

PRELIMINARY SITE ASSESSMENT

**PARCEL 5 – SARAH M. BLAKE PROPERTY
101 BELL FORK RD.
JACKSONVILLE, ONSLOW COUNTY, NORTH CAROLINA**

**TIP NUMBER. U-5728
WBS NUMBER: 54019.1.1
DESCRIPTION: US 17 BUSINESS (MARINE BLVD.) TO SR 1308 (BELL FORK
RD.) INTERSECTION IMPROVEMENTS**

PREPARED FOR:



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

JANUARY 25, 2019

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CATLIN PROJECT NO. 218123

**CORPORATE GEOLOGY LICENSE CERTIFICATION NO. C-118
CORPORATE LICENSURE NO. FOR ENGINEERING SERVICES C-0585**

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**PRELIMINARY SITE ASSESSMENT
FOR
PARCEL 5 – SARAH M. BLAKE
101 BELL FORK RD.
JACKSONVILLE, NORTH CAROLINA**

**TIP NUMBER: U-5728
WBS NUMBER: 54019.1.1**

JANUARY 25, 2019

1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) is planning construction activities and acquisition of the right-of-way (ROW) and/or easement is necessary for roadway improvements in Jacksonville, North Carolina (TIP Number U-5728, WBS Number 54019.1.1). NCDOT has indicated a site investigation is necessary to determine if underground storage tanks (UST) and/or contaminated soils are present.

2.0 PURPOSE OF INVESTIGATION AND DESCRIPTION

CATLIN Engineers and Scientists (CATLIN) was retained by the NCDOT Geotechnical Engineering Unit to provide a field investigation concluding with a Preliminary Site Assessment (PSA) for the above site. In response to a request for proposal by Mr. John Pilipchuk, L.G. P.E. and Mr. Craig Haden dated October 24, 2018, CATLIN submitted a proposal for conducting an investigation at Parcel 5 – Sarah M. Blake property, 101 Bell Fork Rd. along the NCDOT Project “*US 17 Business (Marine Blvd) at SR 1308 (Bell Fork Rd) Intersection Improvements*” in Jacksonville, North Carolina. Sheet 1 illustrates the general location of the site. The NCDOT Conventional Plan Sheet symbols are provided on Sheet 2.

According to NCDOT acquisition of the ROW is necessary for roadway construction (TIP Number U-5728) and specifically at the above referenced parcel (Parcel 5). A site investigation was requested before ROW acquisition and roadway construction. No USTs have been identified within the proposed ROW and/or easement(s).

The work scope as requested includes:

- Conduct a database search for any North Carolina Department of Environmental Quality (NCDEQ) reports associated with the properties.
- Locate all USTs and determine approximate size and contents (if any).
- Determine if contaminated soils are present.

- Test soil for contaminants relevant to the site's past use and/or possible release(s). For petroleum contaminants, Ultra-Violet Fluorescence (UVF) analysis is the preferred testing method.
- Collect a groundwater sample on Parcel 5.
- Include (as a standard delivery item) the RedLab graphs in reports and send the GeoEnvironmental Section a copy of the RedLab Excel file(s).
- 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 soil borings, USTs, soil contamination and monitoring wells.
- Prepare a report including field activities, findings, and recommendations for each site and submit one electronic copy to the NCDOT GeoEnvironmental Section.

This report documents our activities and findings at Parcel 5: Sarah M. Blake property, 101 Bell Fork Rd. Jacksonville, North Carolina.

3.0 METHODS

Proposed boring/sample locations were discussed and agreed upon before boring advancement.

The NCDEQ Laserfiche WebLink and GIS Maps were searched for documents/incidents at the site. Maps searched included: Debris Sites, UST Registered Tanks, Dry Cleaning Solvent Act, Hazardous Waste Sites, UST Incidents, Inactive Hazardous Sites, Manufactured Gas Plants, Pre-regulatory Landfills, Brownfields Sites and Boundaries, and Federal Remediation Sites.

CATLIN coordinated geophysical activities with Pyramid Geophysical Services (Pyramid). The geophysical investigation methods and site photographs are detailed in the Pyramid geophysical report provided in Appendix A.

CATLIN proposed utilizing QROS UVF On-Site Rapid Measurement Techniques and Tools (QED™ Analyzer) by RedLab to evaluate potential for petroleum and Poly Aromatic Hydrocarbon (PAH) impacts to soil in a cost effective manner. Soil samples collected from above the approximate water table depth with total petroleum hydrocarbon (TPH) concentrations greater than 100 milligrams per kilogram (mg/kg) diesel range organics (DRO) or 50 mg/kg gasoline range organics (GRO) will be considered contaminated for estimated impacted 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 contaminated sample location or the property line/easement.

Borings advanced during this investigation are identified with “SB5-” and numbered sequentially “1,” “2,” “3,” “4,” “5,” and “6”. Soil samples for analysis per QROS QED™ Analyzer were identified by boring number and depth [example: SB5-1 (3’)]. CATLIN’s field activities at the site began on November 28, 2018 and concluded on November 29, 2018.

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 a PowerProbe 9600 (PowerProbe). When using the PowerProbe, the borings are advanced to depth by static force and a 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 B). Soils were removed from the liner in two (2) foot intervals and placed in sealable polyethylene bags for organic volatile (headspace) analysis (OVA) utilizing a MiniRAE 3000 Photoionization Detector. The OVA results were documented on field logs and are included on the boring logs in Appendix B. Soil samples were selected and packed in appropriate glassware for analysis. One (1) soil sample was collected from each soil boring location.

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 RedLab in Wilmington, NC. Sample integrity was maintained by following proper Chain of Custody (COC) procedures. A copy of the COC is provided following the analytical report in Appendix C.

Following boring termination and tooling removal, new one-inch slotted poly vinyl chloride (PVC) well screen and casing was installed in the SB5-5 borehole. A grab groundwater sample was collected utilizing a peristaltic pump and new polyethylene tubing. Groundwater was

pumped directly into laboratory provided glassware. New, disposable nitrile gloves were worn when handling well material and while collecting groundwater samples. The samples were packed on ice in an insulated cooler for transportation to the laboratory. Sample integrity was maintained by following proper COC procedures (see Appendix C). Groundwater samples were submitted to SGS North America Inc. (SGS) for analysis per Environmental Protection Agency (EPA) Methods 625 and 6200B for the presence of semi-volatile and volatile organics.

The PVC materials were subsequently removed from the boring and the boring was backfilled to near the surface using three-eighth inch bentonite chips. Bentonite and water were poured into the borehole simultaneously to facilitate hydration. The boring was then backfilled to the surface with native material.

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 NCDEQ for petroleum contamination determination. Complete QROS QED™ procedures are on file with the NCDEQ and are available upon request. The QROS QED™ analysis was conducted by RedLab personnel at their laboratory in Wilmington, North Carolina. QROS QED™ analysis provides Total Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), DRO, GRO, TPH, total Aromatics (C10-C35) and Total 16 EPA PAH concentrations.

Following boring advancement, selected soils were placed in the appropriately labeled glassware. In an attempt to provide information regarding possible petroleum compound impact(s) to soils and/or groundwater with reasonable analytical expense, soil samples were analyzed using UVF and groundwater samples were analyzed using EPA Methods 6200B and 625.

A total of 6 soil samples were submitted to RedLab and one (1) groundwater sample was submitted to SGS. COC documentation is included in Appendix C.

4.0 FIELD ACTIVITIES

4.1 CURRENT SITE CONDITIONS AND FIELD OBSERVATIONS

The property at this location includes a gravel parking lot, some reinforced concrete and a small building utilized for retail seafood sales by Blue Seafood.

Photographs taken during the geophysical investigation are included in the geophysical survey report provided in Appendix A.

Sheet 3 illustrates the subject site with soil boring and sample locations.

4.2 SOIL SAMPLING

A total of six (6) borings were advanced as part of this investigation. A total of six (6) soil samples were collected from soil borings, one (1) from each boring, and submitted for analysis. Boring/sample locations are illustrated on Sheet 3. Boring Logs are included in Appendix B.

Soil borings (except borings SB5-3 and SB5-5) were advanced to four (4) feet below land surface (BLS) and terminated in sandy clay. Borings SB5-3 and SB5-5 were terminated at eight (8) feet BLS in saturated sand. 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. Borings were located at/near proposed drainage features. A total of six (6) soil samples were submitted to RedLab for QED™ analysis. The COC documentation is included in Appendix C.

4.3 GROUNDWATER SAMPLING

One (1) groundwater sample was collected from boring SB5-5 and submitted for analysis per EPA Methods 6200B and 625 under proper COC protocol (see Appendix C).

4.4 SURVEYING

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

5.0 RESULTS

Database Search

No recorded incidents were identified at 101 Bell Fork Road, the Parcel 5 site.

Geophysical Investigation

The purpose of the geophysical survey was to evaluate the potential presence of metal USTs and vent pipes in the accessible areas of the NCDOT ROW and/or easement at Parcel 5.

The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A number of EM anomalies were identified. All the EM anomalies were directly attributed to visible cultural features at the ground surface. Collectively, the geophysical data recorded no evidence of metallic USTs at Parcel 5. The complete geophysical survey report by Pyramid is included in Appendix A.

Soil

Sands and clays were encountered across the site to four (4) feet BLS. Generally, clay content increased with depth to four (4) feet deep and then clay content decreased from four (4) to eight (8) feet BLS. No petroleum/hydrocarbon odor was noted in boring samples. Complete boring logs are provided in Appendix B.

The complete analytical report is provided in Appendix C. Soil sample locations are illustrated on Sheet 3. No TPH DRO or GRO concentrations were detected above the detection limits except 2.1 milligrams per kilogram (mg/kg) GRO in the SB5-2 (3') sample and 0.29 mg/kg DRO in the SB5-4 (3') sample. Boring locations and soil sample results are summarized on Table 1 and Sheet 4.

Groundwater

No EPA Method 6200B or Method 625 compounds were detected above the method detection limits or the North Carolina Administrative Code (NCAC) T15A:02L Groundwater Quality Standards (2L GWQS). The groundwater sample location is illustrated on Sheet 3 and the complete laboratory analytical report is provided in Appendix C. Groundwater was encountered at approximately seven (7) feet BLS in the SB5-3 and SB5-5 borings. Groundwater sample results are summarized on Table 2. The groundwater sample location and summarized results are illustrated on Sheet 4. The complete laboratory analytical report is provided in Appendix D.

6.0 SUMMARY AND CONCLUSIONS

The Parcel 5 site at 101 Bell Fork Road in Jacksonville, NC is currently used by Blue Seafood for retail seafood sales. Historically use is unknown but no signs of USTs were identified during site reconnaissance or through geophysical surveying. Database searches did not reveal any reported incidents at the site. Soil and groundwater samples (6 soil, 1 groundwater) did not reveal TPH DRO/GRO or semi-volatile/volatile organic impacts, respectively above any applicable standards. The proposed construction at the site is not suspected to encounter contaminated soil or groundwater.

7.0 LIMITATIONS

This report is based on the agreed work scope and a review of available data from limited sampling. It is possible that this investigation may have failed to reveal the presence of contamination in the project area where such contamination may exist. Although CATLIN has used accepted methods appropriate for soil and groundwater sampling, CATLIN cannot guarantee that additional soil and/or groundwater contamination does not exist.

8.0 SIGNATURES

(Document Not Considered Final Unless All Signatures Are Completed)

DocuSigned by:
Benjamin J Ashba
DAC04414197D4F0...



2/4/2019

Benjamin J. Ashba, P.G.
Project Manager

DocuSigned by:
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Christian B. Alexander
Project Geologist

TABLES

TABLE 1
SUMMARY OF SOIL LABORATORY RESULTS
ULTRA-VIOLET FLUORESCENCE BY QROS QED™ ANALYZER

PARCEL 5 – SARAH M. BLAKE PROPERTY
101 BELL FORK RD, JACKSONVILLE, ONSLOW COUNTY, NORTH CAROLINA

Boring ID	Northing	Easting	Sample ID	Contaminant of Concern	TPH GRO	TPH DRO
				Date Collected		
SB 5 - 1	374,076	2,478,813	SB 5 - 1 (3')	11/28/2018	<0.5	<0.2
SB 5 - 2	374,044	2,478,846	SB 5 - 2 (3')	11/28/2018	2.1	<0.19
SB 5 - 3	374,092	2,478,858	SB 5 - 3 (3')	11/28/2018	<0.5	<0.2
SB 5 - 4	374,018	2,478,877	SB 5 - 4 (3')	11/28/2018	<0.52	0.29
SB 5 - 5	374,048	2,478,884	SB 5 - 5 (3')	11/29/2018	<0.48	<0.19
SB 5 - 6	373,997	2,478,911	SB 5 - 6 (3')	11/28/2018	<0.52	<0.21
STATE ACTION LEVELS					50	100

Sample depth provided in parantheses as part of the Sample ID.
TPH GRO = Total Petroleum Hydrocarbons Gasoline Range Organics
TPH DRO = Total Petroleum Hydrocarbons Diesel Range Organics
All results and State Action Levels in milligrams per kilogram (mg/kg).
< = Less than method detection limit

TABLE 2
SUMMARY OF GROUNDWATER LABORATORY RESULTS
SM 6200B and EPA 625

PARCEL 5 – SARAH M. BLAKE PROPERTY
101 BELL FORK RD, JACKSONVILLE, ONSLOW COUNTY, NORTH CAROLINA

ANALYTICAL METHOD →					SM 6200B			EPA 625
Boring ID	Northing	Easting	Sample ID	Contaminant of Concern →	Acetone	Toluene	All Other Method 6200B Compounds	All Other Method 625 Compounds
				Date Collected				
SB 5 - 5	374,048	2,478,884	SB 5 - 5 GW	11/29/2018	2.3 J	0.15 J	<	<
2L GWQS					6,000	600	VARIES	VARIES

2L GWQS = NCAC T15A:02L Groundwater Quality Standards

All results and 2L GWQS in micrograms per liter (ug/L).

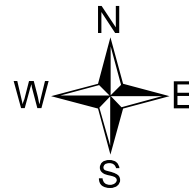
J = Indicates an estimated value

< = Less than method detection limit (refer to analytical report for a complete list of compounds and detection limits)

SHEETS



SCALE



STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS
CONVENTIONAL PLAN SHEET SYMBOLS**BOUNDARIES AND PROPERTY:**

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EP
Computed Property Corner	-----
Property Monument	□ EOM
Parcel/Sequence Number	⑫3
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	-----
Proposed Chain Link Fence	-----
Proposed Barbed Wire Fence	-----
Existing Wetland Boundary	----- WLB
Proposed Wetland Boundary	----- WLB
Existing Endangered Animal Boundary	----- EAB
Existing Endangered Plant Boundary	----- EPB
Existing Historic Property Boundary	----- HPB
Known Contamination Area: Soil	----- S
Potential Contamination Area: Soil	----- S
Known Contamination Area: Water	----- W
Potential Contamination Area: Water	----- W
Contaminated Site: Known or Potential	-----

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:*Note: Not to Scale****S.U.E. = Subsurface Utility Engineering**

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

RIGHT OF WAY & PROJECT CONTROL:

Secondary Horiz and Vert Control Point	◆
Primary Horiz Control Point	○
Primary Horiz and Vert Control Point	◆
Exist Permanent Easement Pin and Cap	◆
New Permanent Easement Pin and Cap	◆
Vertical Benchmark	◆
Existing Right of Way Marker	△
Existing Right of Way Line	-----
New Right of Way Line	-----
New Right of Way Line with Pin and Cap	-----
New Right of Way Line with Concrete or Granite R/W Marker	-----
New Control of Access Line with Concrete C/A Marker	-----
Existing Control of Access	-----
New Control of Access	-----
Existing Easement Line	-----
New Temporary Construction Easement	-----
New Temporary Drainage Easement	-----
New Permanent Drainage Easement	-----
New Permanent Drainage / Utility Easement	-----
New Permanent Utility Easement	-----
New Temporary Utility Easement	-----
New Aerial Utility Easement	-----

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	-----
Proposed Slope Stakes Fill	-----
Proposed Curb 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	-----
U/G Power Line LOS B (S.U.E.*)	-----
U/G Power Line LOS C (S.U.E.*)	-----
U/G Power Line LOS D (S.U.E.*)	-----

TELEPHONE:

Existing Telephone Pole	-----
Proposed Telephone Pole	-----
Telephone Manhole	-----
Telephone Pedestal	-----
Telephone Cell Tower	-----
U/G Telephone Cable Hand Hole	-----
U/G Telephone Cable LOS B (S.U.E.*)	-----
U/G Telephone Cable LOS C (S.U.E.*)	-----
U/G Telephone Cable LOS D (S.U.E.*)	-----
U/G Telephone Conduit LOS B (S.U.E.*)	-----
U/G Telephone Conduit LOS C (S.U.E.*)	-----
U/G Telephone Conduit LOS D (S.U.E.*)	-----
U/G Fiber Optics Cable LOS B (S.U.E.*)	-----
U/G Fiber Optics Cable LOS C (S.U.E.*)	-----
U/G Fiber Optics Cable LOS D (S.U.E.*)	-----

WATER:

Water Manhole	-----
Water Meter	-----
Water Valve	-----
Water Hydrant	-----
U/G Water Line LOS B (S.U.E.*)	-----
U/G Water Line LOS C (S.U.E.*)	-----
U/G Water Line LOS D (S.U.E.*)	-----
Above Ground Water Line	-----

TV:

TV Pedestal	-----
TV Tower	-----
U/G TV Cable Hand Hole	-----
U/G TV Cable LOS B (S.U.E.*)	-----
U/G TV Cable LOS C (S.U.E.*)	-----
U/G TV Cable LOS D (S.U.E.*)	-----
U/G Fiber Optic Cable LOS B (S.U.E.*)	-----
U/G Fiber Optic Cable LOS C (S.U.E.*)	-----
U/G Fiber Optic Cable LOS D (S.U.E.*)	-----

GAS:

Gas Valve	-----
Gas Meter	-----
U/G Gas Line LOS B (S.U.E.*)	-----
U/G Gas Line LOS C (S.U.E.*)	-----
U/G Gas Line LOS D (S.U.E.*)	-----
Above Ground Gas Line	-----

SANITARY SEWER:

Sanitary Sewer Manhole	-----
Sanitary Sewer Cleanout	-----
U/G Sanitary Sewer Line	-----
Above Ground Sanitary Sewer	-----
SS Forced Main Line LOS B (S.U.E.*)	-----
SS Forced Main Line LOS C (S.U.E.*)	-----
SS Forced Main Line LOS D (S.U.E.*)	-----

MISCELLANEOUS:

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

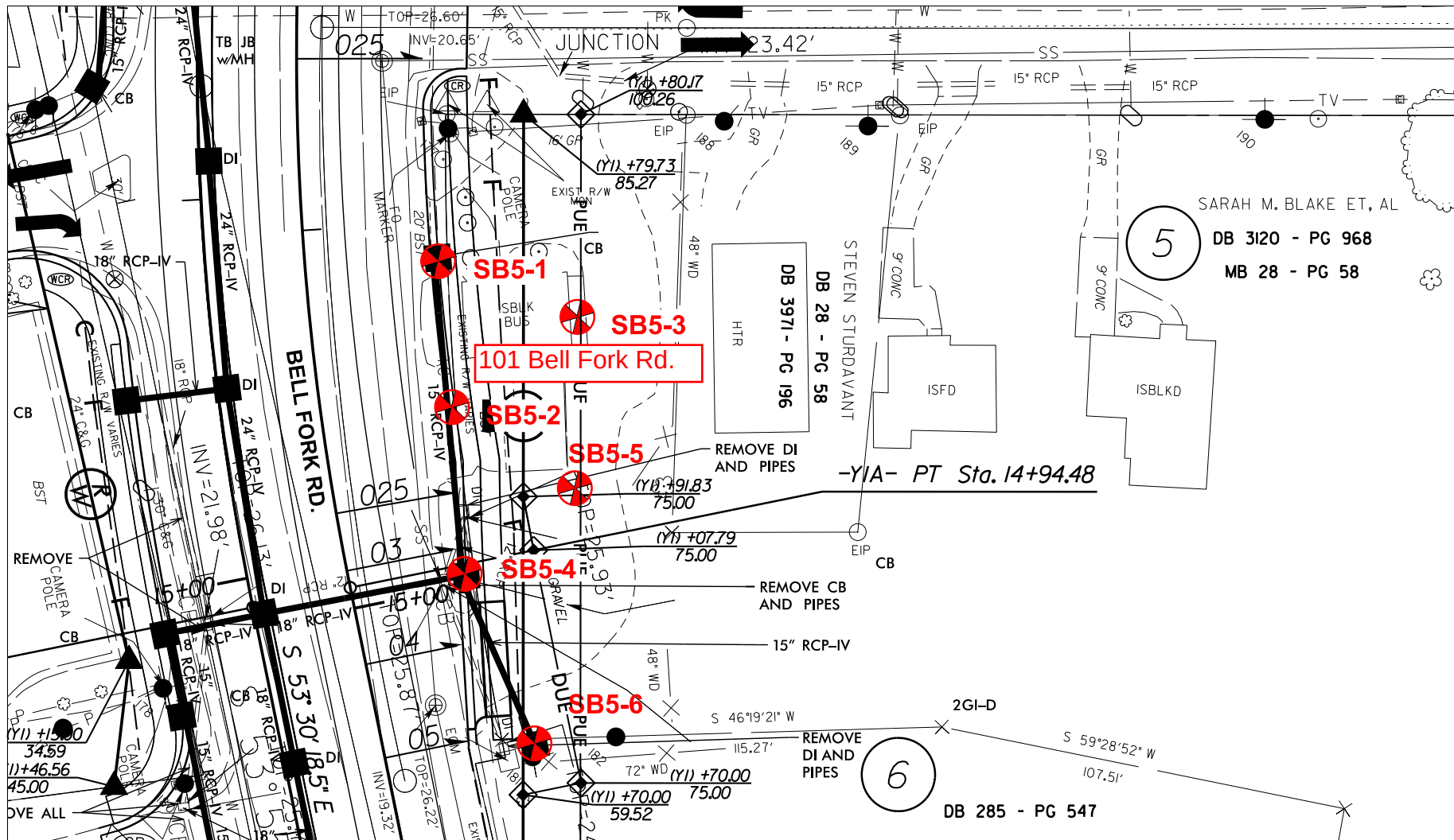
NOTES:

SOIL SAMPLES COLLECTED AT ALL BORING LOCATIONS.

GROUNDWATER SAMPLE COLLECTED AT SB5-5.

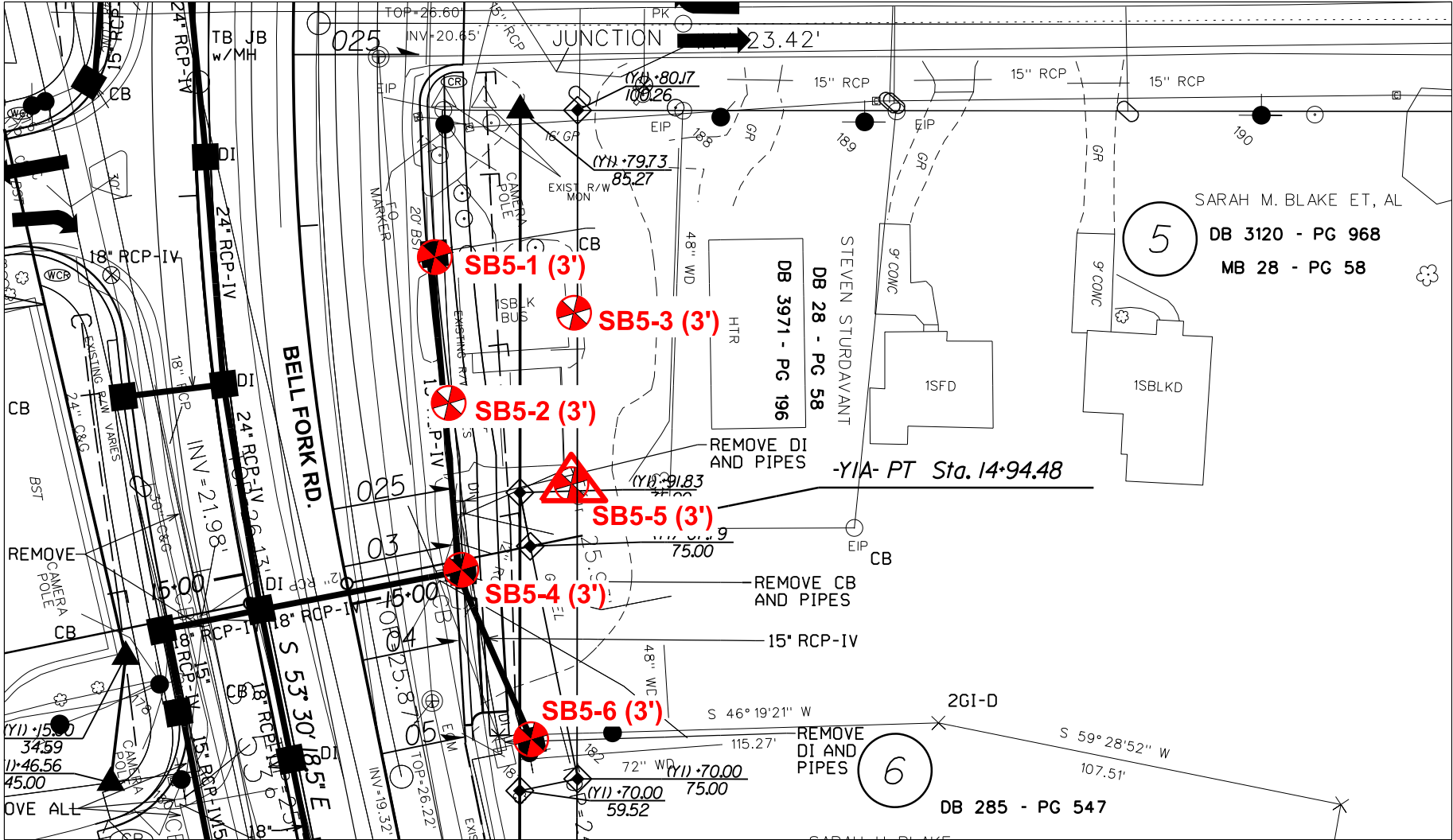
ADAPTED FROM PLAN SHEETS PROVIDED BY NCDOT.

ALL LABORATORY RESULTS WERE BELOW APPLICABLE STANDARDS.



NOTES:
ADAPTED FROM PLAN SHEETS PROVIDED BY NCDOT.
ALL LABORATORY RESULTS WERE BELOW APPLICABLE STANDARDS.

EXISTING	DESCRIPTION
	SOIL SAMPLE
	SOIL SAMPLE AND GROUNDWATER SAMPLE
(#)	SOIL SAMPLE DEPTH



SUMMARY OF GROUNDWATER LABORATORY RESULTS
SM 6200B and EPA 625

PARCEL 5 – SARAH M. BLAKE PROPERTY
101 BELL FORK RD, JACKSONVILLE, ONSLOW COUNTY, NORTH CAROLINA

ANALYTICAL METHOD					SM 6200B			EPA 625
Boring ID	Northing	Easting	Sample ID	Contaminant of Concern	Acetone	Toluene	All Other Method 6200B Compounds	All Other Method 625 Compounds
				Date Collected				
SB 5 - 5	374,048	2,478,884	SB 5 - 5 GW	11/29/2018	2.3 J	0.15 J	<	<
2L GWQS					6,000	600	VARIES	VARIES

2L GWQS = NCAC T15A:02L Groundwater Quality Standards
All results and 2L GWQS in micrograms per liter (ug/L).
J = Indicates an estimated value
< = Less than method detection limit (refer to analytical report for a complete list of compounds and detection limits)

SUMMARY OF SOIL LABORATORY RESULTS
ULTRA-VIOLET FLUORESCENCE BY QROS QED™ ANALYZER

NO PARCEL NUMBER – LAURA FRETWELL PROPERTY
2531 NC 172, SNEADS FERRY, ONSLOW COUNTY, NORTH CAROLINA

Boring ID	Northing	Easting	Sample ID	Contaminant of Concern	TPH GRO	TPH DRO
				Date Collected		
SB LF - 1	301,913	2,481,637	SB LF - 1 (3')	11/28/2018	<0.51	0.2
SB LF - 2	301,994	2,481,653	SB LF - 2 (3')	11/28/2018	<0.47	<0.19
SB LF - 3	302,071	2,481,669	SB LF - 3 (3')	11/28/2018	<0.52	<0.21
STATE ACTION LEVELS					50	100

Sample depth provided in parantheses as part of the Sample ID.
TPH GRO = Total Petroleum Hydrocarbons Gasoline Range Organics
TPH DRO = Total Petroleum Hydrocarbons Diesel Range Organics
All results and State Action Levels in milligrams per kilogram (mg/kg).
< = Less than method detection limit

APPENDICES

APPENDIX A
PYRAMID GEOPHYSICAL SURVEY



PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2018-317)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION: PARCEL 5 NCDOT PROJECT U-5728 (54019.1.1)

101 BELL FORK ROAD, JACKSONVILLE, NC
NOVEMBER 30, 2018

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GEOPHYSICAL INVESTIGATION REPORT
Parcel 5 – 101 Bell Fork Road
Jacksonville, Onslow County, North Carolina

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- Figure 1 – Parcel 5 - Geophysical Survey Boundaries and Site Photographs
Figure 2 – Parcel 5 - EM61 Results Contour Map
Figure 3 – Parcel 5 - GPR Transect Locations and Images

LIST OF ACRONYMS

CADD	Computer Assisted Drafting and Design
DF	Dual Frequency
EM.....	Electromagnetic
GPR.....	Ground Penetrating Radar
GPS	Global Positioning System
NCDOT.....	North Carolina Department of Transportation
ROW	Right-of-Way
UST	Underground Storage Tank

EXECUTIVE SUMMARY

Project Description: Pyramid Environmental conducted a geophysical investigation for Catlin Engineers & Scientists at Parcel 5, located at 101 Bell Fork Road, in Jacksonville, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project U-5728). The survey was designed to extend from the existing edge of pavement into the proposed ROW and/or easements, whichever distance was greater. Conducted on November 26, 2018, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

Geophysical Results: The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of six EM anomalies were identified. All of the EM anomalies were directly attributed to visible cultural features at the ground surface. EM and GPR data showed evidence of reinforcement within the concrete pad on the site. No significant structures were observed beneath this reinforced concrete pad. Collectively, the geophysical data recorded no evidence of metallic USTs at Parcel 5.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for Catlin Engineers & Scientists at Parcel 5, located at 101 Bell Fork Road, in Jacksonville, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project U-5728). The survey was designed to extend from the existing edge of pavement into the proposed ROW and/or easements, whichever distance was greater. Conducted on November 26, 2018, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site included a small commercial building surrounded by asphalt, concrete, gravel and grass surfaces. An aerial photograph 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-MK2 (EM61) metal detector integrated with a Geode External GPS/GLONASS receiver. 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 is 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 15.0 software programs.

GPR data were acquired across select EM anomalies on November 26, 2018, using a Geophysical Survey Systems, Inc. (GSSI) UtilityScan DF unit equipped with a dual frequency 300/800 MHz antenna. Data were collected both in reconnaissance fashion as well as along formal transect lines across EM features. 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 6 feet, based on dielectric constants calculated by the DF unit in the field during the reconnaissance scans. GPR transects across specific anomalies were saved to the hard drive of the DF unit for post-processing and figure generation.

Pyramid’s classifications of USTs for the purposes of this report are based directly on the geophysical UST ratings provided by the NCDOT. These ratings are as follows:

Geophysical Surveys for Underground Storage Tanks on NCDOT Projects			
High Confidence	Intermediate Confidence	Low Confidence	No Confidence
Known UST Active tank - spatial location, orientation, and approximate depth determined by geophysics.	Probable UST Sufficient geophysical data from both magnetic and radar surveys that is characteristic of a tank. Interpretation may be supported by physical evidence such as fill/vent pipe, metal cover plate, asphalt/concrete patch, etc.	Possible UST Sufficient geophysical data from either magnetic or radar surveys that is characteristic of a tank. Additional data is not sufficient enough to confirm or deny the presence of a UST.	Anomaly noted but not characteristic of a UST. Should be noted in the text and may be called out in the figures at the geophysicist’s discretion.

DISCUSSION OF RESULTS

Discussion of EM Results

A contour plot of the EM61 results obtained across the survey area at the property is presented in **Figure 2**. Each EM anomaly is numbered for reference in the figure. The following table presents the list of EM anomalies and the cause of the metallic response, if known:

LIST OF METALLIC ANOMALIES IDENTIFIED BY EM SURVEY

Metallic Anomaly #	Cause of Anomaly	Investigated with GPR
1	Signs/Utilities	
2	Reinforced Concrete Pipe	
3	Building/Debris	
4	Reinforced Concrete	✓
5	Reinforced Concrete Pipe	
6	Drop Inlets	

All of the EM anomalies were directly attributed to visible cultural features at the ground surface, including signs, reinforced concrete pipes, a building, debris, drop inlets and a suspected reinforced concrete pad. EM Anomaly 4 was further investigated with GPR to confirm the presence of reinforcement within the concrete.

Discussion of GPR Results

Figure 3 presents the locations of the formal GPR transects performed at the property, as well as transect images. A total of seven formal GPR transects were collected at the site. GPR Transects 1-7 were performed across EM Anomaly 4 and confirmed the presence of reinforcement within the concrete. No other significant structures were observed beneath the reinforced concrete.

Collectively, the geophysical data recorded no evidence of metallic USTs at Parcel 5.

SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 5 in Jacksonville, 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.
- All of the EM anomalies were directly attributed to visible cultural features at the ground surface.
- EM and GPR data showed evidence of reinforcement within the concrete pad on

the site. No significant structures were observed beneath this reinforced concrete pad.

- Collectively, the geophysical data recorded no evidence of metallic USTs at Parcel 5.

LIMITATIONS

Geophysical surveys have been performed and this report was 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 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 BOUNDARIES OF GEOPHYSICAL SURVEY AREA



View of Survey Area
(Facing Approximately North)



View of Survey Area
(Facing Approximately North)



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

PROJECT
PARCEL 5
JACKSONVILLE, NORTH CAROLINA
NCDOT PROJECT U-5728

TITLE
PARCEL 5 - GEOPHYSICAL
SURVEY BOUNDARIES AND SITE PHOTOGRAPHS

DATE
11/26/2018
PYRAMID
PROJECT #: 2018-317

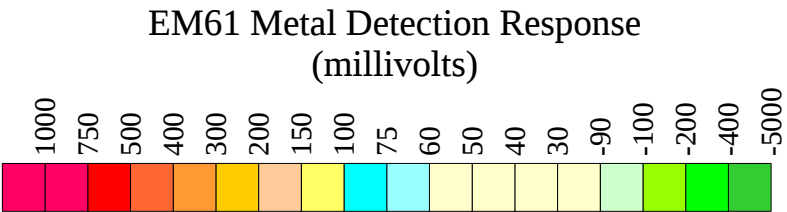
CLIENT
Catlin Engineers &
Scientists
FIGURE 1

EM61 METAL DETECTION RESULTS



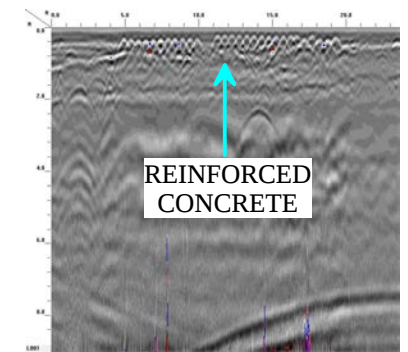
NO EVIDENCE OF METALLIC
USTs OBSERVED.

The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential results focus on larger metallic objects such as USTs and drums. The EM data were collected on November 26, 2018, using a Geonics EM61-MK2 instrument. Verification GPR data were collected using a GSSI UtilityScan DF instrument with a dual frequency 300/800 MHz antenna on November 26, 2018.

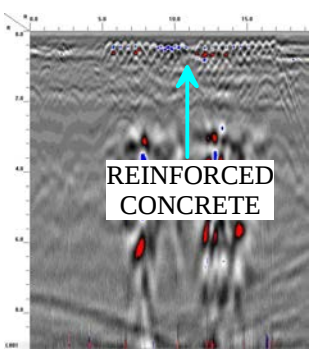


 503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology	PROJECT PARCEL 5 JACKSONVILLE, NORTH CAROLINA NCDOT PROJECT U-5728	TITLE PARCEL 5 - EM61 METAL DETECTION CONTOUR MAP	DATE 11/26/2018	CLIENT Catlin Engineers & Scientists
			PYRAMID PROJECT #: 2018-317	FIGURE 2

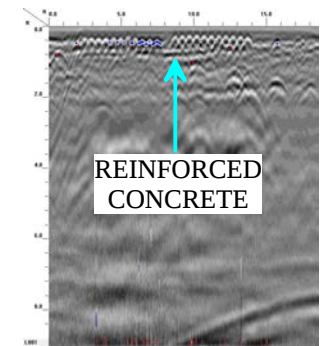
LOCATIONS OF GPR TRANSECTS



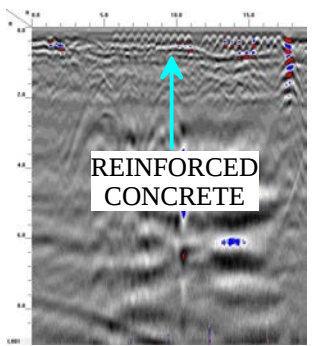
GPR TRANSECT 1 (T1)



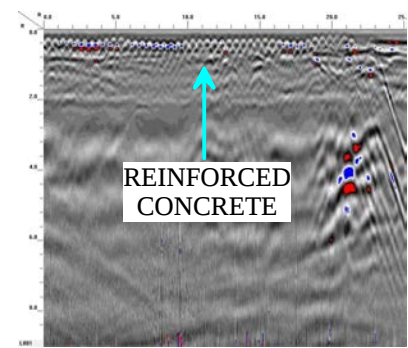
GPR TRANSECT 2 (T2)



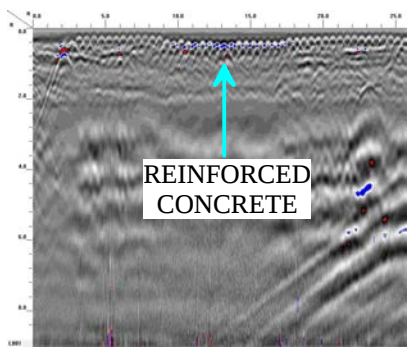
GPR TRANSECT 3 (T3)



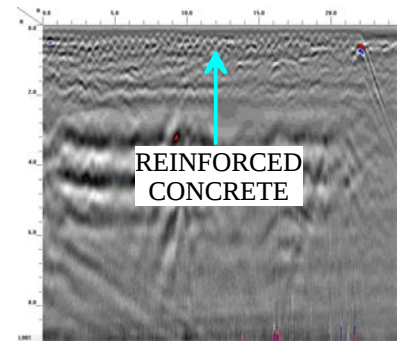
GPR TRANSECT 4 (T4)



GPR TRANSECT 5 (T5)



GPR TRANSECT 6 (T6)



GPR TRANSECT 7 (T7)



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PROJECT
PARCEL 5
JACKSONVILLE, NORTH CAROLINA
NCDOT PROJECT U-5728

TITLE
PARCEL 5 -
GPR TRANSECT LOCATIONS AND IMAGES

DATE
11/26/2018
PYRAMID
PROJECT #:
2018-317

CLIENT
Catlin Engineers &
Scientists
FIGURE 3

APPENDIX B
BORING LOGS

BORING LOG



218123
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 218123	STATE: NC	COUNTY: ONSLOW	LOCATION: Jacksonville
PROJECT NAME: US 17 Business (Marine Blvd) at SR 1308 (Bell Fork Rd) Intersection Improvements		LOGGED BY: C. Alexander	BORING ID:
		DRILLER: William J. Miller	SB5-1
NORTHING: 374,076	EASTING: 2,478,813	CREW: E. Swain	
SYSTEM: NCSP NAD 83 (ft)	BORING LOCATION: SR 1308		LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: DPT	0 HOUR DTW: N/A	BORING DEPTH: 4.0
START DATE: 11/28/18	FINISH DATE: 11/28/18	24 HOUR DTW: N/A	WATER DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	SCREENING RESULTS (ppm)	LAB. ID.	USCS	LOG	SOIL AND ROCK DESCRIPTION	ELEVATION
0.0			0 250 500 750 1,000				LAND SURFACE	0.0
		M	▲0.7		SW		Tan to dk. gray, silty, f. SAND w/ gravel from 0-1' -Moist	1.5
2.0		M	▲0.8	SB5-1 (3')	CL		Dk. gray to gray, sandy, CLAY, med. plas. w/ orange mottling from 2.7-4' -Moist	4.0
4.0							BORING TERMINATED AT DEPTH 4.0 ft in sandy, CLAY, med. plas.	

▽ = 0hr. DTW

▼ = 24hr. DTW

BORING LOG



218123
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 218123	STATE: NC	COUNTY: ONSLOW	LOCATION: Jacksonville
PROJECT NAME: US 17 Business (Marine Blvd) at SR 1308 (Bell Fork Rd) Intersection Improvements	LOGGED BY: C. Alexander	BORING ID: SB5-2	
	DRILLER: William J. Miller		
NORTHING: 374,044	EASTING: 2,478,846	CREW: E. Swain	
SYSTEM: NCSP NAD 83 (ft)	BORING LOCATION: SR 1308	LAND ELEV.: NM	
DRILL MACHINE: Power Probe	METHOD: DPT	0 HOUR DTW: N/A	BORING DEPTH: 4.0
START DATE: 11/28/18	FINISH DATE: 11/28/18	24 HOUR DTW: N/A	WATER DEPTH: --

DEPTH	BLOW COUNT	MOI.	SCREENING RESULTS (ppm)	LAB. ID.	USCS	LOG	SOIL AND ROCK DESCRIPTION	ELEVATION
	0.5 0.5 0.5 0.5		0 250 500 750 1,000					
0.0							LAND SURFACE	0.0
		M	▲1.5		SW		Tan to dk. gray, silty, f. SAND w/ gravel from 0-0.7' -Moist	
2.0								1.9
		W	▲1.7	SB5-2 (3')	SC		Gray, clayey, f. SAND -Moist to 2.9'; wet from 2.9-4'	
4.0							BORING TERMINATED AT DEPTH 4.0 ft in clayey, f. SAND	

▽ = 0hr. DTW

▼ = 24hr. DTW

BORING LOG



218123
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 218123	STATE: NC	COUNTY: ONSLOW	LOCATION: Jacksonville
PROJECT NAME: US 17 Business (Marine Blvd) at SR 1308 (Bell Fork Rd) Intersection Improvements		LOGGED BY: C. Alexander	BORING ID:
		DRILLER: William J. Miller	SB5-3
NORTHING: 374,092	EASTING: 2,478,858	CREW: E. Swain	
SYSTEM: NCSP NAD 83 (ft)	BORING LOCATION: SR 1308	LAND ELEV.: NM	
DRILL MACHINE: Power Probe	METHOD: DPT	0 HOUR DTW: N/A	BORING DEPTH: 8.0
START DATE: 11/28/18	FINISH DATE: 11/28/18	24 HOUR DTW: N/A	WATER DEPTH: --

DEPTH	BLOW COUNT	MOI.	SCREENING RESULTS (ppm)	LAB. ID.	USCS	LOG	SOIL AND ROCK DESCRIPTION	ELEVATION
	0.5 0.5 0.5 0.5		0 250 500 750 1,000					
0.0							LAND SURFACE	0.0
		M	▲1.2		SW		Gray, silty, f. SAND w/ gravel from 0-0.8' -Moist	1.1
2.0					SC		Dk. gray to tan, clayey, f. SAND -Moist	2.3
		M	▲1.0	SB5-3 (3')				
4.0					CL		Tan to gray, sandy, CLAY, med. plas. w/ orange mottling from 2.3-4.7' -Moist	
		M	▲1.2					
6.0								
		W	▲1.4		SC		Gray, silty to clayey, f. SAND -Moist; wet from 7'	6.6
8.0								
							BORING TERMINATED AT DEPTH 8.0 ft in silty to clayey, f. SAND	

▽ = 0hr. DTW

▼ = 24hr. DTW

BORING LOG



218123
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 218123	STATE: NC	COUNTY: ONSLOW	LOCATION: Jacksonville
PROJECT NAME: US 17 Business (Marine Blvd) at SR 1308 (Bell Fork Rd) Intersection Improvements		LOGGED BY: C. Alexander	BORING ID:
		DRILLER: William J. Miller	SB5-4
NORTHING: 374,018	EASTING: 2,478,877	CREW: E. Swain	
SYSTEM: NCSP NAD 83 (ft)	BORING LOCATION: SR 1308		LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: DPT	0 HOUR DTW: N/A	BORING DEPTH: 4.0
START DATE: 11/28/18	FINISH DATE: 11/28/18	24 HOUR DTW: N/A	WATER DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	SCREENING RESULTS (ppm)	LAB. ID.	USCS	LOG	SOIL AND ROCK DESCRIPTION	ELEVATION
0.0			0 250 500 750 1,000				LAND SURFACE	0.0
		M	▲0.7		SW		Tan to dk. gray, silty, f. SAND w/ gravel from 0-0.4' -Moist	1.4
2.0		M	▲0.9	SB5-4 (3')	CL		Dk. gray to tan, sandy, CLAY, med. plas. -Moist	
4.0							BORING TERMINATED AT DEPTH 4.0 ft in sandy, CLAY, med. plas.	

▽ = 0hr. DTW

▼ = 24hr. DTW

BORING LOG



218123
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 218123	STATE: NC	COUNTY: ONSLOW	LOCATION: Jacksonville
PROJECT NAME: US 17 Business (Marine Blvd) at SR 1308 (Bell Fork Rd) Intersection Improvements			LOGGED BY: C. Alexander
			DRILLER: William J. Miller
NORTHING: 374,048	EASTING: 2,478,884	CREW: E. Swain	BORING ID: SB5-5
SYSTEM: NCSP NAD 83 (ft)	BORING LOCATION: SR 1308		LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: DPT	0 HOUR DTW: N/A	BORING DEPTH: 8.0
START DATE: 11/29/18	FINISH DATE: 11/29/18	24 HOUR DTW: N/A	WATER DEPTH: --

DEPTH	BLOW COUNT	MOI.	SCREENING RESULTS (ppm)	LAB. ID.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION
	0.5 0.5 0.5 0.5		0 250 500 750 1,000				0.0	LAND SURFACE	
0.0									
		M	▲0.3		SW			Gray to dk. gray to tan, silty to clayey, f. SAND w/ gravel from 0-1' -Moist	
2.0							2.2		
		M	▲1.1	SB5-5 (3')	CH			Tan to gray, sandy, CLAY, high plas. w/ orange mottling -Moist	
4.0							4.8		
		M	▲1.0		SC			Gray, clayey, f. SAND -Moist	
6.0							6.1		
		W	▲1.0	SB5-5GW	SW			Gray, silty, f. SAND -Moist; wet from 6.9'	
8.0					SP		7.5		
							8.0	Gray, f. SAND -Wet	
								BORING TERMINATED AT DEPTH 8.0 ft in f. SAND	
								1-inch slotted PVC set, sampled, and abandoned	

▽ = 0hr. DTW

▼ = 24hr. DTW

CATLIN\ENVIRO.LOG 218123_US17@BELLFORK.GPJ CATLIN.GDT 1/4/19

BORING LOG



218123
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 218123	STATE: NC	COUNTY: ONSLOW	LOCATION: Jacksonville
PROJECT NAME: US 17 Business (Marine Blvd) at SR 1308 (Bell Fork Rd) Intersection Improvements	LOGGED BY: C. Alexander	BORING ID: SB5-6	
	DRILLER: William J. Miller		
NORTHING: 373,997	EASTING: 2,478,911	CREW: E. Swain	
SYSTEM: NCSP NAD 83 (ft)	BORING LOCATION: SR 1308	LAND ELEV.: NM	
DRILL MACHINE: Power Probe	METHOD: DPT	0 HOUR DTW: N/A	BORING DEPTH: 4.0
START DATE: 11/28/18	FINISH DATE: 11/28/18	24 HOUR DTW: N/A	WATER DEPTH: --

DEPTH	BLOW COUNT	MOI.	SCREENING RESULTS (ppm)	LAB. ID.	USCS	LOG	SOIL AND ROCK DESCRIPTION	ELEVATION
	0.5 0.5 0.5 0.5		0 250 500 750 1,000					
0.0							LAND SURFACE	0.0
		M	▲1.1		SW		Dk. gray, silty to clayey, f. SAND -Moist	
2.0								1.6
		M	▲1.0	SB5-6 (3')	CL		Dk. gray to tan, sandy, CLAY, med. plas. w/ tr. orange mottling	
4.0							BORING TERMINATED AT DEPTH 4.0 ft in sandy, CLAY, med. plas.	

▽ = 0hr. DTW

▼ = 24hr. DTW

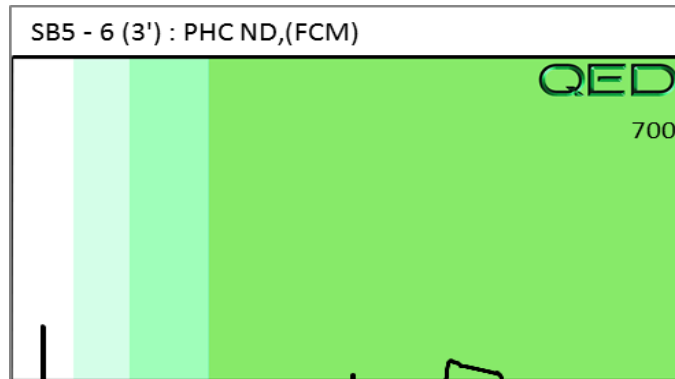
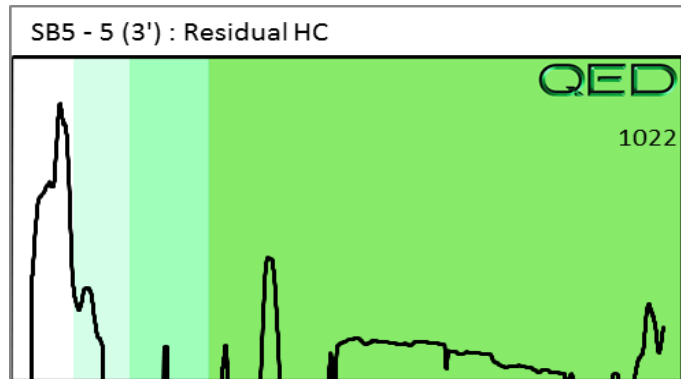
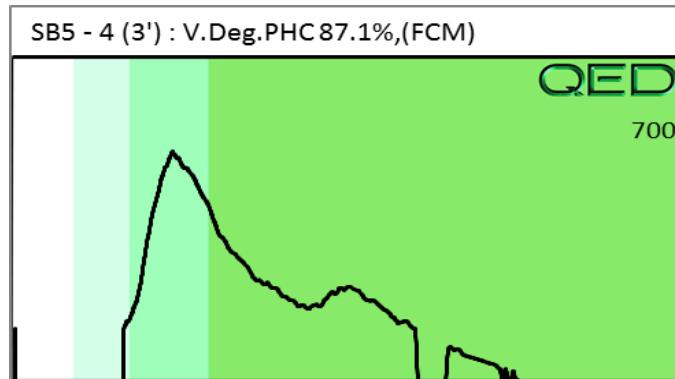
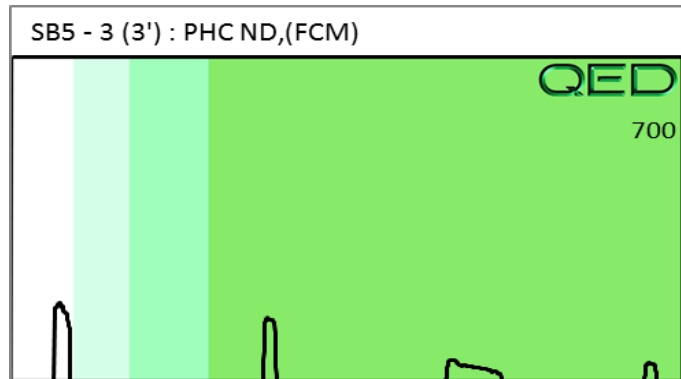
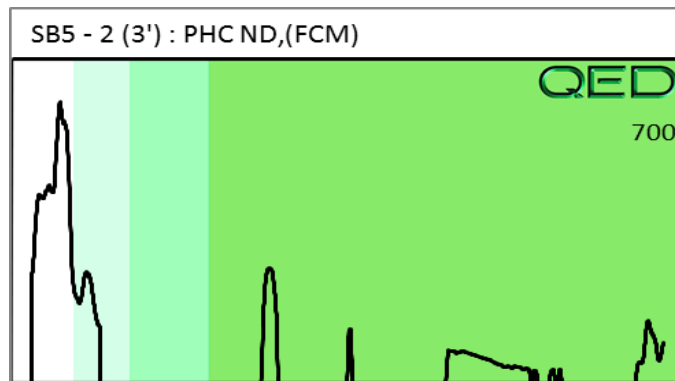
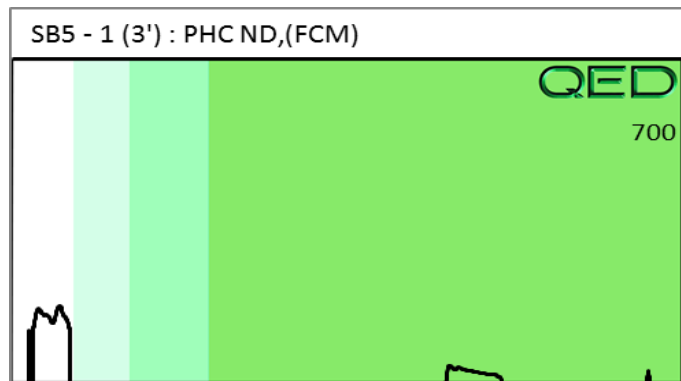
APPENDIX C

LABORATORY REPORT AND CHAIN OF CUSTODY RECORD



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



1348

Client Name:	Catlin Engineers & Scientists	RED LABTM RAPID ENVIRONMENTAL DIAGNOSTICS CHAIN OF CUSTODY AND ANALYTICAL REQUEST FORM	Each sample will be analyzed for BTEX, GRO, DRO, TPH, PAH total aromatics and BaP
Address:	220 Old Dairy Rd. Wilmington, NC 28405		
Contact:	Ben Ashba		
Project Ref.:	218123(5)		
Email:	ben.ashba@catlinusa.com		
Phone #:	(910) 452-5861		
Collected by:	C. Alexander		

[illegible]

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0
Automated Report

Technical Report for

Catlin Engineers & Scientists

218123 (5); NC

PO#: 181130-4

SGS Job Number: FA59809

Sampling Date: 11/29/18

Report to:

Catlin Engineers & Scientists
220 Old Dairy Rd
Wilmington, NC 28405
ben.ashba@catlinusa.com

ATTN: Ben Ashba

Total number of pages in report: **31**



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Caitlin Brice, M.S.
General Manager

Client Service contact: Elvin Kumar 407-425-6700

Certifications: FL(E83510), LA(03051), KS(E-10327), IL(200063), NC(573), NJ(FL002), NY(12022), SC(96038001)
DoD ELAP(ANAB L2229), AZ(AZ0806), CA(2937), TX(T104704404), PA(68-03573), VA(460177),
AK, AR, IA, KY, MA, MS, ND, NH, NV, OK, OR, UT, WA, WV

This report shall not be reproduced, except in its entirety, without the written approval of SGS.

Test results relate only to samples analyzed.

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Sample Summary

Catlin Engineers & Scientists

Job No: FA59809

218123 (5); NC
Project No: PO#: 181130-4

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
FA59809-1	11/29/18	10:15 CA	12/01/18	AQ	Ground Water	SB5-5GW

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client: Catlin Engineers & Scientists

Job No FA59809

Site: 218123 (5); NC

Report Date 12/6/2018 4:26:52

2

1 Sample was collected on 11/29/2018 and received at SGS North America Inc - Orlando on 12/01/2018 properly preserved, at 3.8 Deg. C and intact. These Samples received an SGS Orlando job number of FA59809. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section. Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

MS Volatiles By Method SM 6200B

Matrix: AQ

Batch ID: VA2499

All samples were analyzed within the recommended method holding time.

Sample(s) FA59736-1MS, FA59736-1MSD were used as the QC samples indicated.

All method blanks for this batch meet method specific criteria.

FA59809-1 for Ethyl Alcohol: Associated CCV outside of control limits high, sample was ND.

MS Semi-Volatiles By Method EPA 625

Matrix: AQ

Batch ID: OP72862

All samples were extracted within the recommended method holding time.

All samples were analyzed within the recommended method holding time.

Sample(s) FA59809-1MS, FA59809-1MSD were used as the QC samples indicated.

All method blanks for this batch meet method specific criteria.

Matrix Spike Recovery(s) for 4,6-Dinitro-o-cresol are outside control limits. Probable cause is due to matrix interference.

SGS Orlando certifies that this report meets the project requirements for analytical data produced for the samples as received at SGS Orlando and as stated on the COC. SGS Orlando certifies that the data meets the Data Quality Objectives for precision, accuracy and completeness as specified in the SGS Orlando Quality Manual except as noted above. This report is to be used in its entirety. SGS Orlando is not responsible for any assumptions of data quality if partial data packages are used.

Narrative prepared by:

Ariel Hartney, Client Services (Signature on File)

Summary of Hits

Job Number: FA59809
Account: Catlin Engineers & Scientists
Project: 218123 (5); NC
Collected: 11/29/18



Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
FA59809-1	SB5-5GW					
Acetone		2.3 J	10	2.0	ug/l	SM 6200B
Toluene		0.15 J	0.50	0.13	ug/l	SM 6200B



Orlando, FL

Section 4

4

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	SB5-5GW	Date Sampled:	11/29/18
Lab Sample ID:	FA59809-1	Date Received:	12/01/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SM 6200B		
Project:	218123 (5); NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	A0216322.D	1	12/04/18 14:33	AB	n/a	n/a	VA2499
Run #2							

	Purge Volume
Run #1	10.0 ml
Run #2	

VOA List for NC, May 2012

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	2.3	10	2.0	ug/l	J
71-43-2	Benzene	ND	0.50	0.13	ug/l	
108-86-1	Bromobenzene	ND	0.50	0.13	ug/l	
74-97-5	Bromochloromethane	ND	0.50	0.13	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.13	ug/l	
75-25-2	Bromoform	ND	0.50	0.13	ug/l	
78-93-3	2-Butanone (MEK)	ND	2.5	1.3	ug/l	
104-51-8	n-Butylbenzene	ND	0.50	0.13	ug/l	
135-98-8	sec-Butylbenzene	ND	0.50	0.13	ug/l	
98-06-6	tert-Butylbenzene	ND	0.50	0.13	ug/l	
56-23-5	Carbon Tetrachloride	ND	0.50	0.13	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.13	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.13	ug/l	
95-49-8	o-Chlorotoluene	ND	0.50	0.13	ug/l	
106-43-4	p-Chlorotoluene	ND	0.50	0.13	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.13	ug/l	
106-93-4	1,2-Dibromoethane	ND	0.50	0.13	ug/l	
75-71-8	Dichlorodifluoromethane	ND	0.50	0.20	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	0.50	0.13	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	0.50	0.13	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	0.50	0.13	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.13	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.13	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.13	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.13	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.13	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.13	ug/l	
142-28-9	1,3-Dichloropropane	ND	0.50	0.13	ug/l	
594-20-7	2,2-Dichloropropane	ND	0.50	0.13	ug/l	
563-58-6	1,1-Dichloropropene	ND	0.50	0.13	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.13	ug/l	

ND = Not detected MDL = Method Detection Limit

J = Indicates an estimated value

RL = Reporting Limit

B = Indicates analyte found in associated method blank

E = Indicates value exceeds calibration range

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	SB5-5GW	Date Sampled:	11/29/18
Lab Sample ID:	FA59809-1	Date Received:	12/01/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SM 6200B		
Project:	218123 (5); NC		

VOA List for NC, May 2012

CAS No.	Compound	Result	RL	MDL	Units	Q
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.13	ug/l	
108-20-3	Di-Isopropyl Ether	ND	0.50	0.13	ug/l	
64-17-5	Ethyl Alcohol ^a	ND	100	65	ug/l	
100-41-4	Ethylbenzene	ND	0.50	0.13	ug/l	
591-78-6	2-Hexanone	ND	5.0	1.0	ug/l	
98-82-8	Isopropylbenzene	ND	0.50	0.13	ug/l	
99-87-6	p-Isopropyltoluene	ND	0.50	0.13	ug/l	
74-83-9	Methyl Bromide	ND	0.50	0.20	ug/l	
74-87-3	Methyl Chloride	ND	0.50	0.20	ug/l	
75-09-2	Methylene Chloride	ND	2.0	1.0	ug/l	
108-10-1	4-Methyl-2-pentanone (MIBK)	ND	2.5	1.3	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	0.50	0.13	ug/l	
91-20-3	Naphthalene	ND	0.50	0.13	ug/l	
103-65-1	n-Propylbenzene	ND	0.50	0.13	ug/l	
100-42-5	Styrene	ND	0.50	0.13	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	0.50	0.13	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.13	ug/l	
127-18-4	Tetrachloroethylene	ND	0.50	0.13	ug/l	
108-88-3	Toluene	0.15	0.50	0.13	ug/l	J
87-61-6	1,2,3-Trichlorobenzene	ND	0.50	0.13	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	0.13	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.13	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.13	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.13	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	0.50	0.13	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.13	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	0.13	ug/l	
108-05-4	Vinyl Acetate	ND	5.0	1.0	ug/l	
75-01-4	Vinyl Chloride	ND	0.50	0.13	ug/l	
	m,p-Xylene	ND	1.0	0.13	ug/l	
95-47-6	o-Xylene	ND	0.50	0.13	ug/l	
1330-20-7	Xylene (total)	ND	1.5	0.25	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		70-130%
17060-07-0	1,2-Dichloroethane-D4	103%		70-130%
2037-26-5	Toluene-D8	98%		70-130%
460-00-4	4-Bromofluorobenzene	102%		70-130%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	SB5-5GW	Date Sampled:	11/29/18
Lab Sample ID:	FA59809-1	Date Received:	12/01/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	SM 6200B		
Project:	218123 (5); NC		

VOA List for NC, May 2012

CAS No.	Compound	Result	RL	MDL	Units	Q
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(a) Associated CCV outside of control limits high, sample was ND.

ND = Not detected	MDL = Method Detection Limit	J = Indicates an estimated value
RL = Reporting Limit		B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range		N = Indicates presumptive evidence of a compound

4.1
4

Report of Analysis

Client Sample ID:	SB5-5GW	Date Sampled:	11/29/18
Lab Sample ID:	FA59809-1	Date Received:	12/01/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	EPA 625 SW846 3510C		
Project:	218123 (5); NC		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	6F02055.D	1	12/03/18 21:49	MV	12/03/18 12:00	OP72862	S6F76
Run #2							

	Initial Volume	Final Volume
Run #1	1050 ml	1.0 ml
Run #2		

ABN List for NC, May 2012

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	48	9.5	ug/l	
59-50-7	4-Chloro-3-methyl Phenol	ND	4.8	0.56	ug/l	
95-57-8	2-Chlorophenol	ND	4.8	0.60	ug/l	
120-83-2	2,4-Dichlorophenol	ND	4.8	0.80	ug/l	
105-67-9	2,4-Dimethylphenol	ND	4.8	0.70	ug/l	
51-28-5	2,4-Dinitrophenol	ND	24	4.8	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	9.5	1.9	ug/l	
95-48-7	2-Methylphenol	ND	4.8	0.53	ug/l	
	3&4-Methylphenol	ND	4.8	0.93	ug/l	
88-75-5	2-Nitrophenol	ND	4.8	0.81	ug/l	
100-02-7	4-Nitrophenol	ND	24	4.8	ug/l	
87-86-5	Pentachlorophenol	ND	24	4.8	ug/l	
108-95-2	Phenol	ND	4.8	0.48	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	4.8	0.72	ug/l	
83-32-9	Acenaphthene	ND	4.8	0.60	ug/l	
208-96-8	Acenaphthylene	ND	4.8	0.61	ug/l	
120-12-7	Anthracene	ND	4.8	0.76	ug/l	
56-55-3	Benzo(a)anthracene	ND	4.8	0.72	ug/l	
50-32-8	Benzo(a)pyrene	ND	4.8	0.75	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	4.8	0.74	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	4.8	0.78	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	4.8	0.82	ug/l	
100-51-6	Benzyl Alcohol	ND	4.8	0.58	ug/l	
101-55-3	4-Bromophenyl Phenyl Ether	ND	4.8	0.81	ug/l	
85-68-7	Butyl Benzyl Phthalate	ND	4.8	0.95	ug/l	
106-47-8	4-Chloroaniline	ND	4.8	0.60	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	4.8	0.77	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	4.8	0.70	ug/l	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	4.8	0.72	ug/l	
91-58-7	2-Chloronaphthalene	ND	4.8	0.48	ug/l	
7005-72-3	4-Chlorophenyl Phenyl Ether	ND	4.8	0.51	ug/l	
218-01-9	Chrysene	ND	4.8	0.81	ug/l	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	SB5-5GW	Date Sampled:	11/29/18
Lab Sample ID:	FA59809-1	Date Received:	12/01/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	EPA 625 SW846 3510C		
Project:	218123 (5); NC		

ABN List for NC, May 2012

CAS No.	Compound	Result	RL	MDL	Units	Q
53-70-3	Dibenzo(a,h)anthracene	ND	4.8	0.77	ug/l	
132-64-9	Dibenzofuran	ND	4.8	0.57	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	4.8	0.48	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	4.8	0.48	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	4.8	0.48	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	4.8	0.61	ug/l	
84-66-2	Diethyl Phthalate	ND	4.8	0.95	ug/l	
131-11-3	Dimethyl Phthalate	ND	4.8	0.95	ug/l	
84-74-2	Di-n-butyl Phthalate	ND	4.8	0.95	ug/l	
117-84-0	Di-n-octyl Phthalate	ND	4.8	0.95	ug/l	
122-66-7	1,2-Diphenylhydrazine	ND	4.8	0.72	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	4.8	0.95	ug/l	
206-44-0	Fluoranthene	ND	4.8	0.53	ug/l	
86-73-7	Fluorene	ND	4.8	0.67	ug/l	
118-74-1	Hexachlorobenzene	ND	4.8	0.66	ug/l	
87-68-3	Hexachlorobutadiene	ND	4.8	0.48	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	4.8	1.7	ug/l	
67-72-1	Hexachloroethane	ND	4.8	1.6	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	4.8	0.68	ug/l	
78-59-1	Isophorone	ND	4.8	0.74	ug/l	
90-12-0	1-Methylnaphthalene	ND	4.8	0.50	ug/l	
91-57-6	2-Methylnaphthalene	ND	4.8	0.57	ug/l	
91-20-3	Naphthalene	ND	4.8	0.48	ug/l	
98-95-3	Nitrobenzene	ND	4.8	0.89	ug/l	
621-64-7	N-Nitrosodi-n-propylamine	ND	4.8	0.64	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	4.8	0.77	ug/l	
85-01-8	Phenanthrene	ND	4.8	0.82	ug/l	
129-00-0	Pyrene	ND	4.8	0.65	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	4.8	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	21%		14-67%
4165-62-2	Phenol-d5	12%		10-50%
118-79-6	2,4,6-Tribromophenol	65%		33-118%
4165-60-0	Nitrobenzene-d5	59%		42-108%
321-60-8	2-Fluorobiphenyl	60%		40-106%
1718-51-0	Terphenyl-d14	65%		39-121%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound



Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

PROJECT INFO:

PROJECT: 218123 (5)

P.O. #:

QUOTE #:

SITE REF:

TURN AROUND TIME: Std.

REPORT LEVEL: (see reverse) ☐ Level I ☐ Level II ☐ Level IV

SPECIAL DELIVERABLES: ☐ State of Origin:

☒ EDD:

☐ EoD:

☒ Other: report law runs

SEND DOCUMENTATION / RESULTS TO:

COMPANY: Catlin Engineers & Scientists

CONTACT: Ben Ashba

ADDRESS:

PHONE:

EMAIL:

INVOICE TO: ☐ CHECK IF SAME)

COMPANY:-

CONTACT:

ADDRESS:

PHONE:

EMAIL:

SPECIAL INSTRUCTIONS / COMMENTS:[illegible][illegible]

White - Retained by Lab
Yellow - Retained by Client

SGS-00055 (01/15)

SGS ENVIRONMENTAL SERVICES

TRACE LABORATORY 5500 Business Drive Wilmington, NC 28405 910 350 1903 | 910 794 1613 www.sgs.com

Member of the SGS Group (SGS SA)

SGS Sample Receipt Summary

Job Number: FA59809

Client: CATLIN

Project: 218123(5)

Date / Time Received: 12/1/2018 10:00:00 AM

Delivery Method: FedEx

Airbill #s: 4611 5506 5904

Therm ID: IR 1;

Therm CF: -0.2;

of Coolers: 1

Cooler Temps (Raw Measured) °C: Cooler 1: (4.0);

Cooler Temps (Corrected) °C: Cooler 1: (3.8);

Cooler Information

Y or N

- | | | |
|-----------------------------|-------------------------------------|--------------------------|
| 1. Custody Seals Present | ☒ | ☐ |
| 2. Custody Seals Intact | ☒ | ☐ |
| 3. Temp criteria achieved | ☒ | ☐ |
| 4. Cooler temp verification | <u>IR Gun</u> | |
| 5. Cooler media | <u>Ice (Bag)</u> | |

Trip Blank Information

Y or N N/A

- | | | | |
|--------------------------------|--------------------------|-------------------------------------|-------------------------------------|
| 1. Trip Blank present / cooler | ☐ | ☒ | ☐ |
| 2. Trip Blank listed on COC | ☐ | ☒ | ☐ |
| | <u>W or S</u> | <u>N/A</u> | |
| 3. Type Of TB Received | ☐ | ☐ | ☒ |

Sample Information

Y or N N/A

- | | | | |
|---|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Sample labels present on bottles | ☒ | ☐ | |
| 2. Samples preserved properly | ☒ | ☐ | |
| 3. Sufficient volume/containers recvd for analysis: | ☒ | ☐ | |
| 4. Condition of sample | <u>Intact</u> | | |
| 5. Sample recvd within HT | ☒ | ☐ | |
| 6. Dates/Times/IDs on COC match Sample Label | ☒ | ☐ | |
| 7. VOCs have headspace | ☐ | ☒ | ☐ |
| 8. Bottles received for unspecified tests | ☐ | ☒ | |
| 9. Compositing instructions clear | ☐ | ☐ | ☒ |
| 10. Voa Soil Kits/Jars received past 48hrs? | ☐ | ☐ | ☒ |
| 11. % Solids Jar received? | ☐ | ☐ | ☒ |
| 12. Residual Chlorine Present? | ☐ | ☐ | ☒ |

Misc. Information

Number of Encores: 25-Gram _____ 5-Gram _____
 Test Strip Lot #s: pH 0-3 _____ 230315 _____
 Residual Chlorine Test Strip Lot #: _____

Number of 5035 Field Kits: _____

Number of Lab Filtered Metals: _____

pH 10-12 _____ 219813A _____

Other: (Specify) _____

Comments

SM001
Rev. Date 05/24/17

Technician: PETERH

Date: 12/1/2018 10:00:00 A

Reviewer: PH

Date: 12/2/2018

FA59809: Chain of Custody

Page 2 of 2



MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Page 1 of 3

Job Number: FA59809**Account:** CATENCW Catlin Engineers & Scientists**Project:** 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VA2499-MB	A0216312.D	1	12/04/18	AB	n/a	n/a	VA2499

The QC reported here applies to the following samples:**Method:** SM 6200B

FA59809-1

CAS No.	Compound	Result	RL	MDL	Units	Q
67-64-1	Acetone	ND	10	2.0	ug/l	
71-43-2	Benzene	ND	0.50	0.13	ug/l	
108-86-1	Bromobenzene	ND	0.50	0.13	ug/l	
74-97-5	Bromochloromethane	ND	0.50	0.13	ug/l	
75-27-4	Bromodichloromethane	ND	0.50	0.13	ug/l	
75-25-2	Bromoform	ND	0.50	0.13	ug/l	
78-93-3	2-Butanone (MEK)	ND	2.5	1.3	ug/l	
104-51-8	n-Butylbenzene	ND	0.50	0.13	ug/l	
135-98-8	sec-Butylbenzene	ND	0.50	0.13	ug/l	
98-06-6	tert-Butylbenzene	ND	0.50	0.13	ug/l	
56-23-5	Carbon Tetrachloride	ND	0.50	0.13	ug/l	
108-90-7	Chlorobenzene	ND	0.50	0.13	ug/l	
75-00-3	Chloroethane	ND	0.50	0.20	ug/l	
67-66-3	Chloroform	ND	0.50	0.13	ug/l	
95-49-8	o-Chlorotoluene	ND	0.50	0.13	ug/l	
106-43-4	p-Chlorotoluene	ND	0.50	0.13	ug/l	
124-48-1	Dibromochloromethane	ND	0.50	0.13	ug/l	
106-93-4	1,2-Dibromoethane	ND	0.50	0.13	ug/l	
75-71-8	Dichlorodifluoromethane	ND	0.50	0.20	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	0.50	0.13	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	0.50	0.13	ug/l	
106-46-7	1,4-Dichlorobenzene	ND	0.50	0.13	ug/l	
75-34-3	1,1-Dichloroethane	ND	0.50	0.13	ug/l	
107-06-2	1,2-Dichloroethane	ND	0.50	0.13	ug/l	
75-35-4	1,1-Dichloroethylene	ND	0.50	0.13	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	0.50	0.13	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	0.50	0.13	ug/l	
78-87-5	1,2-Dichloropropane	ND	0.50	0.13	ug/l	
142-28-9	1,3-Dichloropropane	ND	0.50	0.13	ug/l	
594-20-7	2,2-Dichloropropane	ND	0.50	0.13	ug/l	
563-58-6	1,1-Dichloropropene	ND	0.50	0.13	ug/l	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.13	ug/l	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.13	ug/l	
108-20-3	Di-Isopropyl Ether	ND	0.50	0.13	ug/l	
64-17-5	Ethyl Alcohol	ND	100	65	ug/l	
100-41-4	Ethylbenzene	ND	0.50	0.13	ug/l	

Method Blank Summary

Page 2 of 3

Job Number: FA59809
Account: CATENCW Catlin Engineers & Scientists
Project: 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VA2499-MB	A0216312.D	1	12/04/18	AB	n/a	n/a	VA2499

The QC reported here applies to the following samples:

Method: SM 6200B

FA59809-1

CAS No.	Compound	Result	RL	MDL	Units	Q
591-78-6	2-Hexanone	ND	5.0	1.0	ug/l	
98-82-8	Isopropylbenzene	ND	0.50	0.13	ug/l	
99-87-6	p-Isopropyltoluene	ND	0.50	0.13	ug/l	
74-83-9	Methyl Bromide	ND	0.50	0.20	ug/l	
74-87-3	Methyl Chloride	ND	0.50	0.20	ug/l	
75-09-2	Methylene Chloride	ND	2.0	1.0	ug/l	
108-10-1	4-Methyl-2-pentanone (MIBK)	ND	2.5	1.3	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	0.50	0.13	ug/l	
91-20-3	Naphthalene	ND	0.50	0.13	ug/l	
103-65-1	n-Propylbenzene	ND	0.50	0.13	ug/l	
100-42-5	Styrene	ND	0.50	0.13	ug/l	
630-20-6	1,1,1,2-Tetrachloroethane	ND	0.50	0.13	ug/l	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.13	ug/l	
127-18-4	Tetrachloroethylene	ND	0.50	0.13	ug/l	
108-88-3	Toluene	ND	0.50	0.13	ug/l	
87-61-6	1,2,3-Trichlorobenzene	ND	0.50	0.13	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	0.13	ug/l	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.13	ug/l	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.13	ug/l	
79-01-6	Trichloroethylene	ND	0.50	0.13	ug/l	
75-69-4	Trichlorofluoromethane	ND	0.50	0.20	ug/l	
96-18-4	1,2,3-Trichloropropane	ND	0.50	0.13	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.13	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	0.13	ug/l	
108-05-4	Vinyl Acetate	ND	5.0	1.0	ug/l	
75-01-4	Vinyl Chloride	ND	0.50	0.13	ug/l	
	m,p-Xylene	ND	1.0	0.13	ug/l	
95-47-6	o-Xylene	ND	0.50	0.13	ug/l	
1330-20-7	Xylene (total)	ND	1.5	0.25	ug/l	

CAS No.	Surrogate Recoveries	Limits
1868-53-7	Dibromofluoromethane	99% 70-130%
17060-07-0	1,2-Dichloroethane-D4	102% 70-130%
2037-26-5	Toluene-D8	103% 70-130%

Method Blank Summary

Job Number: FA59809
Account: CATENCW Catlin Engineers & Scientists
Project: 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VA2499-MB	A0216312.D	1	12/04/18	AB	n/a	n/a	VA2499

The QC reported here applies to the following samples: Method: SM 6200B
FA59809-1

CAS No.	Surrogate Recoveries	Limits
460-00-4	4-Bromofluorobenzene	102% 70-130%

6.1.1
6

Blank Spike Summary

Page 1 of 3

Job Number: FA59809**Account:** CATENCW Catlin Engineers & Scientists**Project:** 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VA2499-BS	A0216310.D	1	12/04/18	AB	n/a	n/a	VA2499

The QC reported here applies to the following samples:**Method:** SM 6200B

FA59809-1

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
67-64-1	Acetone	50	46.3	93	70-130
71-43-2	Benzene	10	9.5	95	70-130
108-86-1	Bromobenzene	10	9.0	90	70-130
74-97-5	Bromochloromethane	10	9.0	90	70-130
75-27-4	Bromodichloromethane	10	9.6	96	70-130
75-25-2	Bromoform	10	9.1	91	70-130
78-93-3	2-Butanone (MEK)	50	50.2	100	70-130
104-51-8	n-Butylbenzene	10	9.4	94	70-130
135-98-8	sec-Butylbenzene	10	9.2	92	70-130
98-06-6	tert-Butylbenzene	10	8.9	89	70-130
56-23-5	Carbon Tetrachloride	10	10.4	104	70-130
108-90-7	Chlorobenzene	10	9.0	90	70-130
75-00-3	Chloroethane	10	9.5	95	60-140
67-66-3	Chloroform	10	9.7	97	70-130
95-49-8	o-Chlorotoluene	10	9.4	94	70-130
106-43-4	p-Chlorotoluene	10	9.4	94	70-130
124-48-1	Dibromochloromethane	10	9.3	93	70-130
106-93-4	1,2-Dibromoethane	10	9.1	91	70-130
75-71-8	Dichlorodifluoromethane	10	10.1	101	60-140
95-50-1	1,2-Dichlorobenzene	10	9.1	91	70-130
541-73-1	1,3-Dichlorobenzene	10	9.4	94	70-130
106-46-7	1,4-Dichlorobenzene	10	8.9	89	70-130
75-34-3	1,1-Dichloroethane	10	10	100	70-130
107-06-2	1,2-Dichloroethane	10	9.3	93	70-130
75-35-4	1,1-Dichloroethylene	10	10.1	101	70-130
156-59-2	cis-1,2-Dichloroethylene	10	9.6	96	70-130
156-60-5	trans-1,2-Dichloroethylene	10	9.9	99	70-130
78-87-5	1,2-Dichloropropane	10	9.5	95	70-130
142-28-9	1,3-Dichloropropane	10	8.8	88	70-130
594-20-7	2,2-Dichloropropane	10	10.6	106	70-130
563-58-6	1,1-Dichloropropene	10	10.2	102	70-130
10061-01-5	cis-1,3-Dichloropropene	10	8.7	87	70-130
10061-02-6	trans-1,3-Dichloropropene	10	9.2	92	70-130
108-20-3	Di-Isopropyl Ether	10	9.3	93	70-130
64-17-5	Ethyl Alcohol	500	636	127	70-130
100-41-4	Ethylbenzene	10	9.4	94	70-130

* = Outside of Control Limits.

Blank Spike Summary

Page 2 of 3

Job Number: FA59809**Account:** CATENCW Catlin Engineers & Scientists**Project:** 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VA2499-BS	A0216310.D	1	12/04/18	AB	n/a	n/a	VA2499

The QC reported here applies to the following samples:**Method:** SM 6200B

FA59809-1

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
591-78-6	2-Hexanone	50	50.6	101	70-130
98-82-8	Isopropylbenzene	10	9.6	96	70-130
99-87-6	p-Isopropyltoluene	10	9.3	93	70-130
74-83-9	Methyl Bromide	10	8.4	84	60-140
74-87-3	Methyl Chloride	10	10.5	105	60-140
75-09-2	Methylene Chloride	10	9.3	93	70-130
108-10-1	4-Methyl-2-pentanone (MIBK)	50	53.8	108	70-130
1634-04-4	Methyl Tert Butyl Ether	10	9.5	95	70-130
91-20-3	Naphthalene	10	8.7	87	70-130
103-65-1	n-Propylbenzene	10	9.6	96	70-130
100-42-5	Styrene	10	9.1	91	70-130
630-20-6	1,1,1,2-Tetrachloroethane	10	9.5	95	70-130
79-34-5	1,1,2,2-Tetrachloroethane	10	9.6	96	70-130
127-18-4	Tetrachloroethylene	10	9.6	96	70-130
108-88-3	Toluene	10	9.3	93	70-130
87-61-6	1,2,3-Trichlorobenzene	10	9.3	93	70-130
120-82-1	1,2,4-Trichlorobenzene	10	8.6	86	70-130
71-55-6	1,1,1-Trichloroethane	10	9.8	98	70-130
79-00-5	1,1,2-Trichloroethane	10	9.2	92	70-130
79-01-6	Trichloroethylene	10	9.2	92	70-130
75-69-4	Trichlorofluoromethane	10	9.2	92	60-140
96-18-4	1,2,3-Trichloropropane	10	9.2	92	70-130
95-63-6	1,2,4-Trimethylbenzene	10	8.7	87	70-130
108-67-8	1,3,5-Trimethylbenzene	10	8.9	89	70-130
108-05-4	Vinyl Acetate	50	49.9	100	70-130
75-01-4	Vinyl Chloride	10	9.6	96	60-140
	m,p-Xylene	20	19.3	97	70-130
95-47-6	o-Xylene	10	9.0	90	70-130
1330-20-7	Xylene (total)	30	28.3	94	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	102%	70-130%
17060-07-0	1,2-Dichloroethane-D4	104%	70-130%
2037-26-5	Toluene-D8	100%	70-130%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA59809
Account: CATENCW Catlin Engineers & Scientists
Project: 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VA2499-BS	A0216310.D	1	12/04/18	AB	n/a	n/a	VA2499

The QC reported here applies to the following samples: Method: SM 6200B
FA59809-1

CAS No.	Surrogate Recoveries	BSP	Limits
460-00-4	4-Bromofluorobenzene	100%	70-130%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 3

Job Number: FA59809

Account: CATENCW Catlin Engineers & Scientists

Project: 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
FA59736-1MS	A0216318.D	100	12/04/18	AB	n/a	n/a	VA2499
FA59736-1MSD	A0216319.D	100	12/04/18	AB	n/a	n/a	VA2499
FA59736-1	A0216314.D	100	12/04/18	AB	n/a	n/a	VA2499

The QC reported here applies to the following samples:

Method: SM 6200B

FA59809-1

CAS No.	Compound	FA59736-1 ug/l	Spike Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
67-64-1	Acetone	ND		5000	4600	92	5000	4460	89	3	70-130/20
71-43-2	Benzene	146		1000	1120	97	1000	1160	101	4	70-130/20
108-86-1	Bromobenzene	ND		1000	911	91	1000	953	95	5	70-130/20
74-97-5	Bromochloromethane	ND		1000	908	91	1000	953	95	5	70-130/20
75-27-4	Bromodichloromethane	ND		1000	968	97	1000	1010	101	4	70-130/20
75-25-2	Bromoform	ND		1000	885	89	1000	929	93	5	70-130/20
78-93-3	2-Butanone (MEK)	ND		5000	5100	102	5000	4890	98	4	70-130/20
104-51-8	n-Butylbenzene	29.7	J	1000	1020	99	1000	1070	104	5	70-130/20
135-98-8	sec-Butylbenzene	19.6	J	1000	976	96	1000	1030	101	5	70-130/20
98-06-6	tert-Butylbenzene	ND		1000	927	93	1000	991	99	7	70-130/20
56-23-5	Carbon Tetrachloride	ND		1000	1030	103	1000	1080	108	5	70-130/20
108-90-7	Chlorobenzene	ND		1000	926	93	1000	961	96	4	70-130/20
75-00-3	Chloroethane	ND		1000	915	92	1000	1090	109	17	60-140/20
67-66-3	Chloroform	ND		1000	971	97	1000	1010	101	4	70-130/20
95-49-8	o-Chlorotoluene	86.4		1000	1080	99	1000	1130	104	5	70-130/20
106-43-4	p-Chlorotoluene	ND		1000	966	97	1000	1010	101	4	70-130/20
124-48-1	Dibromochloromethane	ND		1000	920	92	1000	962	96	4	70-130/20
106-93-4	1,2-Dibromoethane	ND		1000	930	93	1000	961	96	3	70-130/20
75-71-8	Dichlorodifluoromethane	ND		1000	1000	100	1000	1210	121	19	60-140/20
95-50-1	1,2-Dichlorobenzene	ND		1000	922	92	1000	984	98	7	70-130/20
541-73-1	1,3-Dichlorobenzene	ND		1000	953	95	1000	1000	100	5	70-130/20
106-46-7	1,4-Dichlorobenzene	ND		1000	908	91	1000	956	96	5	70-130/20
75-34-3	1,1-Dichloroethane	ND		1000	1000	100	1000	1050	105	5	70-130/20
107-06-2	1,2-Dichloroethane	ND		1000	935	94	1000	987	99	5	70-130/20
75-35-4	1,1-Dichloroethylene	ND		1000	1000	100	1000	1050	105	5	70-130/20
156-59-2	cis-1,2-Dichloroethylene	ND		1000	960	96	1000	1010	101	5	70-130/20
156-60-5	trans-1,2-Dichloroethylene	ND		1000	996	100	1000	1050	105	5	70-130/20
78-87-5	1,2-Dichloropropane	ND		1000	976	98	1000	1010	101	3	70-130/20
142-28-9	1,3-Dichloropropane	ND		1000	889	89	1000	926	93	4	70-130/20
594-20-7	2,2-Dichloropropane	ND		1000	1080	108	1000	1130	113	5	70-130/20
563-58-6	1,1-Dichloropropene	ND		1000	1020	102	1000	1080	108	6	70-130/20
10061-01-5	cis-1,3-Dichloropropene	ND		1000	899	90	1000	920	92	2	70-130/20
10061-02-6	trans-1,3-Dichloropropene	ND		1000	922	92	1000	961	96	4	70-130/20
108-20-3	Di-Isopropyl Ether	17.0	J	1000	966	95	1000	1020	100	5	70-130/20
64-17-5	Ethyl Alcohol	ND		50000	57100	114	50000	58900	118	3	70-130/20
100-41-4	Ethylbenzene	1520		1000	2480	96	1000	2520	100	2	70-130/20

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Page 2 of 3

Job Number: FA59809

Account: CATENCW Catlin Engineers & Scientists

Project: 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
FA59736-1MS	A0216318.D	100	12/04/18	AB	n/a	n/a	VA2499
FA59736-1MSD	A0216319.D	100	12/04/18	AB	n/a	n/a	VA2499
FA59736-1	A0216314.D	100	12/04/18	AB	n/a	n/a	VA2499

The QC reported here applies to the following samples:

Method: SM 6200B

FA59809-1

CAS No.	Compound	FA59736-1 ug/l	Spike Q ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
591-78-6	2-Hexanone	ND	5000	5040	101	5000	4630	93	8	70-130/20
98-82-8	Isopropylbenzene	87.5	1000	1080	99	1000	1150	106	6	70-130/20
99-87-6	p-Isopropyltoluene	ND	1000	974	97	1000	1030	103	6	70-130/20
74-83-9	Methyl Bromide	ND	1000	820	82	1000	984	98	18	60-140/20
74-87-3	Methyl Chloride	ND	1000	1020	102	1000	1200	120	16	60-140/20
75-09-2	Methylene Chloride	ND	1000	939	94	1000	976	98	4	70-130/20
108-10-1	4-Methyl-2-pentanone (MIBK)	ND	5000	5380	108	5000	5100	102	5	70-130/20
1634-04-4	Methyl Tert Butyl Ether	231	1000	1200	97	1000	1240	101	3	70-130/20
91-20-3	Naphthalene	620	1000	1580	96	1000	1680	106	6	70-130/20
103-65-1	n-Propylbenzene	314	1000	1350	104	1000	1400	109	4	70-130/20
100-42-5	Styrene	ND	1000	975	98	1000	1010	101	4	70-130/20
630-20-6	1,1,1,2-Tetrachloroethane	ND	1000	936	94	1000	1010	101	8	70-130/20
79-34-5	1,1,2,2-Tetrachloroethane	ND	1000	988	99	1000	1030	103	4	70-130/20
127-18-4	Tetrachloroethylene	ND	1000	974	97	1000	1030	103	6	70-130/20
108-88-3	Toluene	1790	1000	2680	89	1000	2750	96	3	70-130/20
87-61-6	1,2,3-Trichlorobenzene	ND	1000	927	93	1000	1030	103	11	70-130/20
120-82-1	1,2,4-Trichlorobenzene	ND	1000	898	90	1000	984	98	9	70-130/20
71-55-6	1,1,1-Trichloroethane	ND	1000	990	99	1000	1040	104	5	70-130/20
79-00-5	1,1,2-Trichloroethane	ND	1000	928	93	1000	968	97	4	70-130/20
79-01-6	Trichloroethylene	ND	1000	930	93	1000	968	97	4	70-130/20
75-69-4	Trichlorofluoromethane	ND	1000	880	88	1000	1040	104	17	60-140/20
96-18-4	1,2,3-Trichloropropane	ND	1000	876	88	1000	959	96	9	70-130/20
95-63-6	1,2,4-Trimethylbenzene	2910	1000	3850	94	1000	3890	98	1	70-130/20
108-67-8	1,3,5-Trimethylbenzene	688	1000	1670	98	1000	1730	104	4	70-130/20
108-05-4	Vinyl Acetate	ND	5000	5120	102	5000	4900	98	4	70-130/20
75-01-4	Vinyl Chloride	ND	1000	907	91	1000	1110	111	20	60-140/20
	m,p-Xylene	6950	2000	8730	89	2000	8810	93	1	70-130/20
95-47-6	o-Xylene	2940	1000	3700	76	1000	3780	84	2	70-130/20
1330-20-7	Xylene (total)	9890	3000	12400	84	3000	12600	90	2	70-130/20

CAS No.	Surrogate Recoveries	MS	MSD	FA59736-1	Limits
1868-53-7	Dibromofluoromethane	101%	102%	101%	70-130%
17060-07-0	1,2-Dichloroethane-D4	103%	104%	103%	70-130%
2037-26-5	Toluene-D8	99%	100%	102%	70-130%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA59809
Account: CATENCW Catlin Engineers & Scientists
Project: 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
FA59736-1MS	A0216318.D	100	12/04/18	AB	n/a	n/a	VA2499
FA59736-1MSD	A0216319.D	100	12/04/18	AB	n/a	n/a	VA2499
FA59736-1	A0216314.D	100	12/04/18	AB	n/a	n/a	VA2499

The QC reported here applies to the following samples: Method: SM 6200B

FA59809-1

CAS No.	Surrogate Recoveries	MS	MSD	FA59736-1	Limits
460-00-4	4-Bromofluorobenzene	101%	101%	98%	70-130%

* = Outside of Control Limits.

MS Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

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Job Number: FA59809
Account: CATENCW Catlin Engineers & Scientists
Project: 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72862-MB	6F02046.D	1	12/03/18	MV	12/03/18	OP72862	S6F76

The QC reported here applies to the following samples:

Method: EPA 625

FA59809-1

CAS No.	Compound	Result	RL	MDL	Units	Q
65-85-0	Benzoic Acid	ND	50	10	ug/l	
59-50-7	4-Chloro-3-methyl Phenol	ND	5.0	0.59	ug/l	
95-57-8	2-Chlorophenol	ND	5.0	0.63	ug/l	
120-83-2	2,4-Dichlorophenol	ND	5.0	0.84	ug/l	
105-67-9	2,4-Dimethylphenol	ND	5.0	0.74	ug/l	
51-28-5	2,4-Dinitrophenol	ND	25	5.0	ug/l	
534-52-1	4,6-Dinitro-o-cresol	ND	10	2.0	ug/l	
95-48-7	2-Methylphenol	ND	5.0	0.56	ug/l	
	3&4-Methylphenol	ND	5.0	0.98	ug/l	
88-75-5	2-Nitrophenol	ND	5.0	0.85	ug/l	
100-02-7	4-Nitrophenol	ND	25	5.0	ug/l	
87-86-5	Pentachlorophenol	ND	25	5.0	ug/l	
108-95-2	Phenol	ND	5.0	0.50	ug/l	
88-06-2	2,4,6-Trichlorophenol	ND	5.0	0.75	ug/l	
83-32-9	Acenaphthene	ND	5.0	0.63	ug/l	
208-96-8	Acenaphthylene	ND	5.0	0.64	ug/l	
120-12-7	Anthracene	ND	5.0	0.80	ug/l	
56-55-3	Benzo(a)anthracene	ND	5.0	0.76	ug/l	
50-32-8	Benzo(a)pyrene	ND	5.0	0.78	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	5.0	0.78	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	5.0	0.82	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	5.0	0.86	ug/l	
100-51-6	Benzyl Alcohol	ND	5.0	0.61	ug/l	
101-55-3	4-Bromophenyl Phenyl Ether	ND	5.0	0.85	ug/l	
85-68-7	Butyl Benzyl Phthalate	ND	5.0	1.0	ug/l	
106-47-8	4-Chloroaniline	ND	5.0	0.63	ug/l	
111-91-1	bis(2-Chloroethoxy)methane	ND	5.0	0.81	ug/l	
111-44-4	bis(2-Chloroethyl)ether	ND	5.0	0.73	ug/l	
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	5.0	0.76	ug/l	
91-58-7	2-Chloronaphthalene	ND	5.0	0.50	ug/l	
7005-72-3	4-Chlorophenyl Phenyl Ether	ND	5.0	0.54	ug/l	
218-01-9	Chrysene	ND	5.0	0.85	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	5.0	0.80	ug/l	
132-64-9	Dibenzofuran	ND	5.0	0.60	ug/l	
95-50-1	1,2-Dichlorobenzene	ND	5.0	0.50	ug/l	
541-73-1	1,3-Dichlorobenzene	ND	5.0	0.50	ug/l	

Method Blank Summary

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Job Number: FA59809
Account: CATENCW Catlin Engineers & Scientists
Project: 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72862-MB	6F02046.D	1	12/03/18	MV	12/03/18	OP72862	S6F76

The QC reported here applies to the following samples:

Method: EPA 625

FA59809-1

CAS No.	Compound	Result	RL	MDL	Units	Q
106-46-7	1,4-Dichlorobenzene	ND	5.0	0.50	ug/l	
91-94-1	3,3'-Dichlorobenzidine	ND	5.0	0.64	ug/l	
84-66-2	Diethyl Phthalate	ND	5.0	1.0	ug/l	
131-11-3	Dimethyl Phthalate	ND	5.0	1.0	ug/l	
84-74-2	Di-n-butyl Phthalate	ND	5.0	1.0	ug/l	
117-84-0	Di-n-octyl Phthalate	ND	5.0	1.0	ug/l	
122-66-7	1,2-Diphenylhydrazine	ND	5.0	0.76	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	1.0	ug/l	
206-44-0	Fluoranthene	ND	5.0	0.55	ug/l	
86-73-7	Fluorene	ND	5.0	0.70	ug/l	
118-74-1	Hexachlorobenzene	ND	5.0	0.69	ug/l	
87-68-3	Hexachlorobutadiene	ND	5.0	0.50	ug/l	
77-47-4	Hexachlorocyclopentadiene	ND	5.0	1.8	ug/l	
67-72-1	Hexachloroethane	ND	5.0	1.6	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	5.0	0.71	ug/l	
78-59-1	Isophorone	ND	5.0	0.78	ug/l	
90-12-0	1-Methylnaphthalene	ND	5.0	0.53	ug/l	
91-57-6	2-Methylnaphthalene	ND	5.0	0.60	ug/l	
91-20-3	Naphthalene	ND	5.0	0.50	ug/l	
98-95-3	Nitrobenzene	ND	5.0	0.93	ug/l	
621-64-7	N-Nitrosodi-n-propylamine	ND	5.0	0.67	ug/l	
86-30-6	N-Nitrosodiphenylamine	ND	5.0	0.81	ug/l	
85-01-8	Phenanthrene	ND	5.0	0.86	ug/l	
129-00-0	Pyrene	ND	5.0	0.68	ug/l	
120-82-1	1,2,4-Trichlorobenzene	ND	5.0	1.1	ug/l	

CAS No.	Surrogate Recoveries	Limits
367-12-4	2-Fluorophenol	36% 14-67%
4165-62-2	Phenol-d5	24% 10-50%
118-79-6	2,4,6-Tribromophenol	60% 33-118%
4165-60-0	Nitrobenzene-d5	62% 42-108%
321-60-8	2-Fluorobiphenyl	62% 40-106%
1718-51-0	Terphenyl-d14	68% 39-121%

Blank Spike Summary

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Job Number: FA59809

Account: CATENCW Catlin Engineers & Scientists

Project: 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72862-BS	6F02045.D	1	12/03/18	MV	12/03/18	OP72862	S6F76

The QC reported here applies to the following samples:

Method: EPA 625

FA59809-1

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
65-85-0	Benzoic Acid	100	33.5	34	10-69
59-50-7	4-Chloro-3-methyl Phenol	50	40.0	80	54-103
95-57-8	2-Chlorophenol	50	39.1	78	52-98
120-83-2	2,4-Dichlorophenol	50	41.7	83	53-103
105-67-9	2,4-Dimethylphenol	50	41.6	83	43-90
51-28-5	2,4-Dinitrophenol	100	71.7	72	44-112
534-52-1	4,6-Dinitro-o-cresol	100	84.5	85	66-121
95-48-7	2-Methylphenol	50	33.3	67	43-90
	3&4-Methylphenol	100	63.2	63	36-88
88-75-5	2-Nitrophenol	50	42.8	86	53-102
100-02-7	4-Nitrophenol	100	47.5	48	18-62
87-86-5	Pentachlorophenol	100	85.0	85	61-115
108-95-2	Phenol	50	18.4	37	19-56
88-06-2	2,4,6-Trichlorophenol	50	46.4	93	59-107
83-32-9	Acenaphthene	50	41.3	83	61-107
208-96-8	Acenaphthylene	50	43.1	86	60-104
120-12-7	Anthracene	50	42.1	84	65-108
56-55-3	Benzo(a)anthracene	50	42.1	84	66-111
50-32-8	Benzo(a)pyrene	50	42.3	85	62-107
205-99-2	Benzo(b)fluoranthene	50	42.2	84	65-114
191-24-2	Benzo(g,h,i)perylene	50	46.3	93	66-116
207-08-9	Benzo(k)fluoranthene	50	43.4	87	65-114
100-51-6	Benzyl Alcohol	50	35.8	72	46-94
101-55-3	4-Bromophenyl Phenyl Ether	50	44.8	90	65-109
85-68-7	Butyl Benzyl Phthalate	50	44.8	90	65-112
106-47-8	4-Chloroaniline	50	36.8	74	49-105
111-91-1	bis(2-Chloroethoxy)methane	50	39.4	79	51-102
111-44-4	bis(2-Chloroethyl)ether	50	39.5	79	53-100
108-60-1	2,2'-Oxybis(1-chloropropane)	50	42.5	85	45-106
91-58-7	2-Chloronaphthalene	50	41.8	84	57-103
7005-72-3	4-Chlorophenyl Phenyl Ether	50	42.8	86	62-105
218-01-9	Chrysene	50	42.8	86	66-111
53-70-3	Dibenzo(a,h)anthracene	50	46.2	92	66-119
132-64-9	Dibenzofuran	50	42.1	84	61-106
95-50-1	1,2-Dichlorobenzene	50	37.5	75	48-97
541-73-1	1,3-Dichlorobenzene	50	38.3	77	45-95

* = Outside of Control Limits.

Blank Spike Summary

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Job Number: FA59809

Account: CATENCW Catlin Engineers & Scientists

Project: 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72862-BS	6F02045.D	1	12/03/18	MV	12/03/18	OP72862	S6F76

The QC reported here applies to the following samples:

Method: EPA 625

FA59809-1

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
106-46-7	1,4-Dichlorobenzene	50	37.6	75	45-98
91-94-1	3,3'-Dichlorobenzidine	50	44.1	88	46-117
84-66-2	Diethyl Phthalate	50	42.8	86	64-108
131-11-3	Dimethyl Phthalate	50	42.2	84	63-106
84-74-2	Di-n-butyl Phthalate	50	44.7	89	65-107
117-84-0	Di-n-octyl Phthalate	50	46.4	93	62-118
122-66-7	1,2-Diphenylhydrazine	50	44.8	90	61-110
117-81-7	bis(2-Ethylhexyl)phthalate	50	47.7	95	61-117
206-44-0	Fluoranthene	50	40.8	82	63-106
86-73-7	Fluorene	50	42.1	84	62-108
118-74-1	Hexachlorobenzene	50	43.3	87	63-108
87-68-3	Hexachlorobutadiene	50	41.6	83	42-102
77-47-4	Hexachlorocyclopentadiene	50	38.0	76	39-102
67-72-1	Hexachloroethane	50	39.7	79	42-100
193-39-5	Indeno(1,2,3-cd)pyrene	50	46.9	94	64-119
78-59-1	Isophorone	50	38.7	77	43-87
90-12-0	1-Methylnaphthalene	50	37.5	75	53-102
91-57-6	2-Methylnaphthalene	50	40.1	80	51-102
91-20-3	Naphthalene	50	38.5	77	47-100
98-95-3	Nitrobenzene	50	40.5	81	50-104
621-64-7	N-Nitrosodi-n-propylamine	50	39.0	78	52-104
86-30-6	N-Nitrosodiphenylamine	50	41.7	83	64-108
85-01-8	Phenanthrene	50	41.8	84	66-110
129-00-0	Pyrene	50	43.6	87	64-113
120-82-1	1,2,4-Trichlorobenzene	50	39.9	80	45-97

CAS No.	Surrogate Recoveries	BSP	Limits
367-12-4	2-Fluorophenol	48%	14-67%
4165-62-2	Phenol-d5	34%	10-50%
118-79-6	2,4,6-Tribromophenol	83%	33-118%
4165-60-0	Nitrobenzene-d5	78%	42-108%
321-60-8	2-Fluorobiphenyl	79%	40-106%
1718-51-0	Terphenyl-d14	76%	39-121%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

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Job Number: FA59809
Account: CATENCW Catlin Engineers & Scientists
Project: 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72862-MS	6F02059.D	1	12/03/18	MV	12/03/18	OP72862	S6F76
OP72862-MSD	6F02060.D	1	12/03/18	MV	12/03/18	OP72862	S6F76
FA59809-1	6F02055.D	1	12/03/18	MV	12/03/18	OP72862	S6F76

The QC reported here applies to the following samples:

Method: EPA 625

FA59809-1

CAS No.	Compound	FA59809-1 ug/l	Spike Q ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
65-85-0	Benzoic Acid	ND	196	75.0	38	196	61.1	31	20	10-69/39
59-50-7	4-Chloro-3-methyl Phenol	ND	98	69.7	71	98	70.4	72	1	54-103/23
95-57-8	2-Chlorophenol	ND	98	67.2	69	98	63.6	65	6	52-98/25
120-83-2	2,4-Dichlorophenol	ND	98	73.2	75	98	73.7	75	1	53-103/26
105-67-9	2,4-Dimethylphenol	ND	98	72.3	74	98	73.8	75	2	43-90/27
51-28-5	2,4-Dinitrophenol	ND	196	103	53	196	115	59	11	44-112/25
534-52-1	4,6-Dinitro-o-cresol	ND	196	127	65*	196	134	68	5	66-121/23
95-48-7	2-Methylphenol	ND	98	59.5	61	98	54.4	55	9	43-90/28
	3&4-Methylphenol	ND	196	114	58	196	101	52	12	36-88/28
88-75-5	2-Nitrophenol	ND	98	74.8	76	98	76.7	78	3	53-102/29
100-02-7	4-Nitrophenol	ND	196	101	52	196	86.1	44	16	18-62/33
87-86-5	Pentachlorophenol	ND	196	155	79	196	159	81	3	61-115/26
108-95-2	Phenol	ND	98	37.0	38	98	29.4	30	23	19-56/35
88-06-2	2,4,6-Trichlorophenol	ND	98	80.0	82	98	81.6	83	2	59-107/23
83-32-9	Acenaphthene	ND	98	72.9	74	98	74.6	76	2	61-107/22
208-96-8	Acenaphthylene	ND	98	76.2	78	98	77.6	79	2	60-104/22
120-12-7	Anthracene	ND	98	73.8	75	98	75.2	77	2	65-108/20
56-55-3	Benzo(a)anthracene	ND	98	75.5	77	98	76.3	78	1	66-111/22
50-32-8	Benzo(a)pyrene	ND	98	73.8	75	98	75.8	77	3	62-107/23
205-99-2	Benzo(b)fluoranthene	ND	98	73.8	75	98	79.7	81	8	65-114/23
191-24-2	Benzo(g,h,i)perylene	ND	98	81.2	83	98	81.7	83	1	66-116/23
207-08-9	Benzo(k)fluoranthene	ND	98	75.8	77	98	73.7	75	3	65-114/24
100-51-6	Benzyl Alcohol	ND	98	66.7	68	98	61.8	63	8	46-94/27
101-55-3	4-Bromophenyl Phenyl Ether	ND	98	79.6	81	98	80.7	82	1	65-109/23
85-68-7	Butyl Benzyl Phthalate	ND	98	82.1	84	98	81.8	83	0	65-112/24
106-47-8	4-Chloroaniline	ND	98	57.4	59	98	62.3	64	8	49-105/27
111-91-1	bis(2-Chloroethoxy)methane	ND	98	69.7	71	98	70.8	72	2	51-102/28
111-44-4	bis(2-Chloroethyl)ether	ND	98	69.6	71	98	68.8	70	1	53-100/27
108-60-1	2,2'-Oxybis(1-chloropropane)	ND	98	75.7	77	98	74.4	76	2	45-106/26
91-58-7	2-Chloronaphthalene	ND	98	72.3	74	98	75.1	77	4	57-103/23
7005-72-3	4-Chlorophenyl Phenyl Ether	ND	98	74.2	76	98	76.9	78	4	62-105/20
218-01-9	Chrysene	ND	98	75.9	77	98	77.0	79	1	66-111/22
53-70-3	Dibenzo(a,h)anthracene	ND	98	80.8	82	98	82.5	84	2	66-119/24
132-64-9	Dibenzofuran	ND	98	75.5	77	98	76.7	78	2	61-106/21
95-50-1	1,2-Dichlorobenzene	ND	98	66.7	68	98	66.2	68	1	48-97/24
541-73-1	1,3-Dichlorobenzene	ND	98	67.3	69	98	67.1	68	0	45-95/25

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

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Job Number: FA59809
Account: CATENCW Catlin Engineers & Scientists
Project: 218123 (5); NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72862-MS	6F02059.D	1	12/03/18	MV	12/03/18	OP72862	S6F76
OP72862-MSD	6F02060.D	1	12/03/18	MV	12/03/18	OP72862	S6F76
FA59809-1	6F02055.D	1	12/03/18	MV	12/03/18	OP72862	S6F76

The QC reported here applies to the following samples:

Method: EPA 625

FA59809-1

CAS No.	Compound	FA59809-1 ug/l	Spike Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
106-46-7	1,4-Dichlorobenzene	ND		98	65.9	67	98	66.3	68	1	45-98/25
91-94-1	3,3' -Dichlorobenzidine	ND		98	80.1	82	98	82.3	84	3	46-117/29
84-66-2	Diethyl Phthalate	ND		98	75.9	77	98	78.3	80	3	64-108/21
131-11-3	Dimethyl Phthalate	ND		98	75.2	77	98	77.1	79	2	63-106/22
84-74-2	Di-n-butyl Phthalate	ND		98	79.0	81	98	81.2	83	3	65-107/21
117-84-0	Di-n-octyl Phthalate	ND		98	81.9	84	98	82.1	84	0	62-118/24
122-66-7	1,2-Diphenylhydrazine	ND		98	79.6	81	98	80.8	82	1	61-110/24
117-81-7	bis(2-Ethylhexyl)phthalate	ND		98	86.0	88	98	85.3	87	1	61-117/23
206-44-0	Fluoranthene	ND		98	71.5	73	98	74.0	75	3	63-106/21
86-73-7	Fluorene	ND		98	74.1	76	98	75.6	77	2	62-108/20
118-74-1	Hexachlorobenzene	ND		98	75.3	77	98	77.6	79	3	63-108/22
87-68-3	Hexachlorobutadiene	ND		98	75.4	77	98	76.2	78	1	42-102/28
77-47-4	Hexachlorocyclopentadiene	ND		98	61.3	63	98	61.4	63	0	39-102/29
67-72-1	Hexachloroethane	ND		98	69.7	71	98	69.1	70	1	42-100/29
193-39-5	Indeno(1,2,3-cd)pyrene	ND		98	81.9	84	98	81.9	84	0	64-119/24
78-59-1	Isophorone	ND		98	69.9	71	98	71.0	72	2	43-87/25
90-12-0	1-Methylnaphthalene	ND		98	65.7	67	98	67.7	69	3	53-102/27
91-57-6	2-Methylnaphthalene	ND		98	72.3	74	98	72.9	74	1	51-102/26
91-20-3	Naphthalene	ND		98	68.6	70	98	70.2	72	2	47-100/29
98-95-3	Nitrobenzene	ND		98	72.2	74	98	73.6	75	2	50-104/28
621-64-7	N-Nitrosodi-n-propylamine	ND		98	70.0	71	98	69.6	71	1	52-104/25
86-30-6	N-Nitrosodiphenylamine	ND		98	75.1	77	98	76.1	78	1	64-108/23
85-01-8	Phenanthrene	ND		98	73.7	75	98	75.9	77	3	66-110/21
129-00-0	Pyrene	ND		98	76.9	78	98	77.0	79	0	64-113/23
120-82-1	1,2,4-Trichlorobenzene	ND		98	70.4	72	98	71.9	73	2	45-97/28

CAS No.	Surrogate Recoveries	MS	MSD	FA59809-1	Limits
367-12-4	2-Fluorophenol	46%	38%	21%	14-67%
4165-62-2	Phenol-d5	36%	28%	12%	10-50%
118-79-6	2,4,6-Tribromophenol	73%	74%	65%	33-118%
4165-60-0	Nitrobenzene-d5	71%	72%	59%	42-108%
321-60-8	2-Fluorobiphenyl	71%	72%	60%	40-106%
1718-51-0	Terphenyl-d14	66%	67%	65%	39-121%

* = Outside of Control Limits.