

DENR USE ONLY:

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Doc/Event #:

NC DENR

Division of Waste Management - Solid Waste

# Environmental Monitoring Reporting Form

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

### Instructions:

- Prepare one form for each individually monitored unit.
- Please type or print legibly.
- Attach a notification table with values that attain or exceed NC 2L groundwater standards or NC 2B surface water standards. The notification must include a preliminary analysis of the cause and significance of each value. (e.g. naturally occurring, off-site source, pre-existing condition, etc.).
- Attach a notification table of any groundwater or surface water values that equal or exceed the reporting limits.
- Attach a notification table of any methane gas values that attain or exceed explosive gas levels. This includes any structures on or nearby the facility (NCAC 13B .1629 (4)(a)(i)).
- Send the original signed and sealed form, any tables, and Electronic Data Deliverable to: Compliance Unit, NCDENR-DWM, Solid Waste Section, 1646 Mail Service Center, Raleigh, NC 27699-1646.

### Solid Waste Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner):

Richardson Smith Gardner and Associates, Inc.

Contact for questions about data formatting. Include data preparer's name, telephone number and E-mail address:

Name: Joan A. Smyth, P.G.

Phone: 919-828-0577 x 221

E-mail: joan@rsgengineers.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Washington County C&D Landfill	718 Landfill Road Roper, NC	94-01	.0500	March 17th, 2010

### Environmental Status: (Check all that apply)

- Initial/Background Monitoring  Detection Monitoring  Assessment Monitoring  Corrective Action

### Type of data submitted: (Check all that apply)

- Groundwater monitoring data from monitoring wells  Methane gas monitoring data  
 Groundwater monitoring data from private water supply wells  Corrective action data (specify) \_\_\_\_\_  
 Leachate monitoring data  Other(specify) \_\_\_\_\_  
 Surface water monitoring data

### Notification attached?

- No. No groundwater or surface water standards were exceeded.  
 Yes, a notification of values exceeding a groundwater or surface water standard is attached. It includes a list of groundwater and surface water monitoring points, dates, analytical values, NC 2L groundwater standard, NC 2B surface water standard or NC Solid Waste GWPS and preliminary analysis of the cause and significance of any concentration.  
 Yes, a notification of values exceeding an explosive methane gas limit is attached. It includes the methane monitoring points, dates, sample values and explosive methane gas limits.

### Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

Joan A. Smyth, P.G.

Senior Hydrogeologist

919-828-0577 x 221

Facility Representative Name (Print)

Title

(Area Code) Telephone Number

*Joan A. Smyth*  
Signature

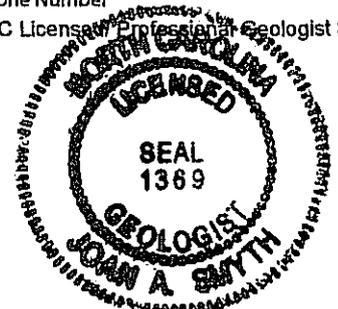
4/13/10  
Date

Affix NC Licensable Professional Geologist Seal

14 N. Boylan Avenue Raleigh, NC 27603

Facility Representative Address

C0828



# **Washington County C&D Landfill**

## **Ground Water Monitoring Report**

### **March 2010 Semi-annual Monitoring Event**

**Washington County C&D Landfill  
Washington, North Carolina  
NC Solid Waste Permit # 94-04 CDLF 1996**

Prepared for:  
**Washington County**  
P.O. Box 1007  
Plymouth, North Carolina 27962

**April 2010**



PRINTED ON 100% RECYCLED PAPER

# Spring 2010 Ground Water Monitoring Report

**Washington County C&D Landfill  
Washington, North Carolina  
NC Solid Waste Permit # 94-04 CDLF-1996**

Prepared for:

**Washington County Solid Waste  
P.O. Box 1007  
Plymouth, North Carolina 27962**

RSG Project No. **Wash 08-2**



---

Joan A. Smyth, P.G.  
Senior Hydrogeologist



**April 2010**



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**Washington County C&D Landfill**

**Semi-annual Ground Water Monitoring Report  
March 2010 Event**

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## 1.0 Introduction

The Washington County Landfill, operating under Solid Waste Permit #94-04-CDLF-1996, is required to submit semiannual ground water monitoring reports for ground water monitoring. This report presents the results of the first semi-annual monitoring event for 2010, conducted on March 17<sup>th</sup>, 2010.

The Washington County Landfill is currently accepting C&D waste. The ground water monitoring network consists of four (4) wells located around the perimeter of the landfill. This report includes summaries of the field procedures, laboratory analyses, and ground water characterization.

## 2.0 Regional Geology

The Washington County Landfill is located near Roper North Carolina. According to the Geologic Map of North Carolina (1985) this site is underlain by Quaternary surficial deposits that include sands, gravel, clay, and peat that were deposited in marine, fluvial, eolian and lacustrine environments. These environments are typical for a coastal plain environment.

## 3.0 Sampling Procedures

The sampling event, performed by Environment 1, Inc. on March 17<sup>th</sup>, 2010, consisted of collecting samples from four (4) ground water wells (MW-1 through MW-4) in accordance with the approved site Sampling and Analysis Plan. Also included in the analysis were trip and field blanks for quality control.

Sampling methods followed the protocol outlined in the North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities (North Carolina Department of Environment and Natural Resources, Division of Waste Management). The depth to water in each well was gauged prior to purging and sampling. Field measurements of pH, specific conductivity, and temperature were obtained from each well.

All samples were collected in laboratory prepared containers for the specified analytical procedures. Sampling equipment (Teflon bailers) were cleaned in the laboratory and transported to the site in aluminum foil. Ground water samples were properly preserved, placed on ice, and transported to the laboratory facility within the specified holding times for each analysis.

## 4.0 Field & Laboratory Results

### 4.1 Laboratory Analysis

The ground and surface water samples were transported to Environment 1, Inc., a North Carolina certified laboratory (NC Wastewater ID #10). Laboratory analysis consisted of the full suite of RCRA Subtitle D Appendix I constituents Parameters were reported at NC DWM Solid Waste Section Limits (SWSLs). The laboratory analytical report is included as **Appendix A**.

## 4.2 Field and Laboratory Results

The field parameter results are included in **Table 2**, while detected constituents are presented in **Tables 3 & 4**.

Five (5) inorganic constituents (barium, cobalt, iron, manganese and zinc) were detected above the SWSL in 4 wells (CD-1 through CD-4) shown in **Table 3**. Of these, two (2) inorganic constituents were detected above the 2L ground water standards:

- iron; and
- manganese.

No organic constituents were detected above the SWSLs.

No surface water samples were collected. Constituents detected below the SWSL are denoted as “J” values and are also included in **Tables 3**.

## 5.0 Ground Water Characterization

A potentiometric surface map was prepared from ground water elevation data collected during this sampling event. The data indicates that ground water is flowing generally to the southwest direction. Hydraulic conductivity data is not available for these wells so ground water velocities could not be calculated. The potentiometric surface map (**Figure 1**) is also attached for your review.

## 6.0 Conclusions

The data and analyses show relatively stable ground water quality at the Washington County C&D Landfill. The inorganic constituents detected are likely due to turbidity in the sample as these are naturally occurring in the soils.

The next ground water monitoring event is scheduled for September 2010. Results will be reported upon completion of laboratory analysis.

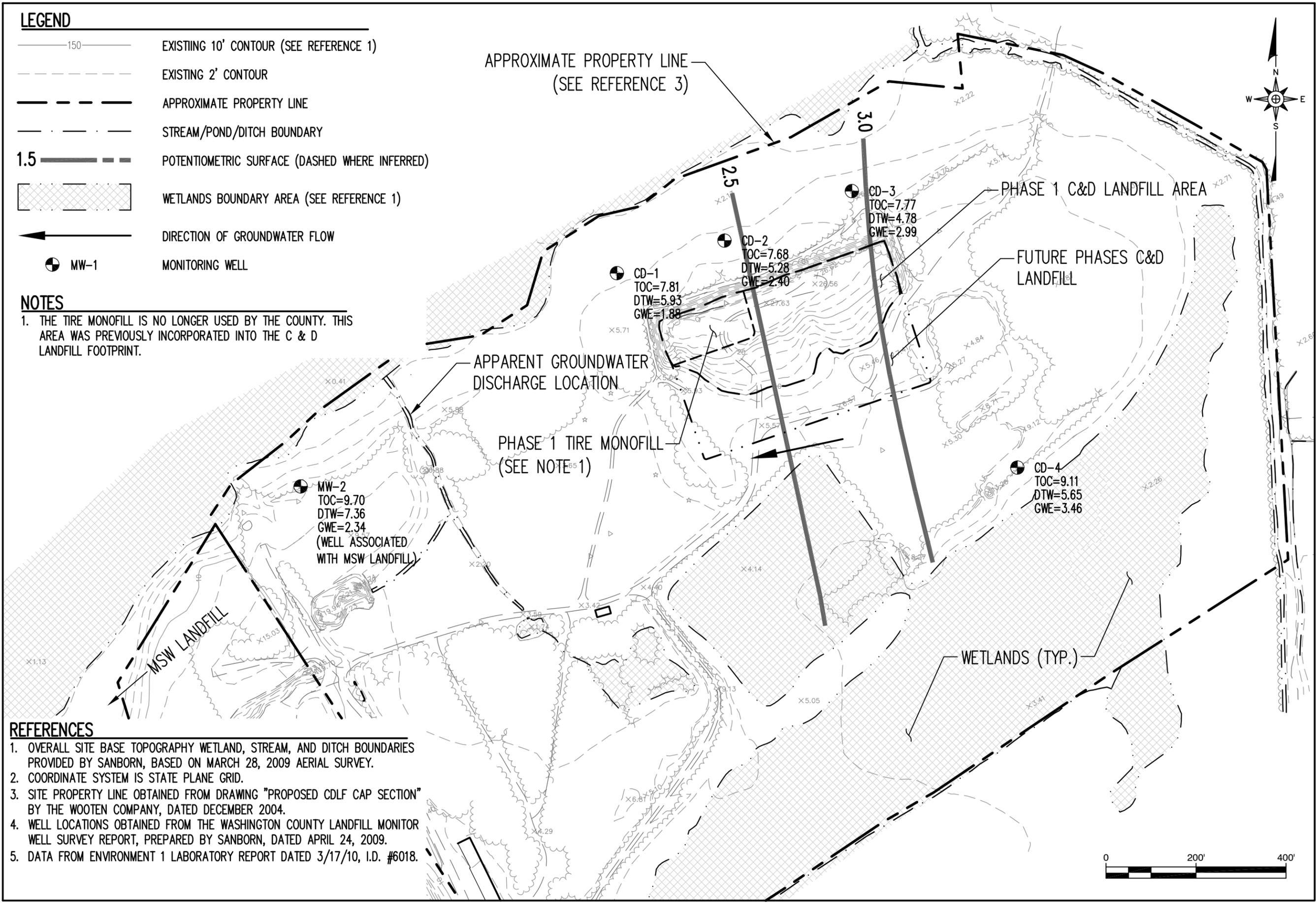
Figures

**LEGEND**

-  150 EXISTING 10' CONTOUR (SEE REFERENCE 1)
-  EXISTING 2' CONTOUR
-  APPROXIMATE PROPERTY LINE
-  STREAM/POND/DITCH BOUNDARY
-  1.5 POTENTIOMETRIC SURFACE (DASHED WHERE INFERRED)
-  WETLANDS BOUNDARY AREA (SEE REFERENCE 1)
-  DIRECTION OF GROUNDWATER FLOW
-  MW-1 MONITORING WELL

**NOTES**

1. THE TIRE MONOFILL IS NO LONGER USED BY THE COUNTY. THIS AREA WAS PREVIOUSLY INCORPORATED INTO THE C & D LANDFILL FOOTPRINT.



**REFERENCES**

1. OVERALL SITE BASE TOPOGRAPHY WETLAND, STREAM, AND DITCH BOUNDARIES PROVIDED BY SANBORN, BASED ON MARCH 28, 2009 AERIAL SURVEY.
2. COORDINATE SYSTEM IS STATE PLANE GRID.
3. SITE PROPERTY LINE OBTAINED FROM DRAWING "PROPOSED CDF CAP SECTION" BY THE WOOTEN COMPANY, DATED DECEMBER 2004.
4. WELL LOCATIONS OBTAINED FROM THE WASHINGTON COUNTY LANDFILL MONITOR WELL SURVEY REPORT, PREPARED BY SANBORN, DATED APRIL 24, 2009.
5. DATA FROM ENVIRONMENT 1 LABORATORY REPORT DATED 3/17/10, I.D. #6018.

**RICHARDSON SMITH GARDNER & ASSOCIATES**  
INC. LIC. NO. C-282 (Engineering)  
 www.rsgengineers.com

14 N. Boylan Ave.  
 Raleigh, N.C. 27603  
 ph: 919-826-0577  
 fax: 919-826-3899

DRAWN BY:	J.A.L.	CHECKED BY:	J.A.S.
SCALE:	AS SHOWN	FIGURE NO.:	1
PROJECT NO.:	WASH 08-2	FILE NAME:	WASH-B0020
DATE:	Apr. 2010		

**WASHINGTON COUNTY  
 C&D LANDFILL  
 POTENTIOMETRIC SURFACE MAP  
 SPRING 2010**

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Tables



By: KBS  
Date: 4/10/2010

**Table 1**  
**Groundwater Elevations**  
**Washington County C&D Landfill**  
**3/17/2010**

Well	Northing	Easting	TOC Elevation (feet)	Water Level (feet)	GW Elev (feet)
CD-1	799028.14	2691515.73	7.81	5.93	1.88
CD-2	799100.9	2691755.17	7.68	5.28	2.4
CD-3	799210.55	2692038.09	7.77	4.78	2.99
CD-4	798597.78	2692406.42	9.11	5.65	3.46

Lab data analyzed by Environmental 1, Inc. ID# 6030 September 3, 2009.

Well locations and elevations provided by Sanborn, Charlotte, NC from field survey conducted on 4/8/09.

**Table 2**  
**Field Parameter Results**  
**Washington County C&D Landfill**  
**3/17/2010**

Well	pH (Std units)	Spec Cond (umhos/cm)	Temp (celsius)
CD-1	4.1	414	12
CD-2	3.8	858	13
CD-3	5.1	85	12
CD-4	5.2	65	12

**Note:** PH measured with a "Hanna" pH/EC/TDS Meter, type HI9811  
 Temperature measured with a laboratory grade thermometer.  
 Lab data analyzed by Environmental 1, Inc. ID# 6030 September 3, 2009.

**Table 3**  
**Detected Inorganic Constituents**  
**Washington County C&D Landfill**  
**3/17/2010**

Parameter	SWSL	2L or GWP Standard	CD-1	CD-2	CD-3	CD-4
Animony	6	64	ND	ND	ND	ND
Arsenic	10	50	ND	0.8 J	ND	0.2 J
Barium	100	2000	13.5 J	15.5 J	24.9 J	13 J
Beryllium	1	4.0	<b>3</b>	<b>3</b>	0.1 J	0.1 J
Cadmium	1	1.75	<b>1</b>	0.9 J	ND	ND
Cobalt	10	70.0	8.5 J	<b>14</b>	0.7 J	1.3 J
Copper	10	1000	4.6 J	0.9 J	ND	ND
Total Chromium	10	50	ND	0.9 J	ND	ND
Iron	300	300	<b>1281</b>	<b>16840</b>	<b>1739</b>	<b>1316</b>
Manganese	50	50	<b>372</b>	<b>914</b>	<b>90</b>	40 J
Lead	10	15	0.1 J	0.6 J	0.5 J	0.1 J
Mercury	0.2	1.05	ND	ND	ND	ND
Nickel	50	100	27 J	6.3 J	0.2 J	0.1 J
Selenium	10	50	1.9 J	2 J	ND	ND
Silver	10	17.5	0.1 J	0.1 J	ND	0.1 J
Thallium	5	0.3	ND	ND	ND	ND
Vanadium	25	3.5	0.3 J	3.7 J	2.1 J	1.7 J
Zinc	10	1050	<b>11</b>	<b>57</b>	0.6 J	0.6 J

Note: All results in ug/l (ppb)

- ND - Not detected at or above SWSL
- Shading - Levels above 2L standard or no 2L standard
- Bold Letters - Levels below 2L standard
- SWSL - Solid Waste Section Quantitation Limits
- J - Detected constituents below the SWSL limit.
- 2L - Groundwater Standards (15A NCAC 2L 0200).
- GWP - Groundwater Protection Standards.

Note: Lab data analyzed by Environmental 1, Inc. ID# 6030 September 3, 2009.

Appendix A

Laboratory Analytical Report

REC'D APR 07 2010

Drinking Water ID: 37715  
Wastewater ID: 10

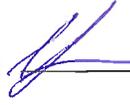
P.O. BOX 7085, 114 OAKMONT DRIVE  
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208  
FAX (252) 756-0633

ID#: 6030

WASHINGTON CO. LANDFILL (C&D)  
MR. CARL CRITCHER  
P.O. BOX 1007  
PLYMOUTH ,NC 27962

DATE COLLECTED: 03/17/10  
DATE REPORTED : 04/06/10

REVIEWED BY: 

PARAMETERS	MDL	SWSL	CD-1	CD-2	CD-3	CD-4	Analysis		Method
							Date	Analyst	Code
PH (field measurement), Units			4.1	3.8	5.1	5.2	03/17/10	RJH	SM4500HB
Total Alkalinity, mg/l	1.0	1.0	--- U	--- U	--- U	5	03/18/10	TRB	SM2320B
Chloride, mg/l	5.0	5.0	24	32	10	12	03/22/10	MJN	SM4500-CLB
Total Dissolved Residue, mg/l	1.0	1.0	241	621	60	41	03/23/10	TRB	SM2540C
Sulfate, mg/l	5.0	250.0	176.6 J	295.7	22.6 J	15.6 J	03/30/10	TRB	SM426C
Antimony, ug/l	0.22	6.0	--- U	--- U	--- U	--- U	03/23/10	CMF	EPA200.8
Arsenic, ug/l	0.04	10.0	--- U	0.8 J	--- U	0.2 J	03/23/10	CMF	EPA200.8
Barium, ug/l	0.03	100.0	13.5 J	15.5 J	24.9 J	13.0 J	03/23/10	CMF	EPA200.8
Beryllium, ug/l	0.02	1.0	3	3	0.1 J	0.1 J	03/23/10	CMF	EPA200.8
Cadmium, ug/l	0.02	1.0	1	0.9 J	--- U	--- U	03/23/10	CMF	EPA200.8
Cobalt, ug/l	0.10	10.0	8.5 J	14	0.7 J	1.3 J	03/23/10	CMF	EPA200.8
Copper, ug/l	0.03	10.0	4.6 J	0.9 J	--- U	--- U	03/23/10	CMF	EPA200.8
Total Chromium, ug/l	0.03	10.0	--- U	0.9 J	--- U	--- U	03/23/10	CMF	EPA200.8
Iron, ug/l	13.8	300.0	1281	16840	1739	1316	03/24/10	ADD	SM3111B
Manganese, ug/l	0.61	50.0	372	914	90	40 J	03/22/10	LPJ	EPA200.7
Lead, ug/l	0.01	10.0	0.1 J	0.6 J	0.5 J	0.1 J	03/23/10	CMF	EPA200.8
Mercury, ug/l	0.08	0.20	--- U	--- U	--- U	--- U	03/23/10	CMF	EPA200.8
Nickel, ug/l	0.05	50.0	27.0 J	6.3 J	0.2 J	0.1 J	03/23/10	CMF	EPA200.8
Selenium, ug/l	0.32	10.0	1.9 J	2.0 J	--- U	--- U	03/23/10	CMF	EPA200.8
Silver, ug/l	0.03	10.0	0.1 J	0.1 J	--- U	0.1 J	03/23/10	CMF	EPA200.8
Thallium, ug/l	0.05	5.0	--- U	--- U	--- U	--- U	03/23/10	CMF	EPA200.8
Vanadium, ug/l	0.03	25.0	0.3 J	3.7 J	2.1 J	1.7 J	03/23/10	CMF	EPA200.8
Zinc, ug/l	0.08	10.0	11	57	0.6 J	0.6 J	03/23/10	CMF	EPA200.8
Conductivity (at 25c), uMhos	1.0	1.0	414	858	85	65	03/17/10	RJH	SM2510B
Temperature, °C			12	13	12	12	03/17/10	RJH	SM2550B
Static Water Level, feet			5.93	5.28	4.78	5.65	03/17/10	RJH	
Well Depth, feet			22.90	19.90	21.45	20.67	03/17/10	RJH	

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

# Environment 1, Incorporated

Drinking Water ID: 37715  
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE  
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208  
FAX (252) 756-0633

CLIENT: WASHINGTON CO. LANDFILL (C&D)  
MR. CARL CRITCHER  
P.O. BOX 1007  
PLYMOUTH, NC 27962

CLIENT ID: 6030  
ANALYST: MAO  
DATE COLLECTED: 03/17/10  
DATE ANALYZED: 03/23/10  
DATE REPORTED: 04/06/10

Page: 1

REVIEWED BY: 

## VOLATILE ORGANICS EPA METHOD 8260B

PARAMETERS, ug/l	MDL	SWSL	CD-1	CD-2	CD-3	CD-4
1. Chloromethane	0.77	1.0	---	U	---	U
2. Vinyl Chloride	0.63	1.0	---	U	---	U
3. Bromomethane	0.67	10.0	---	U	---	U
4. Chloroethane	0.48	10.0	---	U	---	U
5. Trichlorofluoromethane	0.24	1.0	---	U	---	U
6. 1,1-Dichloroethene	0.17	5.0	---	U	---	U
7. Acetone	9.06	100.0	---	U	---	U
8. Iodomethane	0.26	10.0	---	U	---	U
9. Carbon Disulfide	0.23	100.0	---	U	---	U
10. Methylene Chloride	0.64	1.0	---	U	---	U
11. trans-1,2-Dichloroethene	0.23	5.0	---	U	---	U
12. 1,1-Dichloroethane	0.20	5.0	---	U	---	U
13. Vinyl Acetate	0.20	50.0	---	U	---	U
14. Cis-1,2-Dichloroethene	0.25	5.0	---	U	---	U
15. 2-Butanone	2.21	100.0	---	U	---	U
16. Bromochloromethane	0.27	3.0	---	U	---	U
17. Chloroform	0.25	5.0	---	U	---	U
18. 1,1,1-Trichloroethane	0.19	1.0	---	U	---	U
19. Carbon Tetrachloride	0.22	1.0	---	U	---	U
20. Benzene	0.24	1.0	---	U	---	U
21. 1,2-Dichloroethane	0.27	1.0	---	U	---	U
22. Trichloroethene	0.23	1.0	---	U	---	U
23. 1,2-Dichloropropane	0.21	1.0	---	U	---	U
24. Bromodichloromethane	0.21	1.0	---	U	---	U
25. Cis-1,3-Dichloropropene	0.24	1.0	---	U	---	U
26. 4-Methyl-2-Pentanone	1.19	100.0	---	U	---	U
27. Toluene	0.23	1.0	---	U	---	U
28. trans-1,3-Dichloropropene	0.28	1.0	---	U	---	U
29. 1,1,2-Trichloroethane	0.25	1.0	---	U	---	U
30. Tetrachloroethene	0.17	1.0	---	U	---	U
31. 2-Hexanone	1.57	50.0	---	U	---	U
32. Dibromochloromethane	0.24	3.0	---	U	---	U
33. 1,2-Dibromoethane	0.26	1.0	---	U	---	U
34. Chlorobenzene	0.30	3.0	---	U	---	U
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	---	U	---	U
36. Ethylbenzene	0.21	1.0	---	U	---	U
37. Xylenes	0.68	5.0	---	U	---	U
38. Dibromomethane	0.28	10.0	---	U	---	U
39. Styrene	0.19	1.0	---	U	---	U
40. Bromoform	0.20	3.0	---	U	---	U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	---	U	---	U
42. 1,2,3-Trichloropropane	0.43	1.0	---	U	---	U
43. 1,4-Dichlorobenzene	0.39	1.0	---	U	---	U
44. 1,2-Dichlorobenzene	0.32	5.0	---	U	---	U
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	---	U	---	U
46. Acrylonitrile	2.72	200.0	---	U	---	U
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	---	U	---	U

J = Between MDL and SWSL, U = Below ALL Quantitation Limits.

