Environmental Consultants
and Contractors

SCS Engineers, P.C.
2520 Whitehall Park Drive
Suite 450
Charlotte, NC 28273-3557

704 504-3107
FAX 704 504-3174
www.scsengineers.com

SCS ENGINEERS, PC

March 17, 2016
File No. 022114708.00

Ms. Jackie Drummond
NC Division of Waste Management
Solid Waste Section
Mail Service Center 1646
Raleigh, NC 27699-1646

RE: Source Demonstration Work Plan
Ground Water Assessment – Phase 1
C&D Landfill, Inc. (Pitt County, NC)
NC Solid Waste Permit #74-07

Dear Ms. Drummond:

On behalf of C&D Landfill, Inc., SCS Engineers, PC (SCS) is pleased to present this Work Plan for a Source Demonstration at the referenced facility. The Facility entered into Assessment Monitoring in late 2009 (second semi-annual monitoring event) after negotiating an Appendix II sampling protocol based on a preliminary characterization of a ground water impact. The impact appears to focus on an old drainage ditch excavated for prior agricultural use of the site. The detected constituents from the Appendix I sampling list, which triggered the Assessment in accordance with 15A NCAC 13B .0545, appeared to consist of petroleum hydrocarbons and pesticides. Initial site permitting, beginning ca. 2000, and subsequent monitoring oversight was provided by David Garrett & Associates, who initiated the Assessment program.

At this time the Assessment monitoring has shown no new constituents in the groundwater, and the data appear to support the initial presumption regarding the source of the contaminants. This document is respectfully submitted to the Division of Waste Management to initiate the next step in characterizing the ground water impact. This document contains a brief summary of known conditions and protocols for conducting the Source Demonstration.

Please contact us if you have any questions regarding this report.

Sincerely,

NORTH CAROLINA PROFESSIONAL SEAL 25462 GEOLOGIST DAVID GARRETT

3/17/2016

G. David Garrett, PG, PE
Project Manager
SCS ENGINEERS

Mike Cobb, PG
Project Professional
SCS ENGINEERS

cc: Judson Whitehurst, C&D Landfill, Inc.
Steve Lamb, PE, SCS Engineers, PC

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Source Demonstration Work Plan
Ground Water Assessment – Phase 1
C&D Landfill, Inc. (Pitt County, NC)
NC Solid Waste Permit #74-07

Submitted to:

NCDEQ Division of Waste Management
Solid Waste Section
217 W Jones Street
Raleigh, NC 27603

Presented To:

C&D Landfill, Inc.
802 Recycling Lane
Greenville, NC 27834

Presented By:

SCS ENGINEERS, PC
2520 Whitehall Park Drive, Suite 450
Charlotte, NC 28273-3557
704 504-3107

March 17, 2016
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Figure 1 Site Map

1.0 BACKGROUND

1.1 Site History

C&D Landfill, Inc., is an unlined construction and demolition debris landfill (CDLF) regulated under 15A NCAC 13B .0537 *et seq*. Phase 1 of the CDLF covers approximately 15 acres and opened in 2001, following site characterization studies performed ca. 2000 that identified the ground water flow conditions. Subsurface conditions within the upper 70 feet consist of two relatively sandy aquifers (fluvial and shallow marine sediments) separated by a partial confining layer (deep marine silt-clay associated with the Yorktown Formation). An upward hydraulic gradient exists beneath much of the site due to mild artesian pressure within the deeper aquifer.

Ground water is shallow, typically within 5 feet beneath the surface, and is directed to the south, toward large receiving streams (Grindle Creek and/or the Tar River). The downgradient area between the facility and the streams is mostly within the 100-year floodplain and contains extensive wetlands. Grindle Creek has a class C-NSW stream designation (fresh water, supportive of aquatic life and recreation, nutrient sensitive). The nearest receiving streams are not blue-line features. There are no ground water users located down-gradient of the facility and virtually no down-gradient development potential exists. The surrounding area is served by public water supply, derived from wells but which are miles away and upgradient.

Past uses of the site include agriculture and recreational hunting and four-wheeling – activities which are potential sources of some of the contaminants observed in excess of the 2L standards. The initial waste material brought to the facility was Hurricane Floyd flood damaged demolition debris, which was collected under emergency management conditions. That is, materials not normally admitted to a CDLF under the Solid Waste regulations may have been introduced and/or one or more spills near a drainage feature in a remote corner of the site, southwest of Phase 1, may have caused the impact. Ground water monitoring did indicate certain inorganic background constituents – not the focus of this assessment – which are exacerbated by turbidity. The organic constituents have been detected only sporadically.

1.2 Assessment Monitoring

The following is a summary of the detected constituents that triggered the Assessment Monitoring along with relevant 2L Standards, which were discussed in the 2009 Assessment Work Plan. Detections after the Assessment began (through Fall 2015) are listed below in **bold** type:

	MW-3s	MW-3d	MW-3A	MW-8
Acetone (2L_6000 µg/l)	5.6 / **9.10J**			4.5
Benzene (2L_1.0 µg/l)	2.1 / **3.1**		0.9J*/ **1.7**	0.7 / **1.9**
2-Butanone (MEK) (2L_4000 µg/l)				1.1

	MW-3s	MW-3d	MW-3A	MW-8
Chloroethane (2L_3000 µg/l)	0.7			
Chloromethane (2L_3 µg/l)	0.5			
Carbon Disulfide (2L_700 µg/l)				0.2
1,2-Dichloroethane (2L_0.4 µg/l)	0.7			
Cis-1,2-Dichloroethene (2L_60 µg/l)	1.3			0.2
Ethylbenzene (2L_600 µg/l)	0.4 / **0.8J**			
Methylene Chloride (2L_5 µg/l)	0.3J / **0.8J**			0.2
Toluene (2L_600 µg/l)	0.4			
Trichloroethene (TEC) (2L_3 µg/l)	0.3J			
Vinyl Chloride (2L_0.3 µg/l)	0.5			
Dinoseb (2L_7 µg/l)	**0.821J***			
2,4,5-TP (Silvex) (2L_50 µg/l)	**0.738J***			

*First detected after the Assessment began. J denotes concentrations detected below reporting limit.

Some of the standards may have changed since this data was compiled in 2011.

Tetrahydrafuran has not been considered, as it was not monitored when the Assessment began.

Inorganic constituents have been shown to be regional background, exacerbated by high turbidity.

No organic constituents have been detected at MW-3d.

1.3 Data Trends

Data through the November 2015 sampling event show a consistent decline in many parameters, despite the fact that reporting limits and a few standards have decreased since the monitoring program began. Significant trends relative to the Assessment Monitoring are as follows:

- Benzene is holding steady just slightly above the 2L Standard at MW-3s, detected above 2L only once at MW-3A, and detected sporadically with recent non-detects at MW-8.

- Constituents present (at any concentrations) before the Assessment that have not been detected (or were detected below 2L or the SWSL) include Acetone, 2-Butanone, Carbon Disulfide, Cis-1,2-Dichloroethene, Chlorobenzene, Ethylbenzene, Methylene Chloride, Trichloroethene, Toluene, Vinyl Chloride, Dinoseb and 2,4,5-TP (Silvex).

- Constituents listed on the pre-assessment detection list, but are no longer listed, i.e., these have not been detected since the database was updated by SCS, include Chloroethane, Chloromethane, and 1,2-Dichloroethane.

2.0 FIELD INVESTIGATION

2.1 Sampling Locations

Six test pits will be excavated for soil sampling and *in situ* observations. The test pits will be excavated to a depth between 48 and 64 inches. Additional test pits without sampling may be added based on preliminary field test results.

SCS recommends sampling test pits in the following locations, shown on **Figure 1**:

- Two test pits on a line between existing groundwater monitoring wells MW-10 and MW-11, such that each point is equidistant from the nearest two points;
- One test pit between monitoring wells MW-11 and MW-8;
- One test pit between monitoring wells MW-8 and MW-12, remaining within the drainage feature;
- One test pit between monitoring wells MW-8 and MW-3s, remaining within the drainage feature;
- One test pit in the MW-3 cluster of wells (MW-3s, MW-3d, and MW-3A), offset at least 20’ from the nearest well to minimize any impact the disturbance of material caused by the excavation may have on the wells.

2.2 Sampling Protocols

Prior to excavation, SCS will conduct photo-ionization testing on "clean" soil located outside the limits of the drainage feature suspected to be the source of contamination. SCS will identify a suitable upgradient location in which to dig a "clean" test pit and direct the equipment operator to excavate to between 48 and 64 inches below ground surface (bgs). Then, using a RAE Systems MiniRAE 3000 (or similar) photo-ionization detector (PID), SCS will obtain a background reading of hydrocarbons present in native soil. Further, SCS will collect a sample from this "clean" soil (per the method laid out below) to be sent to the laboratory for analysis. SCS understands the Landfill will provide a backhoe or other piece of equipment and an operator to assist in excavating this and subsequent test pits.

Sampling will occur at each location within the upper 24 inches and between 48 to 60 inches, unless suspect staining is observed at a shallower depth. As decontaminating heavy equipment between each test pit is not feasible, soil samples will be collected from material that did not come into contact with the excavator bucket to minimize the risk of cross-contamination. To achieve this, SCS will direct the operator to halt excavation approximately six inches above the depth at which samples will be collected. SCS will then use a hand auger to drill down to the sampling depth and collect the necessary soil samples. The hand auger will then be decontaminated using a mixture of distilled water and phosphate-free soap, and rinsed with distilled water.

At each sample location, SCS will obtain a reading with the PID from the depth at which soil samples are collected. SCS will also direct the Landfill's operator to excavate a number of additional test pits for the sole purpose of attempting to delineate the extent of contamination using the PID; no soil samples will be collected from these additional test pits.

2.3 Laboratory Analysis

The samples collected from each test pit will be analyzed with EPA Method 8260B, Volatile Organic Compounds. This method covers all detected constituents listed above, with the exception of Dinoseb and Silvex, both herbicides. To assess the presences of these two constituents, samples will be analyzed with EPA Method 825 1A, Chlorinated Herbicides.

3.0 ANALYSIS AND REPORT

3.1 Data Compilation

The results of the Source Demonstration sampling and analysis will be compiled into tables and portrayed on a site map. The ground water data records going back to the beginning of the facility will be compiled, as well, to support the findings of the Source Demonstration.

3.2 Regulatory Review

Upon completion of the laboratory testing, SCS will review the data and findings of the investigation with NC DEQ officials. The intent is to show (if supported by the data) that the source of the contaminants is pre-landfill activities within and near the drainage feature, such as past agriculture and possible fuel spill(s), as the suspected source of contamination.

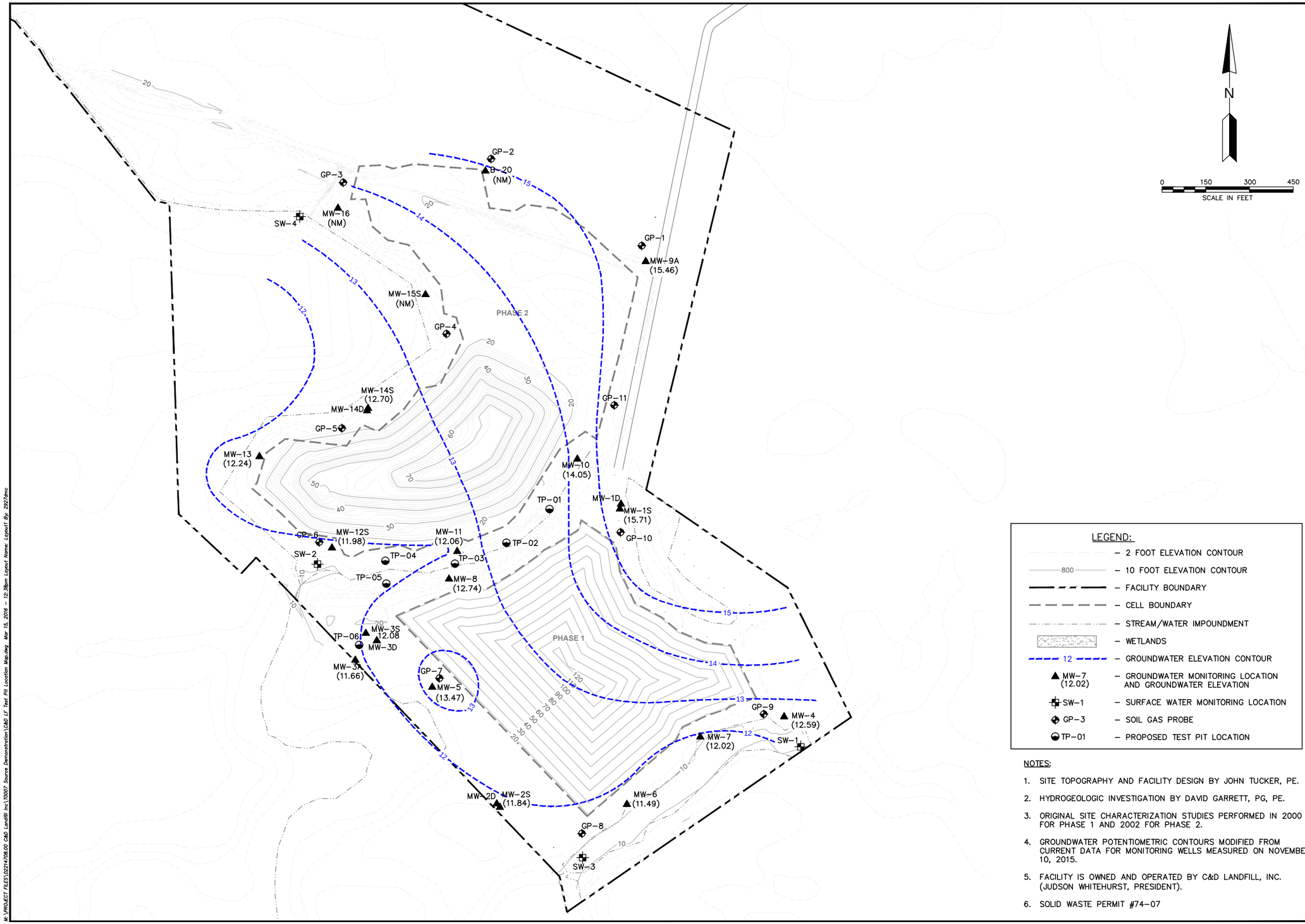
Recommendations for further investigation, if required and an evaluation of appropriate remedial measures (e.g., monitored natural attenuation) will be discussed in the report with input from NC DEQ officials.

3.3 Follow-Up Work

Further investigations or analytical work are not anticipated at this time. Depending on the data from the upcoming investigation, and the input of the Division, additional work may be required.

3.4 Final Report

Following the review, SCS will prepare a summary report with conclusions pertaining to the source of the contaminants, including (but not limited to) a discussion of the nature and extent of the contaminants, comparison of contaminants found in this study with those commonly associated with other landfills, a rate of migration and concentration analysis (based in part on earlier dispersion models generated during permitting), and a potential receptor evaluation.



NOTES:

1. SITE TOPOGRAPHY AND FACILITY DESIGN BY JOHN TUCKER, PE.
2. HYDROGEOLOGIC INVESTIGATION BY DAVID GARRETT, PG, PE.
3. ORIGINAL SITE CHARACTERIZATION STUDIES PERFORMED IN 2000 FOR PHASE 1 AND 2002 FOR PHASE 2.
4. GROUNDWATER POTENTIOMETRIC CONTOURS MODIFIED FROM CURRENT DATA FOR MONITORING WELLS MEASURED ON NOVEMBER 10, 2015.
5. FACILITY IS OWNED AND OPERATED BY C&D LANDFILL, INC. (JUDSON WHITEHURST, PRESIDENT).
6. SOLID WASTE PERMIT #74-07

NC CORP. LICENSE NO. C-1837

NO.	REVISION	DATE

SHEET TITLE
2016 SOURCE DEMONSTRATION

PROJECT TITLE
C&D LANDFILL PHASES 1 & 2 (74-07) WATER QUALITY REPORT

CLIENT
C&D LANDFILL, INC.
802 RECYCLING LANE
GREENVILLE, NC 27834
(252) 757-0023

SCS ENGINEERS, PC
2520 WHITEHALL PARK DRIVE, SUITE 450
CHARLOTTE, NORTH CAROLINA 28273
PHONE: (704) 504-3107 FAX: (704) 504-3174

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DWN. BY: TAS
CHK. BY: DMC
QA/RVW BY: MV
APP. BY: GDG

DATE: JANUARY 2016
SCALE: AS SHOWN
DRAWING NO. 1 of 1

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