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CITY OF DURHAM
DEPARTMENT OF WATER MANAGEMENT
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August 22, 2014

Mr. Ervin Lane, Hydrogeologist
NC DENR Division of Waste Management
Solid Waste Section
217 West Jones Street
Raleigh, North Carolina 27603

RE: NATURE AND EXTENT STUDY
CLOSED CITY OF DURHAM LANDFILL, PERMIT NO. 32-01
DURHAM COUNTY, NORTH CAROLINA

Dear Mr. Lane:

The City of Durham is submitting the enclosed *Nature and Extent Study* (NES) in response to confirmed exceedances of NC 2L Drinking Water Standards (NC 2L Standards) for NC Appendix II parameters in groundwater samples at the above-referenced facility. The attached NES is submitted to comply with the requirements of Title 15A of the North Carolina Administrative Code (NCAC) Subchapter 13B.1634(g)(1)(A), which require the City of Durham to characterize the nature and extent of the release as a result of confirmed NC 2L Standard exceedances detected in samples collected from compliance monitoring wells at the site.

Volatile organic compounds (VOCs) have been detected in samples from groundwater monitoring well MW-10 at concentrations above their respective NC 2L Standards since 2008. As of the most recent semi-annual water quality monitoring event in May 2014, five VOCs have been consistently detected in samples from MW-10 at concentrations above the Solid Waste Section Reporting Limits and NC 2L Standards. These VOCs include benzene; cis-1,2-dichloroethene; 1,2-dichloropropane; trichloroethene; and vinyl chloride.

As part of the NES, the City installed seven piezometers (NES-1 through NES-7) west of the waste unit in the vicinity of MW-10. Groundwater samples were collected and analyzed from these piezometers to determine the lateral extent of the VOC plume. Based on these data, it is not likely that VOCs have migrated off the landfill property. It was also determined that the unnamed tributary/storm water drainage feature located west of MW-10 is a losing stream and is not a hydraulic barrier to groundwater flow.

Based on the findings of the NES, the City would like to make the following requests:

- Remove monitoring well MW-10 from the compliance monitoring network. Well MW-10 will continue to be used to collect groundwater elevation data.
- Add NES-3 to the compliance network to replace MW-10.

The modified compliance monitoring network would consist of background well MW-9R and downgradient wells MW-2, MW-3R, MW-4R, MW-5, and NES-3.

Piezometer NES-3 was drilled and installed in accordance with the NCAC Title 15 Subchapter 2C Well Construction Standards and has a similar screened interval to MW-10. Because NES-3

had not been sampled since the NES investigation in 2009, the well was sampled on May 21, 2014, during the routine semi-annual water quality monitoring event and was analyzed for the NC Appendix I list of constituents. No NC Appendix I VOCs were detected above laboratory detection limits during the May 2014 event. Barium was the only NC Appendix I inorganic constituent detected above the Solid Waste Section Limit (SWSL). Cobalt and vanadium were detected at concentrations that exceeded the Solid Waste Section Groundwater Protection Standards (GPSs), but were below the SWSLs. All concentrations of inorganic constituents are similar to those detected in the facility's current upgradient monitoring well.

Thank you for your consideration. If you have any questions, please contact Dusty Reedy with Golder Associates NC, Inc. at 336-852-4903 or me at 919-560-4381.

Sincerely,

Simon Lobdell

Simon Lobdell, P.E.
Civil Engineer III

Enclosed: Nature and Extent Study

NES-3 Laboratory Certificates-of-Analysis

NES-3 Field Form

CC: David "Dusty" Y. Reedy II, P.G., Senior Hydrogeologist, Golder Associates NC, Inc., 5B Oak Branch Drive, Greensboro, NC 27407. 336-852-4903. dreedy@golder.com

Sam Watts, P.G. S&ME, Inc., 3201 Spring Forest Road, Raleigh NC 27616

NATURE AND EXTENT STUDY

August 28, 2014

City of Durham
Department of Water Management, Utility Engineering Division
1600 Mist Lake Dr.
Durham, NC 27701

Attention: Mr. Simon Lobdell, PE via email: Simon.Lobdell@durhamnc.gov

Reference: Transmittal of Report
Nature and Extent Study (Rev.1)
City of Durham's Closed Municipal Solid Waste Landfill
(Permit No. 32-01)
Durham, North Carolina
S&ME Project No. 1054-07-469

Dear Mr. Lobdell:

By way of this letter, S&ME, Inc. (S&ME) is transmitting our revised report documenting the findings of the Nature and Extent Study (NES) conducted at the City of Durham's Closed Municipal Solid Waste Landfill (Permit No. 32-01).

The NES was performed in accordance with North Carolina Solid Waste Rules defined under 15A NCAC 13B .1634 to characterize the nature and extent of a release from the landfill due to constituents of concern detected in groundwater at concentrations above the North Carolina groundwater protection standards in one of the facilities compliance monitor wells (MW-10) along the western boundary of the landfill.

If you have any questions or need additional information regarding this project, please contact us at (919) 872-2660.

Sincerely,
S&ME, Inc.

Gerald Paul
Staff Environmental Professional

Samuel P. Watts, P.G.
Senior Project Manager

Enclosure: *Nature and Extent Study (Rev.1)*, December 20, 2012, S&ME, Inc.

NATURE AND EXTENT STUDY (REV.1)

City Of Durham
Closed Municipal Solid Waste Landfill
(Permit No. 32-01)
Durham County, North Carolina
S&ME Project No. 1054-07-469

Prepared For:

City of Durham
Department of Water Management
1600 Mist Lake Drive
Durham, North Carolina 27704

Prepared By:

3201 Spring Forest Road
Raleigh, North Carolina 27616

December 20, 2012

NATURE AND EXTENT STUDY (REV.1)
City of Durham Closed Municipal Solid Waste Landfill
(Permit #32-01)
Durham, North Carolina
S&ME Project No. 1054-07-469

I hereby certify this 20th day of December 2012, that this report was prepared by me or under my direct supervision.

NORTH CAROLINA LICENSED SEAL 1806 GEOLOGIST SAMUEL P. WATTS 12/20/12

Samuel P. Watts, P.G.
Senior Project Manager
NC Licensed Geologist No. 1806

Report preparation performed by:

David B. Wells
Senior Geologist

Gerald Paul
Staff Environmental Professional

SR: SPW

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1.0 INTRODUCTION

1.1 Purpose

S&ME, Inc. (S&ME) is submitting this report describing the assessment of groundwater quality at the City of Durham's closed municipal solid waste (MSW) landfill (Permit No. 32-01) located in Durham, North Carolina. The City performs semiannual groundwater and surface water quality monitoring from a monitor well network with of eight monitor well locations surrounding the boundary of the waste disposal unit and four surface water sample locations. The network of monitor wells was designed for water quality compliance monitoring to detect constituent concentrations that may originate from the landfilled waste materials. Groundwater and surface water compliance monitoring is performed to comply with the requirements of North Carolina Solid Waste Management Rules (Solid Waste Rules), 15A NCAC 13B § .600, §.1632 and §.1634 of the Solid Waste Rules.

Volatile organic compounds (VOCs) have been detected above the Groundwater Quality Standards (2L Standards) promulgated by Chapter 15A the North Carolina Administrative Code (NCAC), Subchapter 2L in groundwater samples collected from compliance monitor well MW-10 at the landfill. Seven VOC constituents of concern have been detected in compliance monitoring well MW-10 above the 2L Standard: benzene, cis-1,2-dichloroethene, trichloroethene, 1,1-dichloroethane, 1,2-dichloropropane, tetrachloroethene and vinyl chloride. Two other VOCs have been detected in MW-10 at concentrations above the method detection limit, but below the 2L Standard: 1,4-dichlorobenzene, and trans 1,2-dichloroethene.

NCDENR, Division of Waste Management (DWM), Solid Waste Section (SWS) Solid Waste Rules defined under 15A NCAC 13B .1634(f) require that the facility characterize the nature and extent of a release from the landfill when constituents are detected at concentrations that are above NCDENR groundwater protection standards. This Nature and Extent Study (NES) report has been prepared in general accordance with 15A NCAC 13B.1634(f), and addresses the following components:

(A) Characterize the nature and extent of the release by installing additional piezometers as necessary,

(B) Install at least one additional monitor well at the facility boundary in the direction of contaminant migration and sample this well in accordance with 15A NCAC 13B.1634(d)(2),

(C) Notify all persons who own or reside on the land that directly overlies any part of the plume if contaminants have migrated off-site, and

(D) Initiate an assessment of corrective measures as required under Rule 15A NCAC 13B.1635 (if necessary).

1.2 Site Description and Background Information

The subject site is a closed, unlined MSW landfill that ceased accepting wastes in 1997. The vicinity and location of the facility as depicted on the U.S. Geologic Survey topographic map is shown on **Figure 1. Figure 2** shows the facility location and immediate area as depicted on a 2005 aerial photograph obtained from City of Durham GIS. The landfill is located northeast of downtown Durham, near the North Durham Water Reclamation Facility off East Club Boulevard at Glenn Road.

According to the topographic map, elevations at the facility range from approximately 280 to 380 feet above mean sea level. In general, surface drainage from the facility and surrounding areas is routed by drainage channels and stormwater control structures toward Ellerbe Creek to the west of the facility. Locally, surface water flows in a radial direction, away from the closed landfill toward unnamed drainage features and/or streams to the north, south and west. These drainage features are tributaries of Ellerbe Creek, which flows north-northeast into Falls Lake.

1.3 Compliance Monitoring History

Groundwater quality at the landfill has been monitored since 1989, and is currently monitored semiannually in accordance with the approved Water Quality Monitoring Plan (WQMP) prepared by Malcolm Pirnie, Inc. in April 1994 (MP, 1994). Assessment Monitoring was conducted for the landfill from November 1996 through June 1999 after the detection of benzene in the monitoring well MW-3R sample. Following the June 1999 monitoring event, the NCDENR Solid Waste Section (Section) granted approval for the City to return to Detection Monitoring. Detection Monitoring was conducted for the site from October 1999 through December 2004. At that time, based on additional detections of VOCs, Assessment Monitoring was resumed during the June 2005 monitoring event (Weston, 2006). Beginning with the November 2007 sampling event, a modified Assessment Monitoring protocol was implemented. The modified semiannual monitoring program generally alternates between analyses for the Appendix I constituent list during the fall sampling event and the Appendix II constituent during the spring sampling event.

In May 2008, MW-9R replaced PZ-6 as the up-gradient/background monitoring well due to the poor water quality and elevated metals concentrations detected in the background well (PZ-6). Also in May 2008, MW-3R replaced MW-3 as a down-gradient compliance monitoring well. Monitor well MW-3 was found to be located within or in close proximity to the landfill waste boundary. Prior to their inclusion into the groundwater monitoring network, both wells (MW-3R and MW-9R) were sampled and analyzed one time for the full Appendix I list of constituents plus Appendix II semi-volatile organic compounds (SVOC) constituents on May 1, 2008 to assess groundwater quality at these locations.

Findings reported in the *May 2008-Groundwater Monitoring Report – Semi-Annual Monitoring of Groundwater and Surface Water* (S&ME, July 2008), indicated that the down-gradient monitor well MW-6R appeared to be located within or in close proximity to the landfill waste boundary. Based on this finding, groundwater monitoring data may not accurately reflect true groundwater quality within the uppermost aquifer.

Additionally, due to its close proximity to buried waste, monitor well MW-6R did not meet the requirements listed under Section .1631(a) of the Solid Waste Rules (15A NCAC 13B) as well as EPA's RCRA Technical Enforcement Guidance Document (TEGD) SW-846. As a result, MW-6R was removed from the groundwater monitoring network. MW-6R remains in place and will be utilized to collect groundwater levels to assist in the determination of groundwater flow characteristics.

On August 20, 2008, S&ME installed a new compliance monitoring well (MW-10) in the vicinity of the former compliance well (MW-6R); however, MW-10 was positioned approximately 25 feet beyond the predicted waste boundary. On September 9, 2008, MW-10 was sampled and the results of the sampling were summarized in S&ME's report *Monitoring Well Installation Report*, dated October 2, 2008, included in Appendix IV of the *November 2008 Semi-Annual Monitoring of Groundwater and Surface Water*. The locations of MW-3, MW-3R, MW-6R and MW-10 in relation to the approximate limits of the waste boundary are shown on **Figure 3**. The City is currently evaluating the location of monitor well MW-10 for continued use in the compliance monitoring network.

On behalf of the City, in a letter to the Section dated May 12, 201, S&ME requested reducing the number of compliance monitor wells associated with well network for the Semi-Annual Sampling of the City of Durham's Closed MSWLF. In response, in a letter dated May 17, 2011, the Section approved discontinued sampling of monitor wells MW-7R and MW-8, but requested water level measurements be recorded from these wells.

1.4 Facility Compliance Monitoring Network

The facility's amended water quality monitoring network now consists of 14 monitor wells/piezometers and four surface water locations. Sample locations are depicted on **Figure 3**. Six (6) of the 14 wells/piezometers at the site are used to measure water levels only. The six (6) wells used to collect water quality samples for laboratory analysis consist of one up-gradient/background monitoring well (MW-9R) and five (5) down-gradient compliance monitoring wells (MW-2, MW-3R, MW-4R, MW-5, and MW-10). These compliance wells monitor the uppermost aquifer. The facility's monitoring network also includes one upstream surface water monitoring point (S-4) and three downstream surface water sampling points (S-1, S-2 and S-3), which are sampled in conjunction with the groundwater monitoring wells during the semi-annual groundwater monitoring events. Surface water samples are collected semiannually and analyzed for NC Appendix I constituents.

2.0 SITE GEOLOGY

2.1 General Physiography

Some of the general background information presented in this section has been compiled from the *Water Quality Monitoring Plan* prepared in April 1994 by Malcolm Pirnie, Inc. The information presented herein has been modified for brevity and is intended to maintain continuity of general background information, particularly regional topography, geology and hydrogeology.

2.2 Site Topography

The landfill (site) is located northeast of downtown Durham, near the North Durham Water Reclamation Facility off East Club Boulevard at Glenn Road. According to the topographic map, elevations at the facility range from approximately 280 to 380 feet above mean sea level. It extends approximately 70 to 80 feet above the surrounding natural ground surface at its highest point. The natural ground surface elevations at the site prior to construction of the landfill ranged from 280 to 340 feet above Mean Sea Level (MSL). The current landfill cap surface slopes downward to the north and northeast to an approximate elevation of 300 feet MSL.

2.3 Regional Geology

The City of Durham Closed MSW landfill is located within the Deep River Basin, which is an extensional basin consisting of sedimentary deposits formed during the Triassic and Jurassic Ages. The Deep River Basin extends along the east coast of North and South Carolina for 90 miles, from the South Carolina state line near Wadesboro, Anson County, northeastward to near Oxford, Granville County. The basin is bound by normal block-faults along the basin margins. A series of three interconnected sub-basins have been identified within the Deep River Basin. From north to south they are the Durham, Sanford, and Wadesboro sub-basins. The Durham Landfill lies entirely within the boundaries of the Durham sub-basin.

The sedimentary rocks of the Deep River Basin are part of the Chatham Group, which is divided into three formations: the Pekin, which occurs along the northwestern boundary of the basin; the Cumnock, which occurs in the middle of the basin; and, the Sanford, which occurs along the southeastern boundary of the basin. The formations are divided based on a lateral progression away from the western boundary of the basin rather than a vertical sequence. All three formations belong to the Triassic aged Newark Supergroup. The Durham sub-basin is composed of bedrock of the Pekin formation which consists of arkosic sandstones, siltstones, and mudstones (Stewart, Ballard, and Black, 1989; Huber and others, 1993). Within the Durham sub-basin, the bedrock is informally referred to as "Lithofacies Association I, II or III" (Huber and others, 1993). The total thickness of sedimentary rocks is estimated to be approximately 6,000 feet. Within the Durham sub-basin, the sedimentary rocks are generally characterized as massively bedded, approximately 15 feet thick, dipping towards the east at 20 to 30 degrees. Some thinner

beds, approximately four to six feet thick, may be present in localized areas (Hoffman and Gallagher, 1989).

2.4 Site Geology

The northwestern boundary of the Triassic-age, Durham Basin is estimated to be approximately five miles northwest of the landfill and the southeastern boundary is over 15 miles southeast of the landfill (Stewart, Ballard, and Black, 1989). No fault has been identified along the northwestern boundary of the basin. The Jonesboro Fault along the southeastern boundary of the basin is over 15 miles southeast of Durham, North Carolina. An unnamed, normal block-type fault occurs approximately 10 to 12 miles southeast of the site as noted on the Southeast Durham Geologic Quadrangle (Hoffman and Gallagher, 1989). The bedrock underlying the site consists of mudstone, siltstone, and sandstone, based on observations reported in published reports for the Durham sub-basin (Fleck and White, 1989). The overburden is typically conglomerates, silts and muds formed from the weathering of the bedrock. In some cases soils are composed of partially weathered sedimentary rock which generally resemble the original parent material in texture and composition of the more resistant minerals (e.g., quartz, sandstone, etc.).

Soils

The soils around the landfill consist principally of White Store sandy loams in the upland areas (north, south, and east of the landfill), and Chewacla and Wehadkee soils near Ellerbe Creek (west of the landfill). Also present are Roanoke soils to the southwest and north west, Altavista silt loams, and Creedmoor sandy loams (Soil Survey of Durham County). The White Store, Altavista, and Creedmoor soils are all upland soils, occurring at the higher elevations and on slopes. The White Store soils are typically moderately well drained, low permeability, and high shrink-swell capacity and weather from Triassic mudstone. The Altavista soils are formed from weathered Triassic mudstone and generally have a finer texture than the White Store soils. These soils have hydraulic properties similar to the White Store soils and a lower shrink-swell capacity. The Creedmoor soils are also formed from weathered Triassic mudstone and have a similar texture as the White Store soils but with a lower shrink-swell capacity. The higher shrink-swell capacity of the White Store soils can result in cracks in the soil at the surface. These cracks typically extend only into the B-horizon, where the shrink swell cycle is less frequent and soil from the overlying A-horizon is deposited through illuviation. The principal effect of the higher shrink-swell capacity is to increase the infiltration rates. The Chewacla-Wehadkee association and the Roanoke soils occur on flood plains and consist of somewhat poorly drained loamy soils with low to moderate permeability. These soils are typically formed from alluvial deposits and not from weathering of the underlying bedrock. The groundwater table in these soils is typically high, between one and two feet beneath the surface.

Partially Weathered Rock

The City of Durham Closed MSW landfill site is underlain by greater than 80 feet of partially weathered rock (PWR) in the eastern portion of the site with a gradational transition zone of soil and weathered rock to competent rock, based on site boring logs. In the western portion of the site, in the floodplain near Ellerbe Creek, the PWR is approximately 25 feet thick. Based on soil borings from the original monitoring wells

MW-3, MW-4, and test borings P-l, P-2, P-3, P-4, and MW-2, the unconsolidated overburden at the site consists of sediments derived from the weathering of the underlying Triassic aged mudstones and siltstones of the Pekin Formation (MP 1994). The PWR consists primarily of fine sand to silt with minor percentages of medium-sand and clay. Based on the boring logs, there does not appear to be any laterally continuous, well-defined layers of clay. The PWR is consistently composed of fine-sand to silt which is a typical weathering product of siltstone.

Bedrock

The bedrock units underlying the site belong to the Pekin Formation, which consists of arkosic sandstones, siltstones, and mudstones (Stewart, Ballard, and Black, 1989; Huber and others, 1993). The Pekin Formation has been locally sub-divided into three lithofacies associations (Huber and others, 1993). Contact between the lithofacies is gradational, and the landfill is located near the gradational contact between Lithofacies I and II. No mappable faults have been identified within the area of the landfill. The closest mappable fault is the Jonesboro Fault located approximately 15 miles southeast of Durham, North Carolina and an unnamed, normal block-type fault approximately 10 to 12 miles southeast of the site.

2.5 Regional and Site Hydrology

Surface Water

Surface water features appear to have a significant influence on local groundwater flow around the landfill. From previous sampling events groundwater has been observed to flow in a radial direction away from the landfill toward surface water features to the northwest, west, and southwest. The dominant surface water feature is Ellerbe Creek, which flows past the western border of the landfill. Ellerbe Creek is a major tributary of the Neuse River and serves as the principal drainage basin in the area around the landfill.

Intermittent streams and storm water drainage features are located near the northern, western and southern edges of the landfill. There are three main surface water features around the landfill.

1. The intermittent stream to the north is depicted on **Figure 1** and is fed by two ponds, one on the east side of the landfill and one located east of Glenn Road. The intermittent stream to the north branches at the northeast corner of the landfill, with one branch extending to the southeast, partially encircling the landfill. The headwater of this branch is a pond located approximately 550 feet east of the landfill edge.
2. The intermittent stream to the south of the landfill is also depicted on **Figure 1** and acts as a surface drainage feature for the low-lying wetland areas that encircle the landfill along the southern and southeastern boundaries of the landfill. This intermittent stream also receives surface water runoff from Interstate I-85, Camden Avenue, and the City's Waste Water Treatment Plant.
3. An unnamed tributary/storm water drainage feature located along the western side of the landfill is not depicted on the USGS topographic map, but is depicted on **Figure 3**. This drainage feature receives surface water runoff from the closed landfill and flows north into Ellerbe Creek.

Groundwater

The water table aquifer below the landfill occurs within the soil overburden and within the underlying PWR transition zone to less weathered bedrock. The PWR consists likely has a higher hydraulic conductivity than the underlying bedrock, but is typically less permeable than the overlying soils. Studies performed on the hydraulic effects of remnant structures within PWR/bedrock units indicate that the presence of remnant structures influence groundwater flow within the unit. Geologic studies performed on the subsurface in the site vicinity indicate that preferential paths for groundwater flow occur along remnant structures within the PWR/bedrock such as foliated zones (Fleck and White, 1989) or, as may be the case of the City of Durham Closed MSW landfill, along more permeable weathered coarse-grained bedrock layers.

The bedrock underlying the landfill consists of massively bedded mudstone, sandstone, and siltstone that have been noted to contain only minor fracturing. Based on this information, the dominant groundwater flow path is likely horizontal, through weathered coarse-grained deposits along bedding plains or through the more permeable PWR and weathered transition zone materials.

Groundwater elevations from on-site wells and surface water elevations provide information on groundwater flow direction. The regional direction of groundwater flow in this area appears to be to the west toward Ellerbe Creek. There also appears to be a local groundwater flow component toward the streams adjacent to the landfill and away from the pond east of the landfill. This results in a general radial flow direction away from the landfill and toward the streams leading to Ellerbe Creek. Groundwater flow near the western and northern boundary appears to be west-northwest, toward Ellerbe Creek and its unnamed tributary north of the landfill. On the northeast and east side of the landfill, groundwater flow appears to be to the northeast, toward the stream on the northeast side of the landfill. Along the southern border of the landfill, groundwater flow appears to be in a south-southwest direction, toward the perennial stream located south of the landfill.

3.0 ASSESSMENT OF CONTAMINANTS OF CONCERN IN GROUNDWATER

3.1 Piezometer Installation

On July 31, 2009, S&ME, Inc. installed six temporary piezometers (NES-1, NES-2, NES-3, NES-4, NES-5, and NES-6), and three stream monitoring gauges (SG-1, SG-2 and SG-3) along the western waste boundary in the vicinity of monitor well MW-10. On October 21, 2009, S&ME returned to the site to install one additional piezometer (NES-7) located just beyond the unnamed tributary near MW-10. The piezometers were installed to delineate the groundwater constituents previously identified in this area and to ascertain if the unnamed tributary/surface water drainage feature located just beyond MW-10 presents a hydrological barrier between the landfill and Ellerbe Creek.

Based on well construction records, historical groundwater levels measured at the site and the geologic and hydrogeologic conditions observed at the time of well construction, the shallow piezometers were designed to terminate on top of the resistive mudstone/siltstone PWR encountered at depths between 10-12 feet below ground surface (ft-bgs). The NES piezometers were constructed to monitor the uppermost aquifer at the facility. These locations were positioned along the projected primary components of groundwater flow, toward the west, to characterize and delineate the constituent plume.

The three stream gauges (SG-1, SG-2 and SG-3) consist of 2-inch diameter polyvinyl chloride (PVC) slotted (0.010-inch) screen, sufficient to bring the stream gauge above the banks of the unnamed tributary of the Ellerbe Creek. The stream gauges were installed approximately 1.5 feet into the bottom of the streambed in the center of the channel. The stream gauges were then secured to steel posts driven into the bottom of the streambed to an approximate depth of two ft-bgs. The screens were then attached to the posts with stainless steel clamps to secure the stream gauges.

The borings for the temporary piezometers were advanced using a 5-inch diameter stainless steel hand auger. During advancement of the borings, soil samples were collected for visual description and logged by S&ME personnel. Once the borings were advanced to the desired depth, the temporary piezometers were typically constructed by installing of a five-foot long section of 2-inch diameter polyvinyl chloride (PVC) slotted (0.010-inch) screen and sufficient riser pipe to bring the piezometers above the ground surface (Stick-up). NES-6 was constructed with 7.5 feet of slotted screen. The piezometers were completed by placing #2 type filter sand in the boring annulus to a depth above the screen section (sand pack). A well seal of hydrated bentonite clay was tremied above the sand pack, and neat cement grout was then tremied from the top of the bentonite to approximately six inches bgs. The temporary piezometers extend above ground surface where they were finished with a protective cap and lock.

Following installation, the temporary piezometers were developed until relatively clear, silt-free water was obtained. Completion Reports detailing boring lithology, piezometer construction, and relative water table measurement for each piezometer are included **Appendix I**. Well construction details for groundwater monitor wells, temporary piezometers and stream gauges utilized for the Nature and Extent Study are summarized

on **Table 1**. A site map with the groundwater monitor wells, temporary piezometers and stream gauges is attached as **Figure 3**.

Following installation of the wells, S&ME personnel developed the wells, measured the depth-to-water, collected groundwater samples and installed groundwater monitoring pressure transducers.

3.2 Well Surveying

In September 2009, the monitor wells/piezometers comprising the facility groundwater monitoring network were surveyed by SEPI Engineering & Construction (SEPI). In accordance with the standards specified in the NC Solid Waste Rules (NCAC 15A Subchapter 13B) Section .1632(d)(1) the survey of the wells is reported to conform to the following levels of accuracy:

(A) The horizontal location to the nearest 0.1 ft.
(B) The vertical control for the ground surface elevation to the nearest 0.01 ft.
(C) The vertical control for the measuring reference point on the top of the inner well casing to the nearest 0.01 ft.

The horizontal datum for this survey is the North American Datum of 1983 (NAD 83-2007) to tie the survey to the State Plane Coordinate System of North Carolina (SPC NC). The vertical datum for this survey is the North American Vertical Datum of 1988 (NAVD 88) relative to feet above mean seas level (ft-AMSL). Well/piezometer locations are depicted on **Figure 3.** Top of casing elevations and ground surface elevations are provided on **Table 1.**

3.3 Groundwater Sampling

Upon completion of the piezometers, groundwater samples were collected using new, polyethylene bailers at each monitoring well. Field personnel wore a clean pair of protective/non-reactive gloves at each well during purging and sampling activities. On August 17, 2009, groundwater samples were collected from NES-1, NES-2, NES-3, NES-4, NES-5 and NES-6. The groundwater sample collected from NES-7 was collected on October 21, 2009 following the installation of the piezometer.

Before obtaining a sample, standing water was purged from the piezometer using a bailer. Field parameter measurements on purged groundwater were measured after approximately one well volume was removed to document pH, specific conductance and temperature readings of the groundwater. Samples were collected after the field parameters stabilized or after a minimum of three well volumes were purged. The field parameter measurements taken before collecting each groundwater sample are presented in **Table 4**.

Samples were placed on ice and transported under chain-of-custody protocol to Environmental Conservation (ENCO) Laboratories in Cary, North Carolina for analysis. Chain of custody forms were completed for each sampling event and accompanied the samples to the laboratory. The groundwater samples were analyzed for Appendix I

VOCs by the laboratory analytical method EPA Method 8260B. A copy of the laboratory chain of custody and analytical report are provided in **Appendix III**.

3.4 Groundwater Analytical Results

Constituent concentrations detected in the groundwater samples above the laboratory method detection limits (MDLs) are summarized on **Table 5**. For comparison purposes, these results are shown with their respective Solid Waste Section Limits (SWSLs) and 15A NCAC Subchapter 2L .0200 Groundwater Quality Standards (2L Standards). Where target groundwater constituents have no established 2L Standard, the analytical results were compared to the Solid Waste Groundwater Protection Standard (GWPST) established in accordance with the Solid Waste Management Rules, Section .1634(h). The laboratory data from a contemporary semiannual sampling event (June 30, 2009) from monitor well MW-10 was used to compare constituent concentrations to the NES piezometers. This data was necessary to review the possible extents of groundwater constituents beyond the waste boundary.

A total of eleven VOC concentration detections were reported in the samples collected from the new piezometers installed as part of this groundwater assessment. Only two VOCs were detected above their respective groundwater protection standard from the groundwater samples collected as part of this investigation.

- 1,2-dichloropropane was detected in the NES-7 sample at 0.91 µg/L, above the 2L Standard of 0.6 µg/L.

- Vinyl chloride was detected in the NES-7 sample at 2.4 µg/L, above the 2L Standard of 0.03 µg/L.

The following VOCs were detected above the method detection limits (MDLs) but below groundwater protection standards:

- Acetone was detected at 4.2 µg/L in the sample from NES-3 and at 3.6 µg/L in the sample from NES-7, both below the 2L Standard of 6000 µg/L.

- 1,4-dichlorobenzene was detected at 0.75 µg/L in the sample from NES-7, below the 2L Standard of 6 µg/L.

- 1,1-dichloroethane was detected at 0.80 µg/L in the sample from NES-2 and at 1.0 µg/L in the sample from NES-7, both below the 2L Standard of 6 µg/L.

- 1,1-dichloroethene was detected at 0.50 µg/L in the sample from NES-2, below the 2L Standard of 7 µg/L.

- Cis-1,2-dichloroethene was detected at 1.1 µg/L in the sample from NES-2 and at 28 µg/L in the sample from NES-7, both, below the 2L Standard of 70 µg/L.

- Trans-1,2-dichloroethene was detected at 0.90 µg/L in the sample from NES-7, below the 2L Standard of 100 µg/L.

It is important to note that with the exception of cis-1,2-dichloroethene and vinyl chloride in the sample NES-7, all of these detections were reported with "J" laboratory qualifiers indicating that the values are estimated concentrations below the lowest calibration points. Also, acetone was not a constituent of concern detected in MW-10 and is a typical laboratory contaminant. A copy of the analytical laboratory report is provided in **Appendix III**. Constituent concentrations are also depicted on **Figure 4**.

3.5 Nature and Extent of Contaminants in Groundwater

In order to perform the Nature and Extent Study and fulfill the requirements of 15A NCAC 13B.1634, temporary piezometers NES-1 through NES-7 were installed down-gradient, and cross-gradient of compliance monitor well MW-10. The piezometers were installed to the north, south, and west of monitor well MW-10, at distances ranging from approximately 32' to 300' feet away from MW-10. Temporary piezometer NES-6 was located approximately 885' northeast of MW-10. NES-6 was installed to assess the groundwater quality in the western portion of the landfill between monitor wells MW-10 and MW-2.

As discussed in Section 3.4 and as depicted on **Figure 4**, many of the constituents of concern detected in MW-10 were also detected in NES-7, but at lower concentrations in NES-7. It appears that the source areas for the groundwater constituent plume are located within the landfilled waste and the constituent plume appears to have migrated west of the landfill waste boundary toward Ellerbe Creek. In the area of MW-10 and NES-7, the constituents have migrated as far as 75' west of the limits of waste (location of NES-7) and but not as far as 125' west of the limits of waste (location of NES-3). The other piezometers positioned further downgradient, and sampled as part of the NES, do not exhibit contamination from the constituents of concern. The constituents of concern have been defined laterally and are confined within the 250' compliance boundary.

4.0 ADDITIONAL HYDROLOGIC CHARACTERIZATION

4.1 Purpose

As discussed in Section 1.0, former compliance well MW-6R was believed to be installed in the landfilled waste and was not considered an appropriate compliance point. In 2008, monitoring well MW-10 was installed approximately 25' west of the limits of waste to replace MW-6R. Due to constituents detected above groundwater protection standards in groundwater samples collected from MW-10, this nature and extent study (NES) was undertaken. As discussed in Section 2.0, the results of the groundwater sampling performed downgradient of MW-10 as part of this NES indicate the constituents of concern have been defined laterally and are confined within the 250' compliance boundary.

In accordance with Section .1631 (a)(2)(a), the relevant point of compliance for the western portion of the landfill near MW-10 should be established no more than 250' from the waste boundary, and should be at least 50' within the facility property boundary. However, in determining the relevant point of compliance, the NCDENR-DWM must also consider recommendations based upon consideration of Section .1631 (a)(2)(b)(i), i.e., the hydrogeologic characteristics of the facility and surrounding land. Specifically, additional hydrologic characterization was undertaken to assess the groundwater/surface water interaction of the unnamed tributary/storm water drainage feature located along the western side of the landfill, between the landfill and Ellerbe Creek.

4.1 Water Level Measurements

Following the installation of the temporary "NES" piezometers, depth-to-water measurements were taken on seven different occasions (7/2/2009, 8/12/09, 8/17/09, 8/25/09, 10/21/09, 11/13/09 and 11/30/09). A summary of groundwater elevations collected during the NES investigation is provided on **Table 2**. Static water level measurements obtained from the NES piezometers on August 25, 2009 and October 21, 2009 were used to prepare the groundwater potentiometric map presented on **Figures 5 and 6**, respectively. During the November 30, 2009 semiannual sampling event, a complete round (all monitoring wells and piezometers) of static water level measurements was taken and was used to prepare the groundwater potentiometric map presented on **Figures 7 and 8**. As depicted by the groundwater potentiometric maps, site-wide groundwater flow across is projected radially to the north, west and south, and groundwater flow along the western boundary of the landfill is to the west, towards Ellerbe Creek. As presented on **Figure 7** and **Table 3**, using the November 30, 2009 groundwater elevations, hydraulic gradient for the groundwater flow from the three point problems was calculated to be approximately 0.048 ft/ft, 0.035 ft/ft and 0.05 ft/ft **(Table 3)**. Using these values, the estimated rate of groundwater seepage velocity within the monitored zone of the uppermost aquifer beneath the facility was calculated using the following modified Darcy equation:

$$Vgw = Ki/ne$$

Where values are equal to the following:

Vgw = average seepage velocity (feet/year),
K = hydraulic conductivity (feet/year),
i = horizontal hydraulic gradient, and
ne = effective porosity.

The value for effective porosity (ne) of 20% was based on estimates from Malcolm Pirnie, Inc.'s *City of Durham Sanitary Landfill Water Quality Monitoring plan, dated April 1994*. The values for hydraulic conductivity (K) were based on estimates from S&ME's *Monitoring Report, Semi-Annual Monitoring of Groundwater and Surface Water, dated July 30, 2008*. The calculated groundwater seepage velocity under the waste management unit for the three hydraulic gradient and hydraulic conductivity values from MW-7R, MW-2 and MW-8 were approximately 14.37 ft/year to the north-northeast, 9.70 feet/year to the north-northwest, and approximately 89.08 ft/year to the south-southwest. The gradient near MW-10 is approximately 0.04 ft/ft to the west-northwest and the seepage velocity based on the November 30, 2009 data is approximately 9.54 feet/year **(Table 3)**.

4.3 Groundwater and Surface Water Interaction

Groundwater and Surface Water Transducer Data

Groundwater and surface water elevation data in the unnamed tributary/storm water drainage feature were collected from the piezometers and stream gauges at five minute intervals over a four month period using transducers equipped with data loggers, generating approximately 28,000± data points per location. Water levels collected with pressure transducers from piezometers at the site are summarized below:

Statistical Summary of Elevation Data
Measurement Period July - November 2009
Groundwater and Stream Water Levels

Well ID	Number of data points (n)	Minimum Water Level (Ft MSL)	Maximum Water Level (Ft MSL)	Average Water Level (Ft MSL)
NES-6	27952	269.78	279.82	274.91
Cross Section Group 1				
NES-1	27946	272.64	278.25	274.36
SG-1	27940	276.59	279.48	276.84
NES-2	27934	271.13	280.18	277.05
Cross Section Group 2				
NES-3	27984	271.41	276.95	274.78
NES-7*	11561	273.42	279.48	276.52
SG-2	27963	275.23	278.61	275.86
MW-10	27975	271.45	279.06	275.77
MW-6R	27980	273.03	278.98	276.69
Cross Section Group 2				
NES-4	27967	272.32	275.56	274.34
NES-5	27969	272.43	276.37	274.21
SG-3	27974	274.16	277.52	274.44
NES-5	27969	272.43	276.37	274.21

* NES-7 was installed 2 months after the other NES piezometers and stream gauges.

The transducers collected groundwater or surface water pressure over the top of the transducer measured in pounds per square inch (psi) at five minute intervals over a four month period (July 2009 through November 2009). Groundwater and surface water levels were also periodically measured manually with an electronic water level probe. When the data from the pressure transducers was downloaded, the pressure readings were converted from psi to feet of water. The feet of standing water over the pressure transducers was converted to water level elevations, relative to ft-AMSL, using the manual water level measurements collected from the surveyed top of casing elevations of the temporary piezometers, monitor wells and stream gauges. The pressure transducer data (water levels) has been summarized in the groundwater elevation graphs included in **Appendix II**.

Interaction of Surface Water and Groundwater

The groundwater and surface water elevation data measured in MW-10, the NES piezometers and the stream gauges, from August 25, 2009 to November 30, 2009, are plotted on time-series **Graphs 1 through 9** included in **Appendix II**. The following observations are important to interpreting the interaction of surface water and groundwater in the study area.

1. When there is no water in the unnamed tributary/storm water drainage feature, the water elevations measured in the drainage feature are identified as a flat line of plotted data points.
2. Precipitation events are identified by a quick spike in the surface water elevations measured in the stream gauges.
3. During the drier months (i.e., fewer precipitation events observed during August, September and early-October) groundwater elevations are lower than the bottom of the drainage feature.
4. During the drier months, the unnamed tributary/storm water drainage feature is dry except during a rain event and for a short duration following the rain event.
5. During the drier months, water elevations in the piezometers rise slowly over several hours or days in response to rain events.
6. During the wetter months (i.e., more precipitation events observed during mid-October and November), the water levels in the unnamed tributary/storm water drainage feature still fluctuate quickly in response to rain events, however, the stream does not completely empty and continues to have sustained flow between precipitation events.
7. During the wetter months, groundwater elevations in the piezometers occasionally rise above the bottom of the drainage feature.
8. During the wetter months, there is a noticeable difference in the interaction of the surface water to the groundwater between the three different cross-section groups of piezometers/stream gauges.
    a) The surface water elevations and groundwater elevations in the southern group (NES-1, SG-1 and NES-2) tend to rise and fall at different rates,

indicating little or no connection between the surface water and groundwater.

b) The surface water elevations and groundwater elevations in the center group (NES-3, NES-7, SG-2 and MW-10) tend to rise and fall at similar rates, indicating a connection between the surface water and groundwater.
c) The surface water elevations and groundwater elevations in the southern group (NES-1, SG-1 and NES-2) and the northern group (NES-4, SG-3 and NES-5) tend to rise and fall at different rates, indicating little or no connection between the surface water and groundwater.

Observations 1- 6 indicate the unnamed tributary/storm water drainage feature is characteristic of a losing stream. In a losing stream, the water infiltrates into the ground recharging the local groundwater, because the water table is below the bottom of the stream channel.

Observation 7 indicates the unnamed tributary/storm water drainage feature may occasionally have a characteristic of a gaining stream. A gaining stream increases in water volume as it gains water from the local aquifer.

Observation 8 indicates that when the shallow aquifer is saturated, the unnamed tributary/storm water drainage feature may change from characteristics of a losing stream at 8(a), to a gaining stream at 8(b), and back to a losing stream 8(c) as it flows north past NES-5. A review of the physical shape of the drainage basin along the western portion of the landfill provides an explanation how drainage feature goes from losing to gaining and back to losing. As the drainage area is “pinched” where the western most portion of the landfill just out between MW-10 and NES-5, the available storage capacity in the shallow aquifer is reduced, thereby causing water to move west around the landfill and into the drainage feature. After groundwater and surface water move past the “nose” of the landfill near NES-5 additional storage capacity in the aquifer is available to the north and east of the drainage feature, thereby causing the drainage feature to lose surface water back into the shallow aquifer.

Figure 9 presents a conceptual hydrogeologic model of the interaction of surface water and groundwater along the western boundary of the landfill, based on the data obtained from the NES hydrologic characterization. Based on the conceptual hydrogeologic model developed as part of this NES, the unnamed tributary/storm water drainage feature appears to change from a gaining to a losing stream seasonally and also changes from a gaining to losing stream at different locations along it’s course. Because the unnamed tributary/storm water drainage feature is not consistently a hydraulic barrier to groundwater movement, it would be appropriate to establish a compliance monitoring point (monitor well) west of the drainage feature, in the vicinity of NES-3, to monitor groundwater quality along the western portion of the landfill. Surface water samples should also be collected from the unnamed tributary/storm water drainage feature to account for those periods when the stream is gaining.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

A Nature and Extent Study (NES) was performed at the City of Durham closed MSW landfill as a result of the detection of volatile organic compounds (VOCs) along the western boundary of the landfill, in monitor well MW-10, in excess of groundwater quality standards. The following is a summary of the findings of this NES and our conclusions:

- It appears that the source of the VOCs is located within the landfilled waste. VOC-impacted groundwater has and migrated west of the landfill, in the direction of groundwater flow, toward Ellerbe Creek. Assessment activities conducted as part of the NES, included installation piezometers west of the landfill and collection of groundwater samples. The constituents of concern have been defined laterally and are confined within the 250' compliance boundary.

- Between July 31, 2009 and November 30, 2009, S&ME conducted a hydrologic characterization along the western boundary of the landfill near MW-10. Water levels were measured in seven piezometers and three stream gauges to develop a conceptual model of groundwater and surface water flow, and the connection between the shallow groundwater aquifer and the unnamed tributary/storm water drainage feature near MW-10.

- The results of the study indicate that site-wide groundwater flow across is radially to the north, south and west, consistent with flow projections presented in the facility's Semiannual Sampling Reports. Groundwater flow along the western boundary of the landfill is to the west, towards Ellerbe Creek.

- The drainage feature located between the landfill and Ellerbe Creek is dry for much of the year and is characteristic of a losing stream, recharging the shallow aquifer through infiltration.

- When the shallow aquifer is saturated, the unnamed tributary/storm water drainage feature may exhibit the characteristic of a gaining stream, gaining water from the local shallow aquifer. Under saturated aquifer conditions, as it flows from south to north, the drainage feature change from characteristics of a losing stream, to a gaining stream, and back to a losing stream as it flows north past NES-5.

- Based on the conceptual hydrogeologic model developed as part of this study, the unnamed tributary/storm water drainage feature is not consistently hydraulic barrier to groundwater movement.

6.2 Recommendations

Based on the findings of the NES performed for the City of Durham closed MSW landfill facility, S&ME recommends the following actions:

- This NES report should be submitted to the NCDENR-DWM Solid Waste Section for the Section's consideration as part of a request to modify the facility's water quality monitoring network.

- Sampling of monitor well MW-10 should be discontinued and a new compliance monitoring point (monitor well) should be established west of the drainage feature, to monitor groundwater quality along the western portion of the landfill. The new monitor well should be installed in the vicinity of NES-3 (in the vicinity of proposed monitor well MW-13 in the revised *Water Quality Monitoring Plan*, dated June 9, 2009. Based on the results of groundwater sampling at the new compliance monitor well, the facility may be able to return to detection monitoring as in accordance with the Solid Waste Management Rules, Section .1633 - Detection Monitoring Program.

- Surface water sampling should continue at sampling location SW-2 previously established along the unnamed tributary/storm water drainage feature.

- Proposed revisions to the water quality monitoring network as described in the revised *Water Quality Monitoring Plan*, dated June 9, 2009, previously submitted to the NCDENR-DWM Solid Waste Section, were not fully implemented pending the outcome of the NES. The *Water Quality Monitoring Plan* should be reviewed and implemented as appropriate considering the findings of this NES; the *Request to Revise the Monitor Well Network*, dated May 12, 2011 by S&ME; *Response to Monitor Well Network Revision Request*, dated May 17, 2011 from NCDENR; and recent semiannual groundwater sampling results.

- The temporary piezometers installed as part of the NES (NES-1 through NES-7) should be removed and properly abandoned.

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TABLES

Table 1
Monitor Well/Piezometer Construction Information
City of Durham Closed Municipal Solid Waste Landfill
S&ME Project No. 1054-07-469

Well Identification	Ground Surface Elevation (ft AMSL) Previous	Ground Surface Elevation (ft AMSL) New	TOC Elevation (ft AMSL) Previous	TOC Elevation (ft AMSL) New	Well Depth* (ft bgs)	Well Diameter (inches)	Screened Interval** (ft bgs)
MW-2	284.84	283.69	286.54	285.65	19.62	2	9.62 - 19.62
MW-3	284.20	NM	285.80	NM	25.33	2	15.33 - 25.33
MW-3R	NM	282.18	NM	285.19	17.65	2	7.65 - 17.65
MW-4R	293.00	291.91	295.63	294.48	17.39	2	7.39 - 17.39
MW-5	297.76	297.16	299.76	298.56	21.77	2	11.77 - 21.77
MW-6R	289.39	287.62	291.39	290.51	26.72	2	16.72 - 26.72
MW-7R	315.70	314.60	318.21	317.12	44.10	2	19.10 - 44.10
MW-8	309.30	308.24	313.10	311.96	16.52	2	9.02 - 16.52
MW-9R	358.81	358.03	361.47	360.58	22.55	2	12.55 - 22.55
MW-10	282.11	280.75	284.00	282.81	16.61	2	6.61-16.61
PZ-2R	344.29	343.12	346.56	345.90	34.59	2	24.59 - 34.59
PZ-3	346.90	345.71	350.03	349.33	42.40	2	27.40 - 42.40
PZ-4R	336.40	335.85	339.42	338.82	38.38	2	23.38 - 38.38
PZ-6	347.61	346.79	350.11	349.21	61.50	2	41.50 - 61.50
NES-1	-	280.83	-	282.45	10.20	2	5.20-10.20
NES-2	-	280.94	-	283.44	12.45	2	7.45-12.45
NES-3	-	280.69	-	283.56	12.35	2	7.35-12.35
NES-4	-	280.62	-	282.55	10.20	2	5.20-10.20
NES-5	-	279.93	-	282.53	10.20	2	5.20-10.20
NES-6	-	280.60	-	282.53	12.60	2	7.60-12.60
NES-7	-	278.56	-	282.76	10.20	2	5.20-10.20
SG-1	-	276.57	-	283.70	8.60	2	8.60
SG-2	-	275.54	-	282.51	8.42	2	8.42
SG-3	-	274.13	-	281.88	10.15	2	10.15

Notes:
ft AMSL = feet above mean sea level
TOC = top of well casing elevation
-- = no data available
bgs = below ground surface
TOC and Ground Surface Elevations were surveyed by Barbara H. Mulkey Engineering in January 2001.
TOC and Ground Surface Elevations surveyed for new wells P2-R, P-4R, MW-6R, MW-7R and MW-9R in 2005 by Mulkey Engineering.
TOC and Ground Surface Elevations surveyed for new well MW-10 TOC elevation surveyed by Bateman Civil Survey P.C. in September 2008
** Screened interval is approximate, based on field measurements by S&ME in May 2008.
* Depth to bottom measurements taken on June 13, 2008.

Table 2
Summary of Groundwater Elevation Data
City of Durham Closed Municipal Solid Waste Landfill
S&ME Project No. 1054-07-469

8/25/2009

Barotroll Serial Number	Well ID	Depth to Water (ft. BTOC)	TOC Elevation (ft. AMSL)	Groundwater Elevation (ft. AMSL)
116727	MW-6R	14.23	290.51	276.28
116728	MW-10	7.21	282.81	275.60
116730	NES-1	8.72	282.45	273.73
116759	NES-2	7.25	283.44	276.19
116845	NES-3	9.04	283.56	274.52
116837	NES-4	8.35	282.55	274.20
116828	NES-5	8.70	282.53	273.83
116734	NES-6	8.31	282.53	274.22
116920	NES-7	Not Installed	Not Installed	Not Measured
116833	SG-1	6.92	283.70	276.78
116827	SG-2	6.69	282.51	275.82
116848	SG-3	7.59	281.88	274.29

10/21/2009

Barotroll Serial Number	Well ID	Depth to Water (ft. BTOC)	TOC Elevation (ft. AMSL)	Groundwater Elevation (ft. AMSL)
116727	MW-6R	14.43	290.51	276.08
116728	MW-10	7.35	282.81	275.46
116730	NES-1	8.77	282.45	273.68
116759	NES-2	7.07	283.44	276.37
116845	NES-3	9.06	283.56	274.50
116837	NES-4	8.26	282.55	274.29
116828	NES-5	8.57	282.53	273.96
116734	NES-6	8.82	282.53	273.71
116920	NES-7	9.00	282.76	273.76
116833	SG-1	7.07	283.70	276.63
116827	SG-2	6.70	282.51	275.81
116848	SG-3	7.94	281.88	273.94

11/30/2009

Barotroll Serial Number	Well ID	Depth to Water (ft. BTOC)	TOC Elevation (ft. AMSL)	Groundwater Elevation (ft. AMSL)
116727	MW-6R	11.62	290.51	278.89
116728	MW-10	6.74	282.81	276.07
116730	NES-1	4.93	282.45	277.52
116759	NES-2	3.83	283.44	279.61
116845	NES-3	7.26	283.56	276.30
116837	NES-4	7.58	282.55	274.97
116828	NES-5	7.66	282.53	274.87
116734	NES-6	2.55	282.53	279.98
116920	NES-7	6.73	282.76	276.03
116833	SG-1	6.96	283.70	276.74
116827	SG-2	6.59	282.51	275.92
116848	SG-3	7.37	281.88	274.51
-	MW-2	6.17	285.65	279.48
-	MW-3R	3.49	282.18	278.69
-	MW-4R	2.14	291.91	289.77
-	MW-5	8.41	297.16	288.75
-	MW-7R	15.46	314.6	299.14
-	MW-8	8.11	308.24	300.13
-	MW-9R	13.74	358.03	344.29
-	PZ-2R	26.57	343.12	316.55
-	PZ-3	31.84	345.71	313.87
-	PZ-4R	23.15	335.85	312.7
-	PZ-6	44.17	346.79	302.62

Notes:
ft AMSL = feet above mean sea level
TOC = top of well casing elevation
TOC and Ground Surface Elevations were surveyed by Barbara H. Mulkey Engineering in January 2001.
TOC and Ground Surface Elevations surveyed for new wells P2-R, P-4R, MW-6R, MW-7R and MW-9R in 2005 by Mulkey Engineering.
TOC and Ground Surface Elevations surveyed for new well MW-10 TOC elevation surveyed by Bateman Civil Survey P.C. in September 2008
TOC and Ground Surface Elevations surveyed for all wells by Sepi Engineering in September 2009
NES designation is for temporary piezometers associated with the Nature and Extent Study.
SG = Stream Gauge.

Table 3
Summary of Estimated Horizontal Flow Velocities
City of Durham Closed Municipal Solid Waste Landfill
S&ME Project No. 1054-07-469

November 2009								
Gradient Calculation Segment	**Monitoring Wells in Three point Calculation**	**Flow Direction**	**True Gradient Segment Length (feet)**	**Gradient Segment Elevations (feet)**	**Horizontal Gradient (i, feet)**	**Effective Porosity (ne)**	**Hydraulic Conductivity (K, cm/sec)**	**Velocity (Vgw, feet/year)**
i 1	*MW-9R to MW-5*	NNE	1165	344.29	0.048	0.2	5.85E-05	14.37
	MW-7R			288.75				
i 2	*MW-9R to MW-6R*	NNW	1895	344.29	0.035	0.2	5.43E-05	9.70
	MW-2			278.48				
i 3	*MW-9R to MW-3R*	SSW	1320	344.29	0.050	0.2	3.48E-04	89.08
	MW-8			278.69				
i 4	*NES-2 to MW-10*	WNW	88.9	279.61	0.040	0.2	4.65E-05	9.54
	MW-6R			276.07				
				i1 to i3 Avg. Hydraulic Gradient =	**0.044**		**Avg. Velocity =**	**37.72**

Notes:
Horizontal velocities based on the modified Darcy equation Vgw = Ki/ne.
Hydraulic conductivity values (K) for MW-2, MW-8, MW-7R from *May 2008 Monitoring Report* (S&ME, July 2008)
Effective Porosity (n_e) estimated for residual soils in Carolina Slate Belt
Hydraulic Gradient (i) calculated by measuring linear feet between selected contour intervals
Ave. Linear Velocity (v) = (1.035E06)K*i/n for units shown
To convert cm/sec to ft/yr, multiply n by 1.035E06
i1, i2, and i3 shown on Figure 6
i 4 shown on Figure 7

Table 4
Summary of Field Parameters
City of Durham Closed Municipal Solid Waste Landfill
Project No. 1054-07-469

Well Number	Field Parameter					
	pH	Conductivity (mS/cm)	Temperature (oC)	Dissolved Oxygen (mg/L)	Oxygen Reduction Potential (mV)	Turbidity (NTUs)
NES-1	5.35	0.392	19.62	4.44	215.0	38.6
NES-2	5.89	1.144	18.83	1.29	12.7	11.6
NES-3	5.59	0.412	19.59	0.98	69.8	286.0
NES-4	5.24	0.341	19.24	0.65	125.0	5.1
NES-5	5.03	0.389	20.09	1.08	151.1	13.0
NES-6	6.17	1.004	19.84	2.34	156.4	35.4
NES-7	6.14	0.200	18.10	NM	NM	NM

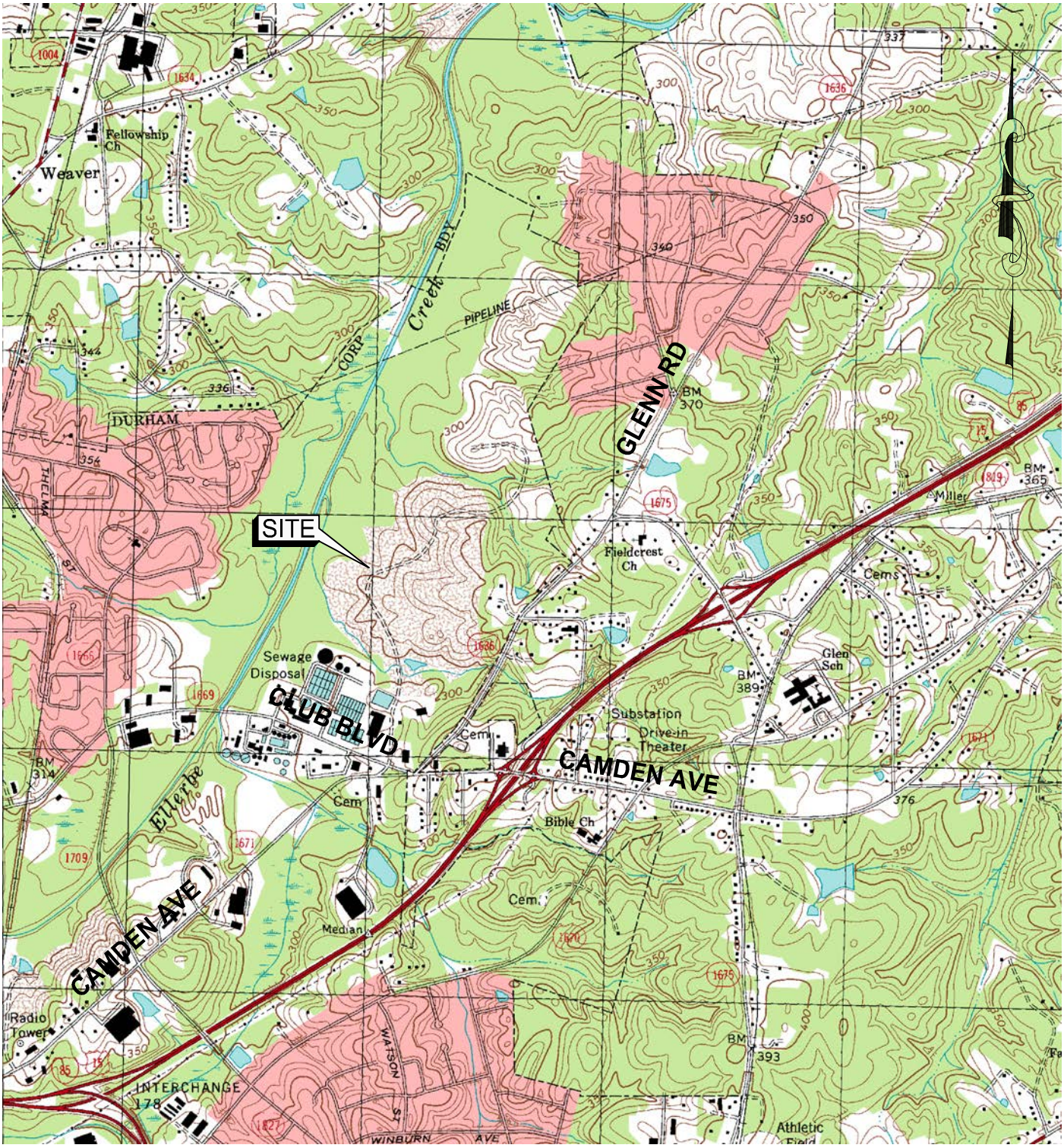
Notes:
pH = power of hydrogen
mS/cm = milliSeimens per centimeter
°C = degrees celcius
mg/L = milligrams per liter
mV = millivolts
NTUs = nephelometric turbidity units
NM = not measured

Table 5
Groundwater Quality Summary
City of Durham Closed Municipal Solid Waste Landfill
Nature and Extent Study
S&ME Project No. 1054-07-469

				GROUNDWATER QUALITY SUMMARY							
APPENDIX I VOCs EPA METHOD 8260	UNITS	SWSL	2L Standard	TEMPORARY PIEZOMETERS							
				NES-1	NES-2	NES-3	NES-4	NES-5	NES-6	NES-7	MW-10*
Date Colllected				17-Aug-09						21-Oct-09	30-Jun-09
Acetone	µg/L	100	6000	<1.5	<1.5	**4.2 J**	<1.5	<1.5	<1.5	**3.6 J**	<1.5
Benzene	µg/L	1	1	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	**4.6 JD**
1,4-Dichlorobenzene	µg/L	1	6	<0.38	<0.38	<0.38	<0.38	<0.38	<0.38	**0.75 J**	**2.2 JD**
1,1-Dichloroethane	µg/L	5	6	<0.33	**0.80 J**	<0.33	<0.33	<0.33	<0.33	**1.0 J**	**7.8 D**
1,1-Dichloroethene	µg/L	5	7	<0.24	**0.50 J**	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24
cis-1,2 Dichloroethene	µg/L	5	70	<0.36	**1.1 J**	<0.36	<0.36	<0.36	<0.36	**28**	**370 D**
trans-1,2-Dichloroethene	µg/L	5	100	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	**0.90 J**	**9.7 D**
1,2-Dichloropropane	µg/L	1	0.6	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	**0.91 J**	**9.4 D**
Tetrachloroethene	µg/L	1	0.7	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	**2.6 JD**
Trichloroethene	µg/L	1	3	<0.38	<0.38	<0.38	<0.38	<0.38	<0.38	<0.38	**38 D**
Vinyl Chloride	µg/L	1	0.03	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	**2.4**	**23 D**

Notes:
VOCs = Volatile Organic Compounds
2L STANDARD = North Carolina groundwater standards as promulgated by 15A North Carolina Administrative Code, Subchapter 2L.
SWSL = Solid Waste Section Limit
µg/L = Micrograms Per Liter
Values which are **BOLDED** and shaded indicate levels above their respective NCDENR 2L or GWP Standards.
Compounds not shown were not detected during this sampling event.
Samples for NES-1 through NES-6 were collected on August 17, 2009 and analyzed by ENCO.
Samples for NES-7 was collected on October 21, 2009 and analyzed by ENCO.
Sample for MW-10 was collected on June 30, 2009 as part of the Semiannual sampling event and was analyzed by ENCO.
Detection limits are shown on laboratory reports.
J = Laboratory Qualifier. Estimated value below the lowest calibration point. Confidence correlates with concentration.
D = The sample was analyzed at a dilution.

FIGURES



TOPO SOURCE: NCGS DRG
SE DURHAM NC, DATED 1999
CONTOUR INTERVAL 10 FEET

GRAPHIC SCALE

1000 0 500 1000 2000

(IN FEET)

A-3264

SCALE: 1" = 2000'	S&ME WWW.SMEINC.COM	VICINITY MAP
DATE: AUG. 2012		CLOSED LANDFILL PERMIT #32-01
DRAWN BY: BTR		DURHAM, NORTH CAROLINA
PROJECT NO: 1054-07-469	NC ENGINEER LICENSE #F-0176 3201 SPRING FOREST RD, RALEIGH, NC 27616	FIGURE NO. 1

S:\PROJECTS\2007\07-469 City of Durham MSWLF\CAD\A3264.dwg, FIG1, 12/13/2012 8:56:21 AM, 1:1

GRAPHIC SCALE

250 0 125 250 500

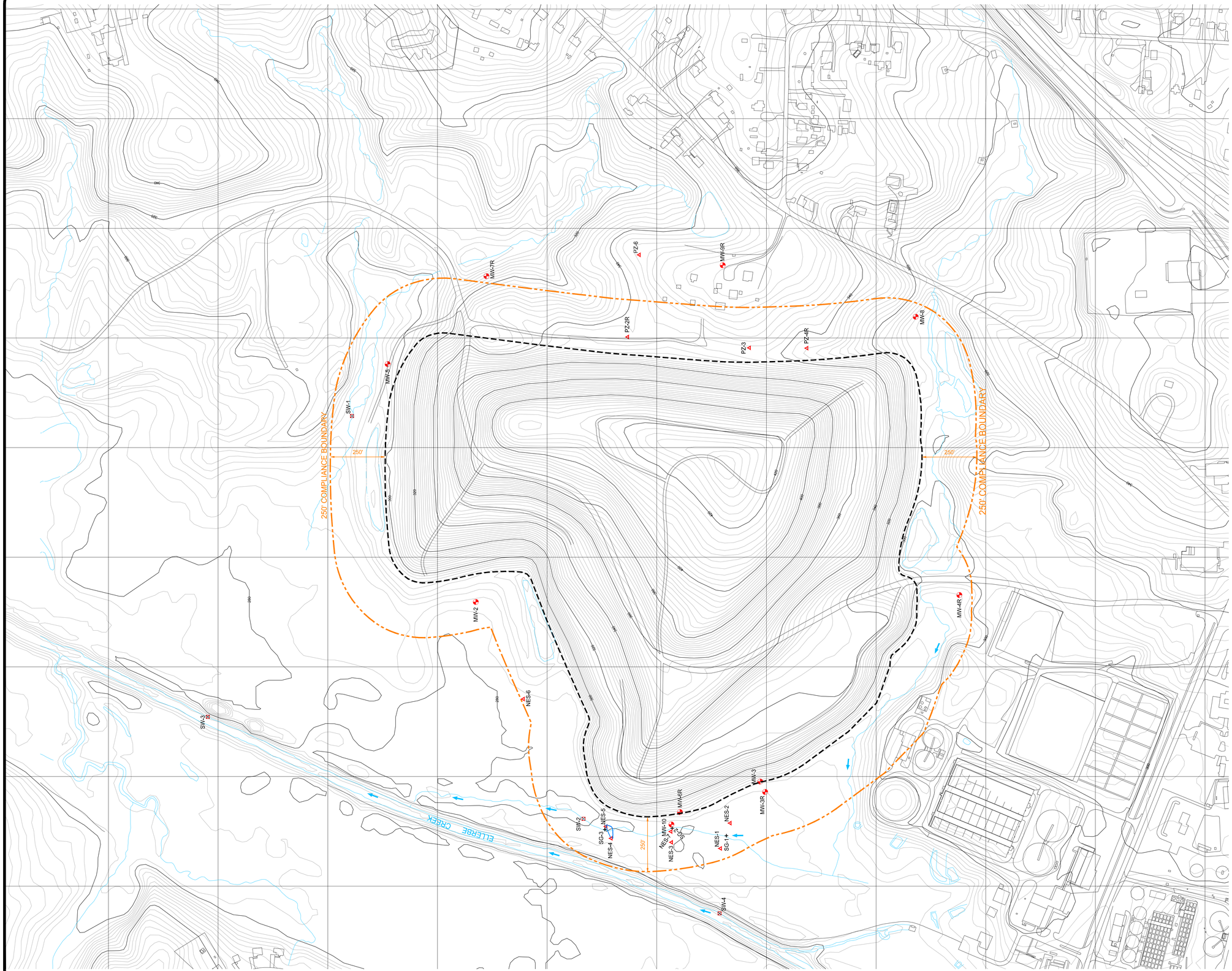
(IN FEET)

IMAGE SOURCE: NC ONEMAP, DATED 2010

A-3265

SCALE: 1" = 500'	S&ME WWW.SMEINC.COM NC ENGINEER LICENSE #F-0176 3201 SPRING FOREST RD, RALEIGH, NC 27616	SITE MAP CLOSED LANDFILL PERMIT #32-01 DURHAM, NORTH CAROLINA	FIGURE NO.
DATE: AUG. 2012			2
DRAWN BY: BTR			
PROJECT NO: 1054-07-469			

S:\PROJECTS\2007\07-469 City of Durham MSWLF\CAD\A3265.dwg, FIG2, 12/13/2012 8:57:00 AM, 1:1



LEGEND

- MONITOR WELLS
- STREAM GAUGE
- PIEZOMETERS
- SURFACE WATER SAMPLE LOCATIONS
- GAS COMPLIANCE MONITORING POINTS
- CONTOUR LINE - MAJOR (20 FT)
- CONTOUR LINE - MINOR (2 FT)
- 250' COMPLIANCE BOUNDARY
- APPROXIMATE LIMIT OF WASTE
- SURFACE WATER FLOW DIRECTION

NOTE:

1. MONITOR WELL LOCATIONS SURVEYED BY MULKEY ENGINEERING IN JANUARY 2001 AND 2005.
2. WELLS MW-1, MW-4, MW-6, MW-7, MW-9, PZ-1, PZ-2 AND PZ-4 HAVE BEEN ABANDONED, DAMAGED OR DESTROYED AND ARE NOT SHOWN ON THIS MAP.
3. TOPOGRAPHIC CONTOUR INTERVAL = 2 ft.
4. *MW-10 SURVEYED BY BATEMAN CIVIL SURVEY.

GRAPHIC SCALE

400 0 200 400

(IN FEET)

SOURCE:
CONTOURS - NCDOT LIDAR DATED APRIL 2007
BUILDINGS - DURHAM GIS DATED 1994
IMAGERY - DURHAM GIS DATED 2005

S&ME
WWW.SMEINC.COM
NC ENG. LICENSE #F-0176 PHONE: (919) 872-2660
3201 SPRING FOREST ROAD, RALEIGH, NC 27616

NO.	DATE	DESCRIPTION	BY

SITE MAP WITH FEATURE LOCATIONS

CLOSED LANDFILL PERMIT #32-01
DURHAM, NORTH CAROLINA

DRAWN BY: BTR	CHECKED BY:
DESIGNED BY:	APPROVED BY:
PROJECT NUMBER: 1054-07-469	
SCALE: 1" = 200'	DATE: JUNE 2010
DRAWING NUMBER: D-1289	
DRAWING: 3	OF:

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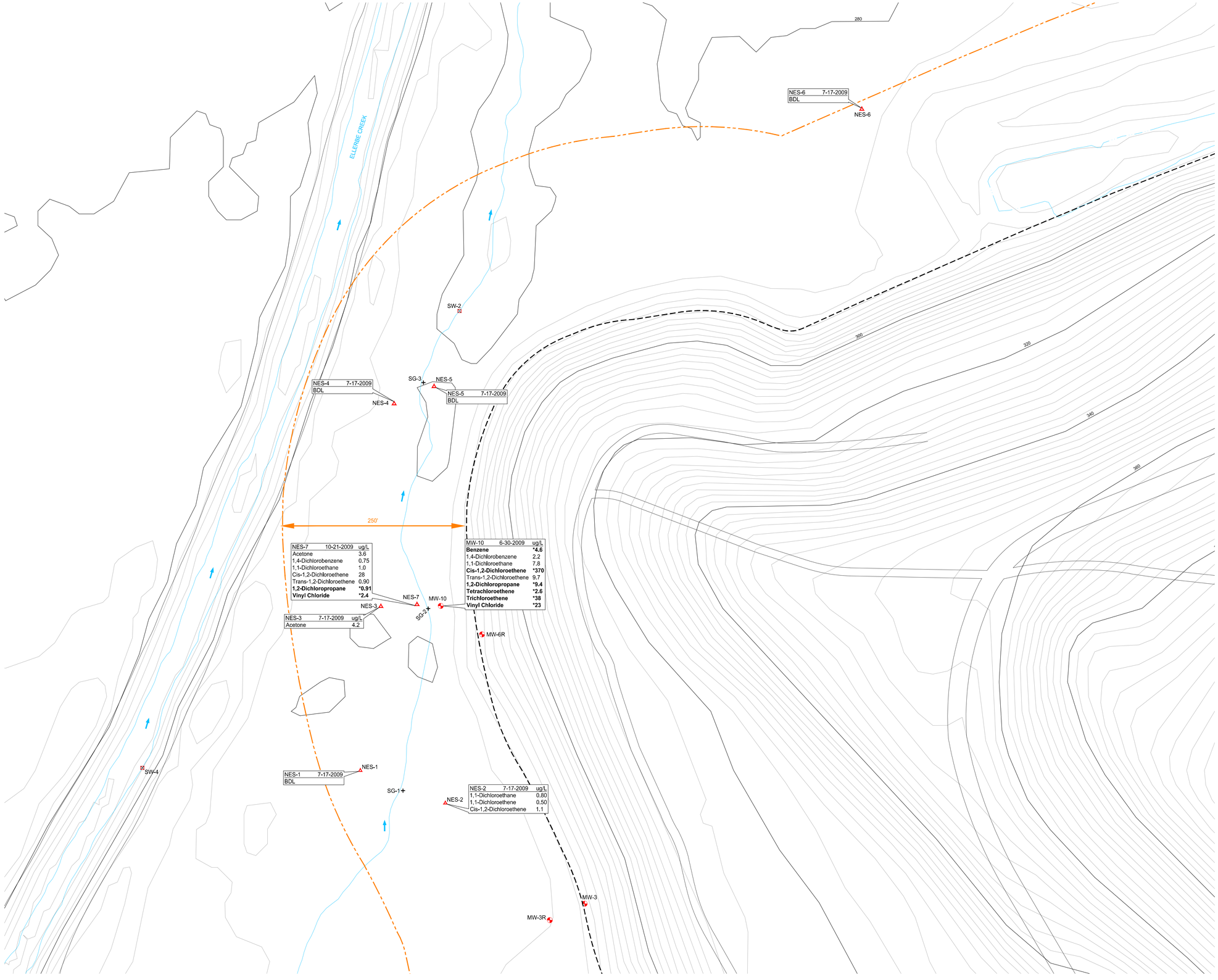

LEGEND

- MONITOR WELLS
- STREAM GAUGE
- PIEZOMETERS
- SURFACE WATER SAMPLE LOCATIONS
- GAS COMPLIANCE MONITORING POINTS
- CONTOUR LINE - MAJOR (20 FT)
- CONTOUR LINE - MINOR (2 FT)
- 250' COMPLIANCE BOUNDARY
- APPROXIMATE LIMIT OF WASTE
- SURFACE WATER FLOW DIRECTION
- ug/L - MICROGRAMS PER LITER
- BDL - BELOW DETECTION LIMIT

NOTE:

1. MONITOR WELL LOCATIONS SURVEYED BY MULKEY ENGINEERING IN JANUARY 2001 AND 2005.
2. WELLS MW-1, MW-4, MW-6, MW-7, MW-9, PZ-1, PZ-2 AND PZ-4 HAVE BEEN ABANDONED, DAMAGED OR DESTROYED AND ARE NOT SHOWN ON THIS MAP.
3. TOPOGRAPHIC CONTOUR INTERVAL = 2 ft.
4. MW-10 SURVEYED BY BATEMAN CIVIL SURVEY.
5. * INDICATES CONCENTRATION EXCEEDS NCDENR GROUNDWATER PROTECTION STANDARD (2L OR GWPST).
6. BDL - ALL CONSTITUENTS WERE BELOW THE LABORATORY DETECTION LIMIT.
7. CONSTITUENTS NOT SHOWN WERE NOT DETECTED.

GRAPHIC SCALE

120 0 60 120

(IN FEET)

SOURCE:
CONTOURS - NCDOT LIDAR DATED APRIL 2007
BUILDINGS - DURHAM GIS DATED 1994
IMAGERY - DURHAM GIS DATED 2005

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NO.	DATE	DESCRIPTION	BY

CONSTITUENT CONCENTRATION MAP

CLOSED LANDFILL PERMIT #32-01
DURHAM, NORTH CAROLINA

DRAWN BY: BTR	CHECKED BY:
DESIGNED BY:	APPROVED BY:
PROJECT NUMBER: 1054-07-469	
SCALE: 1" = 60'	DATE: AUG. 2012
DRAWING NUMBER: D-1294	
DRAWING: 4	OF:

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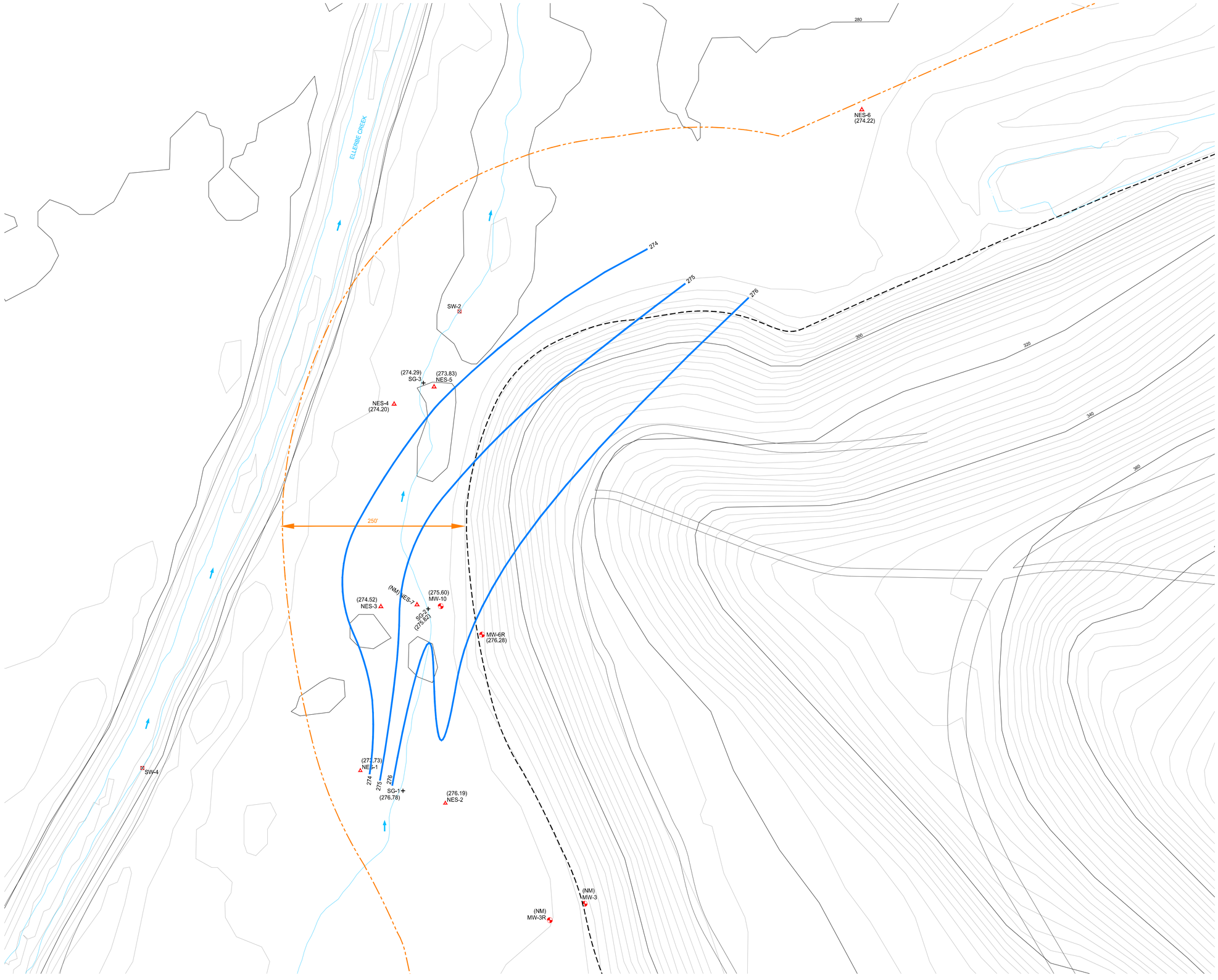

LEGEND

- MONITOR WELLS
- STREAM GAUGE
- PIEZOMETERS
- SURFACE WATER SAMPLE LOCATIONS
- GAS COMPLIANCE MONITORING POINTS
- CONTOUR LINE - MAJOR (20 FT)
- CONTOUR LINE - MINOR (2 FT)
- (276.08) GROUNDWATER ELEVATION
- 285 GROUNDWATER CONTOUR WITH ELEVATION
- GROUNDWATER FLOW DIRECTION
- SURFACE WATER FLOW DIRECTION
- 250' COMPLIANCE BOUNDARY
- APPROXIMATE LIMIT OF WASTE
- (NM) NOT MEASURED

NOTE:

1. MONITOR WELL LOCATIONS SURVEYED BY MULKEY ENGINEERING IN JANUARY 2001 AND 2005.
2. WELLS MW-1, MW-4, MW-6, MW-7, MW-9, PZ-1, PZ-2 AND PZ-4 HAVE BEEN ABANDONED, DAMAGED OR DESTROYED AND ARE NOT SHOWN ON THIS MAP.
3. TOPOGRAPHIC CONTOUR INTERVAL = 2 ft.
4. GROUNDWATER SURFACE CONTOUR INTERVAL = 5 ft.
5. GROUNDWATER CONTOURS BASED ON LINEAR INTERPOLATION BETWEEN AND EXTRAPOLATION FROM KNOW DATA, TOPOGRAPHIC CONTOURS, AND KNOWN FIELD CONDITIONS. THEREFORE, GROUNDWATER CONTOURS MAY NOT REFLECT ACTUAL POTENTIOMETRIC CONDITIONS.
6. GW ELEVATIONS MEASURED ON AUGUST 25, 2009.
7. MW-10 SURVEYED BY BATEMAN CIVIL SURVEY.
8. MW-3R HAS NOT BEEN SURVEYED, AND WAS NOT INCLUDED IN CALCULATION OF CONTOUR LINES.

GRAPHIC SCALE

120 0 60 120

(IN FEET)

SOURCE:
CONTOURS - NCDOT LIDAR DATED APRIL 2007
BUILDINGS - DURHAM GIS DATED 1994
IMAGERY - DURHAM GIS DATED 2005

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NO.	DATE	DESCRIPTION	BY

GROUNDWATER POTENTIOMETRIC MAP
AUGUST 25, 2009

CLOSED LANDFILL PERMIT #32-01
DURHAM, NORTH CAROLINA

DRAWN BY: BTR	CHECKED BY:
DESIGNED BY:	APPROVED BY:
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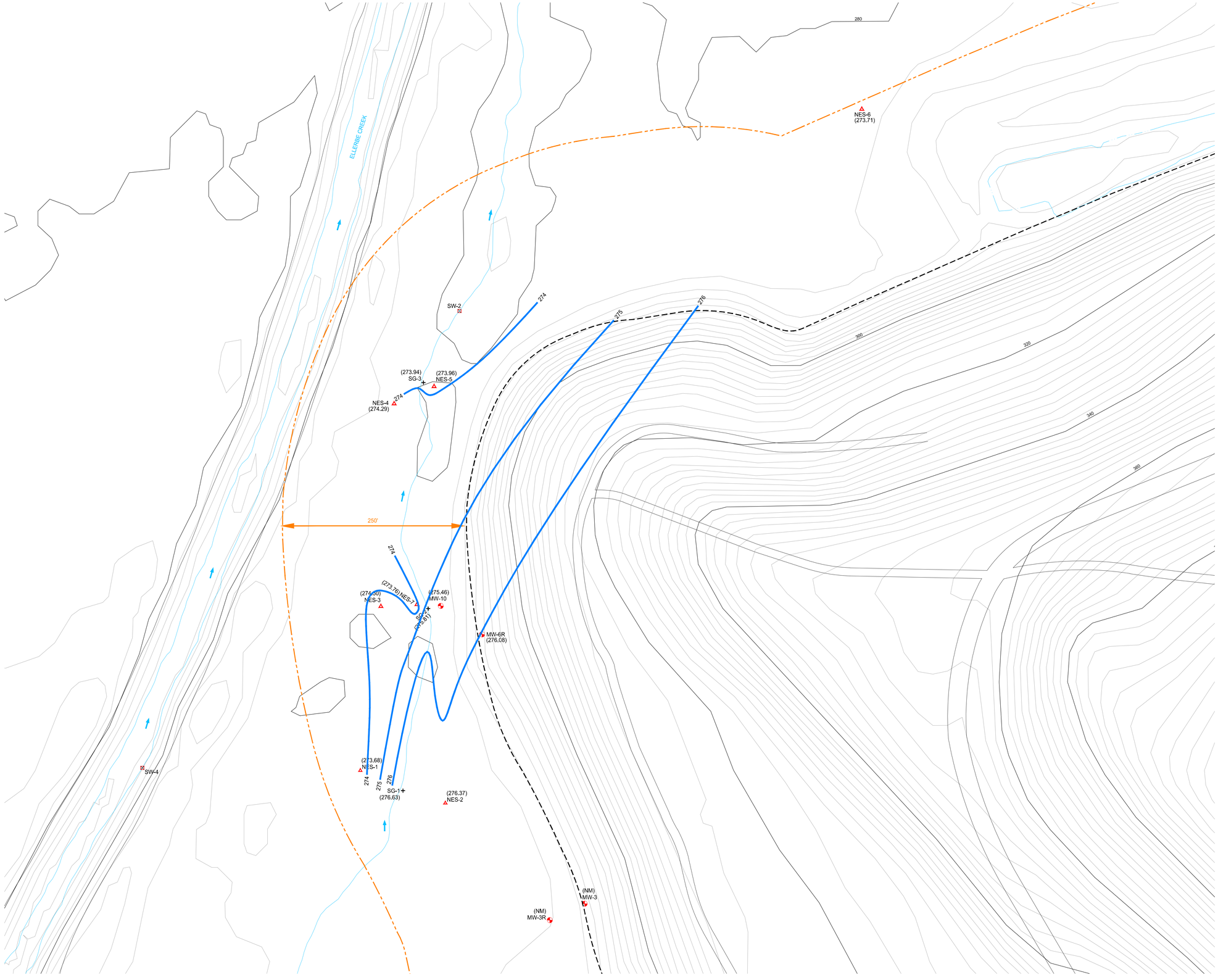

LEGEND

- MONITOR WELLS
- STREAM GAUGE
- PIEZOMETERS
- SURFACE WATER SAMPLE LOCATIONS
- GAS COMPLIANCE MONITORING POINTS
- CONTOUR LINE - MAJOR (20 FT)
- CONTOUR LINE - MINOR (2 FT)
- (276.08) GROUNDWATER ELEVATION
- 285 GROUNDWATER CONTOUR WITH ELEVATION
- GROUNDWATER FLOW DIRECTION
- SURFACE WATER FLOW DIRECTION
- 250' COMPLIANCE BOUNDARY
- APPROXIMATE LIMIT OF WASTE
- (NM) NOT MEASURED

NOTE:

1. MONITOR WELL LOCATIONS SURVEYED BY MULKEY ENGINEERING IN JANUARY 2001 AND 2005.
2. WELLS MW-1, MW-4, MW-6, MW-7, MW-9, PZ-1, PZ-2 AND PZ-4 HAVE BEEN ABANDONED, DAMAGED OR DESTROYED AND ARE NOT SHOWN ON THIS MAP.
3. TOPOGRAPHIC CONTOUR INTERVAL = 2 ft.
4. GROUNDWATER SURFACE CONTOUR INTERVAL = 5 ft.
5. GROUNDWATER CONTOURS BASED ON LINEAR INTERPOLATION BETWEEN AND EXTRAPOLATION FROM KNOW DATA, TOPOGRAPHIC CONTOURS, AND KNOWN FIELD CONDITIONS. THEREFORE, GROUNDWATER CONTOURS MAY NOT REFLECT ACTUAL POTENTIOMETRIC CONDITIONS.
6. GW ELEVATIONS MEASURED ON OCTOBER 21, 2009.
7. MW-10 SURVEYED BY BATEMAN CIVIL SURVEY.
8. MW-3R HAS NOT BEEN SURVEYED, AND WAS NOT INCLUDED IN CALCULATION OF CONTOUR LINES.

GRAPHIC SCALE

120 0 60 120

(IN FEET)

SOURCE:
CONTOURS - NCDOT LIDAR DATED APRIL 2007
BUILDINGS - DURHAM GIS DATED 1994
IMAGERY - DURHAM GIS DATED 2005

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NO.	DATE	DESCRIPTION	BY

GROUNDWATER POTENTIOMETRIC MAP
OCTOBER 21, 2009

CLOSED LANDFILL PERMIT #32-01
DURHAM, NORTH CAROLINA

DRAWN BY: BTR	CHECKED BY:
DESIGNED BY:	APPROVED BY:
PROJECT NUMBER: 1054-07-469	
SCALE: 1" = 60'	DATE: AUG. 2012
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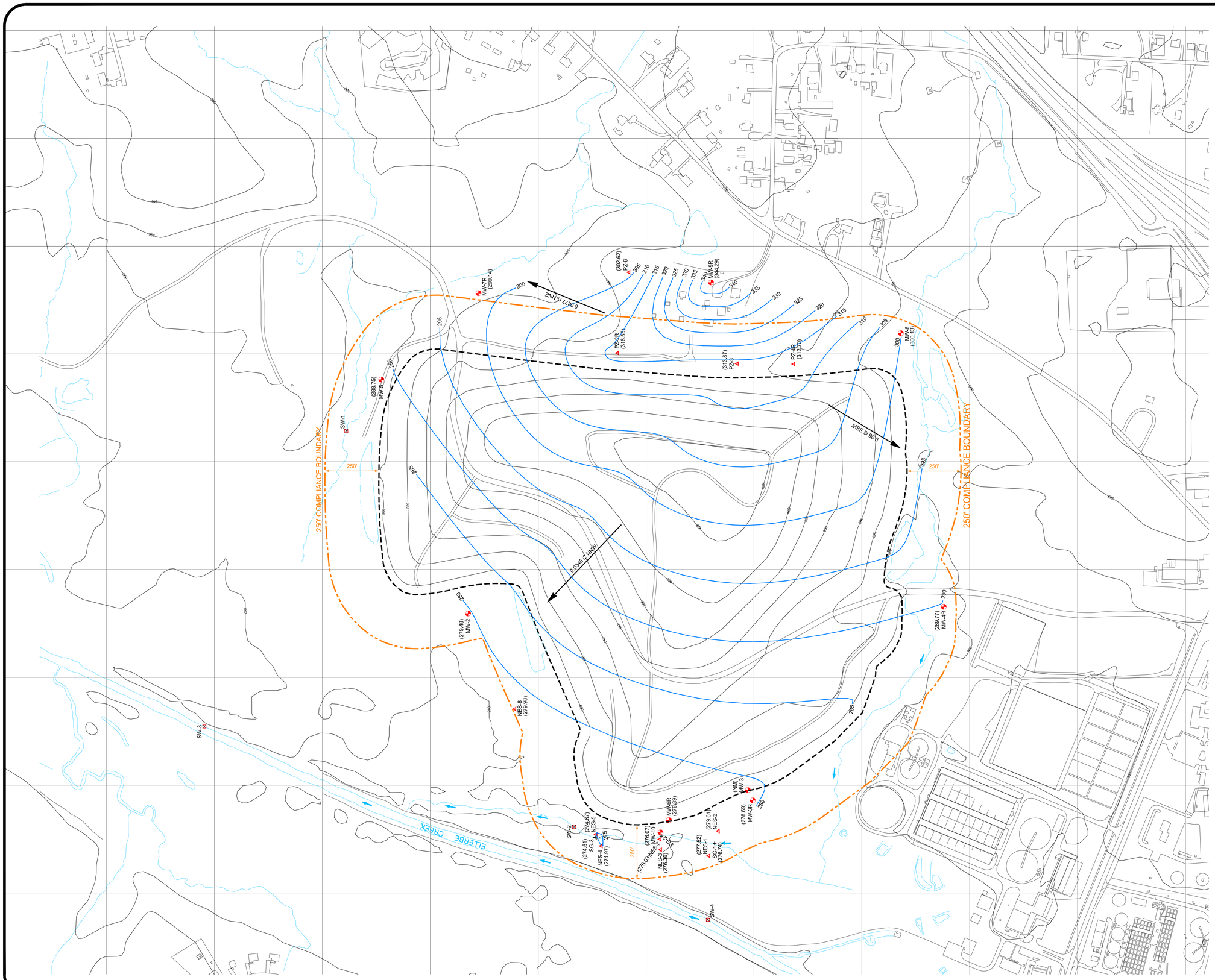

LEGEND

- MONITOR WELLS
- STREAM GAUGE
- PIEZOMETERS
- SURFACE WATER SAMPLE LOCATIONS
- GAS COMPLIANCE MONITORING POINTS
- CONTOUR LINE - MAJOR (20 FT)
- CONTOUR LINE - MINOR (2 FT)
- (276.08) GROUNDWATER ELEVATION
- 285 GROUNDWATER CONTOUR WITH ELEVATION
- GROUNDWATER FLOW DIRECTION
- SURFACE WATER FLOW DIRECTION
- 250' COMPLIANCE BOUNDARY
- APPROXIMATE LIMIT OF WASTE
- (NM) NOT MEASURED

NOTE:

1. MONITOR WELL LOCATIONS SURVEYED BY MULKEY ENGINEERING IN JANUARY 2001 AND 2005.
2. WELLS MW-1, MW-4, MW-6, MW-7, MW-9, PZ-1, PZ-2 AND PZ-4 HAVE BEEN ABANDONED, DAMAGED OR DESTROYED AND ARE NOT SHOWN ON THIS MAP.
3. TOPOGRAPHIC CONTOUR INTERVAL = 2 ft.
4. GROUNDWATER SURFACE CONTOUR INTERVAL = 5 ft.
5. GROUNDWATER CONTOURS BASED ON LINEAR INTERPOLATION BETWEEN AND EXTRAPOLATION FROM KNOW DATA, TOPOGRAPHIC CONTOURS, AND KNOWN FIELD CONDITIONS. THEREFORE, GROUNDWATER CONTOURS MAY NOT REFLECT ACTUAL POTENTIOMETRIC CONDITIONS.
6. GW ELEVATIONS MEASURED ON NOVEMBER 30, 2009.
7. MW-10 SURVEYED BY BATEMAN CIVIL SURVEY.

GRAPHIC SCALE

400 0 200 400

(IN FEET)

SOURCE:
CONTOURS - NCDOT LIDAR DATED APRIL 2007
BUILDINGS - DURHAM GIS DATED 1994
IMAGERY - DURHAM GIS DATED 2005

S&ME
WWW.SMEINC.COM

NO.	DATE	DESCRIPTION	BY

GROUNDWATER POTENTIOMETRIC MAP
NOVEMBER 30, 2009

CLOSED LANDFILL PERMIT #32-01
DURHAM, NORTH CAROLINA

DRAWN BY: BTR	CHECKED BY:
DESIGNED BY:	APPROVED BY:
PROJECT NUMBER: 1054-07-469	
SCALE: 1" = 200'	DATE: AUG. 2012
DRAWING NUMBER: D-1292	
DRAWING: 7	OF:

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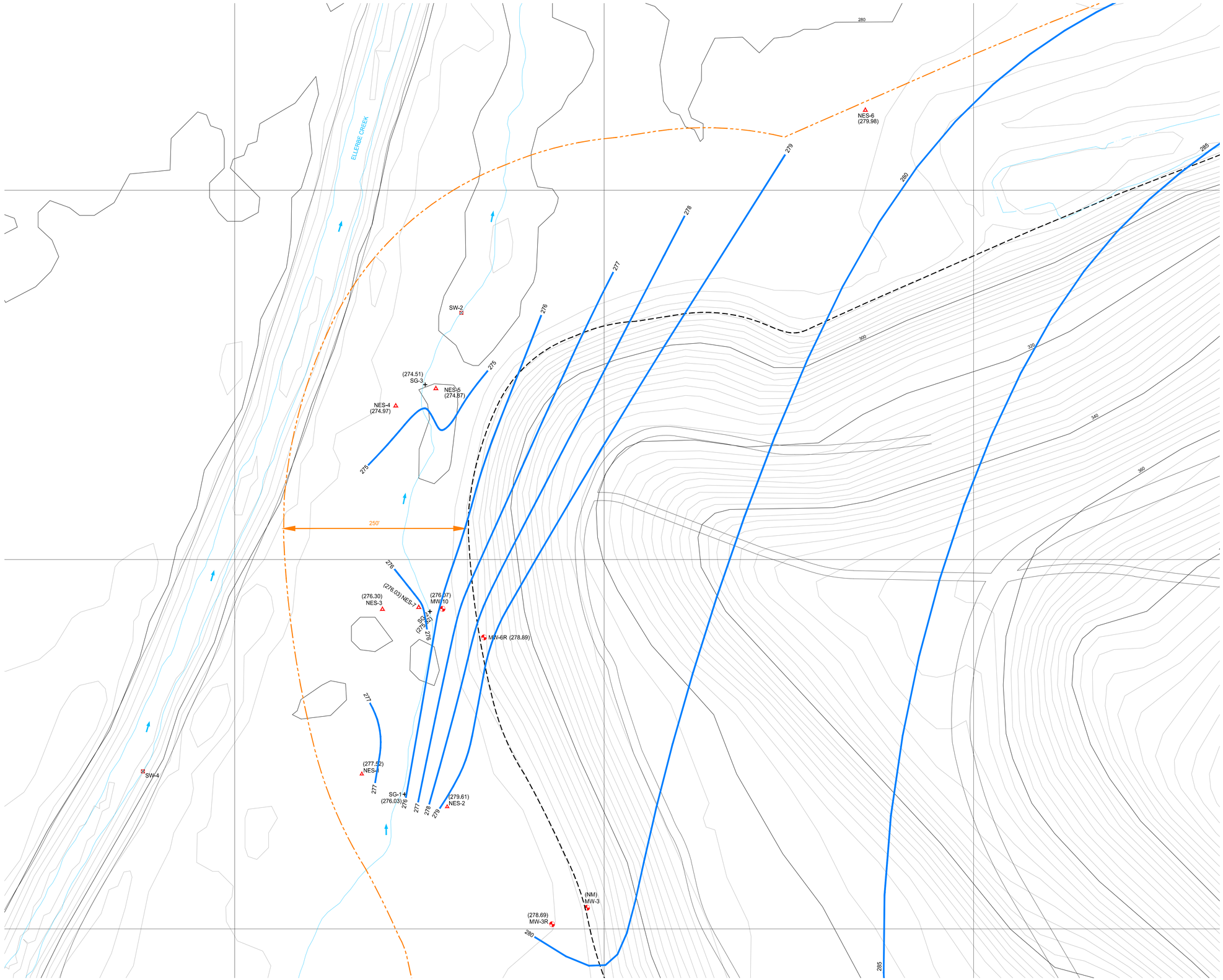

LEGEND

- MONITOR WELLS
- STREAM GAUGE
- PIEZOMETERS
- SURFACE WATER SAMPLE LOCATIONS
- GAS COMPLIANCE MONITORING POINTS
- CONTOUR LINE - MAJOR (20 FT)
- CONTOUR LINE - MINOR (2 FT)
- (276.08) GROUNDWATER ELEVATION
- 285 GROUNDWATER CONTOUR WITH ELEVATION
- GROUNDWATER FLOW DIRECTION
- SURFACE WATER FLOW DIRECTION
- 250' COMPLIANCE BOUNDARY
- APPROXIMATE LIMIT OF WASTE
- (NM) NOT MEASURED

NOTE:

1. MONITOR WELL LOCATIONS SURVEYED BY MULKEY ENGINEERING IN JANUARY 2001 AND 2005.
2. WELLS MW-1, MW-4, MW-6, MW-7, MW-9, PZ-1, PZ-2 AND PZ-4 HAVE BEEN ABANDONED, DAMAGED OR DESTROYED AND ARE NOT SHOWN ON THIS MAP.
3. TOPOGRAPHIC CONTOUR INTERVAL = 2 ft.
4. GROUNDWATER SURFACE CONTOUR INTERVAL = 5 ft.
5. GROUNDWATER CONTOURS BASED ON LINEAR INTERPOLATION BETWEEN AND EXTRAPOLATION FROM KNOW DATA, TOPOGRAPHIC CONTOURS, AND KNOWN FIELD CONDITIONS. THEREFORE, GROUNDWATER CONTOURS MAY NOT REFLECT ACTUAL POTENTIOMETRIC CONDITIONS.
6. GW ELEVATIONS MEASURED ON NOVEMBER 30, 2009.
7. MW-10 SURVEYED BY BATEMAN CIVIL SURVEY.

GRAPHIC SCALE

120 0 60 120

(IN FEET)

SOURCE:
CONTOURS - NCDOT LIDAR DATED APRIL 2007
BUILDINGS - DURHAM GIS DATED 1994
IMAGERY - DURHAM GIS DATED 2005

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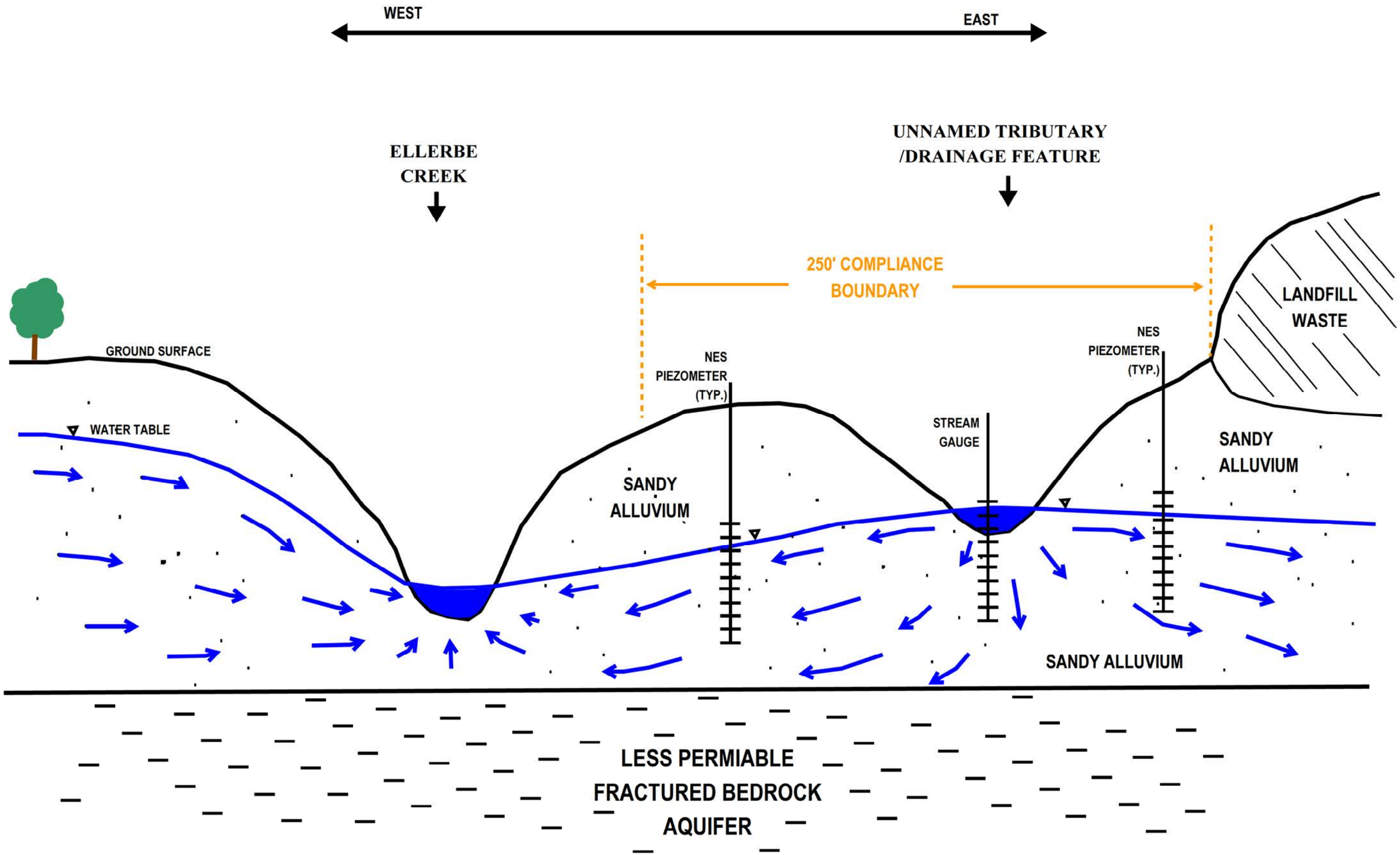
NO.	DATE	DESCRIPTION	BY

GROUNDWATER POTENTIOMETRIC DETAIL MAP
NOVEMBER 30, 2009

CLOSED LANDFILL PERMIT #32-01
DURHAM, NORTH CAROLINA

DRAWN BY: BTR	CHECKED BY:
DESIGNED BY:	APPROVED BY:
PROJECT NUMBER: 1054-07-469	
SCALE: 1" = 60'	DATE: AUG. 2012
DRAWING NUMBER: D-1293	
DRAWING: 8	OF:

S:\PROJECTS\2007\07-469 City of Durham MSW\FIGAUD\0295.dwg, FIG8, 12/13/2012 9:00:08 AM, 1:1



DATE: DEC 2012
DRAWN BY: SPW
CHECKED BY:
SCALE: NTS
PROJECT NUMBER: 1054-07-469
DRAWING NUMBER:

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NC ENGINEER LICENSE #F-0176
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CONCEPTUAL HYDROGEOLOGIC MODEL

CLOSED LANDFILL - PERMIT #32-01
DURHAM, NORTH CAROLINA

FIGURE NO.
9

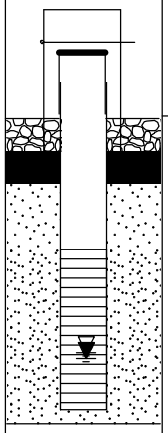
C:\Users\BRatti\Documents\Drawing3.dwg, B-SIZE, 12/19/2012 4:22:49 PM, 1:1

APPENDIX I

Boring Completion Logs

COMPLETION REPORT OF PIEZOMETER NO. NES-1

PROJECT:	**City of Durham MSW Landfill**	APPROXIMATE ELEVATION:	**282.45**
PROJECT NO:	**1054-07-469**	BORING DEPTH (FT.):	**9.5**
PROJECT LOCATION:	**Durham, North Carolina**	LOGGED BY:	**GP**
DRILLING CONTRACTOR:	**S&ME**		
DRILLING METHOD:	**Hand Auger**		
DATE DRILLED:	**7/31/2009**		

STRATA DESCRIPTION	SYMBOL	DEPTH (feet)	WELL DETAILS	DEPTH (feet)	LEGEND	SPT (N-value)	ELEVATION (feet)	FID (ppm)	PID (ppm)
Ground Surface							282.45		
Light brown sandy CLAY		0.0		0 1 2	CB BS				
Light brown/tan large grained SAND, wet at 6.5' bgs		5.0					277.45		
Very hard brown/blue CLAY				9.05	FP				
Boring terminated at 9.5' bgs, piezometer set at 9.05' bgs				9.5	BSC				

WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
Diameter:
Type:
Interval:

OUTER CASING
Diameter:
Type:
Length:

RISER CASING
Diameter:
Type:
Interval:

GROUT
Type: **fill**
Interval: **0 - 1**

SEAL
Type: **bentonite**
Interval: **1 - 2**

FILTERPACK
Type: **#2 sand**
Interval: **2 - 9.05**

SCREEN
Diameter: **2"**
Type: **Sch 40 pvc**
Interval: **4.05 - 9.05**

LEGEND
▽ = Water Level At Termination of Boring (TOB)
▼ = Water Level After 24 Hours
BS = Bentonite Seal
FP = Filter Pack
CG = Cement Grout
BSC = Bottom of Screen
REC = Core Recovery
RQD = Rock Quality Designation

NOTES: Ground surface elevation is 280.83

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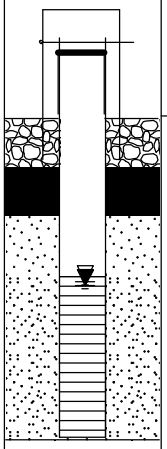
COMPLETION REPORT
OF PIEZOMETER NO. NES-1

COMPLETION REPORT OF PIEZOMETER NO. NES-2

PROJECT:	**City of Durham MSW Landfill**	APPROXIMATE ELEVATION:	**283.44**
PROJECT NO:	**1054-07-469**	BORING DEPTH (FT.):	**10**
PROJECT LOCATION:	**Durham, North Carolina**	LOGGED BY:	**GP**
DRILLING CONTRACTOR:	**S&ME**		
DRILLING METHOD:	**Hand Auger**		
DATE DRILLED:	**7/31/2009**		

STRATA DESCRIPTION	SYMBOL	DEPTH (feet)	WELL DETAILS	DEPTH (feet)	LEGEND	SPT (N-value)	ELEVATION (feet)	FID (ppm)	PID (ppm)
Ground Surface							283.44		
Light brown sandy CLAY		0.0		0 1.5	CB				
Dark brown hard silty CLAY				3	BS		278.44		
Dark brown sandy CLAY, wet at 6.5' bgs		5.0							
Dark blue/brown tight CLAY							273.44		
		10.0		9.91 10	FP BSC				
Boring terminated at 10' bgs, piezometer set at 9.91' bgs									

WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
Diameter:
Type:
Interval:

OUTER CASING
Diameter:
Type:
Length:

RISER CASING
Diameter:
Type:
Interval:

GROUT
Type: **fill**
Interval: **0 - 1.5**

SEAL
Type: **bentonite**
Interval: **1.5 - 3**

FILTERPACK
Type: **#2 sand**
Interval: **3 - 9.91**

SCREEN
Diameter: **2'**
Type: **Sch 40 pvc**
Interval: **4.91 - 9.91**

LEGEND
▽ = Water Level At Termination of Boring (TOB)
▼ = Water Level After 24 Hours
BS = Bentonite Seal
FP = Filter Pack
CG = Cement Grout
BSC = Bottom of Screen
REC = Core Recovery
RQD = Rock Quality Designation

NOTES: Ground surface elevation is 280.94

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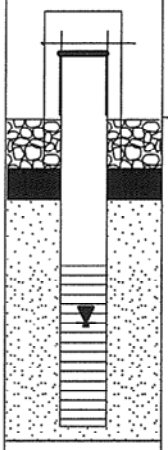
COMPLETION REPORT
OF PIEZOMETER NO. NES-2

COMPLETION REPORT OF PEIZOMETER NO. NES-3

PROJECT:	City of Durham MSW Landfill	APPROXIMATE ELEVATION:	283.56
PROJECT NO:	1054-07-469	BORING DEPTH (FT.):	10
PROJECT LOCATION:	Durham, North Carolina	LOGGED BY:	GP
DRILLING CONTRACTOR:	S&ME		
DRILLING METHOD:	Hand Auger		
DATE DRILLED:	7/31/2009		

STRATA DESCRIPTION	SYMBOL	DEPTH (feet)	WELL DETAILS	DEPTH (feet)	LEGEND	SPT (N-value)	ELEVATION (feet)	FID (ppm)	PID (ppm)
Ground Surface							283.56		
Light brown sandy CLAY		0.0		0 1.5 2.5	TOC CB BS		278.56		
Brown/tan large gained SAND, wet at 6' bgs		5.0							
Very hard blue CLAY				9.55	FP		273.56		
Boring terminated at 10' bgs, piezometer set at 9.55' bgs		10.0		10	BSC				

WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
Diameter:
Type:
Interval:

OUTER CASING
Diameter:
Type:
Length:

RISER CASING
Diameter:
Type:
Interval:

GROUT
Type: **fill**
Interval: **0 - 1.5**

SEAL
Type: **bentonite**
Interval: **1.5 - 2.5**

FILTERPACK
Type: **#2 sand**
Interval: **2.5 - 9.55**

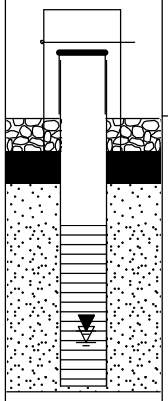
SCREEN
Diameter: **2"**
Type: **Sch 40 pvc**
Interval: **4.55 - 9.55**

LEGEND
▽ = Water Level At Termination of Boring (TOB)
▼ = Water Level After 24 Hours
BS = Bentonite Seal
FP = Filter Pack
CG = Cement Grout
BSC = Bottom of Screen
REC = Core Recovery
RQD = Rock Quality Designation

NOTES: Ground surface elevation is 280.69

COMPLETION REPORT OF PIEZOMETER NO. NES-4

PROJECT:	**City of Durham MSW Landfill**	APPROXIMATE ELEVATION:	**282.55**
PROJECT NO:	**1054-07-469**	BORING DEPTH (FT.):	**8.5**
PROJECT LOCATION:	**Durham, North Carolina**	LOGGED BY:	**GP**
DRILLING CONTRACTOR:	**S&ME**		
DRILLING METHOD:	**Hand Auger**		
DATE DRILLED:	**7/31/2009**		

STRATA DESCRIPTION	SYMBOL	DEPTH (feet)	WELL DETAILS	DEPTH (feet)	LEGEND	SPT (N-value)	ELEVATION (feet)	FID (ppm)	PID (ppm)
Ground Surface							282.55		
Brown sandy CLAY		0.0		0	CB				
				1	BS				
Light brown SAND				2			277.55		
Light brown SAND/ gray SAND, wet at 6.5' bgs		5.0							
Dark blue CLAY very hard				8.32	FP				
Boring terminated at 8.5' bgs, piezometer set at 8.32' bgs				8.5	BSC				

WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
Diameter:
Type:
Interval:

OUTER CASING
Diameter:
Type:
Length:

RISER CASING
Diameter:
Type:
Interval:

GROUT
Type: **fil**
Interval: **0 - 1**

SEAL
Type: **bentonite**
Interval: **1 - 2**

FILTERPACK
Type: **#2 sand**
Interval: **2 - 8.32**

SCREEN
Diameter: **2"**
Type: **Sch 40 pvc**
Interval: **3.32 - 8.32**

LEGEND
▽ = Water Level At Termination of Boring (TOB)
▼ = Water Level After 24 Hours
BS = Bentonite Seal
FP = Filter Pack
CG = Cement Grout
BSC = Bottom of Screen
REC = Core Recovery
RQD = Rock Quality Designation

NOTES: Ground surface elevation is 280.62

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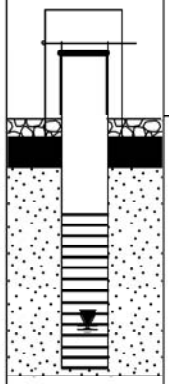
COMPLETION REPORT
OF PIEZOMETER NO. NES-4

COMPLETION REPORT OF PIEZOMETER NO. NES-5

PROJECT:	**City of Durham MSW Landfill**	APPROXIMATE ELEVATION:	**282.53**
PROJECT NO:	**1054-07-469**	BORING DEPTH (FT.):	**8**
PROJECT LOCATION:	**Durham, North Carolina**	LOGGED BY:	**GP**
DRILLING CONTRACTOR:	**S&ME**		
DRILLING METHOD:	**Hand Auger**		
DATE DRILLED:	**7/31/2009**		

STRATA DESCRIPTION	SYMBOL	DEPTH (feet)	WELL DETAILS	DEPTH (feet)	LEGEND	SPT (N-value)	ELEVATION (feet)	FID (ppm)	PID (ppm)
Ground Surface							282.53		
Tan sandy CLAY		0.0		0 0.5	CB BS				
Tan large grained SAND, wet at 6.5' bgs		5.0		1.5			277.53		
Brown blue hard silty CLAY				7.75	FP				
Boring terminated at 8' bgs, piezometer set at 7.75' bgs				8					

WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
Diameter:
Type:
Interval:

OUTER CASING
Diameter:
Type:
Length:

RISER CASING
Diameter:
Type:
Interval:

GROUT
Type: **fill**
Interval: **0 - 0.5**

SEAL
Type: **bentonite**
Interval: **0.5 - 1.5**

FILTERPACK
Type: **#2 sand**
Interval: **1.5 - 7.75**

SCREEN
Diameter: **2"**
Type: **Sch 40 pvc**
Interval: **2.75 - 7.75**

LEGEND
▽ = Water Level At Termination of Boring (TOB)
▼ = Water Level After 24 Hours
BS = Bentonite Seal
FP = Filter Pack
CG = Cement Grout
BSC = Bottom of Screen
REC = Core Recovery
RQD = Rock Quality Designation

NOTES: Ground surface elevation is 279.93

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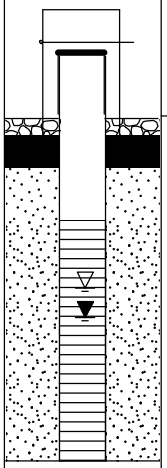
COMPLETION REPORT
OF PIEZOMETER NO. NES-5

COMPLETION REPORT OF PIEZOMETER NO. NES-6

PROJECT:	**City of Durham MSW Landfill**	APPROXIMATE ELEVATION:	**282.53**
PROJECT NO:	**1054-07-469**	BORING DEPTH (FT.):	**12.6**
PROJECT LOCATION:	**Durham, North Carolina**	LOGGED BY:	**GP**
DRILLING CONTRACTOR:	**S&ME**		
DRILLING METHOD:	**Hand Auger**		
DATE DRILLED:	**7/31/2009**		

STRATA DESCRIPTION	SYMBOL	DEPTH (feet)	WELL DETAILS	DEPTH (feet)	LEGEND	SPT (N-value)	ELEVATION (feet)	FID (ppm)	PID (ppm)
Ground Surface							282.53		
Organic, brown clayey SAND		0.0		0 0.5 1.5	CB BS				
Light brown / brown silty CLAY		5.0					277.53		
Tan / gray large grained SAND, wet at 6' bgs									
Bluish silty CLAY, very hard							272.53		
Hard brown silty CLAY		10.0		10.65	FP BSC				
Boring terminated - refusal at 10.65' bgs									

WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
Diameter:
Type:
Interval:

OUTER CASING
Diameter:
Type:
Length:

RISER CASING
Diameter:
Type:
Interval:

GROUT
Type: **fill**
Interval: **0 - 0.5**

SEAL
Type: **bentonite**
Interval: **0.5 - 1.5**

FILTERPACK
Type: **#2 sand**
Interval: **1.5 - 10.65**

SCREEN
Diameter: **2"**
Type: **Sch 40 pvc**
Interval: **3.15 - 10.65**

LEGEND
▽ = Water Level At Termination of Boring (TOB)
▼ = Water Level After 24 Hours
BS = Bentonite Seal
FP = Filter Pack
CG = Cement Grout
BSC = Bottom of Screen
REC = Core Recovery
RQD = Rock Quality Designation

NOTES: Ground surface elevation is 280.60, Refusal at 12.6' bgs

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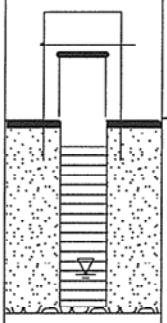
COMPLETION REPORT
OF PIEZOMETER NO. NES-6

COMPLETION REPORT OF PEIZOMETER NO. NES-7

PROJECT:	City of Durham MSW Landfill	APPROXIMATE ELEVATION:	282.76
PROJECT NO:	1054-07-469	BORING DEPTH (FT.):	6
PROJECT LOCATION:	Durham, North Carolina	LOGGED BY:	GP
DRILLING CONTRACTOR:	S&ME		
DRILLING METHOD:	Hand Auger		
DATE DRILLED:	10/21/2009		

STRATA DESCRIPTION	SYMBOL	DEPTH (feet)	WELL DETAILS	DEPTH (feet)	LEGEND	SPT (N-value)	ELEVATION (feet)	FID (ppm)	PID (ppm)
Ground Surface							282.76		
Light brown sandy CLAY		0.0		0 0.2	BS				
Grey/blue clayey SAND		5.0		5.8 6	FP BSC		277.76		
Boring terminated at 6' bgs, piezometer set at 5.8' bgs									

WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
Diameter:
Type:
Interval:

OUTER CASING
Diameter:
Type:
Length:

RISER CASING
Diameter:
Type:
Interval:

GROUT
Type:
Interval:

SEAL
Type: **bentonite**
Interval: **0-0.2**

FILTERPACK
Type: **#2 sand**
Interval: **0.2-5.8**

SCREEN
Diameter: **2"**
Type: **Sch 40 pvc**
Interval: **0.8-5.8**

LEGEND
▽ = Water Level At Termination of Boring (TOB)
▼ = Water Level After 24 Hours
BS = Bentonite Seal
FP = Filter Pack
CG = Cement Grout
BSC = Bottom of Screen
REC = Core Recovery
RQD = Rock Quality Designation

NOTES: Ground surface elevation is 278.56

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COMPLETION REPORT
OF PEIZOMETER NO. NES-7

COMPLETION REPORT OF STREAM GAUGE NO. SG-1

PROJECT:	**City of Durham MSW Landfill**	APPROXIMATE ELEVATION:	**283.70**
PROJECT NO:	**1054-07-469**	BORING DEPTH (FT.):	**8.6**
PROJECT LOCATION:	**Durham, North Carolina**	LOGGED BY:	**GP**
DRILLING CONTRACTOR:	**S&ME**		
DRILLING METHOD:	**Hand Auger**		
DATE DRILLED:	**7/31/2009**		

STRATA DESCRIPTION	SYMBOL	DEPTH (feet)	Gauge	DEPTH (feet)	LEGEND	SPT (N-value)	ELEVATION (feet)	FID (ppm)	PID (ppm)	WELL CONSTRUCTION DETAILS
Ground Surface							283.70			PROTECTIVE CASING Diameter: Type: Interval:
Stream Streambed		0.0		-0.18 0 1.5	TSC		278.70			OUTER CASING Diameter: Type: Length:
		5.0								RISER CASING Diameter: Type: Interval:
										GROUT Type: Interval:
										SEAL Type: Interval:
										FILTERPACK Type: **streambed** Interval: **0 - 1.5**
										SCREEN Diameter: **2"** Type: **Sch 40 pvc** Interval: **-7 - 1.5**

LEGEND
- ▽ = Water Level At Termination of Boring (TOB)
- ▼ = Water Level After 24 Hours
- BS = Bentonite Seal
- FP = Filter Pack
- CG = Cement Grout
- BSC = Bottom of Screen
- REC = Core Recovery
- RQD = Rock Quality Designation

NOTES: Streambed elevation is 276.57

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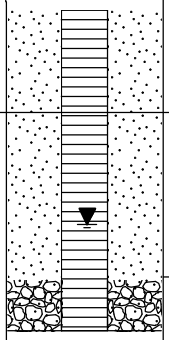
COMPLETION REPORT
OF STREAM GAUGE NO. SG-1

COMPLETION REPORT OF STREAM GAUGE NO. SG-2

PROJECT:	**City of Durham MSW Landfill**	APPROXIMATE ELEVATION:	**282.51**
PROJECT NO:	**1054-07-469**	BORING DEPTH (FT.):	**1.58**
PROJECT LOCATION:	**Durham, North Carolina**	LOGGED BY:	**GP**
DRILLING CONTRACTOR:	**S&ME**		
DRILLING METHOD:	**Hand Auger**		
DATE DRILLED:	**7/31/2009**		

STRATA DESCRIPTION	SYMBOL	DEPTH (feet)	Gauge	DEPTH (feet)	LEGEND	SPT (N-value)	ELEVATION (feet)	FID (ppm)	PID (ppm)
Stream level on 8/25/09 Ground Surface							282.51		
Streambed		0.0		1.58					
Boring terminated at 1.58' below streambed, piezometer / stream gauge set and stabilized									



WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
Diameter:
Type:
Interval:

OUTER CASING
Diameter:
Type:
Length:

RISER CASING
Diameter:
Type:
Interval:

GROUT
Type:
Interval:

SEAL
Type:
Interval:

FILTERPACK
Type: **streambed**
Interval: **0 - 1.58**

SCREEN
Diameter: **2"**
Type: **Sch 40 pvc**
Interval: **-8.42 - 1.58**

LEGEND
▽ = Water Level At Termination of Boring (TOB)
▼ = Water Level After 24 Hours
BS = Bentonite Seal
FP = Filter Pack
CG = Cement Grout
BSC = Bottom of Screen
REC = Core Recovery
RQD = Rock Quality Designation

NOTES: Streambed elevation is 275.54

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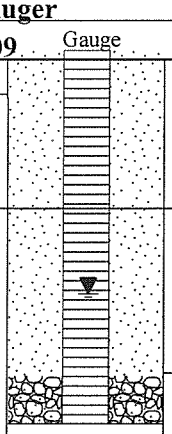
COMPLETION REPORT
OF STREAM GAUGE NO. SG-2

COMPLETION REPORT OF STREAM GAUGE NO. SG-3

PROJECT:	City of Durham MSW Landfill	APPROXIMATE ELEVATION:	281.88
PROJECT NO:	1054-07-469	BORING DEPTH (FT.):	1.5
PROJECT LOCATION:	Durham, North Carolina	LOGGED BY:	GP
DRILLING CONTRACTOR:	S&ME		
DRILLING METHOD:	Hand Auger		
DATE DRILLED:	7/31/2009		



STRATA DESCRIPTION	SYMBOL	DEPTH (feet)	DEPTH (feet)	LEGEND	SPT (N-value)	ELEVATION (feet)	FID (ppm)	PID (ppm)
Stream level on 8/25/09						281.88		
Streambed		0.0	1.5	BSC				
Boring terminated at 1.5' below streambed, piezometer / stream gauge set and stabilized								

WELL CONSTRUCTION DETAILS

PROTECTIVE CASING
Diameter:
Type:
Interval:

OUTER CASING
Diameter:
Type:
Length:

RISER CASING
Diameter:
Type:
Interval:

GROUT
Type:
Interval:

SEAL
Type:
Interval:

FILTERPACK
Type: **streambed**
Interval: **0 - 1.5**

SCREEN
Diameter: **2"**
Type: **Sch 40 pvc**
Interval: **-10.15 - 1.5**

LEGEND
▽ = Water Level At Termination of Boring (TOB)
▼ = Water Level After 24 Hours
BS = Bentonite Seal
FP = Filter Pack
CG = Cement Grout
BSC = Bottom of Screen
REC = Core Recovery
RQD = Rock Quality Designation

NOTES: Streambed elevation is 274.13

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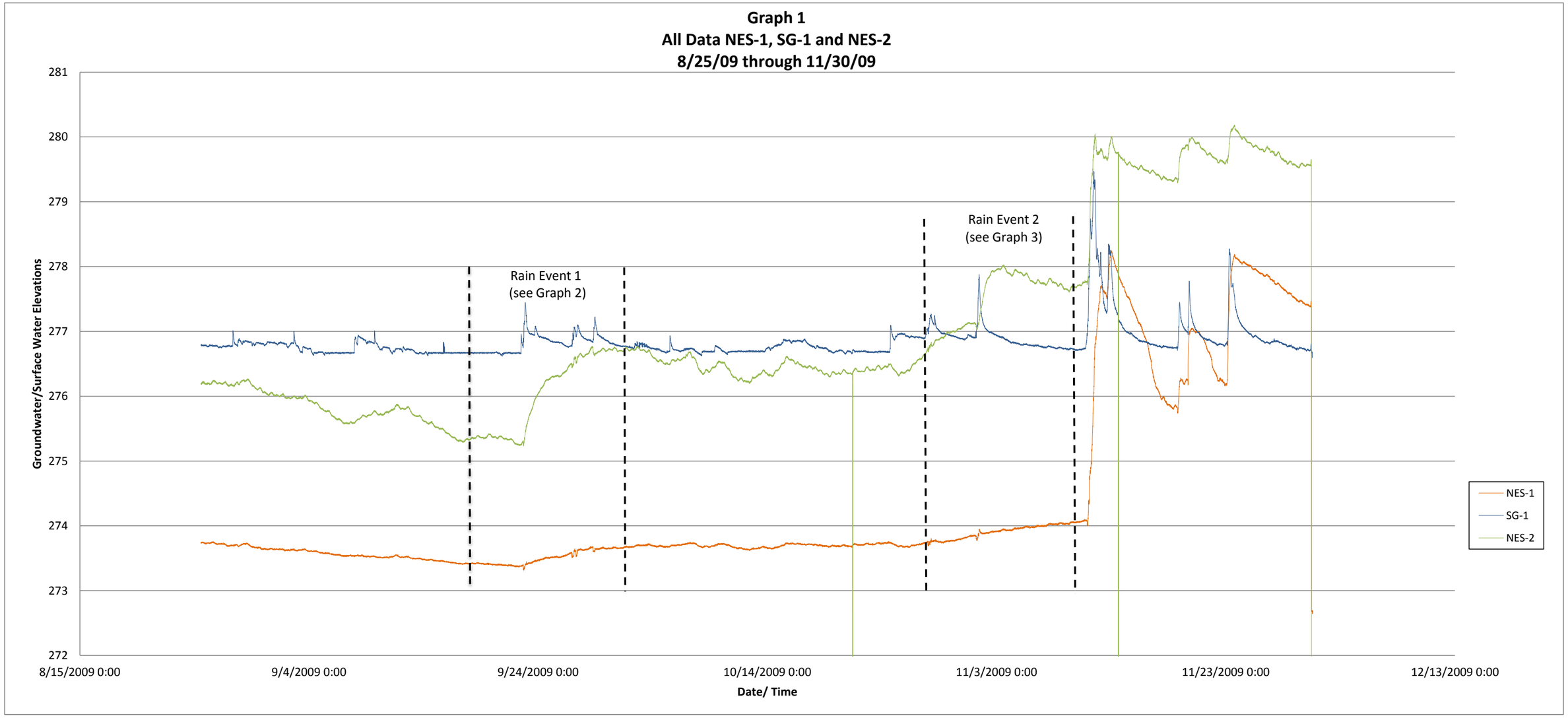
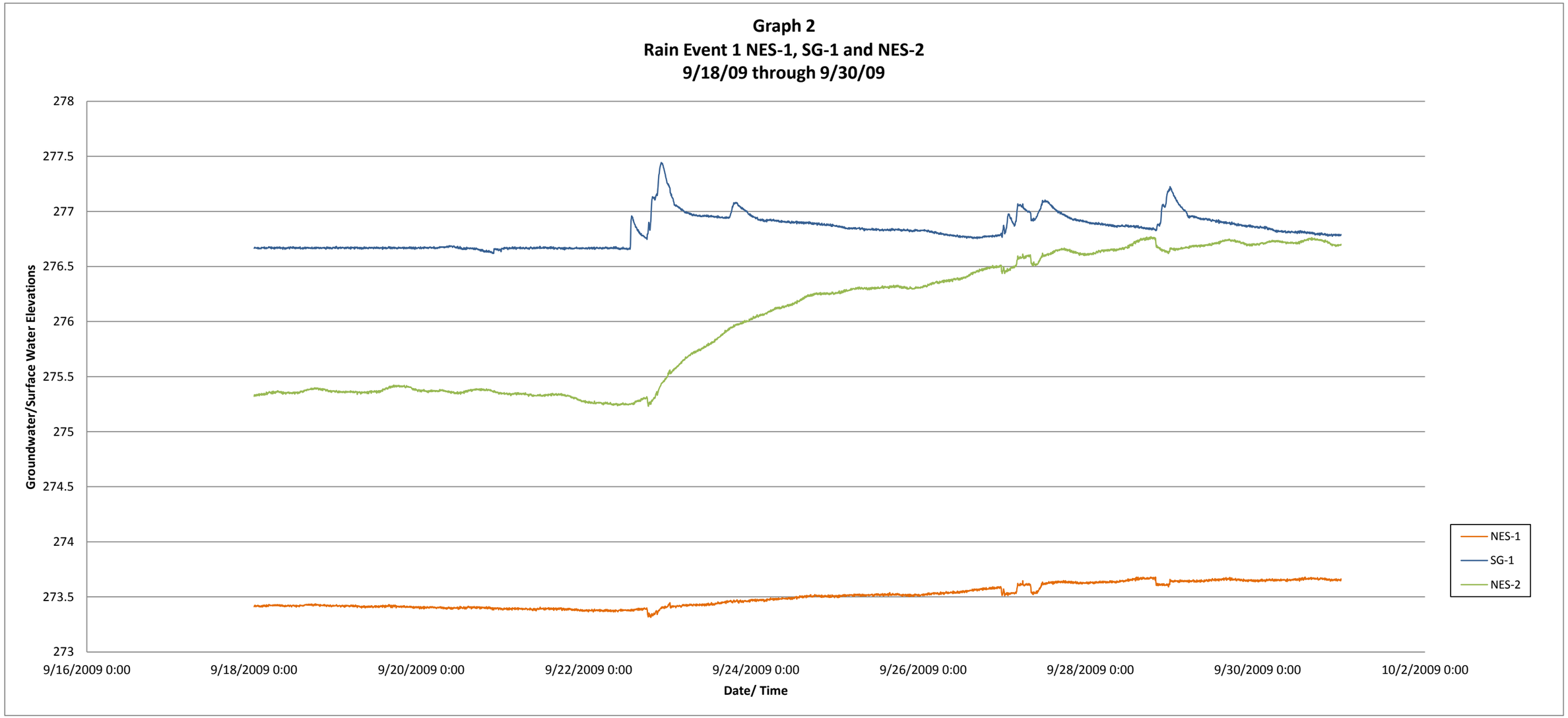
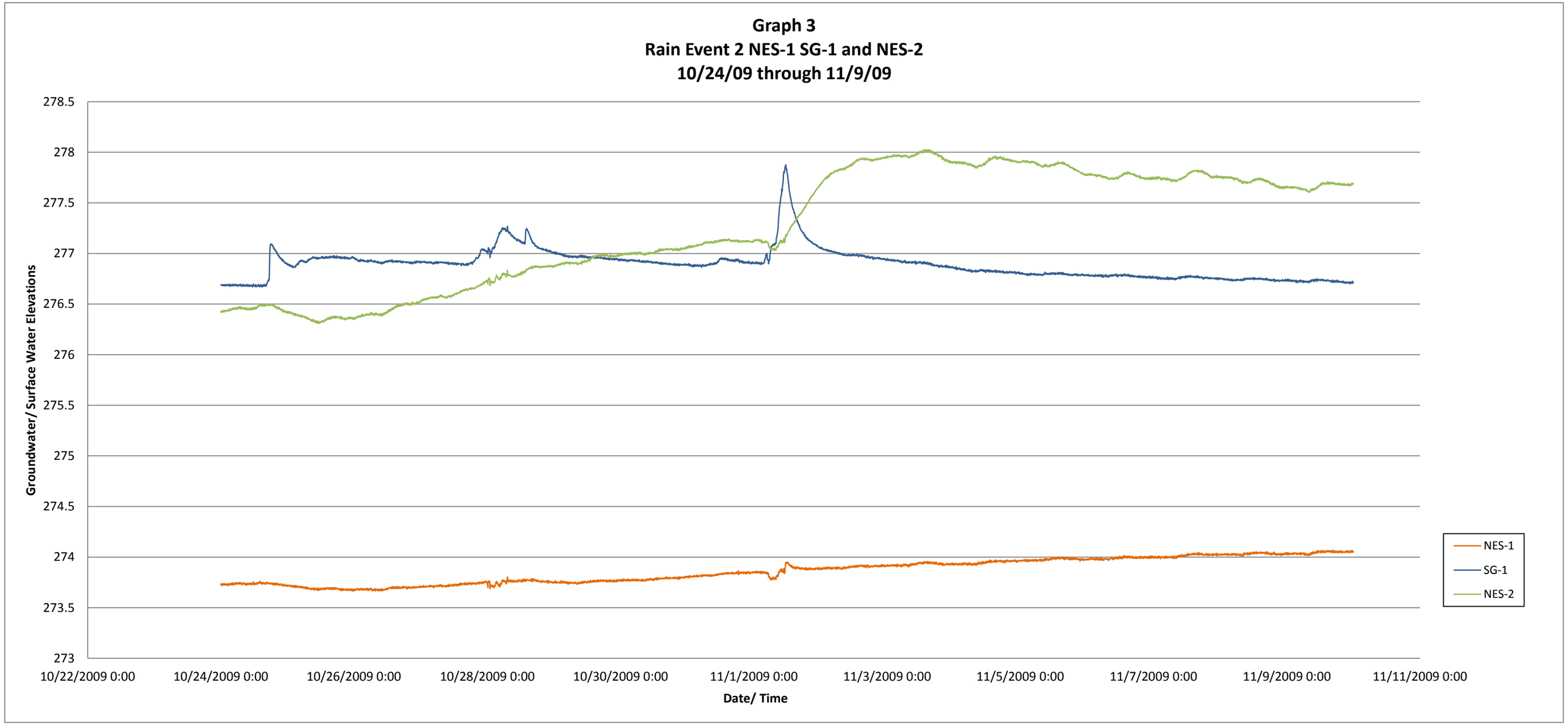
COMPLETION REPORT
OF STREAM GAUGE NO. SG-3

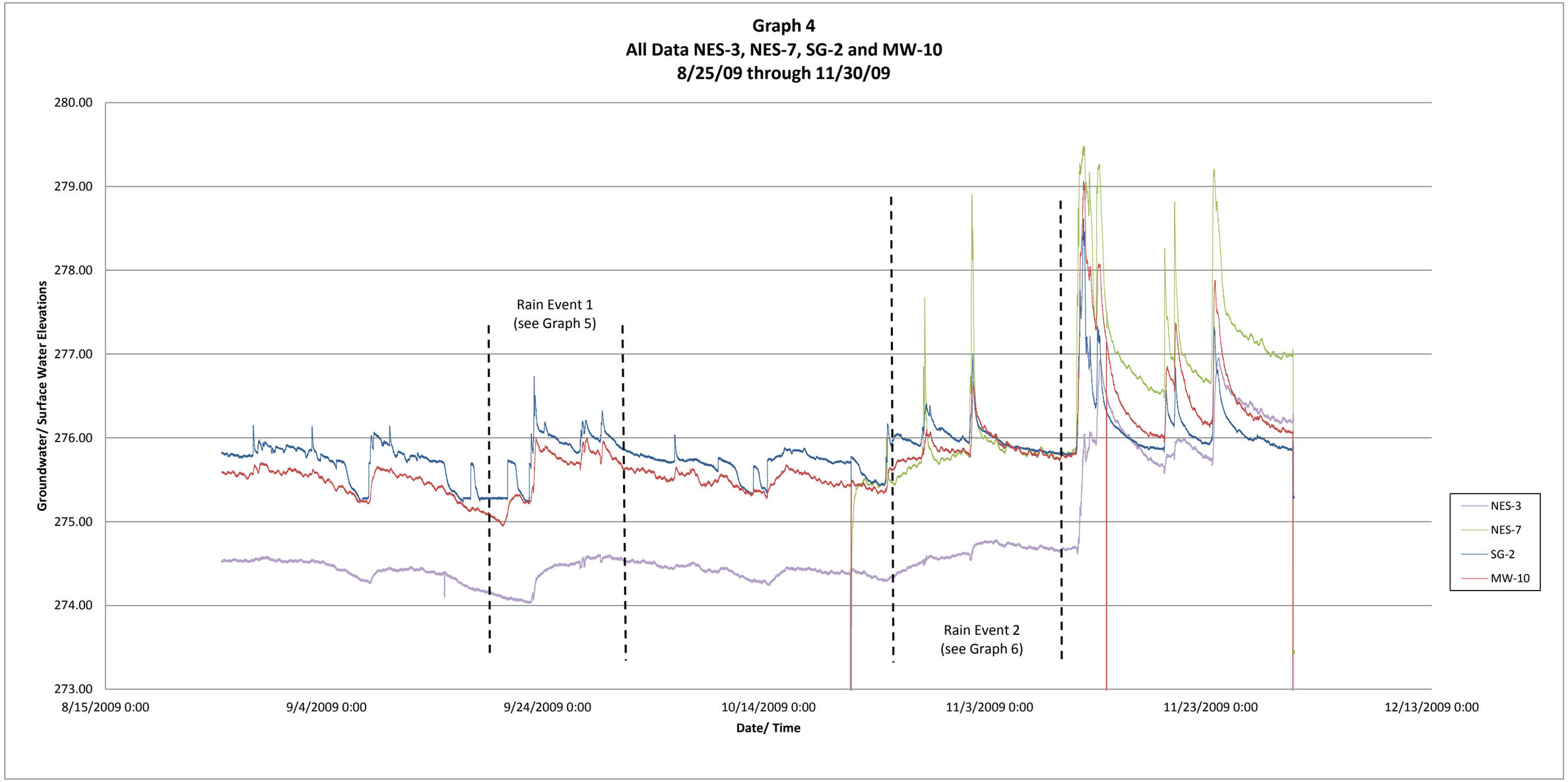
APPENDIX II

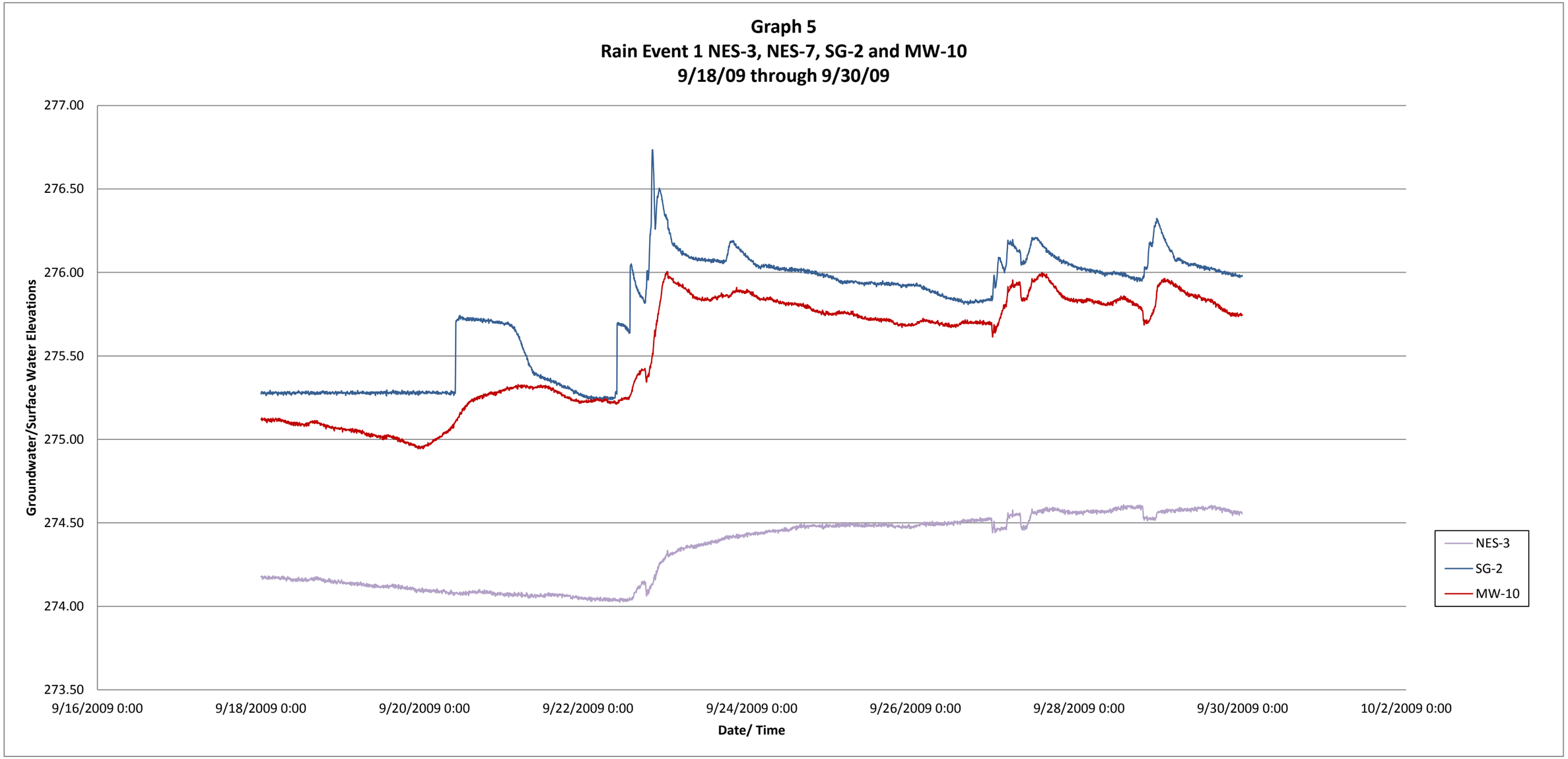
PRESSURE TRANSDUCER DATA & GROUNDWATER ELEVATION GRAPHS

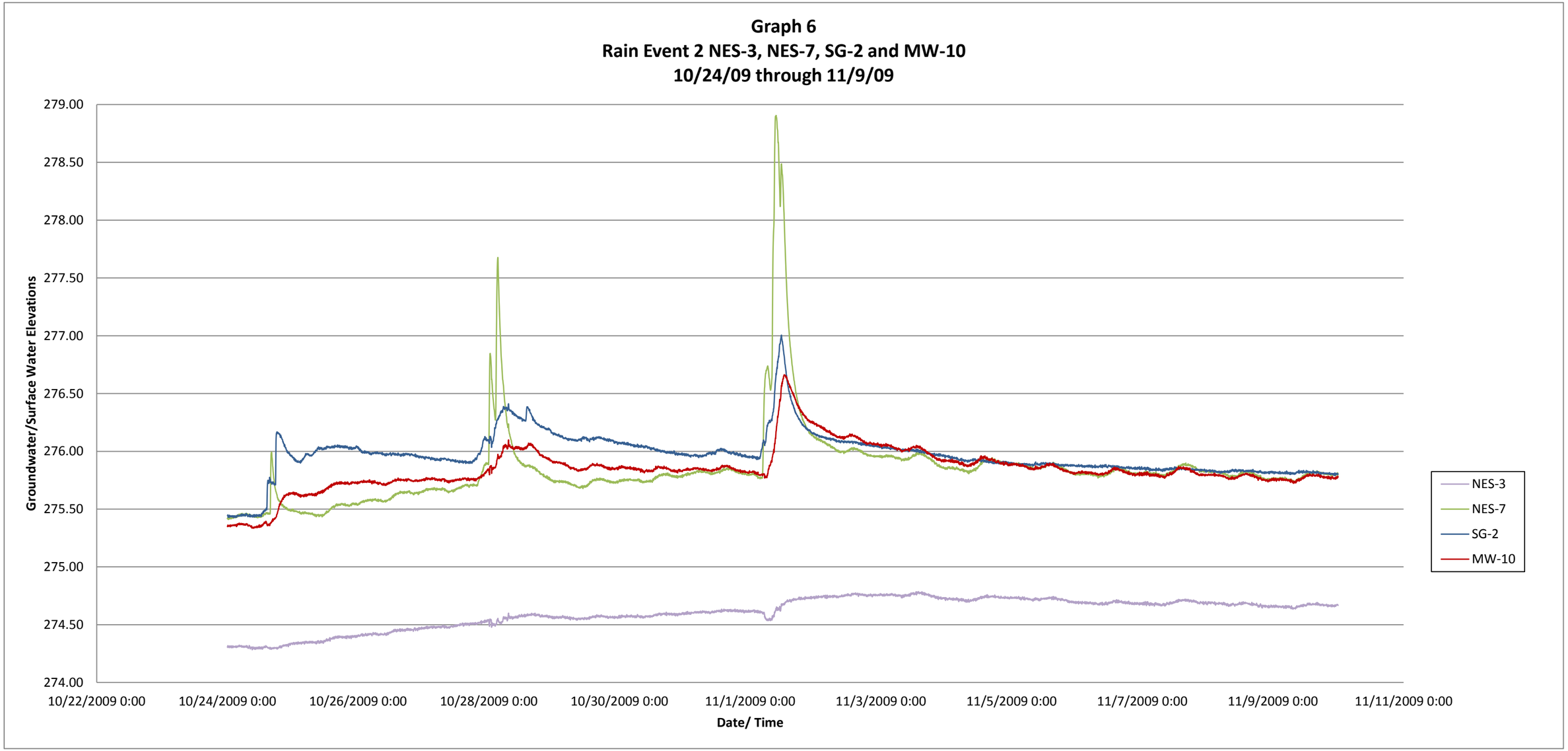

Graph 1
All Data NES-1, SG-1 and NES-2
8/25/09 through 11/30/09
Groundwater/Surface Water Elevations
281
280
279
278
277
276
275
274
273
272
8/15/2009 0:00
9/4/2009 0:00
9/24/2009 0:00
10/14/2009 0:00
11/3/2009 0:00
11/23/2009 0:00
12/13/2009 0:00
Date/ Time
Rain Event 1
(see Graph 2)
Rain Event 2
(see Graph 3)
NES-1
SG-1
NES-2

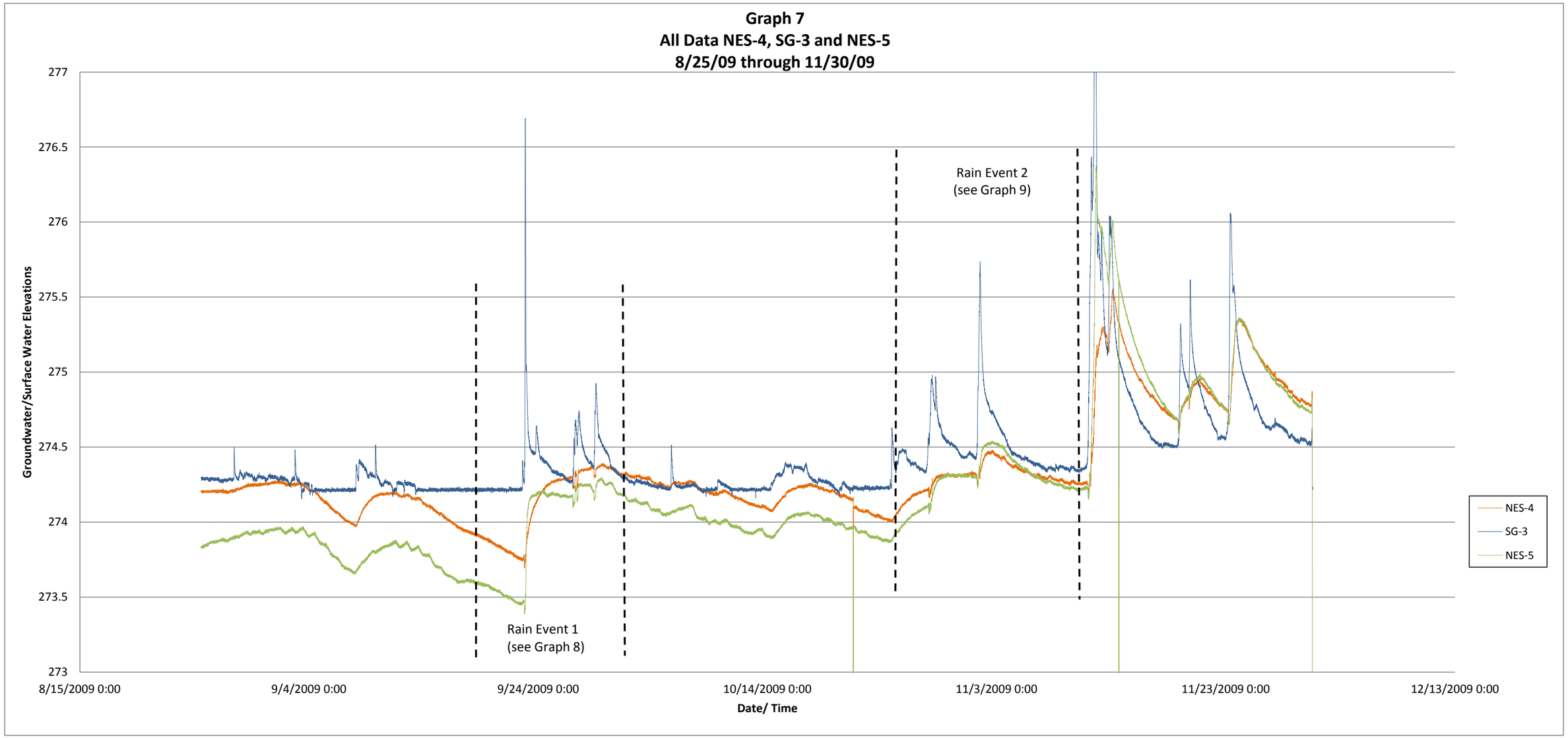

Graph 2
Rain Event 1 NES-1, SG-1 and NES-2
9/18/09 through 9/30/09
Groundwater/Surface Water Elevations
278
277.5
277
276.5
276
275.5
275
274.5
274
273.5
273
9/16/2009 0:00
9/18/2009 0:00
9/20/2009 0:00
9/22/2009 0:00
9/24/2009 0:00
9/26/2009 0:00
9/28/2009 0:00
9/30/2009 0:00
10/2/2009 0:00
Date/ Time
NES-1
SG-1
NES-2

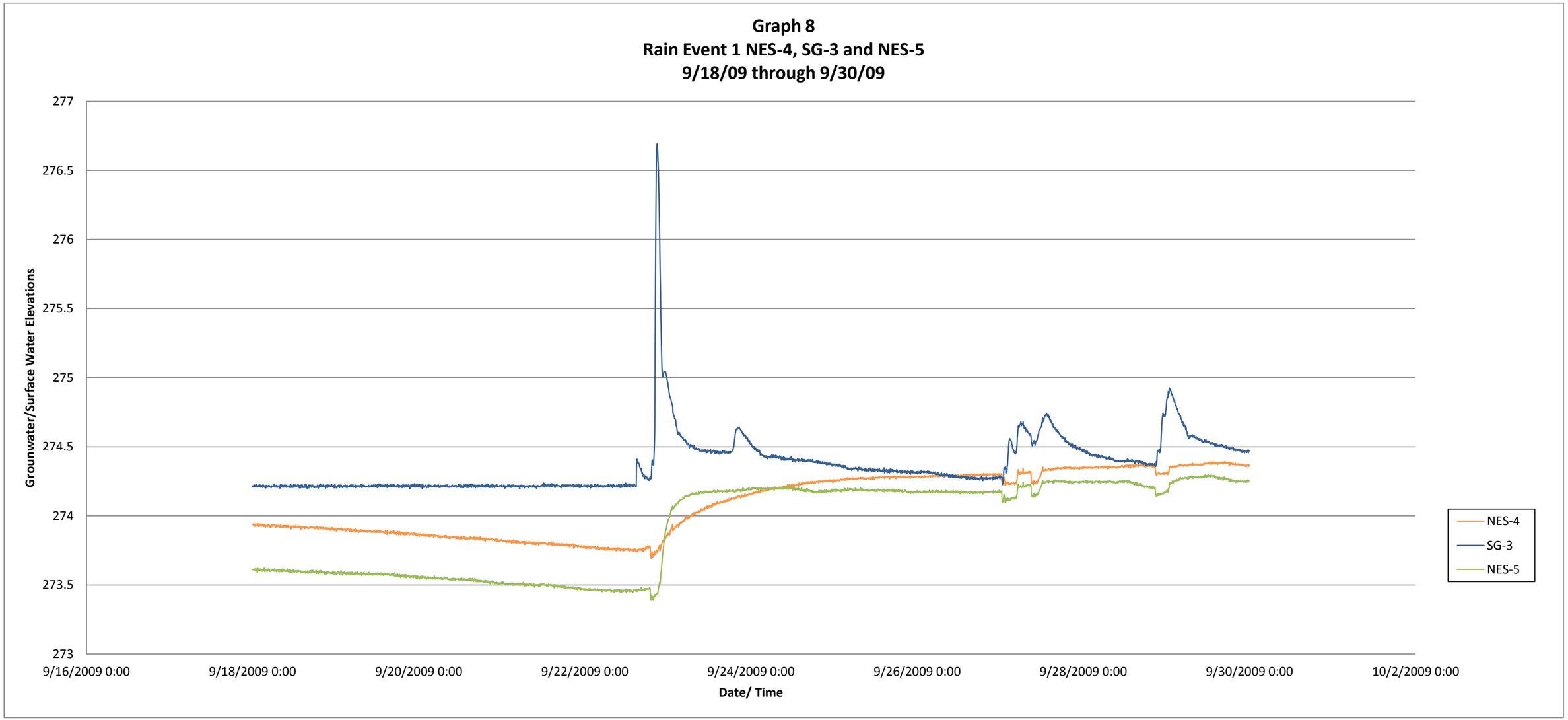

Graph 3
Rain Event 2 NES-1 SG-1 and NES-2
10/24/09 through 11/9/09
Groundwater/ Surface Water Elevations
278.5
278
277.5
277
276.5
276
275.5
275
274.5
274
273.5
273
10/22/2009 0:00
10/24/2009 0:00
10/26/2009 0:00
10/28/2009 0:00
10/30/2009 0:00
11/1/2009 0:00
11/3/2009 0:00
11/5/2009 0:00
11/7/2009 0:00
11/9/2009 0:00
11/11/2009 0:00
Date/ Time
NES-1
SG-1
NES-2

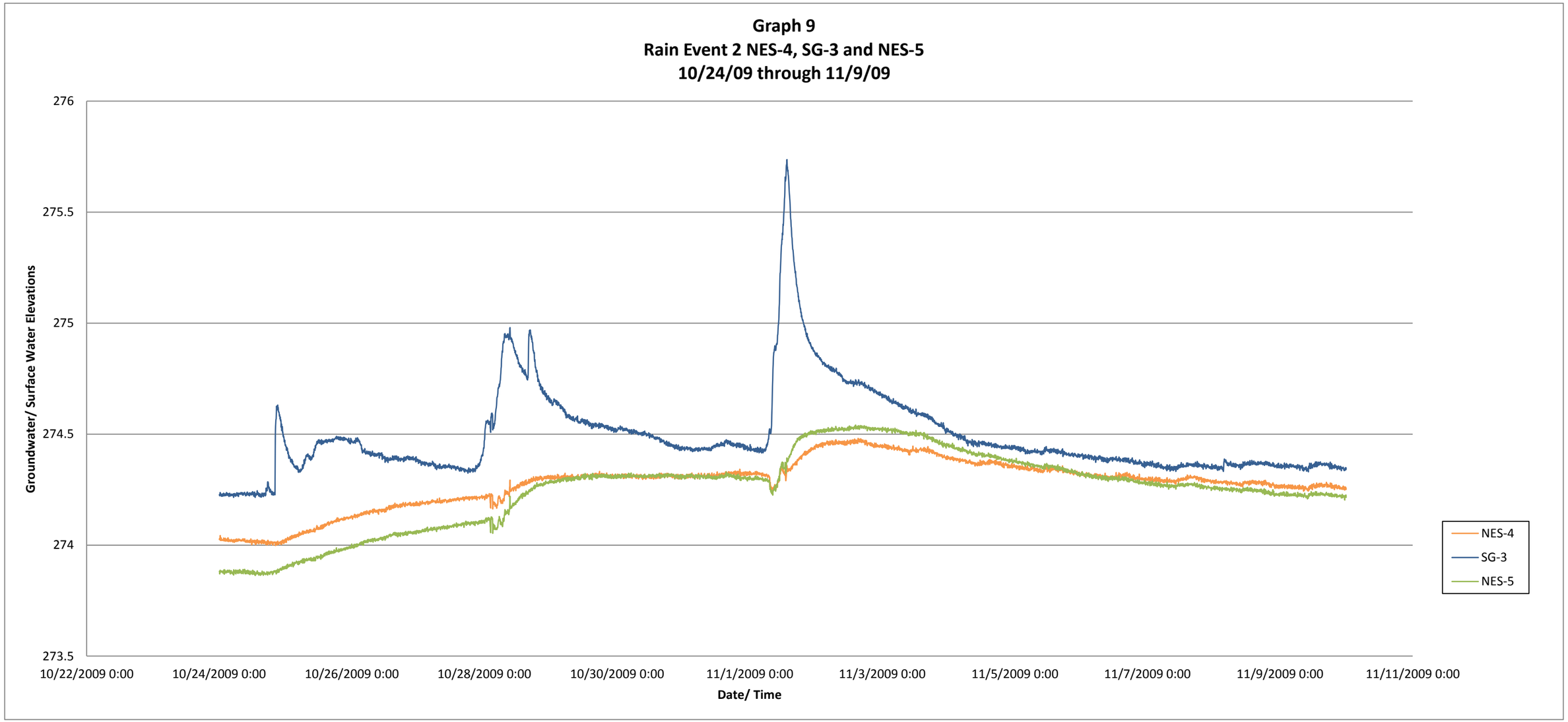

Graph 4
All Data NES-3, NES-7, SG-2 and MW-10
8/25/09 through 11/30/09
Groundwater/ Surface Water Elevations
280.00
279.00
278.00
277.00
276.00
275.00
274.00
273.00
Rain Event 1
(see Graph 5)
Rain Event 2
(see Graph 6)
8/15/2009 0:00
9/4/2009 0:00
9/24/2009 0:00
10/14/2009 0:00
11/3/2009 0:00
11/23/2009 0:00
12/13/2009 0:00
Date/ Time
NES-3
NES-7
SG-2
MW-10


Graph 5
Rain Event 1 NES-3, NES-7, SG-2 and MW-10
9/18/09 through 9/30/09
Groundwater/Surface Water Elevations
277.00
276.50
276.00
275.50
275.00
274.50
274.00
273.50
9/16/2009 0:00
9/18/2009 0:00
9/20/2009 0:00
9/22/2009 0:00
9/24/2009 0:00
9/26/2009 0:00
9/28/2009 0:00
9/30/2009 0:00
10/2/2009 0:00
Date/ Time
NES-3
SG-2
MW-10


Graph 6
Rain Event 2 NES-3, NES-7, SG-2 and MW-10
10/24/09 through 11/9/09
Groundwater/Surface Water Elevations
279.00
278.50
278.00
277.50
277.00
276.50
276.00
275.50
275.00
274.50
274.00
10/22/2009 0:00
10/24/2009 0:00
10/26/2009 0:00
10/28/2009 0:00
10/30/2009 0:00
11/1/2009 0:00
11/3/2009 0:00
11/5/2009 0:00
11/7/2009 0:00
11/9/2009 0:00
11/11/2009 0:00
Date/ Time
NES-3
NES-7
SG-2
MW-10


Graph 7
All Data NES-4, SG-3 and NES-5
8/25/09 through 11/30/09
Groundwater/Surface Water Elevations
277
276.5
276
275.5
275
274.5
274
273.5
273
8/15/2009 0:00
9/4/2009 0:00
9/24/2009 0:00
10/14/2009 0:00
11/3/2009 0:00
11/23/2009 0:00
12/13/2009 0:00
Date/ Time
Rain Event 1
(see Graph 8)
Rain Event 2
(see Graph 9)
NES-4
SG-3
NES-5


Graph 8
Rain Event 1 NES-4, SG-3 and NES-5
9/18/09 through 9/30/09
Grounwater/Surface Water Elevations
277
276.5
276
275.5
275
274.5
274
273.5
273
9/16/2009 0:00
9/18/2009 0:00
9/20/2009 0:00
9/22/2009 0:00
9/24/2009 0:00
9/26/2009 0:00
9/28/2009 0:00
9/30/2009 0:00
10/2/2009 0:00
Date/ Time
NES-4
SG-3
NES-5


Graph 9
Rain Event 2 NES-4, SG-3 and NES-5
10/24/09 through 11/9/09
Groundwater/ Surface Water Elevations
276
275.5
275
274.5
274
273.5
10/22/2009 0:00
10/24/2009 0:00
10/26/2009 0:00
10/28/2009 0:00
10/30/2009 0:00
11/1/2009 0:00
11/3/2009 0:00
11/5/2009 0:00
11/7/2009 0:00
11/9/2009 0:00
11/11/2009 0:00
Date/ Time
NES-4
SG-3
NES-5

APPENDIX III

Laboratory Analytical Data

Environmental Conservation Laboratories, Inc.
102-A Woodwinds Industrial Court
Cary NC, 27511
Phone: 919.467.3090 FAX: 919.467.3515
www.encolabs.com

Friday, August 28, 2009

S&ME, Inc. (SM001)

Attn: Gerald Paul

3201 Spring Forest Road

Raleigh, NC 27616

RE: Laboratory Results for
Project Number: 1054-07-469 Phase 21, Project Name/Desc: City of Durham C&D LF
ENCO Workorder: C909051

Dear Gerald Paul,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Tuesday, August 18, 2009.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Cary. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Chuck Smith

Project Manager

Enclosure(s)

The total number of pages in this report, including this page is 23.

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SAMPLE SUMMARY/LABORATORY CHRONICLE

Client ID:	3201-NES1	Lab ID:	C909051-01	Sampled:	08/17/09 15:00	Received:	08/18/09 13:10

Parameter	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260B	08/31/09	08/21/09 09:18	8/22/2009 00:22

Client ID:	3201-NES2	Lab ID:	C909051-02	Sampled:	08/17/09 15:35	Received:	08/18/09 13:10

Parameter	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260B	08/31/09	08/21/09 09:18	8/22/2009 00:52

Client ID:	3201-NES3	Lab ID:	C909051-03	Sampled:	08/17/09 14:20	Received:	08/18/09 13:10

Parameter	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260B	08/31/09	08/21/09 09:18	8/22/2009 01:23

Client ID:	3201-NES4	Lab ID:	C909051-04	Sampled:	08/17/09 12:50	Received:	08/18/09 13:10

Parameter	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260B	08/31/09	08/21/09 09:18	8/22/2009 01:54

Client ID:	3201-NES5	Lab ID:	C909051-05	Sampled:	08/17/09 13:25	Received:	08/18/09 13:10

Parameter	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260B	08/31/09	08/21/09 09:18	8/22/2009 02:25

Client ID:	3201-NES6	Lab ID:	C909051-06	Sampled:	08/17/09 11:55	Received:	08/18/09 13:10

Parameter	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260B	08/31/09	08/21/09 09:18	8/22/2009 02:56

Client ID:	3201-Trip Blank	Lab ID:	C909051-07	Sampled:	08/17/09 11:55	Received:	08/18/09 13:10

Parameter	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260B	08/31/09	08/21/09 09:18	8/22/2009 03:26

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NORTH CAROLINA SWS SAMPLE DETECTION SUMMARY

Client ID: 3201-NES2 **Lab ID:** C909051-02

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
1,1-Dichloroethane	0.80	J	1	0.33	1.0	5	ug/L	EPA 8260B	
1,1-Dichloroethene	0.50	J	1	0.24	1.0	5	ug/L	EPA 8260B	
cis-1,2-Dichloroethene	1.1	J	1	0.36	1.0	5	ug/L	EPA 8260B	

Client ID: 3201-NES3 **Lab ID:** C909051-03

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Acetone	4.2	J	1	1.5	5.0	100	ug/L	EPA 8260B	

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ANALYTICAL RESULTS

Description: 3201-NES1
Matrix: Ground Water
Project: City of Durham C&D LF

Lab Sample ID: C909051-01
Sampled: 08/17/09 15:00
Sampled By: Gerald Paul

Received: 08/18/09 13:10
Work Order: C909051

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	08/22/09 00:22	JKG	
1,1,1-Trichloroethane [71-55-6] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.33	U	ug/L	1	0.33	1.0	3	EPA 8260B	08/22/09 00:22	JKG	
1,1,2-Trichloroethane [79-00-5] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
1,1-Dichloroethane [75-34-3] ^	0.33	U	ug/L	1	0.33	1.0	5	EPA 8260B	08/22/09 00:22	JKG	
1,1-Dichloroethene [75-35-4] ^	0.24	U	ug/L	1	0.24	1.0	5	EPA 8260B	08/22/09 00:22	JKG	
1,2,3-Trichloropropane [96-18-4] ^	0.55	U	ug/L	1	0.55	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	08/22/09 00:22	JKG	
1,2-Dibromoethane [106-93-4] ^	0.42	U	ug/L	1	0.42	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
1,2-Dichlorobenzene [95-50-1] ^	0.27	U	ug/L	1	0.27	1.0	5	EPA 8260B	08/22/09 00:22	JKG	
1,2-Dichloroethane [107-06-2] ^	0.65	U	ug/L	1	0.65	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
1,2-Dichloropropane [78-87-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
1,4-Dichlorobenzene [106-46-7] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
2-Butanone [78-93-3] ^	1.0	U	ug/L	1	1.0	5.0	100	EPA 8260B	08/22/09 00:22	JKG	
2-Hexanone [591-78-6] ^	0.69	U	ug/L	1	0.69	5.0	50	EPA 8260B	08/22/09 00:22	JKG	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	08/22/09 00:22	JKG	
Acetone [67-64-1] ^	1.5	U	ug/L	1	1.5	5.0	100	EPA 8260B	08/22/09 00:22	JKG	
Acrylonitrile [107-13-1] ^	2.1	U	ug/L	1	2.1	10	200	EPA 8260B	08/22/09 00:22	JKG	
Benzene [71-43-2] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
Bromochloromethane [74-97-5] ^	0.42	U	ug/L	1	0.42	1.0	3	EPA 8260B	08/22/09 00:22	JKG	
Bromodichloromethane [75-27-4] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
Bromoform [75-25-2] ^	0.71	U	ug/L	1	0.71	1.0	3	EPA 8260B	08/22/09 00:22	JKG	
Bromomethane [74-83-9] ^	0.49	U	ug/L	1	0.49	1.0	10	EPA 8260B	08/22/09 00:22	JKG	
Carbon disulfide [75-15-0] ^	0.54	U	ug/L	1	0.54	5.0	100	EPA 8260B	08/22/09 00:22	JKG	
Carbon tetrachloride [56-23-5] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
Chlorobenzene [108-90-7] ^	0.27	U	ug/L	1	0.27	1.0	3	EPA 8260B	08/22/09 00:22	JKG	
Chloroethane [75-00-3] ^	0.30	U	ug/L	1	0.30	1.0	10	EPA 8260B	08/22/09 00:22	JKG	
Chloroform [67-66-3] ^	0.20	U	ug/L	1	0.20	1.0	5	EPA 8260B	08/22/09 00:22	JKG	
Chloromethane [74-87-3] ^	0.34	U	ug/L	1	0.34	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
cis-1,2-Dichloroethene [156-59-2] ^	0.36	U	ug/L	1	0.36	1.0	5	EPA 8260B	08/22/09 00:22	JKG	
cis-1,3-Dichloropropene [10061-01-5] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
Dibromochloromethane [124-48-1] ^	0.32	U	ug/L	1	0.32	1.0	3	EPA 8260B	08/22/09 00:22	JKG	
Dibromomethane [74-95-3] ^	0.37	U	ug/L	1	0.37	1.0	10	EPA 8260B	08/22/09 00:22	JKG	
Ethylbenzene [100-41-4] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
Iodomethane [74-88-4] ^	0.52	U	ug/L	1	0.52	5.0	10	EPA 8260B	08/22/09 00:22	JKG	
Methylene chloride [75-09-2] ^	0.53	U	ug/L	1	0.53	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
Styrene [100-42-5] ^	0.26	U	ug/L	1	0.26	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
Tetrachloroethene [127-18-4] ^	0.36	U	ug/L	1	0.36	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
Toluene [108-88-3] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
trans-1,2-Dichloroethene [156-60-5] ^	0.34	U	ug/L	1	0.34	1.0	5	EPA 8260B	08/22/09 00:22	JKG	
trans-1,3-Dichloropropene [10061-02-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.54	U	ug/L	1	0.54	1.0	100	EPA 8260B	08/22/09 00:22	JKG	
Trichloroethene [79-01-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 00:22	JKG	

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Description:	3201-NES1	**Lab Sample ID:**	C909051-01	**Received:**	08/18/09 13:10
Matrix:	Ground Water	**Sampled:**	08/17/09 15:00	**Work Order:**	C909051
Project:	City of Durham C&D LF	**Sampled By:**	Gerald Paul		

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Trichlorofluoromethane [75-69-4] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
Vinyl acetate [108-05-4] ^	0.98	U	ug/L	1	0.98	5.0	50	EPA 8260B	08/22/09 00:22	JKG	
Vinyl chloride [75-01-4] ^	0.30	U	ug/L	1	0.30	1.0	1	EPA 8260B	08/22/09 00:22	JKG	
Xylenes (Total) [1330-20-7] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	08/22/09 00:22	JKG	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*43*	*1*	*50.0*	*86 %*	*51-122*	*9H21006*	*EPA 8260B*	*08/22/09 00:22*	*JKG*	
Dibromofluoromethane	*42*	*1*	*50.0*	*85 %*	*68-117*	*9H21006*	*EPA 8260B*	*08/22/09 00:22*	*JKG*	
Toluene-d8	*41*	*1*	*50.0*	*83 %*	*69-110*	*9H21006*	*EPA 8260B*	*08/22/09 00:22*	*JKG*	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

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Description: 3201-NES2
Matrix: Ground Water
Project: City of Durham C&D LF

Lab Sample ID: C909051-02
Sampled: 08/17/09 15:35
Sampled By: Gerald Paul

Received: 08/18/09 13:10
Work Order: C909051

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	08/22/09 00:52	JKG	
1,1,1-Trichloroethane [71-55-6] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.33	U	ug/L	1	0.33	1.0	3	EPA 8260B	08/22/09 00:52	JKG	
1,1,2-Trichloroethane [79-00-5] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
1,1-Dichloroethane [75-34-3] ^	**0.80**	J	ug/L	1	0.33	1.0	5	EPA 8260B	08/22/09 00:52	JKG	
1,1-Dichloroethene [75-35-4] ^	**0.50**	J	ug/L	1	0.24	1.0	5	EPA 8260B	08/22/09 00:52	JKG	
1,2,3-Trichloropropane [96-18-4] ^	0.55	U	ug/L	1	0.55	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	08/22/09 00:52	JKG	
1,2-Dibromoethane [106-93-4] ^	0.42	U	ug/L	1	0.42	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
1,2-Dichlorobenzene [95-50-1] ^	0.27	U	ug/L	1	0.27	1.0	5	EPA 8260B	08/22/09 00:52	JKG	
1,2-Dichloroethane [107-06-2] ^	0.65	U	ug/L	1	0.65	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
1,2-Dichloropropane [78-87-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
1,4-Dichlorobenzene [106-46-7] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
2-Butanone [78-93-3] ^	1.0	U	ug/L	1	1.0	5.0	100	EPA 8260B	08/22/09 00:52	JKG	
2-Hexanone [591-78-6] ^	0.69	U	ug/L	1	0.69	5.0	50	EPA 8260B	08/22/09 00:52	JKG	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	08/22/09 00:52	JKG	
Acetone [67-64-1] ^	1.5	U	ug/L	1	1.5	5.0	100	EPA 8260B	08/22/09 00:52	JKG	
Acrylonitrile [107-13-1] ^	2.1	U	ug/L	1	2.1	10	200	EPA 8260B	08/22/09 00:52	JKG	
Benzene [71-43-2] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
Bromochloromethane [74-97-5] ^	0.42	U	ug/L	1	0.42	1.0	3	EPA 8260B	08/22/09 00:52	JKG	
Bromodichloromethane [75-27-4] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
Bromoform [75-25-2] ^	0.71	U	ug/L	1	0.71	1.0	3	EPA 8260B	08/22/09 00:52	JKG	
Bromomethane [74-83-9] ^	0.49	U	ug/L	1	0.49	1.0	10	EPA 8260B	08/22/09 00:52	JKG	
Carbon disulfide [75-15-0] ^	0.54	U	ug/L	1	0.54	5.0	100	EPA 8260B	08/22/09 00:52	JKG	
Carbon tetrachloride [56-23-5] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
Chlorobenzene [108-90-7] ^	0.27	U	ug/L	1	0.27	1.0	3	EPA 8260B	08/22/09 00:52	JKG	
Chloroethane [75-00-3] ^	0.30	U	ug/L	1	0.30	1.0	10	EPA 8260B	08/22/09 00:52	JKG	
Chloroform [67-66-3] ^	0.20	U	ug/L	1	0.20	1.0	5	EPA 8260B	08/22/09 00:52	JKG	
Chloromethane [74-87-3] ^	0.34	U	ug/L	1	0.34	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
cis-1,2-Dichloroethene [156-59-2] ^	**1.1**	J	ug/L	1	0.36	1.0	5	EPA 8260B	08/22/09 00:52	JKG	
cis-1,3-Dichloropropene [10061-01-5] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
Dibromochloromethane [124-48-1] ^	0.32	U	ug/L	1	0.32	1.0	3	EPA 8260B	08/22/09 00:52	JKG	
Dibromomethane [74-95-3] ^	0.37	U	ug/L	1	0.37	1.0	10	EPA 8260B	08/22/09 00:52	JKG	
Ethylbenzene [100-41-4] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
Iodomethane [74-88-4] ^	0.52	U	ug/L	1	0.52	5.0	10	EPA 8260B	08/22/09 00:52	JKG	
Methylene chloride [75-09-2] ^	0.53	U	ug/L	1	0.53	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
Styrene [100-42-5] ^	0.26	U	ug/L	1	0.26	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
Tetrachloroethene [127-18-4] ^	0.36	U	ug/L	1	0.36	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
Toluene [108-88-3] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
trans-1,2-Dichloroethene [156-60-5] ^	0.34	U	ug/L	1	0.34	1.0	5	EPA 8260B	08/22/09 00:52	JKG	
trans-1,3-Dichloropropene [10061-02-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.54	U	ug/L	1	0.54	1.0	100	EPA 8260B	08/22/09 00:52	JKG	
Trichloroethene [79-01-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
Trichlorofluoromethane [75-69-4] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	08/22/09 00:52	JKG	
Vinyl acetate [108-05-4] ^	0.98	U	ug/L	1	0.98	5.0	50	EPA 8260B	08/22/09 00:52	JKG	
Vinyl chloride [75-01-4] ^	0.30	U	ug/L	1	0.30	1.0	1	EPA 8260B	08/22/09 00:52	JKG	

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Description:	3201-NES2	**Lab Sample ID:**	C909051-02	**Received:**	08/18/09 13:10
Matrix:	Ground Water	**Sampled:**	08/17/09 15:35	**Work Order:**	C909051
Project:	City of Durham C&D LF	**Sampled By:**	Gerald Paul		

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Xylenes (Total) [1330-20-7] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	08/22/09 00:52	JKG	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*45*	*1*	*50.0*	*89 %*	*51-122*	*9H21006*	*EPA 8260B*	*08/22/09 00:52*	*JKG*	
Dibromofluoromethane	*42*	*1*	*50.0*	*85 %*	*68-117*	*9H21006*	*EPA 8260B*	*08/22/09 00:52*	*JKG*	
Toluene-d8	*43*	*1*	*50.0*	*85 %*	*69-110*	*9H21006*	*EPA 8260B*	*08/22/09 00:52*	*JKG*	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

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Description: 3201-NES3
Matrix: Ground Water
Project: City of Durham C&D LF

Lab Sample ID: C909051-03
Sampled: 08/17/09 14:20
Sampled By: Gerald Paul

Received: 08/18/09 13:10
Work Order: C909051

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	08/22/09 01:23	JKG	
1,1,1-Trichloroethane [71-55-6] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.33	U	ug/L	1	0.33	1.0	3	EPA 8260B	08/22/09 01:23	JKG	
1,1,2-Trichloroethane [79-00-5] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
1,1-Dichloroethane [75-34-3] ^	0.33	U	ug/L	1	0.33	1.0	5	EPA 8260B	08/22/09 01:23	JKG	
1,1-Dichloroethene [75-35-4] ^	0.24	U	ug/L	1	0.24	1.0	5	EPA 8260B	08/22/09 01:23	JKG	
1,2,3-Trichloropropane [96-18-4] ^	0.55	U	ug/L	1	0.55	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	08/22/09 01:23	JKG	
1,2-Dibromoethane [106-93-4] ^	0.42	U	ug/L	1	0.42	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
1,2-Dichlorobenzene [95-50-1] ^	0.27	U	ug/L	1	0.27	1.0	5	EPA 8260B	08/22/09 01:23	JKG	
1,2-Dichloroethane [107-06-2] ^	0.65	U	ug/L	1	0.65	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
1,2-Dichloropropane [78-87-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
1,4-Dichlorobenzene [106-46-7] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
2-Butanone [78-93-3] ^	1.0	U	ug/L	1	1.0	5.0	100	EPA 8260B	08/22/09 01:23	JKG	
2-Hexanone [591-78-6] ^	0.69	U	ug/L	1	0.69	5.0	50	EPA 8260B	08/22/09 01:23	JKG	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	08/22/09 01:23	JKG	
Acetone [67-64-1] ^	**4.2**	J	ug/L	1	1.5	5.0	100	EPA 8260B	08/22/09 01:23	JKG	
Acrylonitrile [107-13-1] ^	2.1	U	ug/L	1	2.1	10	200	EPA 8260B	08/22/09 01:23	JKG	
Benzene [71-43-2] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
Bromochloromethane [74-97-5] ^	0.42	U	ug/L	1	0.42	1.0	3	EPA 8260B	08/22/09 01:23	JKG	
Bromodichloromethane [75-27-4] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
Bromoform [75-25-2] ^	0.71	U	ug/L	1	0.71	1.0	3	EPA 8260B	08/22/09 01:23	JKG	
Bromomethane [74-83-9] ^	0.49	U	ug/L	1	0.49	1.0	10	EPA 8260B	08/22/09 01:23	JKG	
Carbon disulfide [75-15-0] ^	0.54	U	ug/L	1	0.54	5.0	100	EPA 8260B	08/22/09 01:23	JKG	
Carbon tetrachloride [56-23-5] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
Chlorobenzene [108-90-7] ^	0.27	U	ug/L	1	0.27	1.0	3	EPA 8260B	08/22/09 01:23	JKG	
Chloroethane [75-00-3] ^	0.30	U	ug/L	1	0.30	1.0	10	EPA 8260B	08/22/09 01:23	JKG	
Chloroform [67-66-3] ^	0.20	U	ug/L	1	0.20	1.0	5	EPA 8260B	08/22/09 01:23	JKG	
Chloromethane [74-87-3] ^	0.34	U	ug/L	1	0.34	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
cis-1,2-Dichloroethene [156-59-2] ^	0.36	U	ug/L	1	0.36	1.0	5	EPA 8260B	08/22/09 01:23	JKG	
cis-1,3-Dichloropropene [10061-01-5] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
Dibromochloromethane [124-48-1] ^	0.32	U	ug/L	1	0.32	1.0	3	EPA 8260B	08/22/09 01:23	JKG	
Dibromomethane [74-95-3] ^	0.37	U	ug/L	1	0.37	1.0	10	EPA 8260B	08/22/09 01:23	JKG	
Ethylbenzene [100-41-4] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
Iodomethane [74-88-4] ^	0.52	U	ug/L	1	0.52	5.0	10	EPA 8260B	08/22/09 01:23	JKG	
Methylene chloride [75-09-2] ^	0.53	U	ug/L	1	0.53	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
Styrene [100-42-5] ^	0.26	U	ug/L	1	0.26	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
Tetrachloroethene [127-18-4] ^	0.36	U	ug/L	1	0.36	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
Toluene [108-88-3] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
trans-1,2-Dichloroethene [156-60-5] ^	0.34	U	ug/L	1	0.34	1.0	5	EPA 8260B	08/22/09 01:23	JKG	
trans-1,3-Dichloropropene [10061-02-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.54	U	ug/L	1	0.54	1.0	100	EPA 8260B	08/22/09 01:23	JKG	
Trichloroethene [79-01-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
Trichlorofluoromethane [75-69-4] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	08/22/09 01:23	JKG	
Vinyl acetate [108-05-4] ^	0.98	U	ug/L	1	0.98	5.0	50	EPA 8260B	08/22/09 01:23	JKG	
Vinyl chloride [75-01-4] ^	0.30	U	ug/L	1	0.30	1.0	1	EPA 8260B	08/22/09 01:23	JKG	

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Description:	3201-NES3	**Lab Sample ID:**	C909051-03	**Received:**	08/18/09 13:10
Matrix:	Ground Water	**Sampled:**	08/17/09 14:20	**Work Order:**	C909051
Project:	City of Durham C&D LF	**Sampled By:**	Gerald Paul		

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Xylenes (Total) [1330-20-7] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	08/22/09 01:23	JKG	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*44*	*1*	*50.0*	*87 %*	*51-122*	*9H21006*	*EPA 8260B*	*08/22/09 01:23*	*JKG*	
Dibromofluoromethane	*42*	*1*	*50.0*	*85 %*	*68-117*	*9H21006*	*EPA 8260B*	*08/22/09 01:23*	*JKG*	
Toluene-d8	*42*	*1*	*50.0*	*84 %*	*69-110*	*9H21006*	*EPA 8260B*	*08/22/09 01:23*	*JKG*	

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Description: 3201-NES4
Matrix: Ground Water
Project: City of Durham C&D LF

Lab Sample ID: C909051-04
Sampled: 08/17/09 12:50
Sampled By: Gerald Paul

Received: 08/18/09 13:10
Work Order: C909051

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	08/22/09 01:54	JKG	
1,1,1-Trichloroethane [71-55-6] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.33	U	ug/L	1	0.33	1.0	3	EPA 8260B	08/22/09 01:54	JKG	
1,1,2-Trichloroethane [79-00-5] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
1,1-Dichloroethane [75-34-3] ^	0.33	U	ug/L	1	0.33	1.0	5	EPA 8260B	08/22/09 01:54	JKG	
1,1-Dichloroethene [75-35-4] ^	0.24	U	ug/L	1	0.24	1.0	5	EPA 8260B	08/22/09 01:54	JKG	
1,2,3-Trichloropropane [96-18-4] ^	0.55	U	ug/L	1	0.55	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	08/22/09 01:54	JKG	
1,2-Dibromoethane [106-93-4] ^	0.42	U	ug/L	1	0.42	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
1,2-Dichlorobenzene [95-50-1] ^	0.27	U	ug/L	1	0.27	1.0	5	EPA 8260B	08/22/09 01:54	JKG	
1,2-Dichloroethane [107-06-2] ^	0.65	U	ug/L	1	0.65	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
1,2-Dichloropropane [78-87-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
1,4-Dichlorobenzene [106-46-7] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
2-Butanone [78-93-3] ^	1.0	U	ug/L	1	1.0	5.0	100	EPA 8260B	08/22/09 01:54	JKG	
2-Hexanone [591-78-6] ^	0.69	U	ug/L	1	0.69	5.0	50	EPA 8260B	08/22/09 01:54	JKG	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	08/22/09 01:54	JKG	
Acetone [67-64-1] ^	1.5	U	ug/L	1	1.5	5.0	100	EPA 8260B	08/22/09 01:54	JKG	
Acrylonitrile [107-13-1] ^	2.1	U	ug/L	1	2.1	10	200	EPA 8260B	08/22/09 01:54	JKG	
Benzene [71-43-2] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
Bromochloromethane [74-97-5] ^	0.42	U	ug/L	1	0.42	1.0	3	EPA 8260B	08/22/09 01:54	JKG	
Bromodichloromethane [75-27-4] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
Bromoform [75-25-2] ^	0.71	U	ug/L	1	0.71	1.0	3	EPA 8260B	08/22/09 01:54	JKG	
Bromomethane [74-83-9] ^	0.49	U	ug/L	1	0.49	1.0	10	EPA 8260B	08/22/09 01:54	JKG	
Carbon disulfide [75-15-0] ^	0.54	U	ug/L	1	0.54	5.0	100	EPA 8260B	08/22/09 01:54	JKG	
Carbon tetrachloride [56-23-5] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
Chlorobenzene [108-90-7] ^	0.27	U	ug/L	1	0.27	1.0	3	EPA 8260B	08/22/09 01:54	JKG	
Chloroethane [75-00-3] ^	0.30	U	ug/L	1	0.30	1.0	10	EPA 8260B	08/22/09 01:54	JKG	
Chloroform [67-66-3] ^	0.20	U	ug/L	1	0.20	1.0	5	EPA 8260B	08/22/09 01:54	JKG	
Chloromethane [74-87-3] ^	0.34	U	ug/L	1	0.34	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
cis-1,2-Dichloroethene [156-59-2] ^	0.36	U	ug/L	1	0.36	1.0	5	EPA 8260B	08/22/09 01:54	JKG	
cis-1,3-Dichloropropene [10061-01-5] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
Dibromochloromethane [124-48-1] ^	0.32	U	ug/L	1	0.32	1.0	3	EPA 8260B	08/22/09 01:54	JKG	
Dibromomethane [74-95-3] ^	0.37	U	ug/L	1	0.37	1.0	10	EPA 8260B	08/22/09 01:54	JKG	
Ethylbenzene [100-41-4] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
Iodomethane [74-88-4] ^	0.52	U	ug/L	1	0.52	5.0	10	EPA 8260B	08/22/09 01:54	JKG	
Methylene chloride [75-09-2] ^	0.53	U	ug/L	1	0.53	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
Styrene [100-42-5] ^	0.26	U	ug/L	1	0.26	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
Tetrachloroethene [127-18-4] ^	0.36	U	ug/L	1	0.36	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
Toluene [108-88-3] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
trans-1,2-Dichloroethene [156-60-5] ^	0.34	U	ug/L	1	0.34	1.0	5	EPA 8260B	08/22/09 01:54	JKG	
trans-1,3-Dichloropropene [10061-02-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.54	U	ug/L	1	0.54	1.0	100	EPA 8260B	08/22/09 01:54	JKG	
Trichloroethene [79-01-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
Trichlorofluoromethane [75-69-4] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	08/22/09 01:54	JKG	
Vinyl acetate [108-05-4] ^	0.98	U	ug/L	1	0.98	5.0	50	EPA 8260B	08/22/09 01:54	JKG	
Vinyl chloride [75-01-4] ^	0.30	U	ug/L	1	0.30	1.0	1	EPA 8260B	08/22/09 01:54	JKG	

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Description:	3201-NES4	**Lab Sample ID:**	C909051-04	**Received:**	08/18/09 13:10
Matrix:	Ground Water	**Sampled:**	08/17/09 12:50	**Work Order:**	C909051
Project:	City of Durham C&D LF	**Sampled By:**	Gerald Paul		

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Xylenes (Total) [1330-20-7] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	08/22/09 01:54	JKG	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*43*	*1*	*50.0*	*87 %*	*51-122*	*9H21006*	*EPA 8260B*	*08/22/09 01:54*	*JKG*	
Dibromofluoromethane	*41*	*1*	*50.0*	*82 %*	*68-117*	*9H21006*	*EPA 8260B*	*08/22/09 01:54*	*JKG*	
Toluene-d8	*41*	*1*	*50.0*	*81 %*	*69-110*	*9H21006*	*EPA 8260B*	*08/22/09 01:54*	*JKG*	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

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Description: 3201-NES5
Matrix: Ground Water
Project: City of Durham C&D LF

Lab Sample ID: C909051-05
Sampled: 08/17/09 13:25
Sampled By: Gerald Paul

Received: 08/18/09 13:10
Work Order: C909051

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	08/22/09 02:25	JKG	
1,1,1-Trichloroethane [71-55-6] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.33	U	ug/L	1	0.33	1.0	3	EPA 8260B	08/22/09 02:25	JKG	
1,1,2-Trichloroethane [79-00-5] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
1,1-Dichloroethane [75-34-3] ^	0.33	U	ug/L	1	0.33	1.0	5	EPA 8260B	08/22/09 02:25	JKG	
1,1-Dichloroethene [75-35-4] ^	0.24	U	ug/L	1	0.24	1.0	5	EPA 8260B	08/22/09 02:25	JKG	
1,2,3-Trichloropropane [96-18-4] ^	0.55	U	ug/L	1	0.55	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	08/22/09 02:25	JKG	
1,2-Dibromoethane [106-93-4] ^	0.42	U	ug/L	1	0.42	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
1,2-Dichlorobenzene [95-50-1] ^	0.27	U	ug/L	1	0.27	1.0	5	EPA 8260B	08/22/09 02:25	JKG	
1,2-Dichloroethane [107-06-2] ^	0.65	U	ug/L	1	0.65	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
1,2-Dichloropropane [78-87-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
1,4-Dichlorobenzene [106-46-7] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
2-Butanone [78-93-3] ^	1.0	U	ug/L	1	1.0	5.0	100	EPA 8260B	08/22/09 02:25	JKG	
2-Hexanone [591-78-6] ^	0.69	U	ug/L	1	0.69	5.0	50	EPA 8260B	08/22/09 02:25	JKG	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	08/22/09 02:25	JKG	
Acetone [67-64-1] ^	1.5	U	ug/L	1	1.5	5.0	100	EPA 8260B	08/22/09 02:25	JKG	
Acrylonitrile [107-13-1] ^	2.1	U	ug/L	1	2.1	10	200	EPA 8260B	08/22/09 02:25	JKG	
Benzene [71-43-2] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
Bromochloromethane [74-97-5] ^	0.42	U	ug/L	1	0.42	1.0	3	EPA 8260B	08/22/09 02:25	JKG	
Bromodichloromethane [75-27-4] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
Bromoform [75-25-2] ^	0.71	U	ug/L	1	0.71	1.0	3	EPA 8260B	08/22/09 02:25	JKG	
Bromomethane [74-83-9] ^	0.49	U	ug/L	1	0.49	1.0	10	EPA 8260B	08/22/09 02:25	JKG	
Carbon disulfide [75-15-0] ^	0.54	U	ug/L	1	0.54	5.0	100	EPA 8260B	08/22/09 02:25	JKG	
Carbon tetrachloride [56-23-5] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
Chlorobenzene [108-90-7] ^	0.27	U	ug/L	1	0.27	1.0	3	EPA 8260B	08/22/09 02:25	JKG	
Chloroethane [75-00-3] ^	0.30	U	ug/L	1	0.30	1.0	10	EPA 8260B	08/22/09 02:25	JKG	
Chloroform [67-66-3] ^	0.20	U	ug/L	1	0.20	1.0	5	EPA 8260B	08/22/09 02:25	JKG	
Chloromethane [74-87-3] ^	0.34	U	ug/L	1	0.34	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
cis-1,2-Dichloroethene [156-59-2] ^	0.36	U	ug/L	1	0.36	1.0	5	EPA 8260B	08/22/09 02:25	JKG	
cis-1,3-Dichloropropene [10061-01-5] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
Dibromochloromethane [124-48-1] ^	0.32	U	ug/L	1	0.32	1.0	3	EPA 8260B	08/22/09 02:25	JKG	
Dibromomethane [74-95-3] ^	0.37	U	ug/L	1	0.37	1.0	10	EPA 8260B	08/22/09 02:25	JKG	
Ethylbenzene [100-41-4] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
Iodomethane [74-88-4] ^	0.52	U	ug/L	1	0.52	5.0	10	EPA 8260B	08/22/09 02:25	JKG	
Methylene chloride [75-09-2] ^	0.53	U	ug/L	1	0.53	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
Styrene [100-42-5] ^	0.26	U	ug/L	1	0.26	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
Tetrachloroethene [127-18-4] ^	0.36	U	ug/L	1	0.36	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
Toluene [108-88-3] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
trans-1,2-Dichloroethene [156-60-5] ^	0.34	U	ug/L	1	0.34	1.0	5	EPA 8260B	08/22/09 02:25	JKG	
trans-1,3-Dichloropropene [10061-02-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.54	U	ug/L	1	0.54	1.0	100	EPA 8260B	08/22/09 02:25	JKG	
Trichloroethene [79-01-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
Trichlorofluoromethane [75-69-4] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	08/22/09 02:25	JKG	
Vinyl acetate [108-05-4] ^	0.98	U	ug/L	1	0.98	5.0	50	EPA 8260B	08/22/09 02:25	JKG	
Vinyl chloride [75-01-4] ^	0.30	U	ug/L	1	0.30	1.0	1	EPA 8260B	08/22/09 02:25	JKG	

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Description:	3201-NES5	**Lab Sample ID:**	C909051-05	**Received:**	08/18/09 13:10
Matrix:	Ground Water	**Sampled:**	08/17/09 13:25	**Work Order:**	C909051
Project:	City of Durham C&D LF	**Sampled By:**	Gerald Paul		

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Xylenes (Total) [1330-20-7] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	08/22/09 02:25	JKG	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*43*	*1*	*50.0*	*87 %*	*51-122*	*9H21006*	*EPA 8260B*	*08/22/09 02:25*	*JKG*	
Dibromofluoromethane	*41*	*1*	*50.0*	*83 %*	*68-117*	*9H21006*	*EPA 8260B*	*08/22/09 02:25*	*JKG*	
Toluene-d8	*43*	*1*	*50.0*	*85 %*	*69-110*	*9H21006*	*EPA 8260B*	*08/22/09 02:25*	*JKG*	

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Description: 3201-NES6
Matrix: Ground Water
Project: City of Durham C&D LF

Lab Sample ID: C909051-06
Sampled: 08/17/09 11:55
Sampled By: Gerald Paul

Received: 08/18/09 13:10
Work Order: C909051

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	08/22/09 02:56	JKG	
1,1,1-Trichloroethane [71-55-6] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.33	U	ug/L	1	0.33	1.0	3	EPA 8260B	08/22/09 02:56	JKG	
1,1,2-Trichloroethane [79-00-5] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
1,1-Dichloroethane [75-34-3] ^	0.33	U	ug/L	1	0.33	1.0	5	EPA 8260B	08/22/09 02:56	JKG	
1,1-Dichloroethene [75-35-4] ^	0.24	U	ug/L	1	0.24	1.0	5	EPA 8260B	08/22/09 02:56	JKG	
1,2,3-Trichloropropane [96-18-4] ^	0.55	U	ug/L	1	0.55	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	08/22/09 02:56	JKG	
1,2-Dibromoethane [106-93-4] ^	0.42	U	ug/L	1	0.42	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
1,2-Dichlorobenzene [95-50-1] ^	0.27	U	ug/L	1	0.27	1.0	5	EPA 8260B	08/22/09 02:56	JKG	
1,2-Dichloroethane [107-06-2] ^	0.65	U	ug/L	1	0.65	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
1,2-Dichloropropane [78-87-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
1,4-Dichlorobenzene [106-46-7] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
2-Butanone [78-93-3] ^	1.0	U	ug/L	1	1.0	5.0	100	EPA 8260B	08/22/09 02:56	JKG	
2-Hexanone [591-78-6] ^	0.69	U	ug/L	1	0.69	5.0	50	EPA 8260B	08/22/09 02:56	JKG	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	08/22/09 02:56	JKG	
Acetone [67-64-1] ^	1.5	U	ug/L	1	1.5	5.0	100	EPA 8260B	08/22/09 02:56	JKG	
Acrylonitrile [107-13-1] ^	2.1	U	ug/L	1	2.1	10	200	EPA 8260B	08/22/09 02:56	JKG	
Benzene [71-43-2] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
Bromochloromethane [74-97-5] ^	0.42	U	ug/L	1	0.42	1.0	3	EPA 8260B	08/22/09 02:56	JKG	
Bromodichloromethane [75-27-4] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
Bromoform [75-25-2] ^	0.71	U	ug/L	1	0.71	1.0	3	EPA 8260B	08/22/09 02:56	JKG	
Bromomethane [74-83-9] ^	0.49	U	ug/L	1	0.49	1.0	10	EPA 8260B	08/22/09 02:56	JKG	
Carbon disulfide [75-15-0] ^	0.54	U	ug/L	1	0.54	5.0	100	EPA 8260B	08/22/09 02:56	JKG	
Carbon tetrachloride [56-23-5] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
Chlorobenzene [108-90-7] ^	0.27	U	ug/L	1	0.27	1.0	3	EPA 8260B	08/22/09 02:56	JKG	
Chloroethane [75-00-3] ^	0.30	U	ug/L	1	0.30	1.0	10	EPA 8260B	08/22/09 02:56	JKG	
Chloroform [67-66-3] ^	0.20	U	ug/L	1	0.20	1.0	5	EPA 8260B	08/22/09 02:56	JKG	
Chloromethane [74-87-3] ^	0.34	U	ug/L	1	0.34	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
cis-1,2-Dichloroethene [156-59-2] ^	0.36	U	ug/L	1	0.36	1.0	5	EPA 8260B	08/22/09 02:56	JKG	
cis-1,3-Dichloropropene [10061-01-5] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
Dibromochloromethane [124-48-1] ^	0.32	U	ug/L	1	0.32	1.0	3	EPA 8260B	08/22/09 02:56	JKG	
Dibromomethane [74-95-3] ^	0.37	U	ug/L	1	0.37	1.0	10	EPA 8260B	08/22/09 02:56	JKG	
Ethylbenzene [100-41-4] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
Iodomethane [74-88-4] ^	0.52	U	ug/L	1	0.52	5.0	10	EPA 8260B	08/22/09 02:56	JKG	
Methylene chloride [75-09-2] ^	0.53	U	ug/L	1	0.53	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
Styrene [100-42-5] ^	0.26	U	ug/L	1	0.26	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
Tetrachloroethene [127-18-4] ^	0.36	U	ug/L	1	0.36	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
Toluene [108-88-3] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
trans-1,2-Dichloroethene [156-60-5] ^	0.34	U	ug/L	1	0.34	1.0	5	EPA 8260B	08/22/09 02:56	JKG	
trans-1,3-Dichloropropene [10061-02-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.54	U	ug/L	1	0.54	1.0	100	EPA 8260B	08/22/09 02:56	JKG	
Trichloroethene [79-01-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
Trichlorofluoromethane [75-69-4] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	08/22/09 02:56	JKG	
Vinyl acetate [108-05-4] ^	0.98	U	ug/L	1	0.98	5.0	50	EPA 8260B	08/22/09 02:56	JKG	
Vinyl chloride [75-01-4] ^	0.30	U	ug/L	1	0.30	1.0	1	EPA 8260B	08/22/09 02:56	JKG	

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Description:	3201-NES6	**Lab Sample ID:**	C909051-06	**Received:**	08/18/09 13:10
Matrix:	Ground Water	**Sampled:**	08/17/09 11:55	**Work Order:**	C909051
Project:	City of Durham C&D LF	**Sampled By:**	Gerald Paul		

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Xylenes (Total) [1330-20-7] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	08/22/09 02:56	JKG	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*43*	*1*	*50.0*	*86 %*	*51-122*	*9H21006*	*EPA 8260B*	*08/22/09 02:56*	*JKG*	
Dibromofluoromethane	*41*	*1*	*50.0*	*81 %*	*68-117*	*9H21006*	*EPA 8260B*	*08/22/09 02:56*	*JKG*	
Toluene-d8	*42*	*1*	*50.0*	*84 %*	*69-110*	*9H21006*	*EPA 8260B*	*08/22/09 02:56*	*JKG*	

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Description: 3201-Trip Blank
Matrix: Waste Water
Project: City of Durham C&D LF

Lab Sample ID: C909051-07
Sampled: 08/17/09 11:55
Sampled By: ENCO

Received: 08/18/09 13:10
Work Order: C909051

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	08/22/09 03:26	JKG	
1,1,1-Trichloroethane [71-55-6] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.33	U	ug/L	1	0.33	1.0	3	EPA 8260B	08/22/09 03:26	JKG	
1,1,2-Trichloroethane [79-00-5] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
1,1-Dichloroethane [75-34-3] ^	0.33	U	ug/L	1	0.33	1.0	5	EPA 8260B	08/22/09 03:26	JKG	
1,1-Dichloroethene [75-35-4] ^	0.24	U	ug/L	1	0.24	1.0	5	EPA 8260B	08/22/09 03:26	JKG	
1,2,3-Trichloropropane [96-18-4] ^	0.55	U	ug/L	1	0.55	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	08/22/09 03:26	JKG	
1,2-Dibromoethane [106-93-4] ^	0.42	U	ug/L	1	0.42	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
1,2-Dichlorobenzene [95-50-1] ^	0.27	U	ug/L	1	0.27	1.0	5	EPA 8260B	08/22/09 03:26	JKG	
1,2-Dichloroethane [107-06-2] ^	0.65	U	ug/L	1	0.65	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
1,2-Dichloropropane [78-87-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
1,4-Dichlorobenzene [106-46-7] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
2-Butanone [78-93-3] ^	1.0	U	ug/L	1	1.0	5.0	100	EPA 8260B	08/22/09 03:26	JKG	
2-Hexanone [591-78-6] ^	0.69	U	ug/L	1	0.69	5.0	50	EPA 8260B	08/22/09 03:26	JKG	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	08/22/09 03:26	JKG	
Acetone [67-64-1] ^	1.5	U	ug/L	1	1.5	5.0	100	EPA 8260B	08/22/09 03:26	JKG	
Acrylonitrile [107-13-1] ^	2.1	U	ug/L	1	2.1	10	200	EPA 8260B	08/22/09 03:26	JKG	
Benzene [71-43-2] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
Bromochloromethane [74-97-5] ^	0.42	U	ug/L	1	0.42	1.0	3	EPA 8260B	08/22/09 03:26	JKG	
Bromodichloromethane [75-27-4] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
Bromoform [75-25-2] ^	0.71	U	ug/L	1	0.71	1.0	3	EPA 8260B	08/22/09 03:26	JKG	
Bromomethane [74-83-9] ^	0.49	U	ug/L	1	0.49	1.0	10	EPA 8260B	08/22/09 03:26	JKG	
Carbon disulfide [75-15-0] ^	0.54	U	ug/L	1	0.54	5.0	100	EPA 8260B	08/22/09 03:26	JKG	
Carbon tetrachloride [56-23-5] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
Chlorobenzene [108-90-7] ^	0.27	U	ug/L	1	0.27	1.0	3	EPA 8260B	08/22/09 03:26	JKG	
Chloroethane [75-00-3] ^	0.30	U	ug/L	1	0.30	1.0	10	EPA 8260B	08/22/09 03:26	JKG	
Chloroform [67-66-3] ^	0.20	U	ug/L	1	0.20	1.0	5	EPA 8260B	08/22/09 03:26	JKG	
Chloromethane [74-87-3] ^	0.34	U	ug/L	1	0.34	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
cis-1,2-Dichloroethene [156-59-2] ^	0.36	U	ug/L	1	0.36	1.0	5	EPA 8260B	08/22/09 03:26	JKG	
cis-1,3-Dichloropropene [10061-01-5] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
Dibromochloromethane [124-48-1] ^	0.32	U	ug/L	1	0.32	1.0	3	EPA 8260B	08/22/09 03:26	JKG	
Dibromomethane [74-95-3] ^	0.37	U	ug/L	1	0.37	1.0	10	EPA 8260B	08/22/09 03:26	JKG	
Ethylbenzene [100-41-4] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
Iodomethane [74-88-4] ^	0.52	U	ug/L	1	0.52	5.0	10	EPA 8260B	08/22/09 03:26	JKG	
Methylene chloride [75-09-2] ^	0.53	U	ug/L	1	0.53	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
Styrene [100-42-5] ^	0.26	U	ug/L	1	0.26	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
Tetrachloroethene [127-18-4] ^	0.36	U	ug/L	1	0.36	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
Toluene [108-88-3] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
trans-1,2-Dichloroethene [156-60-5] ^	0.34	U	ug/L	1	0.34	1.0	5	EPA 8260B	08/22/09 03:26	JKG	
trans-1,3-Dichloropropene [10061-02-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.54	U	ug/L	1	0.54	1.0	100	EPA 8260B	08/22/09 03:26	JKG	
Trichloroethene [79-01-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
Trichlorofluoromethane [75-69-4] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	08/22/09 03:26	JKG	
Vinyl acetate [108-05-4] ^	0.98	U	ug/L	1	0.98	5.0	50	EPA 8260B	08/22/09 03:26	JKG	
Vinyl chloride [75-01-4] ^	0.30	U	ug/L	1	0.30	1.0	1	EPA 8260B	08/22/09 03:26	JKG	

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Description:	3201-Trip Blank	**Lab Sample ID:**	C909051-07	**Received:**	08/18/09 13:10
Matrix:	Waste Water	**Sampled:**	08/17/09 11:55	**Work Order:**	C909051
Project:	City of Durham C&D LF	**Sampled By:**	ENCO		

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Xylenes (Total) [1330-20-7] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	08/22/09 03:26	JKG	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*43*	*1*	*50.0*	*86 %*	*51-122*	*9H21006*	*EPA 8260B*	*08/22/09 03:26*	*JKG*	
Dibromofluoromethane	*41*	*1*	*50.0*	*82 %*	*68-117*	*9H21006*	*EPA 8260B*	*08/22/09 03:26*	*JKG*	
Toluene-d8	*41*	*1*	*50.0*	*83 %*	*69-110*	*9H21006*	*EPA 8260B*	*08/22/09 03:26*	*JKG*	

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QUALITY CONTROL

Volatile Organic Compounds by GCMS - Quality Control

Batch 9H21006 - EPA 5030B_MS

Blank (9H21006-BLK1) Prepared: 08/21/2009 10:40 Analyzed: 08/21/2009 20:46

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1,1,2-Tetrachloroethane	0.40	U	1.0	ug/L							
1,1,1-Trichloroethane	0.27	U	1.0	ug/L							
1,1,2,2-Tetrachloroethane	0.33	U	1.0	ug/L							
1,1,2-Trichloroethane	0.37	U	1.0	ug/L							
1,1-Dichloroethane	0.33	U	1.0	ug/L							
1,1-Dichloroethene	0.24	U	1.0	ug/L							
1,2,3-Trichloropropane	0.55	U	1.0	ug/L							
1,2-Dibromo-3-chloropropane	0.48	U	1.0	ug/L							
1,2-Dibromoethane	0.42	U	1.0	ug/L							
1,2-Dichlorobenzene	0.27	U	1.0	ug/L							
1,2-Dichloroethane	0.65	U	1.0	ug/L							
1,2-Dichloropropane	0.20	U	1.0	ug/L							
1,4-Dichlorobenzene	0.38	U	1.0	ug/L							
2-Butanone	1.0	U	5.0	ug/L							
2-Hexanone	0.69	U	5.0	ug/L							
4-Methyl-2-pentanone	1.1	U	5.0	ug/L							
Acetone	1.5	U	5.0	ug/L							
Acrylonitrile	2.1	U	10	ug/L							
Benzene	0.20	U	1.0	ug/L							
Bromochloromethane	0.42	U	1.0	ug/L							
Bromodichloromethane	0.37	U	1.0	ug/L							
Bromoform	0.71	U	1.0	ug/L							
Bromomethane	0.49	U	1.0	ug/L							
Carbon disulfide	0.54	U	5.0	ug/L							
Carbon tetrachloride	0.38	U	1.0	ug/L							
Chlorobenzene	0.27	U	1.0	ug/L							
Chloroethane	0.30	U	1.0	ug/L							
Chloroform	0.20	U	1.0	ug/L							
Chloromethane	0.34	U	1.0	ug/L							
cis-1,2-Dichloroethene	0.36	U	1.0	ug/L							
cis-1,3-Dichloropropene	0.28	U	1.0	ug/L							
Dibromochloromethane	0.32	U	1.0	ug/L							
Dibromomethane	0.37	U	1.0	ug/L							
Ethylbenzene	0.20	U	1.0	ug/L							
Iodomethane	0.52	U	5.0	ug/L							
Methylene chloride	0.53	U	1.0	ug/L							
Styrene	0.26	U	1.0	ug/L							
Tetrachloroethene	0.36	U	1.0	ug/L							
Toluene	0.27	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.34	U	1.0	ug/L							
trans-1,3-Dichloropropene	0.38	U	1.0	ug/L							
trans-1,4-Dichloro-2-butene	0.54	U	1.0	ug/L							
Trichloroethene	0.38	U	1.0	ug/L							
Trichlorofluoromethane	0.28	U	1.0	ug/L							
Vinyl acetate	0.98	U	5.0	ug/L							
Vinyl chloride	0.30	U	1.0	ug/L							
Xylenes (Total)	0.40	U	1.0	ug/L							
Surrogate: 4-Bromofluorobenzene	*42*			*ug/L*	*50.0*		*85*	*51-122*			

QUALITY CONTROL

Volatile Organic Compounds by GCMS - Quality Control

Batch 9H21006 - EPA 5030B_MS

Blank (9H21006-BLK1) Continued Prepared: 08/21/2009 10:40 Analyzed: 08/21/2009 20:46

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Surrogate: Dibromofluoromethane	*41*			*ug/L*	*50.0*		*82*	*68-117*			
Surrogate: Toluene-d8	*42*			*ug/L*	*50.0*		*84*	*69-110*			

LCS (9H21006-BS1) Prepared: 08/21/2009 10:40 Analyzed: 08/21/2009 21:17

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	17		1.0	ug/L	20.0		86	75-133			
Benzene	17		1.0	ug/L	20.0		87	81-134			
Chlorobenzene	18		1.0	ug/L	20.0		89	83-117			
Toluene	17		1.0	ug/L	20.0		87	71-118			
Trichloroethene	18		1.0	ug/L	20.0		90	75-115			

Matrix Spike (9H21006-MS1) Prepared: 08/21/2009 10:40 Analyzed: 08/21/2009 21:48

Source: C909673-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	17		1.0	ug/L	20.0	0.24 U	87	75-133			
Benzene	18		1.0	ug/L	20.0	0.20 U	89	81-134			
Chlorobenzene	19		1.0	ug/L	20.0	0.27 U	93	83-117			
Toluene	18		1.0	ug/L	20.0	0.27 U	88	71-118			
Trichloroethene	18		1.0	ug/L	20.0	0.38 U	89	75-115			

Matrix Spike Dup (9H21006-MSD1) Prepared: 08/21/2009 10:40 Analyzed: 08/21/2009 22:19

Source: C909673-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	17		1.0	ug/L	20.0	0.24 U	86	75-133	1	20	
Benzene	18		1.0	ug/L	20.0	0.20 U	89	81-134	0.6	17	
Chlorobenzene	18		1.0	ug/L	20.0	0.27 U	91	83-117	2	16	
Toluene	18		1.0	ug/L	20.0	0.27 U	89	71-118	1	17	
Trichloroethene	18		1.0	ug/L	20.0	0.38 U	92	75-115	3	18	

Batch 9H26008 - EPA 5030B_MS

Blank (9H26008-BLK1) Prepared: 08/26/2009 09:11 Analyzed: 08/27/2009 01:33

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1,1,2-Tetrachloroethane	0.40	U	1.0	ug/L							
1,1,1-Trichloroethane	0.27	U	1.0	ug/L							
1,1,2,2-Tetrachloroethane	0.33	U	1.0	ug/L							
1,1,2-Trichloroethane	0.37	U	1.0	ug/L							
1,1-Dichloroethane	0.33	U	1.0	ug/L							
1,1-Dichloroethene	0.24	U	1.0	ug/L							
1,2,3-Trichloropropane	0.55	U	1.0	ug/L							
1,2-Dibromo-3-chloropropane	0.48	U	1.0	ug/L							
1,2-Dibromoethane	0.42	U	1.0	ug/L							
1,2-Dichlorobenzene	0.27	U	1.0	ug/L							

QUALITY CONTROL

Volatile Organic Compounds by GCMS - Quality Control

Batch 9H26008 - EPA 5030B_MS

Blank (9H26008-BLK1) Continued Prepared: 08/26/2009 09:11 Analyzed: 08/27/2009 01:33

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2-Dichloroethane	0.65	U	1.0	ug/L							
1,2-Dichloropropane	0.20	U	1.0	ug/L							
1,4-Dichlorobenzene	0.38	U	1.0	ug/L							
2-Butanone	1.0	U	5.0	ug/L							
2-Hexanone	0.69	U	5.0	ug/L							
4-Methyl-2-pentanone	1.1	U	5.0	ug/L							
Acetone	1.5	U	5.0	ug/L							
Acrylonitrile	2.1	U	10	ug/L							
Benzene	0.20	U	1.0	ug/L							
Bromochloromethane	0.42	U	1.0	ug/L							
Bromodichloromethane	0.37	U	1.0	ug/L							
Bromoform	0.71	U	1.0	ug/L							
Bromomethane	0.49	U	1.0	ug/L							
Carbon disulfide	0.54	U	5.0	ug/L							
Carbon tetrachloride	0.38	U	1.0	ug/L							
Chlorobenzene	0.27	U	1.0	ug/L							
Chloroethane	0.30	U	1.0	ug/L							
Chloroform	0.20	U	1.0	ug/L							
Chloromethane	0.34	U	1.0	ug/L							
cis-1,2-Dichloroethene	0.36	U	1.0	ug/L							
cis-1,3-Dichloropropene	0.28	U	1.0	ug/L							
Dibromochloromethane	0.32	U	1.0	ug/L							
Dibromomethane	0.37	U	1.0	ug/L							
Ethylbenzene	0.20	U	1.0	ug/L							
Iodomethane	0.52	U	5.0	ug/L							
Methylene chloride	0.53	U	1.0	ug/L							
Styrene	0.26	U	1.0	ug/L							
Tetrachloroethene	0.36	U	1.0	ug/L							
Toluene	0.27	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.34	U	1.0	ug/L							
trans-1,3-Dichloropropene	0.38	U	1.0	ug/L							
trans-1,4-Dichloro-2-butene	0.54	U	1.0	ug/L							
Trichloroethene	0.38	U	1.0	ug/L							
Trichlorofluoromethane	0.28	U	1.0	ug/L							
Vinyl acetate	0.98	U	5.0	ug/L							
Vinyl chloride	0.30	U	1.0	ug/L							
Xylenes (Total)	0.40	U	1.0	ug/L							
Surrogate: 4-Bromofluorobenzene	*41*			*ug/L*	*50.0*		*81*	*51-122*			
Surrogate: Dibromofluoromethane	*37*			*ug/L*	*50.0*		*75*	*68-117*			
Surrogate: Toluene-d8	*41*			*ug/L*	*50.0*		*81*	*69-110*			

LCS (9H26008-BS1) Prepared: 08/26/2009 09:11 Analyzed: 08/27/2009 02:03

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	17		1.0	ug/L	20.0		87	75-133			
Benzene	18		1.0	ug/L	20.0		91	81-134			
Chlorobenzene	20		1.0	ug/L	20.0		99	83-117			
Toluene	19		1.0	ug/L	20.0		94	71-118			

QUALITY CONTROL

Volatile Organic Compounds by GCMS - Quality Control

Batch 9H26008 - EPA 5030B_MS

LCS (9H26008-BS1) Continued Prepared: 08/26/2009 09:11 Analyzed: 08/27/2009 02:03

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Trichloroethene	21		1.0	ug/L	20.0		105	75-115			

Matrix Spike (9H26008-MS1) Prepared: 08/26/2009 09:11 Analyzed: 08/27/2009 02:34

Source: C909707-07

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	18		1.0	ug/L	20.0	0.24 U	90	75-133			
Benzene	19		1.0	ug/L	20.0	0.20 U	96	81-134			
Chlorobenzene	20		1.0	ug/L	20.0	0.27 U	100	83-117			
Toluene	19		1.0	ug/L	20.0	0.27 U	97	71-118			
Trichloroethene	20		1.0	ug/L	20.0	0.38 U	101	75-115			

Matrix Spike Dup (9H26008-MSD1) Prepared: 08/26/2009 09:11 Analyzed: 08/27/2009 03:05

Source: C909707-07

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	18		1.0	ug/L	20.0	0.24 U	89	75-133	0.8	20	
Benzene	19		1.0	ug/L	20.0	0.20 U	93	81-134	3	17	
Chlorobenzene	20		1.0	ug/L	20.0	0.27 U	100	83-117	0.3	16	
Toluene	20		1.0	ug/L	20.0	0.27 U	99	71-118	1	17	
Trichloroethene	20		1.0	ug/L	20.0	0.38 U	101	75-115	0.7	18	

FLAGS/NOTES AND DEFINITIONS

B	The analyte was detected in the associated method blank.
D	The sample was analyzed at dilution.
J	The reported value is between the laboratory method detection limit (MDL) and the laboratory method reporting limit (MRL), adjusted for actual sample preparation data and moisture content, where applicable.
U	The analyte was analyzed for but not detected to the level shown, adjusted for actual sample preparation data and moisture content, where applicable.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate.
MRL	Method Reporting Limit. The MRL is roughly equivalent to the practical quantitation limit (PQL) and is based on the low point of the calibration curve, when applicable, sample preparation factor, dilution factor, and, in the case of soil samples, moisture content.

ENVIRONMENTAL CONSERVATION LABORATORIES CHAIN-OF-CUSTODY RECORD

10775 Central Port Dr.
Orlando, FL 32824
(407) 826-5314 Fax (407) 850-6945

4810 Executive Park Court, Suite 211
Jacksonville, FL 32216-6069
(904) 296-3007 Fax (904) 296-6210

102-A Woodwinds Industrial Ct.
Cary, NC 27511
(919) 467-3090 Fax (919) 467-3515

Page 1 of 1

Client Name: S&ME, Inc. (SM001)	Project Number: [~~name~~] 1054-07-469 Phase 21
Address: 3201 Spring Forest Road	Project Name/Desc: City of Durham C&D LF
City/ST/Zip: Raleigh, NC 27616	PO # / Billing Info:
Tel: (919) 872-2660 Fax: (919) 876-3958	Reporting Contact: Gerald Paul
Sampler(s) Name, Affiliation (Print): GERALD PAUL	Billing Contact: Accounts Payable
Sampler(s) Signature: [signature]	Facility # (if required):

Requested Analyses: 8260B Appendix 1

Requested Turnaround Times
Note: Rush requests subject to acceptance by the facility
X Standard
___ Expedited
Due __/__/__

Lab Workorder: C909051

Preservation (See Codes) (Combine as necessary)

Item #	Sample ID (Field Identification)	Collection Date	Collection Time	Comp / Grab	Matrix (see codes)	Total # of Containers	8260B Appendix 1	Sample Comments
	NES-1	8-17-09	1500	Grab	GW	3	X	
	NES-2	↓	1535	↓	GW	3	X	
	NES-3		1420		GW	3	X	
	NES-4		1250		GW	3	X	
	NES-5		1325		GW	3	X	
	NES-6	↓	1155	↓	GW	3	X	
	~~NES-7~~	↓			~~GW~~	~~3~~	~~X~~	
	Trip Blank				WA	2	X	
						20	<-- Total # of Containers	

Sample Kit Prepared By	Date/Time	Relinquished By: P. Williams	Date/Time: 8/18/09 1020	Received By: [signature]	Date/Time: 8/18/09 1020
Comments: No SAMPLE WAS COLLECTED for NES-7.		Relinquished By	Date/Time	Received By	Date/Time
		Relinquished By	Date/Time	Received By: [signature]	Date/Time: 8/18/09 110
		Cooler #'s & Temps on Receipt: ~~C388~~ 1.3°C		Condition Upon Receipt: X Acceptable ___ Unacceptable	

Matrix: GW-Groundwater SO-Soil SE-Sediment SW-Surface Water WW-Wastewater A-Air O-Other (detail in comments)

Preservation: I-Ice H-HCl N-HNO3 S-H2SO4 NO-NaOH O-Other (detail in comments)

Note: All samples submitted to ENCO Labs are in accordance with the terms and conditions listed on the reverse of this form, unless prior written agreements exist.

Environmental Conservation Laboratories, Inc.
102-A Woodwinds Industrial Court
Cary NC, 27511
Phone: 919.467.3090 FAX: 919.467.3515
www.encolabs.com

Wednesday, October 28, 2009

S&ME, Inc. (SM001)

Attn: Gerald Paul

3201 Spring Forest Road

Raleigh, NC 27616

RE: Laboratory Results for
Project Number: 1054-07-469 Phase 21, Project Name/Desc: City of Durham C&D LF
ENCO Workorder: C912277

Dear Gerald Paul,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Thursday, October 22, 2009.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Cary. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Chuck Smith

Project Manager

Enclosure(s)

The total number of pages in this report, including this page is 9.

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SAMPLE SUMMARY/LABORATORY CHRONICLE

Client ID:	NES-7	Lab ID:	C912277-01	Sampled:	10/21/09 12:00	Received:	10/22/09 12:28

Parameter	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260B	11/04/09	10/27/09 10:58	10/27/2009 17:48

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NORTH CAROLINA SWS SAMPLE DETECTION SUMMARY

Client ID: NES-7 **Lab ID:** C912277-01

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
1,1-Dichloroethane	1.0	J	1	0.33	1.0	5	ug/L	EPA 8260B	
1,2-Dichloropropane	0.91	J	1	0.20	1.0	1	ug/L	EPA 8260B	
1,4-Dichlorobenzene	0.75	J	1	0.38	1.0	1	ug/L	EPA 8260B	
Acetone	3.6	J	1	1.5	5.0	100	ug/L	EPA 8260B	
cis-1,2-Dichloroethene	28		1	0.36	1.0	5	ug/L	EPA 8260B	
trans-1,2-Dichloroethene	0.90	J	1	0.34	1.0	5	ug/L	EPA 8260B	
Vinyl chloride	2.4		1	0.30	1.0	1	ug/L	EPA 8260B	

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ANALYTICAL RESULTS

Description: NES-7
Matrix: Ground Water
Project: City of Durham C&D LF

Lab Sample ID: C912277-01
Sampled: 10/21/09 12:00
Sampled By: Gerald Paul

Received: 10/22/09 12:28
Work Order: C912277

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	10/27/09 17:48	JKG	
1,1,1-Trichloroethane [71-55-6] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.33	U	ug/L	1	0.33	1.0	3	EPA 8260B	10/27/09 17:48	JKG	
1,1,2-Trichloroethane [79-00-5] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
1,1-Dichloroethane [75-34-3] ^	**1.0**	J	ug/L	1	0.33	1.0	5	EPA 8260B	10/27/09 17:48	JKG	
1,1-Dichloroethene [75-35-4] ^	0.24	U	ug/L	1	0.24	1.0	5	EPA 8260B	10/27/09 17:48	JKG	
1,2,3-Trichloropropane [96-18-4] ^	0.55	U	ug/L	1	0.55	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	10/27/09 17:48	JKG	
1,2-Dibromoethane [106-93-4] ^	0.42	U	ug/L	1	0.42	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
1,2-Dichlorobenzene [95-50-1] ^	0.27	U	ug/L	1	0.27	1.0	5	EPA 8260B	10/27/09 17:48	JKG	
1,2-Dichloroethane [107-06-2] ^	0.65	U	ug/L	1	0.65	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
1,2-Dichloropropane [78-87-5] ^	**0.91**	J	ug/L	1	0.20	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
1,4-Dichlorobenzene [106-46-7] ^	**0.75**	J	ug/L	1	0.38	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
2-Butanone [78-93-3] ^	1.0	U	ug/L	1	1.0	5.0	100	EPA 8260B	10/27/09 17:48	JKG	
2-Hexanone [591-78-6] ^	0.69	U	ug/L	1	0.69	5.0	50	EPA 8260B	10/27/09 17:48	JKG	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	10/27/09 17:48	JKG	
Acetone [67-64-1] ^	**3.6**	J	ug/L	1	1.5	5.0	100	EPA 8260B	10/27/09 17:48	JKG	
Acrylonitrile [107-13-1] ^	2.1	U	ug/L	1	2.1	10	200	EPA 8260B	10/27/09 17:48	JKG	
Benzene [71-43-2] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
Bromochloromethane [74-97-5] ^	0.42	U	ug/L	1	0.42	1.0	3	EPA 8260B	10/27/09 17:48	JKG	
Bromodichloromethane [75-27-4] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
Bromoform [75-25-2] ^	0.71	U	ug/L	1	0.71	1.0	3	EPA 8260B	10/27/09 17:48	JKG	
Bromomethane [74-83-9] ^	0.49	U	ug/L	1	0.49	1.0	10	EPA 8260B	10/27/09 17:48	JKG	
Carbon disulfide [75-15-0] ^	0.54	U	ug/L	1	0.54	5.0	100	EPA 8260B	10/27/09 17:48	JKG	
Carbon tetrachloride [56-23-5] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
Chlorobenzene [108-90-7] ^	0.27	U	ug/L	1	0.27	1.0	3	EPA 8260B	10/27/09 17:48	JKG	
Chloroethane [75-00-3] ^	0.30	U	ug/L	1	0.30	1.0	10	EPA 8260B	10/27/09 17:48	JKG	
Chloroform [67-66-3] ^	0.20	U	ug/L	1	0.20	1.0	5	EPA 8260B	10/27/09 17:48	JKG	
Chloromethane [74-87-3] ^	0.34	U	ug/L	1	0.34	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
cis-1,2-Dichloroethene [156-59-2] ^	**28**		ug/L	1	0.36	1.0	5	EPA 8260B	10/27/09 17:48	JKG	
cis-1,3-Dichloropropene [10061-01-5] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
Dibromochloromethane [124-48-1] ^	0.32	U	ug/L	1	0.32	1.0	3	EPA 8260B	10/27/09 17:48	JKG	
Dibromomethane [74-95-3] ^	0.37	U	ug/L	1	0.37	1.0	10	EPA 8260B	10/27/09 17:48	JKG	
Ethylbenzene [100-41-4] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
Iodomethane [74-88-4] ^	0.52	U	ug/L	1	0.52	5.0	10	EPA 8260B	10/27/09 17:48	JKG	
Methylene chloride [75-09-2] ^	0.53	U	ug/L	1	0.53	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
Styrene [100-42-5] ^	0.26	U	ug/L	1	0.26	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
Tetrachloroethene [127-18-4] ^	0.36	U	ug/L	1	0.36	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
Toluene [108-88-3] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
trans-1,2-Dichloroethene [156-60-5] ^	**0.90**	J	ug/L	1	0.34	1.0	5	EPA 8260B	10/27/09 17:48	JKG	
trans-1,3-Dichloropropene [10061-02-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.54	U	ug/L	1	0.54	1.0	100	EPA 8260B	10/27/09 17:48	JKG	
Trichloroethene [79-01-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	10/27/09 17:48	JKG	

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Description:	NES-7	**Lab Sample ID:**	C912277-01	**Received:**	10/22/09 12:28
Matrix:	Ground Water	**Sampled:**	10/21/09 12:00	**Work Order:**	C912277
Project:	City of Durham C&D LF	**Sampled By:**	Gerald Paul		

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Trichlorofluoromethane [75-69-4] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
Vinyl acetate [108-05-4] ^	0.98	U	ug/L	1	0.98	5.0	50	EPA 8260B	10/27/09 17:48	JKG	
Vinyl chloride [75-01-4] ^	**2.4**		ug/L	1	0.30	1.0	1	EPA 8260B	10/27/09 17:48	JKG	
Xylenes (Total) [1330-20-7] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	10/27/09 17:48	JKG	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*53*	*1*	*50.0*	*106 %*	*51-122*	*9J27021*	*EPA 8260B*	*10/27/09 17:48*	*JKG*	
Dibromofluoromethane	*49*	*1*	*50.0*	*99 %*	*68-117*	*9J27021*	*EPA 8260B*	*10/27/09 17:48*	*JKG*	
Toluene-d8	*52*	*1*	*50.0*	*105 %*	*69-110*	*9J27021*	*EPA 8260B*	*10/27/09 17:48*	*JKG*	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

QUALITY CONTROL

Volatile Organic Compounds by GCMS - Quality Control

Batch 9J27021 - EPA 5030B_MS

Blank (9J27021-BLK1) Prepared: 10/27/2009 10:58 Analyzed: 10/27/2009 12:08

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1,1,2-Tetrachloroethane	0.40	U	1.0	ug/L							
1,1,1-Trichloroethane	0.27	U	1.0	ug/L							
1,1,2,2-Tetrachloroethane	0.33	U	1.0	ug/L							
1,1,2-Trichloroethane	0.37	U	1.0	ug/L							
1,1-Dichloroethane	0.33	U	1.0	ug/L							
1,1-Dichloroethene	0.24	U	1.0	ug/L							
1,2,3-Trichloropropane	0.55	U	1.0	ug/L							
1,2-Dibromo-3-chloropropane	0.48	U	1.0	ug/L							
1,2-Dibromoethane	0.42	U	1.0	ug/L							
1,2-Dichlorobenzene	0.27	U	1.0	ug/L							
1,2-Dichloroethane	0.65	U	1.0	ug/L							
1,2-Dichloropropane	0.20	U	1.0	ug/L							
1,4-Dichlorobenzene	0.38	U	1.0	ug/L							
2-Butanone	1.0	U	5.0	ug/L							
2-Hexanone	0.69	U	5.0	ug/L							
4-Methyl-2-pentanone	1.1	U	5.0	ug/L							
Acetone	1.5	U	5.0	ug/L							
Acrylonitrile	2.1	U	10	ug/L							
Benzene	0.20	U	1.0	ug/L							
Bromochloromethane	0.42	U	1.0	ug/L							
Bromodichloromethane	0.37	U	1.0	ug/L							
Bromoform	0.71	U	1.0	ug/L							
Bromomethane	0.49	U	1.0	ug/L							
Carbon disulfide	0.54	U	5.0	ug/L							
Carbon tetrachloride	0.38	U	1.0	ug/L							
Chlorobenzene	0.27	U	1.0	ug/L							
Chloroethane	0.30	U	1.0	ug/L							
Chloroform	0.20	U	1.0	ug/L							
Chloromethane	0.34	U	1.0	ug/L							
cis-1,2-Dichloroethene	0.36	U	1.0	ug/L							
cis-1,3-Dichloropropene	0.28	U	1.0	ug/L							
Dibromochloromethane	0.32	U	1.0	ug/L							
Dibromomethane	0.37	U	1.0	ug/L							
Ethylbenzene	0.20	U	1.0	ug/L							
Iodomethane	0.52	U	5.0	ug/L							
Methylene chloride	0.53	U	1.0	ug/L							
Styrene	0.26	U	1.0	ug/L							
Tetrachloroethene	0.36	U	1.0	ug/L							
Toluene	0.27	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.34	U	1.0	ug/L							
trans-1,3-Dichloropropene	0.38	U	1.0	ug/L							
trans-1,4-Dichloro-2-butene	0.54	U	1.0	ug/L							
Trichloroethene	0.38	U	1.0	ug/L							
Trichlorofluoromethane	0.28	U	1.0	ug/L							
Vinyl acetate	0.98	U	5.0	ug/L							
Vinyl chloride	0.30	U	1.0	ug/L							
Xylenes (Total)	0.40	U	1.0	ug/L							
Surrogate: 4-Bromofluorobenzene	*52*			*ug/L*	*50.0*		*105*	*51-122*			

QUALITY CONTROL

Volatile Organic Compounds by GCMS - Quality Control

Batch 9J27021 - EPA 5030B_MS

Blank (9J27021-BLK1) Continued Prepared: 10/27/2009 10:58 Analyzed: 10/27/2009 12:08

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Surrogate: Dibromofluoromethane	*48*			*ug/L*	*50.0*		*96*	*68-117*			
Surrogate: Toluene-d8	*53*			*ug/L*	*50.0*		*105*	*69-110*			

LCS (9J27021-BS1) Prepared: 10/27/2009 10:58 Analyzed: 10/27/2009 12:36

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	21		1.0	ug/L	20.0		105	75-133			
Benzene	20		1.0	ug/L	20.0		100	81-134			
Chlorobenzene	20		1.0	ug/L	20.0		101	83-117			
Toluene	22		1.0	ug/L	20.0		110	71-118			
Trichloroethene	20		1.0	ug/L	20.0		101	75-115			

Matrix Spike (9J27021-MS1) Prepared: 10/27/2009 10:58 Analyzed: 10/27/2009 13:05

Source: C912269-05

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	22		1.0	ug/L	20.0	0.24 U	108	75-133			
Benzene	20		1.0	ug/L	20.0	0.20 U	99	81-134			
Chlorobenzene	20		1.0	ug/L	20.0	0.27 U	101	83-117			
Toluene	22		1.0	ug/L	20.0	0.27 U	108	71-118			
Trichloroethene	20		1.0	ug/L	20.0	0.38 U	102	75-115			

Matrix Spike Dup (9J27021-MSD1) Prepared: 10/27/2009 10:58 Analyzed: 10/27/2009 13:33

Source: C912269-05

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	20		1.0	ug/L	20.0	0.24 U	101	75-133	6	20	
Benzene	19		1.0	ug/L	20.0	0.20 U	96	81-134	3	17	
Chlorobenzene	20		1.0	ug/L	20.0	0.27 U	99	83-117	3	16	
Toluene	21		1.0	ug/L	20.0	0.27 U	105	71-118	3	17	
Trichloroethene	20		1.0	ug/L	20.0	0.38 U	99	75-115	3	18	

FLAGS/NOTES AND DEFINITIONS

B	The analyte was detected in the associated method blank.
D	The sample was analyzed at dilution.
J	The reported value is between the laboratory method detection limit (MDL) and the laboratory method reporting limit (MRL), adjusted for actual sample preparation data and moisture content, where applicable.
U	The analyte was analyzed for but not detected to the level shown, adjusted for actual sample preparation data and moisture content, where applicable.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate.
MRL	Method Reporting Limit. The MRL is roughly equivalent to the practical quantitation limit (PQL) and is based on the low point of the calibration curve, when applicable, sample preparation factor, dilution factor, and, in the case of soil samples, moisture content.

ENVIRONMENTAL CONSERVATION LABORATORIES CHAIN-OF-CUSTODY RECORD

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Orlando, FL 32824
(407) 826-5314 Fax (407) 850-6945

4810 Executive Park Court, Suite 211
Jacksonville, FL 32216-6069
(904) 296-3007 Fax (904) 296-6210

102-A Woodwinds Industrial Ct.
Cary, NC 27511
(919) 467-3090 Fax (919) 467-3515

Page 1 of 1

Client Name: STME, INC.	Project Number: 1054-07-469 Phase 21
Address: 3201 Spring Forest Road	Project Name/Desc: City of Durham Landfill
City/ST/Zip: Raleigh, NC 27616	PO # / Billing Info:
Tel: 919 8722660 / Fax:	Reporting Contact: GERALD PAUL
Sampler(s) Name, Affiliation (Print): GERALD PAUL	Billing Contact: Accounts Payable
Sampler(s) Signature: [signature]	Facility # (if required):

Requested Analyses: 8260 B Appendix I

Requested Turnaround Times

Note: Rush requests subject to acceptance by the facility

X Standard

___ Expedited

Due ___/___/___

Lab Workorder: C912277

Preservation (See Codes) (Combine as necessary)

Item #	Sample ID (Field Identification)	Collection Date	Collection Time	Comp / Grab	Matrix (see codes)	Total # of Containers	8260 B Appendix I	Sample Comments
	NES-7	10/21/09	1200	GRAB	GW	3	X	

<= Total # of Containers

Sample Kit Prepared By	Date/Time	Relinquished By: [signature]	Date/Time: 10/22/09 0800	Received By	Date/Time
Comments		Relinquished By	Date/Time	Received By	Date/Time
		Relinquished By	Date/Time	Received By: [signature]	Date/Time: 10/22/09 12:28
		Cooler #'s & Temps on Receipt: 3.7°C		Condition Upon Receipt: X Acceptable ___ Unacceptable	

Matrix: GW-Groundwater SO-Soil SE-Sediment SW-Surface Water WW-Wastewater A-Air O-Other (detail in comments)

Preservation: I-Ice H-HCl N-HNO3 S-H2SO4 NO-NaOH O-Other (detail in comments)

Note: All samples submitted to ENCO Labs are in accordance with the terms and conditions listed on the reverse of this form, unless prior written agreements exist.

NES-3 LABORATORY CERTIFICATES-OF-ANALYSIS AND NES-3 FIELD FORM

Environmental Conservation Laboratories, Inc.
102-A Woodwinds Industrial Court
Cary NC, 27511
Phone: 919.467.3090 FAX: 919.467.3515
www.encolabs.com

Monday, June 9, 2014

Golder Associates, Inc. (GO007)

Attn: Dusty Reedy

5B Oak Branch Drive

Greensboro, NC 27407

RE: Laboratory Results for
Project Number: 073-9604214.100, Project Name/Desc: City of Durham
ENCO Workorder(s): C406437

Dear Dusty Reedy,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Thursday, May 22, 2014.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Cary. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Stephanie Franz

Project Manager

Enclosure(s)

The total number of pages in this report, including this page is 14.

PROJECT NARRATIVE

Date: 09 June 2014
Client: Golder Associates, Inc. (GO007)
Project: City of Durham
Lab ID: C406437

Overview

This report is an amendment to the original report dated 06 June 2014 for this work order. This report was revised, at the client's request, to report NES-3 separately from the other samples.

Environmental Conservation Laboratories, Inc. (ENCO) analyzed all submitted samples in accordance with the methods referenced in the laboratory report. Any particular difficulties encountered during sample handling by ENCO are discussed in the QC Remarks section below.

Quality Control Samples

The spike recovery of Chlorobenzene was outside of control limits for the 8260B MS and MSD samples. The QC batch was approved based on acceptable LCS recovery of this analyte.

Quality Control Remarks

No Comments

Other Comments

All samples received under this work order arrived in acceptable conditions. The samples were not checked for residual chlorine, as it is not required.

The analytical data presented in this report are consistent with the methods as referenced in the analytical report. Any exceptions or deviations are noted in the QC remarks section of this narrative or in the Flags/Notes and Definitions section of the report.

Released By:

Environmental Conservation Laboratories, Inc.
Stephanie Franz
Project Manager

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SAMPLE SUMMARY/LABORATORY CHRONICLE

Client ID: 3201-NES3	Lab ID: C406437-01	Sampled: 05/21/14 11:46	Received: 05/22/14 12:10

Parameter	Hold Date/Time(s)	Prep Date/Time(s)		Analysis Date/Time(s)
EPA 6010C	11/17/14	05/27/14	10:13	5/29/2014 12:24
EPA 6020A	11/17/14	05/29/14	11:48	6/4/2014 11:41
EPA 8260B	06/04/14	06/03/14	09:25	6/3/2014 19:15

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NORTH CAROLINA SWS SAMPLE DETECTION SUMMARY

Client ID: 3201-NES3 **Lab ID:** C406437-01

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Barium - Total	101		1	1.00	10.0	100	ug/L	EPA 6010C	
Chromium - Total	1.88	J	1	1.40	10.0	10	ug/L	EPA 6010C	
Cobalt - Total	5.57	J	1	1.10	10.0	10	ug/L	EPA 6010C	
Copper - Total	1.63	J	1	1.60	10.0	10	ug/L	EPA 6010C	
Nickel - Total	3.88	J	1	1.80	10.0	50	ug/L	EPA 6010C	
Vanadium - Total	1.97	J	1	1.40	10.0	25	ug/L	EPA 6010C	
Zinc - Total	6.20	J	1	3.80	10.0	10	ug/L	EPA 6010C	

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ANALYTICAL RESULTS

Description: 3201-NES3 | **Lab Sample ID:** C406437-01 | **Received:** 05/22/14 12:10

Matrix: Ground Water | **Sampled:** 05/21/14 11:46 | **Work Order:** C406437

Project: City of Durham | **Sampled By:** Anna Stoddard

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.17	U	ug/L	1	0.17	1.0	5	EPA 8260B	06/03/14 19:15	MSZ	
1,1,1-Trichloroethane [71-55-6] ^	0.12	U	ug/L	1	0.12	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.28	U	ug/L	1	0.28	1.0	3	EPA 8260B	06/03/14 19:15	MSZ	
1,1,2-Trichloroethane [79-00-5] ^	0.14	U	ug/L	1	0.14	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
1,1-Dichloroethane [75-34-3] ^	0.13	U	ug/L	1	0.13	1.0	5	EPA 8260B	06/03/14 19:15	MSZ	
1,1-Dichloroethene [75-35-4] ^	0.21	U	ug/L	1	0.21	1.0	5	EPA 8260B	06/03/14 19:15	MSZ	
1,2,3-Trichloropropane [96-18-4] ^	0.23	U	ug/L	1	0.23	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	06/03/14 19:15	MSZ	
1,2-Dibromoethane [106-93-4] ^	0.66	U	ug/L	1	0.66	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
1,2-Dichlorobenzene [95-50-1] ^	0.19	U	ug/L	1	0.19	1.0	5	EPA 8260B	06/03/14 19:15	MSZ	
1,2-Dichloroethane [107-06-2] ^	0.21	U	ug/L	1	0.21	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
1,2-Dichloropropane [78-87-5] ^	0.10	U	ug/L	1	0.10	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
1,4-Dichlorobenzene [106-46-7] ^	0.19	U	ug/L	1	0.19	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
2-Butanone [78-93-3] ^	1.3	U	ug/L	1	1.3	5.0	100	EPA 8260B	06/03/14 19:15	MSZ	
2-Hexanone [591-78-6] ^	0.88	U	ug/L	1	0.88	5.0	50	EPA 8260B	06/03/14 19:15	MSZ	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	06/03/14 19:15	MSZ	
Acetone [67-64-1] ^	1.2	U	ug/L	1	1.2	5.0	100	EPA 8260B	06/03/14 19:15	MSZ	
Acrylonitrile [107-13-1] ^	3.5	U	ug/L	1	3.5	10	200	EPA 8260B	06/03/14 19:15	MSZ	
Benzene [71-43-2] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
Bromochloromethane [74-97-5] ^	0.48	U	ug/L	1	0.48	1.0	3	EPA 8260B	06/03/14 19:15	MSZ	
Bromodichloromethane [75-27-4] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
Bromoform [75-25-2] ^	0.22	U	ug/L	1	0.22	1.0	3	EPA 8260B	06/03/14 19:15	MSZ	
Bromomethane [74-83-9] ^	0.14	U	ug/L	1	0.14	1.0	10	EPA 8260B	06/03/14 19:15	MSZ	
Carbon disulfide [75-15-0] ^	1.5	U	ug/L	1	1.5	5.0	100	EPA 8260B	06/03/14 19:15	MSZ	
Carbon tetrachloride [56-23-5] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
Chlorobenzene [108-90-7] ^	0.17	U	ug/L	1	0.17	1.0	3	EPA 8260B	06/03/14 19:15	MSZ	
Chloroethane [75-00-3] ^	0.23	U	ug/L	1	0.23	1.0	10	EPA 8260B	06/03/14 19:15	MSZ	
Chloroform [67-66-3] ^	0.18	U	ug/L	1	0.18	1.0	5	EPA 8260B	06/03/14 19:15	MSZ	
Chloromethane [74-87-3] ^	0.13	U	ug/L	1	0.13	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
cis-1,2-Dichloroethene [156-59-2] ^	0.15	U	ug/L	1	0.15	1.0	5	EPA 8260B	06/03/14 19:15	MSZ	
cis-1,3-Dichloropropene [10061-01-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
Dibromochloromethane [124-48-1] ^	0.17	U	ug/L	1	0.17	1.0	3	EPA 8260B	06/03/14 19:15	MSZ	
Dibromomethane [74-95-3] ^	0.27	U	ug/L	1	0.27	1.0	10	EPA 8260B	06/03/14 19:15	MSZ	
Ethylbenzene [100-41-4] ^	0.13	U	ug/L	1	0.13	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
Iodomethane [74-88-4] ^	1.7	U	ug/L	1	1.7	5.0	10	EPA 8260B	06/03/14 19:15	MSZ	
Methylene chloride [75-09-2] ^	0.23	U	ug/L	1	0.23	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
Styrene [100-42-5] ^	0.11	U	ug/L	1	0.11	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
Tetrachloroethene [127-18-4] ^	0.17	U	ug/L	1	0.17	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
Toluene [108-88-3] ^	0.14	U	ug/L	1	0.14	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
trans-1,2-Dichloroethene [156-60-5] ^	0.21	U	ug/L	1	0.21	1.0	5	EPA 8260B	06/03/14 19:15	MSZ	
trans-1,3-Dichloropropene [10061-02-6] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.70	U	ug/L	1	0.70	1.0	100	EPA 8260B	06/03/14 19:15	MSZ	
Trichloroethene [79-01-6] ^	0.15	U	ug/L	1	0.15	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	

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Description: 3201-NES3
Matrix: Ground Water
Project: City of Durham

Lab Sample ID: C406437-01
Sampled: 05/21/14 11:46
Sampled By: Anna Stoddard

Received: 05/22/14 12:10
Work Order: C406437

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Trichlorofluoromethane [75-69-4] ^	0.24	U	ug/L	1	0.24	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
Vinyl acetate [108-05-4] ^	0.95	U	ug/L	1	0.95	5.0	50	EPA 8260B	06/03/14 19:15	MSZ	
Vinyl chloride [75-01-4] ^	0.32	U	ug/L	1	0.32	1.0	1	EPA 8260B	06/03/14 19:15	MSZ	
Xylenes (Total) [1330-20-7] ^	0.45	U	ug/L	1	0.45	3.0	5	EPA 8260B	06/03/14 19:15	MSZ	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*42*	*1*	*50.0*	*83 %*	*51-122*	*4F03011*	*EPA 8260B*	*06/03/14 19:15*	*MSZ*	
Dibromofluoromethane	*40*	*1*	*50.0*	*81 %*	*68-117*	*4F03011*	*EPA 8260B*	*06/03/14 19:15*	*MSZ*	
Toluene-d8	*43*	*1*	*50.0*	*86 %*	*67-127*	*4F03011*	*EPA 8260B*	*06/03/14 19:15*	*MSZ*	

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Description: 3201-NES3
Matrix: Ground Water
Project: City of Durham

Lab Sample ID: C406437-01
Sampled: 05/21/14 11:46
Sampled By: Anna Stoddard

Received: 05/22/14 12:10
Work Order: C406437

Metals (total recoverable) by EPA 6000/7000 Series Methods

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Antimony [7440-36-0] ^	0.220	U	ug/L	1	0.220	2.00	6	EPA 6020A	06/04/14 11:41	VLO	
Arsenic [7440-38-2] ^	5.40	U	ug/L	1	5.40	10.0	10	EPA 6010C	05/29/14 12:24	VLO	
Barium [7440-39-3] ^	**101**		ug/L	1	1.00	10.0	100	EPA 6010C	05/29/14 12:24	VLO	
Beryllium [7440-41-7] ^	0.100	U	ug/L	1	0.100	1.00	1	EPA 6010C	05/29/14 12:24	VLO	
Cadmium [7440-43-9] ^	0.360	U	ug/L	1	0.360	1.00	1	EPA 6010C	05/29/14 12:24	VLO	
Chromium [7440-47-3] ^	**1.88**	J	ug/L	1	1.40	10.0	10	EPA 6010C	05/29/14 12:24	VLO	
Cobalt [7440-48-4] ^	**5.57**	J	ug/L	1	1.10	10.0	10	EPA 6010C	05/29/14 12:24	VLO	
Copper [7440-50-8] ^	**1.63**	J	ug/L	1	1.60	10.0	10	EPA 6010C	05/29/14 12:24	VLO	
Lead [7439-92-1] ^	2.10	U	ug/L	1	2.10	10.0	10	EPA 6010C	05/29/14 12:24	VLO	
Nickel [7440-02-0] ^	**3.88**	J	ug/L	1	1.80	10.0	50	EPA 6010C	05/29/14 12:24	VLO	
Selenium [7782-49-2] ^	5.00	U	ug/L	1	5.00	10.0	10	EPA 6010C	05/29/14 12:24	VLO	
Silver [7440-22-4] ^	1.90	U	ug/L	1	1.90	10.0	10	EPA 6010C	05/29/14 12:24	VLO	
Thallium [7440-28-0] ^	0.110	U	ug/L	1	0.110	1.00	5.5	EPA 6020A	06/04/14 11:41	VLO	
Vanadium [7440-62-2] ^	**1.97**	J	ug/L	1	1.40	10.0	25	EPA 6010C	05/29/14 12:24	VLO	
Zinc [7440-66-6] ^	**6.20**	J	ug/L	1	3.80	10.0	10	EPA 6010C	05/29/14 12:24	VLO	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

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QUALITY CONTROL

Volatile Organic Compounds by GCMS - Quality Control

Batch 4F03011 - EPA 5030B_MS

Blank (4F03011-BLK1) Prepared: 06/03/2014 09:25 Analyzed: 06/03/2014 11:18

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1,1,2-Tetrachloroethane	0.17	U	1.0	ug/L							
1,1,1-Trichloroethane	0.12	U	1.0	ug/L							
1,1,2,2-Tetrachloroethane	0.28	U	1.0	ug/L							
1,1,2-Trichloroethane	0.14	U	1.0	ug/L							
1,1-Dichloroethane	0.13	U	1.0	ug/L							
1,1-Dichloroethene	0.21	U	1.0	ug/L							
1,2,3-Trichloropropane	0.23	U	1.0	ug/L							
1,2-Dibromo-3-chloropropane	0.48	U	1.0	ug/L							
1,2-Dibromoethane	0.66	U	1.0	ug/L							
1,2-Dichlorobenzene	0.19	U	1.0	ug/L							
1,2-Dichloroethane	0.21	U	1.0	ug/L							
1,2-Dichloropropane	0.10	U	1.0	ug/L							
1,4-Dichlorobenzene	0.19	U	1.0	ug/L							
2-Butanone	1.3	U	5.0	ug/L							
2-Hexanone	0.88	U	5.0	ug/L							
4-Methyl-2-pentanone	1.1	U	5.0	ug/L							
Acetone	1.2	U	5.0	ug/L							
Acrylonitrile	3.5	U	10	ug/L							
Benzene	0.15	U	1.0	ug/L							
Bromochloromethane	0.48	U	1.0	ug/L							
Bromodichloromethane	0.17	U	1.0	ug/L							
Bromoform	0.22	U	1.0	ug/L							
Bromomethane	0.14	U	1.0	ug/L							
Carbon disulfide	1.5	U	5.0	ug/L							
Carbon tetrachloride	0.17	U	1.0	ug/L							
Chlorobenzene	0.17	U	1.0	ug/L							
Chloroethane	0.23	U	1.0	ug/L							
Chloroform	0.18	U	1.0	ug/L							
Chloromethane	0.13	U	1.0	ug/L							
cis-1,2-Dichloroethene	0.15	U	1.0	ug/L							
cis-1,3-Dichloropropene	0.20	U	1.0	ug/L							
Dibromochloromethane	0.17	U	1.0	ug/L							
Dibromomethane	0.27	U	1.0	ug/L							
Ethylbenzene	0.13	U	1.0	ug/L							
Iodomethane	1.7	U	5.0	ug/L							
Methylene chloride	0.23	U	1.0	ug/L							
Styrene	0.11	U	1.0	ug/L							
Tetrachloroethene	0.17	U	1.0	ug/L							
Toluene	0.14	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.21	U	1.0	ug/L							
trans-1,3-Dichloropropene	0.15	U	1.0	ug/L							
trans-1,4-Dichloro-2-butene	0.70	U	1.0	ug/L							
Trichloroethene	0.15	U	1.0	ug/L							
Trichlorofluoromethane	0.24	U	1.0	ug/L							
Vinyl acetate	0.95	U	5.0	ug/L							
Vinyl chloride	0.32	U	1.0	ug/L							
Xylenes (Total)	0.45	U	3.0	ug/L							
Surrogate: 4-Bromofluorobenzene	*41*			*ug/L*	*50.0*		*83*	*51-122*			

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QUALITY CONTROL

Volatile Organic Compounds by GCMS - Quality Control

Batch 4F03011 - EPA 5030B_MS

Blank (4F03011-BLK1) Continued Prepared: 06/03/2014 09:25 Analyzed: 06/03/2014 11:18

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Surrogate: Dibromofluoromethane	*37*			*ug/L*	*50.0*		*74*	*68-117*			
Surrogate: Toluene-d8	*41*			*ug/L*	*50.0*		*83*	*67-127*			

LCS (4F03011-BS1) Prepared: 06/03/2014 09:25 Analyzed: 06/03/2014 11:48

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	20		1.0	ug/L	20.0		100	75-133			
Benzene	20		1.0	ug/L	20.0		99	81-134			
Chlorobenzene	23		1.0	ug/L	20.0		113	83-117			
Toluene	21		1.0	ug/L	20.0		105	71-118			
Trichloroethene	20		1.0	ug/L	20.0		99	74-119			

Matrix Spike (4F03011-MS1) Prepared: 06/03/2014 09:25 Analyzed: 06/03/2014 12:18

Source: C405635-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	23		1.0	ug/L	20.0	0.21 U	115	75-133			
Benzene	21		1.0	ug/L	20.0	0.15 U	107	81-134			
Chlorobenzene	24		1.0	ug/L	20.0	0.17 U	122	83-117			QM-07
Toluene	22		1.0	ug/L	20.0	0.14 U	112	71-118			
Trichloroethene	23		1.0	ug/L	20.0	0.15 U	113	74-119			

Matrix Spike Dup (4F03011-MSD1) Prepared: 06/03/2014 09:25 Analyzed: 06/03/2014 12:48

Source: C405635-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	23		1.0	ug/L	20.0	0.21 U	117	75-133	1	20	
Benzene	21		1.0	ug/L	20.0	0.15 U	107	81-134	0.7	17	
Chlorobenzene	25		1.0	ug/L	20.0	0.17 U	124	83-117	2	16	QM-07
Toluene	23		1.0	ug/L	20.0	0.14 U	114	71-118	2	17	
Trichloroethene	22		1.0	ug/L	20.0	0.15 U	109	74-119	4	22	

Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control

Batch 4E27011 - EPA 3005A

Blank (4E27011-BLK1) Prepared: 05/27/2014 10:13 Analyzed: 05/29/2014 10:52

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	5.40	U	10.0	ug/L							
Barium	1.00	U	10.0	ug/L							
Beryllium	0.100	U	1.00	ug/L							
Cadmium	0.360	U	1.00	ug/L							
Chromium	1.40	U	10.0	ug/L							
Cobalt	1.10	U	10.0	ug/L							
Copper	1.60	U	10.0	ug/L							
Lead	2.10	U	10.0	ug/L							
Nickel	1.80	U	10.0	ug/L							

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QUALITY CONTROL

Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control

Batch 4E27011 - EPA 3005A

Blank (4E27011-BLK1) Continued Prepared: 05/27/2014 10:13 Analyzed: 05/29/2014 10:52

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Selenium	5.00	U	10.0	ug/L							
Silver	1.90	U	10.0	ug/L							
Vanadium	1.40	U	10.0	ug/L							
Zinc	3.80	U	10.0	ug/L							

LCS (4E27011-BS1) Prepared: 05/27/2014 10:13 Analyzed: 05/29/2014 10:54

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	220		10.0	ug/L	200		110	80-120			
Barium	211		10.0	ug/L	200		105	80-120			
Beryllium	21.2		1.00	ug/L	20.0		106	80-120			
Cadmium	21.2		1.00	ug/L	20.0		106	80-120			
Chromium	209		10.0	ug/L	200		105	80-120			
Cobalt	220		10.0	ug/L	200		110	80-120			
Copper	207		10.0	ug/L	200		104	80-120			
Lead	215		10.0	ug/L	200		107	80-120			
Nickel	211		10.0	ug/L	200		106	80-120			
Selenium	217		10.0	ug/L	200		108	80-120			
Silver	216		10.0	ug/L	200		108	80-120			
Vanadium	213		10.0	ug/L	200		107	80-120			
Zinc	211		10.0	ug/L	200		106	80-120			

Matrix Spike (4E27011-MS1) Prepared: 05/27/2014 10:13 Analyzed: 05/29/2014 10:59

Source: C405635-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	214		10.0	ug/L	200	5.40 U	107	75-125			
Barium	478		10.0	ug/L	200	265	107	75-125			
Beryllium	21.9		1.00	ug/L	20.0	0.100 U	110	75-125			
Cadmium	21.8		1.00	ug/L	20.0	0.360 U	109	75-125			
Chromium	217		10.0	ug/L	200	4.33	106	75-125			
Cobalt	221		10.0	ug/L	200	6.05	108	75-125			
Copper	223		10.0	ug/L	200	1.64	111	75-125			
Lead	219		10.0	ug/L	200	5.52	107	75-125			
Nickel	224		10.0	ug/L	200	7.44	108	75-125			
Selenium	224		10.0	ug/L	200	5.00 U	112	75-125			
Silver	228		10.0	ug/L	200	1.90 U	114	75-125			
Vanadium	224		10.0	ug/L	200	2.91	111	75-125			
Zinc	220		10.0	ug/L	200	4.08	108	75-125			

Matrix Spike Dup (4E27011-MSD1) Prepared: 05/27/2014 10:13 Analyzed: 05/29/2014 11:02

Source: C405635-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	214		10.0	ug/L	200	5.40 U	107	75-125	0.1	20	
Barium	472		10.0	ug/L	200	265	104	75-125	1	20	
Beryllium	21.7		1.00	ug/L	20.0	0.100 U	109	75-125	0.7	20	

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QUALITY CONTROL

Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control

Batch 4E27011 - EPA 3005A

Matrix Spike Dup (4E27011-MSD1) Continued Prepared: 05/27/2014 10:13 Analyzed: 05/29/2014 11:02

Source: C405635-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Cadmium	21.4		1.00	ug/L	20.0	0.360 U	107	75-125	2	20	
Chromium	214		10.0	ug/L	200	4.33	105	75-125	1	20	
Cobalt	216		10.0	ug/L	200	6.05	105	75-125	3	20	
Copper	221		10.0	ug/L	200	1.64	110	75-125	1	20	
Lead	212		10.0	ug/L	200	5.52	103	75-125	3	20	
Nickel	218		10.0	ug/L	200	7.44	105	75-125	3	20	
Selenium	223		10.0	ug/L	200	5.00 U	112	75-125	0.3	20	
Silver	228		10.0	ug/L	200	1.90 U	114	75-125	0.04	20	
Vanadium	221		10.0	ug/L	200	2.91	109	75-125	1	20	
Zinc	215		10.0	ug/L	200	4.08	106	75-125	2	20	

Post Spike (4E27011-PS1) Prepared: 05/27/2014 10:13 Analyzed: 05/29/2014 11:05

Source: C405635-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	0.207		0.0100	mg/L	0.200	-0.00842	108	80-120			
Barium	0.464		0.0100	mg/L	0.200	0.265	100	80-120			
Beryllium	0.0205		0.00100	mg/L	0.0200	5.80E-5	102	80-120			
Cadmium	0.0204		0.00100	mg/L	0.0200	0.000214	101	80-120			
Chromium	0.206		0.0100	mg/L	0.200	0.00433	101	80-120			
Cobalt	0.206		0.0100	mg/L	0.200	0.00605	100	80-120			
Copper	0.211		0.0100	mg/L	0.200	0.00164	105	80-120			
Lead	0.204		0.0100	mg/L	0.200	0.00552	99	80-120			
Nickel	0.207		0.0100	mg/L	0.200	0.00744	100	80-120			
Selenium	0.206		0.0100	mg/L	0.200	-0.00263	104	80-120			
Silver	0.216		0.0100	mg/L	0.200	0.00182	107	80-120			
Vanadium	0.212		0.0100	mg/L	0.200	0.00291	104	80-120			
Zinc	0.205		0.0100	mg/L	0.200	0.00408	100	80-120			

Batch 4E29028 - EPA 3005A

Blank (4E29028-BLK1) Prepared: 05/29/2014 11:48 Analyzed: 06/04/2014 10:17

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	0.220	U	2.00	ug/L							
Thallium	0.110	U	1.00	ug/L							

LCS (4E29028-BS1) Prepared: 05/29/2014 11:48 Analyzed: 06/04/2014 10:25

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	203		2.00	ug/L	200		102	80-120			
Thallium	202		1.00	ug/L	200		101	80-120			

Matrix Spike (4E29028-MS1) Prepared: 05/29/2014 11:48 Analyzed: 06/04/2014 10:29

Source: C405662-02

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QUALITY CONTROL

Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control

Batch 4E29028 - EPA 3005A

Matrix Spike (4E29028-MS1) Continued Prepared: 05/29/2014 11:48 Analyzed: 06/04/2014 10:29

Source: C405662-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	207		2.00	ug/L	200	0.220 U	104	75-125			
Thallium	194		1.00	ug/L	200	0.110 U	97	75-125			

Matrix Spike Dup (4E29028-MSD1) Prepared: 05/29/2014 11:48 Analyzed: 06/04/2014 10:33

Source: C405662-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	204		2.00	ug/L	200	0.220 U	102	75-125	2	20	
Thallium	189		1.00	ug/L	200	0.110 U	95	75-125	2	20	

Post Spike (4E29028-PS1) Prepared: 05/29/2014 11:48 Analyzed: 06/04/2014 10:37

Source: C405662-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	204		2.00	ug/L	200	0.0498	102	80-120			
Thallium	189		1.00	ug/L	200	0.00958	95	80-120			

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FLAGS/NOTES AND DEFINITIONS

B	The analyte was detected in the associated method blank.
D	The sample was analyzed at dilution.
J	The reported value is between the laboratory method detection limit (MDL) and the laboratory method reporting limit (MRL), adjusted for actual sample preparation data and moisture content, where applicable.
U	The analyte was analyzed for but not detected to the level shown, adjusted for actual sample preparation data and moisture content, where applicable.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate.
MRL	Method Reporting Limit. The MRL is roughly equivalent to the practical quantitation limit (PQL) and is based on the low point of the calibration curve, when applicable, sample preparation factor, dilution factor, and, in the case of soil samples, moisture content.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

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ENVIRONMENTAL CONSERVATION LABORATORIES CHAIN-OF-CUSTODY RECORD

www.encolabs.com

10775 Central Port Dr.
Orlando, FL 32824
(407) 826-5314 Fax (407) 850-6945

4810 Executive Park Court, Suite 211
Jacksonville, FL 32216-6069
(904) 296-3007 Fax (904) 296-6210

102-A Woodwinds Industrial Ct.
Cary, NC 27511
(919) 467-3090 Fax (919) 467-3515

Client Name: Golder Associates, Inc	Project Number: 0739604214.100
Address: 5B Oak Branch Drive	Project Name/Desc: City of Durham
City/ST/Zip: Greensboro, NC 27407	PO # / Billing Info:
Tel: 336-852-4903 Fax: 336-852-4904	Reporting Contact: Dusty Reedy
Sampler(s) Name, Affiliation (Print): Anna Stoddard, Golder	Billing Contact: Accounts Payable
Sampler(s) Signature: Anna Stoddard	Site Location / Time Zone: Durham, NC / EST

Requested Analyses: 8260B Appendix I; Ag, As, Ba, Be, Cd, Co, Cr, Cu, Ni, Pb, Sb, Se, Tl, V, Zn

Preservation (See Codes) (Combine as necessary)

Requested Turnaround Times

Note : Rush requests subject to acceptance by the facility

✓ Standard

___ Expedited

Due ___/___/___

Lab Workorder: C406437

Item #	Sample ID (Field Identification)	Collection Date	Collection Time	Comp / Grab	Matrix (see codes)	Total # of Containers	8260B Appendix I	Ag, As, Ba, Be, Cd, Co, Cr, Cu, Ni, Pb, Sb, Se, Tl, V, Zn								Sample Comments
	NES-3	5-21-14	1146	G	GW	4	X	X								

<-- Total # of Containers

Sample Kit Prepared By	Date/Time	Relinquished By: Anna Stoddard	Date/Time: 5-22-14 / 10:20	Received By: Bobby Jewell	Date/Time: 5/22/14 10:20
Comments/Special Reporting Requirements: 1. Please provide a "Level 2" data report 2. Unit rates per "Basic Ordering Agreement for Lab Services" dated April 19, 2004 and the 2013 Unit Price Sheet		Relinquished By	Date/Time	Received By	Date/Time: 5-22-14 12:10
		Relinquished By	Date/Time	Received By	Date/Time
		Cooler #'s & Temps on Receipt: 1.6°		Condition Upon Receipt: X Acceptable ___ Unacceptable	

Mat GW-Groundwater SO-Soil DW-Drinking Water SE-Sediment SW-Surface Water WW-Wastewater A-Air O-Other (detail in comments) Preservation: I-Ice H-HCl N-HNO3 S-H2SO4 NO-NaOH O-Other (detail in comments)

Note : All samples submitted to ENCO Labs are in accordance with the terms and conditions listed on the reverse of this form, unless prior written agreements exist

Work order by Anna Stoddard Accepted by [illegible]

SIR SPEEDY #50600 (407) 847-3328 Rel. No. G 847500150

WORK ORDER

Printed: 6/9/2014 10:59:31AM

C406437

ENCO Cary

Sample Receipt Conditions

Client:	**Golder Associates, Inc. (GO007)**	**Lab Project Mgr:**	**Stephanie Franz**
Project:	**City of Durham**	**Project Number:**	**073-9604214.100**
PO #:			

Report To:

Golder Associates, Inc. (GO007)
Dusty Reedy
5B Oak Branch Drive
Greensboro, NC 27407
Phone: (336) 852-4903
Fax: (336) 852-4904

Invoice To:

Golder Associates, Inc. (GO007)
Accounts Payable
5B Oak Branch Drive
Greensboro, NC 27407
Phone :(804) 358-7900
Fax: 804-358-2900

Received By:	John C King	Date Received:	22-May-14 12:10
Logged In By:	Andrew S Coons	Date Logged In:	22-May-14 14:32

Work Order Comments:

Default Cooler received at 1.6°C

Containers Intact	**Y**	Containers Properly Preserved	**Y**	Proper Containers Received	**Y**	All Samples in PreLog Received	**N**	COC/Labels Agree	**Y**
Custody Seals Intact	**Y**	Volatile Containers Preserved	**Y**	Volatile Containers Headspace Free	**Y**	Aqueous Samples Checked for Residual Cl	**N**	Received On Ice	**Y**
Temperature Corrected	**Y**								

Golder Associates

DATE: 5-20-14

GROUNDWATER SAMPLING LOG

Project Name: City of Durham
Project No./Phase No.: 0739604214
Well ID: NES-3
Sampler(s): A. Stoddard, K. Sizemore
Well Diameter: 2 inches
Int. Depth to Water: 5.55 feet
Depth to Bottom: 12.20 feet
Total Water Column: 6.65 feet
Well Volume: 1.1 ~~3.30~~ AS gallons
3x Well Volume: ~~9.90~~ AS 3.30 gallons
Well Location: behind MW-10 and stream (SW-2), behind ~~MW-7~~ NES-7
Equipment: YSI ProPlus, water level meter, Hach 2100P turbidimeter, disposable bailer

	Time	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	Temp. (°C)	Vol. (gallons)
	1305	6.42	0.245	513	15.8	0
	1307	6.41	0.194	277	15.4	1.1
	1309	6.17	0.189	310	15.0	2.2
	1311	5.82	0.184	558	14.7	3.3
	—	allow well to recharge				—
5-21-14	1146	6.51	0.195	269.3	16.7	—

Comments (weather conditions, color, type of sample, purge-water management, etc.):
72° F, cloudy, wind slight
* Water has a sulfur-like smell

Signature: Anna Stoddard
Date: 5-21-14

QA/QC Sign Off: [illegible]
Date: 7-25-14