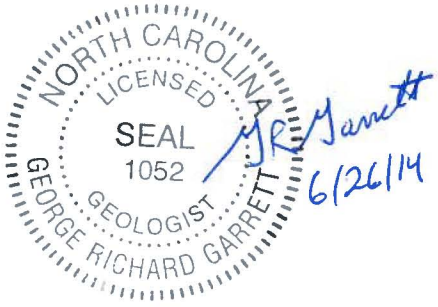
6.0 SUMMARY AND CONCLUSIONS

The site is currently a vacant lot adjacent to an active retail fuels sales facility. No USTs are suspected at the area of investigation. Nine (9) borings were advanced for soil sample collection at proposed drainage features. Contaminated soils were revealed in samples collected at seven (7) of the nine (9) locations.

A total estimated contaminated soil volume of 690 yds^3 may be encountered in vadose zone soils across the site except in the vicinity of borings 4-03 and 4-09. Any detectable concentrations in excavated soils may require handling and disposal as an impacted waste. Any saturated soils encountered during construction/excavation at the site may also be contaminated.

7.0 SIGNATURES

Benjamin J. Ashba, P.G.
Project Manager



G. Richard Garrett, P.G.
Contract Manager

TABLES

TABLE 1
SUMMARY OF SOIL RESULTS

QED

QROS

Hydrocarbon Analysis Results

Client: CATLIN / NCDOT
Address: 220 Old Dairy Rd.
Wilmington, NC 28405

***Samples taken** 5/16/14
***Samples extracted** 5/16/14
***Samples analysed** 5/19/14

Samples taken Friday, May 09, 2014
Samples extracted Friday, May 09, 2014
Samples analysed Monday, May 12, 2014

Contact: Ben Ashba
Operator Rachel Menoher

Project: Parcel 4 NCDOT Front St. and Burnett Blvd - WBS: 17BP.3.R.28
CATLIN Project No. 214037

Matrix	Sample ID	Location	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match
											% light	% mid	% heavy	
s	4-01(2')	Proposed Catch Basin (CB) 0407	279.0	<14	<14	125	125	83.96	15.5	<0.279	49.9	41.4	8.7	V.Deg.PHC 81.6%
s	*4-02 (2')	CB 0411	39.0	<1.9	<1.9	44.8	44.8	41.08	2.64	<0.039	29	54.5	16.5	V.Deg.PHC 77.1%
s	*4-02 (4')		33.0	<1.6	<1.6	4.6	4.6	4.21	0.32	<0.033	49.9	33.7	16.5	V.Deg.PHC 72.2%
s	*4-03 (2')	CB 0405	19.0	<1	<1	6.59	6.59	6.04	0.46	0.043	38.9	41.7	19.4	V.Deg.PHC 69.6%
s	4-04(2')	CB 0404	25.0	<1.3	<1.3	34.9	34.9	27.07	4.79	0.207	31.7	47.5	20.8	Deg.Fuel 59.1%
s	4-04(4')		22.0	<1.1	<1.1	7.66	7.66	7.05	2.02	0.073	46.1	31.3	22.6	V.Deg.PHC 51.2%
s	4-05(2')	CB 0403	22.0	<1.1	<1.1	38.94	38.94	29.98	4.43	0.29	27.2	50.6	22.2	Deg.Fuel 57.1%
s	4-05(4')		24.0	<1.2	<1.2	46.99	46.99	42.86	5.27	0.156	41.9	45.4	12.7	V.Deg.PHC 77.6%
s	4-06(2')	Proposed drainage south of CB 0403	268.0	<13.4	<13.4	63.9	63.9	58.63	14.2	1.01	38.8	41.2	20	V.Deg.PHC 67%
s	4-07(2')	Proposed drainage south of boring 4-06	322.0	<16.1	<16.1	44.63	44.63	41.11	13.66	0.839	35.4	39.2	25.4	V.Deg.PHC 59.9%
s	4-08(2')	Proposed drainage north of CB 0402	291.0	<14.6	<14.6	861.3	861.3	658.3	68.11	2.36	29.6	54.9	15.5	V.Deg.PHC 69.1%
s	4-09(2')	CB 0402	12.0	<0.6	<0.6	<0.12	<0.12	<0.12	0.06	<0.012	18.9	9.2	71.9	PAH (P)
s	4-09(4')		13.0	<0.7	<0.7	<0.13	<0.13	<0.13	0.06	<0.013	18.6	14.1	67.2	PAH (P)

Initial Calibrator QC check OK **Final FCM QC Check** OK **97.6%**

Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content
Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library (SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present

SHEETS

PREPARED BY:
CATLIN
Engineers and Scientists
Wilmington, North Carolina
PROJ #: 214037

WBS NO.:	17bp.3.r.28
TIP NO.:	N/A
COUNTY:	NEW HANOVER

SHEET 1

2000 1000 0 2000
SCALE IN FEET

GENERAL LOCATION USGS TOPOGRAPHIC QUADRANGLE

SITE LOCATION

NOTES:
-USGS TOPOGRAPHIC QUADRANGLE "WILMINGTON" OBTAINED FROM TERRAIN NAVIGATOR PRO

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.28 (N/A)	2

Note: Not to Scale

**S.U.E. = Subsurface Utility Engineering*

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin
- Property Corner
- Property Monument
- Parcel/Sequence Number
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary
- Proposed Wetland Boundary
- Existing Endangered Animal Boundary
- Existing Endangered Plant Boundary
- Known Soil Contamination: Area or Site
- Potential Soil Contamination: Area or Site

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign
- Well
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream
- Buffer Zone 1
- Buffer Zone 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch
- False Sump

RAILROADS:

- Standard Gauge
- RR Signal Milepost
- Switch
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line
- Proposed Right of Way Line with Iron Pin and Cap Marker
- Proposed Right of Way Line with Concrete or Granite Marker
- Existing Control of Access
- Proposed Control of Access
- Existing Easement Line
- Proposed Temporary Construction Easement
- Proposed Temporary Drainage Easement
- Proposed Permanent Drainage Easement
- Proposed Permanent Drainage / Utility Easement
- Proposed Permanent Utility Easement
- Proposed Temporary Utility Easement
- Proposed Aerial Utility Easement
- Proposed Permanent Easement with Iron Pin and Cap Marker

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut
- Proposed Slope Stakes Fill
- Proposed Curb Ramp
- Curb Cut Future Ramp
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard

EXISTING STRUCTURES:

MAJOR:
- Bridge, Tunnel or Box Culvert
- Bridge Wing Wall, Head Wall and End Wall

MINOR:
- Head and End Wall
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB
- Paved Ditch Gutter
- Storm Sewer Manhole
- Storm Sewer

UTILITIES:

POWER:
- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- Recorded U/G Power Line
- Designated U/G Power Line (S.U.E.*)

TELEPHONE:
- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole
- Telephone Booth
- Telephone Pedestal
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole
- Recorded U/G Telephone Cable
- Designated U/G Telephone Cable (S.U.E.*)
- Recorded U/G Telephone Conduit
- Designated U/G Telephone Conduit (S.U.E.*)
- Recorded U/G Fiber Optics Cable
- Designated U/G Fiber Optics Cable (S.U.E.*)

WATER:
- Water Manhole
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line
- Designated U/G Water Line (S.U.E.*)
- Above Ground Water Line

TV:
- TV Satellite Dish
- TV Pedestal
- TV Tower
- U/G TV Cable Hand Hole
- Recorded U/G TV Cable
- Designated U/G TV Cable (S.U.E.*)
- Recorded U/G Fiber Optic Cable
- Designated U/G Fiber Optic Cable (S.U.E.*)

GAS:
- Gas Valve
- Gas Meter
- Recorded U/G Gas Line
- Designated U/G Gas Line (S.U.E.*)
- Above Ground Gas Line

SANITARY SEWER:
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line
- Above Ground Sanitary Sewer
- Recorded SS Forced Main Line
- Designated SS Forced Main Line (S.U.E.*)

MISCELLANEOUS:
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box
- Utility Unknown U/G Line
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc.
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PREPARED BY:
CATLIN
Engineers and Scientists
Wilmington, North Carolina
PROJ #: 214037

WBS NO.:	17BP.3.R.28
TIP NO.:	N/A
COUNTY:	NEW HANOVER

SHEET 3

40 20 0 40
SCALE IN FEET

SITE MAP
PARCEL 004
1755 BURNETT BLVD.

NOTES:
ALL LOCATIONS APPROXIMATE
ALL RESULTS IN mg/kg
N/S = NOT SAMPLED
ALL SOIL SAMPLES ANALYZED FOR DIESEL AND GASOLINE RANGE ORGANICS (DRO & GRO).
ALL GRO RESULTS REPORTED BELOW DETECTION LIMITS AND THEREFORE NOT ILLUSTRATED.
BASE DRAWINGS OBTAINED FROM NCDOT

LEGEND
(X') = XX.XX (SAMPLE DEPTH) = TPH DRO RESULTS IN mg/kg
(X') = XX.XX RESULTS EXCEED ACTION LEVEL
(X') = XX.XX RESULTS BELOW ACTION LEVEL

APPENDIX A

PYRAMID GEOPHYSICAL REPORT

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.

PYRAMID ENVIRONMENTAL & ENGINEERING
(PROJECT 2014-103)

GEOPHYSICAL SURVEY

PARCEL 004 –FRONT STREET & BURNETT BOULEVARD NCDOT PROJECT WBS: 17BP.3.R.28

WILMINGTON, NEW HANOVER COUNTY, NC

MAY 12, 2014

Report prepared for: **Benjamin J. Ashba, PG**
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C257: GEOLOGY C1251: ENGINEERING

GEOPHYSICAL INVESTIGATION REPORT
Parcel 4 – Front St. & Burnett Blvd.
Wilmington, New Hanover County, North Carolina

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Figure 3 – Parcel 004 GPR Transect Locations and Images

EXECUTIVE SUMMARY

Project Description: Pyramid Environmental conducted a geophysical investigation for Catlin Engineers & Scientists at NCDOT Parcel 4 located along at the intersection of Burnett Blvd. and Front Street in Wilmington, New Hanover County, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) overhead rail line project (NCDOT Project WBS 17BP.3.R.28). Catlin Engineers & Scientists directed Pyramid as to the geophysical survey boundaries at the project site, which were designed to include the area between the existing edge of pavement and the NCDOT proposed ROW and/or easement. The geophysical investigation consisted of an electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys.

Geophysical Results: The majority of the EM61 anomalies detected could be attributed to visible objects at the ground surface such as signs and drainage inlets, or to known underground utilities. One unknown EM anomaly was identified at the southwest corner of the survey area and investigated with the GPR. GPR scans across this feature recorded evidence of possible buried debris. The geophysical investigation did not record any evidence of metallic UST at the property.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for Catlin Engineers & Scientists at NCDOT Parcel 4 located at the intersection of Burnett Blvd. and Front Street in Wilmington, New Hanover County, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) overhead rail line project (NCDOT Project WBS 17BP.3.R.28). Catlin Engineers & Scientists directed Pyramid as to the geophysical survey boundaries at the project site, which were designed to include the area between the existing edge of pavement and the NCDOT proposed ROW and/or easement. The survey grid spanned a maximum of 240 feet from north to south and a maximum of 220 feet from west to east, and included the majority of the accessible portions of Parcel 004 between the existing pavement and the proposed ROW/easement. Conducted on May 9, 2014, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site was relatively open, and consisted primarily of an open grassy area to the north of an active service station, as well as asphalt drives and parking areas on the southwest and southeast sides. Aerial photographs showing the survey area boundaries and ground-level photographs are shown in **Figure 1**.

FIELD METHODOLOGY

The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. Pyramid collected the EM data using a Geonics EM61 metal detector integrated with a Trimble AG-114 GPS antenna. The integrated GPS system allows the location of the instrument to be recorded in real-time during data collection, resulting in an EM data set that geo-referenced and can be overlain on aerial photographs and CADD drawings. A boundary grid was established around the perimeter of the site with marks every 10 feet to maintain orientation of the instrument throughout the survey and assure complete coverage of the area.

According to the instrument specifications, the EM61 can detect a metal drum down to a maximum depth of approximately 8 feet. Smaller objects (1-foot or less in size) can be detected to a maximum depth of 4 to 5 feet. The EM61 data were digitally collected at approximately 0.8 foot intervals along north-south trending or east-west trending, generally parallel survey lines spaced five feet apart. The data were downloaded to a computer and reviewed in the field and office using the Geonics NAV61 and Surfer for Windows Version 11.0 software programs.

GPR data were acquired across select EM differential anomalies on May 9, 2014, using a Geophysical Survey Systems, Inc. (GSSI) UtilityScan DF radar unit that continuously collects data at both 300 MHz and 800MHz frequencies. This dual frequency antenna allows for higher resolution imaging both near the ground surface and within deeper strata. Data were collected generally from east to west and/or north to south across the property. The GPR data were viewed in real time using a vertical scan of 512 samples, at a rate of 48 scans per second. GPR data were viewed down to a maximum depth of approximately 8 feet, based on an estimated two-way travel time of 8 nanoseconds per foot. GPR Transects across specific anomalies were saved to the hard drive of the GSSI DF unit for post-processing and figure generation.

DISCUSSION OF RESULTS

A contour plot of the EM61 differential results obtained across survey area at the property is presented in **Figure 2**. 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 drum and UST-size objects and ignore the smaller insignificant metal objects.

Discussion of EM Anomalies: The EM response that was observed along the entire east boundary of the survey area adjacent to the road was associated with known utilities and drainage piping. Multiple street signs and metal drop inlets resulted in isolated differential EM responses along the west and north-central areas of the survey. These features are annotated on Figure 2. A large utility junction box was present at the north boundary of the survey area that also resulted in an isolated EM response. The EM features along the center of the survey area to the north of the active pump islands were the result of metal UST vent pipes and reinforcement in the concrete curbing. Lastly, the EM response at the southwest corner of the survey area was not attributable to any cultural features, and was investigated further with the GPR.

Discussion of GPR Survey: **Figure 3** presents the locations and images of the formal GPR transects performed at the property. The two GPR transects performed across anomaly recorded minor disruptions in the subsurface reflectors that are often characteristic of buried debris. No reflections were observed that were characteristic of larger objects such as USTs.

The geophysical investigation did not record any evidence of metallic UST at the property.

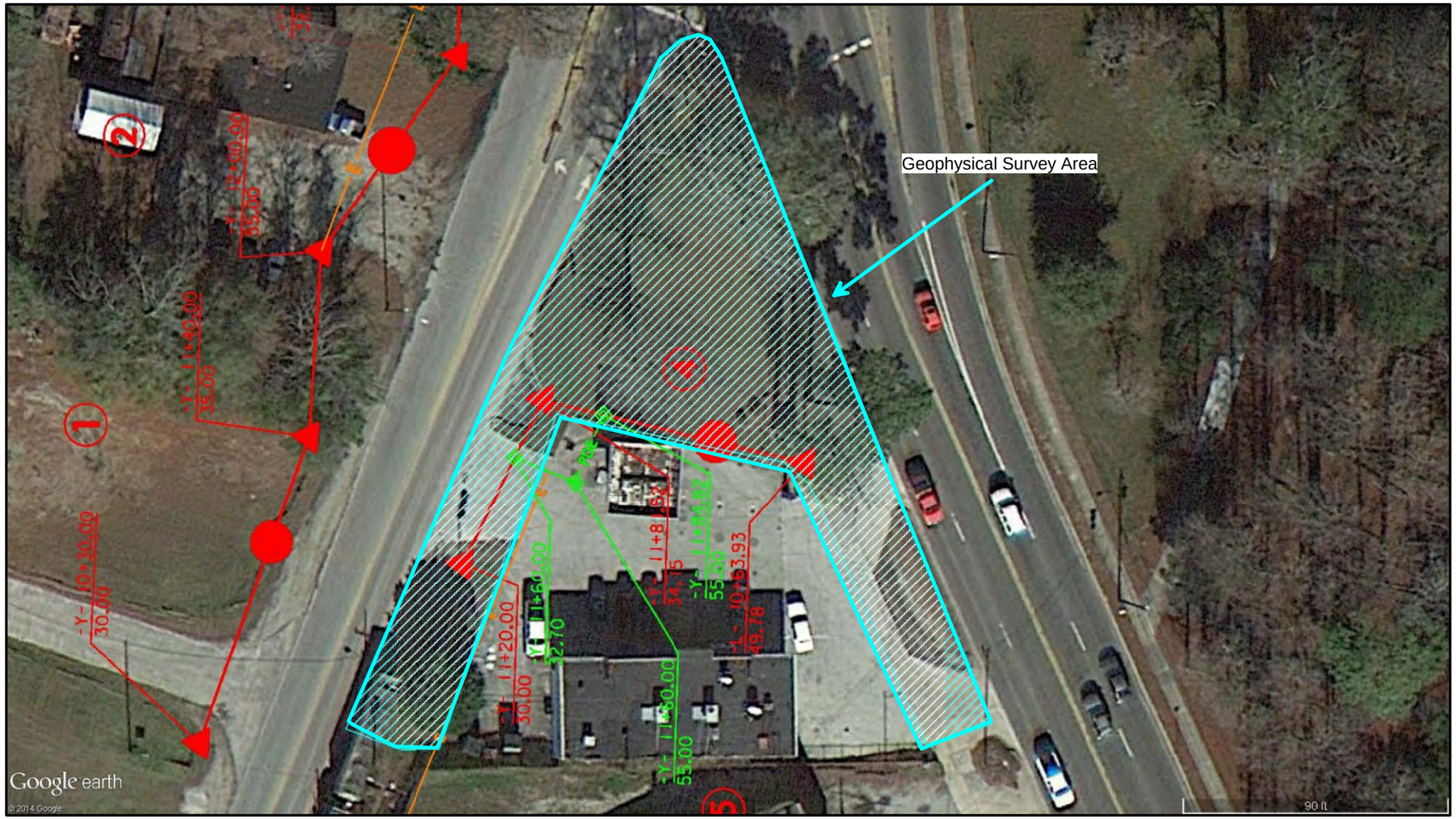
SUMMARY & CONCLUSIONS

Our evaluation of the EM61 and GPR data collected at Parcel 004 along Burnett Blvd. in Wilmington, New Hanover 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 accessible portions of the geophysical survey area.
- The majority of the EM61 anomalies detected could be attributed to visible objects at the ground surface such as signs and drop inlets, or to known underground utilities.
- One unknown EM anomaly was recorded at the southwest corner of the survey area. GPR scans across this feature indicated the possible presence of buried metallic debris.
- The geophysical investigation did not record any evidence of metallic UST at the property.

LIMITATIONS

Geophysical surveys have been performed and this report prepared for Catlin Engineers & Scientists in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the EM61 and GPR surveys are non-unique and may not represent actual subsurface conditions. The EM61 and GPR results obtained for this project have not conclusively determined the definitive presence or absence of metallic USTs, but that the evidence collected is sufficient to result in the conclusions made in this report. Additionally, it should be understood that areas containing extensive vegetation, reinforced concrete, or other restrictions to the accessibility of the geophysical instruments could not be fully investigated.



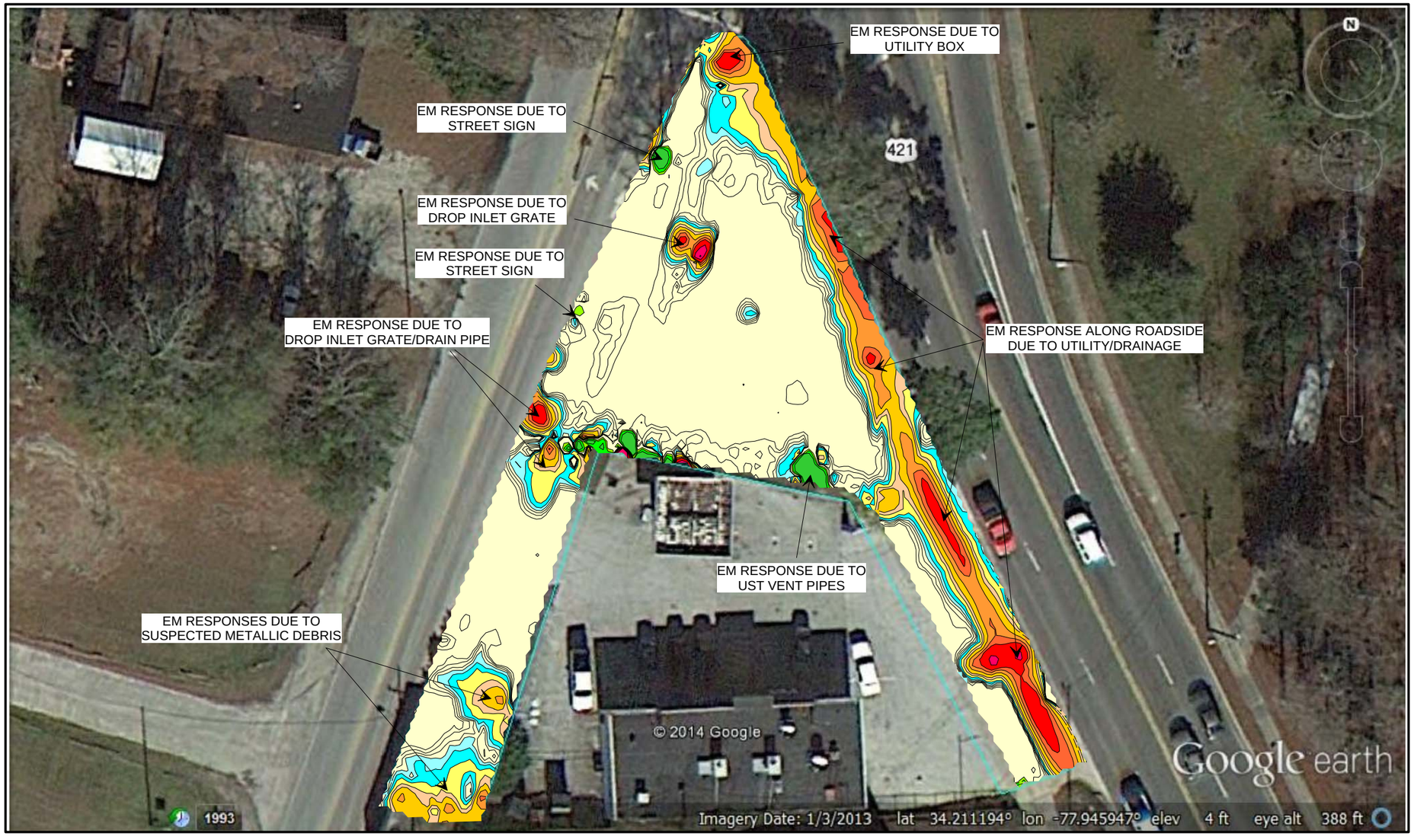
Approximate Location of the Geophysical Survey Area
With NCDOT Proposed ROW/Easement Overlay

View of North Portion of Survey Area
(Facing Approximately North)

View of Southwest Portion of Survey Area
(Facing Approximately South)

TITLE	PARCEL 004: GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS
PROJECT	FRONT ST. & BURNETT BLVD. (NCDOT WBS 17BP.3.R.28) WILMINGTON, NEW HANOVER COUNTY, NC
PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.	503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology
DATE 5/9/2014	CLIENT CATLIN ENGINEERS
PYRAMID PROJECT #: 2014-	**FIGURE 1**

EM61 Differential Results



NO EVIDENCE OF METALLIC USTs OBSERVED

The contour plots show the differential results of the EM61instrument 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 EM61 data were collected on May 9, 2014, using a Geonics EM61 instrument. Ground penetrating radar (GPR) data were collected on May 9, 2014, using a GSSI Utility Scan DF Dual Frequency Radar unit that utilizes a combined 300 MHz and 800 MHz antennae.

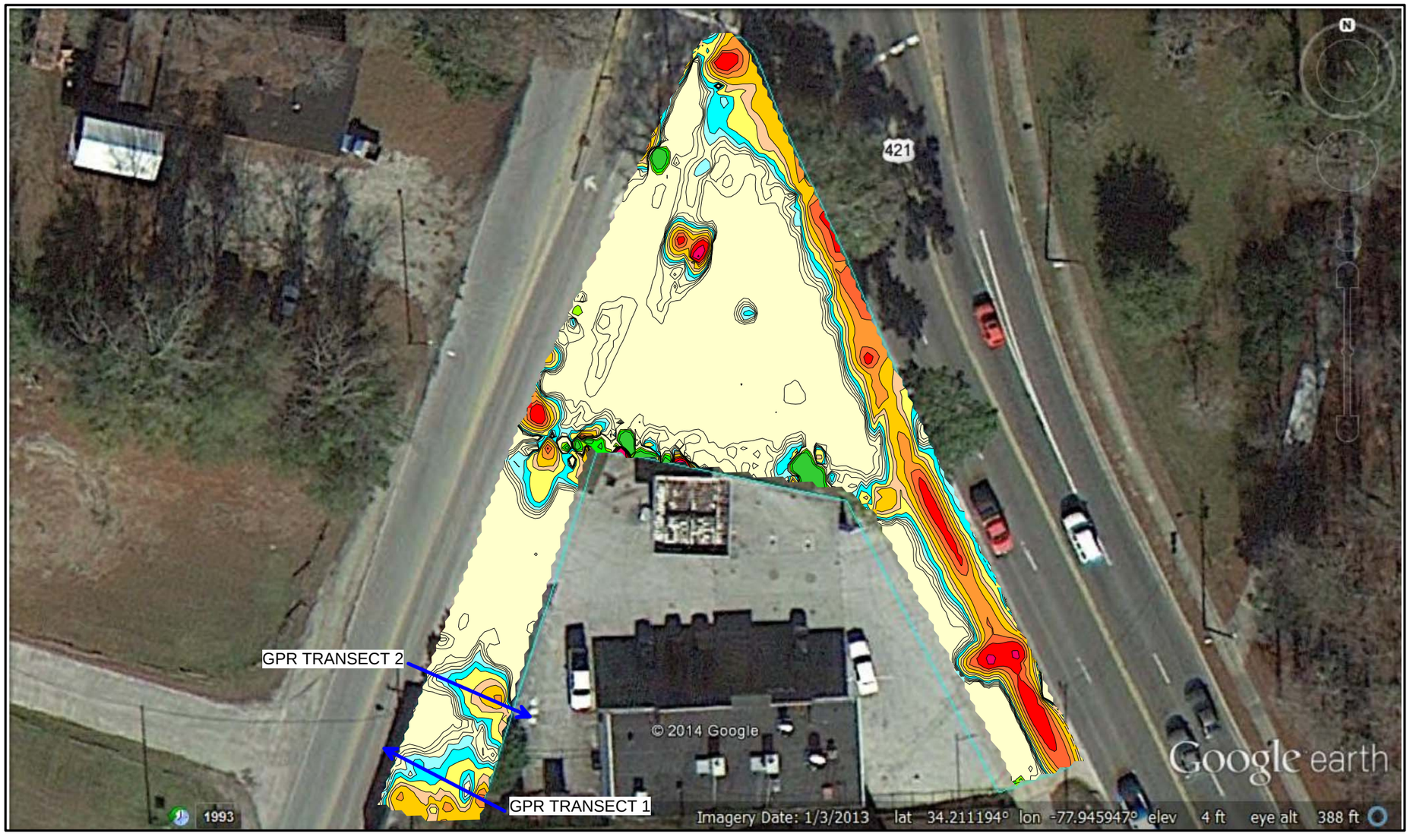
EM61 Metal Detection Response (millivolts)

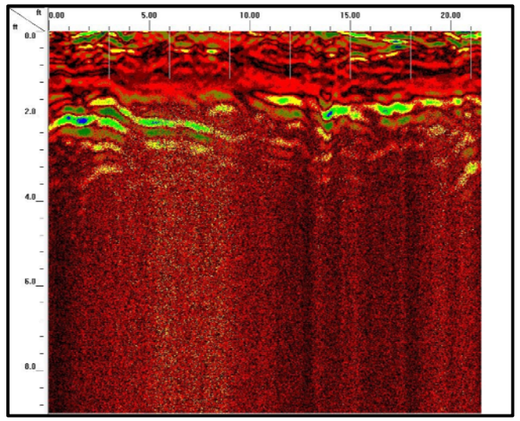
TITLE	PARCEL 004: EM61 DIFFERENTIAL RESULTS CONTOUR MAP
PROJECT	FRONT ST. & BURNETT BLVD. (NCDOT WBS 17BP.3.R.28) WILMINGTON, NEW HANOVER COUNTY, NC

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C
503 INDUSTRIAL AVENUE
GREENSBORO, NC 27460
(336) 335-3174 (p) (336) 691-0648 (f)
License # C1251 Eng. / License # C257 Geology

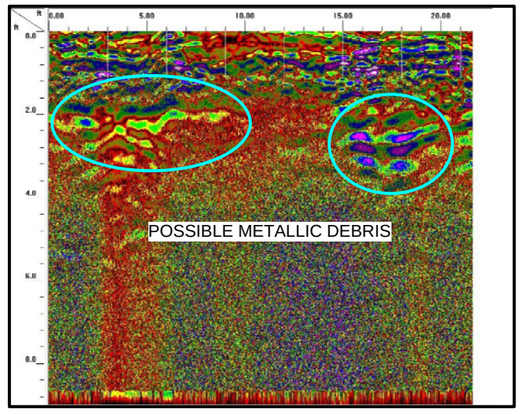
DATE 5/9/2014	CLIENT CATLIN ENGINEERS
PYRAMID PROJECT #: 2014-	**FIGURE 2**

Locations of GPR Transects





GPR TRANSECT 1



GPR TRANSECT 2

TITLE	PARCEL 004: GPR TRANSECT LOCATIONS AND IMAGES
PROJECT	FRONT ST. & BURNETT BLVD. (NCDOT WBS 17BP.3.R.28) WILMINGTON, NEW HANOVER COUNTY, NC

PYRAMID ENVIRONMENTAL & ENGINEERING, P.C.
503 INDUSTRIAL AVENUE
GREENSBORO, NC 27460
(336) 335-3174 (p) (336) 691-0648 (f)
License # C1251 Eng. / License # C257 Geology

DATE	5/9/2014	CLIENT	CATLIN ENGINEERS
PYRAMID PROJECT #:	2014-		**FIGURE 3**

APPENDIX B
NCDENR FILE REVIEW INFORMATION

State of North Carolina
Department of Environment and Natural Resources
Wilmington Regional Office
Division of Waste Management
UST Section

James B. Hunt, Jr., Governor
Bill Holman, Secretary

NCDENR
North Carolina Department of Environment and Natural Resources

July 27, 2000

CERTIFIED MAIL #7000 0600 0023 4230 1473
RETURN RECEIPT REQUESTED

Corporation Service Company
327 Hillsborough Street
Raleigh, NC 27603

Subject: Notice of No Further Action
15A NCAC 2L .0115(h)
Fast Fare #735 (Crown Central Petroleum Corporation)
1746 Carolina Beach Road
Wilmington, New Hanover County
Incident No. 18327
Low Risk Classification

Dear Sirs:

On May 30, 2000, the Division of Waste Management (DWM) Wilmington Regional Office received a Groundwater Monitoring Report with Site Closure Request for the above-referenced site. A review of the incident file shows that contaminated soil was excavated at the site and is no longer an issue due to high water table conditions. A review of the Groundwater Monitoring Report with Site Closure Request also shows that contaminated groundwater does not exceed gross contamination levels that were established in 15A NCAC 2L .0115(g).

Based on information provided to date, the DWM determines that no further action is required for this incident. This determination is conditional pending completion of the public notice specified below. Once proper public notice has been given, this determination will apply unless the DWM later determines that the discharge or release poses an unacceptable risk or a potentially unacceptable risk to human health or the environment.

Please be advised that because contaminated groundwater has not been restored to the level of the standard or interim standard established in 15A NCAC 2L .0202, groundwater within the area of contamination or within the area where contamination is expected to migrate, **is not suitable** for use as a water supply.

Pursuant to 15A NCAC 2L .0115(e), Crown Central Petroleum Corporation has a continuing obligation to notify the DWM of any changes that Crown Central Petroleum Corporation knows of or should know of, that might affect the level of risk assigned to the discharge or release. Such changes include, but are not limited to, changes in zoning of real property, use of real property or the use of groundwater that has been contaminated or is expected to be contaminated by the discharge or release, if such change could cause the DWM to reclassify the risk. Please note that this responsibility not only pertains to changes involving the property on which the release occurred, but to changes involving the surrounding properties as well.

Please be advised that Crown Central Petroleum Corporation must comply with the public notice requirements of 15A NCAC 2L .0115(k) as specified below. **If public notice is not provided as required, this no further action determination will be deemed invalid.** Within **30 days** of receipt of this no further action notice, Crown Central Petroleum Corporation must provide a copy of this notice to the following persons:

- local health director;
- chief administrative officer (i.e., Mayor, Chairman of the County Commissioners, County Manager, City Manager or other official of equal or similar position) of each political jurisdiction in which the contamination occurs;
- all property owners and occupants within or contiguous to the area containing contamination; and
- all property owners and occupants within or contiguous to the area where the contamination is expected to migrate.

Copies of this no further action notice must be sent to the persons listed above by certified mail. If it is impractical to provide notice by certified mail to the occupants of apartment buildings, condominiums, office buildings, etc., Crown Central Petroleum Corporation may post a copy of this notice in a prominent place where the occupants are most likely to see it.

Within **60 days** of receiving this no further action notice, Crown Central Petroleum Corporation must provide the DWM Wilmington Regional Office with proof of receipt of the copy of the notice or of refusal by the addressee to accept delivery of the copy of the notice. If a copy of the notice is posted, Crown Central Petroleum Corporation must provide the DWM with a description of the manner in which the notice was posted.

Interested parties may examine the Groundwater Monitoring Report with Site Closure Request by contacting Mr. Jim Janson at (410) 987-3696. In addition, the DWM Wilmington Regional Office has the Groundwater Monitoring Report with Site Closure Request along with other site information on file and available for public review. Interested parties may arrange to review this information by contacting the regional office as listed below. In addition, comments on the Groundwater Monitoring Report with Site Closure Request may be submitted to the regional office.

Bruce Reed
NCDENR Wilmington Regional Office
127 Cardinal Drive Extension
Wilmington, N C 28405
(910) 395-3900

Please be advised that Crown Central Petroleum Corporation must close any monitoring wells or injection wells used to investigate or remediate this incident in accordance with 15A NCAC 2C .0113 and .0214, respectively. For guidance on closure of infiltration galleries, please contact the Wilmington Regional Office.

Should Crown Central Petroleum Corporation have any questions concerning this notice, please contact Bruce Reed at (910) 395-3900.

Sincerely,

Kirk McDonald
Acting UST Regional Supervisor

KM/BR

Attachment: Well Abandonment Form

cc: Fay Sweat
Raj Shah (Agra Env.)
Jim Janson (Crown Central)
WiRO-UST

s:\ust\bruce\crown735.nfa

7000 0600 0023 4230 1473

U.S. Postal Service
CERTIFIED MAIL RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

Article Sent To: Corporation Service Company ust

Postage	$ .33
Certified Fee	1.40
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	1.25
Total Postage & Fees	$ 2.98

Postmark Here

Name (Please Print Clearly) (to be completed by mailer)
Corporation Service Company
Street, Apt. No.; or PO Box No.
327 Hillsborough Street
City, State, ZIP+4
Raleigh NC 27603

PS Form 3800, July 1999 — See Reverse for Instructions

TE THIS SECTION ON DELIVERY

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:
Corporation Service Company
327 Hillsborough Street
Raleigh, NC 27603

A. Received by (Please Print Clearly) B. Date of Delivery 7-31-00

C. Signature X [signature] ☐ Agent ☐ Addressee

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☑ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Copy from service label)
7000 0600 0023 4230 1473

PS Form 3811, July 1999 — Domestic Return Receipt — 102595-00-M-0952

POLLUTION INCIDENT/U.S.T. LEAK REPORTING FORM

Department of Environment, Health, Natural Resources
Division of Environmental Management
GROUNDWATER SECTION

Confirm. GW Contamination (Y/N) Y
Major Soil Contamination (Y/N) N
Minor Soil Contaminatin (Y/N) Y

Incident # 18327

Date Incident Occurred or Leak Detected 10-16-97

INCIDENT DESCRIPTION

Incident Location/Name: Fast Fare #735

Address: 1746 Carolina Beach Road

City/Town: | County: New Hanover | Region: WiRO

Briefly Describe Incident: An UST Line Closure Assessment Report received on February 17, 1998 documents soil and groundwater contamination at the subject site. A NORR will be sent to the UST owner.

POTENTIAL SOURCE OWNER-OPERATOR

Potential Source Owner-Operator: Mr. Bob Hughes

Telephone: (410)539-7400

Company: Crown Central Petroleum Corp.

Street Address: P.O. Box 1168

City: Baltimore | County: — | State: Maryland | Zip Code: 21203-1168

OWNERSHIP
0. N/A 1. Municipal 2. Military 3. Unknown (4.Private) 5.Federal 6. County 7. State

OPERATION TYPE
0. N/A 1. Public Service 2. Agricultural 3. Residential 4. Educational/Relig. 5. Industrial (6.Commercial) 7. Mining

POLLUTANTS INVOLVED

MATERIALS INVOLVED	AMOUNT LOST	AMOUNT RECOVERED
gasoline	UNK	UNK

SOURCE OF POLLUTION

PRIMARY SOURCE OF POLLUTION (Select one)
1. Intentional dump
2. Pit, pond, lagoon
(3.) Leak-underground
4. Spray irrigation
5. Land application
6. Animal feedlot
7. Source unknown
8. Septic tank
9. Sewer line
10. Stockpile
11. Landfill
12. Spill-surface
13. Well
14. Above-ground Storage Tank
15. Nonpoint source

PRIMARY POLLUTANT TYPE (Select one)
1. Pesticide/herbicide
2. Radioactive waste
(3.) Gasoline/diesel
4. Heating oil
5. Other petroleum prod.
6. Sewage/septage
7. Fertilizers
8. Sludge
9. Solid waste leachate
10. Metals
11. Other inorganics
12. Other organics

LOCATION
(1.) Facility
2. Railroad
3. Waterway
4. Pipeline
5. Dumpsite
6. Highway
7. Residence
8. Other

SETTING
1. Residential
2. Industrial
(3.) Urban
4. Rural

Site Priority Ranking: 5/E INTERMEDIATE

D.E.M. Regional Contact: Bruce Reed

Signature: Bruce Reed

Date: 2-25-98

GW-61 Revised 2/95

2-27-98

IMPACT ON DRINKING WATER SUPPLIES

WELLS AFFECTED 1. YES (2) NO

NUMBER OF WELLS AFFECTED _____

Well(s) Contaminated: (Users Name)

1.

2.

3.

4.

5.

Circle Appropriate Responses

Lab Samples Taken By: 1. DEM 2. DHS (3) Responsible Party 4. Other 5. None

Samples Taken Include: (1) Groundwater (2) Soil

LOCATION OF INCIDENT

7 1/2 Min. Quad Name: Wilmington

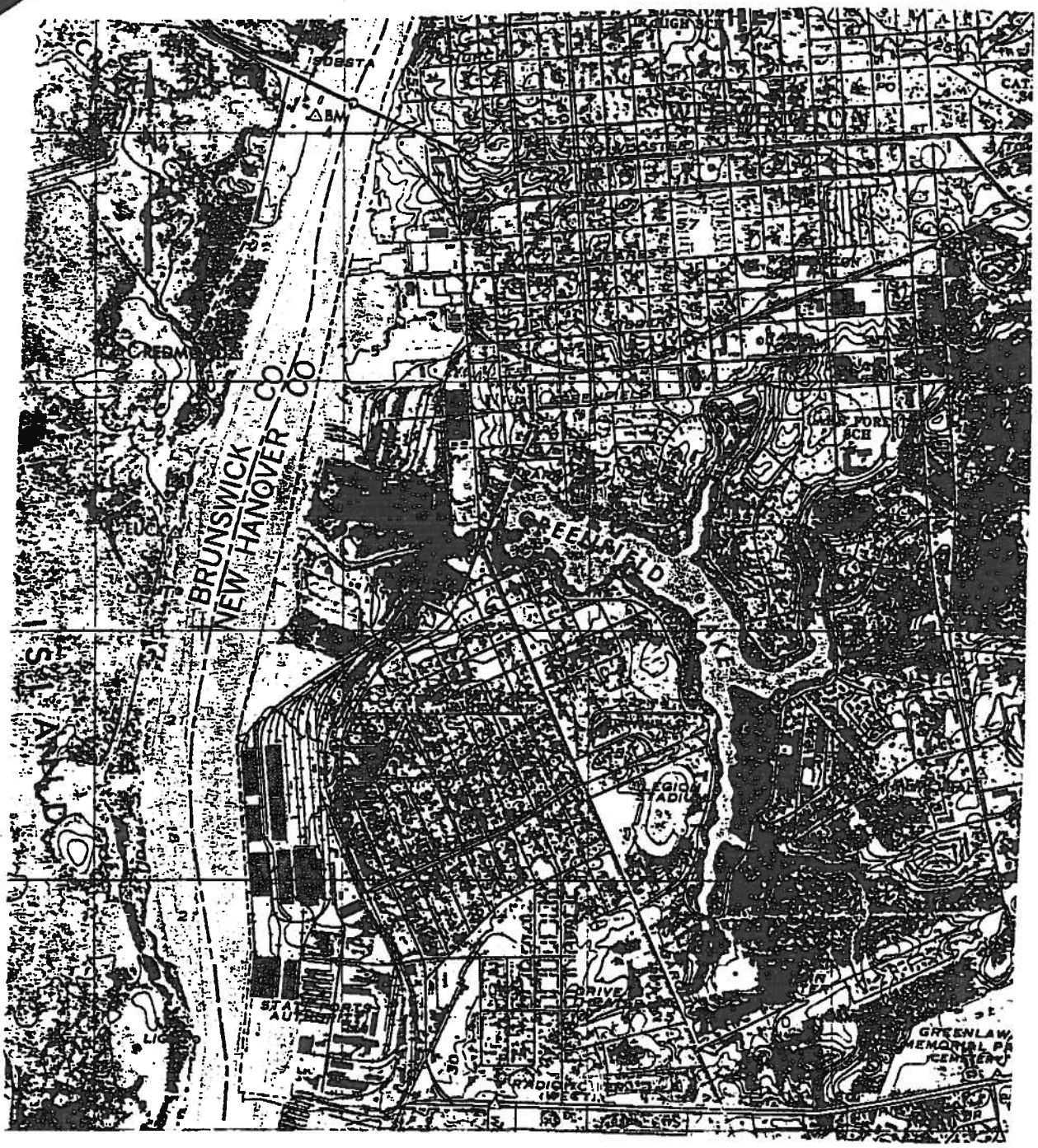
Lat. : Deg : Min : Sec : 34 12 38

5 Min. Quad Number: DD-31

Long. : Deg : Min : Sec : 77 56 46

Draw Sketch of Area or Attach Additional Maps

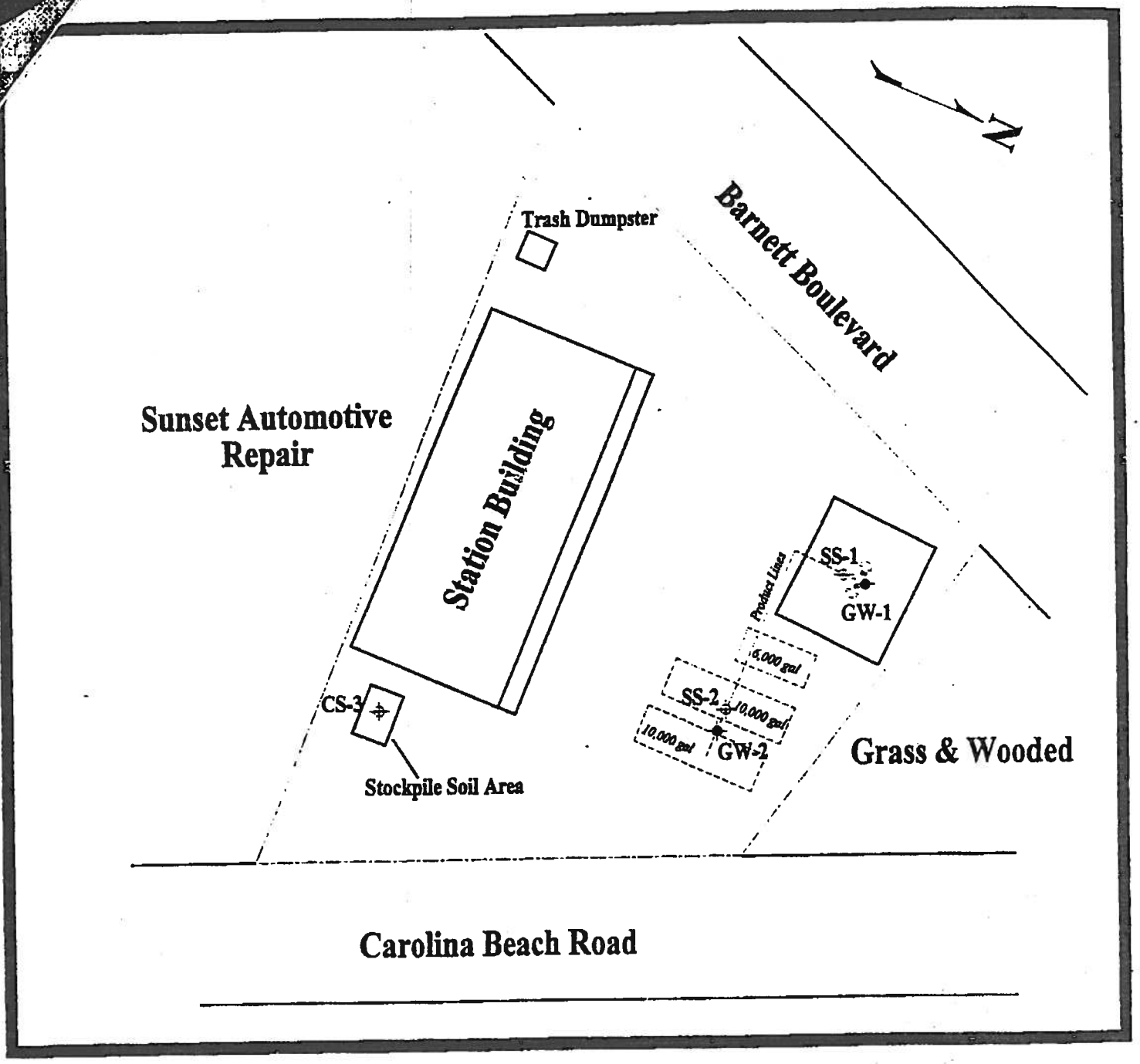
See attached.



NOTE - Map adapted from USGS 7.5 min Wilmington, NC quadrangle

DWG: vicinity.skd BY: MTS REVD: APPR:

Excel Environmental Associates		
MAP TITLE —	Figure 1 Site Vicinity Map Crown Site Number NC- 735 1746 Carolina Beach Road Wilmington, North Carolina	
PROJECT NAME Line Closure Assessment Report		DATE 10/31/97
PROJECT # 97057	DRAWN BY MTS	SCALE 1 inch = 2,000 fee

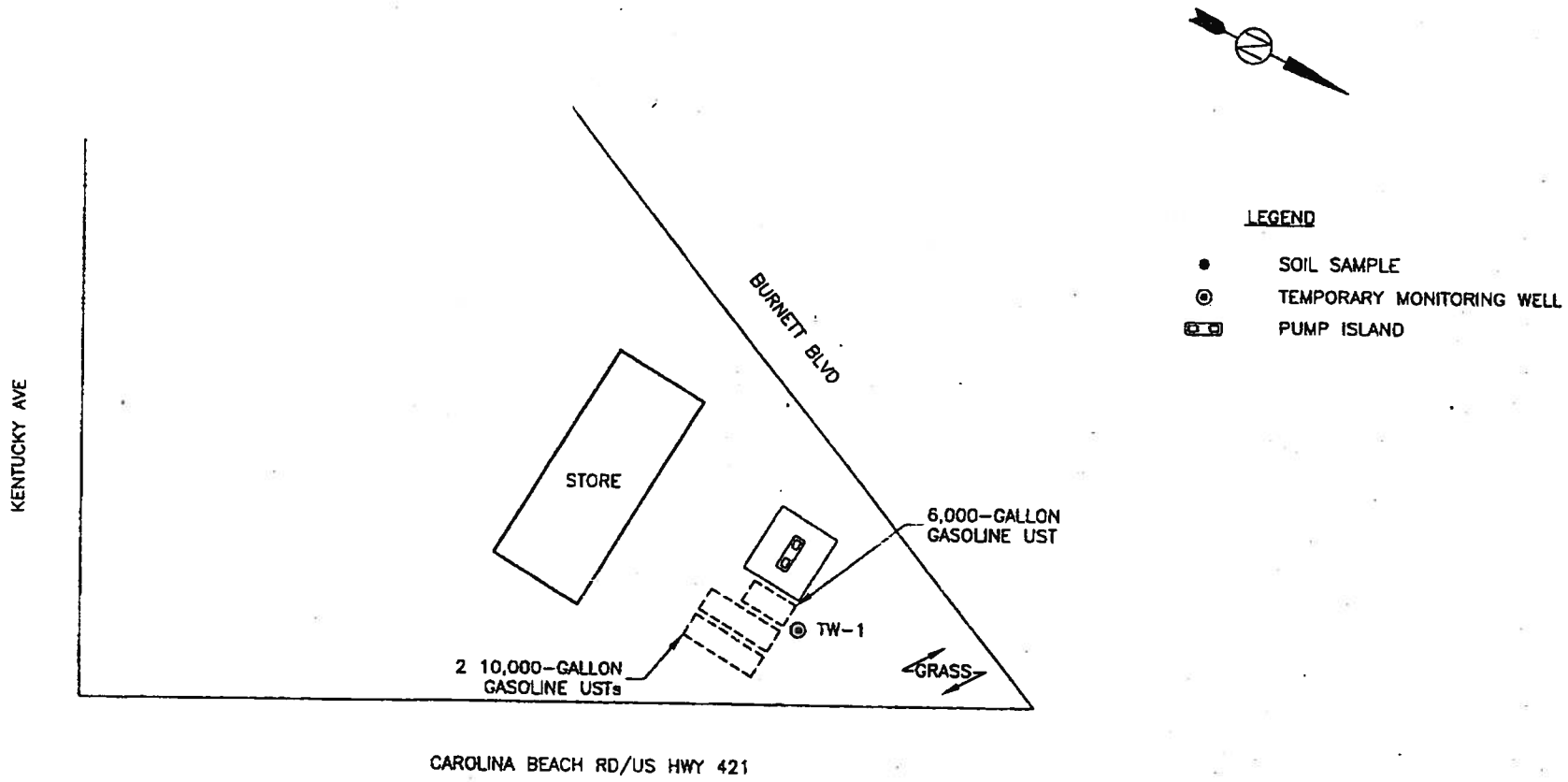


LEGEND

- Soil Sample Locations
- Groundwater Sample Locations

DWG: siteplan.skd BY: MTS REVD: APPR:

Excel Environmental Associates, PLLC		
MAP TITLE	Figure 2 - Site Plan Crown No. NC - 735 1746 Carolina Beach Road Wilmington, North Carolina	
PROJECT NAME Line Closure Assessment		DATE 10/31 9
PROJECT # 97057	DRAWN BY MTS	APPROX. SCALE 1 inch = 30 feet



CBM
ENVIRONMENTAL SERVICES, INC.

SITE I.D. NO.	N/A
PROJECT NO.	70499-33
DRAWN BY:	BLS
CHECKED BY:	DC

SITE MAP

CROWN STORE NC-735
1745 CAROLINA BEACH ROAD
WILMINGTON NC

FIGURE 1

May 19, 2000

Mr. Bruce Reed
NCDENR DWM
Wilmington Regional Office
UST Section
127 Cardinal Drive Extension
Wilmington, NC 28405

Ref.: Groundwater Monitoring Report
Crown NC 735, GW Incident # 18327
1746 Carolina Beach Road
Wilmington, NC

Dear Mr. Reed:

Agra Environmental, Inc., Cary, North Carolina was contracted by Crown Central Petroleum Corporation (Crown) to complete an environmental site investigation for their service station (Crown NC-735) located at 1746 Carolina Beach Road in Wilmington, NC (Figure 1). The site of release is approximately located at latitude 34°12'40" and longitude 77°56'40". A Comprehensive Site Assessment (CSA) report has been previously submitted to the North Carolina Department of Environment and Natural Resources (NCDENR), Division of Waste Management (DWM), Wilmington Regional Office (WiRO) on April 1, 1999. The site assessment was performed in response to a release detected during line closure activities carried out by Excel Environmental Associates (Excel) in October 1997. Currently three (one 6,000 gallon and two 10,000 gallon) regulated Underground Storage Tanks (USTs) holding various grades of gasoline are located on the subject property. The USTs are owned and operated by Crown.

The subject site is currently an active gasoline retail facility and a convenience store (Figure 2). The area within 1,500 feet of the site is predominantly zoned under industrial/commercial category. An intermittent ditch (75 ft. west of the source area of release) and Greenfield Lake (250 ft. northeast of the source area of release, beyond Carolina Beach Rd.) are part of the surface water receptors located within 1,500 feet radius of the source area of release. At least one active water supply well has been identified approx. 350-400 feet southwest of the subject site, at J. T. Lee's L. P. Gas Service facility on Burnett Boulevard. As per information supplied by the property owner, the well is used for truck washing and other non-drinking purposes. Figure 1 shows location of potential receptors within 1,500 feet radius of the source area of release.

In order to investigate the horizontal and vertical extent of soil contamination at the site and the impact on local groundwater, three (3) Type II monitoring wells (MWs 2, 3 & 4) and one (1) Type III monitoring well (MW-5D) were installed during Phase II LSA activities. The subsequent CSA activities involved installation of two (2) additional Type II monitoring wells (MWs 6 & 7) at the subject site. Excel installed MW-1 (1" dia.) in June 1998. Based on the findings of the CSA activities, several dissolved compounds were detected in MW 1. In particular, Benzene and Lead were noted to be present in the local groundwater at 285 ppb and 254 ppb, respectively. None of the contaminants, however, exceeded the gross contaminant levels (GCLs). Based on the findings of the CSA, Agra Environmental recommended additional monitoring for MW-1 and MW-2.

The first groundwater monitoring event (Post-CSA) was performed at the above referenced site on September 18, 1999. A groundwater sample was collected from one (1) existing monitoring well at the site (i.e. MWs 2). MW-1 could not be sampled since it was filled with bentonite. In order to collect a representative groundwater sample, MW-1 previously installed by Excel was replaced by new well MW-1R. The casing and well cover of former MW-1 were removed and a new well (MW-1R) was installed to a total depth of 12' (screened interval 2'-12') by Sage Drilling of Wilmington, NC at the same location on October 15, 1999. Figure 2 shows location of existing monitoring wells and the site layout. The most recent sampling of MW-1R and MW-2 by Agra Environmental, Inc. occurred on January 20, 2000. Well construction data are included in Table 1.

Prior to sampling, the volume of each well was calculated based on the depth of the well and the depth to the water table. Table 2 summarizes the groundwater elevation data. The predominant groundwater flow direction across the subject area is towards MW-2 in the northwest direction (Figure 4). Approximately three (3) well volumes were purged to obtain a homogenous sample from each well. Dedicated polyethylene bailers were utilized to collect the groundwater samples. In each case the samples were collected in 40ml VOA vials with Teflon coated seals and 250 ml plastic jars. All samples were placed on ice and forwarded to the laboratory for analysis. Analysis for Volatile Organics (EPA Method 602, modified to include BTEX, MTBE, EDB, IPE), Purgeable Halocarbons (EPA Method 601), MADEP VPH, and Lead (EPA Method 3030c) were performed by Environmental Science Corp., Mt. Juliet, TN.

Discussion of Sampling Results:

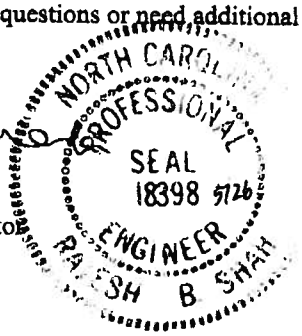
The groundwater laboratory results did not reveal presence of dissolved petroleum compounds above the Gross Contamination Levels (GCLs) established under the risk-based corrective action guidelines. Additionally, none of the compounds detected in MWs 1R and 2 were exceeding 10 times the Class SC tidal water quality standards established under 15A NCAC 2B .0220 (i.e. surface water quality standards). Benzene and Lead were detected at 9.4 ppb and 61 ppb, respectively for MW 1R. Table 3 and Figure 3 summarizes the groundwater laboratory results for MWs 1R and 2. The historical groundwater results are reproduced in Table 4, while Table 5 summarizes the historical water table elevations for the subject site. The complete laboratory results are included in the Appendix.

Conclusions and Recommendation:

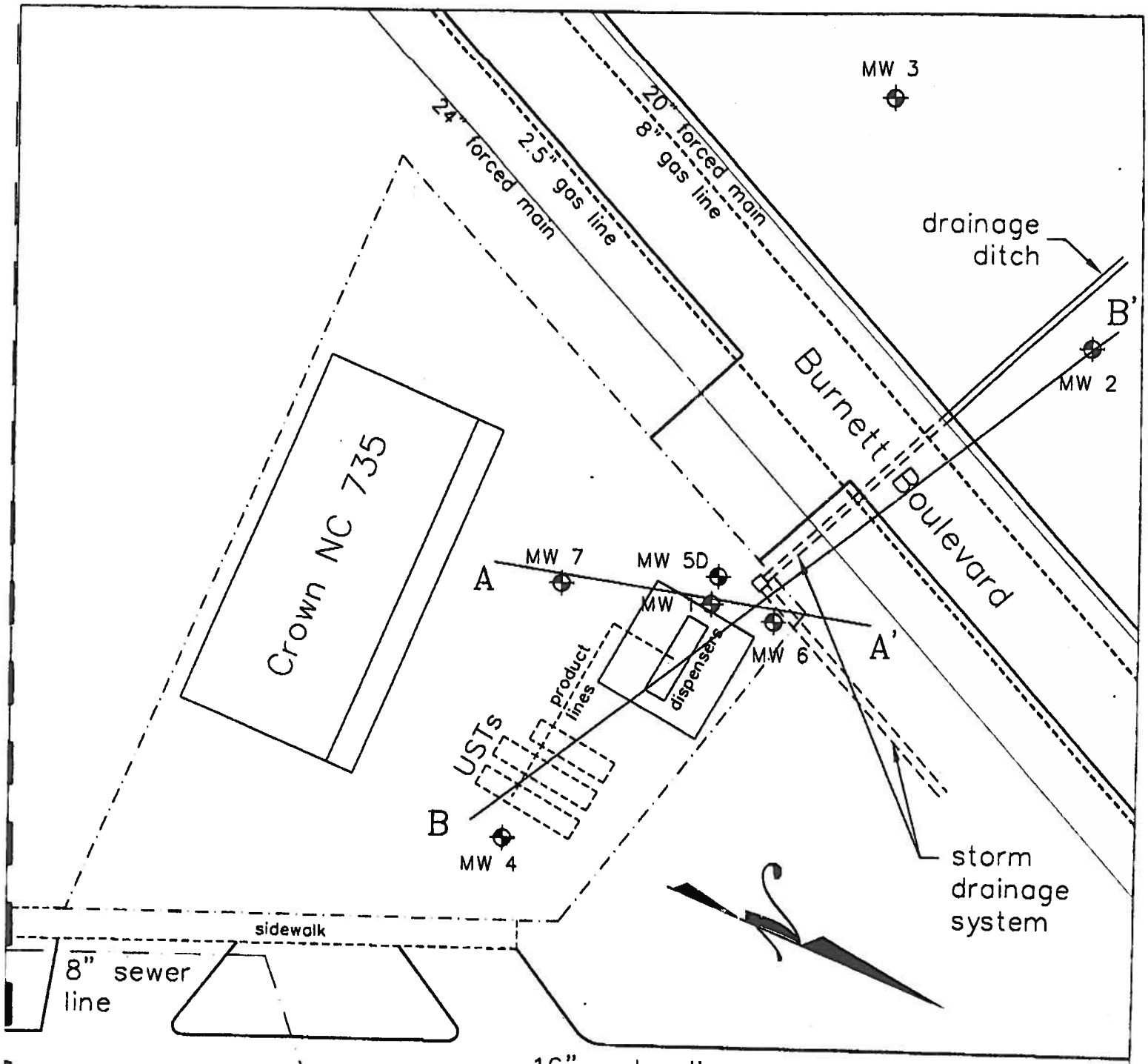
Based on the results of this sampling event for MWs 1R and 2 at the subject site, it appears that the dissolved contaminants in the local groundwater primarily exist near MW-1R. However, the detected levels are below the GCLs and none of the compounds detected exceed 10 times the Class SC Tidal Surface Water Quality Standards, therefore the site may be classified as a low risk. As such, no further action may be necessary at the site at this time subject to the NCDWM approval.

If you have any questions or need additional information, please call me at (919) 858-5350, ext. 101.

Sincerely,



Raj Shah, PE
Technical Director



Site Layout
Crown NC 735
1746 Carolina Beach Road
Wilmington, NC

Agra Environmental, Inc.

P.O. Box 5611 Cary, NC 27512

Figure No:	Scale:	Drawn By:	Checked By:	Date:	Project No:
2	1" = 30'	LC	RS	3/12/99	

Table 5

Historical Water Table Data

Well I.D.	Top of Casing (ft.)	Water Table Elevations (ft.)				
		9/18/98	3/5/99	9/10/99	1/20/00	5/10/00
MW 1R*	Not Surveyed	NM	4.01	-	0.75	1.34
MW 2	4.37	3.04	2.95	3.33	0.89	1.28
MW 3	5.63	3.73	3.48	NM	1.57	NM
MW 4	7.21	6.07	5.01	NM	1.36	NM
MW 5D	6.02	NM	4.47	NM	NM	NM
MW 6	6.12	**	4.59	NM	0.72	NM
MW 7	6.92	**	4.79	NM	1.29	NM

Note:

* MW-1 was replaced by MW-1R on 10/15/99.

** Well not installed

NM Groundwater depth not measured

RECD APR 19 1999

TRANSMITTAL

CROWNCEN MARKETING CO.
One North Charles Street
Baltimore, MD 21201-3709

To: **North Carolina Dept. of Environment and Natural Resources**
UST Section
127 Cardinal Drive Extension
Wilmington, NC 28405

Attn.: **Mr. Bruce Reed**

From: John Wolf
Phone: (410) 659-4862
Fax: (410) 659-4734
E-mail: jwolf@crowncentral.com

Date: 15 April, 1999

In regard to your request for information on soils removal at Fast Fare NC-735, **Incident No. 18327**, I found a little more information, enclosed are:
1) several colour photographs of the line upgrade work documenting initial excavation, vac-work and installation of new lines in approximate reverse chronological order,
2) documents associated with the removal and treatment of 18.77 tons of contaminated soil, removed from the line/dispenser trenches, and
3) documents associated with the pumping and removal for treatment of 2,370 gallons of potentially contaminated water from the line/dispenser trenches.
As discussed, I do not have access to specific measurements, but you may be able to estimate from the photos. Please contact me if you have any questions. Thank you.

1. Executive Summary

Agra Environmental, Inc. was contracted by Crown Central Petroleum Corporation (Crown) to complete a Comprehensive Site Assessment (CSA) for their service station (Crown NC-735) located at 1746 Carolina Beach Rd., Wilmington, North Carolina (Figure 1). Both, Phase I and Phase II LSA reports have previously been submitted to the North Carolina Department of Environment and Natural Resources (NCDENR), Division of Waste Management (DWM), Wilmington Regional Office (WiRO). The Phase I Limited Site Assessment Report was prepared and submitted (July 6, 1998) by Excel Environmental Associates (Excel). Agra Environmental, Inc., conducted the Phase II activities and submitted the report on October 27, 1998.

Three (one 6,000 gallon and two 10,000 gallon) regulated Underground Storage Tanks (USTs) holding various grades of gasoline are located on the subject property. The USTs are currently owned and operated by Crown.

During October 1997, Excel removed old product lines and submitted a line closure report to NCDENR, DWM, WiRO. Elevated levels of hydrocarbon constituents were found above North Carolina action levels in both soil and groundwater samples collected during line closure activities. The Phase I LSA activities were conducted by Excel during April through June 1998. The activities included completion of seven soil borings (B1-B7), one monitoring well (MW-1) and collection of soil and groundwater samples. The soil samples were analyzed for volatile organics by EPA Method 8260 and Total Petroleum Hydrocarbons (TPH) by Method 5030 and MADEP VPH. The groundwater sample was analyzed for EPA Method 601/602, Lead (3030C) and MADEP VPH. The laboratory results revealed soil contamination above the Soil-to-Groundwater Maximum Soil Contaminant Concentrations (MSCCs) levels in the vicinity of the pump island, downgradient from the USTs. The groundwater contamination in MW-1 detected the presence of several compounds that exceeded the 15A NCAC 2L action levels by a factor of 10.

In accordance with the NCDWM rules, a Phase II LSA was prepared. The Phase II LSA activities were conducted by Agra Environmental, Inc. and involved the installation of three (3) Type II and one (1) Type III groundwater monitoring wells on the subject property to determine the extent of soil and groundwater contamination (Figure 2). Soil samples were collected from each well at a depth of 3 feet below ground level and analyzed for EPA Method 8260 and MADEP VPH. The soil laboratory results revealed several constituents above the Soil-to-Groundwater MSCCs in the deep well (MW-5D). Groundwater samples were also collected from all five (5) monitoring wells and analyzed using EPA Methods 601/602, 3030C and MADEP VPH. The groundwater laboratory results revealed constituents above the 15A NCAC 2L standards in both MW 1 and MW-5D.

Agra Environmental, Inc. was further contracted by Crown to complete Comprehensive Site Assessment (CSA) activities at the subject site. The CSA activities involved installation of two (2) additional Type II monitoring wells (MWs 6 and 7) on the subject property (Figure 2). Soil samples were collected from both monitoring wells at the time of installation and analyzed using EPA Method 8260 and MADEP VPH. Groundwater samples were collected from all seven (7) monitoring wells on the site and analyzed using EPA Methods 601/602, 3030C, and MADEP VPH. The soil laboratory results indicated C5-C8 Aliphatic and C9-C10 Aromatic petroleum hydrocarbon fractions above the soil-to-groundwater MSCCs in MW-6 (downgradient). The groundwater laboratory results revealed dissolved constituents in MW-1 and MW-6 above the 15A NCAC 2L standards. The predominant groundwater flow direction is towards the northwest direction.

Due to proximity of surface waters within 500 feet of the source area of the release and potential for impact by the contaminants in the local groundwater, the site can be classified into "Intermediate Risk" site. As such the clean-up level for the site would be the lesser of the industrial/commercial maximum soil contaminant concentrations or the soil-to-groundwater maximum soil contaminant concentrations. The groundwater contaminants must be, at a minimum, remediated to gross contaminant levels (GCLs).

2. Site History and Source Characterization:

The subject property is currently an active retail gasoline station and convenience store. Three (one 6,000 gallon and two 10,000 gallon) regulated Underground Storage Tanks (USTs) holding various grades of gasoline are located on the subject property. During October 1997, as part of site upgrade activities, the existing product lines were replaced, and a Line Closure Report was prepared by Excel. Excel was further contracted by Crown to complete the Phase I Limited Site Assessment (LSA), as per requirements outlined in Notice of Regulatory Requirements issued by the NCDENR, DWM, WiRO. According to the Phase I LSA Report (dated July 6, 1998), soil contamination was noted in the vicinity of the existing pump island. Table 1 summarizes the soil analytical results conducted by Excel (data obtained from Phase I LSA Report). During the Phase I LSA investigation, Excel also installed one (1) shallow monitoring well (MW-1) within the area of contamination. The report revealed the presence of petroleum constituents in the groundwater that exceeded the 15A NCAC 2L standards by factor of 10 in MW-1. Table 2 summarizes the results of groundwater analytical conducted by Excel (data obtained from Phase I LSA Report).

Table 1: - Soil Laboratory Results Boring B-1 to B-7 - Collected on 04/16/98 (by Excel)
Results in parts per million (ppm)

Constituents/Fractions MADEP VPH & EPA Method 8260	B-1	B-2	B-3	B-4	B-5	B-6*	B-7*	Soil-to-Groundwater MSCCs
C5-C8 Alipatics	NA	NA	NA	NA	NA	12.9	**845**	72
C9-C12 Aliphatics	NA	NA	NA	NA	NA	163	982	3255
C9-C10 Aromatics	NA	NA	NA	NA	NA	<1	20.3	34
Benzene	BDL	BDL	BDL	BDL	BDL	**0.0725**	**1.52**	0.0056
n-butylbenzene	BDL	**20.0**	BDL	**19.0**	BDL	0.108	**6.60**	4.0
sec-butylbenzene	BDL	**6.70**	BDL	**6.30**	BDL	0.0413	**3.82**	3.0
Ethylbenzene	BDL	**53.0**	**5.90**	**64.0**	0.023	0.0695	**8.72**	0.240
Naphthalene	0.008	**21.0**	BDL	**24.0**	BDL	0.0718	**7.88**	0.580
p-isopropyltoluene	BDL	BDL	BDL	**10.0**	**0.007**	**0.108**	**0.824**	**
Iso-propylbenzene	BDL	**12.0**	BDL	**18.0**	BDL	0.0533	**4.36**	2.0
n-propylbenzene	0.008	**49.0**	**7.70**	**56.0**	0.009	0.25	**19.40**	2.0
Toluene	BDL	**13.0**	BDL	**28.0**	0.01	0.09	2.27	7.0
1,2,4 – Trimethylbenzene	0.012	**170.0**	**58.0**	**240.0**	0.065	0.09	**26.6**	8.0
1,3,5 – Trimethylbenzene	0.011	**100.0**	**48.0**	**260.0**	0.066	0.0383	6.16	7.0
Xylenes	0.028	**140.0**	**31.0**	**300.0**	0.12	0.049	**8.22**	5.0

Note:
* = B-6 and B-7 soil borings were collected on 06/10/98
** = No regulatory standards exist for this compound. Laboratory detection is considered above the regulatory standard.
BDL=Below Detection limits, NA=Not Analyzed

Table 2: - Groundwater Laboratory Results - MW-1 (Sampled on 06/10/98, by Excel)
Results in parts per billion(ppb)

Constituents Methods 601/602, 3030 C	MW-1	15A NCAC 2L Limits
Benzene	**631**	1
Ethylbenzene	**2,240**	29
Naphthalene	**1,540**	21
Xylenes (Total)	**7,940**	530
MTBE	191	200
Lead	**9,750**	15

In October 1998, Agra Environmental, Inc. was contracted by Crown to further investigate the release and prepare a Phase II LSA report in accordance with the Groundwater Section Guidelines for the Investigation and

1.0 INTRODUCTION

Excel Environmental Associates (Excel) was contracted by Crown Central Petroleum Incorporated (Crown) to complete a Phase I Limited Site Assessment Report for the Crown Convenience Store facility number NC-735 located at 1746 Carolina Beach Road in Wilmington, North Carolina. (Refer to Figure 1). The program was conducted as a result of a Notice of Regulatory Requirements issued by the Division of Water Quality in March, 1998.

The following report will discuss the Phase I Limited Site Assessment activities conducted by Excel during April through June, 1998. The activities included the completion of one monitor well, seven soil borings, collection of liquid level data, soil and groundwater sampling with associated laboratory analysis and the completion of this report.

2.0 BACKGROUND INFORMATION

2.1 Area of Investigation

The facility is located near the intersection of Carolina Beach Road and Barnett Boulevard approximately 200 feet west of Greenfield Lake, New Hanover County, North Carolina. Structures located on the property at the time of this assessment consisted of underground storage tanks, a convenience store building pump islands and canopy (refer to Figure 2). The area to the west, beyond Barnett Boulevard and south of the site is primarily commercial; to the east beyond Carolina Beach Road is Greenfield Lake and to the north is undeveloped City of Wilmington property. During the site assessment, an active water supply well was identified approximately 350 feet downgradient (west) of the property at Lee's LP Gas Service on Barnett Boulevard. The remaining area in the vicinity of the site appears to be served by city water.

There are a total of three (one 6,000 and two 10,000 gallon) regulated steel underground storage tanks containing various grades of gasoline located on the property.

Situated in the Atlantic Coastal Plain Physiographic Province of North Carolina, the elevation in the area of investigation is approximately 20 feet above mean sea level (see Figure 1). The majority of the site is covered by concrete and asphalt, which slopes to the west. Surface drainage generally follows the topography and discharges in a westerly direction.

2.2 Previous Investigations

As part of site upgrade activities at the facility, Excel Environmental Associates completed a line closure project and summarized the information in a report dated October 31, 1997. Elevated levels of hydrocarbon constituents were found above agency action levels in both soil and groundwater samples collected during line closure sampling activities.

1.0 INTRODUCTION

1.1 Site Location

Excel Environmental Associates, (Excel) was requested by Crown Central Petroleum Corporation (Crown) to complete a line closure site assessment at the Crown NC-735 facility located at 1746 Carolina Beach Road, Wilmington, NC. The site is located between Barnett Boulevard and Carolina Beach Road in a primarily commercial area of Wilmington, NC. Surrounding properties include an automotive repair facility and Greenfield Lake. Figure 1, Site Vicinity Map, illustrates the general site location on the USGS 7.5 minute series topographic map, Wilmington, North Carolina quadrangle. Figure 2 illustrates the Site Plan.

1.2 Facility Description

The subject site is open and operates as a service station facility and is owned by Crown. Figure 2 identifies the site features and illustrates the location of the USTs and product lines. Three steel UST, capacities 6,000 gallon and 2 - 10,000 gallon, are utilized at the facility. The lines were replaced as part of an upgrade project at the station.

1.3 Potable Well Search

The subject property appears to be served by municipal water and sewerage service. Greenfield Lake is located approximately 200 feet to the northeast of the site.

2.0 FIELD ACTIVITIES

2.1 Line Closure Activities

Line closure activities were conducted on October 16, 1997. After the lines were removed, soil and groundwater samples were collected in accordance with current agency guidelines.

2.2 Soil and Groundwater Sample Collection

On October 16, 1997, two soil borings were placed along the closed product lines area. Sample locations are depicted on Figure 2. Soil samples were collected from each boring. Soil samples for laboratory analysis were tightly packed into clean glass jars, sealed with a Teflon-lined cap, and stored in a chilled cooler. Soil samples were submitted to a North Carolina certified laboratory to be analyzed for total petroleum hydrocarbons (TPH) by EPA Method 8015 with sample preparation Method 5030 for volatile (gasoline range organics (GRO).

APPENDIX C

BORING LOGS

BORING LOG

CATLIN Engineers and Scientists
214037 Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 214037	**STATE:** NC	**COUNTY:** New Hanover	**LOCATION:** Wilmington
PROJECT NAME: PARCEL 004 - City of Wilmington Property		**LOGGED BY:** Ben Ashba	**BORING ID:** 4-01
		DRILLER: Michael D. Mason	
NORTHING: 169,531	**EASTING:** 2,318,649	**CREW:** CATLIN	
SYSTEM: NCSP NAD 83 (USft)	**BORING LOCATION:** Catch Basin 0407		**LAND ELEV.:** 5.0
DRILL MACHINE: Hand Auger	**METHOD:** Hand Auger	**0 HOUR DTW:** Dry	**BORING DEPTH:** 2.0
START DATE: 5/9/14	**FINISH DATE:** 5/9/14	**24 HOUR DTW:** FIAD	**WATER DEPTH:** --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	SCREENING RESULTS (ppm) 0 250 500 750 1,000	LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION
							0.0	LAND SURFACE	5.0
0.0	G R A B			4-01 (2')			1.0	Orangish brown, Gravelly, f. SAND.	4.0
							2.0	Brown, SAND and Clayey SAND. Moist.	3.0
2.0								Boring Terminated by Auger Refusal at Elevation 3.0 ft due to obstruction.	

▽ = 0hr. DTW ▼ = 24hr. DTW

CATLIN ENVIRO_LOG_214037_NCDOT-BURNETT-BLVD.GPJ CATLIN.GDT 6/26/14

BORING LOG

CATLIN Engineers and Scientists
214037 Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 214037	**STATE:** NC	**COUNTY:** New Hanover		**LOCATION:** Wilmington			
PROJECT NAME: PARCEL 004 - City of Wilmington Property		**LOGGED BY:** Michael D. Mason		**BORING ID:** 4-02			
		DRILLER: Larry Wessell					
NORTHING: 169,548	**EASTING:** 2,318,648	**CREW:** CATLIN					
SYSTEM: NCSP NAD 83 (USft)	**BORING LOCATION:** Catch Basin 0411			**LAND ELEV.:** NM			
DRILL MACHINE: Power Probe	**METHOD:** CPT / DPT		**0 HOUR DTW:** Dry	**BORING DEPTH:** 4.0			
START DATE: 5/16/14	**FINISH DATE:** 5/16/14		**24 HOUR DTW:** FIAD	**WATER DEPTH:** --			

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	SCREENING RESULTS (ppm) 0 250 500 750 1,000	LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION
							0.0	LAND SURFACE	
0.0	G R A B			4-02 (2')				Black, poorly graded SAND. Moist.	
2.0	G R A B			4-02 (4')			2.0	Orangish tan, Clayey SAND. Moist.	
4.0							4.0	Boring Terminated at Depth 4.0 ft	

▽ = 0hr. DTW ▼ = 24hr. DTW

BORING LOG

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214037 Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 214037	**STATE:** NC	**COUNTY:** New Hanover		**LOCATION:** Wilmington	
PROJECT NAME: PARCEL 004 - City of Wilmington Property		**LOGGED BY:** Michael D. Mason		**BORING ID:** 4-03	
		DRILLER: Larry Wessell			
NORTHING: 169,598	**EASTING:** 2,318,696	**CREW:** CATLIN			
SYSTEM: NCSP NAD 83 (USft)	**BORING LOCATION:** Catch Basin 0405			**LAND ELEV.:** NM	
DRILL MACHINE: Power Probe	**METHOD:** CPT / DPT		**0 HOUR DTW:** Dry	**BORING DEPTH:** 4.0	
START DATE: 5/16/14	**FINISH DATE:** 5/16/14		**24 HOUR DTW:** FIAD	**WATER DEPTH:** --	

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	SCREENING RESULTS (ppm) 0 250 500 750 1,000	LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION
							0.0	LAND SURFACE	
0.0	G R A B			4-03 (2')			1.0	Black, poorly graded SAND. Moist.	
2.0	G R A B						2.0	Orange, poorly graded SAND. Moist. Wet at bottom.	
4.0								Boring Terminated at Depth 4.0 ft	

▽ = 0hr. DTW ▼ = 24hr. DTW

CATLIN ENVIRO_LOG_214037_NCDOT-BURNETT-BLVD.GPJ CATLIN.GDT 6/26/14

BORING LOG

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214037 Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 214037	**STATE:** NC	**COUNTY:** New Hanover		**LOCATION:** Wilmington			
PROJECT NAME: PARCEL 004 - City of Wilmington Property		**LOGGED BY:** Ben Ashba		**BORING ID:** 4-04			
		DRILLER: Michael D. Mason					
NORTHING: 169,650	**EASTING:** 2,318,690	**CREW:** CATLIN					
SYSTEM: NCSP NAD 83 (USft)	**BORING LOCATION:** Catch Basin 0404			**LAND ELEV.:** 6.0			
DRILL MACHINE: Hand Auger	**METHOD:** Hand Auger		**0 HOUR DTW:** Dry	**BORING DEPTH:** 4.0			
START DATE: 5/9/14	**FINISH DATE:** 5/9/14		**24 HOUR DTW:** FIAD	**WATER DEPTH:** --			

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	SCREENING RESULTS (ppm) 0 250 500 750 1,000	LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION
							0.0	LAND SURFACE	6.0
0.0	G R A B			4-04 (2')			1.0	Black, Silty SAND.	5.0
2.0	G R A B			4-04 (4')			4.0	Orangish brown, Clayey SAND. Moist @ 2'.	2.0
4.0								Boring Terminated at Elevation 2.0 ft	

▽ = 0hr. DTW ▼ = 24hr. DTW

CATLIN ENVIRO_LOG_214037_NCDOT-BURNETT-BLVD.GPJ CATLIN.GDT 6/26/14

BORING LOG

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214037 Wilmington, NC
SHEET 1 OF 1

PROJECT NO.: 214037	**STATE:** NC	**COUNTY:** New Hanover		**LOCATION:** Wilmington			
PROJECT NAME: PARCEL 004 - City of Wilmington Property		**LOGGED BY:** Ben Ashba		**BORING ID:** 4-05			
		DRILLER: Michael D. Mason					
NORTHING: 169,625	**EASTING:** 2,318,725	**CREW:** CATLIN					
SYSTEM: NCSP NAD 83 (USft)	**BORING LOCATION:** Catch Basin 0403			**LAND ELEV.:** 6.3			
DRILL MACHINE: Hand Auger	**METHOD:** Hand Auger		**0 HOUR DTW:** Dry	**BORING DEPTH:** 4.0			
START DATE: 5/9/14	**FINISH DATE:** 5/9/14		**24 HOUR DTW:** FIAD	**WATER DEPTH:** --			

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	SCREENING RESULTS (ppm) 0 250 500 750 1,000	LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION
							0.0	LAND SURFACE	6.3
0.0	GRAB			4-05 (2')			1.0	Black, Silty SAND.	5.3
2.0	GRAB			4-05 (4')			4.0	Orangish brown, Clayey SAND. Moist @ 2'. Strong HCO & black staining and hydrocarbon sheen from 3.8'-4.0'.	2.3
4.0								Boring Terminated at Elevation 2.3 ft	

▽ = 0hr. DTW ▼ = 24hr. DTW

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BORING LOG

CATLIN Engineers and Scientists
214037 Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 214037	**STATE:** NC	**COUNTY:** New Hanover	**LOCATION:** Wilmington
PROJECT NAME: PARCEL 004 - City of Wilmington Property		**LOGGED BY:** Ben Ashba	**BORING ID:** 4-06
		DRILLER: Michael D. Mason	
NORTHING: 169,588	**EASTING:** 2,318,741	**CREW:** CATLIN	
SYSTEM: NCSP NAD 83 (USft)	**BORING LOCATION:** Catch Basin 0403 along drainage		**LAND ELEV.:** 6.7
DRILL MACHINE: Hand Auger	**METHOD:** Hand Auger	**0 HOUR DTW:** Dry	**BORING DEPTH:** 2.0
START DATE: 5/9/14	**FINISH DATE:** 5/9/14	**24 HOUR DTW:** FIAD	**WATER DEPTH:** --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	SCREENING RESULTS (ppm) 0 250 500 750 1,000	LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION
							0.0	LAND SURFACE	6.7
0.0	G R A B			4-06 (2')			0.5	Dark brown to black, Silty/Gravelly, f. SAND. Organics. Topsoil.	6.2
								Silty/Gravelly SAND.	
2.0							2.0		4.7
								Boring Terminated at Elevation 4.7 ft	

▽ = 0hr. DTW ▼ = 24hr. DTW

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BORING LOG

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214037 Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 214037	**STATE:** NC	**COUNTY:** New Hanover	**LOCATION:** Wilmington
PROJECT NAME: PARCEL 004 - City of Wilmington Property		**LOGGED BY:** Ben Ashba	**BORING ID:** 4-07
		DRILLER: Michael D. Mason	
NORTHING: 169,547	**EASTING:** 2,318,761	**CREW:** CATLIN	
SYSTEM: NCSP NAD 83 (USft)	**BORING LOCATION:** South of 4-06 along drainage		**LAND ELEV.:** 6.7
DRILL MACHINE: Hand Auger	**METHOD:** Hand Auger	**0 HOUR DTW:** Dry	**BORING DEPTH:** 2.0
START DATE: 5/9/14	**FINISH DATE:** 5/9/14	**24 HOUR DTW:** FIAD	**WATER DEPTH:** --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	SCREENING RESULTS (ppm) 0 250 500 750 1,000	LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION
							0.0	LAND SURFACE	6.7
0.0	G R A B			4-07 (2')			0.5	Dark brown to black, Silty/Gravelly, f. SAND. Organics. Topsoil.	6.2
								Silty/Gravelly SAND.	
2.0							2.0		4.7
								Boring Terminated at Elevation 4.7 ft	

▽ = 0hr. DTW ▼ = 24hr. DTW

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BORING LOG

CATLIN Engineers and Scientists
214037 Wilmington, NC
SHEET 1 OF 1

PROJECT NO.: 214037	**STATE:** NC	**COUNTY:** New Hanover	**LOCATION:** Wilmington
PROJECT NAME: PARCEL 004 - City of Wilmington Property		**LOGGED BY:** Ben Ashba	**BORING ID:** 4-08
		DRILLER: Michael D. Mason	
NORTHING: 169,509	**EASTING:** 2,318,777	**CREW:** CATLIN	
SYSTEM: NCSP NAD 83 (USft)	**BORING LOCATION:** Proposed drainage north of CB0402		**LAND ELEV.:** 7.1
DRILL MACHINE: Hand Auger	**METHOD:** Hand Auger	**0 HOUR DTW:** Dry	**BORING DEPTH:** 2.0
START DATE: 5/9/14	**FINISH DATE:** 5/9/14	**24 HOUR DTW:** FIAD	**WATER DEPTH:** --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	SCREENING RESULTS (ppm) 0 250 500 750 1,000	LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION
							0.0	LAND SURFACE	7.1
0.0	G R A B			4-08 (2')			0.5	Dark brown to black, Silty/Gravelly, f. SAND. Organics. Topsoil.	6.6
								Silty/Gravelly SAND.	
2.0							2.0		5.1
								Boring Terminated at Elevation 5.1 ft	

▽ = 0hr. DTW ▼ = 24hr. DTW

CATLIN ENVIRO_LOG_214037_NCDOT-BURNETT-BLVD.GPJ CATLIN.GDT 6/26/14

BORING LOG

CATLIN Engineers and Scientists
214037 Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 214037	**STATE:** NC	**COUNTY:** New Hanover		**LOCATION:** Wilmington			
PROJECT NAME: PARCEL 004 - City of Wilmington Property		**LOGGED BY:** Ben Ashba		**BORING ID:** 4-09			
		DRILLER: Michael D. Mason					
NORTHING: 169,478	**EASTING:** 2,318,795	**CREW:** CATLIN					
SYSTEM: NCSP NAD 83 (USft)	**BORING LOCATION:** Catch Basin 0402			**LAND ELEV.:** 7.4			
DRILL MACHINE: Hand Auger	**METHOD:** Hand Auger		**0 HOUR DTW:** Dry	**BORING DEPTH:** 4.0			
START DATE: 5/9/14	**FINISH DATE:** 5/9/14		**24 HOUR DTW:** FIAD	**WATER DEPTH:** --			

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	SCREENING RESULTS (ppm) 0 250 500 750 1,000	LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION
							0.0	LAND SURFACE	7.4
0.0							0.5	Dark brown to black, Silty/Gravelly, f. SAND. Organics. Topsoil.	6.9
	GRAB			4-09 (2')				Silty/Gravelly SAND.	
2.0							2.0		5.4
	GRAB			4-09 (4')				Orangish brown, f. SAND to Clayey, f. SAND.	
4.0							4.0		3.4
								Boring Terminated at Elevation 3.4 ft	

▽ = 0hr. DTW ▼ = 24hr. DTW

CATLIN ENVIRO_LOG_214037_NCDOT-BURNETT-BLVD.GPJ CATLIN.GDT 6/26/14

APPENDIX D

QROS QED™ REPORT

QED

AQROS

Hydrocarbon Analysis Results

Client: CATLIN / NCDOT
Address: 220 Old Dairy Rd.
Wilmington, NC 28405

Samples taken Friday, May 09, 2014
Samples extracted Friday, May 09, 2014
Samples analysed Monday, May 12, 2014

Contact: Ben Ashba

Operator Rachel Menoher

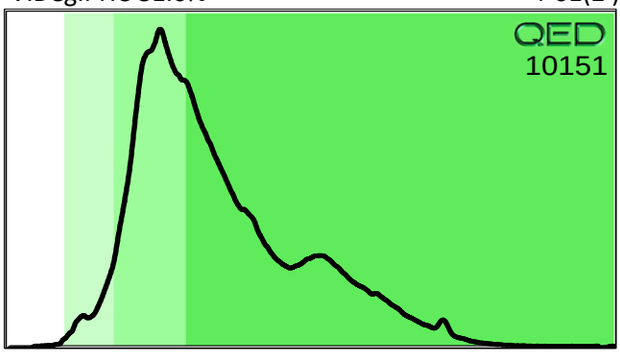
Project: Parcel 4 NCDOT Front St. and Burnett Blvd - WBS: 17BP.3.R.28
CATLIN Project No. 214037

Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match
										% light	% mid	% heavy	
s	4-01(2')	279.0	<14	<14	125	125	83.96	15.5	<0.279	49.9	41.4	8.7	V.Deg.PHC 81.6%
s	4-04(2')	25.0	<1.3	<1.3	34.9	34.9	27.07	4.79	0.207	31.7	47.5	20.8	Deg.Fuel 59.1%
s	4-04(4')	22.0	<1.1	<1.1	7.66	7.66	7.05	2.02	0.073	46.1	31.3	22.6	V.Deg.PHC 51.2%
s	4-05(2')	22.0	<1.1	<1.1	38.94	38.94	29.98	4.43	0.29	27.2	50.6	22.2	Deg.Fuel 57.1%
s	4-05(4')	24.0	<1.2	<1.2	46.99	46.99	42.86	5.27	0.156	41.9	45.4	12.7	V.Deg.PHC 77.6%
s	4-06(2')	268.0	<13.4	<13.4	63.9	63.9	58.63	14.2	1.01	38.8	41.2	20	V.Deg.PHC 67%
s	4-07(2')	322.0	<16.1	<16.1	44.63	44.63	41.11	13.66	0.839	35.4	39.2	25.4	V.Deg.PHC 59.9%
s	4-08(2')	291.0	<14.6	<14.6	861.3	861.3	658.3	68.11	2.36	29.6	54.9	15.5	V.Deg.PHC 69.1%
s	4-09(2')	12.0	<0.6	<0.6	<0.12	<0.12	<0.12	0.06	<0.012	18.9	9.2	71.9	PAH (P)
s	4-09(4')	13.0	<0.7	<0.7	<0.13	<0.13	<0.13	0.06	<0.013	18.6	14.1	67.2	PAH (P)
	Initial Calibrator QC check			OK				Final FCM QC Check			OK		97.6%

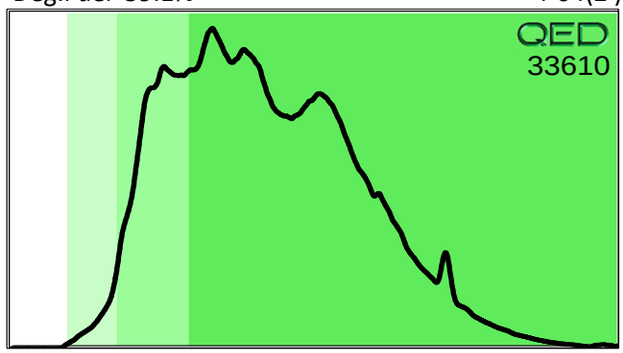
Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content

Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library (SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present

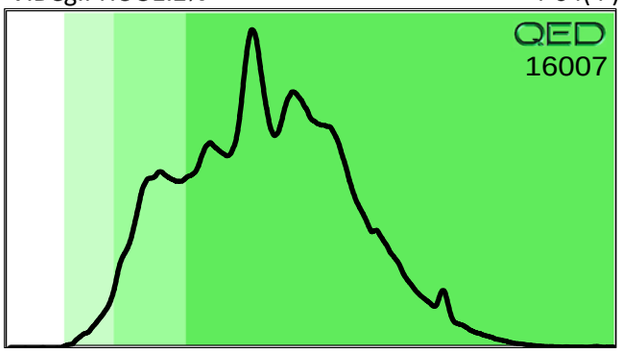
V.Deg.PHC 81.6% 4-01(2')



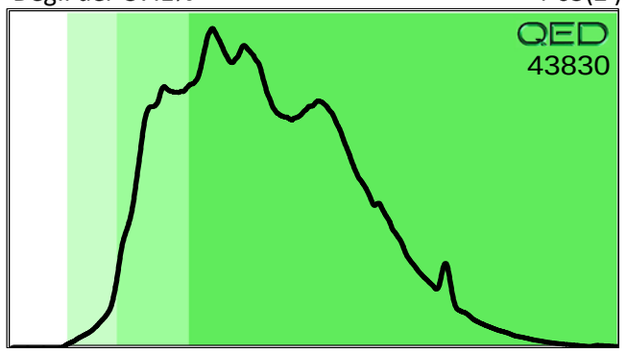
Deg.Fuel 59.1% 4-04(2')



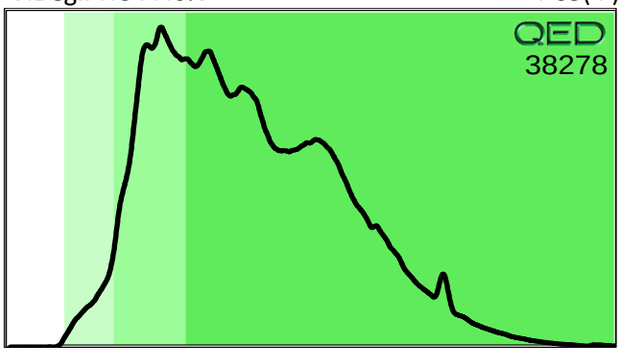
V.Deg.PHC 51.2% 4-04(4')



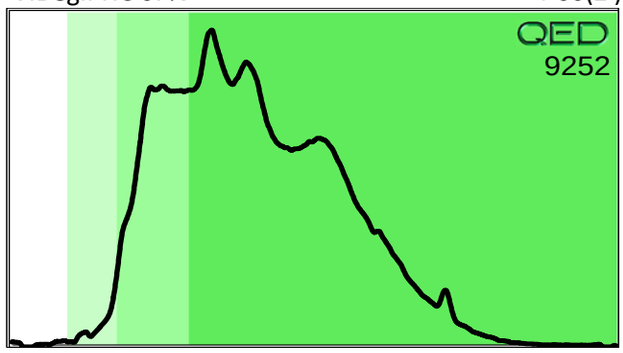
Deg.Fuel 57.1% 4-05(2')



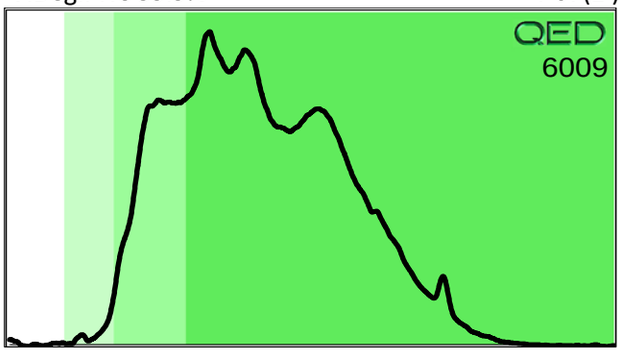
V.Deg.PHC 77.6% 4-05(4')



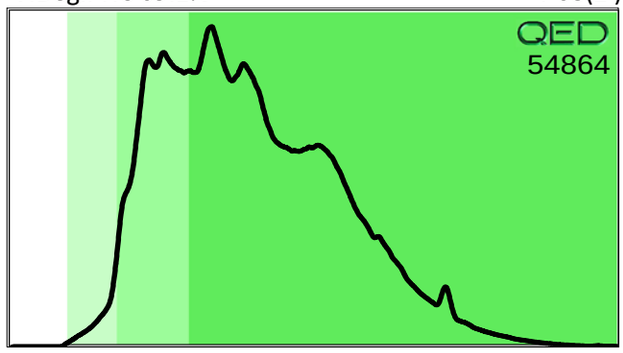
V.Deg.PHC 67% 4-06(2')



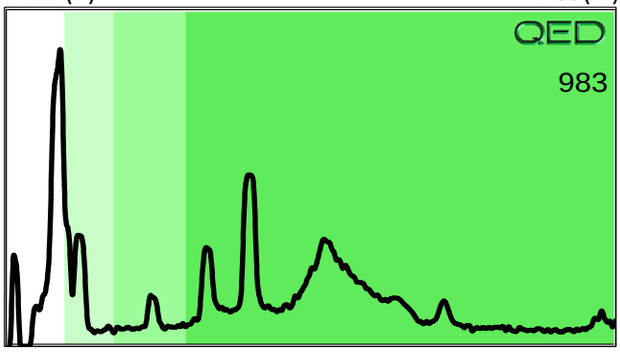
V.Deg.PHC 59.9% 4-07(2')



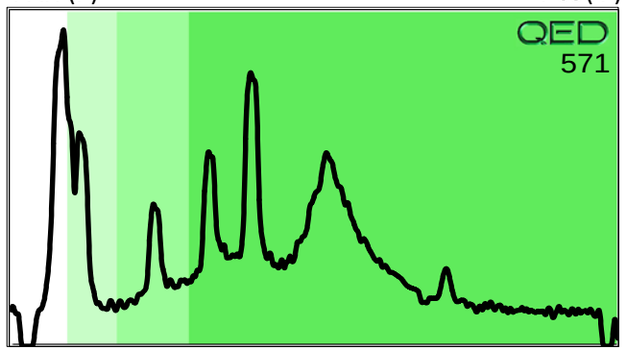
V.Deg.PHC 69.1% 4-08(2')



PAH (P) 4-09(2')



PAH (P) 4-09(4')



Chain of Custody Record and Analytical Request Form

Sample ID	Sample Collection			TAT Requested	
QED UVF	Date	Time	Initials	24 Hour	48 Hour
4-01(2')	5.9.14	1230	BA		X
4-04(2')		1330	BA		
4-04(4')		1305	BA		
4-05(2')		1310	BA		
HOT→ 4-05(4')		1315	BA		
4-06(2')		1330	BA		
4-07(2')		1340	BA		
4-08(2')		1345	BA		
4-09(2')		1350	BA		
4-09(4')		1355	BA		

Client: CATLIN

Contact: Ben Ashba

Phone: 910-471-3454

Email: ben.ashba@catlinusa.com

Project Reference: DOT Front St. & Burnett Blvd. 214037

PO#140512-1

Each Sample will be analyzed for total

BTEX, GRO, DRO, TPH, and PAH

Each Sample will generate a fingerprint representative of the petroleum product within the sample. Electronic Data will be submitted to the email above.

Relinquished by	Date/time	Accepted by	Date/time
Ben Ashba	5.12.14	[illegible]	5-12-14 8:00 A.M.
Relinquished by	Date/time	Accepted by	Date/time
Relinquished by	Date/time	Accepted by	Date/time

SHIP TO: QROS

420 Raleigh Street Suite E

Wilmington, NC 28412

Rachel Menoher-
rachelm@grosllc.com

910-520-2902

QED

AQROS

Hydrocarbon Analysis Results

Client: Catlin
Address: Wilmington, NC

Samples taken Friday, May 16, 2014
Samples extracted Friday, May 16, 2014
Samples analysed Monday, May 19, 2014

Contact: Ben Ashba

Operator Rachel Menoher

Project: Parcel 4 NCDOT Front St. and Burnett Blvd - WBS: 17BP.3.R.28
CATLIN Project No. 214037

Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match
										% light	% mid	% heavy	
s	4-02 (2')	39.0	<1.9	<1.9	44.8	44.8	41.08	2.64	<0.039	29	54.5	16.5	V.Deg.PHC 77.1%
s	4-02 (4')	33.0	<1.6	<1.6	4.6	4.6	4.21	0.32	<0.033	49.9	33.7	16.5	V.Deg.PHC 72.2%
s	4-03 (2')	19.0	<1	<1	6.59	6.59	6.04	0.46	0.043	38.9	41.7	19.4	V.Deg.PHC 69.6%

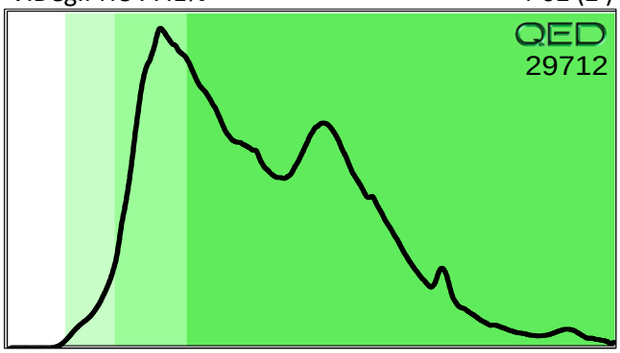
Initial Calibrator QC check OK Final FCM QC Check OK 99.5%

Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content

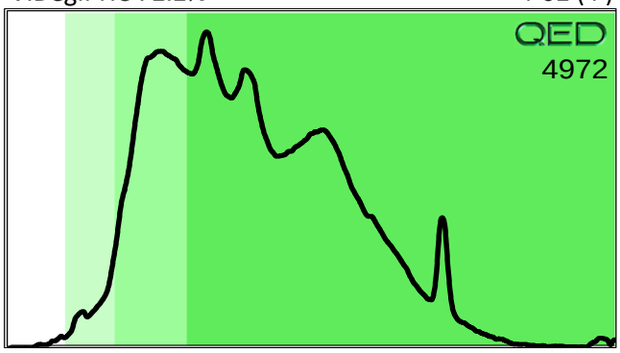
Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library

(SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present

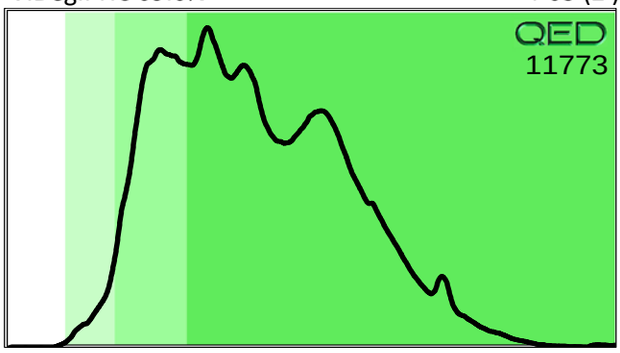
V.Deg.PHC 77.1% 4-02 (2')



V.Deg.PHC 72.2% 4-02 (4')



V.Deg.PHC 69.6% 4-03 (2')



Chain of Custody Record and Analytical Request Form

Sample ID	Sample Collection			TAT Requested	
QED UVF	Date	Time	Initials	24 Hour	48 Hour
4-02 (2')	5.16.14	0935	MWM		X
4-02 (4')	↓	0935	MWM		X
4-03 (2')	↓	1015	MWM		X

Client: CATLIN

Contact: Ben Ashby

Phone: 910-452-5861

Email: ben.ashby@catlinusa.com

Project Reference:

214037

PO# 05140519-1

Each Sample will be analyzed for total

BTEX, GRO, DRO, TPH, and PAH

Each Sample will generate a fingerprint representative of the petroleum product within the sample. Electronic Data will be submitted to the email above.

Relinquished by	Date/time	Accepted by	Date/time
Michael Mann	5/19/14 0830	Ben Ashby	
Relinquished by	Date/time	Accepted by	Date/time
Ben Ashby			5/19/14 9:30
Relinquished by	Date/time	Accepted by	Date/time

SHIP TO: QROS

420 Raleigh Street Suite E

Wilmington, NC 28412

Rachel Menoher-
rachelm@qrosllc.com

910-520-2902