NOTE TO FILE CONCERNING PILKINGTON/LIBBEY OWENS FORD SITE

The following document has not been reviewed or approved by the Inactive Hazardous Sites Branch (IHSB) staff. On October 23, 2014, Pilkington North America was deemed eligible for private party oversight and cleanup under the Registered Environmental Consultant (REC) program. All remedial activities should be performed under the REC program in order to be granted approval by the IHSB. At this time, the responsible party has indicated they have elected to instead self-report by continuing with semi-annual monitoring.

REPORT OF
SEMI-ANNUAL GROUNDWATER
MONITORING EVENT
November 2015

Prepared on Behalf of:

PILKINGTON

Pilkington North America, Inc.
13121 S. Rocky Ford Road
Laurinburg, NC 28352

Sampling Date:

November 23, 2015

Prepared by:

HUNT
ENVIRONMENTAL ASSOCIATES

Hunt Environmental Associates
3430 Capauno St.
Lumberton NC, 28358

December 23, 2015

Mr. Phil Waters
Pilkington North America, Inc.
13121 S. Rocky Ford Road
Laurinburg, NC 28352

Subject: Report of Semi-Annual Groundwater Monitoring Event – November 2015
Pilkington North America, Inc.
Laurinburg, Scotland County, North Carolina

Mr. Phil Waters:

Hunt Environmental Associates (HEA) has prepared this *Report of Semi-Annual Groundwater Monitoring – November 2015 Event* for Pilkington North America, Inc.'s Laurinburg Plant, herein referred to as the "Site." This report summarizes the results of the semi-annual groundwater sampling event we conducted on November 23, 2015. The semi-annual monitoring included sample collection from four monitoring wells and the lagoon. Included in this report is a summary of the work conducted at the site and HEA's findings, conclusions, and recommendations.

This report is intended for sole use and dissemination by Pilkington North America, Inc. (PNA). The contents should not be relied upon by other parties without the expressed written consent of HEA. The findings presented herein are representative of the site conditions at the time of sampling and should not be relied upon to be expressive of conditions at any other time.

Sincerely,

Hunt Environmental Associates

1.0 SITE HISTORY

The subject site is the PNA glass-production facility located in Laurinburg, Scotland County, North Carolina (**Figure 1**). MACTEC, formerly Law Engineering and Environmental Services, Inc. (LAW), initially on behalf of PNA assessed the soil and groundwater impacts associated with current and historic plant operations at the site, mainly associated with the underground cooling- water lines to the plant furnaces. LAW conducted a Limited Phase II Environmental Site Assessment at the site in 2001 and 2002. In LAW's Report of Phase II Environmental Site Assessment dated August 7, 2002, LAW reported impacts to soil and groundwater at the site from total and hexavalent chromium.

The Fayetteville Regional Office of the North Carolina Department of Environment and Natural Resources (NCDENR), Division of Water Quality (DWQ), Groundwater Section, issued a Notice of Violation (NOV), dated May 28, 2002. This NOV required that PNA conduct a Comprehensive Site Assessment (CSA) for the subject site. MACTEC completed the CSA and submitted the Report of Comprehensive Site Assessment, dated March 4, 2003, in which they recommended preparation of a Corrective Action Plan (CAP) for the site.

In conjunction with the CAP, MACTEC also recommended that an additional assessment be conducted to delineate the extent of hexavalent chromium in groundwater. MACTEC subsequently conducted this additional assessment and installed cross-gradient monitoring wells MW-7 and MW-8 and deep monitoring well MW-9.

MACTEC prepared a CAP, dated October 17, 2003, and submitted the CAP to the NCDENR for approval. MACTEC's proposed remedial approach was to allow natural attenuation of the groundwater coupled with a quarterly groundwater monitoring program for a period of two years, after which monitoring would be conducted semi-annually until total and hexavalent chromium concentrations were below their respective NCDENR's groundwater quality standards. PNA requested conditional approval of the CAP due to the limited groundwater analytical data available at the time for the subject site. Mr. Sean Boyles, case manager for the Groundwater Section, issued conditional approval of the CAP in a letter dated March 2004.

MACTEC completed eight quarters of the two-year groundwater sampling program between March 2004 and December 2005 as recommended in the CAP. Following the completion of the quarterly sampling, MACTEC conducted semi-annual monitoring in 2006 and 2007.

In 2007, the NCDENR underwent an organizational change and regulatory jurisdiction for oversight of the subject site was transferred to the Superfund Section's Inactive Hazardous Sites Branch (IHSB) within the Division of Waste Management (DWM). As requested by NCDENR in a letter dated March 12, 2008, MACTEC completed and submitted to NCDENR a Site Cleanup Questionnaire for the subject site. The NCDENR issued a Notice of Regulatory Requirements for

Contaminant Assessment and Cleanup, dated April 17, 2008. PNA prepared and submitted a response to the NCDENR in a letter dated June 5, 2008, which proposed the continuation of semi-annual groundwater monitoring.

In 2011, PNA underwent a staffing change in the environmental division, and since then no monitoring events were conducted. PNA continued this requirement in August of 2014.

This report presents the results of the November 2015 Semi-annual groundwater monitoring event which has been conducted to satisfy the on-going monitoring reporting requirements to NCDENR.

2.0 FIELD ACTIVITIES

Groundwater Sampling

On November 23, 2015, HEA conducted a groundwater monitoring event by sampling on-site monitoring wells MW-1, MW-2, MW-4, and MW-7 and the effluent discharge point in the lagoon (Holding Pond or SW-1). **Figure 2** illustrates the locations of the on-site monitoring wells.

HEA collected groundwater samples from the monitoring well(s) using procedures in accordance with the U.S. Environmental Protection Agency (EPA)-approved "Low Flow" sampling procedures. Low flow sampling procedures are presented in **Appendix A**. Field chemistry data collected during the sampling event are presented in **Appendix B**.

The surface water sample was decanted directly into laboratory-provided sample bottles. HEA submitted the water samples to Environmental Science Corp., a North Carolina certified laboratory, for analysis of total chromium according to EPA Method 200.7 and hexavalent chromium according to Colorimetric Method 3500-CR D.

Groundwater samples and the effluent water sample were also analyzed for the following natural attenuation parameters: total (ferric) iron (Fe^{+3}), ferrous iron (Fe^{+2}), sulfate, sulfide, total organic carbon (TOC) and manganese. The natural attenuation parameters were collected to evaluate the groundwater quality beneath the site and to determine the source of the hexavalent chromium detection in the effluent water sample.

Water Table Elevations

Prior to conducting the groundwater sampling activities, HEA measured the depth to the water table in nine on-site monitoring wells. From these depths, the water table elevation was calculated (**Table 1**) and used to construct a map of the water table surface, which is presented as **Figure 3**. As shown on this map, groundwater in the surficial aquifer flows to the southeast, towards the wastewater pond/lagoon. This direction is consistent with previous sampling events.

3.0 ANALYTICAL RESULTS

Groundwater and surface water analytical results from the Site during the November 2015 sampling event are presented in **Table 2** (historical results are presented in **Table 3**). The laboratory report and chain of custody record for the analyses for the November 2015 sampling event are included in the Appendices. As indicated in **Table 2** & **Figure 4**, the heaviest impacted areas are near wells MW-2 and MW-7. According to laboratory analytical results, the following constituents were detected above the 15A NCAC 2L .0202 ("2L Standards").

Total Chromium

The laboratory detected total chromium in the groundwater samples collected from MW-1, MW-2, and MW-7 in the November 2015 sampling event. The concentrations detected in samples MW-1 (0.083 mg/L), MW-2 (0.44 mg/L) and MW-7 (0.067 mg/L) **exceeded** the groundwater quality standard of .01 milligrams per liter (mg/L) established in Title 15A, Subchapter 2L, Section .0202 of the North Carolina Administrative Code (15A NCAC 2L .0202; "2L Standards") dated April 2013.

The laboratory did not detect total chromium in the effluent sample SW-1 or MW-4. Total chromium was previously detected in the effluent sample SW-1 in June 2010 at a concentration above the 2L Standard and was not previously detected since December 2008. Furthermore, the total chromium concentration for the December 2008 effluent sample SW-1 was below the groundwater quality standard. Pilkington NA, Inc. is no longer using chromium in their process and it is assumed that this prior detection was due to historical sources.

Hexavalent Chromium

The laboratory detected hexavalent chromium in the samples collected in the November 2015 sampling event from monitoring wells MW-1 (0.089 mg/L), MW-2 (0.39 mg/L) and MW-7 (0.069 mg/L). The NCDENR has not established a numerical 2L Standard for hexavalent chromium. In accordance with the 2L Standards, the laboratory method detection limit (MDL) is the standard for a compound for which a numerical standard has not been established. The MDL for these sampling events was 0.01 mg/L, therefore the limit was **exceeded** in MW-1, MW-2, and MW-7. Hexavalent chromium appears to be associated within the same areas as Total Chromium.

The laboratory did not detect hexavalent chromium in the effluent sample SW-1. Hexavalent chromium was previously detected during the June 2010 event which has not been detected in the effluent sample since April 2005.

No other metals were detected above 2L Standards during the November 2015 sampling event. The detected constituents and concentrations have remained relatively static since the previous August 2014 sampling event.

Natural Attenuation and Geochemistry Parameters

The following natural attenuation and geochemical parameters were analyzed and/or measured in the four monitoring wells and the effluent discharging to the lagoon to evaluate the groundwater quality beneath the site and to determine the potential source(s) of hexavalent chromium in the effluent water. Natural attenuation parameters will be useful for comparison purposes over time and this baseline data will be available for evaluation should chromium be detected in the effluent sample during future sampling events. A brief discussion of each parameter is presented below:

Dissolved Oxygen

The DO measurements ranged from 4.76 mg/L in the sample MW-4 to 9.32 mg/L in the sample MW-2. The DO measurements indicate aerobic conditions in the aquifer beneath the site.

Manganese (+2)

Manganese is present in the samples from 0.014 mg/L in MW-7 to 0.04 mg/L in SW-1. The presence of manganese may aid in reducing hexavalent chromium to trivalent chromium in a low pH groundwater.

Ferrous Iron (Fe^{+2})

Ferrous iron (Fe^{2+}) is present in the sample from monitoring well MW-4 (0.673 mg/L); it was also detected in the effluent sample SW-1 at a concentration of 0.12 mg/L. Hexavalent chromium is rapidly reduced to trivalent chromium when ferrous iron or manganese are present under reducing conditions.

Sulfate

Sulfate is present in the sample from monitoring wells MW-2 (13.8 mg/L), MW-1 (6.51 mg/L), and MW-4 (45.6 mg/L). If present, sulfate can interfere with the detection of chromium during analysis.

Sulfide

Sulfide was not detected in the monitoring wells or the effluent sample. If presented, sulfide can interfere with the detection of chromium during analysis.

Redox Potential

Redox potential indicates that oxidation and reduction reactions are occurring in groundwater. Redox potentials ranged from 287 mV (MW-4) to 394 mV (MW-7). This information suggests that these reactions may be occurring in the groundwater beneath the site.

pH/Temperature/Conductivity

If present, the reduction of ferric iron to ferrous iron will also reduce hexavalent chromium to trivalent chromium, but requires the groundwater to exhibit a low pH value (<3.0). The pH in groundwater monitoring wells ranged from 4.28 (MW-7) to 6.2 (MW-4) standard units. The pH in groundwater beneath the site may be conducive to the reduction of iron and chromium, but the reaction may be incomplete because the pH is not low enough.

The production of ions such as sulfate correlates directly with the conductivity. Conductivity measurements ranged from 0.060 µS/cm (MW-1) to 0.419 µS/cm (MW-4). During this sampling event, temperature ranged from 17.61 °C (MW-7) to 22.16 °C (MW-4).

Total Organic Carbon

TOC was detected in the groundwater sample from monitoring well MW-4 (1.8 mg/L). TOC was also detected in the effluent sample (SW-1) at a concentration of 8.6 mg/L. A source of organic carbon may interfere with the detection of chromium during analysis.

4.0 CONCLUSIONS & RECOMMENDATIONS

Based on the results of the November 2015 sampling event, HEA presents the following conclusions:

- The groundwater samples from monitoring wells MW-1, MW-2, and MW-7 exhibited total chromium at concentrations that exceed the 2L Standard;
- The groundwater samples from monitoring wells MW-1, MW-2, and MW-7 exhibited hexavalent chromium at concentrations that exceed the MDL, and thus an exceedance of the 2L Standard;
- The surface water sample exhibited Total Iron above the 2L Standard; and
- The laboratory did not detect hexavalent chromium or total chromium in the effluent discharging into the lagoon.

During the December 2010 monitoring event, MACTEC attempted to evaluate the groundwater quality beneath the site and to determine the source of hexavalent chromium in the effluent sample SW-1 during the June event. However, during the December 2010 event, hexavalent chromium was not detected in the effluent sample and chromium concentrations (hexavalent and total) returned to those levels detected in the December 2009 monitoring event. For this reason, the source of hexavalent chromium in the effluent sampling during the June 2010 sampling event could not be determined. Due to the absence of hexavalent chromium during this effluent sampling event, the original source is most likely attributable to an unidentified point source occurring historically.

HEA recommends the continued semi-annual collection of groundwater samples from the monitoring wells and analyzing the groundwater samples for hexavalent and total chromium and natural attenuation parameters.

Obtaining the natural attenuation parameters during the November 2015 monitoring event provided baseline concentrations to which hexavalent chromium concentrations will be compared should hexavalent chromium be detected during future sampling events.

If you have any questions concerning this report or project, please contact us at (910) 774-9306.

Signed,

Hunt Environmental Associates

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Michael Cody Hunt, P.G.
Project Geologist

TABLES

Pilkington NA, Inc.
Semi-Annual Groundwater Monitoring
November 2015 Sampling Event

Table 1
Water Table Elevation Measurements

Well ID	Well Depth (feet)	Screened Interval (feet)	Top of Casing Elevation[1] (feet)	Depth to Water Table (feet)	Relative Water Table Elevation (feet)
MW-1	35	20 to 35	97.29	20.61	76.68
MW-2	29	14 to 29	98.30	24.33	73.97
MW-3	30	15 to 30	97.27	20.65	76.62
MW-4	39	24 to 39	94.61	22.47	72.14
MW-5[2]	73	68 to 73	97.67	25.75	71.92
MW-6	35	20 to 35	96.55	26.25	70.30
MW-7	40	25 to 40	100.82	29.68	71.14
MW-8	35	20 to 35	97.07	23.2	73.87
MW-9[2]	100	90 to 100	98.67	25.65	73.02

Notes:
NM = Not Measured
N/A = Not Applicable
(1) Top-of-casing elevation of each well was established relative to a benchmark with an assumed elevation of 100 feet (precision of 0.01 foot). The benchmark was previously established at the southeastern corner of the concrete pad that surrounds the pipe vault beneath the water tower.
(2) Type III monitoring wells were not used for the preparation of Figure 3, Groundwater Contour Map

Pilkington NA, Inc.
Semi-Annual Groundwater Monitoring
November 2015 Sampling Event

Table 2
Monitoring Well Results

Parameters	2L Standards (mg/L)	Monitoring Well ID				
		MW-1	MW-2	MW-4	MW-7	SW-1
Hexavalent Chromium	NE	**0.089**	**0.395**	BDL	**0.069**	BDL
Chromium	0.01	**0.083**	**0.437**	BDL	**0.067**	BDL
Total Iron	0.3	**0.108**	BDL	**1.05**	BDL	**1.9**
Ferrous Iron	NE	BDL	BDL	0.67	BDL	0.22
Sulfate	250	6.51	13.8	45.6	BDL	BDL
Sulfide	NE	BDL	BDL	BDL	BDL	BDL
Total Organic Carbon	NE	BDL	BDL	1.8	BDL	8.6
Manganese	0.05	BDL	BDL	0.01	0.014	0.04
Field Parameters						
pH (S.U.)	-	4.61	4.42	6.2	4.31	NS
Conductivity (mS/cm)	-	0.064	0.12	0.437	0.094	NS
Dissolved Oxygen	-	9.69	10.14	4.76	7.98	NS

Notes:
All results are mg/L = micrograms per liter
Result is above 2L limit
NS = not sampled
N/A = not applicable
BDL = Below Detectable Limits
NE = Not Established

Pilkington NA, Inc.
Semi-Annual Groundwater Monitoring
November 2015 Sampling Event

Table 3
Summary of Historical Groundwater Sample Results

Monitoring Well ID	Sample Date	Hexavalent Chromium	Total Chromium
MW-1	6/5/2001	**0.02**	0.03
	11/12/2002	BDL	BDL
	8/1/2003	BDL	BDL
	3/25/2004	BDL	BDL
	6/17/2004	**0.03**	BDL
	9/29/2004	**0.051**	BDL
	1/4/2005	BDL	0.011
	4/11/2005	**0.056**	0.043
	6/22/2005	BDL	0.025
	9/22/2005	BDL	0.013
	12/1/2005	BDL	0.025
	6/30/2006	BDL	BDL
	1/9/2007	BDL	0.015
	6/6/2007	BDL	0.016
	12/4/2007	BDL	BDL
	6/16/2008	BDL	0.021
	12/16/2008	**0.03**	0.034
	6/16/2009	BDL	0.021
	12/16/2009	BDL	BDL
	6/8/2010	**0.058**	**0.059**
	12/22/2010	BDL	BDL
	8/21/2014	NS	NS
	6/22/2015	0.012	0.019
MW-2	6/5/2001	**0.69**	**0.71**
	1/24/2002	**0.15**	**0.15**
	11/12/2002	**0.2**	**0.27**
	6/4/2002	**0.04**	0.04
	8/1/2003	**0.2**	**0.19**
	3/25/2004	**0.074**	**0.06**
	6/17/2004	**0.07**	**0.052**
	9/30/2004	**0.51**	**0.82**
	1/4/2005	**0.094**	**0.087**
	4/11/2005	**0.27**	**0.24**
	6/22/2005	**0.26**	**0.24**
	9/22/2005	**0.72**	**0.41**
	12/1/2005	**0.22**	**0.21**
	6/30/2006	**0.089**	**0.088**
	1/9/2007	**0.109**	**0.124**
	6/6/2007	**0.051**	**0.054**

Table 3 continued...

	12/4/2007	**0.073**	**0.08**
	6/16/2008	**0.157**	**0.195**
	12/16/2008	**0.192**	**0.439**
	6/16/2009	**0.099**	**0.137**
	12/16/2009	**0.217**	**0.229**
	6/8/2010	**0.564**	**0.57**
	12/22/2010	**0.16**	**0.184**
	8/21/2014	**0.16**	**0.17**
	6/22/2015	**0.14**	**0.34**
MW-4	6/6/2001	**0.02**	0.04
	1/24/2002	**0.05**	0.02
	11/12/2002	**0.061**	0.019
	8/1/2003	**0.06**	BDL
	3/25/2004	BDL	BDL
	6/17/2004	BDL	BDL
	9/30/2004	**0.66**	BDL
	1/4/2005	BDL	BDL
	4/11/2005	**0.044**	0.0093
	6/23/2005	BDL	0.018
	9/22/2005	BDL	0.028
	12/1/2005	BDL	0.034
	6/30/2006	BDL	**0.093**
	1/9/2007	BDL	0.024
	6/6/2007	**0.029**	0.034
	12/4/2007	BDL	**0.11**
	6/16/2008	**0.026**	0.03
	12/16/2008	BDL	0.047
	6/16/2009	**0.037**	0.034
	12/16/2009	BDL	BDL
	6/8/2010	BDL	BDL
	12/22/2010	BDL	BDL
	8/21/2014	BDL	BDL
	6/22/2015	BDL	BDL
MW-7	9/15/2003	**0.07**	**0.1**
	3/25/2004	**0.1**	**0.26**
	6/17/2004	**0.14**	**0.14**
	9/30/2004	**0.096**	**0.12**
	1/4/2005	**0.11**	**0.13**
	4/11/2005	**0.11**	**0.11**
	6/22/2005	**0.15**	**0.12**
	9/22/2005	NA	NA
	12/1/2005	**0.13**	**0.11**
	6/30/2006	**0.11**	**0.11**
	1/9/2007	**0.105**	**0.108**
	6/6/2007	**0.061**	**0.069**
	12/4/2007	**0.093**	**0.1017**
	6/16/2008	**0.065**	**0.066**

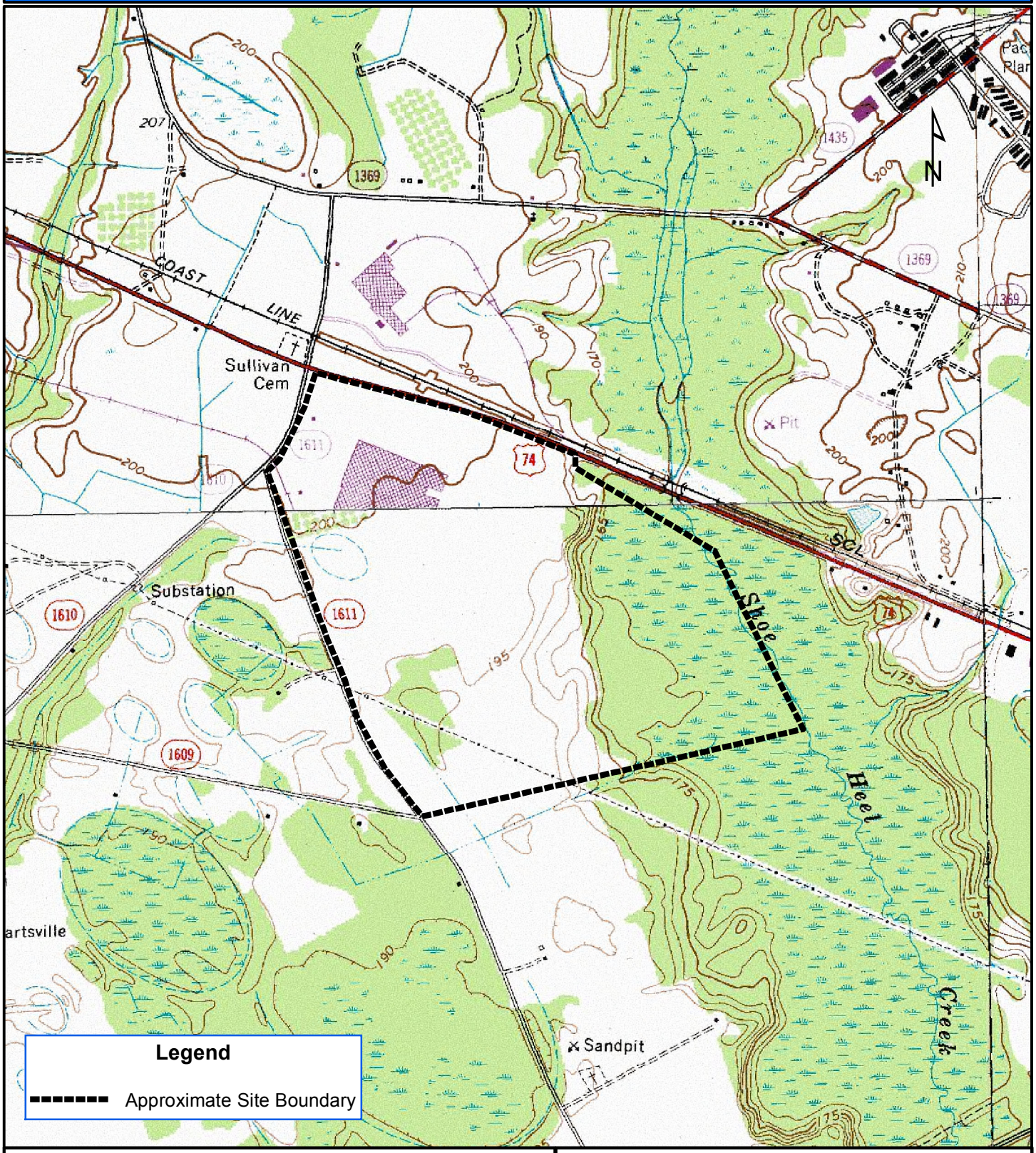
Table 3 continued...

	12/16/2008	**0.078**	**0.083**
	6/16/2009	**0.082**	**0.079**
	12/16/2009	**0.065**	**0.074**
	6/8/2010	**0.058**	**0.068**
	12/22/2010	**0.067**	**0.073**
	8/21/2014	**0.076**	**0.073**
	6/22/2015	**0.064**	**0.073**
SW-1	9/24/2004	**0.034**	BDL
	1/4/2005	BDL	0.038
	4/11/2005	**0.042**	0.032
	6/22/2005	BDL	0.042
	9/23/2005	BDL	0.038
	6/22/2006	BDL	0.032
	1/9/2007	BDL	0.022
	6/6/2007	BDL	0.023
	12/4/2007	BDL	0.017
	6/16/2008	BDL	0.013
	12/16/2008	BDL	0.036
	6/16/2009	BDL	BDL
	12/16/2009	BDL	BDL
	6/8/2010	**0.05**	**0.059**
	12/22/2010	BDL	BDL
	8/21/2014	BDL	BDL
	6/22/2015	BDL	BDL
NCDENR 2L Groundwater Quality Standards		NE	0.05

Notes: NA= not available (well dry)
BDL = Below Detectable Limits
All historical results in mg/L = milligrams per liter

FIGURES

Pilkington NA, Inc.
Laurinburg, NC



Graphical Scale

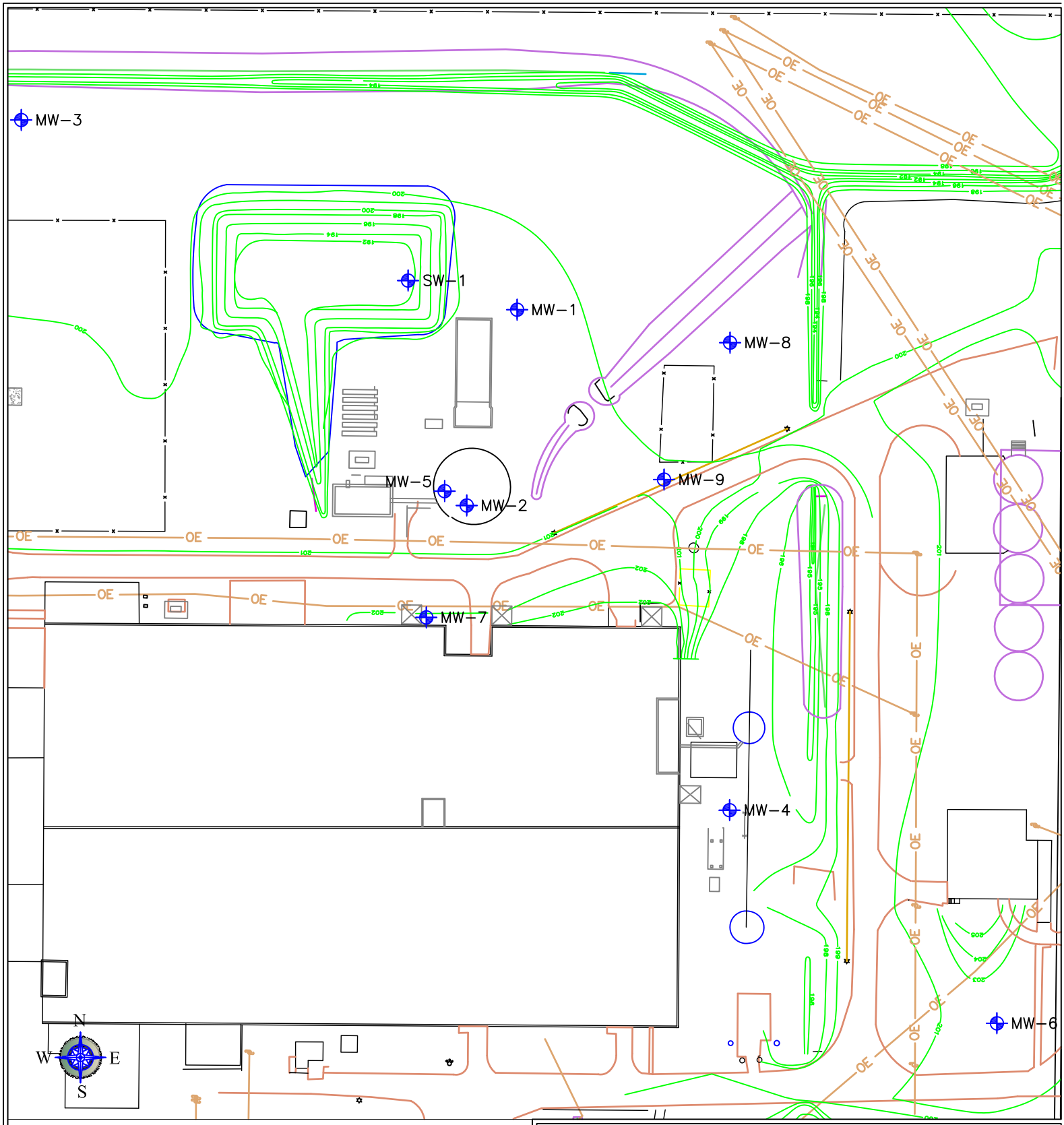
0 625 1,250 2,500 3,750 5,000 Feet

HUNT ENVIRONMENTAL ASSOCIATES

Figure 1

Site Location Map

Date:	Project Number:	Drawn By:
November 23, 2015	15-062295	MCH



0 150 300 Feet

HUNT ENVIRONMENTAL ASSOCIATES

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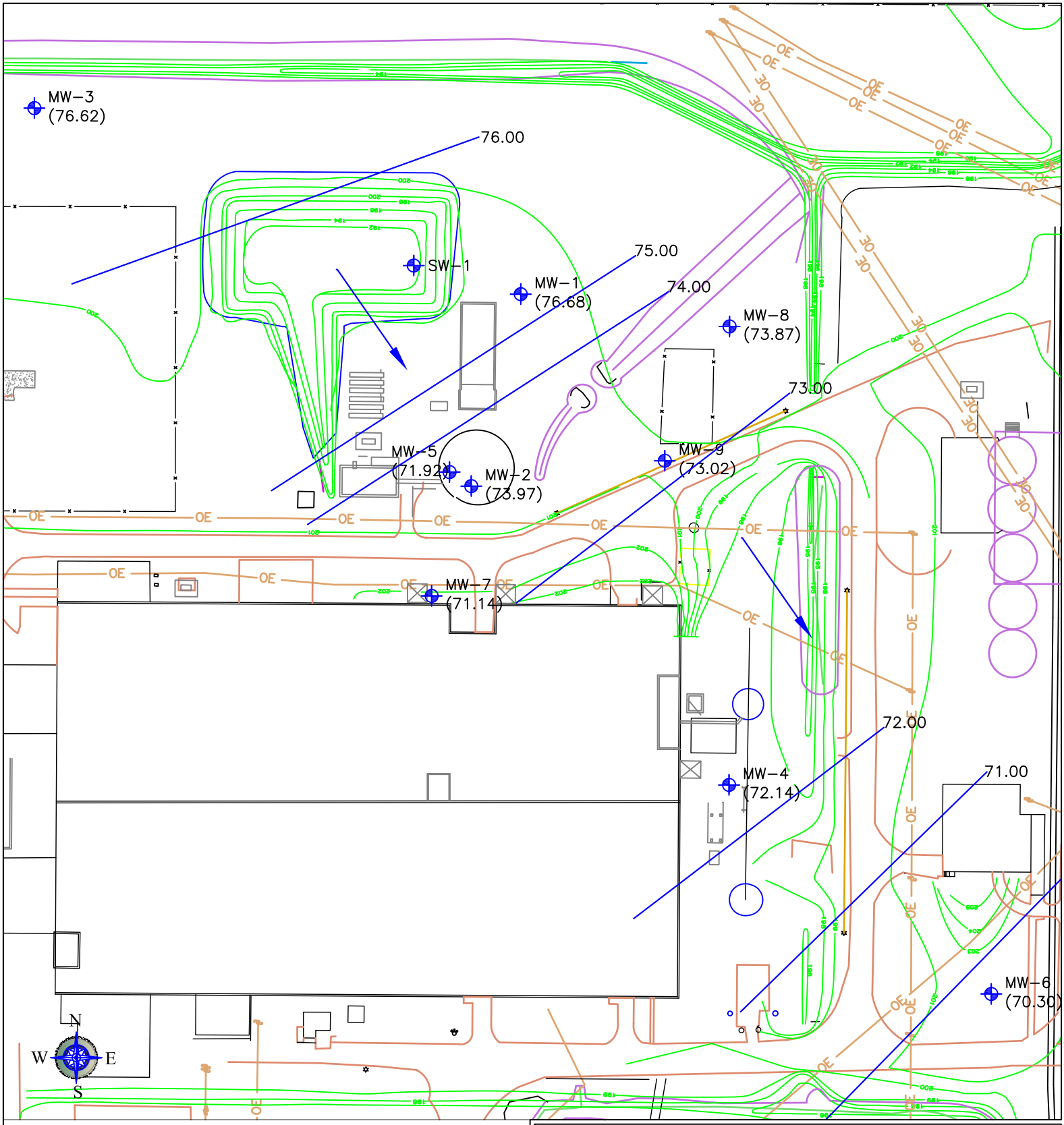
Figure 2

Site Plan

DRAWN: MCH	DATE: 11-23-2015
CHECKED: TM	FIGURE: 2
APPROVED: MCH	PROJECT #: 15-062295

REFERENCE:



0 150 300 Feet

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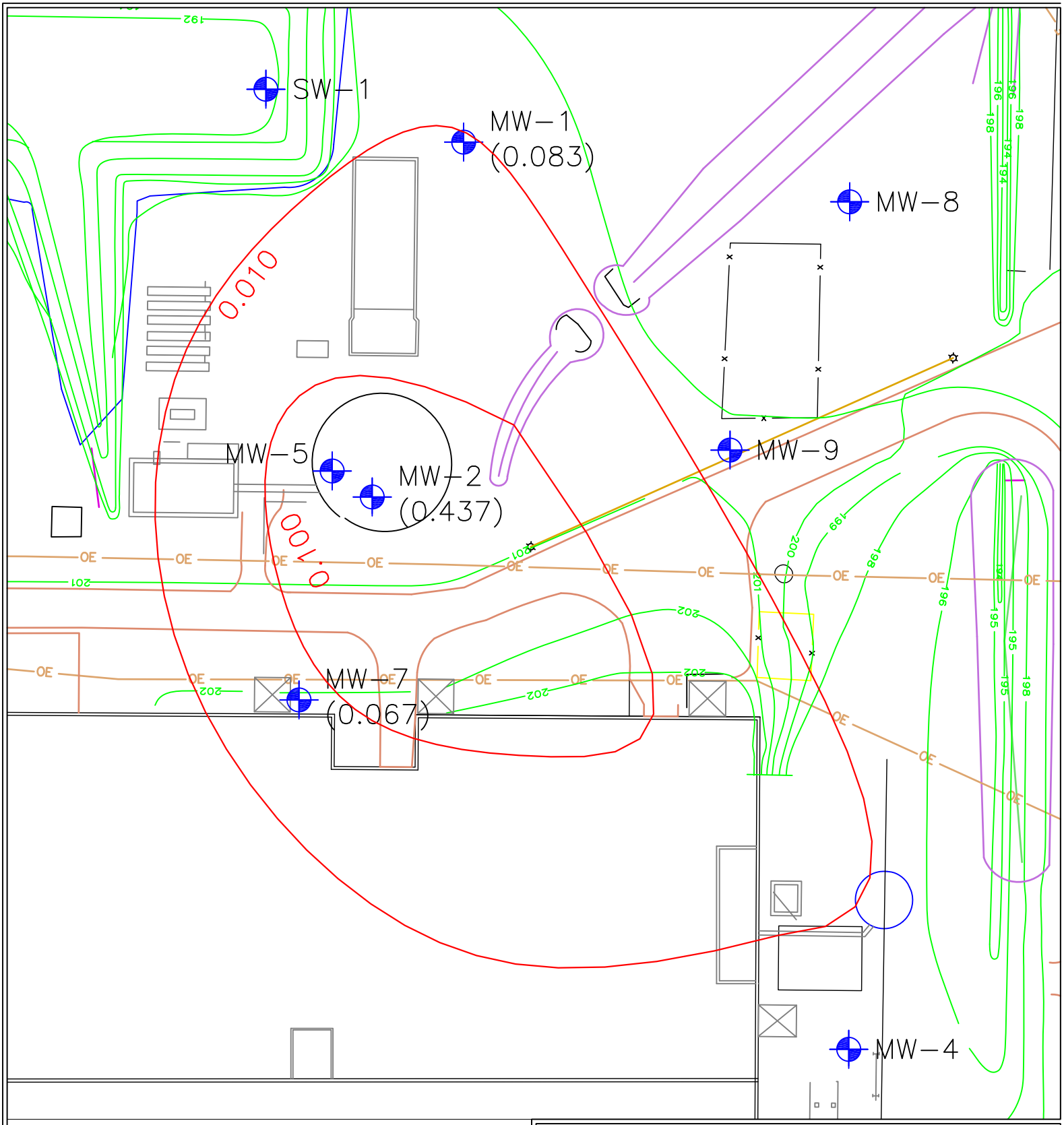
Figure 3

Potentiometric Map

DRAWN: MCH	DATE: 11-23-2015
CHECKED: TM	FIGURE: 3
APPROVED: MCH	PROJECT #: 15-062295

REFERENCE:



0 50 100 Feet

N W E S

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Figure 4

Total Chromium Concentrations

DRAWN: MCH	DATE: 11-23-2015
CHECKED: TM	FIGURE: 4
APPROVED: MCH	PROJECT #: 15-062295

REFERENCE:

APPENDIX A

FIELD METHODS

1.1 INTRODUCTION

Micropurge sample collection provides a method of minimizing increased colloid mobilization by removing water from the well at the screened interval at a rate that preserves or minimally disrupts steady-state flow conditions in the aquifer. During micropurge sampling, groundwater is discharged from the aquifer at a rate that the aquifer will yield without creating a cone of depression around the sampled well. Research indicates that colloid mobilization will not increase above steady-state conditions during low-flow discharge. Therefore, the collected sample is more likely to represent steady-state groundwater chemistry.

1.2 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to describe the procedures to be used to collect a groundwater sample from a well using the micropurge technology. The following sections describe the equipment to be used and the methods to be followed to promote uniform sample collection techniques by field personnel that are experienced in sample collection and handling for environmental investigations.

1.3 SCOPE

This SOP applies to groundwater sampling using the micropurge technology.

1.4 DEFINITIONS

Colloid: Suspended particles that range in diameter from 5 nanometers to 0.2 micrometers.

Dissolved oxygen: The ratio of the concentration or mass of oxygen in water relative to the partial pressure of gaseous oxygen above the liquid which is a function of temperature, pressure, and concentration of other solutes.

Flow-through cell: A device connected to the discharge line of a groundwater purge pump that allows regular or continuous measurement of selected parameters of the water and minimizes contact between the water and air.

pH: The negative base-10 log of the hydrogen-ion activity in moles per liter.

Specific conductance: The reciprocal of the resistance in ohms measured between opposite faces of a centimeter cube of aqueous solution at a specified temperature.

Turbidity: A measurement of the suspended particles in a liquid that have the ability to reflect or refract part of the visible portion of the light spectrum.

1.5 REFERENCES

The following are the applicable American Society for Testing and Materials (ASTM) standard practices and guidelines related to field measurement of groundwater samples by various methods. The ASTM standards listed are considered an integral part of this SOP.

- D-1293-99(2005) Standard Test Methods for pH of Water
- D888-05 Standard Test Methods for Dissolved Oxygen in Water
- D-1125 Standard Test Methods for Electrical Conductivity and Resistivity of Water
- D-1889 Standard Test Methods for Turbidity in Water

Puls, R. W. and M. J. Barcelona. 1996. Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures. U.S. Environmental Protection Agency. Office of Research and Development. EPA/540/S-95/504. April.

1.6 REQUIREMENTS AND RESOURCES

The following equipment is required to complete micropurge sample collection:

- Water level indicator
- Adjustable flow rate pump (bladder, piston, peristaltic, or impeller)
- Discharge flow controller
- Flow-through cell
- pH probe
- Dissolved oxygen (DO) probe
- Turbidity meter
- Specific conductance (SC) probe (optional)
- Temperature probe (optional)
- Meter to display data for the probes
- Calibration solutions for pH, SC, turbidity, and DO probes, as necessary
- Container of known volume for flow measurement or calibrated flow meter

- Data recording and management system

2.1 PROCEDURE

The following procedures and criteria were modified from the U. S. Environmental Protection Agency guidance titled "Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures" (Puls and Barcelona 1996). This reference may be consulted for a more detailed description of micropurge sampling theory.

Micropurging is accomplished with low-discharge rate pumps, such as bladder pumps, piston pumps, controlled velocity impeller pumps, or peristaltic pumps. Bailers and high capacity submersible pumps are not considered acceptable micropurge sample collection devices. The purged water is monitored (in a flow-through cell or other constituent monitoring device) for chemical and optical parameters that indicate steady state flow conditions between the sample extraction point and the aquifer. Samples are collected when steady state conditions are indicated.

2.2 EQUIPMENT CALIBRATION

Prior to sample collection, the monitoring equipment used to measure pH, DO, turbidity, and SC should be calibrated or checked according to manufacturer's directions. Typically, calibration activities are completed at the field office at the beginning of sampling activities each day. The pH meter calibration should bracket the pH range of the wells to be sampled (acidic to neutral pH range [4.00 to 7.00] or neutral to basic pH range [7.00 to 10.00]). The DO meter should be calibrated to one point (air-saturated water) or two points (air-saturated water and water devoid of all oxygen). The SC meter cannot be calibrated in the field. It is checked against a known standard (typical standards are 1, 10, and 50 millimhos per centimeter at 25°C). The offset of the measured value of the calibration standard can be used as a correction value. All calibration data should be recorded on the Micropurging Groundwater Sampling Data Sheet or in a logbook.

2.3 WELL PURGING

The well to be sampled should be opened and groundwater in the well allowed to equilibrate to atmospheric pressure. Equilibration should be determined by measuring depth to water below the marked reference on the wellhead (typically the top of the well casing) over two or more 5-minute intervals. Equilibrium conditions exist when the measured depth to water varies by less than 0.01 foot over two consecutive readings. Total depth of well measurement should be made before installing the sample collection equipment.

A new or previously decontaminated portable sample collection device should be placed within the well. The intake of the device should be positioned at the midpoint of the well screen interval. The device should be installed slowly to minimize turbulence within the water in the casing and mixing of stagnant water above the screened interval with water in the screened interval. Following installation, the flow controller should be connected to the sample collection device and the flow-through cell connected to the outlet of the sample collection device. The calibrated groundwater chemistry monitoring probes should be installed in the flow-through cell.

The controller for the sample collection device should be connected to the sample collection device. The flow-through cell should be connected in line to the discharge tube, and the probes installed in the flow-through cell.

The controller should be activated and groundwater extracted (purged) from the well. The purge rate should be monitored, and should not exceed the capacity of the well. The well capacity is defined as the maximum discharge rate that can be obtained with less than 0.1 meter (0.3 foot) drawdown. Typically, the discharge rate will be less than 0.5 liters per minute (L/min) (0.13 gallons per minute). The maximum purge rate should be adjusted to achieve minimal drawdown.

Water levels, effluent chemistry, and effluent flow rate should be continuously monitored while purging the well. Purging should continue until the measured chemical and optical parameters are stable. Stable parameters are defined as monitored chemistry values that do not fluctuate by more than the following ranges over three successive readings at 3-minute intervals: +/-0.1 pH unit; +/-3 percent for SC; and +/-10 percent for turbidity and DO. Purging will continue until these stabilization criteria have been met or three well casing volumes have been purged. If three casing volumes of water have been purged and the stabilization criteria have not been met, a comment should be made on the data sheet that sample collection began after three well casing volumes were purged. The final pH, SC, turbidity, and DO values will be recorded. All data should be recorded on the Micropurging Groundwater Sampling Data Sheet or in a logbook.

2.4 SAMPLE COLLECTION

Following purging, the flow through cell shall be disconnected, and groundwater samples collected directly from the discharge line. Discharge rates should be adjusted so that groundwater is dispensed into the sample container with minimal aeration of the sample. Samples collected for volatile organic compound analysis should be dispensed into the sample container at a flow rate equal to or less than 100 milliliters per minute. Samples should be preserved and handled as described in the investigation field sampling plan or quality assurance project plan.

DISCLAIMER
This SOP provided general guidance for LL&J contractors and subcontractors for technical issues addressed during environmental site investigation and remediation activities. It is noted, however, that each site and project is unique and these guidelines are not a substitute for common sense and good management practices based on professional training and experience. In addition, individual contract terms may affect the implementation of this SOP. LL&J contractors reserve the unrestricted right to change, modify or not apply these guidelines in their sole, complete, and unrestricted discretion to meet certain circumstances, contractual requirements, site conditions, or job requirement.

APPENDIX B

GROUNDWATER SAMPLING LOGS

GROUNDWATER SAMPLING LOG

SITE NAME: Pilkington Glass	SITE LOCATION: Laurinburg, NC	
WELL NO: MW-1	SAMPLE ID:	DATE: 11/23/2015

PURGING DATA

WELL DIAMETER (inches):	2 inch	WELL SCREEN INTERVAL DEPTH: feet to feet	STATIC DEPTH TO WATER (feet): 20.61”	PURGE PUMP TYPE OR BAILER: Peristaltic

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X gallons/foot = gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

FINAL BOTTOM DEPTH IN WELL (feet): 35’		PURGING INITIATED AT: 1335	PURGING ENDED AT: 1405	TOTAL VOLUME PURGED (gallons): 2

TIME			PURGE PUMP RATE	ORP (mV)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1405			6.15	354	4.51	19.01	0.054	9.69	71.5	None	None
1410			6.19	356	4.59	19.03	0.060	8.63	56.8	None	None
1415			6.00	357	4.62	19.02	0.064	8.21	29.2	None	None
1418			5.99	358	4.61	19.08	0.063	7.97	21.0	None	None
1421			5.94	360	4.61	19.06	0.062	7.90	15.9	None	None
1424			6.01	362	4.59	19.07	0.061	7.91	16.8	None	None
1427			6.01	364	4.57	19.04	0.060	7.85	16.7	None	None

WELL CAPACITY (Gallons Per Foot): **0.75”** = 0.02; **1”** = 0.04; **1.25”** = 0.06; **2”** = 0.16; **3”** = 0.37; **4”** = 0.65; **5”** = 1.02; **6”** = 1.47; **12”** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP =** Peristaltic Pump; **O** = Other (Specify)

NOTES:

STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS:

pH: ± 0.1 units **Temperature:** ± 0.2 °C(±3%) **Specific Conductance:** ± 3% **Dissolved Oxygen:** all readings ± 10% saturation; optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** optionally ± 5 NTU or ± 10% (whichever is greater) **ORP:** ± 10 millivolts

GROUNDWATER SAMPLING LOG

SITE NAME: Pilkington Glass	SITE LOCATION: Laurinburg, NC	
WELL NO: MW-4	SAMPLE ID:	DATE: 11/23/2015

PURGING DATA

WELL DIAMETER (inches):	2 inch	WELL SCREEN INTERVAL DEPTH: feet to feet	STATIC DEPTH TO WATER (feet): 22.47'	PURGE PUMP TYPE OR BAILER: Peristaltic

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X gallons/foot = gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

FINAL BOTTOM DEPTH IN WELL (feet): 39'		PURGING INITIATED AT: 1520	PURGING ENDED AT: 1548	TOTAL VOLUME PURGED (gallons): 2

TIME			PURGE PUMP RATE	ORP (mV)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1548			6.05	329	6.08	21.06	0.429	3.80	43.4	None	None
1553			6.03	307	6.09	21.64	0.431	3.45	29.3	None	None
1558			6.04	297	6.11	21.92	0.437	4.60	24.8	None	None
1601			6.00	294	6.12	22.05	0.434	4.41	25.0	None	None
1603			6.01	292	6.13	21.97	0.434	4.39	25.6	None	None
1606			6.03	287	6.20	22.16	0.419	4.76	28.9	None	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP =** Peristaltic Pump; **O** = Other (Specify)

NOTES:

STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS:

pH: ± 0.1 units **Temperature:** ± 0.2 °C(±3%) **Specific Conductance:** ± 3% **Dissolved Oxygen:** all readings ± 10% saturation; optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** optionally ± 5 NTU or ± 10% (whichever is greater) **ORP:** ± 10 millivolts

GROUNDWATER SAMPLING LOG

SITE NAME: Pilkington Glass	SITE LOCATION: Laurinburg, NC	
WELL NO: MW-7	SAMPLE ID:	DATE: 11/23/2015

PURGING DATA

WELL DIAMETER (inches):	2 inch	WELL SCREEN INTERVAL DEPTH: feet to feet	STATIC DEPTH TO WATER (feet): 29.68'	PURGE PUMP TYPE OR BAILER: Peristaltic

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X gallons/foot = gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

FINAL BOTTOM DEPTH IN WELL (feet): 40'	PURGING INITIATED AT: 1435	PURGING ENDED AT: 1455	TOTAL VOLUME PURGED (gallons): 2

TIME			PURGE PUMP RATE	ORP (mV)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1455			6.05	381	4.30	17.42	0.092	6.41	22.5	None	None
1500			6.04	386	4.31	17.61	0.092	8.24	14.2	None	None
1505			6.06	390	4.31	17.71	0.094	6.38	10.0	None	None
1508			6.05	391	4.30	17.70	0.091	7.98	8.4	None	None
1511			6.04	392	4.29	17.68	0.092	6.33	5.3	None	None
1514			6.05	394	4.29	17.65	0.090	7.91	4.2	None	None
1517			6.06	394	4.28	17.61	0.090	6.05	3.1	None	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP =** Peristaltic Pump; **O** = Other (Specify)

NOTES:

STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS:

pH: ± 0.1 units **Temperature:** ± 0.2 °C(±3%) **Specific Conductance:** ± 3% **Dissolved Oxygen:** all readings ± 10% saturation; optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** optionally ± 5 NTU or ± 10% (whichever is greater) **ORP:** ± 10 millivolts

NOTE: Dissolved oxygen would not stabilize possibly due to recent activity around this location.

GROUNDWATER SAMPLING LOG

SITE NAME: Pilkington Glass	SITE LOCATION: Laurinburg, NC	
WELL NO: MW-2	SAMPLE ID:	DATE: 11/23/2015

PURGING DATA

WELL DIAMETER (inches):	2 inch	WELL SCREEN INTERVAL DEPTH: feet to feet	STATIC DEPTH TO WATER (feet): 24.33'	PURGE PUMP TYPE OR BAILER: Peristaltic

WELL VOLUME PURGE: 1 WELL VOLUME = (TOTAL WELL DEPTH – STATIC DEPTH TO WATER) X WELL CAPACITY
(only fill out if applicable)
= (feet – feet) X gallons/foot = gallons

EQUIPMENT VOLUME PURGE: 1 EQUIPMENT VOL. = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME
(only fill out if applicable)
= gallons + (gallons/foot X feet) + gallons = gallons

FINAL BOTTOM DEPTH IN WELL (feet): 29'	PURGING INITIATED AT: 1100	PURGING ENDED AT: 1130	TOTAL VOLUME PURGED (gallons): 2

TIME			PURGE PUMP RATE	ORP (mV)	pH (standard units)	TEMP. (°C)	COND. (circle units) µmhos/cm or µS/cm	DISSOLVED OXYGEN (circle units) mg/L or % saturation	TURBIDITY (NTUs)	COLOR (describe)	ODOR (describe)
1130			6.15	324	4.37	18.07	0.121	10.14	33.5	None	None
1135			6.17	334	4.39	17.87	0.116	9.91	26.0	None	None
1140			6.15	336	4.42	18.19	0.120	9.57	21.5	None	None
1145			6.15	341	4.41	19.18	0.114	9.45	17.0	None	None
1148			6.12	341	4.42	19.30	0.115	9.48	15.4	None	None
1151			6.17	342	4.42	19.48	0.114	9.34	14.1	None	None
1154			6.15	342	4.41	19.56	0.114	9.32	12.1	None	None

WELL CAPACITY (Gallons Per Foot): **0.75"** = 0.02; **1"** = 0.04; **1.25"** = 0.06; **2"** = 0.16; **3"** = 0.37; **4"** = 0.65; **5"** = 1.02; **6"** = 1.47; **12"** = 5.88
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): **1/8"** = 0.0006; **3/16"** = 0.0014; **1/4"** = 0.0026; **5/16"** = 0.004; **3/8"** = 0.006; **1/2"** = 0.010; **5/8"** = 0.016

PURGING EQUIPMENT CODES: **B** = Bailer; **BP** = Bladder Pump; **ESP** = Electric Submersible Pump; **PP =** Peristaltic Pump; **O** = Other (Specify)

NOTES:

STABILIZATION CRITERIA FOR RANGE OF VARIATION OF LAST THREE CONSECUTIVE READINGS:

pH: ± 0.1 units **Temperature:** ± 0.2 °C(±3%) **Specific Conductance:** ± 3% **Dissolved Oxygen:** all readings ± 10% saturation; optionally, ± 0.2 mg/L or ± 10% (whichever is greater) **Turbidity:** optionally ± 5 NTU or ± 10% (whichever is greater) **ORP:** ± 10 millivolts

APPENDIX C

LABORATORY DATA AND CHAIN OF CUSTODY

ANALYTICAL REPORT

December 03, 2015

Hunt Environmental Associates

Sample Delivery Group:	L802937
Samples Received:	11/24/2015
Project Number:	PILKINGTON GW
Description:	Pilkington
Report To:	Cody Hunt 3430 Capuano Street Lumberton, NC 28358

Entire Report Reviewed By:

Jimmy Hunt
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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1 Cp
2 Tc
3 Ss
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5 Sr
6 Qc
7 Gl
8 Al
9 Sc

MW-2 L802937-01 GW

Collected by: Cody Hunt | Collected date/time: 11/23/15 11:56 | Received date/time: 11/24/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010C	WG831615	1	11/25/15 16:18	11/27/15 11:44	WBD
Wet Chemistry by Method 3500Fe B-2011	WG831373	1	11/24/15 14:33	11/24/15 14:33	AMC
Wet Chemistry by Method 4500S2 D-2011	WG831734	1	11/27/15 10:53	11/27/15 10:53	JER
Wet Chemistry by Method 7196A	WG831342	1	11/24/15 11:25	11/24/15 11:25	AMC
Wet Chemistry by Method 9056MOD	WG832035	1	11/28/15 14:22	11/28/15 14:22	CM
Wet Chemistry by Method 9060A	WG830901	1	11/25/15 19:05	11/25/15 19:05	LLS

MW-1 L802937-02 GW

Collected by: Cody Hunt | Collected date/time: 11/23/15 14:30 | Received date/time: 11/24/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010C	WG831615	1	11/25/15 16:18	11/27/15 12:50	WBD
Wet Chemistry by Method 3500Fe B-2011	WG831373	1	11/24/15 14:34	11/24/15 14:34	AMC
Wet Chemistry by Method 4500S2 D-2011	WG831734	1	11/27/15 10:53	11/27/15 10:53	JER
Wet Chemistry by Method 7196A	WG831342	1	11/24/15 11:29	11/24/15 11:29	AMC
Wet Chemistry by Method 9056MOD	WG832035	1	11/28/15 14:35	11/28/15 14:35	CM
Wet Chemistry by Method 9060A	WG830901	1	11/25/15 20:13	11/25/15 20:13	LLS

MW-7 L802937-03 GW

Collected by: Cody Hunt | Collected date/time: 11/23/15 15:18 | Received date/time: 11/24/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010C	WG831615	1	11/25/15 16:18	11/27/15 12:53	WBD
Wet Chemistry by Method 3500Fe B-2011	WG831373	1	11/24/15 14:35	11/24/15 14:35	AMC
Wet Chemistry by Method 4500S2 D-2011	WG831734	1	11/27/15 10:53	11/27/15 10:53	JER
Wet Chemistry by Method 7196A	WG831342	1	11/24/15 11:31	11/24/15 11:31	AMC
Wet Chemistry by Method 9056MOD	WG832035	1	11/28/15 14:48	11/28/15 14:48	CM
Wet Chemistry by Method 9060A	WG830901	1	11/25/15 20:26	11/25/15 20:26	LLS

MW-4 L802937-04 GW

Collected by: Cody Hunt | Collected date/time: 11/23/15 16:08 | Received date/time: 11/24/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010C	WG831615	1	11/25/15 16:18	11/27/15 12:56	WBD
Wet Chemistry by Method 3500Fe B-2011	WG831373	1	11/24/15 14:35	11/24/15 14:35	AMC
Wet Chemistry by Method 4500S2 D-2011	WG831734	1	11/27/15 10:54	11/27/15 10:54	JER
Wet Chemistry by Method 7196A	WG831342	1	11/24/15 11:33	11/24/15 11:33	AMC
Wet Chemistry by Method 9056MOD	WG832035	1	11/28/15 15:01	11/28/15 15:01	CM
Wet Chemistry by Method 9060A	WG830901	1	11/25/15 20:43	11/25/15 20:43	LLS

SW-1 L802937-05 GW

Collected by: Cody Hunt | Collected date/time: 11/23/15 14:36 | Received date/time: 11/24/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Metals (ICP) by Method 6010C	WG831615	1	11/25/15 16:18	11/27/15 12:59	WBD
Wet Chemistry by Method 3500Fe B-2011	WG831373	1	11/24/15 14:36	11/24/15 14:36	AMC
Wet Chemistry by Method 4500S2 D-2011	WG831734	1	11/27/15 10:54	11/27/15 10:54	JER
Wet Chemistry by Method 7196A	WG831342	1	11/24/15 11:34	11/24/15 11:34	AMC
Wet Chemistry by Method 9056MOD	WG832035	1	11/28/15 15:14	11/28/15 15:14	CM
Wet Chemistry by Method 9060A	WG830901	1	11/25/15 20:57	11/25/15 20:57	LLS

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jimmy Hunt

Jimmy Hunt
Technical Service Representative

Sample Handling and Receiving

The following samples were prepared and/or analyzed past recommended holding time. Concentrations should be considered minimum values.

ESC Sample ID	Project Sample ID	Method
L802937-01	MW-2	3500Fe B-2011
L802937-02	MW-1	3500Fe B-2011
L802937-03	MW-7	3500Fe B-2011
L802937-04	MW-4	3500Fe B-2011
L802937-05	SW-1	3500Fe B-2011

Wet Chemistry by Method 3500Fe B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ferrous Iron	ND		0.0500	1	11/24/2015 14:33	WG831373

Wet Chemistry by Method 4500S2 D-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Sulfide	ND		0.0500	1	11/27/2015 10:53	WG831734

Wet Chemistry by Method 7196A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	0.395	J5	0.0100	1	11/24/2015 11:25	WG831342

Wet Chemistry by Method 9056MOD

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Sulfate	13.8		5.00	1	11/28/2015 14:22	WG832035

Wet Chemistry by Method 9060A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	ND		1.00	1	11/25/2015 19:05	WG830901

Metals (ICP) by Method 6010C

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chromium	0.437		0.0100	1	11/27/2015 11:44	WG831615
Iron	ND		0.100	1	11/27/2015 11:44	WG831615
Manganese	ND		0.0100	1	11/27/2015 11:44	WG831615

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Wet Chemistry by Method 3500Fe B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ferrous Iron	ND		0.0500	1	11/24/2015 14:34	WG831373

Wet Chemistry by Method 4500S2 D-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Sulfide	ND		0.0500	1	11/27/2015 10:53	WG831734

Wet Chemistry by Method 7196A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	0.0890		0.0100	1	11/24/2015 11:29	WG831342

Wet Chemistry by Method 9056MOD

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Sulfate	6.51		5.00	1	11/28/2015 14:35	WG832035

Wet Chemistry by Method 9060A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	ND		1.00	1	11/25/2015 20:13	WG830901

Metals (ICP) by Method 6010C

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chromium	0.0833		0.0100	1	11/27/2015 12:50	WG831615
Iron	0.108		0.100	1	11/27/2015 12:50	WG831615
Manganese	ND		0.0100	1	11/27/2015 12:50	WG831615

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Wet Chemistry by Method 3500Fe B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ferrous Iron	ND		0.0500	1	11/24/2015 14:35	WG831373

Wet Chemistry by Method 4500S2 D-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Sulfide	ND		0.0500	1	11/27/2015 10:53	WG831734

Wet Chemistry by Method 7196A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	0.0690		0.0100	1	11/24/2015 11:31	WG831342

Wet Chemistry by Method 9056MOD

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Sulfate	ND		5.00	1	11/28/2015 14:48	WG832035

Wet Chemistry by Method 9060A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	ND		1.00	1	11/25/2015 20:26	WG830901

Metals (ICP) by Method 6010C

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chromium	0.0665		0.0100	1	11/27/2015 12:53	WG831615
Iron	ND		0.100	1	11/27/2015 12:53	WG831615
Manganese	0.0139		0.0100	1	11/27/2015 12:53	WG831615

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Wet Chemistry by Method 3500Fe B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ferrous Iron	0.673		0.0500	1	11/24/2015 14:35	WG831373

Wet Chemistry by Method 4500S2 D-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Sulfide	ND		0.0500	1	11/27/2015 10:54	WG831734

Wet Chemistry by Method 7196A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	ND		0.0100	1	11/24/2015 11:33	WG831342

Wet Chemistry by Method 9056MOD

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Sulfate	45.6		5.00	1	11/28/2015 15:01	WG832035

Wet Chemistry by Method 9060A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	1.85		1.00	1	11/25/2015 20:43	WG830901

Metals (ICP) by Method 6010C

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chromium	ND		0.0100	1	11/27/2015 12:56	WG831615
Iron	1.05		0.100	1	11/27/2015 12:56	WG831615
Manganese	ND		0.0100	1	11/27/2015 12:56	WG831615

Wet Chemistry by Method 3500Fe B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Ferrous Iron	0.118		0.0500	1	11/24/2015 14:36	WG831373

Wet Chemistry by Method 4500S2 D-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Sulfide	ND		0.0500	1	11/27/2015 10:54	WG831734

Wet Chemistry by Method 7196A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chromium,Hexavalent	ND		0.0100	1	11/24/2015 11:34	WG831342

Wet Chemistry by Method 9056MOD

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Sulfate	6.70		5.00	1	11/28/2015 15:14	WG832035

Wet Chemistry by Method 9060A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	4.57		1.00	1	11/25/2015 20:57	WG830901

Metals (ICP) by Method 6010C

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Chromium	ND		0.0100	1	11/27/2015 12:59	WG831615
Iron	ND		0.100	1	11/27/2015 12:59	WG831615
Manganese	ND		0.0100	1	11/27/2015 12:59	WG831615

QUALITY CONTROL SUMMARY

L802937-01,02,03,04,05

Method Blank (MB)

(MB) 11/24/15 14:30

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
Ferrous Iron	ND		0.0500

L802937-02 Original Sample (OS) • Duplicate (DUP)

(OS) 11/24/15 14:34 • (DUP) 11/24/15 14:34

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ferrous Iron	ND	ND	1	0.000		20

L802937-04 Original Sample (OS) • Duplicate (DUP)

(OS) 11/24/15 14:35 • (DUP) 11/24/15 14:35

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ferrous Iron	0.673	0.674	1	0.148		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 11/24/15 14:31 • (LCSD) 11/24/15 14:31

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Ferrous Iron	1.00	0.993	0.994	99.3	99.4	85.0-115			0.101	20

L802937-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 11/24/15 14:34 • (MS) 11/24/15 14:34 • (MSD) 11/24/15 14:34

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Ferrous Iron	1.50	0.0330	1.50	1.51	100	101	1	80.0-120			0.664	20

Method Blank (MB)

(MB) 11/27/15 10:50

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
Sulfide	ND		0.0500

L802999-05 Original Sample (OS) • Duplicate (DUP)

(OS) 11/27/15 10:55 • (DUP) 11/27/15 10:55

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Sulfide	0.0780	0.0780	1	0.000		20

L803012-01 Original Sample (OS) • Duplicate (DUP)

(OS) 11/27/15 10:58 • (DUP) 11/27/15 10:58

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Sulfide	ND	ND	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 11/27/15 10:52 • (LCSD) 11/27/15 10:52

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Sulfide	0.500	0.521	0.521	104	104	85.0-115			0.000	20

L802999-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 11/27/15 10:57 • (MS) 11/27/15 10:57 • (MSD) 11/27/15 10:57

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Sulfide	1.00	0.00100	0.606	0.606	60.6	60.6	1	80.0-120	J6	J6	0.000	20

Method Blank (MB)

(MB) 11/24/15 11:20

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
Chromium,Hexavalent	ND		0.0100

L800440-01 Original Sample (OS) • Duplicate (DUP)

(OS) 11/24/15 11:22 • (DUP) 11/24/15 11:22

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chromium,Hexavalent	ND	ND	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 11/24/15 11:22 • (LCSD) 11/24/15 11:22

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Chromium,Hexavalent	0.600	0.541	0.542	90.2	90.3	85.0-115			0.185	20

L802937-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 11/24/15 11:25 • (MS) 11/24/15 11:37 • (MSD) 11/24/15 11:37

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chromium,Hexavalent	0.500	0.395	0.978	0.979	117	117	1	85.0-115	J5	J5	0.102	20

Method Blank (MB)

(MB) 11/28/15 08:25

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
Sulfate	ND		5.00

L802305-01 Original Sample (OS) • Duplicate (DUP)

(OS) 11/28/15 12:26 • (DUP) 11/28/15 12:39

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Sulfate	893	893	10	0		20

L803144-02 Original Sample (OS) • Duplicate (DUP)

(OS) 11/28/15 17:36 • (DUP) 11/28/15 17:48

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Sulfate	46.1	46.2	1	0		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 11/28/15 08:38 • (LCSD) 11/28/15 08:51

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Sulfate	40.0	39.7	39.6	99	99	90-110			0	20

L802322-01 Original Sample (OS) • Matrix Spike (MS)

(OS) 11/28/15 12:52 • (MS) 11/28/15 13:05

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Sulfate	50.0	4.52	56.7	104	1	80-120	

L803144-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 11/28/15 16:57 • (MS) 11/28/15 17:10 • (MSD) 11/28/15 17:23

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Sulfate	50.0	75.4	119	118	86	86	1	80-120			0	20

Method Blank (MB)

(MB) 11/25/15 11:13

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
TOC	ND		1.00

L802744-14 Original Sample (OS) • Duplicate (DUP)

(OS) 11/25/15 16:42 • (DUP) 11/25/15 17:01

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
TOC	3.28	3.66	1	11.0		20

L802676-12 Original Sample (OS) • Duplicate (DUP)

(OS) 11/25/15 21:58 • (DUP) 11/25/15 22:19

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
TOC	122	123	2	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 11/25/15 12:27 • (LCSD) 11/25/15 12:51

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TOC	75.0	83.6	84.9	111	113	85.0-115			1.54	20

L802744-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 11/25/15 15:21 • (MS) 11/25/15 15:42 • (MSD) 11/25/15 16:06

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TOC	50.0	2.02	62.9	66.1	122	128	1	80.0-120	J5	J5	4.92	20

Method Blank (MB)

(MB) 11/27/15 11:33

Analyte	MB Result mg/l	MB Qualifier	MB RDL mg/l
Chromium	ND		0.0100
Iron	ND		0.100
Manganese	ND		0.0100

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 11/27/15 11:36 • (LCSD) 11/27/15 11:41

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Chromium	1.00	1.06	1.03	106	103	80-120			3	20
Iron	1.00	1.02	0.965	102	96	80-120			5	20
Manganese	1.00	1.02	0.985	102	99	80-120			3	20

L802937-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 11/27/15 11:44 • (MS) 11/27/15 11:50 • (MSD) 11/27/15 11:53

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Chromium	1.00	0.437	1.49	1.46	106	102	1	75-125			3	20
Iron	1.00	0.0107	1.01	1.00	100	99	1	75-125			1	20
Manganese	1.00	0.00303	1.01	0.992	101	99	1	75-125			2	20

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND,U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.
SDL	Sample Detection Limit.
MQL	Method Quantitation Limit.
Unadj. MQL	Unadjusted Method Quantitation Limit.

Qualifier	Description
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.

ACCREDITATIONS & LOCATIONS

ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE.**

State Accreditations

Alabama	40660
Alaska	UST-080
Arizona	AZ0612
Arkansas	88-0469
California	01157CA
Colorado	TN00003
Conneticut	PH-0197
Florida	E87487
Georgia	NELAP
Georgia [1]	923
Idaho	TN00003
Illinois	200008
Indiana	C-TN-01
Iowa	364
Kansas	E-10277
Kentucky [1]	90010
Kentucky [2]	16
Louisiana	AI30792
Maine	TN0002
Maryland	324
Massachusetts	M-TN003
Michigan	9958
Minnesota	047-999-395
Mississippi	TN00003
Missouri	340
Montana	CERT0086
Nebraska	NE-OS-15-05
Nevada	TN-03-2002-34
New Hampshire	2975
New Jersey–NELAP	TN002
New Mexico	TN00003
New York	11742
North Carolina	Env375
North Carolina [1]	DW21704
North Carolina [2]	41
North Dakota	R-140
Ohio–VAP	CL0069
Oklahoma	9915
Oregon	TN200002
Pennsylvania	68-02979
Rhode Island	221
South Carolina	84004
South Dakota	n/a
Tennessee [1 4]	2006
Texas	T 104704245-07-TX
Texas [5]	LAB0152
Utah	6157585858
Vermont	VT2006
Virginia	109
Washington	C1915
West Virginia	233
Wisconsin	9980939910
Wyoming	A2LA

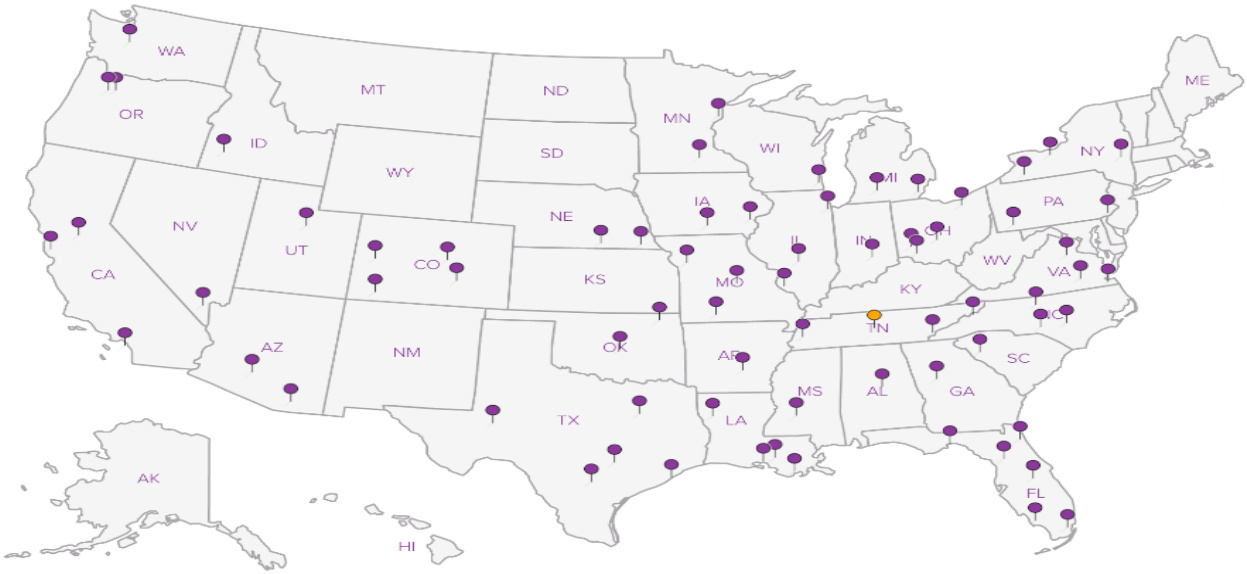
Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01
A2LA – ISO 17025 [5]	1461.02
Canada	1461.01
EPA–Crypto	TN00003
AIHA	100789
DOD	1461.01
USDA	S-67674

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [n/a] Accreditation not applicable

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



Hunt Environmental Associates

3430 Capuano Street
Lumberton, NC 28358

Billing Information:
Cody Hunt
PO Box 390
Lumberton, NC 28359

Report to: Cody Hunt

Email To: mchunt22@gmail.com

Project Description: Pilkington

City/State Collected: Laurinburg/NC

Phone: 910-674-5925
Fax:

Client Project # Pilkington GW

Lab Project # HUNENVLNC-PILKINGTON

Collected by (print): Cody Hunt

Site/Facility ID #

P.O. #

Collected by (signature): [signature]

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day 200%
___ Next Day 100%
___ Two Day 50%
___ Three Day 25%

Date Results Needed

Email? ___No X Yes
FAX? ___No ___Yes

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	CR6 250mlHDPE-NoPres	Cr, Fe, Mn 500mlHDPE-HNO3	FF.RUSFE 250mlAmb-HCl	SULFATE 125mlHDPE-NoPres	SULFIDE 125mlAmb-S-NaOH+ZnAc	TOC 250mlAmb-Septa-HCl					Rem./Contaminant	Sample # (lab only)
MW-2	G	GW	26'	11/23/15	1156	6	X	X	X	X	X	X						01
MW-1	G	GW	28'	11/23/15	1430	6	X	X	X	X	X	X						02
MW-7	G	GW	29'	11/23/15	1518	6	X	X	X	X	X	X						03
MW-4	G	GW	28'	11/23/15	1608	6	X	X	X	X	X	X						04
SW-1	G	GW	N/A	11/23/15	1430	6	X	X	X	X	X	X						05

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other_____

Remarks:

pH _____ Temp _____
Flow _____ Other _____

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
[signature]	11/23/15		
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)
			[signature]

Samples returned via: ☐ UPS ☑ FedEx ☐ Courier ☐ _____

Temp: 3.8 °C Bottles Received: 30

Date: 11/24/15 Time: 0940

Hold #

Condition: (lab use only) 7F 0C

COC Seal Intact: ___Y ___N ___NA

pH Checked: L2

NCF:

6529 1904 8465

Chain of Custody Page ___ of ___

ESC LAB SCIENCES
YOUR LAB OF CHOICE

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L# 302437

B045

Acctnum: HUNENVLNC
Template: T103245
Prelogin: P530701
TSR: 350 - Jimmy Hunt
PB: 11/10/15 AA
Shipped Via: FedEX Ground