

**REMEDIAL ACTION PLAN  
SOUTH BRUNSWICK MIDDLE SCHOOL  
100 COUGAR DRIVE  
SOUTHPORT, BRUNSWICK COUNTY, NORTH CAROLINA**

**ECS PROJECT NO. 49:1389**

**PREPARED FOR**

**BRUNSWICK COUNTY SCHOOLS  
35 REFERENDUM DRIVE  
BOLIVIA, NORTH CAROLINA 28422**

**April 7, 2016**



April 7, 2016

Mr. Craig Eckert  
Director of Facilities and Capital Projects  
Brunswick County Schools  
35 Referendum Drive  
Bolivia, North Carolina 28422

Reference: Remedial Action Plan  
South Brunswick Middle School  
100 Cougar Drive  
Southport, Brunswick County, North Carolina  
ECS Project No. 49:1389

Dear Mr. Eckert:

ECS Carolinas, LLP (ECS) is pleased to provide this Remedial Action Plan (RAP) for the above-referenced site. The purpose of this RAP is to evaluate remedial alternatives and select the alternative that is best suited to meet the remedial goals. The RAP also describes how the remediation will be implemented, monitored, and documented.

ECS appreciates this opportunity to provide our services to you on this project. If you have any questions concerning this report or this project, please contact us at (919) 861-9910.

Sincerely,

**ECS CAROLINAS, LLP**

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cc: Mr. David Brown – NCDEQ, Inactive Hazardous Sites Branch

## Table of Contents

<b>A. STATEMENT OF PURPOSE.....</b>	<b>1</b>
<b>B. SITE HISTORY .....</b>	<b>1</b>
<b>C. LAND USE, SITE DRAINAGE, GEOLOGY, AND HYDROGEOLOGY .....</b>	<b>7</b>
<b>D. POTENTIALLY APPLICABLE TECHNOLOGIES.....</b>	<b>8</b>
<b>E. REMEDIAL ALTERNATIVES .....</b>	<b>12</b>
<b>F. EVALUATION OF REMEDIAL ALTERNATIVES.....</b>	<b>16</b>

## FIGURES

- Figure 1 – Site Location Map
- Figure 2 – Parcel Map
- Figure 3 – Site Survey
- Figure 4 – Previous Sample Location Map
- Figure 5 – Water Supply Well Location Map
- Figure 6 – Sample Location Map
- Figure 7 – Surficial Soil Arsenic Concentration Map
- Figure 8 – Subsurface Soil Arsenic Concentration Map
- Figure 9 – Perimeter Boring Location Map
- Figure 10 – Fly Ash Location Map
- Figure 11 – Potentiometric Surface Map (8/13/14)
- Figure 12 – Potentiometric Surface Map (10/9/14)
- Figure 13 – Soil Remedial Alternative #2
- Figure 14 – Soil Remedial Alternative #3
- Figure 15 – Soil Remedial Alternative #4
- Figure 16 – Soil Remedial Alternative #5

## TABLES

- Table 1 – Water Supply Well Survey Table
- Table 2 – Well Construction and Groundwater Elevation Details
- Table 3 – Soil Sampling Results
- Table 4 – Groundwater Sampling Results
- Table 5 – Summary of Current Groundwater Analytical Results

## APPENDICES

- Appendix A – Prior Analytical Results Table
- Appendix B – Geophysical Survey
- Appendix C – Soil Boring Logs
- Appendix D – Declaration of Perpetual Land Use Restrictions (DPLUR)
- Appendix E – Monitoring Well Construction Records
- Appendix F – Laboratory Analytical Results
- Appendix G – ECS Personnel Field Notes
- Appendix H – Certification Documentation

## A. Statement of Purpose

This Remedial Action Plan (RAP) is intended for the exclusive use Brunswick County Schools and for submission to the North Carolina Department of Environmental Quality (NCDEQ), Inactive Hazardous Sites Branch (IHSB). The contents should not be relied upon by other parties without the express written consent of ECS. The data and information presented are relevant to the dates of previous site work and should not be relied upon to represent site conditions on other dates. Our evaluation of site conditions and the formulation of this RAP is based on the most current site and project information and data available or obtained in previous phases of assessment at the site. The primary objective of this RAP is to evaluate remedial alternatives and select the alternative that is best suited to meet the remedial goals. The RAP also describes how the remediation will be implemented, monitored, and documented.

## B. Site History

The site is the Brunswick County Middle School located at 100 Cougar Drive in Southport, Brunswick County, North Carolina (Figures 1 and 2). ECS understands that Brunswick County Schools re-graded a portion of the site for a baseball field and a stockpile of soil was created. Brunswick County Schools was informed that fly-ash may have been placed as fill material on the site in the early to mid 1990s. Based on interviews with a knowledgeable party, the area of the baseball field was filled with fly-ash received from the Southport CoGentrix facility and the estimated depth of the backfill material on the site was approximately 18 +/- inches. A copy of the site survey showing the original elevation of the field prior to fly ash placement is included as Figure 3. On November 6, 2013, Brunswick County Schools collected four composite soil samples from the stockpile and had the samples analyzed for arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver (RCRA metals). A review of the laboratory analytical report indicates that concentrations of arsenic, cadmium, and selenium exceeded their respective IHSB Protection of Groundwater Soil Remediation Goals (SRGs). In addition, it was determined that concentrations of arsenic and chromium exceeded their respective IHSB Preliminary Residential Health-Based Soil Remediation Goals (PSRGs).

ECS was contracted to conduct soil assessment activities (*Revised Soil Assessment Report*, ECS Project 22-19741 dated January 16, 2014) at the site. The analytical results of the soil samples did not identify concentrations of polycyclic aromatic hydrocarbons (PAHs) above the laboratory detection limits. However, metals were detected in the soil samples collected from the baseball field and stockpile exceeding the concentration of metals detected in three of the four background soil samples. The metal concentrations also exceeded their respective IHSB PSRGs. Composite soil sample C3 contained the greatest metal concentrations with a total chromium concentration of 9.3 mg/kg and an arsenic concentration of 23.6 milligrams per kilogram (mg/kg). The soil samples were subsequently analyzed for hexavalent chromium and the analysis did not detect hexavalent chromium in the samples. However, due to the soil matrix, the laboratory detection limits in select samples were greater than the previously detected total chromium concentrations. One of these samples was C3, which contained the greatest total chromium concentration but was non-detect for hexavalent chromium with a detection limit of <1.9 mg/kg. Based on the chromium analysis, the concentration in the total chromium analysis appears to consist of trivalent chromium (chromium III). Since the soil samples appear to be homogenous, ECS believes the total chromium concentrations detected in the remaining soil samples are a result of trivalent chromium. Therefore, the detected concentrations of trivalent chromium are less than their IHSB SRGs. The soil samples; however, still contain antimony, arsenic, iron, selenium, and thallium at concentrations exceeding their respective IHSB SRGs. The prior sample results are included in Appendix A and the approximate location of the samples is shown on Figure 4.

Following review of the report, the IHSB issued a letter (dated February 7, 2014) to Brunswick County Schools requesting that a brief work plan be prepared and submitted to their office by March 21, 2014 that includes the following:

- 1) a brief history of the site, including any and all available information on the suspected fly ash disposal on the site;
- 2) proposal for sampling soil to determine depth of contamination, including a sample location plan; and,
- 3) analysis of soil samples (using leachate analysis) or groundwater samples to demonstrate that groundwater has not been impacted by the identified metals.

ECS was contracted to prepare a Work Plan as requested by the NCDEQ and to conduct additional soil assessment activities (*Additional Soil Assessment Report*, ECS Project 22-19741A dated March 13, 2014) at the site. In accordance with the NCDEQ request, ECS prepared and submitted a Work Plan for the additional assessment activities at the site (Work Plan dated February 24, 2014). ECS received approval of the Work Plan from the NCDEQ via email on February 25, 2014.

Based on the results of the additional soil assessment, ECS concluded the following:

- Based on information obtained from two soil borings located in the vicinity of the site baseball field, apparent backfill material consisting of black silty gravel, assumed to be fly-ash, ranged in thickness from 42" to 55" below ground surface (bgs). Groundwater was encountered in the borings at an approximate depth of 70" bgs with apparent perched groundwater encountered at an approximate depth of 30" to 48" bgs. The horizontal extent of this backfill material was not delineated at this time;
- Laboratory analysis of a toxicity characteristic leaching procedure (TCLP) composite soil sample (S-1), collected in the vicinity (quadrant C3) and similar depth (4" to 6") of a previously collected composite soil sample where total concentrations of select metals were detected above the IHSB SRGs and PSRGs, did not detect targeted metals above laboratory detection limits. Additionally, two deeper (12" and 24" bgs) soil samples (S-2 and S-3) collected from quadrant C3 and within what is believed to be the backfill fly ash detected total concentrations of antimony, arsenic, copper, chromium, mercury, nickel, selenium, and zinc above their respective IHSB SRGs; however, laboratory analysis using TCLP methodology did not detect these metals above laboratory detection limits. Based on the depth of the apparent fill material, groundwater identified during this assessment, and the lack of these targeted metals detected at concentrations above laboratory detection limits using TCLP methodology, ECS postulated it was unlikely that groundwater beneath the site has been significantly impacted by the release;
- In accordance with the IHSB *Guidelines for Assessment and Cleanup*, dated January 2014, to determine a site-specific IHSB SRG, where applicable, total concentrations of metals should be plotted versus their corresponding TCLP concentrations to determine their linear correlation. Due to either the detected total concentrations of metals being less than the IHSB Protection of Groundwater SRGs and PSRGs or TCLP values being reported as non-detect, the linear correlation process was not conducted for antimony, arsenic, beryllium, chromium, selenium, zinc, and mercury. Additionally, due to limited number of samples used to make a linear correlation, this procedure was also not conducted for the remaining metals barium, cadmium, copper, lead, and nickel;

- Laboratory analysis of four TCLP composite soil samples, collected from an existing on-site stockpile of soil where total concentrations of select metals were previously detected above IHSB SRGs and PSRGs, did not detect targeted metals at concentrations above laboratory detection limits. ECS recommended that these stockpiled soil be disposed of at an off-site at a permitted facility;
- Laboratory analysis of background soil samples collected from an adjoining off-site property owned by Brunswick County Schools detected select metals above laboratory detection limits; however, the concentrations did not exceed their respective IHSB Protection of Groundwater SRGs and/or Residential Health-Based PSRGs. Additionally, laboratory analysis of the background soil samples using TCLP did not detect targeted metals above laboratory detection limits. ECS also conducted a seasonal-high water table (SHWT) assessment at the off-site boring locations. Apparent backfill materials were not identified in the background soil borings. ECS estimated the SHWT in the off-site borings ranged in depth from 15" to 20" bgs and groundwater was encountered at depths ranging from 24" to 32" bgs; and
- During the completion of the previous assessment work, Brunswick County Schools located and provided ECS with a scaled grading plan survey of the athletic fields at the site (dated 1992). The grading plan depicts existing elevations and proposed elevations at the site with proposed backfill depths ranging from two to three feet.

Following review of the *Additional Soil Assessment Report*, the IHSB issued a letter (dated April 5, 2014) to Brunswick County Schools indicating the following:

- 1) The IHSB agrees that the stockpile on the site should be properly disposed at a permitted landfill.
- 2) Additional assessment is necessary to delineate the horizontal and vertical extent of the apparent fly-ash backfill material beneath the site.
- 3) Upon delineation of the apparent fly-ash backfill material beneath the site, a sampling grid should be established across the site so that a sufficient number of samples can be collected in ¼-acre quadrants to determine average contaminant concentrations within each sector. The information will be used to determine if material within each sector meets or exceeds unrestricted use remedial goals.
- 4) Based on the TCLP concentrations of barium, cadmium, and lead exceeding their respective North Carolina 2L groundwater quality standards (NC2LGWQS), groundwater samples must be collected at the site and that groundwater sample locations can be selected after the apparent fly-ash backfill material has been delineated.
- 5) Prior to conducting additional work, the IHSB requested Brunswick County Schools submit (within 30 days from the date of their letter) a brief proposed sampling plan for conducting additional sampling activities for review and approval by the NCDEQ.

ECS submitted a brief proposed sampling plan to the NCDEQ on May 13, 2014. The plan included performing an electromagnetic (EM) survey to determine the horizontal extent of the fly-ash beneath the site and an electric resistivity (ER) imaging survey to determine the vertical extent of fly-ash beneath the site. Upon completion of the geophysical survey and mapping, ECS subdivided the backfill areas into ¼-acre quadrants and advanced one soil boring in each quadrant using a Geoprobe® drill rig. Two soil samples were collected from each soil boring for laboratory analysis. The soil samples and duplicate samples were submitted to a North Carolina certified laboratory for analysis for arsenic and thallium using EPA Methods 6010. Based on the results of the soil samples, ECS proposed to install four groundwater monitoring wells within the area of fly ash. The groundwater collected from these wells

was sampled for laboratory analysis for Priority Pollutant Metals (antimony, arsenic, beryllium, cadmium, chromium, copper, mercury, lead, nickel, selenium, silver, thallium, and zinc) plus barium using EPA Methods 6010/7471.

On May 20, 2014, the IHSB responded with the following recommendations:

At least one soil sample should include the full scan of IHSB Hazardous Substances List Metals (antimony, arsenic, beryllium, cadmium, chromium, copper, mercury, lead, manganese, nickel, selenium, silver, thallium, and zinc) and should be a composite sample collected from the fly-ash material. Using the TCLP analysis, the soil samples exceeded NC2LGWQS on barium, cadmium and lead. Therefore, the soil samples were analyzed for arsenic, barium, cadmium, lead, and thallium. The groundwater samples were analyzed for the full scan of IHSB Hazardous Substance List metals. Soil borings (either Geoprobe or hand auger) were conducted to confirm the vertical and horizontal extent of the fly ash to support the geophysical results.

ECS submitted a *Remedial Investigation Work Plan* dated July 14, 2014 documenting the proposed investigation activities. As part of the Work Plan, ECS researched the site and surrounding area to determine if Environmentally Sensitive Areas were present. None were identified within 1,500 feet of the site. In addition, ECS included the geophysical survey within the Work Plan to assist in the location of soil borings and groundwater samples. The EM survey was performed using an EM-31 induction meter to measure the apparent conductivity of the subsurface. High conductivity materials can be caused by conductive chemical compounds such as acids, sulfates, fly ash, and salts in the subsurface and by conductive soil such as clay. The geophysical survey indicated high anomalies at both ball fields west of the school. The anomalies appear to be fly ash with the highest readings on the western section of the southern ball field. A copy of this geophysical survey is included in Appendix B.

On August 6, 2014, the NCDEQ responded to the Work Plan requesting a Receptor Survey and the preparation of a Site Plan identifying pertinent features within 1,500 feet of the center of the site. ECS was contracted to prepare a Receptor Survey and a Remedial Investigation Report as requested by the IHSB (*Remedial Investigation Report*, ECS Project 22-19741B dated October 30, 2014) for the site.

Based on the results of the *Remedial Investigation Report*, ECS concluded the following:

- Fly ash appeared to have been mixed with soil and used as a fill material at the South Brunswick Middle School baseball field. The soil mixture within the fly ash fill appears to contain elevated concentrations of metals which exceed their respective IHSB standards. The fly ash and arsenic concentrations appear to be confined to the field. The vertical extent of fly ash appears to extend to a depth of approximately 3.5 to 4.5 feet bgs. A copy of the sample location map is included as Figure 6 and copies of the boring logs are included in Appendix C;
- The groundwater at the site appears to contain arsenic at concentrations that exceed its NC2LGWQS. The arsenic impact in the groundwater appears to be limited to area of greatest arsenic concentrations in the site soil. Therefore, it does not appear that significant leaching of arsenic into the site groundwater has occurred within the past 20 years, or has a high potential to occur within the next 20 years. Table 2 summarizes the well construction details. Groundwater flow data is illustrated on Figures 11 and 12;

- Municipal water is supplied to properties within 1,000 feet of the site. Water supply wells identified on these properties are either no longer used, or are used for non-potable purposes. ECS sampled the water supply well located at the southern adjacent landscape company for the metals that have been identified in the site groundwater. Laboratory analysis did not detect arsenic in the water supply well sample at a concentration above the laboratory reporting limit; however, manganese was detected at a concentration that is consistent with naturally occurring concentrations; and
- ECS recommended preparing a RAP to address arsenic impacts at the site.

On January 13, 2015, the NCDEQ responded with the following recommendations:

1. The detection of manganese in the offsite irrigation well may be naturally occurring. In order to confirm this, NCDEQ requested that the other identified irrigation wells also be sampled for manganese to confirm the occurrence of natural manganese.
2. The coal combustion materials (CCMs) on the athletic fields appear to overlie natural hardpan materials (AKA caliche). Hardpan may cause natural "perched" conditions causing runoff or discharge to the ditch that is adjacent to King George II Highway. We request that surface water samples be collected upstream on the property near Cougar Drive and downstream near the property boundary of the plant nursery to determine if the surface water is being impacted.

Per the request of the NCDEQ, ECS sampled two irrigations wells associated with the South Brunswick Middle School (WSW-3) and South Brunswick High School (WSW-6) on February 3, 2015. ECS also sampled the irrigation well at the adjacent residence at 201 Cougar Road (WSW-4) on February 5, 2015. The wells were allowed to run approximately 10 to 15 minutes prior to sample collection. The samples were collected in laboratory provided containers and submitted to Pace for analysis for manganese and arsenic using EPA Method 6010.

Per the request of the NCDEQ, on February 3, 2015, ECS collected a surface water sample from the downgradient drainage ditch along George II Highway, south and downgradient of the intersection of the ditch along George II Highway and the ditch separating the school property from the southern adjacent landscaping property. This sample, identified as SW-1, should be representative of surface water run-off from the school field. ECS also collected a surface water sample from the drainage ditch along George II Highway at the southeastern corner of the intersection of Cougar Road. This sample (SW-2) should represent the surface water flowing towards the site. The samples were collected in laboratory provided containers and submitted to Pace for analysis for manganese and arsenic using EPA Method 6010.

The results of the water supply well sample analysis did not identify concentrations of arsenic in the samples. Manganese was detected at concentrations between 175 and 193 ug/L, which exceed the NC2LGWQS for manganese of 50 ug/L. The concentration of manganese previously detected in the landscape water supply well was 194 ug/L. Due to the locations of the sampled water supply wells covering an approximate 2,000-foot area, being located both upgradient and downgradient of the school field, and the similarity of the manganese concentrations (175-194 ug/L), ECS believes the manganese concentration is naturally occurring.

Laboratory analysis of the surface water samples did not detect arsenic or manganese in the sample collected from the upgradient portion of the drainage ditch (SW-2). The sample collected from the

downgradient drainage ditch (SW-1) did not contain arsenic; however, manganese was detected at a concentration of 20.7 ug/L. The NCDEQ Division of Water Resources previously had a surface water standard (NCAC 2B surface water standard) for manganese of 200 ug/L for drinking water surface waters and no standard for non-drinking water surface waters. However, as of January 1, 2015, the manganese standard of 200 ug/L was removed and there is currently no standard for manganese for drinking water surface waters.

Based on the results of the recent sampling activities, the groundwater in the vicinity of the site appears to contain naturally elevated concentrations of manganese with concentrations ranging from 175 to 194 ug/L. The naturally occurring manganese concentration exceeds the NC2LGWQS for manganese of 50 ug/L. Arsenic was not detected in the water supply well samples. The results of the sampling also indicated the presences of manganese in the surface waters located downgradient of the site. However, the manganese concentration does not exceed the NC2LGWQS or the former NCAC 2B surface water standard. Therefore, the site metals contamination does not appear to be impacting the surrounding surface water and/or groundwater at this time.

On February 19, 2015, ECS submitted a Draft Remedial Action Plan for review by the NCDEQ. On March 6, 2015, ECS received an email correspondence from Mr. Eckert stating that the NCDEQ responded with the following recommendations:

1. A separation fabric should be placed between existing and new fill. The extent of the 20-inch (12" fill, 6" topsoil in outfield (for the infield we will modify this to 14" fill, 4" inch clay)) will be inside the 300-ft radius of the baseball field. The fill will slope to existing grade outside the fence. A 300-ft radius fence will be installed at the limits of the outfield.
2. Overlay disturbed areas with approximately four to six inches of topsoil should be added as a Soil Remediation alternative.

On May 26, 2015, ECS visited the site to develop monitoring wells MW-2 and MW-4. Monitoring well MW-2 was pumped for 1 hour 25 minutes and approximately 55 gallons of water were purged. Monitoring well MW-4 was pumped for 1.5 hours and approximately 55 gallons of water were purged.

On June 1, 2015, ECS was onsite to purge monitoring wells MW-2 and MW-4 to reach approximate field parameter stabilization. The depth to groundwater was measured in each monitoring well and well volumes were purged from each well using a peristaltic pump. The depth of groundwater from the top of the wells varied from 3.46 feet to 5.95 feet. As the wells were being purged, interim groundwater samples were periodically collected and field parameters were measured using a HANNA HI 9828 meter and recorded.

On June 2, 2015, ECS returned to the site to collect groundwater samples from monitoring wells MW-2 and MW-4. Additionally, ECS utilized an X-Ray Fluorescence (XRF) meter to identify arsenic concentrations near soil borings B-10 and B-24. Readings were collected using a Delta Dynamic XRF at each soil boring and four locations approximately 10 feet in each direction.

Laboratory analysis did not report arsenic at concentrations above its laboratory reporting limit in the groundwater samples collected from monitoring wells MW-2 and MW-4.

XRF readings taken around soil borings B-10 and B-24 ranged from 2.3 ppm to 5.2 ppm.

On September 9, 2015, ECS visited the site to develop monitoring wells MW-1 through MW-4.

On September 10, 2015, ECS returned to the site to collect groundwater samples from monitoring wells MW-1 through MW-4.

Laboratory analysis reported boron, vanadium, and sulfate at concentrations above their respective NC2LGWQS in the groundwater sample collected from monitoring well MW-2.

Laboratory analysis reported boron and sulfate at concentrations above their respective NC2LGWQS in the groundwater sample collected from monitoring well MW-3.

Laboratory analysis reported boron and sulfate at concentrations above their respective laboratory reporting limits but below their respective NC2LGWQS in the groundwater samples collected from monitoring wells MW-1 and MW-4.

On October 13, 2015, ECS developed monitoring wells MW-2 and MW-3 and collected groundwater samples from monitoring wells MW-2 and MW-3 and water supply well WSW-1. Water supply well WSW-1 is located at the nursery property adjacent to the southeast of the subject site.

Laboratory analysis reported vanadium at a concentration above its NC2LGWQS in the groundwater sample collected from monitoring well MW-2.

Laboratory analysis reported boron and sulfate at concentrations above their respective laboratory reporting limits but below their respective NC2LGWQS in the groundwater samples collected from monitoring wells MW-2 and MW-3.

Laboratory analysis reported boron at a concentration above its laboratory reporting limit but below its NC2LGWQS in the groundwater sample collected from water supply well WSW-1.

### **C. Land Use, Site Drainage, Geology, and Hydrogeology**

Currently, the referenced site consists of the South Brunswick Middle School and associated playing fields. The surrounding area is a mixture of commercial and residential properties. Areas of sensitive features were not identified within 1,500 feet of the site (Figure 5). According to the Brunswick County GIS, the site is zoned commercial. Properties in the vicinity of the site, including residences, are zoned commercial and residential.

As determined from the USGS Topographic Map, Funston, North Carolina Quadrangle (Figure 1), the site is at an approximate elevation of 45 feet above mean sea level. The site is relatively flat and as such, surface water runoff from the site generally sheet flows from higher areas of relief to lower areas. Drainage ditches are located north and south of the site and appear to flow to the east towards Moore Creek which then flows southward towards Orion Creek. The area surrounding the site slopes generally to the south-southeast towards an unnamed tributary to Orion Creek. The unnamed tributary is located approximately 1,700 feet southeast of the site.

The site is located in the Coastal Plain Physiographic Province. The Coastal Plain is composed of seven marine Pliocene terraces each representing former marine scarps formed by series of sea level rises and subsequent sea level recession events of the Atlantic Ocean. Soil in this area generally consists of marine deposited sediments including variations of silts, sands, and clay strata. These sediment deposits generally strike in a northeast-southwest trend and dip moderately to the east. The sediment bedding varies in thickness from a thin veneer along the western edge of the region to nearly

2,000 feet in thickness along the coast. The sedimentary deposits of the Coastal Plain rest upon crystalline metamorphic basement rock which also exists in the Piedmont and the Blue Ridge Physiographic Provinces. Throughout most of the Coastal Plains the unconfined surficial aquifer immediately overlies the more productive confined aquifers including the Castle Hayne Aquifer and Pee Dee Aquifer. The unconfined water table aquifer is comprised of differentiated sediments of varying thicknesses. In the project area, the upper limits of the underlying Castle Hayne limestone aquifer is at an elevation approximately 40 ft below grade and is immediately overlain by sands, clays, and silts to ground surface. The unconfined water table aquifer serves little to no use as a potable water source in the vicinity of the project site and is generally of a poor quality due to high concentrations of iron and sulfate. The Castle Hayne Aquifer serves as one of the primary water sources for potable water in the area in addition to the Northeast Cape Fear River.

Site soil is described by the United States Department of Agriculture (USDA) Soil Conservation Service maps as Muryville mucky fine sand (Mu) at the site. This soil type, if native, consists of mucky fine sand on the upper 10 inches and sand from 10 to 80 inches bgs. This soil type is poorly drained. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), Community and Panel number 3720208900J, dated June 2, 2006, the site is located in Zone X, which are areas determined to be outside the 0.2% annual chance flood.

Soil borings advanced across the site identified the native soil as black silty sand. Groundwater was encountered at an approximate depth 2.35 feet bgs to 5.70 feet bgs. As previously discussed, the groundwater flow at the site is estimated to be towards the south-southeast (Figures 11 and 12).

Research of sources of potable water at the site and within 2.5 miles south of the site was conducted by ECS. According to Mr. Jeremy Sexton, the Water Resources Superintendent for Brunswick County Utilities, the closest public water supply wells to the site are located approximately 2.5 miles south of the site. ECS obtained a copy of the well construction records for wells 6A, 8 and 16. The boring log for well 6A identified white sand from a depth of 0 to 3 feet bgs, then a hard pan from a depth of 3 to 6 feet bgs, followed by sand from a depth of 6 to 19 feet bgs. Clay intermingled with shells were identified to a depth of 55 feet bgs at which point rock was encountered. The boring for well 8 indicated top soil to a depth of four feet bgs, followed by clay to 46 feet, at which point shells were encountered. Rock was encountered at 59 feet bgs. The boring for well 16 indicated fine sand to a depth of 30 feet, followed by clay to 40 feet, shells to 56 feet at which depth limestone was encountered.

#### **D. Potentially Applicable Technologies**

Environmental impacts related to the South Brunswick Middle School site will be remediated/mitigated in order to meet the Remedial Action Objectives (RAOs). The primary RAO for this site is to prevent exposure to the impacted soil through direct contact. The area of remediation for each of the soil alternatives is shown on Figure 13 through Figure 16. This RAP is focused on potentially applicable remedial technologies that are available given the impacts present and the potential future use for the site. The media of concern at the site are impacted soil and groundwater. Remedial technologies considered are discussed below for both soil and groundwater. The groundwater remedial technologies presented below are passive. Based on the analytical data results and field observations, specifically the TCLP data, the depth of groundwater, and the thickness of the fly-ash in the soil, there does not appear to be a "hot spot" in the soil that could be feasibly remediated in order to achieve the groundwater protection remedial goal. In addition, there is no documented direct exposure to the groundwater of the site and the TCLP data

indicates that the leaching of metals from the soil is minimal and does not appear to significantly impact the groundwater.

## **SOIL**

The remedial technologies considered for use for soil and sediments at the site include: no action, institutional controls, engineering controls, and excavation followed by off-site treatment/disposal. The various remedial technologies considered for the impacted soil present at the site are discussed below.

### **Soil Remedial Alternative 1: No Action**

No action serves as a baseline for comparing the overall effectiveness of the other remedial technologies. No action would rely on natural attenuation processes to reduce the concentrations of constituents of interest in soil and sediments and would not involve the implementation of remedial activities to prevent contact with, remove, treat, or contain the constituents of interest in soil and sediments at the site. This remedial response will be retained for further evaluation as it provides a baseline for comparison of other alternatives.

### **Institutional Controls**

Institutional controls would be implemented that place restrictions on activities within the impacted area or the site, as appropriate, without any active remedial measures to minimize exposure to the impacted soil. Institutional controls may include:

- Governmental controls – land zoning restrictions and local ordinances requiring construction permit specifically requiring that specified activities be managed to prevent the spread of impacted media and require health and safety plans/measure for protection to workers.
- Property controls – deed modifications, standard easements, conservation easements, and/or covenants prohibiting certain activities on the properties; and
- Informational devices – deed notices, advisories, notifications, and signage.

Several types of institutional controls may be “layered” or implemented in series to increase the protectiveness of the remedy (USEPA 2000). The actual institutional controls implemented under this alternative would be determined in consultation with the NCDEQ.

Institutional Controls would be drafted in accordance with NCDEQ’s guidance, to be modified as appropriate for the site. The final Declaration of Perpetual Land Use Restrictions (DPLURs) would have to be approved, signed, and filed by the current property owners. The specific controls may include restriction on altering or digging on the property without notice and prior approval from the NCDEQ. In addition, as a part of the DPLUR process, a Notice of Hazardous Substance or Waste Disposal Site would have to be prepared in accordance with the North Carolina NCGS 130A-310.8. The DPLUR is provided in Appendix D.

Implementation of Institutional Controls will be retained as a component of potential remedies for the site.

### **Soil Remedial Alternative 2: Capping Fill Area with Fabric/Fill/Topsoil/Hydroseed System (with Soil Amendments, Engineering, and Institutional Controls)**

A capping system with engineering and institutional controls would be used to minimize exposure to impacted soil. This can be achieved by installing a capping system containing an eight ounce non-woven geotextile cover material overlain with approximately one foot of fill dirt and six inches of top soil, Figure 13. This technology prevents direct contact with constituents of interest that remain in the soil. It does not remove the soil impacts and typically requires institutional controls (deed restrictions) that will maintain the integrity of the cover under future land use scenarios (i.e. digging and/or grading).

If implemented at the site, engineering controls would minimize direct exposure to the impacted soil. This technology would not fully achieve each RAO for soil at the site. Establishing engineering controls would not provide source removal to improve current and future condition of the soil or groundwater quality at the site. However, based on the analytical data, there does not appear to be a “hot spot” source area defined in the soil that could feasibly be excavated to prevent future impacts to the groundwater. Engineering Controls will be retained as a potential remedy for the site or portion of the site. It should be noted that a groundwater monitoring component will also be included as a part of the remedy and is discussed in detail under the groundwater remedy portion of this section.

### **Soil Remedial Alternative 3: Excavation and Off-Site Disposal of Coal Residuals/ Fill/ Hydroseed System (with Soil Amendments, Engineering, and Institutional Controls)**

Excavation of contaminated soil and sediments would be used for the removal of source contaminants and is the most widely used soil remedial technology at the State and Federal level due to its ease of implementation and technical effectiveness. Excavation uses common construction equipment to remove contaminated soil and other materials. Removal of impacted source soil from the site would achieve the RAO of preventing direct contact exposure. Under a scenario where this technology is implemented at the site, impacted soil would be excavated; excavated material would then be available for off-site disposal. In summary, excavation and off-site disposal will not be retained as a potential remedy for the site due to the high costs that would be incurred (Figure 14). A DPLUR and groundwater monitoring component will also be associated with this engineering control and is discussed later in this section.

### **Soil Remedial Alternative 4: Capping Disturbed Area with Fabric/Fill/Hydroseed System (with Soil Amendments, Engineering, and Institutional Controls)**

This alternative consists of capping impacted soil in the baseball field areas with an eight ounce non-woven geotextile fabric on top of the existing soil. The fabric would be covered with approximately one foot of clean fill dirt and six inches of top soil in the outfield one foot of clean fill dirt and six inches of clay in the infield. The fill dirt will slope to existing grade outside of the baseball field areas. The areas outside of the baseball fields will be isolated by fencing (Figure 15). This technology prevents direct contact with constituents of interest remaining in the soil. It does not remove the soil impacts and typically requires institutional controls (deed restrictions) so the cover cannot be breached under future land use scenarios. This technology would not achieve each RAO for soil at the site. Establishing engineering controls would not provide source removal to improve current and future conditions of the soil or groundwater quality at the site. However, as mentioned previously, there does not appear to be a “hot spot” source area defined in the soil that could feasibly be excavated to prevent future impacts to the groundwater. It should be noted that a DPLUR and groundwater monitoring component will also be associated with this engineering control and is discussed later in this section.

### **Soil Remedial Alternative 5: Capping Disturbed Area with Fill/Irrigated Bermuda Sod System (with Soil Amendments, Engineering, and Institutional Controls)**

This alternative consists of capping impacted soil with approximately seven inches of top soil to allow for the installation of an irrigation system without trenching into the existing soil. Subsequent to the placement of approximately seven inches of top soil and the irrigation system, a Bermuda sod overlay will be installed. The areas outside of the baseball fields will be isolated by fencing (Figure 16). This technology prevents direct contact with constituents of interest remaining in the soil. It does not remove the soil impacts and typically requires institutional controls (deed restrictions) so the cover cannot be breached under future land use scenarios. This technology would not achieve each RAO for soil at the site; however, this remedial alternative is the most cost-effective option. Establishing engineering controls would not provide source removal to improve current and future condition of the soil or groundwater quality at the site. However, as mentioned previously, there does not appear to be a “hot spot” source area defined in the soil that could feasibly be excavated to prevent future impacts to the groundwater. It should be noted that a DPLUR and groundwater monitoring component will also be associated with this engineering control and is discussed later in this section.

## **GROUNDWATER**

Remedial technologies for the groundwater include a number of “passive” measures to improve and/or monitor groundwater quality. The applicability of each technology for a particular site is dependent upon site-specific factors such as hydrogeology, extent of impacts, chemical nature of the impacts, and exposure pathways. The following sections discuss no action and monitored natural attenuation (MNA) in relation to the site.

### **No Action**

No Action serves as a baseline for comparing the overall effectiveness of the other remedial alternatives. No Action would not involve the implementation of active remedial measures to remove, treat, or contain the constituents of interest in groundwater at the site. This alternative relies on natural attenuation processes to reduce the concentrations of constituents of interest in groundwater over time.

This remedial response will be retained for further evaluation because; it provides a baseline for comparison of other alternatives.

### **Groundwater Monitoring of Boron, Vanadium, and Sulfate**

Based on discussions with Brunswick County Schools, ECS, and the NCDEQ, it was determined that boron, sulfate, and vanadium are common groundwater contaminants associated with coal ash disposal areas. Therefore, NCDEQ requested groundwater samples to be collected periodically from monitoring wells MW-1 through MW-4 for these contaminants.

Monitored natural attenuation (MNA), as used by the USEPA, refers to the reliance on natural processes to achieve site-specific remediation objectives. Natural attenuation processes include a variety of physical, chemical, and biological processes that act to reduce the volume, toxicity, mobility, and concentration of contaminants in the groundwater. These processes include biodegradation, dilution, absorption, volatilization, and chemical reactions with natural materials. Determining whether groundwater monitoring of boron, vanadium, and sulfate may be an appropriate action for a site as part of NMA requires answers to the following questions:

1. Are the contaminants of interest amendable to biodegradation?
2. Will physical processes (e.g., absorption) contribute significantly to the attenuation of contaminants?
3. Will contaminant degradation result in more toxic compounds or compounds that are less biodegradable?
4. Does the site's hydrogeologic profile or conceptual model support the use of groundwater monitoring (e.g., location of potential receptors, complexity of site geology)?

Given that answers to the above questions are favorable, data from a groundwater monitoring program are needed to further document that groundwater sampling of boron, vanadium, and sulfate will achieve the RAOs. Physical, chemical, and biological data collected from a groundwater monitoring program would be evaluated to determine if: 1) there is an observed trend of declining contaminant concentrations over time, and 2) the estimated rate of attenuation will exceed the rate of contaminant transport resulting in an unacceptable exposure to groundwater.

In relation to the South Brunswick Middle School site, concentrations of boron, vanadium, and sulfate will be retained for detailed analysis based on the following:

- The RI data indicated that the primary contaminants of concern in the site groundwater are RCRA metals. Metals, unlike VOCs, cannot be degraded.
- The groundwater in the area is not used for drinking water purposes. One non-potable irrigation water supply well is present within the vicinity of the site.
- Groundwater discharge to surface water has not resulted in surface water impacts.

Groundwater monitoring of boron, vanadium, and sulfate will be periodically evaluated to determine if additional remedial alternative is required for site groundwater. Groundwater monitoring will also include an assessment of turbidity as detections of constituents of concern in the groundwater may be related to increased turbidity issues. In addition, assessment of concentrations trends will be conducted and should concentrations exhibit an increasing trend or indicate that migration is occurring, the groundwater remedy (and soil remedy) will be re-evaluated and revised as needed.

## **E. Remedial Alternatives**

Based on the preceding discussions, remedial alternatives are developed for detailed analysis and evaluation for each of the impacted media at the site.

### **SOIL**

The remedial alternatives for soil include No Action, Capping System with Engineering and Institutional Controls, Excavation and Off-Site Disposal with Engineering and Institutional Controls, Capping System with Clay, Engineering and Institutional Controls, and Capping System with Irrigation, Engineering and Institutional Controls.

#### **Soil Remedial Alternative 1: No Action**

This alternative would not involve active remediation for the impacted soil at the site. The site-specific risk evaluation identified direct contact risks at the site for on-site workers, visitors and future construction workers. This alternative would not achieve the RAO as it leaves source material in-place that may continue to impact the groundwater at the site; however based on the

analytical data, there does not appear to be a “hot spot” source area defined in the soil that could feasibly be actively remediated to prevent future impacts to the groundwater. Although the “No Action” alternative would not meet the RAOs of the site, it will be retained for detailed evaluation as it provides a baseline for alternative comparison.

**Soil Remedial Alternative 2: Capping Fill Area with Fabric/Fill/Topsoil/Hydroseed System (with Soil Amendments, Engineering, and Institutional Controls)**

This alternative consists of capping impacted soil with an eight ounce non-woven geotextile fabric on top of the existing soil. The fabric would be covered with approximately one foot of clean fill dirt and six inches of top soil six inches of clay at the infield), Figure 13. This technology prevents direct contact with constituents of interest remaining in the soil though it does not remove the soil impacts and typically requires institutional controls (deed restrictions) to maintain the integrity of the cover under future land use scenarios. In addition, this alternative leaves source material in-place that may impact the groundwater at the site.

Institutional Controls would be implemented to include a DPLUR that would limit the future uses of the property and would place restrictions and requirements on the ability to perform an activity that would compromise the engineering controls. In addition, a groundwater monitoring component will also be in place and if concentrations of constituents of concern exhibit an increasing trend or indicate the migration is occurring, both the soil and groundwater remedial alternatives will be re-evaluated and revised as needed. Groundwater monitoring will include assessment of turbidity as detections of constituents of concern may be related to increased turbidity of the samples collected.

**Soil Remedial Alternative 3: Excavation and Off-Site Disposal of Coal Residuals/ Fill/ Hydroseed System (with Soil Amendments, Engineering, and Institutional Controls)**

This alternative consists of excavating impacted soil and materials to visibly clean or to the saturated zone, which is located at an approximate depth of four to five feet bgs, Figure 14. This alternative would effectively prevent direct contact exposure and remove the impacted material that provides a continuing source of groundwater contamination. The excavation would be backfilled with clean materials that would serve as engineering controls to prevent direct contact exposure to remaining impacted soil and/or groundwater.

This soil remedial alternative removes impacted material above the saturated zone that is a continuing source of groundwater contamination and prevents direct contact exposure by excavating impacted soil and utilizing existing and backfilled clean soil cover as Engineering Controls and implementing Institutional Controls. Excavated soil would be disposed of at a pre-approved landfill.

Post-excavation documentation sampling will be conducted in the excavation area in accordance with Appendix B of the IHSB's (*Guidelines for Assessment and Cleanup* dated August 2011). The sampling strategy will include the following elements:

- Post-excavation sidewall samples will be collected every 50 linear feet. Each of these sidewall samples will consist of a four-part composite for RCRA metals plus hexavalent chromium analysis per the guidance document.
- If the excavation in an area is terminated prior to encountering the saturated zone, a documentation sample will be collected at the base of the excavation at a rate of one per 250

square feet. Up to four locations may be composited for RCRA metals and hexavalent chromium analysis as per the guidance document. If the excavation in an area is advanced into the saturated zone, a documentation sample from the base of the excavation will not be collected.

Post-excavation composite documentation samples will be analyzed for RCRA metals using EPA Method 6010C and hexavalent chromium using EPA Method SM 3500.

In addition, samples will be collected from the off-site borrow material. Off-site borrow material will be sampled, at a frequency of one five-part composite per 500 tons (each), to determine if these materials are acceptable for use as on-site backfill. Off-site borrow material will be analyzed for VOCs, SVOCs plus base neutral and acid extractables (BNAs), and RCRA metals. Results for the samples described above will be included in the Remedial Action Final Report, which will document the RAP activities. The sample results will be used to help develop the DPLUR for the site.

If implemented, site restoration activities will include a post-excavation survey, backfilling, grading, and restoration to conditions consistent with the potential future use of the property. The excavated areas will be backfilled with clean fill from an off-site borrow source, as needed. The backfilled areas will be compacted in layers, graded, and re-seeded.

#### **Soil Remedial Alternative 4: Capping Disturbed Area with Fabric/Fill/Hydroseed System (with Soil Amendments, Engineering, and Institutional Controls)**

This alternative consists of capping impacted soil in the baseball field areas with an eight ounce non-woven geotextile fabric on top of the existing soil, Figure 15. The fabric would be covered with approximately one foot of clean fill dirt and six inches of top soil in the outfield and one foot of clean fill dirt and six inches of clay in the infield. The fill dirt will slope to existing grade outside of the baseball field areas. The areas outside of the baseball fields will be isolated by fencing. The area where the capping will be emplaced is represented by the green outline and fencing shown on Figure 15. This technology prevents direct contact with constituents of interest remaining in the soil. It does not remove the soil impacts and typically requires institutional controls (deed restrictions) to maintain the integrity of the cover under future land use scenarios. In addition, this alternative leaves source material in-place that may impact the groundwater at the site.

Institutional Controls would be implemented to include a DPLUR that would limit the future uses of the property and would place restrictions and requirements on the ability to perform activity that would disturb the engineering controls. The area that the DPLUR would encompass is represented by the red outline on Figure 15; however, the capping system will only be installed on the baseball field for this option. In addition, a groundwater monitoring component will also be in place and if concentrations of constituents of concern exhibit an increasing trend or indicate the migration is occurring, both the soil and groundwater remedial alternatives will be re-evaluated and revised as needed. Groundwater monitoring will include assessment of turbidity as detections of constituents of concern may be related to increased turbidity of the samples collected.

### **Soil Remedial Alternative 5: Capping Disturbed Area with Fill/Irrigated Bermuda Sod System (with Soil Amendments, Engineering, and Institutional Controls)**

This alternative consists of capping impacted soil in the baseball areas with approximately seven inches of top soil (clay at the infield) to allow for the installation of an irrigation system without trenching into the existing soil. Once the top soil is in place, a Bermuda sod overlay will be installed. The areas outside of the baseball fields will be isolated by fencing. The area where the capping and irrigation system will be emplaced is represented by the green outline and fencing shown on Figure 16. This technology prevents direct contact with constituents of interest remaining in the soil. It does not remove the soil impacts and typically requires institutional controls (deed restrictions) to maintain the integrity of the cover under future land use scenarios. In addition, this alternative leaves source material in-place that may impact the groundwater at the site.

Institutional Controls would be implemented to include a DPLUR that would limit the future uses of the property and would place restrictions and requirements on the ability to perform activity that would disturb the engineering controls. The area that the DPLUR would encompass is represented by the red outline on Figure 16. In addition, a groundwater monitoring component will also be in place and if concentrations of constituents of concern exhibit an increasing trend or indicate the migration is occurring, both the soil and groundwater remedial alternatives will be re-evaluated and revised as needed. Groundwater monitoring will include assessment of turbidity as detections of constituents of concern may be related to increased turbidity of the samples collected.

## **GROUNDWATER**

The retained remedial alternatives for groundwater include No Action and MNA. Each alternative is described below.

### **Groundwater Remedial Alternative 1: No Action**

This alternative would involve no active remediation for the impacted groundwater at the site. The site-specific risk assessment results indicated no potential risks associated with exposure to site groundwater. Although the “No Action” alternative would not immediately meet the RAO of improving groundwater quality, it is expected that natural attenuation of the contaminants in the groundwater will occur over a long period of time. Long term groundwater monitoring is not included as a part of the alternative. The No Action alternative will be retained for detailed evaluation as it provides a baseline for alternative comparison.

### **Groundwater Remedial Alternative 2: Groundwater Monitoring of Boron, Vanadium, and Sulfate**

This groundwater alternative would allow for the monitoring of boron, vanadium, and sulfate over time to achieve the RAOs in a reasonable timeframe. Groundwater monitoring will include assessment of turbidity as detections of constituents of concern may be related to increased turbidity of the samples collected. This alternative would involve a long-term groundwater monitoring program to evaluate the migration of impacted groundwater off of the site and also to evaluate the concentration trend in the groundwater over time. If concentration trends indicate that groundwater concentrations are increasing, the soil and groundwater alternatives will be re-evaluated.

## F. Evaluation of Remedial Alternatives

### Evaluation Criteria

The remedial alternatives proposed for the impacted soil and groundwater at the South Brunswick Middle School are evaluated below in accordance with Section V (H.3) of the AOC. The NCDEQ uses eight criteria to evaluate each alternative. The criteria to be used are summarized below. These evaluation criteria are the same as the National Contingency Plan (NCP) criteria for federal Superfund Site Feasibility Study (FS) evaluations.

### Protection of Human Health and the Environment

This criterion evaluates the remedial action's effectiveness in protecting human health and the environment, including attainment of RAOs. Alternatives will be assessed to evaluate whether they adequately protect human health and the environment in both the short-term and long-term from risks posed by contaminants present at the site by eliminating, reducing or controlling exposures to those contaminants.

### Compliance with Applicable Federal, State and Local Regulations

The criterion evaluates whether the proposed remedial action will comply with applicable regulations. As such, the proposed remedial alternatives will be evaluated to determine if they comply with applicable Federal, State, and Local laws and regulations.

### Long-Term Effectiveness and Permanence

This criterion evaluates the technical performance, reliability and effectiveness of the remedial action in achieving the applicable remediation standards. Factors to be considered include magnitude of residual risk remaining from untreated waste or treatment residuals remaining after the completion of the remedial action activities, and adequacy and reliability of controls such as containment and institutional controls. This criterion also includes the uncertainties associated with land disposal for providing long-term protection from residuals.

### Reduction of Toxicity, Mobility, and Volume

The criterion evaluates the degree to which the proposed remedial action reduces the toxicity, mobility, or volume of contaminants will be evaluated as well as the degree to which the remedial action minimizes risks and short-term impacts associated with implementation. Evaluation of this criterion will consider the following:

1. Treatment or recycling processes included in the remedial alternative and materials they will treat.
2. Amount of hazardous substances, pollutants, or contaminants destroyed, treated or recycled.
3. The amount of toxicity, mobility or volume reduction from the remedial action.
4. The degree to which the treatment is irreversible or permanent.
5. The type and quantity of treatment residuals following remediation considering the residuals persistence in the environment, toxicity, and mobility.
6. The degree to which the proposed treatment minimizes the hazards posed by the principal threats of the contaminants on the site.

### Short-Term Effectiveness

This criterion evaluates the technical performance, reliability and effectiveness of the remedial action in minimizing the impact of the remediation on the environment and the local community.

This will focus on how the construction activities may impact the environment and the activities of the surrounding community.

### **Implementability**

Implementability, in this context, includes the technical and logistical feasibility of implementing the remedial action, including an estimate of time required to complete the remediation. The implementability of the proposed remedial alternatives will include the engineering and scientific feasibility, and availability of the technologies that make up the remedial alternative. In addition, the timely implementation of the remedial alternative and the degree to which the action minimizes risks and short-term impacts associated with implementation will be evaluated.

### **Cost**

The overall capital and operating costs associated with the proposed remedial alternatives will be evaluated along with the other evaluation criteria.

### **Community Acceptance**

The proposed remedial alternatives will be evaluated to determine potential impacts to the community and whether the alternative meets the local land use master plan.

## **EVALUATION OF SOIL REMEDIAL ALTERNATIVES**

The soil alternatives under consideration for the site are evaluated against the eight criteria in the following section.

### **Soil Remedial Alternative 1: No Action**

#### ***Protection of Human Health and the Environment***

This alternative is not protective of human health and the environment as impacted soil and residuals would be left in place at the site. This alternative would not meet the RAOs as source material impacting groundwater will remain in place. Short term risks associated with direct contact to impacted soil would not be mitigated and long term risks associated migration of impacted soil and continued impacts to groundwater would persist. However, based on the analytical data, there does not appear to be a “hot spot” source area defined in the soil that could feasibly be actively remediated to prevent future impacts to the groundwater. In addition, a groundwater monitoring component will also be in place and if concentrations of constituents of concern exhibit an increasing trend or indicate the migration is occurring, both the soil and groundwater remedial alternatives will be re-evaluated and revised as needed. Groundwater monitoring will include assessment of turbidity as detections of constituents of concern may be related to increased turbidity of the samples collected.

#### ***Compliance with Applicable Federal, State and Local Regulations***

This soil alternative does not comply with applicable Federal, State or local regulations as soil will remain that do not meet soil remedial goals and may remain a source of groundwater impacts.

#### ***Long-Term Effectiveness and Permanence***

The No Action alternative is not effective over the long-term and is not a permanent remedy as impacted soil would remain in place. No reduction in risk to human health and the environment would be achieved as direct contact with the soil would continue to be a completed exposure pathway.

### ***Reduction of Toxicity, Mobility and Volume***

This alternative does not reduce the toxicity, mobility, or volume of soil contaminants as impacted soil would not be addressed as part of the No Action alternative.

### ***Short-Term Effectiveness***

The No Action alternative is not effective in the short-term as RAOs would not be achieved because the impacted soil would remain on-site.

### ***Implementability***

The No Action alternative is easily implementable as no construction activity is required.

### ***Cost***

There are minimal costs associated with the No Action alternative.

### ***Community Acceptance***

It is anticipated that the No Action alternative would not meet with community approval because impacted soil would remain on the site in an area with the potential for direct contact exposure.

## **Soil Remedial Alternative 2: Capping Fill Area with Fabric/Fill/Topsoil/Hydroseed System (with Soil Amendments, Engineering, and Institutional Controls)**

### ***Protection of Human Health and the Environment***

This remedial alternative protects human health and environment as direct contact with impacted soil is mitigated by the capping of impacted soil. Soil contamination would remain onsite and institutional controls would be required. The results of the documented sampling of soil would be used to develop the institutional controls. The impacted soil may pose minimal risk at the site due to future leaching into site groundwater; however, based on the analytical data, there does not appear to be a "hot spot" source area defined in the soil that could feasibly be actively remediated to prevent future impacts to the groundwater. In addition, a groundwater monitoring component will also be in place and if concentrations of constituents of concern exhibit an increasing trend or indicate the migration is occurring, both the soil and groundwater remedial alternatives will be re-evaluated and revised as needed. Groundwater monitoring will include assessment of turbidity as detections of constituents of concern may be related to increased turbidity of the samples collected.

### ***Compliance with Applicable Federal, State and Local Regulations***

This alternative complies with applicable Federal, State, and local regulations. An evaluation of compliance issues is presented below.

#### **Federal**

Remedial action construction activities will be conducted personnel under appropriate health and safety precautions and personal protective equipment. Waste management and transportation will be conducted in compliance with applicable State and USDOT regulations.

#### **State**

The NCDEQ governs the control of sedimentation and erosion at soil excavation sites. If the disturbed soil area is equal to or greater than one acre, a separate approved Soil Erosion and Sedimentation (E&S) Control Plan is required from the NCDEQ's Division of Land Resources, Land Quality Section. Because the area of disturbance is greater than one acre, an approved E&S

Control Plan should be required.

### Local

Local agencies including the Brunswick County Public Services Department will be contacted prior to commencing work.

### **Long-Term Effectiveness and Permanence**

This alternative would effectively eliminate direct contact exposure to impacted soil at the site through providing a physical barrier on top of the impacted soil.

### **Reduction of Toxicity, Mobility, and Volume**

This alternative does not reduce the toxicity, mobility, or volume of soil contaminants as impacted soil would not be removed from the site.

### **Short-Term Effectiveness**

This alternative utilizes typical construction equipment and methods that are reliable and effective. An eight ounce non-woven geotextile fabric will be used as a solid demarcation fabric on top of existing impacted soil, creating a barrier to the surface. Soil erosion and sediment control measures, and health and safety monitoring would be conducted during the remedial construction activities to reduce potential impacts to the surrounding community and environment.

It is anticipated that the construction activities would take approximately thirty days to complete, if no unforeseen delays occur due to weather or conditions outside the control of the construction contractor. This timeframe assumes that approximately 280,000 square feet of soil would be capped, 15,500 tons of fill dirt, and 8,000 tons of top soil would be imported to the site. The construction work is not anticipated to adversely impact the environment or the surrounding community.

### **Implementability**

As indicated above, the proposed alternative would be installed using typical construction equipment and methods.

### **Cost**

The estimated capital cost to implement Soil Remedial Alternative 2 is approximately \$765,575.

The cost includes engineering/design and permitting to construct the remedial alternative, construction, construction oversight, and project management and site restoration. In addition, a part of the cost will include the following: the demolition and rebuilding of the dugouts on the baseball field (BB Field), the removal and reinstallation of the bleachers, removal and re-installation of new fencing around the baseball field, the removal and replacement of fencing around the SBMS softball field (SB Field), and removal and reinstallation of bleachers at the softball field.

### **Capping System**

- Mobilization and Demobilization .....\$4,600.00
- Install 8 oz Non-woven Geotextile (280,000 ft<sup>2</sup> @ \$0.20/ ft<sup>2</sup>) .....\$56,000.00
- Import, Emplace, Tamp/Prepare Backfill Dirt (Estimated 15,500 tons at \$22/ton) ..... \$341,000.00
- Import, Emplace, Tamp/Prepare Top Soil (Estimated 8,000 tons at \$32/ton) ..... \$256,000.00

- Seeding/Vegetative Cover (Estimated 280,000 ft<sup>2</sup> at \$0.12/ft<sup>2</sup>).....\$33,600.00
- Removal and Replacement of Fencing at SB Field  
 (Estimate 750 lf @ \$17.5/lf) .....\$13,125.00
- Removal and Re-installation of bleachers at SB Field.....\$2,500.00
- Demolition and Rebuilding of the Dugouts at BB Field .....\$38,000.00
- Removal and Re-installation of the bleachers at BB Field .....\$2,500.00
- Removal of Fencing at BB Field (Estimate 300 lf @ \$2.50/lf) .....\$750.00
- Installation of New Fencing at BB Field (Estimate 800 lf @ \$15/lf).....\$12,000.00
- Project Management and Reporting .....5,500.00

**Total Estimated Fee ..... \$765,575.00**

**Community Acceptance**

It is anticipated that this alternative would meet with community approval because direct contact risks associated with impacted soil would be eliminated.

**Soil Remedial Alternative 3: Excavation and Off-Site Disposal of Coal Residuals/ Fill/Hydroseed System (with Soil Amendments, Engineering, and Institutional Controls)**

**Protection of Human Health and the Environment**

This remedial alternative protects human health and the environment as direct contact with impacted soil is mitigated through its removal above the water table by excavation and backfilling with clean soil (Figure 14). Because soil contamination would remain on-site below the water table, land use restrictions (institutional controls) would be implemented and maintained by the property owners. The results of the documented sampling of soil and groundwater would be used to guide the land use restrictions (institutional controls) that would be placed on the site. Land use restrictions (institutional controls) would need to be maintained by the property owners. Impacted soil remaining below the water table may migrate to areas where it could be exposed in the future. Long-term monitoring would be required to evaluate such migration. If groundwater monitoring shows that constituent concentrations exhibit an increasing trend or that migration is occurring, both the soil and groundwater remedial alternatives will be re-evaluated and revised as needed. Groundwater monitoring will include assessment of turbidity as detections of constituents of concern may be related to increased turbidity of the samples collected.

Post-excavation soil management alternatives include disposal of the impacted soil at a pre-approved, permitted landfill. Disposal of the excavated site soil may pose minimal risk at the landfill facility for future leaching or exposure; however, it is anticipated that the soil would be disposed at a facility where the landfill is lined and strictly managed to limit exposure risks and leachate.

**Compliance with Applicable Federal, State and Local Regulations**

This alternative complies with all appropriate Federal, State and local regulations and laws. An evaluation of compliance issues is presented below.

Federal

Remedial action construction activities will be conducted with appropriately OSHA trained personnel under appropriate health and safety precautions and personal protective equipment. Waste management and transportation will be conducted in compliance with applicable State and USDOT regulations.

### State

The NCDEQ governs the control of sedimentation and erosion at soil excavation sites. If the disturbed soil area is equal to or greater than one acre, a separate approved E&S Control Plan is required from the NCDEQ's Division of Land Resources, Land Quality Section. Because the area of excavation would be greater than one acre, an approved E&S Control Plan will be required.

The handling, storage, and disposal of the excavated soil would be regulated by the NCDEQ's solid and hazardous waste management regulations. NCDEQ's hazardous waste regulations apply the Federal regulations by reference. The soil to be transported off-site would not be a hazardous waste and would, therefore, be managed as a non-hazardous waste at the pre-approved disposal facility. This remedial alternative will include waste profiling and pre-approvals for each disposal facility to ensure the proper management of the excavated soil.

This alternative complies with the NCDEQ's soil cleanup guidelines as soil with contaminant concentrations above the soil remediation goals or which human health risk assessment has determined to pose a risk would be removed from the site or controlled.

### Local

Local agencies including the Brunswick County Public Services Department will be contacted prior to commencing work.

### ***Long-Term Effectiveness and Permanence***

This alternative would effectively eliminate direct contact exposure to impacted soil with concentrations exceeding health-based risk guidelines from the site. This alternative would remove impacted soil from the site. It would be a permanent and effective remedial action for the soil removed from the site. It would be effective in the long term provided the institutional controls are maintained. As some of the excavated soil would be transported to an off-site disposal facility there would remain some potential future liability from the excavated impacted soil. Residuals remaining below the water table may migrate to areas where they may be exposed. Long-term monitoring will be required to evaluate potential migration.

### ***Reduction of Toxicity, Mobility and Volume***

This alternative would reduce the volume of impacted soil at the site. The remediation would be irreversible and permanent with respect to this soil. Excavated soil would be transported to an off-site disposal facility, which does not provide any reduction of toxicity or mobility; however, the tentative disposal facility is permitted to handle such wastes and strictly manages its facility. Mobility of remaining impacted soil would not be reduced and residuals may migrate to areas where they may be exposed. For example, residuals remaining below the water table could migrate to areas of no contamination.

### ***Short-Term Effectiveness***

This alternative utilizes typical construction equipment and methods that are reliable and effective. Soil erosion and sediment control measures, and health and safety monitoring would be conducted during the remedial construction activities to reduce potential impacts to the surrounding community and environment.

It is anticipated that the construction activities would take approximately six months to complete, if no unforeseen delays occur due to weather or conditions outside the control of the construction contractor. This timeframe assumes that approximately 65,000 tons of impacted material would be

excavated and disposed. The construction work is not anticipated to adversely impact the environment or the surrounding community; however, transportation of the soil to be disposed would result in over 2,500 trucks traveling to and from the site over a six month period, which could provide a disruption to the local community. An almost equal amount of truck traffic would result from importing backfill to the site.

**Implementability**

As indicated above, the proposed soil excavation would be conducted using typical construction equipment and methods. Soil excavation is easily implemented but would be accomplished over long period of time.

**Cost**

The estimated capital cost to implement this alternative is approximately \$6,744,185. The cost estimate assumes approximately 65,000 tons of fly ash soil will be excavated and disposed. Post excavation soil samples will be collected in accordance with the IHSB Guidance for Assessment and Cleanup (Appendix B Section 2.2.1). The cost below includes collection of excavation base samples on a 50-foot by 50-foot grid with the addition of side-wall samples also on a 50-linear foot spacing on the perimeter of the excavation.

The cost includes engineering/design and permitting to construct the remedial alternative, construction, construction oversight, and project management, confirmation sampling and analysis, soil transportation and disposal, waste characterization sampling and analysis, and site restoration. In addition, a part of the cost will include the following: the demolition and rebuilding of the dugouts on the baseball field, the removal and reinstallation of the bleachers, removal and re-installation of new fencing around the baseball field, the removal and replacement of fencing around the SBMS softball field, and removal and reinstallation of bleachers at the softball field.

**Excavation and Off-Site Disposal**

- Mobilization and Demobilization .....\$4,600.00
- Excavate Fly Ash (Estimated 65,000 tons at \$4.30/ton)..... \$279,500.00
- Fly Ash Transport and Disposal (Estimated 65,000 tons at \$75/ton)..... \$4,875,000.00
- Import, Emplace, Tamp/Prepare Backfill  
 (Estimated 65,000 tons at \$22/ton) ..... \$1,430,000.00
- Excavation soil sample analyses:
  - 130 samples RCRA Metals @ \$75/sample.....\$9,750.00
  - 130 samples Hexavalent Chromium @ \$23/sample .....\$2,990.00
- Backfill soil sample analyses:
  - 100 samples EPA 8260 @ \$90/sample .....\$9,000.00
  - 100 samples EPA 8270 @ \$185/sample .....\$18,500.00
  - 100 samples RCRA Metals @ \$75/sample.....\$7,500.00
- Seeding/Vegetative Cover (Estimated 280,000 ft<sup>2</sup> at \$0.12/ft<sup>2</sup>).....\$33,600.00
- Removal and Replacement of Fencing at SB Field  
 (Estimate 750 lf @ \$17.5/lf) .....\$13,125.00
- Removal and Re-installation of bleachers at SB Field.....\$2,500.00
- Demolition and Rebuilding of the Dugouts at BB Field .....\$38,000.00
- Removal and Re-installation of the bleachers at BB Field .....\$2,500.00
- Removal of Fencing at BB Field (Estimate 300 lf @ \$2.5/lf) .....\$750.00
- Installation of New Fencing at BB Field (Estimate 800 lf @ \$15/lf).....\$12,000.00

- Project Management and Reporting .....5,500.00
- Total Estimated Fee ..... \$6,744,815.00**

**Community Acceptance**

It is anticipated that this alternative would meet with community approval because direct contact with impacted soil would be mitigated and the source of impacts to groundwater will be reduced; however, the high volume of truck traffic, high costs, and the six month duration associated with this alternative may be a concern to the local community. Land use restrictions would further preclude the opportunity for exposure via direct contact.

**Soil Remedial Alternative 4: Capping Disturbed Area with Fabric/Fill/Hydroseed System (with Soil Amendments, Engineering, and Institutional Controls)**

**Protection of Human Health and the Environment**

This remedial alternative protects human health and environment as direct contact with impacted soil is mitigated by the capping of impacted soil. Soil contamination would remain onsite and institutional controls would be required (Figure 15). The results of the documented sampling of soil would be used to develop the institutional controls. The impacted soil may pose minimal risk at the site due to future leaching or exposure into site groundwater; however, this is a minimal risk as groundwater is not used at the site or surrounding area. Additionally, based on the analytical data, there does not appear to be a “hot spot” source area defined in the soil that could feasibly be actively remediated to prevent future impacts to the groundwater. A groundwater monitoring component will also be in place and if concentrations of constituents of concern exhibit an increasing trend or indicate the migration is occurring, both the soil and groundwater remedial alternatives will be re-evaluated and revised as needed. Groundwater monitoring will include assessment of turbidity as detections of constituents of concern may be related to increased turbidity of the samples collected.

**Compliance with Applicable Federal, State and Local Regulations**

This alternative complies with applicable Federal, State, and local regulations. An evaluation of compliance issues is presented below.

Federal

Remedial action construction activities will be conducted with appropriately OSHA trained personnel under appropriate health and safety precautions and personal protective equipment. Waste management and transportation will be conducted in compliance with applicable State and USDOT regulations.

State

The NCDEQ governs the control of sedimentation and erosion at soil excavation sites. If the disturbed soil area is equal to or greater than one acre, a separate approved E&S Control Plan is required from the NCDEQ’s Division of Land Resources, Land Quality Section. Because the area of disturbance is greater than one acre, an approved E&S Control Plan should be required.

Local

Local agencies including the Brunswick County Public Services Department will be contacted prior to commencing work.

**Long-Term Effectiveness and Permanence**

This alternative would effectively eliminate direct contact exposure to impacted soil at the site by capping the impacted soil.

**Reduction of Toxicity, Mobility, and Volume**

This alternative does not reduce the toxicity, mobility, or volume of soil contaminants as impacted soil would not be removed from the site.

**Short-Term Effectiveness**

This alternative utilizes typical construction equipment and methods that are reliable and effective. An eight ounce non-woven geotextile fabric will be used as a solid demarcation fabric on top of existing impacted soil in the baseball areas, creating a barrier to the surface. Soil erosion and sediment control measures, and health and safety monitoring would be conducted during the remedial construction activities to reduce potential impacts to the surrounding community and environment.

It is anticipated that the construction activities would take approximately thirty to forty-five days to complete, if no unforeseen delays occur due to weather or conditions outside the control of the construction contractor. This timeframe assumes that approximately 170,000 square feet of soil would be capped, 9,500 tons of fill dirt, and 5,500 tons of top soil would be imported to the site. The construction work is not anticipated to adversely impact the environment or the surrounding community.

**Implementability**

As indicated above, the proposed excavation would be conducted using typical construction equipment and methods.

**Cost**

The estimated capital cost to implement Soil Remedial Alternative 4 is approximately \$502,750.

The cost includes engineering/design and permitting to construct the remedial alternative, construction, construction oversight, project management, and site restoration. In addition, a part of the cost will include the following: the demolition and rebuilding of the dugouts on the baseball field, the removal and reinstallation of the bleachers, and removal and re-installation of new fencing around the baseball field.

**Capping System**

- Mobilization and Demobilization .....\$4,600.00
- Install 8 oz non-woven Geotextile (170,000 ft<sup>2</sup> @ \$0.20/ ft<sup>2</sup>) .....\$34,000.00
- Import, Emplace, Tamp/Prepare Backfill Dirt/Clay  
(Estimated 9,500 tons at \$22/ton) ..... \$209,000.00
- Import, Emplace, Tamp/Prepare Top Soil (Estimated 5,500 tons  
at \$32/ton) ..... \$176,000.00
- Seeding/Vegetative Cover (Estimated 170,000 ft<sup>2</sup> at \$0.12/ft<sup>2</sup>).....\$20,400.00
- Demolition and Rebuilding of the Dugouts at BB Field .....\$38,000.00
- Removal and Re-installation of the bleachers at BB Field .....\$2,500.00
- Removal of Fencing at BB Field (Estimate 300 lf @ \$2.5/) .....\$750.00
- Installation of New Fencing at BB Field (Estimate 800 lf @ \$15/).....\$12,000.00
- Project Management and Reporting .....5,500.00

**Total Estimated Fee ..... \$502,750.00**

***Community Acceptance***

It is anticipated that this alternative would meet with community approval because direct contact risks associated with impacted soil would be eliminated.

**Soil Remedial Alternative 5: Capping Disturbed Area with Fill/Irrigated Bermuda Sod System (with Soil Amendments, Engineering, and Institutional Controls)**

***Protection of Human Health and the Environment***

This remedial alternative protects human health and environment as direct contact with impacted soil is mitigated by the capping of impacted soil. Soil contamination would remain onsite and institutional controls would be required (Figure 16). The results of the documented sampling of soil would be used to develop the institutional controls. The impacted soil may pose minimal risk at the site due to future leaching or exposure into site groundwater; however, this is a minimal risk as groundwater is not used at the site or surrounding area. Additionally, based on the analytical data, there does not appear to be a “hot spot” source area defined in the soil that could feasibly be actively remediated to prevent future impacts to the groundwater. A groundwater monitoring component will also be in place and if concentrations of constituents of concern exhibit an increasing trend or indicate the migration is occurring, both the soil and groundwater remedial alternatives will be re-evaluated and revised as needed. Groundwater monitoring will include assessment of turbidity as detections of constituents of concern may be related to increased turbidity of the samples collected.

***Compliance with Applicable Federal, State and Local Regulations***

This alternative complies with applicable Federal, State, and local regulations. An evaluation of compliance issues is presented below.

Federal

Remedial action construction activities will be conducted with appropriately OSHA trained personnel under appropriate health and safety precautions and personal protective equipment. Waste management and transportation will be conducted in compliance with applicable State and USDOT regulations.

State

The NCDEQ governs the control of sedimentation and erosion at soil excavation sites. If the disturbed soil area is equal to or greater than one acre, a separate approved E&S Control Plan is required from the NCDEQ’s Division of Land Resources, Land Quality Section. Because the area of disturbance is greater than one acre, an approved E&S Control Plan should be required.

Local

Local agencies including the Brunswick County Public Services Department will be contacted prior to commencing work.

***Long-Term Effectiveness and Permanence***

This alternative would effectively eliminate direct contact exposure to impacted soil at the site by capping the impacted soil.

***Reduction of Toxicity, Mobility, and Volume***

This alternative does not reduce the toxicity, mobility, or volume of soil contaminants as impacted soil would not be removed from the site.

**Short-Term Effectiveness**

This alternative utilizes typical construction equipment and methods that are reliable and effective. Approximately six inches of top soil will be spread over the existing impacted soil, creating a barrier to the surface. Once the top soil is placed, a Bermuda sod will be installed. Soil erosion and sediment control measures, and health and safety monitoring would be conducted during the remedial construction activities to reduce potential impacts to the surrounding community and environment.

It is anticipated that the construction activities would take approximately thirty days to complete, if no unforeseen delays occur due to weather or conditions outside the control of the construction contractor. This timeframe assumes that approximately 170,000 square feet of soil would be capped and approximately 5,500 tons of topsoil would be imported to the site. The construction work is not anticipated to adversely impact the environment or the surrounding community.

**Implementability**

As indicated above, the proposed excavation would be conducted using typical construction equipment and methods.

**Cost**

The estimated capital cost to implement Soil Remedial Alternative 5 is approximately \$349,350.

The cost includes engineering/design and permitting to construct the remedial alternative, construction, construction oversight, project management, and site restoration. In addition, a part of the cost will include the following: the demolition and rebuilding of the dugouts on the baseball field, the removal and reinstallation of the bleachers, and removal and re-installation of new fencing around the baseball field.

**Capping System**

• Mobilization and Demobilization .....	\$4,600.00
• Import, Emplace, Tamp/Prepare Top Soil (Estimated 5,500 tons at \$32/ton) .....	\$176,000.00
• Install Bermuda Sod (Estimate 170,000/ ft <sup>2</sup> at \$0.50/ ft <sup>2</sup> .....	\$85,000.00
• Install Irrigation System.....	\$25,000.00
• Demolition and Rebuilding of the Dugouts at BB Field .....	\$38,000.00
• Removal and Re-installation of the bleachers at BB Field .....	\$2,500.00
• Removal of Fencing at BB Field (Estimate 300 lf @ \$2.5/lf) .....	\$750.00
• Installation of New Fencing at BB Field (Estimate 800 lf @ \$15/).....	\$12,000.00
• Project Management and Reporting .....	5,500.00
<b>Total Estimated Fee .....</b>	<b>\$349,350.00</b>

**Community Acceptance**

It is anticipated that this alternative would meet with community approval because direct contact risks associated with impacted soil would be eliminated.

**Preferred Soil Remedial Alternative**

Based on the evaluation of the soil remedial alternatives for the site, the preferred alternative is Soil

Remedial Alternative 5. Soil Remedial Alternative 5 consists of protecting human health and environment as direct contact with impacted soil is mitigated by the capping of impacted soil and the placement of the Bermuda soil cap. Soil contamination would remain onsite and institutional controls would be required to prevent future exposure. The results of the documented sampling of soil would be used to develop the institutional controls. Alternative 5 meets the RAOs by preventing direct contact exposure to impacted soil. Because treated material and impacted material below the water table and outside the treatment area would remain on-site, institutional controls (DPLURS) would also be implemented. Institutional controls in the form of land use restrictions would also be placed on the property and maintained to preclude future on-site use of groundwater and reduce exposure to residual impacts in site soil and groundwater. A groundwater monitoring component will also be in place and if concentrations of constituents of concern exhibit an increasing trend or indicate the migration is occurring, both the soil and groundwater remedial alternatives will be re-evaluated and revised as needed. Groundwater monitoring will include assessment of turbidity as detections of constituents of concern may be related to increased turbidity of the samples collected.

## **EVALUATION OF GROUNDWATER REMEDIAL ALTERNATIVES**

The groundwater alternatives under consideration for the site are evaluated against the eight criteria in the following section. It should be noted that the evaluation of these alternatives assumes selection and implementation of the preferred soil remedial alternative (Alternative 5). Groundwater remediation without implementation of the preferred soil remedial alternative would require additional evaluation.

### **Groundwater Remedial Alternative 1: - No Action**

#### ***Protection of Human Health and the Environment***

The No Action groundwater alternative is not protective of human health and the environment as no active remediation is implemented. However, the groundwater in this area is not used for potable purposes and, therefore, there are no receptors for exposure to groundwater through ingestion or direct contact.

#### ***Compliance with Applicable Federal, State and Local Regulations***

The No Action alternative for groundwater does not comply with applicable regulations.

#### ***Long-Term Effectiveness and Permanence***

The No Action groundwater remedial alternative is not permanent as no action is to be taken. However, natural processes will still occur under the No Action alternative that may decrease the constituent concentrations over the long term. Based on the constituents detected in site groundwater it is anticipated that the reduction of concentrations over time would be minimal.

#### ***Reduction of Toxicity, Mobility, and Volume***

There would be no active reduction of toxicity, mobility, or volume of groundwater contaminants as part of the No Action groundwater alternative other than that which may occur due to natural processes.

#### ***Short-Term Effectiveness***

There are no construction activities associated with the No Action groundwater alternative; therefore, there are no potential impacts to the environment or the community from construction

activities. The short-term effectiveness would not be evaluated under this alternative as no monitoring would be conducted.

### ***Implementability***

The No Action groundwater alternative is easily implemented.

### ***Cost***

There are no costs associated with the No Action groundwater alternative.

### ***Community Acceptance***

As no active remedial action is included in the alternative, the alternative would not be expected to meet community acceptance.

## **Groundwater Remedial Alternative 2: Groundwater Monitoring of Boron, Vanadium, and Sulfate**

### ***Protection of Human Health and the Environment***

Groundwater monitoring of boron, vanadium, and sulfate provides protection of human health and the environment. Dissolved contaminants present in the groundwater will minimally degrade over time to meet the required groundwater remediation guidelines. The groundwater in this area is not used for potable purposes and, therefore, there is no exposure to receptors for groundwater ingestion during the monitoring. Additionally, based on the analytical data, there does not appear to be a "hot spot" source area defined in the soil that could feasibly be actively remediated to prevent future impacts to the groundwater. As such, as a part of the groundwater monitoring component, if concentrations of constituents of concern exhibit an increasing trend or indicate the migration is occurring, both the soil and groundwater remedial alternatives will be re-evaluated and revised as needed. Groundwater monitoring will include assessment of turbidity as detections of constituents of concern may be related to increased turbidity of the samples collected.

### ***Compliance with Applicable Federal, State and Local Regulations***

The NCDEQ accepts groundwater monitoring of boron, vanadium, and sulfate as a viable alternative for addressing dissolved groundwater plumes. The groundwater monitoring alternative should, over time, meet the NCDEQ groundwater remedial guidelines. A restriction on groundwater use at the site would be implemented.

### ***Long-Term Effectiveness and Permanence***

This alternative would provide long-term effectiveness and permanence. Over the long-term (i.e. several decades), the dissolved contaminants would be monitored to determine if the contaminants are increasing or decreasing and if the contaminants are migrating or are stationary.

### ***Reduction of Toxicity, Mobility, and Volume***

The monitored natural attenuation alternative does not reduce the toxicity, mobility, and volume of metals present in the groundwater.

### ***Short-Term Effectiveness***

This alternative would not achieve the NC2LGWQS in the short-term. Groundwater monitoring and reporting would be conducted to monitor the effectiveness of this alternative. The installation of additional monitoring wells, if required, as part of this remedial alternative would not adversely impact the environment or the surrounding community.

### **Implementability**

The groundwater monitoring alternative is easily implemented. The remediation processes are naturally occurring and require no construction activities beyond the capping of impacted soil. The installation of monitoring wells (if necessary) uses typical drilling methods and equipment that are readily available. The groundwater monitoring procedures are routinely available throughout the industry.

### **Cost**

The estimated cost to implement Groundwater Remedial Alternative 2 – Groundwater Monitoring of Boron, Vanadium, and Sulfate, for a period of 30 years, is approximately \$285,000. This cost includes operation and maintenance (O&M) including labor, equipment, and analytical laboratory expenses over a 30-year monitoring period. The total estimated cost per event is \$3,000 including four events in Year 1 and two events every year thereafter, and increasing by 3% per year.

- A Groundwater Monitoring Plan will be submitted for the NCDEQ approval following implementation of the RAP.
- Up to eight monitoring wells will be included in the monitoring program.
- Groundwater samples will be collected at a frequency of quarterly for the first year and semi-annually thereafter.
- Groundwater samples will be analyzed for boron, vanadium, and sulfate.
- A Groundwater Summary Report will be prepared after each sampling events (quarterly the first year and semi-annually thereafter) and a Groundwater Monitoring Report will be prepared after five years of groundwater monitoring. The report will evaluate the groundwater monitoring results, groundwater quality trends, and, provide recommendations for future activities.

### **Community Acceptance**

The NCDEQ accepts groundwater monitoring as a viable and effective alternative to address groundwater impacts. It is anticipated that this alternative would meet with community acceptance given that it will be conducted in accordance with established NCDEQ criteria and requirements, and that groundwater is not used for potable purposes in this area. Further, community acceptance is expected to be high as the groundwater monitoring alternative for groundwater would be coupled with the capping of impacted soil will slow the leaching of metals into the groundwater.

### **Preferred Groundwater Remedial Alternative**

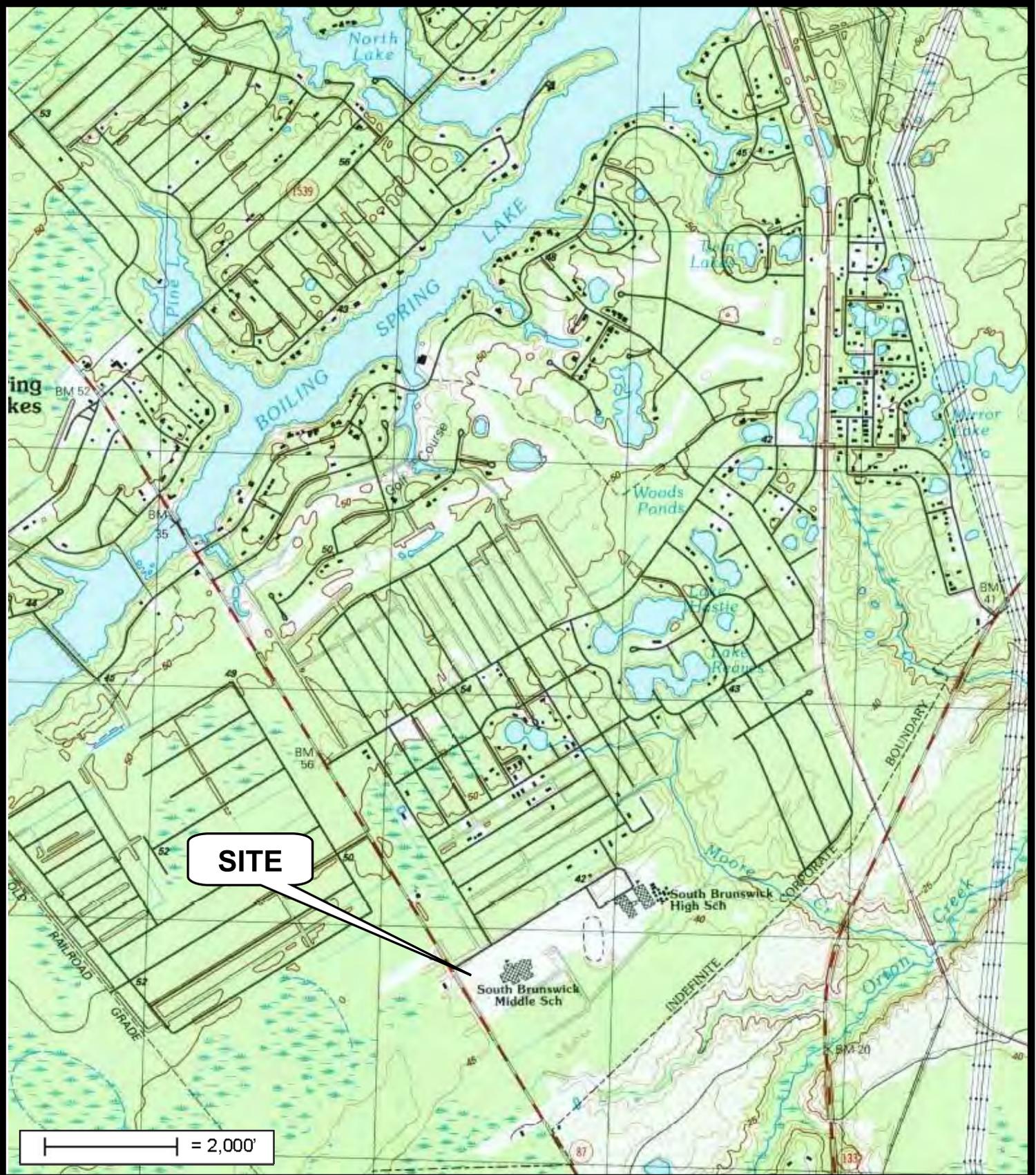
Based on the evaluation of the groundwater remedial alternatives for the site, the preferred alternative is Groundwater Remedial Alternative 2. This alternative consists of on-going monitoring of metals in site groundwater. Long-term groundwater monitoring will also be implemented to evaluate groundwater quality. The elements of this alternative, groundwater monitoring, will be subsequent to the soil remediation action. This alternative provides protection of human health and the environment in the most cost-effective manner. Institutional controls in the form of land use restrictions will be maintained on the site groundwater until NC2LGWQS are achieved.

## **SUMMARY OF PREFERRED REMEDIAL ALTERNATIVES**

Remedial alternatives have been evaluated for soil and groundwater. The preferred remedial

alternatives include: Soil Remedial Alternative 5 consisting of capping impacted soil in the baseball field areas and implementation of an irrigation system and Groundwater Remedial Alternative 2 consisting of on-going monitoring of the site groundwater. As a part of the groundwater monitoring, if concentrations of constituents of concern exhibit an increasing trend or indicate the migration is occurring, both the soil and groundwater remedial alternatives will be re-evaluated and revised as needed.

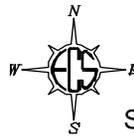
## FIGURES



**SOURCE:**

USGS 7.5-MINUTE QUADRANGLE:  
FUNSTON, NORTH CAROLINA,  
DATED 1990

CONTOUR INTERVAL: 5 FEET  
SCALE AS SHOWN



**FIGURE 1  
SITE LOCATION MAP**

SOUTH BRUNSWICK MIDDLE SCHOOL  
100 COUGAR ROAD  
SOUTPORT, BRUNSWICK COUNTY,  
NORTH CAROLINA

ECS PROJECT 22-19741B



Approximate Area of Coal Ash Residual Fill

● 3765 = Property Address

□ = Approximate Site Boundary



**SOURCE:**

BRUNSWICK COUNTY GIS

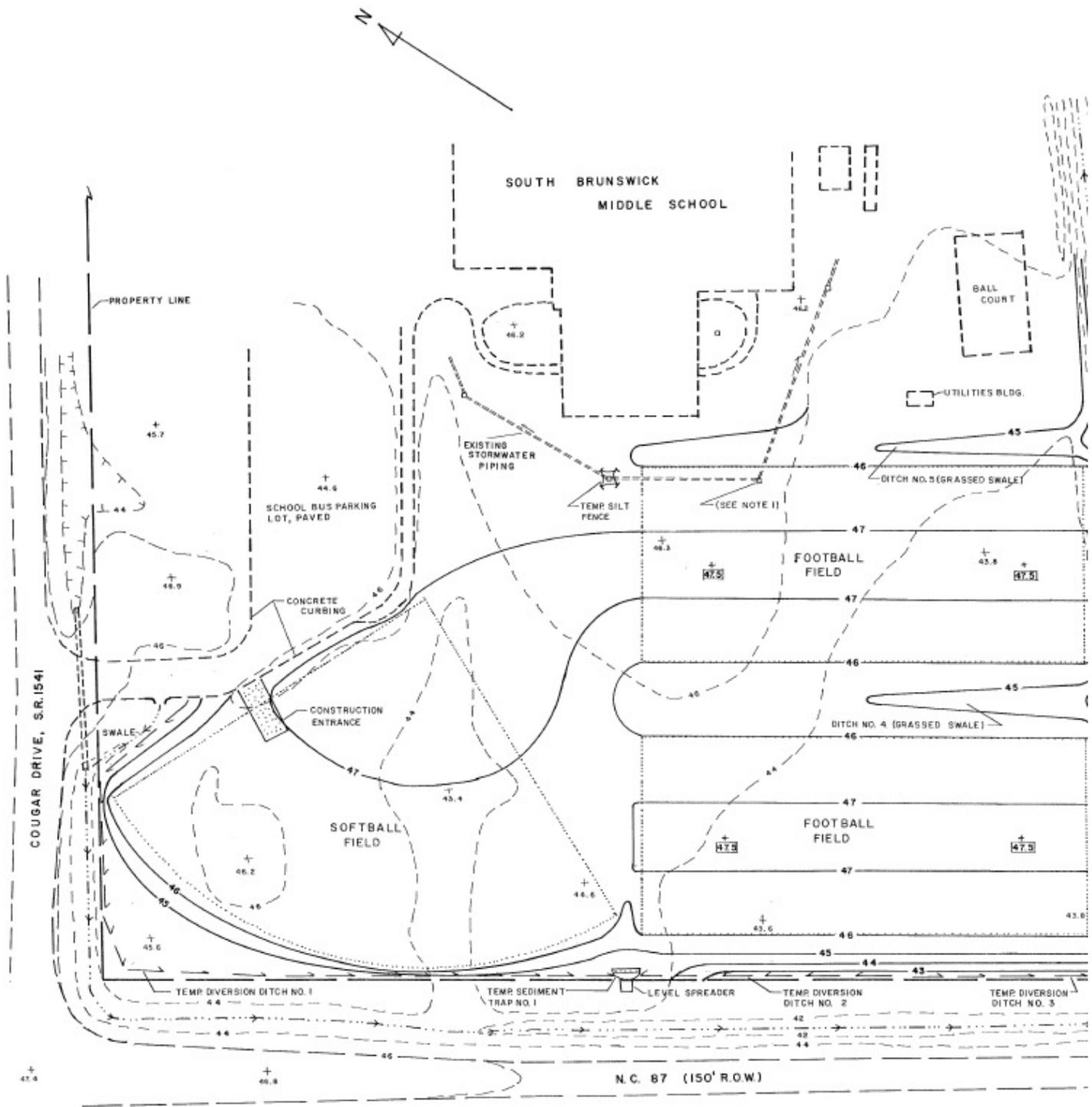
APPROXIMATE SCALE: 1 INCH = 400 FEET



**FIGURE 2  
PARCEL MAP**

SOUTH BRUNSWICK MIDDLE SCHOOL  
100 COUGAR ROAD  
SOUTPORT, BRUNSWICK COUNTY,  
NORTH CAROLINA

ECS PROJECT 22-19741B



**SOURCE:**

1992 FIELD SURVEY BY  
BRUNSWICK COUNTY

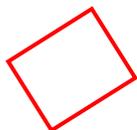
NOT TO SCALE



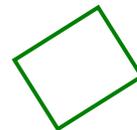
**FIGURE 3  
SITE SURVEY**

SOUTH BRUNSWICK MIDDLE SCHOOL  
100 COUGAR ROAD  
SOUTHPORT, BRUNSWICK COUNTY,  
NORTH CAROLINA

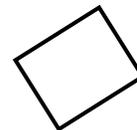
ECS PROJECT 22-19741A



= Proposed & Previous Composite Soil Sampling Quadrant



= Previous Composite Soil Sampling Quadrant



= Composite Stockpile Soil Sampling Quadrant

● = Discrete Soil Sample Locations for Composite Samples S-1, S-2, and S-3

● = Background Soil Sample Locations

■ = Seasonal High Water Level Locations



**SOURCE:**

AERIAL PROVIDED BY  
BRUNSWICK COUNTY SCHOOLS

NOT TO SCALE



**FIGURE 4  
PREVIOUS SAMPLE LOCATION MAP**

SOUTH BRUNSWICK MIDDLE SCHOOL  
100 COUGAR ROAD  
SOUTPORT, BRUNSWICK COUNTY,  
NORTH CAROLINA

ECS PROJECT 22-19741B

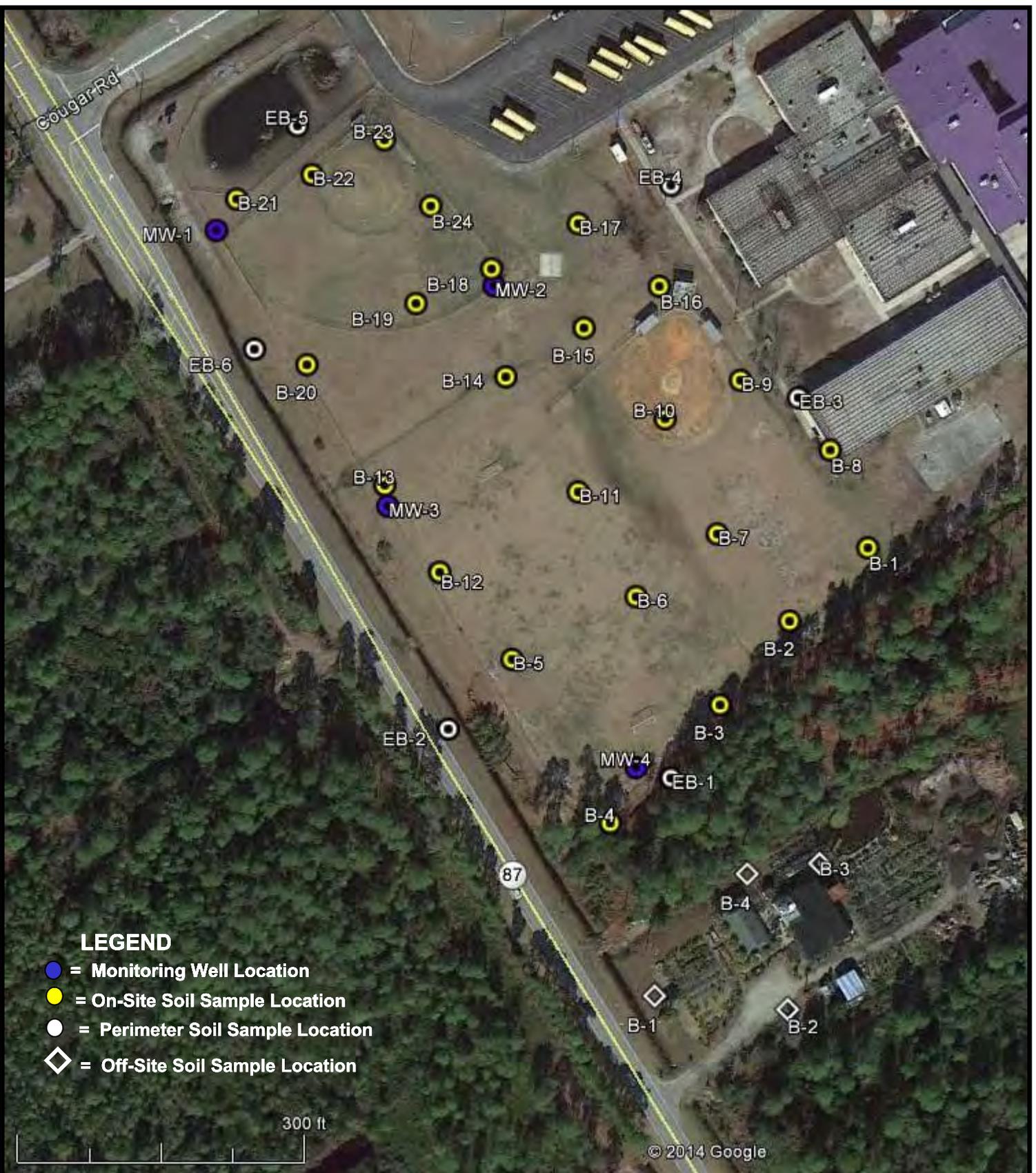


-  = Approximate Site Boundary
-  = Approximate Water Supply Well Location
-  = Drainage Ditch/Water Feature

  
**SOURCE:**  
 BRUNSWICK COUNTY GIS  
 APPROXIMATE SCALE: 1 INCH = 400 FEET



**FIGURE 5**  
**WATER SUPPLY WELL LOCATION MAP**  
 SOUTH BRUNSWICK MIDDLE SCHOOL  
 100 COUGAR ROAD  
 SOUTPORT, BRUNSWICK COUNTY,  
 NORTH CAROLINA  
 ECS PROJECT 22-19741B



**LEGEND**

- = Monitoring Well Location
- = On-Site Soil Sample Location
- = Perimeter Soil Sample Location
- ◇ = Off-Site Soil Sample Location

300 ft

© 2014 Google



**SOURCE:**  
GOOGLE EARTH  
SCALE AS SHOWN



**FIGURE 6  
SAMPLE LOCATION MAP**

SOUTH BRUNSWICK MIDDLE SCHOOL  
100 COUGAR DRIVE  
SOUTPORT, BRUNSWICK COUNTY,  
NORTH CAROLINA

ECS PROJECT 22-19741B



**LEGEND**  
 ● = Monitoring Well Location  
 ● = Soil Sample Location  
 ND = No Arsenic Detected  
 16.7 = Arsenic Concentration (mg/kg)  
35 = Exceeds Remediation



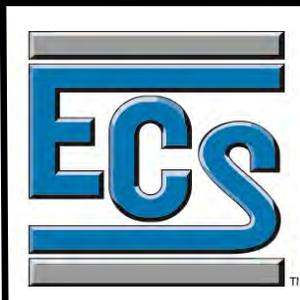
**SOURCE:**  
 GOOGLE EARTH  
 SCALE AS SHOWN



**FIGURE 7**  
**SURFICIAL (0-1FT) SOIL ARSENIC CONCENTRATION MAP**  
 SOUTH BRUNSWICK MIDDLE SCHOOL  
 100 COUGAR DRIVE  
 SOUTPORT, BRUNSWICK COUNTY,  
 NORTH CAROLINA  
 ECS PROJECT 22-19741B



**SOURCE:**  
GOOGLE EARTH  
SCALE AS SHOWN



**FIGURE 8**  
**SUBSURFACE (5FT) SOIL ARSENIC CONCENTRATION MAP**  
SOUTH BRUNSWICK MIDDLE SCHOOL  
100 COUGAR DRIVE  
SOUTPORT, BRUNSWICK COUNTY,  
NORTH CAROLINA  
ECS PROJECT 22-19741B



**LEGEND**

● = Boring Location



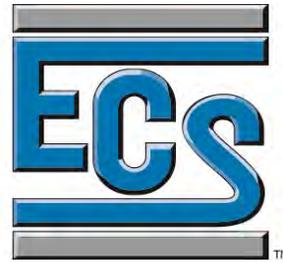
**SOURCE:**  
 GOOGLE EARTH  
 SCALE AS SHOWN



**FIGURE 9**  
**PERIMETER BORING LOCATION MAP**  
 SOUTH BRUNSWICK MIDDLE SCHOOL  
 100 COUGAR DRIVE  
 SOUTPORT, BRUNSWICK COUNTY,  
 NORTH CAROLINA  
 ECS PROJECT 22-19741B



**SOURCE:**  
 GOOGLE EARTH  
 SCALE AS SHOWN



**FIGURE 10  
 FLY ASH LOCATION MAP**

SOUTH BRUNSWICK MIDDLE SCHOOL  
 100 COUGAR DRIVE  
 SOUTPORT, BRUNSWICK COUNTY,  
 NORTH CAROLINA

ECS PROJECT 22-19741B



**LEGEND**

-  = Groundwater Contour
- 97.45 = Monitoring Well Elevation
-  = Monitoring Well Location
-  = Estimated Groundwater Flow Direction





**SOURCE:**

GOOGLE EARTH

SCALE AS SHOWN



**FIGURE 11**  
**POTENTIOMETRIC SURFACE MAP (8/13/14)**

SOUTH BRUNSWICK MIDDLE SCHOOL  
 100 COUGAR DRIVE  
 SOUTPORT, BRUNSWICK COUNTY,  
 NORTH CAROLINA

ECS PROJECT 22-19741B



**LEGEND**

- = Groundwater Contour
- 96.83 = Monitoring Well Elevation
- = Monitoring Well Location
- = Estimated Groundwater Flow Direction

200 ft

© 2014 Google

**SOURCE:**  
 GOOGLE EARTH  
 SCALE AS SHOWN



**FIGURE 12**  
**POTENTIOMETRIC SURFACE MAP (10/9/14)**  
 SOUTH BRUNSWICK MIDDLE SCHOOL  
 100 COUGAR DRIVE  
 SOUTPORT, BRUNSWICK COUNTY,  
 NORTH CAROLINA  
 ECS PROJECT 22-19741B



**SOURCE:**  
 GOOGLE EARTH AERIAL  
 2016

**SCALE**

1 inch = 250 feet



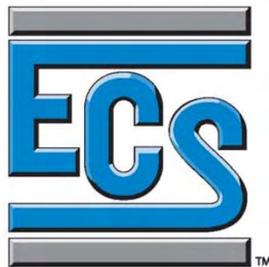
**FIGURE 13**  
**SOIL REMEDIAL ALTERNATIVE #2**

SOUTH BRUNSWICK MIDDLE SCHOOL  
 100 COUGAR ROAD  
 SOUTHPORT, BRUNSWICK COUNTY,  
 NORTH CAROLINA  
 ECS PROJECT: 49:1389



**SOURCE:**  
GOOGLE EARTH AERIAL  
2016

**SCALE**  
1 inch = 250 feet



**FIGURE 14**  
**SOIL REMEDIAL ALTERNATIVE #3**  
SOUTH BRUNSWICK MIDDLE SCHOOL  
100 COUGAR ROAD  
SOUTHPORT, BRUNSWICK COUNTY,  
NORTH CAROLINA  
ECS PROJECT: 49:1389



**SOURCE:**

GOOGLE EARTH AERIAL  
 2016

**SCALE**



**1 inch = 250 feet**



**FIGURE 15**

**SOIL REMEDIAL ALTERNATIVE #4**

SOUTH BRUNSWICK MIDDLE SCHOOL  
 100 COUGAR ROAD  
 SOUTHPORT, BRUNSWICK COUNTY,  
 NORTH CAROLINA  
 ECS PROJECT: 49:1389



DPLUR  
(RED)

FENCING

170,000 SQ FT BASEBALL  
(GREEN)

REMEDIAL ALTERNATIVE #5  
CAPPING DISTURBED AREA WITH FILL/IRRIGATED  
BERMUDA SODSYSTEM

SOURCE:  
GOOGLE EARTH AERIAL  
2016

SCALE  
1 inch = 250 feet



**FIGURE 16**  
**SOIL REMEDIAL ALTERNATIVE #5**  
SOUTH BRUNSWICK MIDDLE SCHOOL  
100 COUGAR ROAD  
SOUTHPORT, BRUNSWICK COUNTY,  
NORTH CAROLINA  
ECS PROJECT: 49:1389

## TABLES

**Table 1**  
**Water Supply Well Survey Table**  
**South Brunswick Middle School**  
**100 Cougar Road**  
**Southport, Brunswick County, North Carolina**  
**ECS Project Number. 22-19741B**

Parcel #	Parcel Address	Owner	Owner Address	Active City Water Account	Water Well on Site	Well Distance (feet)	Well Number	Comments
208912853496	South Brunswick Middle School 100 Cougar Road	Brunswick County Board of Education	35 Referendum Drive NE, Bolivia NC 28422	Yes	Yes	930 feet	3	
208916844609	The Garden Center 3765 George II Hwy	Brown, James E.	7109 River Road Southport, NC 28461	Yes	Yes	150	1	Lynwood Stephens (tenant) uses WSW for irrigation and fish tanks
208916832361	Multi-tenant Commercial 3846 George II Hwy	BSL Warehouse, LLC	3846 George II Highway Southport, NC 28461	Yes	No			
208916834148	Residence 3850 George II Hwy	Coastal Community Church of the Naz	281 Fairway Drive Southport, NC 28461	Yes	No			
208912867452	Residence 201 Cougar Road	Gile Terry & Deborah	201 Cougar Road Boiling Spring Lakes, NC	Yes	Yes	1,185	4	No one was home. Observed water supply well.
208911762534	Boiling Springs Lakes Family Medicine 3599 George II Hwy	Leaping Lizards Realty, LLC	3599 George II Highway Southport, NC 28461	Yes	No			
208911761683	Boiling Springs Lakes Family Medicine 3599 George II Hwy	Leaping Lizards Realty, LLC	3599 George II Highway Southport, NC 28461	Yes	No			
208911751037	Residence 3704 George II Hwy	Prince, Lacy W Et	896 Solomon Road Pulaski, TN 28478	Yes	Yes	280	2	Allison Huxley (tenant); Indicated WSW under the house but no longer used
208911659402	Residence 3686 George II Hwy	Stanely, Boyd J	3686 George II Highway Southport, NC 28461	Yes				No one was home.
208916930844	Business 3847 George II Hwy	M&M Rentals & Development Corp.	310 Charleston Road BSL Southport, NC 28461	Yes	Yes	1,300	Not on Figure	No one was home.

**Table 2**  
**Well Construction and Groundwater Elevation Details**  
**South Brunswick Middle School**  
**100 Cougar Road**  
**Southport, Brunswick County, North Carolina**  
**ECS Project Number 22-19741B**

Well ID	Date Installed	Date Water Level Measured	Well Casing Depth (ft)	Screened Interval (ft BLS)	Depth of Well (BLS)	Top of Casing Elevation (ft)	Depth to Water	Groundwater Elevation
MW-1	8/11/14	8/13/14	15	5-15	15	99.79	2.35	97.44
		NM					NM	NM
MW-2	8/11/14	8/13/14	15	5-15	15	102.53	5.05	97.48
		10/9/14					5.70	96.83
MW-3	8/11/14	8/13/14	15	5-15	15	99.90	2.45	97.45
		10/9/14					3.31	96.59
MW-4	8/11/14	8/13/14	15	5-15	15	99.33	2.40	96.93
		10/9/14					3.02	96.31

NM - Not Measured



**Table 3**  
**Soil Sampling Results**  
**South Brunswick Middle School**  
**100 Cougar Road**  
**Southport, Brunswick County, North Carolina**  
**ECS Project Number 22-19741B**

Sample	Type	Depth	Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Total Chromium	Chromium VI	Copper	Iron	Lead	Nickel	Selenium	Silver	Thallium	Zinc	Mercury	Magnesium	Manganese	
B-15	Grab	0-12"	8/11/14	NA	ND	10.6	NA	ND	NA	NA	NA	NA	6.5	NA	NA	NA	ND	NA	NA	NA	NA	
B-15A	Grab	48-60**	8/11/14	NA	ND	1.4	NA	ND	NA	NA	NA	NA	3.6	NA	NA	NA	ND	NA	NA	NA	NA	
B-16	Grab	0-12"	8/11/14	NA	ND	4.4	NA	ND	NA	NA	NA	NA	5.1	NA	NA	NA	ND	NA	NA	NA	NA	
B-16A	Grab	48-60**	8/11/14	NA	ND	1.0	NA	ND	NA	NA	NA	NA	3.2	NA	NA	NA	ND	NA	NA	NA	NA	
B-17	Grab	0-12"	8/11/14	NA	<b>2.4</b>	28.9	NA	ND	NA	NA	NA	NA	10.4	NA	NA	NA	ND	NA	NA	NA	NA	
B-17A	Grab	48-60"	8/11/14	NA	ND	5.4	NA	ND	NA	NA	NA	NA	4.5	NA	NA	NA	ND	NA	NA	NA	NA	
B-18	Grab	0-12"	8/11/14	NA	<b>46.9</b>	220	NA	0.60	NA	NA	NA	NA	43.7	NA	NA	NA	ND	NA	NA	NA	NA	
B-18A	Grab	48-60"	8/11/14	NA	<b>60.9</b>	329	NA	1.9	NA	NA	NA	NA	70.2	NA	NA	NA	ND	NA	NA	NA	NA	
B-19	Grab	0-12"	8/11/14	NA	<b>41.5</b>	225	NA	0.55	NA	NA	NA	NA	39.1	NA	NA	NA	ND	NA	NA	NA	NA	
B-19A	Grab	48-60"	8/11/14	NA	<b>36.0</b>	201	NA	0.65	NA	NA	NA	NA	47.8	NA	NA	NA	ND	NA	NA	NA	NA	
B-20	Grab	0-12"	8/11/14	NA	<b>18.7</b>	154	NA	0.51	NA	NA	NA	NA	23.8	NA	NA	NA	ND	NA	NA	NA	NA	
B-20A	Grab	42-55"	8/11/14	NA	<b>67.6</b>	333	NA	1.3	NA	NA	NA	NA	60.8	NA	NA	NA	ND	NA	NA	NA	NA	
B-21	Grab	0-12"	8/11/14	NA	<b>4.3</b>	21.6	NA	ND	NA	NA	NA	NA	10.0	NA	NA	NA	ND	NA	NA	NA	NA	
B-21A	Grab	48-60**	8/11/14	NA	ND	5.4	NA	ND	NA	NA	NA	NA	1.7	NA	NA	NA	ND	NA	NA	NA	NA	
B-22	Grab	0-12"	8/11/14	NA	<b>28.5</b>	164	NA	0.55	NA	NA	NA	NA	29.5	NA	NA	NA	ND	NA	NA	NA	NA	
B-22A	Grab	48-60"	8/11/14	NA	<b>35.9</b>	339	NA	0.77	NA	NA	NA	NA	65.8	NA	NA	NA	ND	NA	NA	NA	NA	
B-23	Grab	0-12"	8/11/14	NA	<b>34.4</b>	165	NA	0.59	NA	NA	NA	NA	32.1	NA	NA	NA	ND	NA	NA	NA	NA	
B-23A	Grab	48-60"	8/11/14	NA	<b>48.3</b>	272	NA	1.1	NA	NA	NA	NA	63.6	NA	NA	NA	ND	NA	NA	NA	NA	
B-24	Grab	0-12"	8/11/14	NA	<b>113</b>	527	NA	1.8	NA	NA	NA	NA	105	NA	NA	NA	ND	NA	NA	NA	NA	
B-24A	Grab	48-60"	8/11/14	NA	<b>41.2</b>	186	NA	0.77	NA	NA	NA	NA	39.3	NA	NA	NA	ND	NA	NA	NA	NA	
Health Based PSRG					6.2	0.61	3,000	32	14	24,000	0.29	620	11,000	400	300	78	78	0.16	4,600	2.0	NS	360
NCDENR Remediation Goal						30																

Total concentrations reported in mg/kg

NS = No Standard

Bold exceeds Preliminary Soil Remediation Goal

Bold and underline exceeds NCDENR Remediatoin Goal

**Table 4**  
**Groundwater Sampling Results**  
**South Brunswick Middle School**  
**100 Cougar Road**  
**Southport, Brunswick County, North Carolina**  
**ECS Project Number 22-19741B**

Sample	Date	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Magnesium	Manganese	Nickel	Selenium	Silver	Thallium	Zinc	Mercury	Turbidity
MW-1	8/13/14	ND	ND	ND	ND	ND	ND	ND	996	18.0	ND	ND	ND	ND	16.4	ND	NA
MW-1	Not Sampled																
MW-2	8/13/14	<b>10.8</b>	<b>115</b>	2.2	1.2	<b>13.5</b>	21.7	<b>22.8</b>	9,880	<b>128</b>	35.0	ND	ND	ND	54.5	ND	NA
MW-2	10/9/14	ND	<b>62.9</b>	NA	NA	ND	NA	14.6	NA	<b>169</b>	NA	NA	NA	NA	NA	NA	95.5
MW-3	8/13/14	ND	ND	ND	ND	ND	ND	ND	13,000	<b>134</b>	13.4	ND	ND	ND	39.8	ND	NA
MW-3	10/9/14	NA	NA	NA	NA	NA	NA	NA	NA	<b>614</b>	NA	NA	NA	NA	NA	NA	36.4
MW-4	8/13/14	ND	<b>11.8</b>	ND	ND	ND	ND	ND	8,570	<b>257</b>	13.2	ND	ND	ND	25.2	ND	NA
MW-4	10/9/14	NA	ND	NA	NA	NA	NA	NA	NA	<b>657</b>	NA	NA	NA	NA	NA	NA	13.3
WSW-1	10/9/14	ND	ND	NA	NA	ND	NA	ND	NA	<b>194</b>	NA	NA	NA	NA	NA	NA	NA
NC2LGWQS		1	10	4	2	10	1,000	15	NS	50	100	20	20	0.2	1,000	1.0	NS

Concentrations are in ug/L

NS = No Standard

NA = Not Analyzed

Bold Numbers = Exceed NC2LGWQS

Turbidity in NTU

**Table 5**  
**Summary of Current Groundwater Analytical Results**  
**Brunswick County Middle School**  
**100 Cougar Road**  
**Southport, Brunswick County, North Carolina**  
**ECS Project: 06:22625-C**

Analytical Method		EPA 6010/3010		EPA 300.0
Contaminant of Concern (µg/L)				
Sample ID	Sample Date	Boron	Vanadium	Sulfate
MW-1	9/10/2015	75.4	BRL	8,600
MW-2	9/10/2015	<b>2,170</b>	<b>9.4</b>	<b>561,000</b>
	10/13/2015	172	<b>35.1</b>	72.0
MW-3	9/10/2015	<b>2,260</b>	BRL	<b>685,000</b>
	10/13/2015	40.4	BRL	318
MW-4	9/10/2015	145	BRL	40,400
WSW-1	10/13/2015	15.1	BRL	BRL
NC2LGWQS (µg/L)		700	0.3	250,000

NC2LGWQS = North Carolina 2L Groundwater Quality Standard as of April 1, 2013

(µg/L) = Micrograms per Liter

BRL = Below Reporting Limit

## **APPENDIX A**

**Table 1  
Summary of Soil Results  
100 Cougar Drive  
Southport, Brunswick County, North Carolina 28461  
ECS Project Number 22-19741**

	Analytical Method	C1	C2	C3	C4	C5	C6	B1	B2	B3	B4	SP1	SP2	SP3	SP4	Protection of Groundwater PSRG	Health Based Residential PSRG
<b>Grab / Composite</b>		Composite	Composite	Composite	Composite	Composite	Composite	Grab	Grab	Grab	Grab	Composite	Composite	Composite	Composite		
<b>Depth</b>		2-4"	2-4"	2-4"	2-4"	2-4"	2-4"	2-4"	2-4"	2-4"	2-4"	Varies	Varies	Varies	Varies		
<b>Date</b>		11/6/13	11/6/13	11/6/13	11/6/13	11/6/13	11/6/13	11/6/13	11/6/13	11/6/13	11/6/13	11/6/13	11/6/13	11/6/13	11/6/13		
<b>Multiple Compounds</b>	8270	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Varies	Varies
<b>Antimony</b>	6010	<0.53	<0.63	<b>2.3</b>	<0.48	<0.54	0.52	0.70	<0.47	<0.52	<0.50	0.68	<0.55	<0.45	<b>1.0</b>	0.9	6.2
<b>Arsenic</b>	6010	<b>2.6</b>	<1.3	<b>23.6</b>	<b>1.1</b>	<b>2.3</b>	<b>3.9</b>	<b>7.2</b>	<0.95	<1.0	<1.0	<b>6.7</b>	<b>3.6</b>	<b>3.7</b>	<b>8.5</b>	5.8	0.61
<b>Barium</b>	6010	22.2	14.3	116	10.4	19.7	27.6	39.9	4.0	2.0	3.0	41.8	29.7	25.5	56.6	580	3,000
<b>Beryllium</b>	6010	0.63	0.38	3.2	0.28	0.59	1.1	1.5	<0.095	<0.10	<0.10	1.2	0.79	0.64	1.7	63	32
<b>Cadmium</b>	6010	<0.11	ND	0.18	<0.096	<0.11	<0.094	<0.097	<0.095	<0.10	<0.10	<0.11	<0.11	<0.090	<0.11	3.0	14
<b>Total Chromium*</b>	6010	3.9	3.0	9.3	4.1	2.8	4.1	4.2	1.6	1.2	2.3	4.5	3.8	3.9	5.1	360,000	24,000
<b>Chromium VI</b>	7169A	<9.6	<1.9	<1.9	<2.1	<9.4	<4.6	<0.36	<0.94	<0.84	<4.8	<10	<9.9	<5.2	<10	3.8	0.29
<b>Iron</b>	6010	<b>959</b>	<b>1,040</b>	<b>2,390</b>	<b>1,760</b>	<b>633</b>	<b>765</b>	<b>725</b>	<b>285</b>	<b>261</b>	<b>271</b>	<b>1,050</b>	<b>1,110</b>	<b>1,470</b>	<b>1,320</b>	150	11,000
<b>Lead</b>	6010	7.0	5.5	28.5	5.3	7.1	9.7	9.3	3.3	2.1	2.4	11.7	9.0	7.0	14.8	270	400
<b>Nickel</b>	6010	2.4	2.8	14.7	1.2	2.0	5.1	3.6	<0.47	<0.52	<0.50	4.2	3.1	2.5	5.8	130	300
<b>Selenium</b>	6010	<0.53	<1.3	<b>6.2</b>	<0.96	1.1	1.3	2.0	<0.95	<1.0	<1.0	<b>2.4</b>	1.5	1.1	<b>2.8</b>	2.1	78
<b>Silver</b>	6010	<1.1	<0.63	<0.59	<0.48	<0.54	<0.47	<0.48	<0.47	<0.52	<0.50	<0.55	<0.55	<0.45	<0.54	3.4	78
<b>Thallium</b>	6010	<1.1	<1.3	<b>1.2</b>	<0.96	<1.1	<0.94	<0.97	<0.95	<1.0	<1.0	<1.1	<1.1	<0.90	<1.1	0.28	0.16
<b>Zinc</b>	6010	9.8	14.3	33.4	2.8	5.8	8.0	6.5	3.3	3.0	4.9	10.6	8.5	7.1	13.5	1,200	4,600
<b>Mercury</b>	7471	0.024	0.014	0.093	0.0071	0.013	0.018	0.030	0.0096	0.0068	0.0056	0.023	0.020	0.018	0.026	1	2.0

Concentrations in mg/kg

MSCC = Maximum Soil Contaminant Concentration

**Bold** concentrations exceed the Inactive Hazardous Sites Branch (IHSB) Protection of Groundwater Soil Remediation Goals

**Red** concentrations exceed the IHSB Residential Health-Based Soil Remediation Goals

PSRG = Preliminary Soil Remediation Goal

\* Total Chromium numbers assumed to be chromium III.

**Table 1**  
**Summary of Soil Sampling Results**  
**100 Cougar Drive**  
**Southport, Brunswick County, North Carolina 28461**  
**ECS Project Number 22-19741A**

	Analytical Method	S-1	S-2	S-3	BG-1	BG-2	SP-1	SP-2	SP-3	SP-4	Protection of Groundwater PSRG (mg/kg)	Health Based Residential PSRG (mg/kg)	20 x NCAC 2L Standard (mg/L)	NCAC 2L Standard (mg/L)	"Contained-Out" TCLP Values (mg/L)
Grab / Composite		Composite	Composite	Composite	Grab	Grab	Composite	Composite	Composite	Composite					
Depth		4-6"	12"	24"	4-6"	4-6"	Varies	Varies	Varies	Varies					
Date		3/4/14	3/4/14	3/4/14	3/4/14	3/4/14	3/4/14	3/4/14	3/4/14	3/4/14					
Antimony	6010	ANR	2.2	2.3	ND	ND	ANR	ANR	ANR	ANR	0.9	6.2	NS	NS	1.5
	6010 TCLP	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Arsenic	6010	ANR	28.6	44.2	ND	ND	ANR	ANR	ANR	ANR	5.8	0.61	0.2	0.01	< 5
	6010 TCLP	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Barium	6010	ANR	120	147	1.1	ND	ANR	ANR	ANR	ANR	580	3,000	14	0.7	< 100
	6010 TCLP	ANR	1.9	1.6	ND	ND	ND	ND	ND	ND					
Beryllium	6010	ANR	3.1	3.3	0.071	ND	ANR	ANR	ANR	ANR	63	32	NS	NS	7.3
	6010 TCLP	ANR	0.010	0.0096	ND	ND	ND	ND	ND	ND					
Cadmium	6010	ANR	0.62	0.96	ND	ND	ANR	ANR	ANR	ANR	3.0	14	0.04	0.002	< 1
	6010 TCLP	ANR	0.0053	0.0057	ND	ND	ND	ND	ND	ND					
Total Chromium*	6010	ANR	9.6	10.0	1.5	ND	ANR	ANR	ANR	ANR	360,000	24,000	0.2	0.01	< 5
	6010 TCLP	ANR	ND	ND	ND	ND	ND	ND	ND	ND					
Copper	6010	ANR	40.5	51.3	ND	ND	ANR	ANR	ANR	ANR	700	620	20	1	100
	6010 TCLP	ANR	0.10	0.13	ND	ND	ND	ND	ND	ND					
Lead	6010	ANR	26.5	34.9	2.70	0.48	ANR	ANR	ANR	ANR	270	400	0.3	0.015	< 5
	6010 TCLP	ANR	0.026	0.030	ND	ND	ND	ND	ND	ND					
Nickel	6010	ANR	13.1	15.1	0.37	ND	ANR	ANR	ANR	ANR	130	300	2	0.1	10
	6010 TCLP	ANR	0.094	0.074	ND	ND	ND	ND	ND	ND					
Selenium	6010	ANR	4.3	6.6	ND	ND	ANR	ANR	ANR	ANR	2.1	78	0.4	0.02	< 1
	6010 TCLP	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Silver	6010	ANR	ND	ND	ND	ND	ANR	ANR	ANR	ANR	3.4	78	0.4	0.02	< 5
	6010 TCLP	ANR	ND	ND	ND	ND	ND	ND	ND	ND					
Thallium	6010	ANR	ND	ND	ND	ND	ANR	ANR	ANR	ANR	0.28	0.16	NS	NS	0.24
	6010 TCLP	ND	ND	ND	ND	ND	ND	ND	ND	ND					
Zinc	6010	ANR	28.7	42.8	ND	ND	ANR	ANR	ANR	ANR	1,200	4,600	20	1	105
	6010 TCLP	ANR	0.54	ND	ND	ND	ND	ND	ND	ND					
Mercury	7471	ANR	0.12	0.20	0.0048	ND	ANR	ANR	ANR	ANR	1	2.0	0.02	0.001	< 0.2
	7470 TCLP	ANR	ND	ND	ND	ND	ND	ND	ND	ND					

Total concentrations reported in mg/kg

TCLP = Toxicity Characteristics Leaching Procedure concentrations in mg/L

\* Total Chromium numbers assumed to be Chromium III (based on previous assessment)

Red concentration exceeds the IHSB Residential Health-Based PSRG Bold concentration exceeds the IHSB Protection of Groundwater PSRG

Total concentration exceeds 20 times groundwater remediation goal (NCAC 2L Standard)

TCLP concentration exceeds groundwater remediation goal (NCAC 2L Standard)

## **APPENDIX B**

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**Geophysical Survey  
South Brunswick Middle School  
100 Cougar Drive  
Southport, North Carolina**

Prepared For:  
**ECS Carolinas, LLP**  
6714 Netherlands Drive  
Wilmington, North Carolina 28405

Prepared By:



July 2014

FES Project No. 14167

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## Table of Contents

Section	Page
<b>1.0 Introduction</b> .....	1
<b>2.0 Equipment and Procedures</b> .....	2
<b>3.0 Survey Results and Conclusions</b> .....	4

### List of Figures

Figure	
1	Geophysical Site Map .....
2	Apparent Conductivity Contour Map .....
3	Geophysical Anomaly Map .....

## **1.0 Introduction**

Forrest Environmental Services, Inc. (FES) performed a geophysical survey at South Brunswick Middle School located on 100 Cougar Drive in Southport, North Carolina on the 25<sup>th</sup> and 26<sup>th</sup> June 2014. The investigation consisted of an electromagnetic (EM) survey to locate suspected buried fly ash.

The EM survey included west of the school that includes two baseball fields. Data was collected along linear 10 foot traverses having stations at 10 readings per second using an Archer data logger connected to a GPS within a sub-meter accuracy that covered approximately 800 by 800 feet. The northings and eastings values were in UTM feet coordinates. The survey boundaries were selected by an ECS Carolinas, LLP. representative.

Topographically, the site slopes to the north. The site consists mostly of grassed field that included metal fences. Survey locations and physical features are shown in Figure 1.

Details of the geophysical survey are described in the following sections.

## 2.0 Equipment and Procedures

The EM survey was performed using an EM-31 induction meter to measure the apparent conductivity of the subsurface. The EM-31 consists of two horizontal coplanar loops, one acting as a transmitter and the other as a receiver. The transmitter induces electrical eddy currents in the earth, which in turn produce a secondary magnetic field. The receiver intercepts the secondary field, and the meter measures the terrain conductivity by comparing the strength of the secondary field to that of the primary field.

The depth of investigation by EM is a function of the intercoil spacing and the orientation of the antenna dipoles. The EM-31 has an intercoil spacing of 12 feet, and used in the vertical dipole mode, has an effective penetration depth of approximately 18 feet.

Two readings were obtained from the EM-31 at each measurement station. The EM was connected to a data logger that simultaneously recorded both the quadrature-phase component and the in-phase component. The quadrature-phase component measures the apparent terrain conductivity of the subsurface, and will detect metallic and nonmetallic objects or features with conductivities that deviate from their surroundings. The background apparent terrain conductivity value at the site was approximately 10 millimhos per meter (mmhos/m).

The in-phase component measurements are proportional to an effective, average magnetic susceptibility of the surrounding earth; this mode is sensitive to large metallic objects. The readings do not indicate true magnetic susceptibility because there is an unknown additive constant and multiplying factor that would be required to convert the measured values to magnetic susceptibility.

Generally, negative EM values can indicate the areal extent of large, shallow buried metal objects. The EM displays moderate-sized metal objects that are buried deep as areas of high conductivity; therefore, both high and negative readings of apparent conductivity can indicate metal. However, high conductivity materials can also be caused by conductive chemical compounds such as acids, sulfates, fly ash, and salts in the subsurface and by conductive soils

such as clay. Low conductivity materials such as wood and oil are generally not detectable by the EM.

### **3.0 Survey Results and Conclusions**

The objective of the geophysical survey was to determine the presence of suspected fly ash.

The EM apparent terrain conductivity contour map (Figure 2) exhibited two anomalies from surface anthropogenic interferences. Two high anomalies around the ball fields are centered at 2534600 East 12358400 feet North, 2534350 feet East 12358850 feet North. Anomalies A and B appear to be a metal fence around the ball fields

Two linear negative anomalies are centered at 2534700 feet East 12358500 feet North and 2534600 feet East 12358800 feet North. Anomalies C and D appear to be from metal from the silk fence and the reinforced concrete, respectively.

High anomalies are centered at 2534325 feet East 12358550 feet North and 2534250 feet East 12358880 feet North. Anomalies E and F appear to be from fly ash

The geophysical survey indicated high anomalies at both ball fields west of the school. The high anomalies appear to be fly ash with highest anomaly at the western section of the southern ball field.

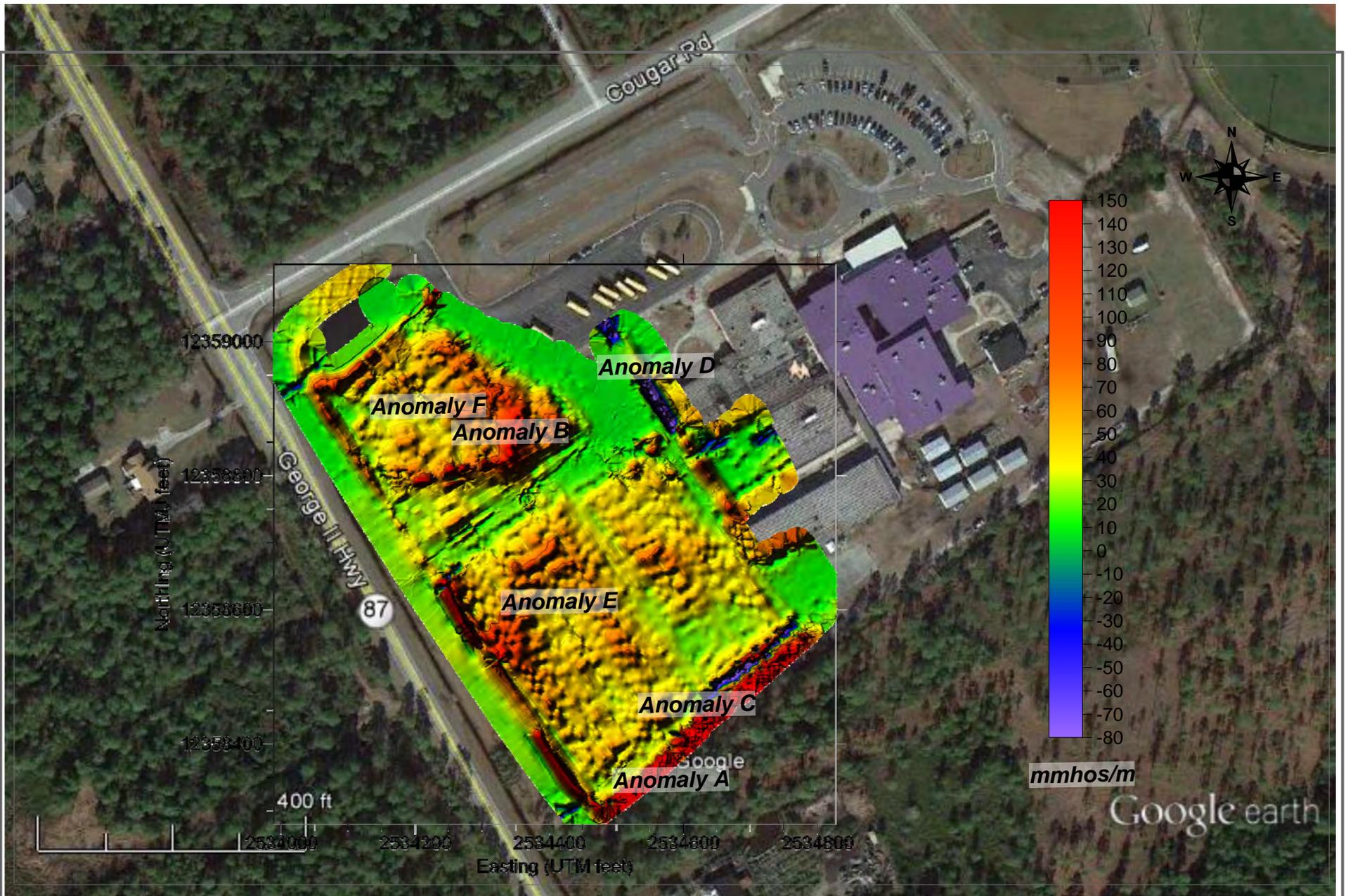


**Forrest Environmental Services, Inc.**



Oak Hill, Virginia  
 (703) 648-9090  
[www.fesinc.net](http://www.fesinc.net)

DATE	July 2014	SCALE	1 inch ~ 200 ft	TITLE	<b>Geophysical Site Map South Brunswick Middle School 100 Cougar Drive Southport, North Carolina</b>
DRAWN BY		APPROVED BY			
JOB NO.	14167	DWG. NO./REV. NO.	ECSSBMSF1	CLIENT	ECS Carolinas, LLP
					FIGURE <b>1</b>



**Forrest Environmental Services, Inc.**



Oak Hill, Virginia  
 (703) 648-9090  
[www.fesinc.net](http://www.fesinc.net)

DATE	July 2014	SCALE	1 inch ~ 200 ft	TITLE	<b>Apparent Conductivity Contour Map South Brunswick Middle School 100 Cougar Drive Southport, North Carolina</b>	
DRAWN BY		APPROVED BY				
JOB NO.	14167	DWG. NO./REV. NO.	ECSSBMSF2	CLIENT	ECS Carolinas, LLP	FIGURE <b>2</b>



**Legend**

 High EM Anomaly Area

**Forrest Environmental Services, Inc.**



Oak Hill, Virginia  
 (703) 648-9090  
[www.fesinc.net](http://www.fesinc.net)

DATE	July 2014	SCALE	1 inch ~ 200 ft	TITLE	<b>Geophysical Anomaly Map          South Brunswick Middle School          100 Cougar Drive          Southport, North Carolina</b>	
DRAWN BY		APPROVED BY				
JOB NO.	14167	DWG. NO./REV. NO.	ECSSBMSF3	CLIENT		ECS Carolinas, LLP
					FIGURE	<b>3</b>

## APPENDIX C

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-1  
**PROJECT NO.** 22:19741-B



**LOCATION:** South Brunswick Middle School - Southport, NC

**ELEVATION:** NA

**DRILLER:** 3D

**DATE DRILLED:** 8/11/2014

**LOGGED BY:** KBW

**DRILL RIG:** Geoprobe

**DEPTH TO WATER:** 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						
2					SM	Black Silty Sand
4					SP-SM Fill	Apparent Fly Ash
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-2  
**PROJECT NO.** 22:19741-B



**LOCATION:**  
 South Brunswick Middle School - Southport, NC

**ELEVATION:**  
 NA

**DRILLER:**  
 3D

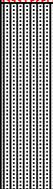
**DATE DRILLED:**  
 8/11/2014

**LOGGED BY:**  
 KBW

**DRILL RIG:**  
 Geoprobe

**DEPTH TO WATER:**  
 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0					sp-sm fill	Apparent Fly Ash
2					sm	Black Silty Sand
4						
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-3  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> 3D		<b>DATE DRILLED:</b> 8/11/2014
<b>DRILL RIG:</b> Geoprobe		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 4'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						Apparent Fly Ash
2				[Red hatched pattern]	sp-sm fill	
4				[Grey hatched pattern]	sm	Black Silty Sand
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-4  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC	<b>ELEVATION:</b> NA	<b>LOGGED BY:</b> KBW
<b>DRILLER:</b> 3D	<b>DATE DRILLED:</b> 8/11/2014	
<b>DRILL RIG:</b> Geoprobe	<b>DEPTH TO WATER:</b> 4'	

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						Apparent Fly Ash
2				[Red hatched pattern]	sp-sm fill	
4					sm	Black Silty Sand
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-5  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> 3D		<b>DATE DRILLED:</b> 8/11/2014
<b>DRILL RIG:</b> Geoprobe		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						Apparent Fly Ash
2				[Red hatched pattern]	sp-sm fill	
4				[Grey hatched pattern]	sm	Black Silty Sand
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-6  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> 3D		<b>DATE DRILLED:</b> 8/11/2014
<b>DRILL RIG:</b> Geoprobe		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						Apparent Fly Ash
2				[Red hatched pattern]	sp-sm fill	
4				[Grey hatched pattern]	sm	Black Silty Sand
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-7  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC	<b>ELEVATION:</b> NA	<b>LOGGED BY:</b> KBW
<b>DRILLER:</b> 3D	<b>DATE DRILLED:</b> 8/11/2014	
<b>DRILL RIG:</b> Geoprobe	<b>DEPTH TO WATER:</b> 5'	

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						Apparent Fly Ash
2				[Red hatched pattern]	sp-sm fill	
4				[Grey hatched pattern]	sm	Black Silty Sand
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-8  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> 3D		<b>DATE DRILLED:</b> 8/11/2014
<b>DRILL RIG:</b> Geoprobe		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						Apparent Fly Ash
2					sp-sm fill	
4						
5					sm	Black Silty Sand
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-9  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> 3D		<b>DATE DRILLED:</b> 8/11/2014
<b>DRILL RIG:</b> Geoprobe		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0					cl	Orange Clay
2					sp-sm fill	Apparent Fly Ash
4					sm	Black Silty Sand
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-10  
**PROJECT NO.** 22:19741-B



**LOCATION:** South Brunswick Middle School - Southport, NC

**ELEVATION:** NA

**DRILLER:** 3D

**DATE DRILLED:** 8/11/2014

**LOGGED BY:** KBW

**DRILL RIG:** Geoprobe

**DEPTH TO WATER:** 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0					cl	Orange Clay
2					sp-sm fill	Apparent Fly Ash
4					sm	Black Silty Sand
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-11  
**PROJECT NO.** 22:19741-B



**LOCATION:** South Brunswick Middle School - Southport, NC

**ELEVATION:** NA

**DRILLER:** 3D

**DATE DRILLED:** 8/11/2014

**LOGGED BY:** KBW

**DRILL RIG:** Geoprobe

**DEPTH TO WATER:** 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						Apparent Fly Ash
2				[Red hatched pattern]	sp-sm fill	
4				[Grey hatched pattern]	sm	Black Silty Sand
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-12  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> 3D		<b>DATE DRILLED:</b> 8/11/2014
<b>DRILL RIG:</b> Geoprobe		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						Apparent Fly Ash
2				[Red hatched pattern]	sp-sm fill	
4				[Grey hatched pattern]	sm	Black Silty Sand
6						
8						
10						
12						
14						

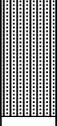
**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-13  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> 3D		<b>DATE DRILLED:</b> 8/11/2014
<b>DRILL RIG:</b> Geoprobe		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						Apparent Fly Ash
2					sp-sm fill	
4					sm	Black Silty Sand
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-14  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC	<b>ELEVATION:</b> NA	<b>LOGGED BY:</b> KBW
<b>DRILLER:</b> 3D	<b>DATE DRILLED:</b> 8/11/2014	
<b>DRILL RIG:</b> Geoprobe	<b>DEPTH TO WATER:</b> 5'	

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						Apparent Fly Ash
2					<b>sp-sm fill</b>	
4					<b>sm</b>	Black Silty Sand
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-15  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> 3D		<b>DATE DRILLED:</b> 8/11/2014
<b>DRILL RIG:</b> Geoprobe		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						
2					sm	Black Silty Sand
4						
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-16  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> 3D		<b>DATE DRILLED:</b> 8/11/2014
<b>DRILL RIG:</b> Geoprobe		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						
2					sm	Black Silty Sand
4						
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-17  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> 3D		<b>DATE DRILLED:</b> 8/11/2014
<b>DRILL RIG:</b> Geoprobe		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						Apparent Fly Ash
2				[Red hatched pattern]	sp-sm fill	
4						
6						Organics
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-18  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC	<b>ELEVATION:</b> NA	<b>LOGGED BY:</b> KBW
<b>DRILLER:</b> 3D	<b>DATE DRILLED:</b> 8/11/2014	
<b>DRILL RIG:</b> Geoprobe	<b>DEPTH TO WATER:</b> 5'	

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0					sm	Black Silty Sand
2					sp-sm fill	Apparent Fly Ash
4						
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-19  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> 3D		<b>DATE DRILLED:</b> 8/11/2014
<b>DRILL RIG:</b> Geoprobe		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0					sm	Black Silty Sand
2					sp-sm fill	Apparent Fly Ash
4						
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-20  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> 3D		<b>DATE DRILLED:</b> 8/11/2014
<b>DRILL RIG:</b> Geoprobe		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 4'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						Apparent Fly Ash
2				[Red hatched pattern]	sp-sm fill	
4				[Grey hatched pattern]	sm	Black Silty Sand
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-21  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> 3D		<b>DATE DRILLED:</b> 8/11/2014
<b>DRILL RIG:</b> Geoprobe		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						
2					sm	Black Silty Sand
4						
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-22  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC	<b>ELEVATION:</b> NA	<b>LOGGED BY:</b> KBW
<b>DRILLER:</b> 3D	<b>DATE DRILLED:</b> 8/11/2014	
<b>DRILL RIG:</b> Geoprobe	<b>DEPTH TO WATER:</b> 5'	

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0					sm	Black Silty Sand
2					sp-sm fill	Apparent Fly Ash
4						
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-23  
**PROJECT NO.** 22:19741-B



**LOCATION:** South Brunswick Middle School - Southport, NC

**ELEVATION:** NA

**DRILLER:** 3D

**DATE DRILLED:** 8/11/2014

**LOGGED BY:** KBW

**DRILL RIG:** Geoprobe

**DEPTH TO WATER:** 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0					sm	Black Silty Sand
2					sp-sm fill	Apparent Fly Ash
4						
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** B-24  
**PROJECT NO.** 22:19741-B



LOCATION: South Brunswick Middle School - Southport, NC		ELEVATION: NA
DRILLER: 3D		DATE DRILLED: 8/11/2014
DRILL RIG: Geoprobe		LOGGED BY: KBW
		DEPTH TO WATER: 5'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0					sm	Black Silty Sand
2					sp-sm fill	Apparent Fly Ash
4						
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** EB-1  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> ECS		<b>DATE DRILLED:</b> 8/13/2014
<b>DRILL RIG:</b> Hand Auger		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 1'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						
1					sm	Black Silty Sand
2						
4						
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** EB-2  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC	<b>ELEVATION:</b> NA	<b>LOGGED BY:</b> KBW
<b>DRILLER:</b> ECS	<b>DATE DRILLED:</b> 8/13/2014	
<b>DRILL RIG:</b> Hand Auger	<b>DEPTH TO WATER:</b> 1.5'	

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						
1.5					sm	Black Silty Sand
2						
4						
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** EB-3  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> ECS		<b>DATE DRILLED:</b> 8/13/2014
<b>DRILL RIG:</b> Hand Auger		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 3'

This information pertains only to this boring and should not be in terpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						
2					sm	Black Silty Sand
4						
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** EB-4  
**PROJECT NO.** 22:19741-B



LOCATION: South Brunswick Middle School - Southport, NC		ELEVATION: NA
DRILLER: ECS		DATE DRILLED: 8/13/2014
DRILL RIG: Hand Auger		LOGGED BY: KBW
		DEPTH TO WATER: 2'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						
2					sm	Black Silty Sand
4						
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** EB-5  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> ECS		<b>DATE DRILLED:</b> 8/13/2014
<b>DRILL RIG:</b> Hand Auger		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 2'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						
2					sm	Black Silty Sand
4						
6						
8						
10						
12						
14						

**PROJECT:** South Brunswick Middle School  
**CLIENT:** Brunswick County Schools

**BORING NUM.** EB-6  
**PROJECT NO.** 22:19741-B



<b>LOCATION:</b> South Brunswick Middle School - Southport, NC		<b>ELEVATION:</b> NA
<b>DRILLER:</b> ECS		<b>DATE DRILLED:</b> 8/13/2014
<b>DRILL RIG:</b> Hand Auger		<b>LOGGED BY:</b> KBW
		<b>DEPTH TO WATER:</b> 2'

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Elevation/ Depth (Ft)	PID Reading	Sample Number	Sample Recovery (in/in)	Graphic Log	Soil Classification	SOIL DESCRIPTION
0						
2					sm	Black Silty Sand
4						
6						
8						
10						
12						
14						

## APPENDIX D

## **DECLARATION OF PERPETUAL LAND USE RESTRICTIONS**

### **For Property Owned By: Brunswick County Board of Education**

**The real property which is the subject of this Declaration of Perpetual Land Use Restrictions ("Declaration") is contaminated with hazardous substances, and is an INACTIVE HAZARDOUS SUBSTANCE OR WASTE DISPOSAL SITE ("the Site") as defined by North Carolina's Inactive Hazardous Sites Response Act of 1987, which consists of Section 130A-310 through Section 130A-310.19 of the North Carolina General Statutes ("N.C.G.S). This Declaration is part of a Remedial Action Plan for the Site that has been approved by the Secretary of the North Carolina Department of Environmental Quality, Division of Waste Management, Superfund Section (or its successor in function), or his/her delegate, as authorized by N.C.G.S. Section 130A-310.3(f). The North Carolina Department of Environmental Quality shall hereafter be referred to as "DEQ." Hereafter, the Division of Waste Management, Superfund Section shall be referred to as "Superfund Section".**

Brunswick County Board of Education, 35 Referendum Drive, Bolivia NC 28422 the owner in fee simple of the Property ("the Property"), which is located at 100 Cougar Drive, in the County of Brunswick, City of Boiling Springs Lake, State of North Carolina, and is the real property legally described in Deed Book 2669, Page 0962 in the Office of the Register of Deeds for Brunswick County. The Property is also shown on a Notice of Inactive Hazardous Substance or Waste Disposal Site, in the form of a survey plat ("Survey Plat"), which has been recorded prior to the recordation of this Declaration in **Map Book \_\_\_\_\_ Page \_\_\_\_\_** in the Office of the Register of Deeds for Brunswick County. A copy of the Survey Plat is included as Exhibit A to this Declaration.

For the purpose of protecting public health and the environment, Brunswick County Board of Education hereby declares that all of the Property shall be held, sold and conveyed subject to the following perpetual land use restrictions, which shall run with the land; shall be binding on all parties having any right, title or interest in the Property or any part thereof, their heirs, successors and assigns; and shall, as provided in N.C.G.S. Section 130A-310.3(f), be enforceable without regard to lack of privity of estate or contract, lack of benefit to particular land, or lack of any property interest in particular land. These restrictions shall continue in perpetuity and cannot be amended or canceled unless and until the Brunswick County Register of Deeds receives and records the written concurrence of the Secretary of DEQ (or its successor in function), or his/her delegate. If any provision of this Declaration is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired.

### **PERPETUAL LAND USE RESTRICTIONS**

The following restrictions only apply to the athletic fields adjacent to Highway 87 and Cougar Drive encompassing approximately 8 acres on the southwestern portion of the property where coal

combustible materials (CCMs) were used as structural fill material. This area is identified as Area A on the Survey Plat.

1. The Property shall be used for open space only and for no other purpose. "Open space" for purposes of this restriction means an undeveloped, open area where the sole human use shall be recreational activities such as softball, baseball, football, soccer, hiking and running. The Property shall not be developed or utilized for residential, commercial or industrial purposes.
2. The Property shall not be used for:
  - Agriculture, grazing or timber production
  - Mining, extraction of coal, oil, gas or any other minerals or non-mineral substances
  - Kennel or private animal pens
  - Horseback riding
  - Off-Road vehicle activities
3. No above- or below-ground construction or improvements (including, but not limited to, utilities, roads, sidewalks, and landscaping) are allowed without prior written approval by the Superfund Section or its successor in function.
4. No alteration or disturbance of the existing soil, landscape and contours shall occur other than erosion control measures without prior written approval by the Superfund Section or its successor in function.
5. Mowing of vegetation and tree pruning is allowed on the Property as part of normal maintenance.
6. Surface water or underground water (groundwater) shall not be used for any purpose.
7. The installation of groundwater wells or other devices for access to groundwater for any purpose other than monitoring groundwater quality is prohibited without prior written approval by the Superfund Section or its successor in function.
8. The following standard maintenance activities shall be performed at the Property:
  - All grassed areas shall be properly maintained (mowing, irrigation, fertilization, etc.) to ensure that a healthy vegetative cover is always present.
  - A minimum 6 in. thick soil/clay cover shall be maintained in good condition at all times in the baseball and softball infield areas. During baseball and

softball seasons the infield areas shall be inspected weekly and repaired as necessary.

All erosion problems and areas of dead/stressed vegetation shall be repaired promptly upon discovery.

9. No surface or subsurface native or fill earthen materials may be removed from the Property without prior written approval by the Superfund Section or its successor in function.
10. Each person who owns any portion of the Property shall submit a letter report, containing the notarized signature of the owner, in January of each year on or before January 31<sup>st</sup>, to the Superfund Section, or its successor in function, confirming that this Declaration is still recorded in the Office of the Brunswick County Register of Deeds, that activities and conditions at the Property remain in compliance with the land use restrictions herein, and that the Property has not been subdivided since the last letter report submitted to the Superfund Section.

At least monthly, the owner or its representative must inspect Area A to ensure that the entire cap is in good condition. Any problems identified during the inspection shall be promptly repaired. The results of each inspection and how any problems were addressed shall be documented. The monthly inspection reports must be submitted along with the annual letter report.

11. No person conducting environmental assessment or remediation at the Site, or involved in determining compliance with applicable land use restrictions at the Property, at the direction of, or pursuant to a permit or order issued by the Superfund Section or its successor in function may be denied access to the Property for the purpose of conducting such activities.
12. Each person who owns any portion of the Property shall cause the instrument of any sale, lease, grant, or other transfer of any interest in the Property to include a provision expressly requiring the lessee, grantee, or transferee to comply with this Declaration. The failure to include such provision shall not affect the validity or applicability of any land use restriction in this Declaration.

### **REPRESENTATIONS AND WARRANTIES**

The owner of the Property hereby represents and warrants to the other signatories hereto:

that the owner of the Property is the sole owner of the Property holding fee simple title to the

Property free, clear and unencumbered, or that the owner of the Property has provided to the Superfund Section the names of all other persons that own an interest in or hold an encumbrance on the Property and has notified such persons of the owner's intention to enter into this Declaration;

that the owner of the Property has the power and authority to enter into this Declaration, to grant the rights and interests herein provided and to carry out all obligations hereunder;

that this Declaration will not materially violate or contravene or constitute a material default under any other agreement, document or instrument to which the owner of the Property is a party or by which the owner of the Property may be bound or affected.

### **ENFORCEMENT**

The above land use restrictions are an integral part of the remedy for the contamination at the Site. Adherence to the restrictions is necessary to protect public health and the environment. These land use restrictions shall be enforced by any owner, operator, or other party responsible for any part of the Site. The above land use restrictions may also be enforced by the Superfund Section through the remedies provided in N.C.G.S. Chapter 130A, Article 1, Part 2 or by means of a civil action, and may also be enforced by any unit of local government having jurisdiction over any part of the Site. Any attempt to cancel this Declaration without the approval of the Superfund Section or its successor in function shall constitute noncompliance with the Remedial Action Plan approved by the Superfund Section for the Site, and shall be subject to enforcement by the Superfund Section to the full extent of the law. Failure by any party required or authorized to enforce any of the above restrictions shall in no event be deemed a waiver of the right to do so thereafter as to the same violation or as to one occurring prior or subsequent thereto.

### **FUTURE SALES, LEASES, CONVEYANCES AND TRANSFERS**

When any portion of the Property is sold, leased, conveyed or transferred, pursuant to N.C.G.S. Section 130A-310.8(e) the deed or other instrument of transfer shall contain in the description section, in no smaller type than that used in the body of the deed or instrument, a statement that the real property being sold, leased, conveyed, or transferred has been used as a hazardous substance or waste disposal site and a reference by book and page to the recordation of the Notice of Inactive Hazardous Substance or Waste Disposal Site referenced in this Declaration.

**OWNER SIGNATURE**

IN WITNESS WHEREOF, I, exercising power of attorney for Brunswick County Board of Education execute these presents on this \_\_\_ day of \_\_\_\_\_, 20\_\_.

Signatory's name typed or printed: \_\_\_\_\_

Signatory's title typed or printed: \_\_\_\_\_

Signature: \_\_\_\_\_

STATE OF NORTH CAROLINA  
COUNTY OF \_\_\_\_\_

I, \_\_\_\_\_, a Notary Public, do hereby certify that \_\_\_\_\_ personally appeared before me this day, produced proper identification in the form of \_\_\_\_\_, and declared that he *or* she is acting on behalf of Brunswick County Board of Education and that by authority duly given and proven by the power of attorney attached hereto, and as the act of Brunswick County Board of Education he *or* she has signed this Declaration.

WITNESS my hand and official seal this \_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Notary Public

My Commission expires: \_\_\_\_\_

[SEAL]

**APPROVAL AND CERTIFICATION OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY**

The foregoing Declaration of Perpetual Land Use Restrictions is hereby approved and certified.

By: \_\_\_\_\_

Jim Bateson, Chief  
Superfund Section  
Division of Waste Management  
North Carolina Department of Environmental  
Quality

STATE OF NORTH CAROLINA  
COUNTY OF \_\_\_\_\_

I, \_\_\_\_\_, a Notary Public, do hereby certify that  
\_\_\_\_\_ personally appeared before me this day,  
produced proper identification in the form of \_\_\_\_\_, and signed this  
Declaration.

WITNESS my hand and official seal this \_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Notary Public

My Commission expires: \_\_\_\_\_

[SEAL]

**REGISTER OF DEEDS CERTIFICATION**

The foregoing Declaration of Perpetual Land Use Restrictions is certified to be duly recorded at the date and time, and the Book and Page, shown on the first page hereof.

Register of Deeds for Brunswick County

By: \_\_\_\_\_

Signature

\_\_\_\_\_  
Type or print name and title



## **APPENDIX E**





# NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3162-A

**1. WELL CONTRACTOR:**

**Walter Lea Davis**  
 Well Contractor (Individual) Name  
**3D Environmental Investigations L.L.C.**  
 Well Contractor Company Name  
**2157 Mocksville Highway**  
 Street Address  
**statesville** **NC** **28625**  
 City or Town State Zip Code  
**(704) 857-7785**  
 Area code Phone number

**2. WELL INFORMATION:**

WELL CONSTRUCTION PERMIT# \_\_\_\_\_  
 OTHER ASSOCIATED PERMIT#(if applicable) \_\_\_\_\_  
 SITE WELL ID #(if applicable) MU # 3

**3. WELL USE (Check One Box)** Monitoring  Municipal/Public   
 Industrial/Commercial  Agricultural  Recovery  Injection   
 Irrigation  Other  (list use) \_\_\_\_\_  
 DATE DRILLED 8-11-14

**4. WELL LOCATION:**

100 Cougar Dr  
 (Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)  
 CITY: Southport COUNTY \_\_\_\_\_  
 TOPOGRAPHIC / LAND SETTING: (check appropriate box)  
 Slope  Valley  Flat  Ridge  Other \_\_\_\_\_  
 LATITUDE 36 ° ' " DMS OR 3x.xxxxxxxx DD  
 LONGITUDE 75 ° ' " DMS OR 7x.xxxxxxxx DD  
 Latitude/longitude source:  GPS  Topographic map  
 (location of well must be shown on a USGS topo map and attached to this form if not using GPS)

**5. FACILITY (Name of the business where the well is located )**

Facility Name 100 Cougar Dr Facility ID# (if applicable) \_\_\_\_\_  
 Street Address Southport **NC**  
 City or Town State Zip Code  
 Contact Name ECS (Banks?)  
 Mailing Address 6714 Netherlands Drive  
 City or Town Wilmington **NC** 28405  
 State Zip Code  
**(910) 686-9114**  
 Area code Phone number

**6. WELL DETAILS:**

a. TOTAL DEPTH: 15  
 b. DOES WELL REPLACE EXISTING WELL? YES  NO   
 c. WATER LEVEL Below Top of Casing: \_\_\_\_\_ FT.  
 (Use "+" if Above Top of Casing)

d. TOP OF CASING IS 0 FT. Above Land Surface  
 \*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .011E.

e. YIELD (gpm): \_\_\_\_\_ METHOD OF TEST \_\_\_\_\_

f. DISINFECTION: Type \_\_\_\_\_ Amount \_\_\_\_\_

g. WATER ZONES (depth):  
 Top \_\_\_\_\_ Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_  
 Top \_\_\_\_\_ Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_  
 Top \_\_\_\_\_ Bottom \_\_\_\_\_ Top \_\_\_\_\_ Bottom \_\_\_\_\_

7. CASING:	Depth	Diameter	Thickness/Weight	Material
Top	<u>0</u>	<u>2</u> Ft.	<u>sch 40</u>	<u>pvc</u>
Bottom	<u>5</u>			
Top	_____	_____ Ft.	_____	_____
Bottom	_____			

8. GROUT:	Depth	Material	Method
Top	<u>0</u>	<u>cem sand</u>	<u>pour</u>
Bottom	<u>3</u>		
Top	<u>3</u>	<u>Benlate</u>	<u>chips</u>
Bottom	<u>4</u>		
Top	_____	_____	_____
Bottom	_____		

9. SCREEN:	Depth	Diameter	Slot Size	Material
Top	<u>5</u>	<u>2</u> in.	<u>0.10</u> in.	<u>prc</u>
Bottom	<u>15</u>			
Top	_____	_____ in.	_____ in.	_____
Bottom	_____			

10. SAND/GRAVEL PACK:	Depth	Size	Material
Top	<u>4</u>	<u>#2</u>	<u>sand</u>
Bottom	<u>15</u>		
Top	_____	_____	_____
Bottom	_____		

11. DRILLING LOG	Formation Description
Top	_____
Bottom	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

**12. REMARKS:**  
 \_\_\_\_\_  
 \_\_\_\_\_  
 I DO HEREBY CERTIFY THAT THE WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.  
Walter L Davis 8-17-14  
 SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE  
WALTER L DAVIS  
 PRINTED NAME OF PERSON CONSTRUCTING THE WELL



## APPENDIX F

August 22, 2014

Amy Conchas  
ECS  
6714 Netherlands Drive  
Wilmington, NC 28405

RE: Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

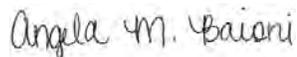
Dear Amy Conchas:

Enclosed are the analytical results for sample(s) received by the laboratory on August 14, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Analyses were performed at the Pace Analytical Services location indicated on the sample analyte page for analysis unless otherwise footnoted.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Angela Baioni  
angela.baioni@pacelabs.com  
Project Manager

Enclosures

cc: Ms. Amy Conchas, ECS  
Brooks Wall, ECS



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## CERTIFICATIONS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

---

### Charlotte Certification IDs

9800 Kincey Ave. Ste 100, Huntersville, NC 28078  
North Carolina Drinking Water Certification #: 37706  
North Carolina Field Services Certification #: 5342  
North Carolina Wastewater Certification #: 12  
South Carolina Certification #: 99006001

Florida/NELAP Certification #: E87627  
Kentucky UST Certification #: 84  
West Virginia Certification #: 357  
Virginia/VELAP Certification #: 460221

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### Asheville Certification IDs

2225 Riverside Dr., Asheville, NC 28804  
Florida/NELAP Certification #: E87648  
Massachusetts Certification #: M-NC030  
North Carolina Drinking Water Certification #: 37712

North Carolina Wastewater Certification #: 40  
South Carolina Certification #: 99030001  
West Virginia Certification #: 356  
Virginia/VELAP Certification #: 460222

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## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92213359001	B-1	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359002	B-1A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359003	B-2	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359004	B-2A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359005	B-3	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359006	B-3A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359007	B-4	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359008	B-4A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359009	B-5	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359010	B-5A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359011	B-6	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359012	B-6A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359013	B-7	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359014	B-7A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359015	B-8	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359016	B-8A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359017	B-9	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359018	B-9A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359019	B-10	EPA 6010	JMW	5	PASI-A

### REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92213359020	B-10A	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A
92213359021	B-11	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A
92213359022	B-11A	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A
92213359023	B-12	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	14	PASI-A
		EPA 7471	HVK	1	PASI-A
92213359024	B-12A	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	14	PASI-A
		EPA 7471	HVK	1	PASI-A
92213359025	B-13	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A
92213359026	B-13A	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A
92213359027	B-14	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A
92213359028	B-14A	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A
92213359029	B-15	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A
92213359030	B-15A	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A
92213359031	B-16	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A
92213359032	B-16A	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A
92213359033	B-17	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A
92213359034	B-17A	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A
92213359035	B-18	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A
92213359036	B-18A	ASTM D2974-87	ACS	1	PASI-C
		EPA 6010	JMW	5	PASI-A

### REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, Inc..

### SAMPLE ANALYTE COUNT

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92213359037	B-19	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359038	B-19A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359039	B-20	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359040	B-20A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359041	B-21	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359042	B-21A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359043	B-22	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359044	B-22A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359045	B-23	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359046	B-23A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359047	B-24	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359048	B-24A	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359049	MW-1	EPA 6010	JMW	14	PASI-A
		EPA 7470	HVK	1	PASI-A
92213359050	MW-2	EPA 6010	JMW	14	PASI-A
		EPA 7470	HVK	1	PASI-A
92213359051	MW-3	EPA 6010	JMW	14	PASI-A
		EPA 7470	HVK	1	PASI-A
92213359052	MW-4	EPA 6010	JMW	14	PASI-A
		EPA 7470	HVK	1	PASI-A
92213359053	RINSATE	EPA 6010	JMW	14	PASI-A
		EPA 7470	HVK	1	PASI-A
92213359054	DUPLICATE SOIL	EPA 6010	JMW	5	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92213359055	DUPLICATE WATER	EPA 6010	JMW	14	PASI-A

### REPORT OF LABORATORY ANALYSIS

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**SAMPLE ANALYTE COUNT**

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 7470	HVK	1	PASI-A

**REPORT OF LABORATORY ANALYSIS**

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## PROJECT NARRATIVE

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

---

**Method:** EPA 6010  
**Description:** 6010 MET ICP  
**Client:** ECS  
**Date:** August 22, 2014

### General Information:

55 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below.

### Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

### Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/16704

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 92213359020

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1266532)
  - Barium
  - Manganese
- MSD (Lab ID: 1266533)
  - Manganese

QC Batch: MPRP/16709

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 92213359040

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1267236)
  - Barium
  - Thallium
- MSD (Lab ID: 1267237)
  - Thallium

### Additional Comments:

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## PROJECT NARRATIVE

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

---

**Method:** EPA 7470

**Description:** 7470 Mercury

**Client:** ECS

**Date:** August 22, 2014

**General Information:**

6 samples were analyzed for EPA 7470. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with EPA 7470 with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Additional Comments:**

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## PROJECT NARRATIVE

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

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**Method:** EPA 7471

**Description:** 7471 Mercury

**Client:** ECS

**Date:** August 22, 2014

**General Information:**

2 samples were analyzed for EPA 7471. All samples were received in acceptable condition with any exceptions noted below.

**Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

**Sample Preparation:**

The samples were prepared in accordance with EPA 7471 with any exceptions noted below.

**Initial Calibrations (including MS Tune as applicable):**

All criteria were within method requirements with any exceptions noted below.

**Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

**Method Blank:**

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

**Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

**Matrix Spikes:**

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

**Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-1**      **Lab ID: 92213359001**      Collected: 08/11/14 11:30      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>16.7</b>	mg/kg	1.0	1	08/18/14 20:00	08/19/14 07:34	7440-38-2	
Barium	<b>82.5</b>	mg/kg	0.51	1	08/18/14 20:00	08/19/14 07:34	7440-39-3	
Cadmium	<b>0.40</b>	mg/kg	0.10	1	08/18/14 20:00	08/19/14 07:34	7440-43-9	
Lead	<b>21.1</b>	mg/kg	0.51	1	08/18/14 20:00	08/19/14 07:34	7439-92-1	
Thallium	ND	mg/kg	1.0	1	08/18/14 20:00	08/19/14 07:34	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>20.4</b>	%	0.10	1		08/15/14 15:45		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-1A**      **Lab ID: 92213359002**      Collected: 08/11/14 11:30      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>2.4</b>	mg/kg	2.1	1	08/18/14 20:00	08/19/14 07:37	7440-38-2	
Barium	<b>7.0</b>	mg/kg	1.1	1	08/18/14 20:00	08/19/14 07:37	7440-39-3	
Cadmium	ND	mg/kg	0.21	1	08/18/14 20:00	08/19/14 07:37	7440-43-9	
Lead	<b>6.5</b>	mg/kg	1.1	1	08/18/14 20:00	08/19/14 07:37	7439-92-1	
Thallium	ND	mg/kg	2.1	1	08/18/14 20:00	08/19/14 07:37	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>58.5</b>	%	0.10	1		08/15/14 15:45		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-2**      **Lab ID: 92213359003**      Collected: 08/11/14 11:40      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>114</b>	mg/kg	1.7	1	08/18/14 20:00	08/19/14 07:40	7440-38-2	
Barium	<b>446</b>	mg/kg	0.86	1	08/18/14 20:00	08/19/14 07:40	7440-39-3	
Cadmium	<b>2.1</b>	mg/kg	0.17	1	08/18/14 20:00	08/19/14 07:40	7440-43-9	
Lead	<b>113</b>	mg/kg	0.86	1	08/18/14 20:00	08/19/14 07:40	7439-92-1	
Thallium	ND	mg/kg	1.7	1	08/18/14 20:00	08/19/14 07:40	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>42.1</b>	%	0.10	1		08/15/14 15:24		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

**Sample: B-2A**      **Lab ID: 92213359004**      Collected: 08/11/14 11:40      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>44.4</b>	mg/kg	1.1	1	08/18/14 20:00	08/19/14 07:43	7440-38-2	
Barium	<b>179</b>	mg/kg	0.56	1	08/18/14 20:00	08/19/14 07:43	7440-39-3	
Cadmium	<b>0.89</b>	mg/kg	0.11	1	08/18/14 20:00	08/19/14 07:43	7440-43-9	
Lead	<b>43.0</b>	mg/kg	0.56	1	08/18/14 20:00	08/19/14 07:43	7439-92-1	
Thallium	ND	mg/kg	1.1	1	08/18/14 20:00	08/19/14 07:43	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>38.5</b>	%	0.10	1		08/15/14 15:25		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-3**      **Lab ID: 92213359005**      Collected: 08/11/14 11:50      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	1.2	1	08/18/14 20:00	08/19/14 07:55	7440-38-2	
Barium	<b>21.5</b>	mg/kg	0.58	1	08/18/14 20:00	08/19/14 07:55	7440-39-3	
Cadmium	ND	mg/kg	0.12	1	08/18/14 20:00	08/19/14 07:55	7440-43-9	
Lead	<b>8.8</b>	mg/kg	0.58	1	08/18/14 20:00	08/19/14 07:55	7439-92-1	
Thallium	ND	mg/kg	1.2	1	08/18/14 20:00	08/19/14 07:55	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>29.4</b>	%	0.10	1		08/15/14 15:25		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-3A**      **Lab ID: 92213359006**      Collected: 08/11/14 11:50      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	1.3	1	08/18/14 20:00	08/19/14 07:58	7440-38-2	
Barium	<b>3.0</b>	mg/kg	0.66	1	08/18/14 20:00	08/19/14 07:58	7440-39-3	
Cadmium	ND	mg/kg	0.13	1	08/18/14 20:00	08/19/14 07:58	7440-43-9	
Lead	<b>4.1</b>	mg/kg	0.66	1	08/18/14 20:00	08/19/14 07:58	7439-92-1	
Thallium	ND	mg/kg	1.3	1	08/18/14 20:00	08/19/14 07:58	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>25.6</b>	%	0.10	1		08/15/14 15:26		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

**Sample: B-4**      **Lab ID: 92213359007**      Collected: 08/11/14 12:00      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	1.2	1	08/18/14 20:00	08/19/14 08:02	7440-38-2	
Barium	<b>5.1</b>	mg/kg	0.59	1	08/18/14 20:00	08/19/14 08:02	7440-39-3	
Cadmium	ND	mg/kg	0.12	1	08/18/14 20:00	08/19/14 08:02	7440-43-9	
Lead	<b>6.7</b>	mg/kg	0.59	1	08/18/14 20:00	08/19/14 08:02	7439-92-1	
Thallium	ND	mg/kg	1.2	1	08/18/14 20:00	08/19/14 08:02	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>16.6</b>	%	0.10	1		08/15/14 15:26		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-4A**      **Lab ID: 92213359008**      Collected: 08/11/14 12:00      Received: 08/14/14 09:15      Matrix: Solid

*Results reported on a "dry-weight" basis*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	1.0	1	08/18/14 20:00	08/19/14 08:05	7440-38-2	
Barium	1.4	mg/kg	0.50	1	08/18/14 20:00	08/19/14 08:05	7440-39-3	
Cadmium	ND	mg/kg	0.10	1	08/18/14 20:00	08/19/14 08:05	7440-43-9	
Lead	3.6	mg/kg	0.50	1	08/18/14 20:00	08/19/14 08:05	7439-92-1	
Thallium	ND	mg/kg	1.0	1	08/18/14 20:00	08/19/14 08:05	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	15.7	%	0.10	1		08/15/14 15:26		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-5**      **Lab ID: 92213359009**      Collected: 08/11/14 12:10      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	0.95	1	08/18/14 20:00	08/19/14 08:08	7440-38-2	
Barium	<b>3.1</b>	mg/kg	0.47	1	08/18/14 20:00	08/19/14 08:08	7440-39-3	
Cadmium	ND	mg/kg	0.095	1	08/18/14 20:00	08/19/14 08:08	7440-43-9	
Lead	<b>4.4</b>	mg/kg	0.47	1	08/18/14 20:00	08/19/14 08:08	7439-92-1	
Thallium	ND	mg/kg	0.95	1	08/18/14 20:00	08/19/14 08:08	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>21.3</b>	%	0.10	1		08/15/14 15:26		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-5A**      **Lab ID: 92213359010**      Collected: 08/11/14 12:10      Received: 08/14/14 09:15      Matrix: Solid

*Results reported on a "dry-weight" basis*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	1.1	1	08/18/14 20:00	08/19/14 08:11	7440-38-2	
Barium	1.5	mg/kg	0.56	1	08/18/14 20:00	08/19/14 08:11	7440-39-3	
Cadmium	ND	mg/kg	0.11	1	08/18/14 20:00	08/19/14 08:11	7440-43-9	
Lead	3.6	mg/kg	0.56	1	08/18/14 20:00	08/19/14 08:11	7439-92-1	
Thallium	ND	mg/kg	1.1	1	08/18/14 20:00	08/19/14 08:11	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	23.7	%	0.10	1		08/15/14 15:27		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-6**      **Lab ID: 92213359011**      Collected: 08/11/14 12:20      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>38.8</b>	mg/kg	1.1	1	08/18/14 20:00	08/19/14 08:14	7440-38-2	
Barium	<b>246</b>	mg/kg	0.54	1	08/18/14 20:00	08/19/14 08:14	7440-39-3	
Cadmium	<b>0.83</b>	mg/kg	0.11	1	08/18/14 20:00	08/19/14 08:14	7440-43-9	
Lead	<b>52.6</b>	mg/kg	0.54	1	08/18/14 20:00	08/19/14 08:14	7439-92-1	
Thallium	ND	mg/kg	1.1	1	08/18/14 20:00	08/19/14 08:14	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>30.6</b>	%	0.10	1		08/15/14 15:27		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-6A**      **Lab ID: 92213359012**      Collected: 08/11/14 12:20      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>34.6</b>	mg/kg	1.3	1	08/18/14 20:00	08/19/14 08:17	7440-38-2	
Barium	<b>204</b>	mg/kg	0.63	1	08/18/14 20:00	08/19/14 08:17	7440-39-3	
Cadmium	<b>0.80</b>	mg/kg	0.13	1	08/18/14 20:00	08/19/14 08:17	7440-43-9	
Lead	<b>41.7</b>	mg/kg	0.63	1	08/18/14 20:00	08/19/14 08:17	7439-92-1	
Thallium	ND	mg/kg	1.3	1	08/18/14 20:00	08/19/14 08:17	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>25.1</b>	%	0.10	1		08/15/14 15:27		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-7**      **Lab ID: 92213359013**      Collected: 08/11/14 12:30      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>49.5</b>	mg/kg	1.2	1	08/18/14 20:00	08/19/14 08:20	7440-38-2	
Barium	<b>205</b>	mg/kg	0.58	1	08/18/14 20:00	08/19/14 08:20	7440-39-3	
Cadmium	<b>0.78</b>	mg/kg	0.12	1	08/18/14 20:00	08/19/14 08:20	7440-43-9	
Lead	<b>46.0</b>	mg/kg	0.58	1	08/18/14 20:00	08/19/14 08:20	7439-92-1	
Thallium	ND	mg/kg	1.2	1	08/18/14 20:00	08/19/14 08:20	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>17.7</b>	%	0.10	1		08/15/14 15:27		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-7A**      **Lab ID: 92213359014**      Collected: 08/11/14 12:30      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>26.0</b>	mg/kg	1.0	1	08/18/14 20:00	08/19/14 08:23	7440-38-2	
Barium	<b>148</b>	mg/kg	0.50	1	08/18/14 20:00	08/19/14 08:23	7440-39-3	
Cadmium	<b>0.49</b>	mg/kg	0.10	1	08/18/14 20:00	08/19/14 08:23	7440-43-9	
Lead	<b>29.9</b>	mg/kg	0.50	1	08/18/14 20:00	08/19/14 08:23	7439-92-1	
Thallium	ND	mg/kg	1.0	1	08/18/14 20:00	08/19/14 08:23	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>22.3</b>	%	0.10	1		08/15/14 15:28		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

**Sample: B-8**      **Lab ID: 92213359015**      Collected: 08/11/14 12:40      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>22.3</b>	mg/kg	0.84	1	08/18/14 20:00	08/19/14 08:35	7440-38-2	
Barium	<b>119</b>	mg/kg	0.42	1	08/18/14 20:00	08/19/14 08:35	7440-39-3	
Cadmium	<b>0.59</b>	mg/kg	0.084	1	08/18/14 20:00	08/19/14 08:35	7440-43-9	
Lead	<b>24.0</b>	mg/kg	0.42	1	08/18/14 20:00	08/19/14 08:35	7439-92-1	
Thallium	ND	mg/kg	0.84	1	08/18/14 20:00	08/19/14 08:35	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>21.0</b>	%	0.10	1		08/15/14 15:28		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-8A**      **Lab ID: 92213359016**      Collected: 08/11/14 12:40      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>34.8</b>	mg/kg	1.2	1	08/18/14 20:00	08/19/14 08:38	7440-38-2	
Barium	<b>158</b>	mg/kg	0.61	1	08/18/14 20:00	08/19/14 08:38	7440-39-3	
Cadmium	<b>0.71</b>	mg/kg	0.12	1	08/18/14 20:00	08/19/14 08:38	7440-43-9	
Lead	<b>34.4</b>	mg/kg	0.61	1	08/18/14 20:00	08/19/14 08:38	7439-92-1	
Thallium	ND	mg/kg	1.2	1	08/18/14 20:00	08/19/14 08:38	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>26.1</b>	%	0.10	1		08/15/14 15:28		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-9**      **Lab ID: 92213359017**      Collected: 08/11/14 12:50      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>47.7</b>	mg/kg	0.86	1	08/18/14 20:00	08/19/14 08:41	7440-38-2	
Barium	<b>186</b>	mg/kg	0.43	1	08/18/14 20:00	08/19/14 08:41	7440-39-3	
Cadmium	<b>0.84</b>	mg/kg	0.086	1	08/18/14 20:00	08/19/14 08:41	7440-43-9	
Lead	<b>45.6</b>	mg/kg	0.43	1	08/18/14 20:00	08/19/14 08:41	7439-92-1	
Thallium	<b>1.4</b>	mg/kg	0.86	1	08/18/14 20:00	08/19/14 08:41	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>23.1</b>	%	0.10	1		08/15/14 15:28		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-9A**      **Lab ID: 92213359018**      Collected: 08/11/14 12:50      Received: 08/14/14 09:15      Matrix: Solid

*Results reported on a "dry-weight" basis*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>44.1</b>	mg/kg	1.2	1	08/18/14 20:00	08/19/14 08:44	7440-38-2	
Barium	<b>181</b>	mg/kg	0.58	1	08/18/14 20:00	08/19/14 08:44	7440-39-3	
Cadmium	<b>0.78</b>	mg/kg	0.12	1	08/18/14 20:00	08/19/14 08:44	7440-43-9	
Lead	<b>47.7</b>	mg/kg	0.58	1	08/18/14 20:00	08/19/14 08:44	7439-92-1	
Thallium	<b>1.5</b>	mg/kg	1.2	1	08/18/14 20:00	08/19/14 08:44	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>21.2</b>	%	0.10	1		08/15/14 15:29		

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### ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

**Sample: B-10**      **Lab ID: 92213359019**      Collected: 08/11/14 13:00      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>70.1</b>	mg/kg	1.0	1	08/18/14 20:00	08/19/14 08:47	7440-38-2	
Barium	<b>206</b>	mg/kg	0.52	1	08/18/14 20:00	08/19/14 08:47	7440-39-3	
Cadmium	<b>1.2</b>	mg/kg	0.10	1	08/18/14 20:00	08/19/14 08:47	7440-43-9	
Lead	<b>55.4</b>	mg/kg	0.52	1	08/18/14 20:00	08/19/14 08:47	7439-92-1	
Thallium	ND	mg/kg	1.0	1	08/18/14 20:00	08/19/14 08:47	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>17.6</b>	%	0.10	1		08/15/14 15:29		

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### ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-10A**      **Lab ID: 92213359020**      Collected: 08/11/14 13:00      Received: 08/14/14 09:15      Matrix: Solid

*Results reported on a "dry-weight" basis*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>64.9</b>	mg/kg	1.3	1	08/18/14 21:45	08/20/14 01:04	7440-38-2	
Barium	<b>280</b>	mg/kg	0.65	1	08/18/14 21:45	08/20/14 01:04	7440-39-3	M1
Cadmium	<b>1.0</b>	mg/kg	0.13	1	08/18/14 21:45	08/20/14 01:04	7440-43-9	
Lead	<b>66.4</b>	mg/kg	0.65	1	08/18/14 21:45	08/20/14 01:04	7439-92-1	
Thallium	ND	mg/kg	1.3	1	08/18/14 21:45	08/20/14 01:04	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>25.8</b>	%	0.10	1		08/15/14 15:29		

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### ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-11**      **Lab ID: 92213359021**      Collected: 08/11/14 13:10      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>33.0</b>	mg/kg	1.3	1	08/18/14 21:45	08/20/14 01:13	7440-38-2	
Barium	<b>215</b>	mg/kg	0.65	1	08/18/14 21:45	08/20/14 01:13	7440-39-3	
Cadmium	<b>0.92</b>	mg/kg	0.13	1	08/18/14 21:45	08/20/14 01:13	7440-43-9	
Lead	<b>51.6</b>	mg/kg	0.65	1	08/18/14 21:45	08/20/14 01:13	7439-92-1	
Thallium	ND	mg/kg	1.3	1	08/18/14 21:45	08/20/14 01:13	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>23.2</b>	%	0.10	1		08/15/14 15:29		

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### ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-11A**      **Lab ID: 92213359022**      Collected: 08/11/14 13:10      Received: 08/14/14 09:15      Matrix: Solid

*Results reported on a "dry-weight" basis*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>28.7</b>	mg/kg	1.2	1	08/18/14 21:45	08/20/14 01:16	7440-38-2	
Barium	<b>190</b>	mg/kg	0.61	1	08/18/14 21:45	08/20/14 01:16	7440-39-3	
Cadmium	<b>0.44</b>	mg/kg	0.12	1	08/18/14 21:45	08/20/14 01:16	7440-43-9	
Lead	<b>38.9</b>	mg/kg	0.61	1	08/18/14 21:45	08/20/14 01:16	7439-92-1	
Thallium	ND	mg/kg	1.2	1	08/18/14 21:45	08/20/14 01:16	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>20.3</b>	%	0.10	1		08/15/14 15:30		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-12**      **Lab ID: 92213359023**      Collected: 08/11/14 13:20      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Antimony	2.6	mg/kg	0.42	1	08/18/14 21:45	08/20/14 01:19	7440-36-0	
Arsenic	66.1	mg/kg	0.84	1	08/18/14 21:45	08/20/14 01:19	7440-38-2	
Beryllium	6.2	mg/kg	0.084	1	08/18/14 21:45	08/20/14 01:19	7440-41-7	
Cadmium	1.4	mg/kg	0.084	1	08/18/14 21:45	08/20/14 01:19	7440-43-9	
Chromium	15.1	mg/kg	0.42	1	08/18/14 21:45	08/20/14 01:19	7440-47-3	
Copper	73.4	mg/kg	0.42	1	08/18/14 21:45	08/20/14 01:19	7440-50-8	
Lead	56.4	mg/kg	0.42	1	08/18/14 21:45	08/20/14 01:19	7439-92-1	
Magnesium	277	mg/kg	8.4	1	08/18/14 21:45	08/20/14 01:19	7439-95-4	
Manganese	19.0	mg/kg	0.42	1	08/18/14 21:45	08/20/14 01:19	7439-96-5	
Nickel	27.1	mg/kg	0.42	1	08/18/14 21:45	08/20/14 01:19	7440-02-0	
Selenium	19.7	mg/kg	0.84	1	08/18/14 21:45	08/20/14 01:19	7782-49-2	
Silver	ND	mg/kg	0.42	1	08/18/14 21:45	08/20/14 01:19	7440-22-4	
Thallium	ND	mg/kg	0.84	1	08/18/14 21:45	08/20/14 01:19	7440-28-0	
Zinc	73.0	mg/kg	0.84	1	08/18/14 21:45	08/20/14 01:19	7440-66-6	
<b>7471 Mercury</b>		Analytical Method: EPA 7471    Preparation Method: EPA 7471						
Mercury	0.49	mg/kg	0.042	10	08/19/14 17:45	08/21/14 17:16	7439-97-6	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	24.5	%	0.10	1		08/15/14 15:32		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-12A**      **Lab ID: 92213359024**      Collected: 08/11/14 13:20      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Antimony	2.6	mg/kg	0.61	1	08/18/14 21:45	08/20/14 01:22	7440-36-0	
Arsenic	82.9	mg/kg	1.2	1	08/18/14 21:45	08/20/14 01:22	7440-38-2	
Beryllium	7.0	mg/kg	0.12	1	08/18/14 21:45	08/20/14 01:22	7440-41-7	
Cadmium	1.3	mg/kg	0.12	1	08/18/14 21:45	08/20/14 01:22	7440-43-9	
Chromium	19.9	mg/kg	0.61	1	08/18/14 21:45	08/20/14 01:22	7440-47-3	
Copper	88.5	mg/kg	0.61	1	08/18/14 21:45	08/20/14 01:22	7440-50-8	
Lead	70.3	mg/kg	0.61	1	08/18/14 21:45	08/20/14 01:22	7439-92-1	
Magnesium	371	mg/kg	12.2	1	08/18/14 21:45	08/20/14 01:22	7439-95-4	
Manganese	14.3	mg/kg	0.61	1	08/18/14 21:45	08/20/14 01:22	7439-96-5	
Nickel	22.4	mg/kg	0.61	1	08/18/14 21:45	08/20/14 01:22	7440-02-0	
Selenium	18.0	mg/kg	1.2	1	08/18/14 21:45	08/20/14 01:22	7782-49-2	
Silver	ND	mg/kg	0.61	1	08/18/14 21:45	08/20/14 01:22	7440-22-4	
Thallium	ND	mg/kg	1.2	1	08/18/14 21:45	08/20/14 01:22	7440-28-0	
Zinc	55.7	mg/kg	1.2	1	08/18/14 21:45	08/20/14 01:22	7440-66-6	
<b>7471 Mercury</b>		Analytical Method: EPA 7471    Preparation Method: EPA 7471						
Mercury	0.43	mg/kg	0.061	10	08/19/14 17:45	08/21/14 16:52	7439-97-6	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	25.5	%	0.10	1		08/15/14 15:33		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

**Sample: B-13**      **Lab ID: 92213359025**      Collected: 08/11/14 13:30      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>43.1</b>	mg/kg	1.1	1	08/18/14 21:45	08/20/14 01:25	7440-38-2	
Barium	<b>193</b>	mg/kg	0.54	1	08/18/14 21:45	08/20/14 01:25	7440-39-3	
Cadmium	<b>0.79</b>	mg/kg	0.11	1	08/18/14 21:45	08/20/14 01:25	7440-43-9	
Lead	<b>45.4</b>	mg/kg	0.54	1	08/18/14 21:45	08/20/14 01:25	7439-92-1	
Thallium	ND	mg/kg	1.1	1	08/18/14 21:45	08/20/14 01:25	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>24.2</b>	%	0.10	1		08/15/14 15:33		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

**Sample: B-13A**      **Lab ID: 92213359026**      Collected: 08/11/14 13:30      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>48.7</b>	mg/kg	1.2	1	08/18/14 21:45	08/20/14 01:28	7440-38-2	
Barium	<b>244</b>	mg/kg	0.58	1	08/18/14 21:45	08/20/14 01:28	7440-39-3	
Cadmium	<b>1.0</b>	mg/kg	0.12	1	08/18/14 21:45	08/20/14 01:28	7440-43-9	
Lead	<b>54.0</b>	mg/kg	0.58	1	08/18/14 21:45	08/20/14 01:28	7439-92-1	
Thallium	ND	mg/kg	1.2	1	08/18/14 21:45	08/20/14 01:28	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>25.1</b>	%	0.10	1		08/15/14 15:33		

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### ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-14**      **Lab ID: 92213359027**      Collected: 08/11/14 13:40      Received: 08/14/14 09:15      Matrix: Solid

*Results reported on a "dry-weight" basis*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>37.8</b>	mg/kg	1.2	1	08/18/14 21:45	08/20/14 01:41	7440-38-2	
Barium	<b>193</b>	mg/kg	0.60	1	08/18/14 21:45	08/20/14 01:41	7440-39-3	
Cadmium	<b>0.59</b>	mg/kg	0.12	1	08/18/14 21:45	08/20/14 01:41	7440-43-9	
Lead	<b>41.5</b>	mg/kg	0.60	1	08/18/14 21:45	08/20/14 01:41	7439-92-1	
Thallium	ND	mg/kg	1.2	1	08/18/14 21:45	08/20/14 01:41	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>22.5</b>	%	0.10	1		08/15/14 15:33		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-14A**      **Lab ID: 92213359028**      Collected: 08/11/14 13:40      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>56.2</b>	mg/kg	1.3	1	08/18/14 21:45	08/20/14 01:44	7440-38-2	
Barium	<b>228</b>	mg/kg	0.67	1	08/18/14 21:45	08/20/14 01:44	7440-39-3	
Cadmium	<b>1.2</b>	mg/kg	0.13	1	08/18/14 21:45	08/20/14 01:44	7440-43-9	
Lead	<b>51.4</b>	mg/kg	0.67	1	08/18/14 21:45	08/20/14 01:44	7439-92-1	
Thallium	ND	mg/kg	1.3	1	08/18/14 21:45	08/20/14 01:44	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>30.6</b>	%	0.10	1		08/15/14 15:33		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-15**      **Lab ID: 92213359029**      Collected: 08/11/14 13:50      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	1.1	1	08/18/14 21:45	08/20/14 01:47	7440-38-2	
Barium	<b>10.6</b>	mg/kg	0.53	1	08/18/14 21:45	08/20/14 01:47	7440-39-3	
Cadmium	ND	mg/kg	0.11	1	08/18/14 21:45	08/20/14 01:47	7440-43-9	
Lead	<b>6.5</b>	mg/kg	0.53	1	08/18/14 21:45	08/20/14 01:47	7439-92-1	
Thallium	ND	mg/kg	1.1	1	08/18/14 21:45	08/20/14 01:47	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>17.1</b>	%	0.10	1		08/15/14 15:34		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-15A**      **Lab ID: 92213359030**      Collected: 08/11/14 13:50      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	0.93	1	08/18/14 21:45	08/20/14 01:50	7440-38-2	
Barium	1.4	mg/kg	0.47	1	08/18/14 21:45	08/20/14 01:50	7440-39-3	
Cadmium	ND	mg/kg	0.093	1	08/18/14 21:45	08/20/14 01:50	7440-43-9	
Lead	3.6	mg/kg	0.47	1	08/18/14 21:45	08/20/14 01:50	7439-92-1	
Thallium	ND	mg/kg	0.93	1	08/18/14 21:45	08/20/14 01:50	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	15.1	%	0.10	1		08/15/14 15:34		

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### ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-16**      **Lab ID: 92213359031**      Collected: 08/11/14 14:00      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	0.90	1	08/18/14 21:45	08/20/14 01:53	7440-38-2	
Barium	<b>4.4</b>	mg/kg	0.45	1	08/18/14 21:45	08/20/14 01:53	7440-39-3	
Cadmium	ND	mg/kg	0.090	1	08/18/14 21:45	08/20/14 01:53	7440-43-9	
Lead	<b>5.1</b>	mg/kg	0.45	1	08/18/14 21:45	08/20/14 01:53	7439-92-1	
Thallium	ND	mg/kg	0.90	1	08/18/14 21:45	08/20/14 01:53	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>18.7</b>	%	0.10	1		08/15/14 15:34		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-16A**      **Lab ID: 92213359032**      Collected: 08/11/14 14:00      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	1.2	1	08/18/14 21:45	08/20/14 01:56	7440-38-2	
Barium	<b>1.0</b>	mg/kg	0.61	1	08/18/14 21:45	08/20/14 01:56	7440-39-3	
Cadmium	ND	mg/kg	0.12	1	08/18/14 21:45	08/20/14 01:56	7440-43-9	
Lead	<b>3.2</b>	mg/kg	0.61	1	08/18/14 21:45	08/20/14 01:56	7439-92-1	
Thallium	ND	mg/kg	1.2	1	08/18/14 21:45	08/20/14 01:56	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>20.7</b>	%	0.10	1		08/15/14 15:34		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-17**      **Lab ID: 92213359033**      Collected: 08/11/14 15:00      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>2.4</b>	mg/kg	1.1	1	08/18/14 21:45	08/20/14 01:59	7440-38-2	
Barium	<b>28.9</b>	mg/kg	0.55	1	08/18/14 21:45	08/20/14 01:59	7440-39-3	
Cadmium	ND	mg/kg	0.11	1	08/18/14 21:45	08/20/14 01:59	7440-43-9	
Lead	<b>10.4</b>	mg/kg	0.55	1	08/18/14 21:45	08/20/14 01:59	7439-92-1	
Thallium	ND	mg/kg	1.1	1	08/18/14 21:45	08/20/14 01:59	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>17.6</b>	%	0.10	1		08/15/14 15:35		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-17A**      **Lab ID: 92213359034**      Collected: 08/11/14 15:00      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	0.95	1	08/18/14 21:45	08/20/14 02:02	7440-38-2	
Barium	<b>5.4</b>	mg/kg	0.48	1	08/18/14 21:45	08/20/14 02:02	7440-39-3	
Cadmium	ND	mg/kg	0.095	1	08/18/14 21:45	08/20/14 02:02	7440-43-9	
Lead	<b>4.5</b>	mg/kg	0.48	1	08/18/14 21:45	08/20/14 02:02	7439-92-1	
Thallium	ND	mg/kg	0.95	1	08/18/14 21:45	08/20/14 02:02	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>18.0</b>	%	0.10	1		08/15/14 15:35		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-18**      **Lab ID: 92213359035**      Collected: 08/11/14 15:10      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>46.9</b>	mg/kg	1.1	1	08/18/14 21:45	08/20/14 02:06	7440-38-2	
Barium	<b>220</b>	mg/kg	0.56	1	08/18/14 21:45	08/20/14 02:06	7440-39-3	
Cadmium	<b>0.60</b>	mg/kg	0.11	1	08/18/14 21:45	08/20/14 02:06	7440-43-9	
Lead	<b>43.7</b>	mg/kg	0.56	1	08/18/14 21:45	08/20/14 02:06	7439-92-1	
Thallium	ND	mg/kg	1.1	1	08/18/14 21:45	08/20/14 02:06	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>17.8</b>	%	0.10	1		08/15/14 15:35		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-18A**      **Lab ID: 92213359036**      Collected: 08/11/14 15:10      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>60.9</b>	mg/kg	1.2	1	08/18/14 21:45	08/20/14 02:09	7440-38-2	
Barium	<b>329</b>	mg/kg	0.62	1	08/18/14 21:45	08/20/14 02:09	7440-39-3	
Cadmium	<b>1.9</b>	mg/kg	0.12	1	08/18/14 21:45	08/20/14 02:09	7440-43-9	
Lead	<b>70.2</b>	mg/kg	0.62	1	08/18/14 21:45	08/20/14 02:09	7439-92-1	
Thallium	ND	mg/kg	1.2	1	08/18/14 21:45	08/20/14 02:09	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>29.8</b>	%	0.10	1		08/15/14 15:35		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-19**      **Lab ID: 92213359037**      Collected: 08/11/14 15:20      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>41.5</b>	mg/kg	1.0	1	08/18/14 21:45	08/20/14 02:21	7440-38-2	
Barium	<b>225</b>	mg/kg	0.50	1	08/18/14 21:45	08/20/14 02:21	7440-39-3	
Cadmium	<b>0.55</b>	mg/kg	0.10	1	08/18/14 21:45	08/20/14 02:21	7440-43-9	
Lead	<b>39.1</b>	mg/kg	0.50	1	08/18/14 21:45	08/20/14 02:21	7439-92-1	
Thallium	ND	mg/kg	1.0	1	08/18/14 21:45	08/20/14 02:21	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>18.6</b>	%	0.10	1		08/15/14 15:35		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-19A**      **Lab ID: 92213359038**      Collected: 08/11/14 15:20      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>36.0</b>	mg/kg	1.9	1	08/18/14 21:45	08/20/14 02:24	7440-38-2	
Barium	<b>201</b>	mg/kg	0.95	1	08/18/14 21:45	08/20/14 02:24	7440-39-3	
Cadmium	<b>0.65</b>	mg/kg	0.19	1	08/18/14 21:45	08/20/14 02:24	7440-43-9	
Lead	<b>47.8</b>	mg/kg	0.95	1	08/18/14 21:45	08/20/14 02:24	7439-92-1	
Thallium	ND	mg/kg	1.9	1	08/18/14 21:45	08/20/14 02:24	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>56.3</b>	%	0.10	1		08/15/14 15:35		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-20**      **Lab ID: 92213359039**      Collected: 08/11/14 15:30      Received: 08/14/14 09:15      Matrix: Solid

*Results reported on a "dry-weight" basis*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>18.7</b>	mg/kg	1.7	1	08/18/14 21:45	08/20/14 02:27	7440-38-2	
Barium	<b>154</b>	mg/kg	0.87	1	08/18/14 21:45	08/20/14 02:27	7440-39-3	
Cadmium	<b>0.51</b>	mg/kg	0.17	1	08/18/14 21:45	08/20/14 02:27	7440-43-9	
Lead	<b>23.8</b>	mg/kg	0.87	1	08/18/14 21:45	08/20/14 02:27	7439-92-1	
Thallium	ND	mg/kg	1.7	1	08/18/14 21:45	08/20/14 02:27	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>46.6</b>	%	0.10	1		08/15/14 15:36		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-20A**      **Lab ID: 92213359040**      Collected: 08/11/14 15:30      Received: 08/14/14 09:15      Matrix: Solid

*Results reported on a "dry-weight" basis*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>67.6</b>	mg/kg	2.0	1	08/19/14 16:30	08/20/14 16:29	7440-38-2	
Barium	<b>333</b>	mg/kg	1.0	1	08/19/14 16:30	08/20/14 16:29	7440-39-3	M1
Cadmium	<b>1.3</b>	mg/kg	0.20	1	08/19/14 16:30	08/20/14 16:29	7440-43-9	
Lead	<b>60.8</b>	mg/kg	1.0	1	08/19/14 16:30	08/20/14 16:29	7439-92-1	
Thallium	ND	mg/kg	2.0	1	08/19/14 16:30	08/20/14 16:29	7440-28-0	M1
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>53.8</b>	%	0.10	1		08/15/14 15:36		

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### ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-21**      **Lab ID: 92213359041**      Collected: 08/11/14 15:40      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>4.3</b>	mg/kg	1.4	1	08/19/14 16:30	08/20/14 16:38	7440-38-2	
Barium	<b>21.6</b>	mg/kg	0.72	1	08/19/14 16:30	08/20/14 16:38	7440-39-3	
Cadmium	ND	mg/kg	0.14	1	08/19/14 16:30	08/20/14 16:38	7440-43-9	
Lead	<b>10.0</b>	mg/kg	0.72	1	08/19/14 16:30	08/20/14 16:38	7439-92-1	
Thallium	ND	mg/kg	1.4	1	08/19/14 16:30	08/20/14 16:38	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>37.6</b>	%	0.10	1		08/15/14 15:36		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-21A**      **Lab ID: 92213359042**      Collected: 08/11/14 15:40      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	1.2	1	08/19/14 16:30	08/20/14 16:41	7440-38-2	
Barium	<b>5.4</b>	mg/kg	0.62	1	08/19/14 16:30	08/20/14 16:41	7440-39-3	
Cadmium	ND	mg/kg	0.12	1	08/19/14 16:30	08/20/14 16:41	7440-43-9	
Lead	<b>1.7</b>	mg/kg	0.62	1	08/19/14 16:30	08/20/14 16:41	7439-92-1	
Thallium	ND	mg/kg	1.2	1	08/19/14 16:30	08/20/14 16:41	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>31.0</b>	%	0.10	1		08/15/14 15:36		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-22**      **Lab ID: 92213359043**      Collected: 08/11/14 15:50      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>28.5</b>	mg/kg	0.87	1	08/19/14 16:30	08/20/14 16:44	7440-38-2	
Barium	<b>164</b>	mg/kg	0.44	1	08/19/14 16:30	08/20/14 16:44	7440-39-3	
Cadmium	<b>0.55</b>	mg/kg	0.087	1	08/19/14 16:30	08/20/14 16:44	7440-43-9	
Lead	<b>29.5</b>	mg/kg	0.44	1	08/19/14 16:30	08/20/14 16:44	7439-92-1	
Thallium	ND	mg/kg	0.87	1	08/19/14 16:30	08/20/14 16:44	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>16.9</b>	%	0.10	1		08/18/14 15:38		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-22A**      **Lab ID: 92213359044**      Collected: 08/11/14 15:50      Received: 08/14/14 09:15      Matrix: Solid

*Results reported on a "dry-weight" basis*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>35.9</b>	mg/kg	1.3	1	08/19/14 16:30	08/20/14 16:47	7440-38-2	
Barium	<b>339</b>	mg/kg	0.64	1	08/19/14 16:30	08/20/14 16:47	7440-39-3	
Cadmium	<b>0.77</b>	mg/kg	0.13	1	08/19/14 16:30	08/20/14 16:47	7440-43-9	
Lead	<b>65.8</b>	mg/kg	0.64	1	08/19/14 16:30	08/20/14 16:47	7439-92-1	
Thallium	ND	mg/kg	1.3	1	08/19/14 16:30	08/20/14 16:47	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>25.1</b>	%	0.10	1		08/18/14 15:38		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-23**      **Lab ID: 92213359045**      Collected: 08/11/14 16:00      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>34.4</b>	mg/kg	0.96	1	08/19/14 16:30	08/20/14 17:00	7440-38-2	
Barium	<b>165</b>	mg/kg	0.48	1	08/19/14 16:30	08/20/14 17:00	7440-39-3	
Cadmium	<b>0.59</b>	mg/kg	0.096	1	08/19/14 16:30	08/20/14 17:00	7440-43-9	
Lead	<b>32.1</b>	mg/kg	0.48	1	08/19/14 16:30	08/20/14 17:00	7439-92-1	
Thallium	ND	mg/kg	0.96	1	08/19/14 16:30	08/20/14 17:00	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>17.6</b>	%	0.10	1		08/18/14 15:38		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-23A**      **Lab ID: 92213359046**      Collected: 08/11/14 16:00      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>48.3</b>	mg/kg	1.3	1	08/19/14 16:30	08/20/14 17:03	7440-38-2	
Barium	<b>272</b>	mg/kg	0.63	1	08/19/14 16:30	08/20/14 17:03	7440-39-3	
Cadmium	<b>1.1</b>	mg/kg	0.13	1	08/19/14 16:30	08/20/14 17:03	7440-43-9	
Lead	<b>63.6</b>	mg/kg	0.63	1	08/19/14 16:30	08/20/14 17:03	7439-92-1	
Thallium	ND	mg/kg	1.3	1	08/19/14 16:30	08/20/14 17:03	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>46.1</b>	%	0.10	1		08/18/14 15:38		

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

**Sample: B-24**      **Lab ID: 92213359047**      Collected: 08/11/14 16:10      Received: 08/14/14 09:15      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>113</b>	mg/kg	2.3	1	08/19/14 16:30	08/20/14 17:06	7440-38-2	
Barium	<b>527</b>	mg/kg	1.2	1	08/19/14 16:30	08/20/14 17:06	7440-39-3	
Cadmium	<b>1.8</b>	mg/kg	0.23	1	08/19/14 16:30	08/20/14 17:06	7440-43-9	
Lead	<b>105</b>	mg/kg	1.2	1	08/19/14 16:30	08/20/14 17:06	7439-92-1	
Thallium	ND	mg/kg	2.3	1	08/19/14 16:30	08/20/14 17:06	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>57.7</b>	%	0.10	1		08/18/14 15:38		

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### ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: B-24A**      **Lab ID: 92213359048**      Collected: 08/11/14 16:10      Received: 08/14/14 09:15      Matrix: Solid

*Results reported on a "dry-weight" basis*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>41.2</b>	mg/kg	1.0	1	08/19/14 16:30	08/20/14 17:09	7440-38-2	
Barium	<b>186</b>	mg/kg	0.50	1	08/19/14 16:30	08/20/14 17:09	7440-39-3	
Cadmium	<b>0.77</b>	mg/kg	0.10	1	08/19/14 16:30	08/20/14 17:09	7440-43-9	
Lead	<b>39.3</b>	mg/kg	0.50	1	08/19/14 16:30	08/20/14 17:09	7439-92-1	
Thallium	ND	mg/kg	1.0	1	08/19/14 16:30	08/20/14 17:09	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>18.4</b>	%	0.10	1		08/18/14 15:39		

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### ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>Sample: MW-1</b>								
<b>Lab ID: 92213359049</b>								
Collected: 08/13/14 11:00 Received: 08/14/14 09:15 Matrix: Water								
<b>6010 MET ICP</b>								
Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Antimony	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:18	7440-36-0	
Arsenic	ND	ug/L	10.0	1	08/18/14 19:05	08/19/14 23:18	7440-38-2	
Beryllium	ND	ug/L	1.0	1	08/18/14 19:05	08/19/14 23:18	7440-41-7	
Cadmium	ND	ug/L	1.0	1	08/18/14 19:05	08/19/14 23:18	7440-43-9	
Chromium	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:18	7440-47-3	
Copper	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:18	7440-50-8	
Lead	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:18	7439-92-1	
Magnesium	<b>996</b>	ug/L	100	1	08/18/14 19:05	08/19/14 23:18	7439-95-4	
Manganese	<b>18.0</b>	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:18	7439-96-5	
Nickel	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:18	7440-02-0	
Selenium	ND	ug/L	10.0	1	08/18/14 19:05	08/19/14 23:18	7782-49-2	
Silver	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:18	7440-22-4	
Thallium	ND	ug/L	10.0	1	08/18/14 19:05	08/19/14 23:18	7440-28-0	
Zinc	<b>16.4</b>	ug/L	10.0	1	08/18/14 19:05	08/19/14 23:18	7440-66-6	
<b>7470 Mercury</b>								
Analytical Method: EPA 7470 Preparation Method: EPA 7470								
Mercury	ND	ug/L	0.20	1	08/16/14 14:10	08/21/14 15:10	7439-97-6	

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

Sample: MW-2	Lab ID: 92213359050	Collected: 08/13/14 11:30	Received: 08/14/14 09:15	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010 Preparation Method: EPA 3010						
Antimony	10.8 ug/L		5.0	1	08/18/14 19:05	08/19/14 23:27	7440-36-0	
Arsenic	115 ug/L		10.0	1	08/18/14 19:05	08/19/14 23:27	7440-38-2	
Beryllium	2.2 ug/L		1.0	1	08/18/14 19:05	08/19/14 23:27	7440-41-7	
Cadmium	1.2 ug/L		1.0	1	08/18/14 19:05	08/19/14 23:27	7440-43-9	
Chromium	13.5 ug/L		5.0	1	08/18/14 19:05	08/19/14 23:27	7440-47-3	
Copper	21.7 ug/L		5.0	1	08/18/14 19:05	08/19/14 23:27	7440-50-8	
Lead	22.8 ug/L		5.0	1	08/18/14 19:05	08/19/14 23:27	7439-92-1	
Magnesium	9880 ug/L		100	1	08/18/14 19:05	08/19/14 23:27	7439-95-4	
Manganese	128 ug/L		5.0	1	08/18/14 19:05	08/19/14 23:27	7439-96-5	
Nickel	35.0 ug/L		5.0	1	08/18/14 19:05	08/19/14 23:27	7440-02-0	
Selenium	ND ug/L		10.0	1	08/18/14 19:05	08/19/14 23:27	7782-49-2	
Silver	ND ug/L		5.0	1	08/18/14 19:05	08/19/14 23:27	7440-22-4	
Thallium	ND ug/L		10.0	1	08/18/14 19:05	08/19/14 23:27	7440-28-0	
Zinc	54.5 ug/L		10.0	1	08/18/14 19:05	08/19/14 23:27	7440-66-6	
<b>7470 Mercury</b>		Analytical Method: EPA 7470 Preparation Method: EPA 7470						
Mercury	ND ug/L		0.20	1	08/16/14 14:10	08/21/14 15:18	7439-97-6	

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### ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

Sample: MW-3		Lab ID: 92213359051	Collected: 08/13/14 12:00	Received: 08/14/14 09:15	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010 Preparation Method: EPA 3010						
Antimony	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:40	7440-36-0	
Arsenic	ND	ug/L	10.0	1	08/18/14 19:05	08/19/14 23:40	7440-38-2	
Beryllium	ND	ug/L	1.0	1	08/18/14 19:05	08/19/14 23:40	7440-41-7	
Cadmium	ND	ug/L	1.0	1	08/18/14 19:05	08/19/14 23:40	7440-43-9	
Chromium	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:40	7440-47-3	
Copper	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:40	7440-50-8	
Lead	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:40	7439-92-1	
Magnesium	<b>13000</b>	ug/L	100	1	08/18/14 19:05	08/19/14 23:40	7439-95-4	
Manganese	<b>134</b>	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:40	7439-96-5	
Nickel	<b>13.4</b>	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:40	7440-02-0	
Selenium	ND	ug/L	10.0	1	08/18/14 19:05	08/19/14 23:40	7782-49-2	
Silver	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:40	7440-22-4	
Thallium	ND	ug/L	10.0	1	08/18/14 19:05	08/19/14 23:40	7440-28-0	
Zinc	<b>39.8</b>	ug/L	10.0	1	08/18/14 19:05	08/19/14 23:40	7440-66-6	
<b>7470 Mercury</b>		Analytical Method: EPA 7470 Preparation Method: EPA 7470						
Mercury	ND	ug/L	0.20	1	08/16/14 14:10	08/21/14 15:20	7439-97-6	

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

Sample: MW-4	Lab ID: 92213359052	Collected: 08/13/14 12:30	Received: 08/14/14 09:15	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010 Preparation Method: EPA 3010						
Antimony	ND ug/L		5.0	1	08/18/14 19:05	08/19/14 23:43	7440-36-0	
Arsenic	<b>11.8</b> ug/L		10.0	1	08/18/14 19:05	08/19/14 23:43	7440-38-2	
Beryllium	ND ug/L		1.0	1	08/18/14 19:05	08/19/14 23:43	7440-41-7	
Cadmium	ND ug/L		1.0	1	08/18/14 19:05	08/19/14 23:43	7440-43-9	
Chromium	ND ug/L		5.0	1	08/18/14 19:05	08/19/14 23:43	7440-47-3	
Copper	ND ug/L		5.0	1	08/18/14 19:05	08/19/14 23:43	7440-50-8	
Lead	ND ug/L		5.0	1	08/18/14 19:05	08/19/14 23:43	7439-92-1	
Magnesium	<b>8570</b> ug/L		100	1	08/18/14 19:05	08/19/14 23:43	7439-95-4	
Manganese	<b>257</b> ug/L		5.0	1	08/18/14 19:05	08/19/14 23:43	7439-96-5	
Nickel	<b>13.2</b> ug/L		5.0	1	08/18/14 19:05	08/19/14 23:43	7440-02-0	
Selenium	ND ug/L		10.0	1	08/18/14 19:05	08/19/14 23:43	7782-49-2	
Silver	ND ug/L		5.0	1	08/18/14 19:05	08/19/14 23:43	7440-22-4	
Thallium	ND ug/L		10.0	1	08/18/14 19:05	08/19/14 23:43	7440-28-0	
Zinc	<b>25.2</b> ug/L		10.0	1	08/18/14 19:05	08/19/14 23:43	7440-66-6	
<b>7470 Mercury</b>		Analytical Method: EPA 7470 Preparation Method: EPA 7470						
Mercury	ND ug/L		0.20	1	08/16/14 14:10	08/21/14 15:23	7439-97-6	

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

<b>Sample: RINSATE</b>		<b>Lab ID: 92213359053</b>	Collected: 08/11/14 16:00	Received: 08/14/14 09:15	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010 Preparation Method: EPA 3010						
Antimony	ND ug/L		5.0	1	08/18/14 19:05	08/19/14 23:46	7440-36-0	
Arsenic	<b>33.3</b> ug/L		10.0	1	08/18/14 19:05	08/19/14 23:46	7440-38-2	
Beryllium	<b>3.7</b> ug/L		1.0	1	08/18/14 19:05	08/19/14 23:46	7440-41-7	
Cadmium	ND ug/L		1.0	1	08/18/14 19:05	08/19/14 23:46	7440-43-9	
Chromium	<b>113</b> ug/L		5.0	1	08/18/14 19:05	08/19/14 23:46	7440-47-3	
Copper	<b>66.4</b> ug/L		5.0	1	08/18/14 19:05	08/19/14 23:46	7440-50-8	
Lead	<b>32.5</b> ug/L		5.0	1	08/18/14 19:05	08/19/14 23:46	7439-92-1	
Magnesium	<b>5120</b> ug/L		100	1	08/18/14 19:05	08/19/14 23:46	7439-95-4	
Manganese	<b>106</b> ug/L		5.0	1	08/18/14 19:05	08/19/14 23:46	7439-96-5	
Nickel	<b>34.3</b> ug/L		5.0	1	08/18/14 19:05	08/19/14 23:46	7440-02-0	
Selenium	ND ug/L		10.0	1	08/18/14 19:05	08/19/14 23:46	7782-49-2	
Silver	ND ug/L		5.0	1	08/18/14 19:05	08/19/14 23:46	7440-22-4	
Thallium	ND ug/L		10.0	1	08/18/14 19:05	08/19/14 23:46	7440-28-0	
Zinc	<b>61.7</b> ug/L		10.0	1	08/18/14 19:05	08/19/14 23:46	7440-66-6	
<b>7470 Mercury</b>		Analytical Method: EPA 7470 Preparation Method: EPA 7470						
Mercury	ND ug/L		0.20	1	08/16/14 14:10	08/21/14 15:26	7439-97-6	

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## ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

**Sample: DUPLICATE SOIL**      **Lab ID: 92213359054**      Collected: 08/11/14 00:00      Received: 08/14/14 09:15      Matrix: Solid

*Results reported on a "dry-weight" basis*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	<b>11.4</b>	mg/kg	0.85	1	08/19/14 16:30	08/20/14 17:12	7440-38-2	
Barium	<b>68.6</b>	mg/kg	0.42	1	08/19/14 16:30	08/20/14 17:12	7440-39-3	
Cadmium	<b>0.24</b>	mg/kg	0.085	1	08/19/14 16:30	08/20/14 17:12	7440-43-9	
Lead	<b>19.5</b>	mg/kg	0.42	1	08/19/14 16:30	08/20/14 17:12	7439-92-1	
Thallium	ND	mg/kg	0.85	1	08/19/14 16:30	08/20/14 17:12	7440-28-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>15.5</b>	%	0.10	1		08/18/14 15:39		

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### ANALYTICAL RESULTS

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

<b>Sample: DUPLICATE WATER</b>		<b>Lab ID: 92213359055</b>	Collected: 08/13/14 00:00	Received: 08/14/14 09:15	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010 Preparation Method: EPA 3010						
Antimony	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:49	7440-36-0	
Arsenic	ND	ug/L	10.0	1	08/18/14 19:05	08/19/14 23:49	7440-38-2	
Beryllium	ND	ug/L	1.0	1	08/18/14 19:05	08/19/14 23:49	7440-41-7	
Cadmium	ND	ug/L	1.0	1	08/18/14 19:05	08/19/14 23:49	7440-43-9	
Chromium	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:49	7440-47-3	
Copper	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:49	7440-50-8	
Lead	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:49	7439-92-1	
Magnesium	<b>954</b>	ug/L	100	1	08/18/14 19:05	08/19/14 23:49	7439-95-4	
Manganese	<b>17.7</b>	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:49	7439-96-5	
Nickel	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:49	7440-02-0	
Selenium	ND	ug/L	10.0	1	08/18/14 19:05	08/19/14 23:49	7782-49-2	
Silver	ND	ug/L	5.0	1	08/18/14 19:05	08/19/14 23:49	7440-22-4	
Thallium	ND	ug/L	10.0	1	08/18/14 19:05	08/19/14 23:49	7440-28-0	
Zinc	<b>17.4</b>	ug/L	10.0	1	08/18/14 19:05	08/19/14 23:49	7440-66-6	
<b>7470 Mercury</b>		Analytical Method: EPA 7470 Preparation Method: EPA 7470						
Mercury	ND	ug/L	0.20	1	08/16/14 14:10	08/21/14 15:28	7439-97-6	

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### QUALITY CONTROL DATA

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

QC Batch: MERP/6976 Analysis Method: EPA 7470  
QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury  
Associated Lab Samples: 92213359049, 92213359050, 92213359051, 92213359052, 92213359053, 92213359055

METHOD BLANK: 1265918 Matrix: Water  
Associated Lab Samples: 92213359049, 92213359050, 92213359051, 92213359052, 92213359053, 92213359055

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	08/21/14 14:43	

LABORATORY CONTROL SAMPLE: 1265919

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	2.5	2.4	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1265920 1265921

Parameter	Units	92213336001 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	RPD	Qual
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits		
Mercury	ug/L	ND	2.5	2.5	2.3	2.3	90	92	75-125	2	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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### QUALITY CONTROL DATA

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

QC Batch: MERP/6984 Analysis Method: EPA 7471  
QC Batch Method: EPA 7471 Analysis Description: 7471 Mercury  
Associated Lab Samples: 92213359023, 92213359024

METHOD BLANK: 1267390 Matrix: Solid  
Associated Lab Samples: 92213359023, 92213359024

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	ND	0.0050	08/21/14 16:19	

LABORATORY CONTROL SAMPLE: 1267391

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.067	0.060	90	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1267392 1267393

Parameter	Units	35149073002		MSD		MS		MSD		% Rec Limits	RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	% Rec	% Rec				
Mercury	mg/kg	0.010	.038	.042	0.044	0.044	90	80	75-125	1		

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### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

QC Batch:	MPRP/16701	Analysis Method:	EPA 6010
QC Batch Method:	EPA 3050	Analysis Description:	6010 MET
Associated Lab Samples:	92213359001, 92213359002, 92213359003, 92213359004, 92213359005, 92213359006, 92213359007, 92213359008, 92213359009, 92213359010, 92213359011, 92213359012, 92213359013, 92213359014, 92213359015, 92213359016, 92213359017, 92213359018, 92213359019		

METHOD BLANK:	1266519	Matrix:	Solid
Associated Lab Samples:	92213359001, 92213359002, 92213359003, 92213359004, 92213359005, 92213359006, 92213359007, 92213359008, 92213359009, 92213359010, 92213359011, 92213359012, 92213359013, 92213359014, 92213359015, 92213359016, 92213359017, 92213359018, 92213359019		

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	1.0	08/19/14 07:19	
Barium	mg/kg	ND	0.50	08/19/14 07:19	
Cadmium	mg/kg	ND	0.10	08/19/14 07:19	
Lead	mg/kg	ND	0.50	08/19/14 07:19	
Thallium	mg/kg	ND	1.0	08/19/14 07:19	

LABORATORY CONTROL SAMPLE: 1266520						
Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	50	51.0	102	80-120	
Barium	mg/kg	50	52.6	105	80-120	
Cadmium	mg/kg	50	51.4	103	80-120	
Lead	mg/kg	50	51.6	103	80-120	
Thallium	mg/kg	50	50.0	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1266521											1266522		
Parameter	Units	92213668001		MS	MSD	MS	MSD	MS	MSD	% Rec	Limits	RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec				
Arsenic	mg/kg	ND	53.1	53.1	53.1	54.3	55.4	102	104	75-125		2	
Barium	mg/kg	6.2	53.1	53.1	53.1	61.4	62.1	104	105	75-125		1	
Cadmium	mg/kg	ND	53.1	53.1	53.1	54.2	55.0	102	104	75-125		2	
Lead	mg/kg	ND	53.1	53.1	53.1	54.2	55.4	101	104	75-125		2	
Thallium	mg/kg	ND	53.1	53.1	53.1	46.2	46.3	87	87	75-125		0	

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### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

QC Batch: MPRP/16704 Analysis Method: EPA 6010  
QC Batch Method: EPA 3050 Analysis Description: 6010 MET  
Associated Lab Samples: 92213359020, 92213359021, 92213359022, 92213359023, 92213359024, 92213359025, 92213359026, 92213359027, 92213359028, 92213359029, 92213359030, 92213359031, 92213359032, 92213359033, 92213359034, 92213359035, 92213359036, 92213359037, 92213359038, 92213359039

METHOD BLANK: 1266530 Matrix: Solid  
Associated Lab Samples: 92213359020, 92213359021, 92213359022, 92213359023, 92213359024, 92213359025, 92213359026, 92213359027, 92213359028, 92213359029, 92213359030, 92213359031, 92213359032, 92213359033, 92213359034, 92213359035, 92213359036, 92213359037, 92213359038, 92213359039

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/kg	ND	0.50	08/20/14 00:49	
Arsenic	mg/kg	ND	1.0	08/20/14 00:49	
Barium	mg/kg	ND	0.50	08/20/14 00:49	
Beryllium	mg/kg	ND	0.10	08/20/14 00:49	
Cadmium	mg/kg	ND	0.10	08/20/14 00:49	
Chromium	mg/kg	ND	0.50	08/20/14 00:49	
Copper	mg/kg	ND	0.50	08/20/14 00:49	
Lead	mg/kg	ND	0.50	08/20/14 00:49	
Magnesium	mg/kg	ND	10.0	08/20/14 00:49	
Manganese	mg/kg	ND	0.50	08/20/14 00:49	
Nickel	mg/kg	ND	0.50	08/20/14 00:49	
Selenium	mg/kg	ND	1.0	08/20/14 00:49	
Silver	mg/kg	ND	0.50	08/20/14 00:49	
Thallium	mg/kg	ND	1.0	08/20/14 00:49	
Zinc	mg/kg	ND	1.0	08/20/14 00:49	

LABORATORY CONTROL SAMPLE: 1266531

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/kg	50	53.4	107	80-120	
Arsenic	mg/kg	50	51.3	103	80-120	
Barium	mg/kg	50	53.1	106	80-120	
Beryllium	mg/kg	50	53.8	108	80-120	
Cadmium	mg/kg	50	53.8	108	80-120	
Chromium	mg/kg	50	52.6	105	80-120	
Copper	mg/kg	50	52.0	104	80-120	
Lead	mg/kg	50	53.4	107	80-120	
Magnesium	mg/kg	500	535	107	80-120	
Manganese	mg/kg	50	51.4	103	80-120	
Nickel	mg/kg	50	51.5	103	80-120	
Selenium	mg/kg	50	52.5	105	80-120	
Silver	mg/kg	25	25.8	103	80-120	
Thallium	mg/kg	50	50.7	101	80-120	
Zinc	mg/kg	50	52.0	104	80-120	

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### QUALITY CONTROL DATA

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

Parameter	Units	92213359020		MS		MSD		MS		MSD		% Rec	Limits	RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec							
Antimony	mg/kg	4.2	67.4	67.4	58.0	57.2	80	79	75-125	1					
Arsenic	mg/kg	64.9	67.4	67.4	132	122	100	85	75-125	8					
Barium	mg/kg	280	67.4	67.4	395	356	171	114	75-125	10 M1					
Beryllium	mg/kg	7.6	67.4	67.4	72.1	71.3	96	95	75-125	1					
Cadmium	mg/kg	1.0	67.4	67.4	62.6	62.8	91	92	75-125	0					
Chromium	mg/kg	17.8	67.4	67.4	82.3	80.7	96	93	75-125	2					
Copper	mg/kg	103	67.4	67.4	186	173	123	104	75-125	7					
Lead	mg/kg	66.4	67.4	67.4	141	132	110	97	75-125	6					
Magnesium	mg/kg	260	67.4	67.4	949	941	102	101	75-125	1					
Manganese	mg/kg	46.5	67.4	67.4	77.3	80.8	46	51	75-125	4 M1					
Nickel	mg/kg	27.6	67.4	67.4	87.7	89.6	89	92	75-125	2					
Selenium	mg/kg	3.9	67.4	67.4	61.6	61.6	86	86	75-125	0					
Silver	mg/kg	ND	33.7	33.7	30.0	30.1	89	89	75-125	0					
Thallium	mg/kg	ND	67.4	67.4	51.2	53.2	75	77	75-125	4					
Zinc	mg/kg	51.9	67.4	67.4	119	117	100	96	75-125	2					

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### QUALITY CONTROL DATA

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

QC Batch: MPRP/16709 Analysis Method: EPA 6010  
 QC Batch Method: EPA 3050 Analysis Description: 6010 MET  
 Associated Lab Samples: 92213359040, 92213359041, 92213359042, 92213359043, 92213359044, 92213359045, 92213359046, 92213359047, 92213359048, 92213359054

METHOD BLANK: 1267234 Matrix: Solid  
 Associated Lab Samples: 92213359040, 92213359041, 92213359042, 92213359043, 92213359044, 92213359045, 92213359046, 92213359047, 92213359048, 92213359054

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	1.0	08/20/14 16:23	
Barium	mg/kg	ND	0.50	08/20/14 16:23	
Cadmium	mg/kg	ND	0.10	08/20/14 16:23	
Lead	mg/kg	ND	0.50	08/20/14 16:23	
Thallium	mg/kg	ND	1.0	08/20/14 16:23	

LABORATORY CONTROL SAMPLE: 1267235

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	50	50.4	101	80-120	
Barium	mg/kg	50	51.7	103	80-120	
Cadmium	mg/kg	50	51.3	103	80-120	
Lead	mg/kg	50	50.5	101	80-120	
Thallium	mg/kg	50	49.8	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1267236 1267237

Parameter	Units	MS		MSD		MS		MSD		% Rec Limits	RPD	Qual
		Spike Conc.	Result	Spike Conc.	Result	% Rec	% Rec					
Arsenic	mg/kg	98.4	67.6	95	162	96	86	75-125	8			
Barium	mg/kg	98.4	333	95	510	180	116	75-125	14	M1		
Cadmium	mg/kg	98.4	1.3	95	88.0	88	89	75-125	2			
Lead	mg/kg	98.4	60.8	95	152	93	90	75-125	4			
Thallium	mg/kg	98.4	ND	95	63.7	64	65	75-125	3	M1		

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### QUALITY CONTROL DATA

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

QC Batch: MPRP/16699 Analysis Method: EPA 6010  
QC Batch Method: EPA 3010 Analysis Description: 6010 MET  
Associated Lab Samples: 92213359049, 92213359050, 92213359051, 92213359052, 92213359053, 92213359055

METHOD BLANK: 1266503 Matrix: Water  
Associated Lab Samples: 92213359049, 92213359050, 92213359051, 92213359052, 92213359053, 92213359055

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	ND	5.0	08/19/14 23:12	
Arsenic	ug/L	ND	10.0	08/19/14 23:12	
Beryllium	ug/L	ND	1.0	08/19/14 23:12	
Cadmium	ug/L	ND	1.0	08/19/14 23:12	
Chromium	ug/L	ND	5.0	08/19/14 23:12	
Copper	ug/L	ND	5.0	08/19/14 23:12	
Lead	ug/L	ND	5.0	08/19/14 23:12	
Magnesium	ug/L	ND	100	08/19/14 23:12	
Manganese	ug/L	ND	5.0	08/19/14 23:12	
Nickel	ug/L	ND	5.0	08/19/14 23:12	
Selenium	ug/L	ND	10.0	08/19/14 23:12	
Silver	ug/L	ND	5.0	08/19/14 23:12	
Thallium	ug/L	ND	10.0	08/19/14 23:12	
Zinc	ug/L	ND	10.0	08/19/14 23:12	

LABORATORY CONTROL SAMPLE: 1266504

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	527	105	80-120	
Arsenic	ug/L	500	506	101	80-120	
Beryllium	ug/L	500	530	106	80-120	
Cadmium	ug/L	500	527	105	80-120	
Chromium	ug/L	500	520	104	80-120	
Copper	ug/L	500	517	103	80-120	
Lead	ug/L	500	524	105	80-120	
Magnesium	ug/L	5000	5190	104	80-120	
Manganese	ug/L	500	510	102	80-120	
Nickel	ug/L	500	509	102	80-120	
Selenium	ug/L	500	519	104	80-120	
Silver	ug/L	250	252	101	80-120	
Thallium	ug/L	500	501	100	80-120	
Zinc	ug/L	500	511	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1266505 1266506

Parameter	Units	92213359049 Result	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
			Spike Conc.	MS Result	MSD Spike Conc.	MSD Result					
Antimony	ug/L	ND	500	517	500	519	103	104	75-125	0	

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### QUALITY CONTROL DATA

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

Parameter	92213359049		MS		MSD		MS		MSD		% Rec	Limits	RPD	Qual
	Units	Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec						
Arsenic	ug/L	ND	500	500	503	501	100	99	75-125	0				
Beryllium	ug/L	ND	500	500	527	529	105	106	75-125	0				
Cadmium	ug/L	ND	500	500	521	527	104	105	75-125	1				
Chromium	ug/L	ND	500	500	519	528	104	105	75-125	2				
Copper	ug/L	ND	500	500	511	514	102	103	75-125	1				
Lead	ug/L	ND	500	500	512	520	102	104	75-125	2				
Magnesium	ug/L	996	5000	5000	6160	6250	103	105	75-125	1				
Manganese	ug/L	18.0	500	500	524	530	101	103	75-125	1				
Nickel	ug/L	ND	500	500	501	508	100	101	75-125	1				
Selenium	ug/L	ND	500	500	504	508	100	101	75-125	1				
Silver	ug/L	ND	250	250	249	250	99	100	75-125	1				
Thallium	ug/L	ND	500	500	486	495	97	99	75-125	2				
Zinc	ug/L	16.4	500	500	520	530	101	103	75-125	2				

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### QUALITY CONTROL DATA

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

QC Batch: PMST/6930

Analysis Method: ASTM D2974-87

QC Batch Method: ASTM D2974-87

Analysis Description: Dry Weight/Percent Moisture

Associated Lab Samples: 92213359001, 92213359002

SAMPLE DUPLICATE: 1264847

Parameter	Units	92213359001 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	20.4	21.2	4	

SAMPLE DUPLICATE: 1264848

Parameter	Units	92213369020 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	16.3	17.0	4	

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## QUALIFIERS

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Acid preservation may not be appropriate for 2-Chloroethylvinyl ether, Styrene, and Vinyl chloride.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### LABORATORIES

PASI-A Pace Analytical Services - Asheville

PASI-C Pace Analytical Services - Charlotte

### ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92213359001	B-1	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359002	B-1A	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359003	B-2	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359004	B-2A	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359005	B-3	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359006	B-3A	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359007	B-4	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359008	B-4A	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359009	B-5	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359010	B-5A	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359011	B-6	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359012	B-6A	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359013	B-7	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359014	B-7A	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359015	B-8	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359016	B-8A	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359017	B-9	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359018	B-9A	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359019	B-10	EPA 3050	MPRP/16701	EPA 6010	ICP/15072
92213359020	B-10A	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359021	B-11	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359022	B-11A	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359023	B-12	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359024	B-12A	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359025	B-13	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359026	B-13A	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359027	B-14	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359028	B-14A	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359029	B-15	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359030	B-15A	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359031	B-16	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359032	B-16A	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359033	B-17	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359034	B-17A	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359035	B-18	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359036	B-18A	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359037	B-19	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359038	B-19A	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359039	B-20	EPA 3050	MPRP/16704	EPA 6010	ICP/15078
92213359040	B-20A	EPA 3050	MPRP/16709	EPA 6010	ICP/15084
92213359041	B-21	EPA 3050	MPRP/16709	EPA 6010	ICP/15084
92213359042	B-21A	EPA 3050	MPRP/16709	EPA 6010	ICP/15084
92213359043	B-22	EPA 3050	MPRP/16709	EPA 6010	ICP/15084
92213359044	B-22A	EPA 3050	MPRP/16709	EPA 6010	ICP/15084
92213359045	B-23	EPA 3050	MPRP/16709	EPA 6010	ICP/15084
92213359046	B-23A	EPA 3050	MPRP/16709	EPA 6010	ICP/15084
92213359047	B-24	EPA 3050	MPRP/16709	EPA 6010	ICP/15084
92213359048	B-24A	EPA 3050	MPRP/16709	EPA 6010	ICP/15084

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Brunswick Co Schools 22-19741B

Pace Project No.: 92213359

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92213359054	DUPLICATE SOIL	EPA 3050	MPRP/16709	EPA 6010	ICP/15084
92213359049	MW-1	EPA 3010	MPRP/16699	EPA 6010	ICP/15080
92213359050	MW-2	EPA 3010	MPRP/16699	EPA 6010	ICP/15080
92213359051	MW-3	EPA 3010	MPRP/16699	EPA 6010	ICP/15080
92213359052	MW-4	EPA 3010	MPRP/16699	EPA 6010	ICP/15080
92213359053	RINSATE	EPA 3010	MPRP/16699	EPA 6010	ICP/15080
92213359055	DUPLICATE WATER	EPA 3010	MPRP/16699	EPA 6010	ICP/15080
92213359049	MW-1	EPA 7470	MERP/6976	EPA 7470	MERC/6715
92213359050	MW-2	EPA 7470	MERP/6976	EPA 7470	MERC/6715
92213359051	MW-3	EPA 7470	MERP/6976	EPA 7470	MERC/6715
92213359052	MW-4	EPA 7470	MERP/6976	EPA 7470	MERC/6715
92213359053	RINSATE	EPA 7470	MERP/6976	EPA 7470	MERC/6715
92213359055	DUPLICATE WATER	EPA 7470	MERP/6976	EPA 7470	MERC/6715
92213359023	B-12	EPA 7471	MERP/6984	EPA 7471	MERC/6722
92213359024	B-12A	EPA 7471	MERP/6984	EPA 7471	MERC/6722
92213359001	B-1	ASTM D2974-87	PMST/6930		
92213359002	B-1A	ASTM D2974-87	PMST/6930		
92213359003	B-2	ASTM D2974-87	PMST/6931		
92213359004	B-2A	ASTM D2974-87	PMST/6931		
92213359005	B-3	ASTM D2974-87	PMST/6931		
92213359006	B-3A	ASTM D2974-87	PMST/6931		
92213359007	B-4	ASTM D2974-87	PMST/6931		
92213359008	B-4A	ASTM D2974-87	PMST/6931		
92213359009	B-5	ASTM D2974-87	PMST/6931		
92213359010	B-5A	ASTM D2974-87	PMST/6931		
92213359011	B-6	ASTM D2974-87	PMST/6931		
92213359012	B-6A	ASTM D2974-87	PMST/6931		
92213359013	B-7	ASTM D2974-87	PMST/6931		
92213359014	B-7A	ASTM D2974-87	PMST/6931		
92213359015	B-8	ASTM D2974-87	PMST/6931		
92213359016	B-8A	ASTM D2974-87	PMST/6931		
92213359017	B-9	ASTM D2974-87	PMST/6931		
92213359018	B-9A	ASTM D2974-87	PMST/6931		
92213359019	B-10	ASTM D2974-87	PMST/6931		
92213359020	B-10A	ASTM D2974-87	PMST/6931		
92213359021	B-11	ASTM D2974-87	PMST/6931		
92213359022	B-11A	ASTM D2974-87	PMST/6931		
92213359023	B-12	ASTM D2974-87	PMST/6932		
92213359024	B-12A	ASTM D2974-87	PMST/6932		
92213359025	B-13	ASTM D2974-87	PMST/6932		
92213359026	B-13A	ASTM D2974-87	PMST/6932		
92213359027	B-14	ASTM D2974-87	PMST/6932		
92213359028	B-14A	ASTM D2974-87	PMST/6932		
92213359029	B-15	ASTM D2974-87	PMST/6932		
92213359030	B-15A	ASTM D2974-87	PMST/6932		
92213359031	B-16	ASTM D2974-87	PMST/6932		

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Brunswick Co Schools 22-19741B  
Pace Project No.: 92213359

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92213359032	B-16A	ASTM D2974-87	PMST/6932		
92213359033	B-17	ASTM D2974-87	PMST/6932		
92213359034	B-17A	ASTM D2974-87	PMST/6932		
92213359035	B-18	ASTM D2974-87	PMST/6932		
92213359036	B-18A	ASTM D2974-87	PMST/6932		
92213359037	B-19	ASTM D2974-87	PMST/6932		
92213359038	B-19A	ASTM D2974-87	PMST/6932		
92213359039	B-20	ASTM D2974-87	PMST/6932		
92213359040	B-20A	ASTM D2974-87	PMST/6932		
92213359041	B-21	ASTM D2974-87	PMST/6932		
92213359042	B-21A	ASTM D2974-87	PMST/6932		
92213359043	B-22	ASTM D2974-87	PMST/6933		
92213359044	B-22A	ASTM D2974-87	PMST/6933		
92213359045	B-23	ASTM D2974-87	PMST/6933		
92213359046	B-23A	ASTM D2974-87	PMST/6933		
92213359047	B-24	ASTM D2974-87	PMST/6933		
92213359048	B-24A	ASTM D2974-87	PMST/6933		
92213359054	DUPLICATE SOIL	ASTM D2974-87	PMST/6933		

### REPORT OF LABORATORY ANALYSIS

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Document Name: **Sample Condition Upon Receipt (SCUR)**

Document Number:

Issuing Authority:

F-CHR-CS-003-rev.14

Pace Huntersville Quality Office

Client Name: ECS Cabinets

Courier:  Fed Ex  UPS  USPS  Client  Commercial  Pace Other   
Custody Seal on Cooler/Box Present:  yes  no Seals intact:  yes  no

Optional:  
Proj. Due Date:  
Proj. Name:

Packing Material:  Bubble Wrap  Bubble Bags  None  Other \_\_\_\_\_  
Thermometer Used: IR Gun T1102  T1401 Type of Ice:  Wet  Blue  None  Samples on ice, cooling process has begun

Temp Correction Factor T1102: No Correction T1301: No Correction

Corrected Cooler Temp.: 1.8 °C Biological Tissue is Frozen: Yes  No  N/A

Date and Initials of person examining contents: 8/14/14

Temp should be above freezing to 6°C

Comments:

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	10. Sample #5 p12 - Sample #7 p13 received broken
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix:		
All containers needing preservation have been checked.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation. exceptions: VOA, coliform, TOC, O&G, Wt-DRO (water)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples checked for dechlorination:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	16.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution:

Field Data Required?

Y / N

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

SCURF Review: AMB Date: 8-14-14  
SRF Review: RA Date: 8/14/14

Place label here

WO#: 92213359



92213359

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)





# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 3 of 5  
**1837719**

**Section A**  
Required Client Information:

Company: BCS CAROLINAS  
Address: ILM NC  
Email To: Amy Conikas  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Requested Due Date/TAT: STANDARD

**Section B**  
Required Project Information:

Report To: Amy  
Copy To: Brooks  
Purchase Order No.: \_\_\_\_\_  
Project Name: BCoS  
Project Number: 22-19741B

**Section C**  
Invoice Information:

Attention: Amy  
Company Name: BCS  
Address: ILM NC  
Pace Quote Reference: \_\_\_\_\_  
Pace Project Manager: \_\_\_\_\_  
Pace Profile #: \_\_\_\_\_

**REGULATORY AGENCY**

NPDES  GROUND WATER  DRINKING WATER  
 UST  RCRA  OTHER \_\_\_\_\_

Site Location: \_\_\_\_\_  
STATE: NC

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives								Analysis Test Y/N <u>6010</u>	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
					COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	HCl	NaOH	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Methanol	Other				
					DATE	TIME	DATE	TIME														
1	B-13		SL	S			8-11	1330	1										025			
2	B-13A							1330											026			
3	B-14							1340											027			
4	B-14A							1340											028			
5	B-15							1350											029			
6	B-15A							1350											030			
7	B-16							1400											031			
8	B-16A							1400											032			
9	B-17							1500											033			
10	B-17A							1500											034			
11	B-18							1510											035			
12	B-18A							1510											036			

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS							
	<u>KBSW/BCS</u>	<u>8-13</u>	<u>1500</u>	<u>J. M. [Signature]</u>	<u>8/13</u>	<u>1545</u>								
				<u>A. W. [Signature]</u>	<u>8/14/14</u>	<u>0915</u>	<u>1.8</u>	<u>Y</u>	<u>N</u>	<u>Y</u>	<u>Y</u>	<u>Y</u>	<u>Y</u>	<u>Y</u>

**ORIGINAL**

**SAMPLER NAME AND SIGNATURE**

PRINT Name of SAMPLER: Brooks Wolf  
SIGNATURE of SAMPLER: [Signature]  
DATE Signed (MM/DD/YY): 8-13-14

Temp in °C: \_\_\_\_\_  
Received on Ice (Y/N): \_\_\_\_\_  
Custody Sealed Cooler (Y/N): \_\_\_\_\_  
Samples intact (Y/N): \_\_\_\_\_

\*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 4 of 5  
**1837720**

**Section A**

Required Client Information:

Company: ECs LABORATORIES  
Address: ILM NC  
Email To: Amy WALKERS  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Requested Due Date/TAT: SCANADIPS

**Section B**

Required Project Information:

Report To: Amy  
Copy To: Brooks  
Purchase Order No.: \_\_\_\_\_  
Project Name: Brunswick Co Schools  
Project Number: \_\_\_\_\_

**Section C**

Invoice Information:

Attention: Amy  
Company Name: ECs  
Address: ILM, NC  
Pace Quote Reference: \_\_\_\_\_  
Pace Project Manager: \_\_\_\_\_  
Pace Profile #: \_\_\_\_\_

**REGULATORY AGENCY**

NPDES  GROUND WATER  DRINKING WATER  
 UST  RCRA  OTHER \_\_\_\_\_

Site Location

STATE: NC

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives							Analysis Test ↓ Analysis Test ↓	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.	
					COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	HCl	NaOH	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Methanol				Other
					DATE	TIME	DATE	TIME													
1	B-19		SL	G			8-11	1520	1										037		
2	B-19A							1520											038		
3	B-20							1530											039		
4	B-20A							1540											040		
5	B-21							1540											041		
6	B-21A							1540											042		
7	B-22							1550											043		
8	B-22A							1550											044		
9	B-23							1600											045		
10	B-23A							1600											046		
11	B-24							1610											047		
12	B-24A							1610											048		

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	<u>KSW / ECs</u>	<u>8-13</u>	<u>1500</u>	<u>J. Moore</u>	<u>8/13</u>	<u>1545</u>	
				<u>Z.A. Pace</u>	<u>8/14/14</u>	<u>0915</u>	<u>1.8 y n y</u>

ORIGINAL

**SAMPLER NAME AND SIGNATURE**

PRINT Name of SAMPLER: Brooks Walk

SIGNATURE of SAMPLER: [Signature] DATE Signed (MM/DD/YY): 8-13-2014

Temp in °C \_\_\_\_\_  
Received on Ice (Y/N) \_\_\_\_\_  
Custody Sealed Cooler (Y/N) \_\_\_\_\_  
Samples Intact (Y/N) \_\_\_\_\_

\*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

### CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 5 of 5  
**1837721**

<b>Section A</b> Required Client Information:		<b>Section B</b> Required Project Information:		<b>Section C</b> Invoice Information:	
Company: <u>ECS CAROLINA</u>		Report To: <u>Amy</u>		Attention: <u>Amy Conchas</u>	
Address: <u>WILMINGTON NC</u>		Copy To: <u>Brooks</u>		Company Name: <u>ECS</u>	
Email To: <u>Amy CONCHAS</u>		Purchase Order No.:		Address: <u>ILM NC</u>	
Phone: _____ Fax: _____		Project Name: <u>Brunswick Co. Schools</u>		Pace Quote Reference:	
Requested Due Date/TAT: <u>SCANUANG</u>		Project Number: <u>22-19741</u>		Pace Project Manager:	
				Pace Profile #:	
				REGULATORY AGENCY	
				<input type="checkbox"/> NPDES <input checked="" type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER _____	
				Site Location: <u>NC</u>	
				STATE: _____	

ITEM #	SAMPLE ID (A-Z, 0-9 / . -) Sample IDs MUST BE UNIQUE	Matrix Codes MATRIX / CODE Drinking Water DW Water WT Waste Water WW Product P Soil/Solid SL Oil OL Wipe WP Air AR Tissue TS Other OT	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives							Analysis Test Y/N	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.	
					COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	HCl	NaOH	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	Methanol				Other
					DATE	TIME	DATE	TIME													
1	MW-1		WT				8-13	1100	1										049		
2	MW-2		WT				8-13	1130	1										050		
3	MW-3		WT				8-13	1200	1										051		
4	MW-4		WT				8-13	1230	1										052		
5	RWSAFE		WT				8-11	1600	1										053		
6	Duplicate Soil		SC				8-11		1										054		
7	Duplicate H <sub>2</sub> O		WT				8-13		1										055		
8																					
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	<u>KBR / ECS</u>	<u>8-13</u>	<u>1500</u>	<u>[Signature]</u>	<u>8/13/14</u>	<u>0915</u>	<u>1.8</u>	<u>Y</u>	<u>N</u>	<u>Y</u>
				<u>[Signature]</u>	<u>8/14/14</u>	<u>0915</u>				

**ORIGINAL**

SAMPLER NAME AND SIGNATURE		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: <u>Brooks Wolf</u>					
SIGNATURE of SAMPLER: <u>[Signature]</u>	DATE Signed (MM/DD/YY): <u>8-13-2014</u>				

October 15, 2014

Amy Conchas  
ECS  
6714 Netherlands Drive  
Wilmington, NC 28405

RE: Project: Brunswick Co School 19741B  
Pace Project No.: 92221078

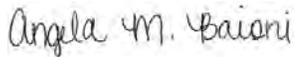
Dear Amy Conchas:

Enclosed are the analytical results for sample(s) received by the laboratory on October 11, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Analyses were performed at the Pace Analytical Services location indicated on the sample analyte page for analysis unless otherwise footnoted.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Angela Baioni  
angela.baioni@pacelabs.com  
Project Manager

Enclosures

cc: Ms. Amy Conchas, ECS  
Brooks Wall, ECS



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: Brunswick Co School 19741B

Pace Project No.: 92221078

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### Charlotte Certification IDs

9800 Kinsey Ave. Ste 100, Huntersville, NC 28078  
North Carolina Drinking Water Certification #: 37706  
North Carolina Field Services Certification #: 5342  
North Carolina Wastewater Certification #: 12  
South Carolina Certification #: 99006001

Florida/NELAP Certification #: E87627  
Kentucky UST Certification #: 84  
West Virginia Certification #: 357  
Virginia/VELAP Certification #: 460221

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### Asheville Certification IDs

2225 Riverside Dr., Asheville, NC 28804  
Florida/NELAP Certification #: E87648  
Massachusetts Certification #: M-NC030  
North Carolina Drinking Water Certification #: 37712

North Carolina Wastewater Certification #: 40  
South Carolina Certification #: 99030001  
West Virginia Certification #: 356  
Virginia/VELAP Certification #: 460222

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## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: Brunswick Co School 19741B

Pace Project No.: 92221078

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92221078001	MW-2	EPA 6010	JMW	5	PASI-A
92221078002	MW-3	EPA 6010	JMW	1	PASI-A
92221078003	MW-4	EPA 6010	JMW	2	PASI-A
92221078004	SUPPLY WELL	EPA 6010	JMW	5	PASI-A
92221078005	B-1	EPA 6010	JMW	1	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92221078006	B-2	EPA 6010	JMW	1	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92221078007	B-3	EPA 6010	JMW	1	PASI-A
		ASTM D2974-87	ACS	1	PASI-C
92221078008	B-4	EPA 6010	JMW	1	PASI-A
		ASTM D2974-87	ACS	1	PASI-C

### REPORT OF LABORATORY ANALYSIS

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### SUMMARY OF DETECTION

Project: Brunswick Co School 19741B

Pace Project No.: 92221078

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
<b>92221078001</b>	<b>MW-2</b>					
EPA 6010	Arsenic	62.9 ug/L		10.0	10/14/14 19:20	
EPA 6010	Lead	14.6 ug/L		5.0	10/14/14 19:20	
EPA 6010	Manganese	169 ug/L		5.0	10/14/14 19:20	
<b>92221078002</b>	<b>MW-3</b>					
EPA 6010	Manganese	614 ug/L		5.0	10/14/14 19:37	
<b>92221078003</b>	<b>MW-4</b>					
EPA 6010	Manganese	657 ug/L		5.0	10/14/14 19:44	
<b>92221078004</b>	<b>SUPPLY WELL</b>					
EPA 6010	Manganese	194 ug/L		5.0	10/14/14 19:52	
<b>92221078005</b>	<b>B-1</b>					
ASTM D2974-87	Percent Moisture	14.3 %		0.10	10/15/14 13:50	
<b>92221078006</b>	<b>B-2</b>					
ASTM D2974-87	Percent Moisture	21.8 %		0.10	10/15/14 13:51	
<b>92221078007</b>	<b>B-3</b>					
ASTM D2974-87	Percent Moisture	20.6 %		0.10	10/15/14 13:51	
<b>92221078008</b>	<b>B-4</b>					
ASTM D2974-87	Percent Moisture	10.8 %		0.10	10/15/14 13:51	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: Brunswick Co School 19741B

Pace Project No.: 92221078

Sample: MW-2		Lab ID: 92221078001	Collected: 10/09/14 11:30	Received: 10/11/14 10:30	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010 Preparation Method: EPA 3010						
Antimony	ND	ug/L	5.0	1	10/13/14 15:25	10/14/14 19:20	7440-36-0	
Arsenic	<b>62.9</b>	ug/L	10.0	1	10/13/14 15:25	10/14/14 19:20	7440-38-2	
Chromium	ND	ug/L	5.0	1	10/13/14 15:25	10/14/14 19:20	7440-47-3	
Lead	<b>14.6</b>	ug/L	5.0	1	10/13/14 15:25	10/14/14 19:20	7439-92-1	
Manganese	<b>169</b>	ug/L	5.0	1	10/13/14 15:25	10/14/14 19:20	7439-96-5	

### REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Brunswick Co School 19741B

Pace Project No.: 92221078

Sample: MW-3	Lab ID: 92221078002	Collected: 10/09/14 14:45	Received: 10/11/14 10:30	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>								
Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Manganese	<b>614</b>	ug/L	5.0	1	10/13/14 15:25	10/14/14 19:37	7439-96-5	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Brunswick Co School 19741B

Pace Project No.: 92221078

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>Sample: MW-4</b>								
<b>Lab ID: 92221078003</b>								
Collected: 10/09/14 15:30								
Received: 10/11/14 10:30								
Matrix: Water								
<b>6010 MET ICP</b>								
Analytical Method: EPA 6010 Preparation Method: EPA 3010								
Arsenic	ND	ug/L	10.0	1	10/13/14 15:25	10/14/14 19:44	7440-38-2	
Manganese	657	ug/L	5.0	1	10/13/14 15:25	10/14/14 19:44	7439-96-5	

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## ANALYTICAL RESULTS

Project: Brunswick Co School 19741B

Pace Project No.: 92221078

Sample: SUPPLY WELL		Lab ID: 92221078004	Collected: 10/09/14 17:00	Received: 10/11/14 10:30	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010 Preparation Method: EPA 3010						
Antimony	ND	ug/L	5.0	1	10/13/14 15:25	10/14/14 19:52	7440-36-0	
Arsenic	ND	ug/L	10.0	1	10/13/14 15:25	10/14/14 19:52	7440-38-2	
Chromium	ND	ug/L	5.0	1	10/13/14 15:25	10/14/14 19:52	7440-47-3	
Lead	ND	ug/L	5.0	1	10/13/14 15:25	10/14/14 19:52	7439-92-1	
Manganese	<b>194</b>	ug/L	5.0	1	10/13/14 15:25	10/14/14 19:52	7439-96-5	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Brunswick Co School 19741B

Pace Project No.: 92221078

---

**Sample: B-1**      **Lab ID: 92221078005**    Collected: 10/09/14 17:05    Received: 10/11/14 10:30    Matrix: Solid

*Results reported on a "dry-weight" basis*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	0.76	1	10/13/14 17:50	10/14/14 21:56	7440-38-2	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>14.3</b>	%	0.10	1		10/15/14 13:50		

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Brunswick Co School 19741B

Pace Project No.: 92221078

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**Sample: B-2**      **Lab ID: 92221078006**    Collected: 10/09/14 17:10    Received: 10/11/14 10:30    Matrix: Solid

*Results reported on a "dry-weight" basis*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	0.95	1	10/13/14 17:50	10/14/14 21:59	7440-38-2	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>21.8</b>	%	0.10	1		10/15/14 13:51		

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Brunswick Co School 19741B  
Pace Project No.: 92221078

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**Sample: B-3**      **Lab ID: 92221078007**      Collected: 10/09/14 17:15      Received: 10/11/14 10:30      Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	1.0	1	10/13/14 17:50	10/14/14 22:12	7440-38-2	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>20.6</b>	%	0.10	1		10/15/14 13:51		

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: Brunswick Co School 19741B

Pace Project No.: 92221078

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**Sample: B-4**      **Lab ID: 92221078008**      Collected: 10/09/14 17:20      Received: 10/11/14 10:30      Matrix: Solid

*Results reported on a "dry-weight" basis*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>		Analytical Method: EPA 6010    Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	1.1	1	10/13/14 17:50	10/14/14 22:15	7440-38-2	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>10.8</b>	%	0.10	1		10/15/14 13:51		

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: Brunswick Co School 19741B

Pace Project No.: 92221078

QC Batch: MPRP/17109

Analysis Method: EPA 6010

QC Batch Method: EPA 3050

Analysis Description: 6010 MET

Associated Lab Samples: 92221078005, 92221078006, 92221078007, 92221078008

METHOD BLANK: 1305781

Matrix: Solid

Associated Lab Samples: 92221078005, 92221078006, 92221078007, 92221078008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	1.0	10/14/14 20:19	

LABORATORY CONTROL SAMPLE: 1305782

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	50	50.0	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1305783 1305784

Parameter	Units	92220989013		MS		MSD		MS		MSD		% Rec Limits	RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Arsenic	mg/kg	6.2	50.6	51.5	57.6	62.6	102	110	75-125	8				

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: Brunswick Co School 19741B  
Pace Project No.: 92221078

QC Batch: MPRP/17104 Analysis Method: EPA 6010  
QC Batch Method: EPA 3010 Analysis Description: 6010 MET  
Associated Lab Samples: 92221078001, 92221078002, 92221078003, 92221078004

METHOD BLANK: 1305666 Matrix: Water  
Associated Lab Samples: 92221078001, 92221078002, 92221078003, 92221078004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	ND	5.0	10/14/14 18:04	
Arsenic	ug/L	ND	10.0	10/14/14 18:04	
Chromium	ug/L	ND	5.0	10/14/14 18:04	
Lead	ug/L	ND	5.0	10/14/14 18:04	
Manganese	ug/L	ND	5.0	10/14/14 18:04	

LABORATORY CONTROL SAMPLE: 1305667

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	500	507	101	80-120	
Arsenic	ug/L	500	486	97	80-120	
Chromium	ug/L	500	496	99	80-120	
Lead	ug/L	500	497	99	80-120	
Manganese	ug/L	500	492	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1305668 1305669

Parameter	Units	92220975001		MS		MSD		MS		MSD		% Rec Limits	RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Antimony	ug/L	ND	500	500	521	509	104	102	75-125	2				
Arsenic	ug/L	ND	500	500	509	490	102	98	75-125	4				
Chromium	ug/L	ND	500	500	495	480	99	96	75-125	3				
Lead	ug/L	ND	500	500	488	473	98	95	75-125	3				
Manganese	ug/L	7690	500	500	8010	7790	65	20	75-125	3 M1				

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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## QUALIFIERS

Project: Brunswick Co School 19741B

Pace Project No.: 92221078

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Acid preservation may not be appropriate for 2-Chloroethylvinyl ether, Styrene, and Vinyl chloride.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### LABORATORIES

PASI-A Pace Analytical Services - Asheville

PASI-C Pace Analytical Services - Charlotte

### ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Brunswick Co School 19741B

Pace Project No.: 92221078

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92221078005	B-1	EPA 3050	MPRP/17109	EPA 6010	ICP/15420
92221078006	B-2	EPA 3050	MPRP/17109	EPA 6010	ICP/15420
92221078007	B-3	EPA 3050	MPRP/17109	EPA 6010	ICP/15420
92221078008	B-4	EPA 3050	MPRP/17109	EPA 6010	ICP/15420
92221078001	MW-2	EPA 3010	MPRP/17104	EPA 6010	ICP/15419
92221078002	MW-3	EPA 3010	MPRP/17104	EPA 6010	ICP/15419
92221078003	MW-4	EPA 3010	MPRP/17104	EPA 6010	ICP/15419
92221078004	SUPPLY WELL	EPA 3010	MPRP/17104	EPA 6010	ICP/15419
92221078005	B-1	ASTM D2974-87	PMST/7128		
92221078006	B-2	ASTM D2974-87	PMST/7128		
92221078007	B-3	ASTM D2974-87	PMST/7128		
92221078008	B-4	ASTM D2974-87	PMST/7128		

### REPORT OF LABORATORY ANALYSIS

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Document Name: **Sample Condition Upon Receipt (SCUR)**

Document Revised: June 10, 2014  
Page 1 of 2

Document No.:  
F-ASV-CS-003-rev.14

Issuing Authorities:  
Pace Asheville Quality Office

Client Name: FCS

Courier (Circle): Fed Ex UPS USPS Client Commercial Pace Other \_\_\_\_\_

Custody Seal on Cooler/Box Present:  yes  no Seals intact:  yes  no

Packing Material:  Bubble Wrap  Bubble Bags  None  Other \_\_\_\_\_

Thermometer Used: IR Gun#3 -130265963 Type of Ice: Wet Blue None  Samples on ice, cooling process has begun

IR Gun #4 SN:140290365 Other: \_\_\_\_\_  
Temp Correction Factor: Add Subtract \_\_\_\_\_ C

Corrected Cooler Temp.: 1.4 C Biological Tissue is Frozen: Yes No N/A  
Temp should be above freezing to 6°C

Date and Initials of person examining contents: 10/11/14

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered volume received for Dissolved tests	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	11.
Sample Labels match COC:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>ww/soil</u>		
All containers needing preservation have been checked.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Samples checked for dechlorination:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	16.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution:

Field Data Required? Y / N

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

SCURF Review: AMB Date: 10-11-14  
SRF Review: (h) Date: 10-14-14

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office ( i.e out of hold, incorrect preservative, out of temp, incorrect containers)

WO#: 92221078





## APPENDIX G

B-11-14	Brunswick Co Schools	90° crossing
	Soil Sampling - 6010	
	2 per Bag 12 0.2' 20	each
	Price 1805	30 ENV. 1000000
B-11/A	34.007390, 78.048790	
1130	0-48" Black Silt Sand (ASH)	1/2 sand
Q 5'	48-60" G/S	Blow - Fine Sand
B-21/A	34.007490, 78.048660	
1140	0-30" ASH	(SPT) Pure Hd
Q 5'	30-60" BSS	(Lack Silt Sand)
B-3/A	34.006940, 78.048900	
1150	0-40" ASH	
Q 78"	48-60" BSS	
B-4/A	34.006600, 78.049280	
1200	0-56" ASH	
Q 48"	50" BSS	
B-5/A	34.006900, 78.049530	
1210	34.007070, 78.049620	
Q 96"	0-56" ASH	
	50-60" BSS	

B-6/A	34.007250, 78.049190	
1220	0-50" ASH (SPT)	
Q 760"	50"-60" BSS	
B-7/A	34.007430, 78.048910	
1230	0-50" ASH (SPT)	
Q 760"	50-60" BSS	
B-8/A	34.007670, 78.048520	
1240	0-55" ASH	
Q 760"	55-60" BSS	
B-9/A	34.007820, 78.048870	
1250	0-40" ASH	
Q 760"	44-60" BSS	organs
B-10/A	34.007760, 78.049090	
1300	0-4" OC	
Q 760"	4-50" ASH	
	50-60" BSS	
B-11/A	34.007550, 78.049390	
1310	0-50" ASH	(SPT)
Q 760"	50-60" BSS	
B-12/A	34.007720, 78.049820	
1320	0-48" ASH	
Q 260"	48-60" BSS	

6010/7421

8-11-14	BSE	BCS	CONT	
B-13/A	34.007570	78.050060		
1330	0-45"	ASH (SAT)		
7 760"	45-60"	BSS		
B-14	34.007880	78.049640		
1340	0-50"	ASH (SAT)		
7 760"	50-60"	BSS		
B-15	34.008020	78.049370		
1350	0-60"	BSS (No Ash?)		
7 760"				
B-16	34.008140	78.049110		
1400	0-60"	BSS (No Ash?)		
<del>7 760"</del>				
<del>7 50"</del>				
B-17	34.008320	78.049390		(Duplicate)
1500	0-60"	ASH		
7 760"	60" Stump			
B-18	34.008810	78.049690		
1510	0-12"	BSS		
7 40"	12-60"	ASH		

8-14-14	BSS	CONT	
B-19	34.008400	78.050310	34.008090
1520	0-12"	O/B SS	78.049950
7 48"	12-60"	ASH (SAT)	
B-20	34.007940	78.050330	
1530	0-55"	ASH	
7 48"	55-60"	BSS	
B-21	34.008350	78.050570	
1540	0-24"	BSS (No Ash?)	
7 40"	24-60"	BFS 5x/5cut	
B-22	34.008460	78.050310	
1550	0-10"	BSS	
7 60"	10-60"	ASH (SAT)	
B-23	34.008560	78.050060	
1600	0-8"	GL	
7 55"	8-60"	ASH	
B-24	34.008370	78.049500	
1610	0-18"	O/B Stry SAND	
7 50"	18-60"	ASH	

8-11-14/8-12-14 BCS Well Installation

X Equipment Wash Sample Lab  
HSA Averages w/ Geo Probe

MW-1 39.008700, 78.05640

15' well 10' screen 5' riser  
SAND 4'15" Bent. 3'  
padto 0' Flush Mount

MW-2 74.008140, 78.049680

15' well 10' screen 5' riser  
SAND 4'15" Bent. 3'  
PAD to 0' Flush Mount

MW-3 39.007510, 78.056450

SAME CONSTRUCTION

MW-4 39.006760, 78.049190

SAME CONSTRUCTION

Wells Developed with Submersible Pump  
Joiner to Clean Turbidity

8-13-14 BCS CAWT

Sample Wells En GOLD 7471

MW-1 + Dup Dates DTL 2.35' 6.34  
1100 ST

MW-2 5.05' 5.60  
1130

MW-3 2.45' 6.23  
1200

MW-4 2.40' 6.80  
1230

KNOWLEDGE  
8-11-14  
1600

Survey BM = 100 H0I = 6.13



800  
Sun

AW

AW &

AY

0.1254

Shub  
& clay

C. 0298

1974 B

# 10-9-14 Brunswick Co. Schools

Sample Wells (in):

HANNA 98703  
TURBID meter

MW-2 = Antimony, Manganese, Chlorine, Lead, Cadmium

MW-3 - Manganese

MW-4 - Antimony, Manganese

Each Well volume person w/ Datalogger

Each sample measured for Turbidity

Well	Vol	Sample Time	OTW	TD	TURBIDITY
MW-2	4.5gal	1130	5.70	15'	95.5

SE \* Sample w/ PARASOLIC pump; DEDICATED TUBING

MW-3	5.6gal	1445	3.31	15'	36.4
------	--------	------	------	-----	------

MW-4	5.8gal	1530	3.02	15'	13.3
------	--------	------	------	-----	------

Supply Well ST 1700

B-1	Dark grey to S w/ sand	0-24"
1705	34.006100, 78.049130	

B-2	dy ss	0-24"
1710	34.006060, 78.048670	

B-3	Dark silty sand	0-24"
1715	34.006480, 78.048560	

B-4	dy ss	
1720	34.006450, 78.048610	

loc 166642

## APPENDIX H

"I certify that to the best of my knowledge, after thorough investigation, the information contained in or accompanying this certification is true, accurate, and complete."

Brunswick County Schools

Name of Remediating Party



11-19-14

Signature of Remediating Party Date

**NOTARIZATION**

North Carolina (Enter State)

Brunswick COUNTY

I, Ronda M. Willets, a Notary Public of said County and State, do

hereby certify that Craig Eckert did personally appear and sign

before me this day, produced proper identification in the form of

NC drivers license was duly sworn or affirmed, and declared that, to the best of

his or her knowledge and belief, after thorough investigation, the information contained

in the above certification is true and accurate, and he or she then signed this certification

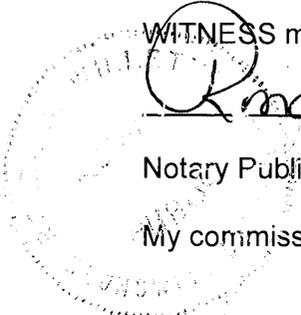
in my presence.

WITNESS my hand and official seal this 19<sup>th</sup> day of November, 2014

 (OFFICIAL SEAL)

Notary Public (signature)

My commission expires: 8-24-18



"I certify that to the best of my knowledge, after thorough investigation, the information contained in or accompanying this certification is true, accurate, and complete."

ECS Carolinas, LLP C. Brian Smith  
Name of Consultant

C. Brian Smith 11/24/2014  
Signature of Consultant

**NOTARIZATION**

North Carolina (Enter State)

Guilford COUNTY

I, Shannon P. Zirpolo, a Notary Public of said County and State, do hereby certify that C. Brian Smith did personally appear and sign

before me this day, produced proper identification in the form of Drivers License, was duly sworn or affirmed, and declared that, to the best of his or her knowledge and belief, after thorough investigation, the information contained in the above certification is true and accurate, and he or she then signed this certification in my presence.

WITNESS my hand and official seal this 24 day of November, 2014.

Shannon P. Zirpolo (OFFICIAL SEAL)

Notary Public (signature)

My commission expires: 2/12/2017

