Construction Quality Assurance Report

Brownfield Road C&D Landfill - Phase 2A Cell 2
Raleigh, North Carolina

Prepared for:

Wake Reclamation, LLC
(A Subsidiary of Waste Industries USA, Inc.)
Raleigh, North Carolina

APPROVED
DIVISION OF WASTE MANAGEMENT
SOLID WASTE SECTION
Date 10/01/2014 **By** Patricia A. Beeker
DIN 21826
Attachment 1 **Part** V **Document** 14
Permit 9231-CDLF-2012 **Permit DIN** 21833

August 2014

Prepared by:

NC LIC. NO. C-0828 (ENGINEERING)

SMITH+GARDNER

14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577

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ADDITIONAL

CORRESPONDENCE

SMITH+GARDNER
ENGINEERS

ADDRESS 14 N. Boylan Avenue, Raleigh NC 27603 TEL 919.828.0577 WEB www.smithgardnerinc.com

September 30, 2014

Ms. Pat Backus, P.E.
Environmental Engineer
NC DENR - Division of Waste Management
217 W. Jones Street
Raleigh, North Carolina 27603

RE: **Landfill Capacity**
Wake Reclamation, LLC
NC Solid Permit No. 92-31

Dear Pat:

On behalf of Waste Industries, Smith Gardner, Inc. (S+G) is pleased to respond your email received on September 23, 2014 (**attached**). S+G has performed an updated capacity study for the site which is reflected in **Table 1** (below). The respective phase and sub-phase volumes were calculated by direct (layer to layer) comparison within AutoCAD from subgrade to top-of-waste to generate the GROSS capacity as shown in **Figures 1-5** (attached). The GROSS capacity is obtained from the FILL volume of each one of the figures. The original permit table showed Phase 2 (Stage 2) to have an area of 11.9 acres. The area of Phase 2A (Cell 2) is 4.4 acres, therefore the area of Phase 2A (remaining area) is 7.5 acres.

Table 1: Landfill Capacity by Phase

Phase	Acres	Gross Capacity	Status
1	20	1,636,000	Partially filled
2A (Cell 1)	4.8	366,000	Partially filled
2A (Cell 2)	4.4	267,367	Approved for fill
2A (Stage 2)	7.5	433,980	Approved for construction
2B	8.2	1,138,231	Future
2C	*	2,169,810	Future
Total northern area	45	6,011,388	---
Southern area 3-5	24.2	2,223,134	Future
Total northern and southern areas	69.2	8,234,522	---

*Phase 2C will be vertical fill over Phases 1, 2A, and 2B.

To date, the total constructed area is 29.2 acres as assumed in the financial assurance calculations.

Should you have any questions or require additional information, please contact us at (919) 828-0577 or by email below.

Sincerely,

SMITH GARDNER, INC.

Jorge L. Montezuma, E.I.
Staff Engineer, ext. 140
jorge@smithgardnerinc.com

Stacey A. Smith, P.E.
Senior Engineer, ext. 127
stacey@smithgardnerinc.com

jlm/sas
Att.
Cc: Shawn McKee, NCDENR
David Pepper, Waste Industries
John Barnard, P.E., Waste Industries
Donald Plessinger, Brownfield Road C&D Landfill
File

H:\Projects\WCA Waste Industries\Brownfield Road CDLF\BROWNFIELD-14-1\Volume Capacity Update (Pat Backus)\2014-09-30 PatBackusLetter.docx

FIGURE 1. PHASE 2A CELL 2

Volume

Base Surface	PHASE 2_TOW PASTE
Comparison Surface	PH2-2A TOW USABLE

Cut volume (unadjusted)	93.63 Cu. Yd.
Fill volume (unadjusted)	267,367.46 Cu. Yd.
Net volume (unadjusted)	267,273.83 Cu. Yd.<Fill>

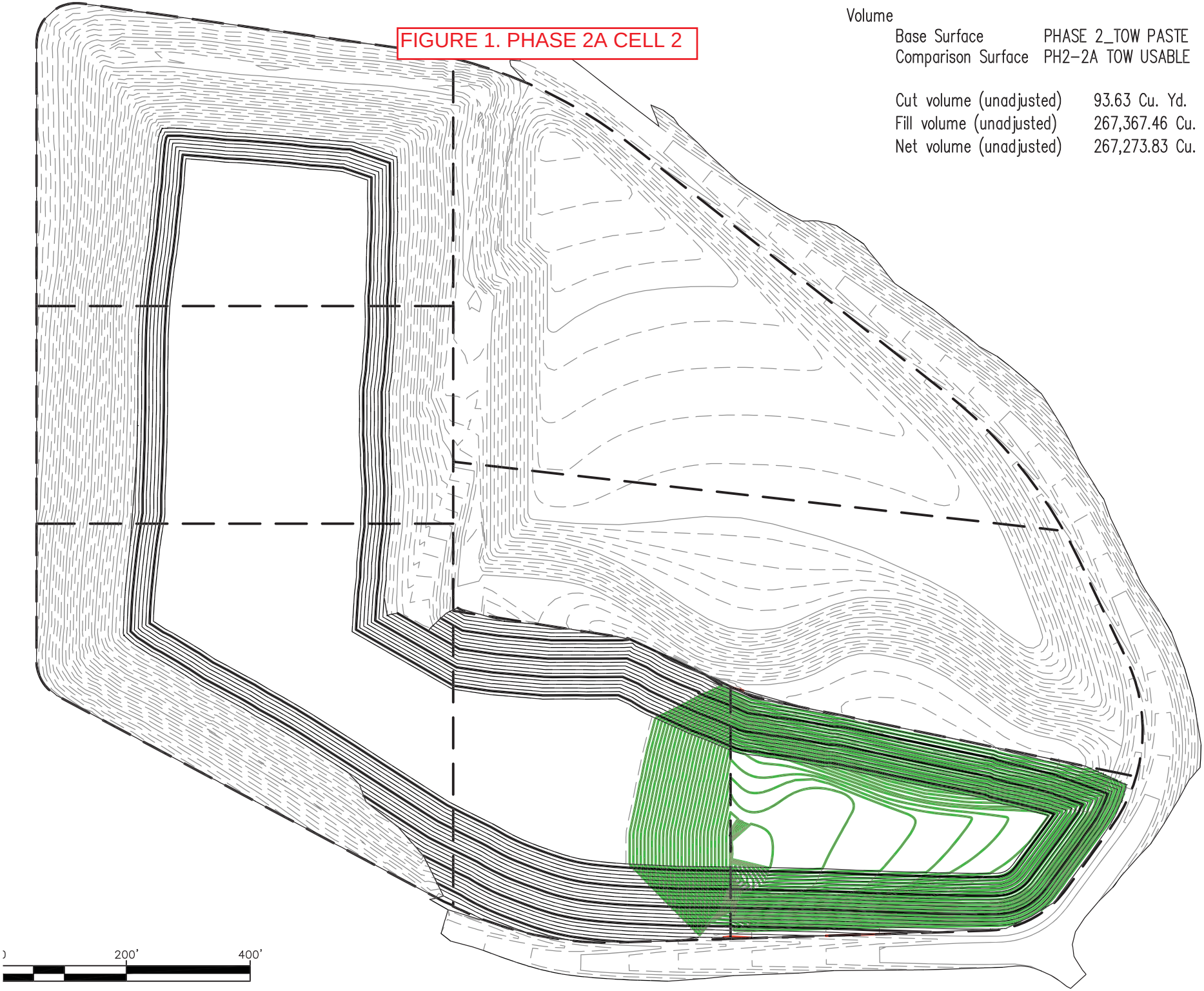


FIGURE 2. PHASE 2A STAGE 2

Volume

Base Surface	PHASE 2_2A CELL 2 TOW PAST
Comparison Surface	PH2A STAGE 2 TOW

Cut volume (unadjusted)	55.98 Cu. Yd.
Fill volume (unadjusted)	433,979.79 Cu. Yd.
Net volume (unadjusted)	433,923.82 Cu. Yd.<Fill>

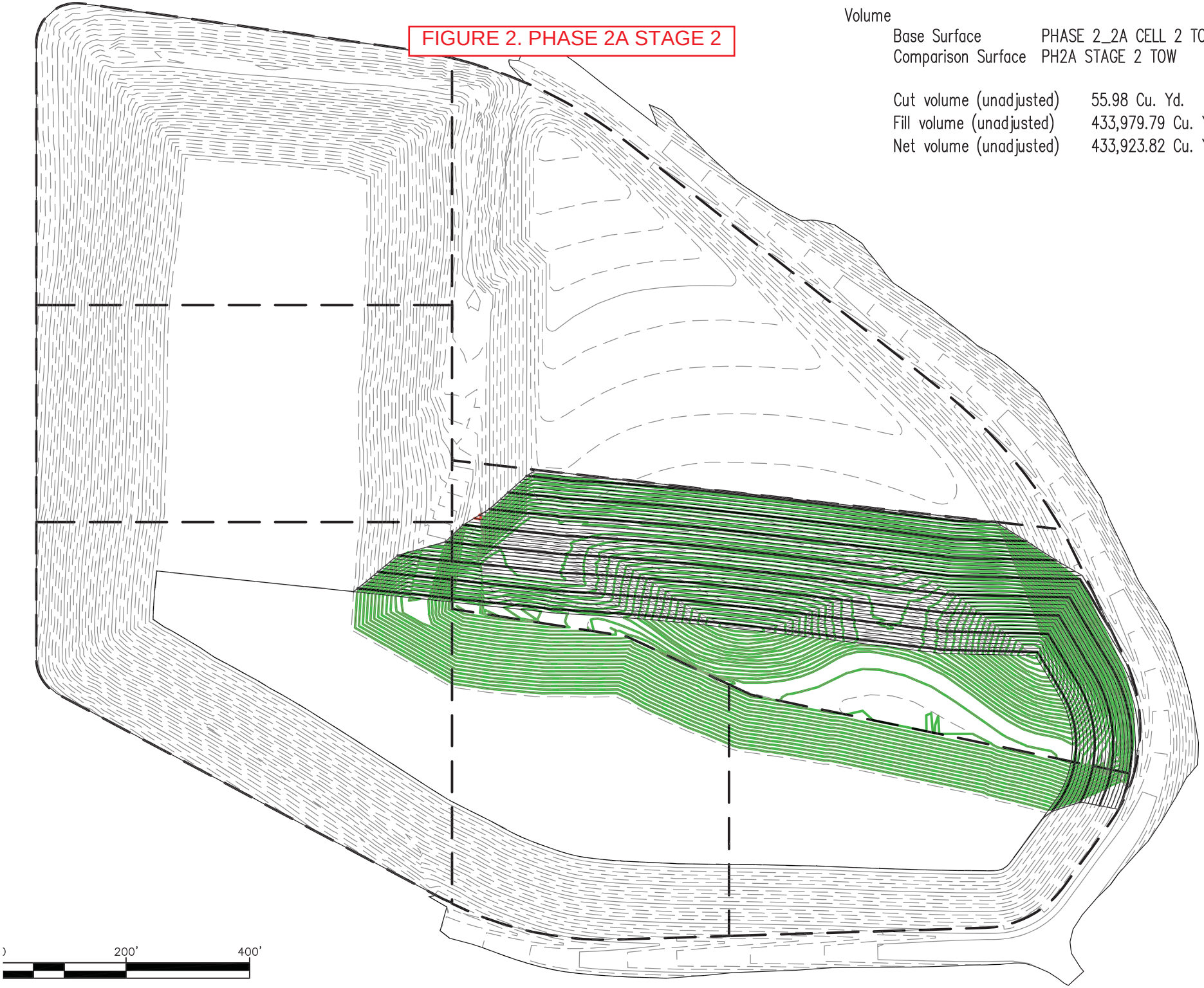


FIGURE 3. PHASE 2B

Volume

Base Surface	PHASE 2_2A STAGE 2 TOW PA:
Comparison Surface	PH2B TOW

Cut volume (unadjusted)	1,211.25 Cu. Yd.
Fill volume (unadjusted)	1,138,231.41 Cu. Yd.
Net volume (unadjusted)	1,137,020.16 Cu. Yd.<Fill

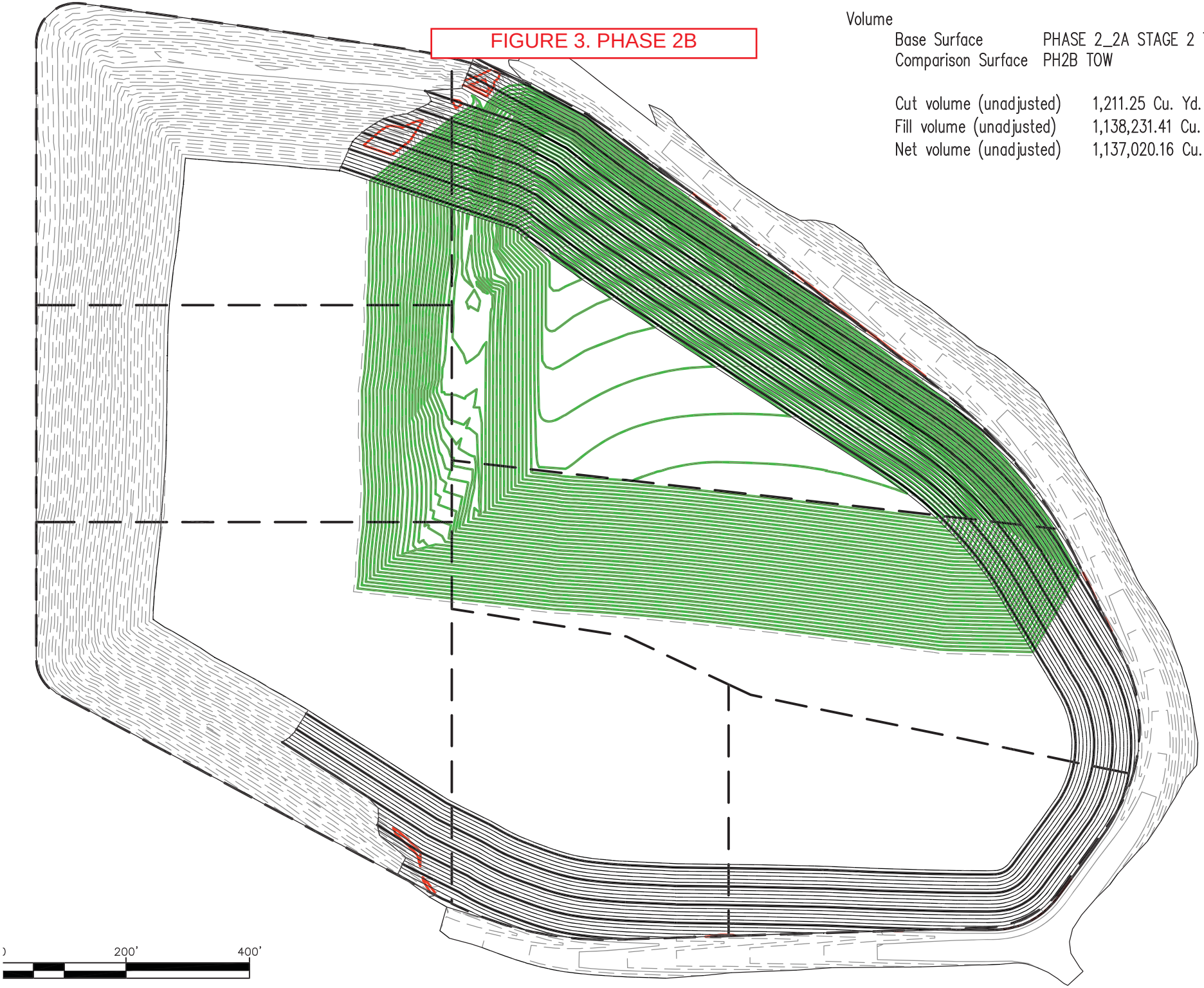


FIGURE 4. PHASE 2C

Volume

Base Surface	PHASE 2_2B TOW PASTE
Comparison Surface	PH2 TOP OF WASTE 012213

Cut volume (unadjusted)	226.77 Cu. Yd.
Fill volume (unadjusted)	2,169,809.59 Cu. Yd.
Net volume (unadjusted)	2,169,582.82 Cu. Yd.<Fill>

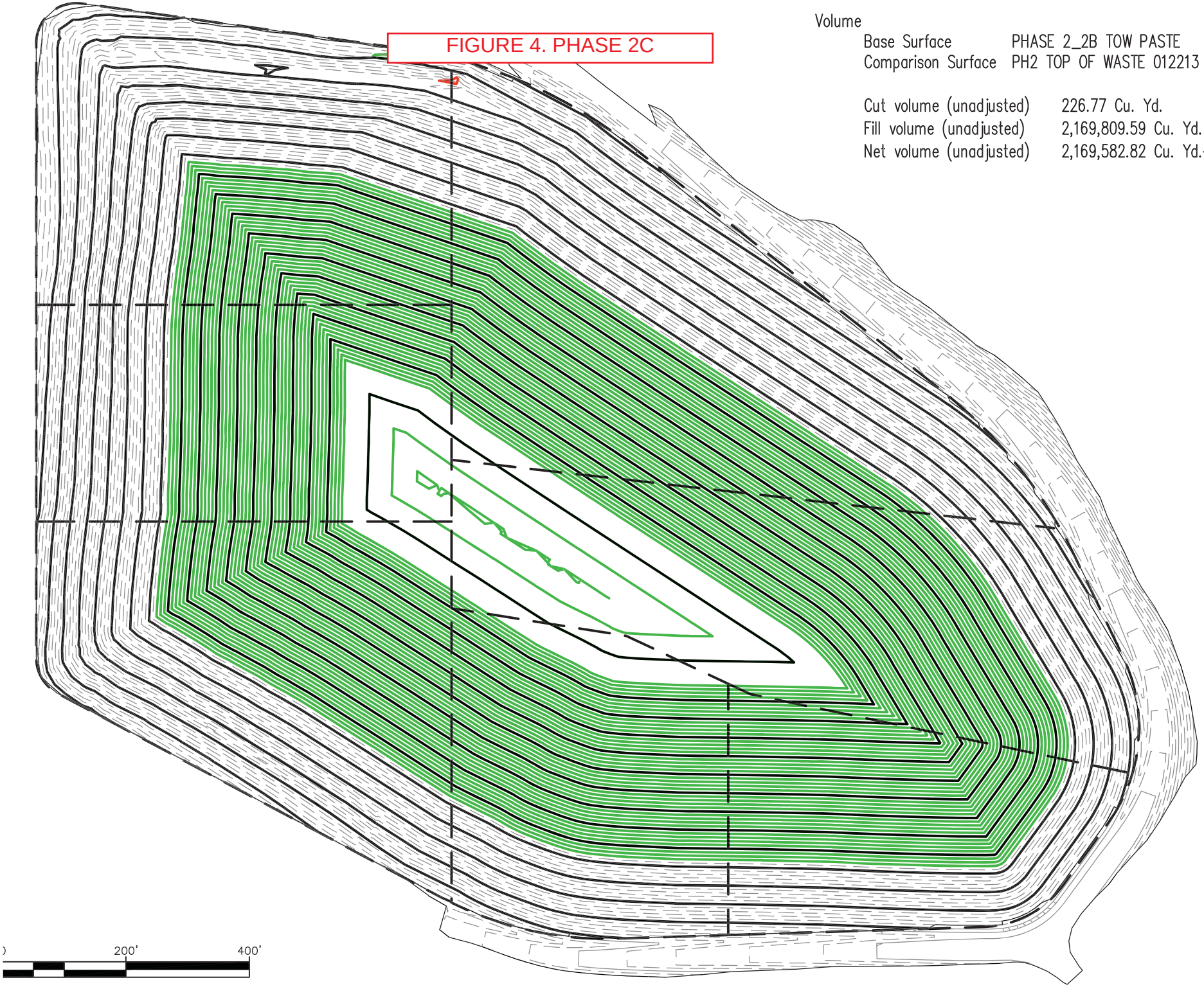
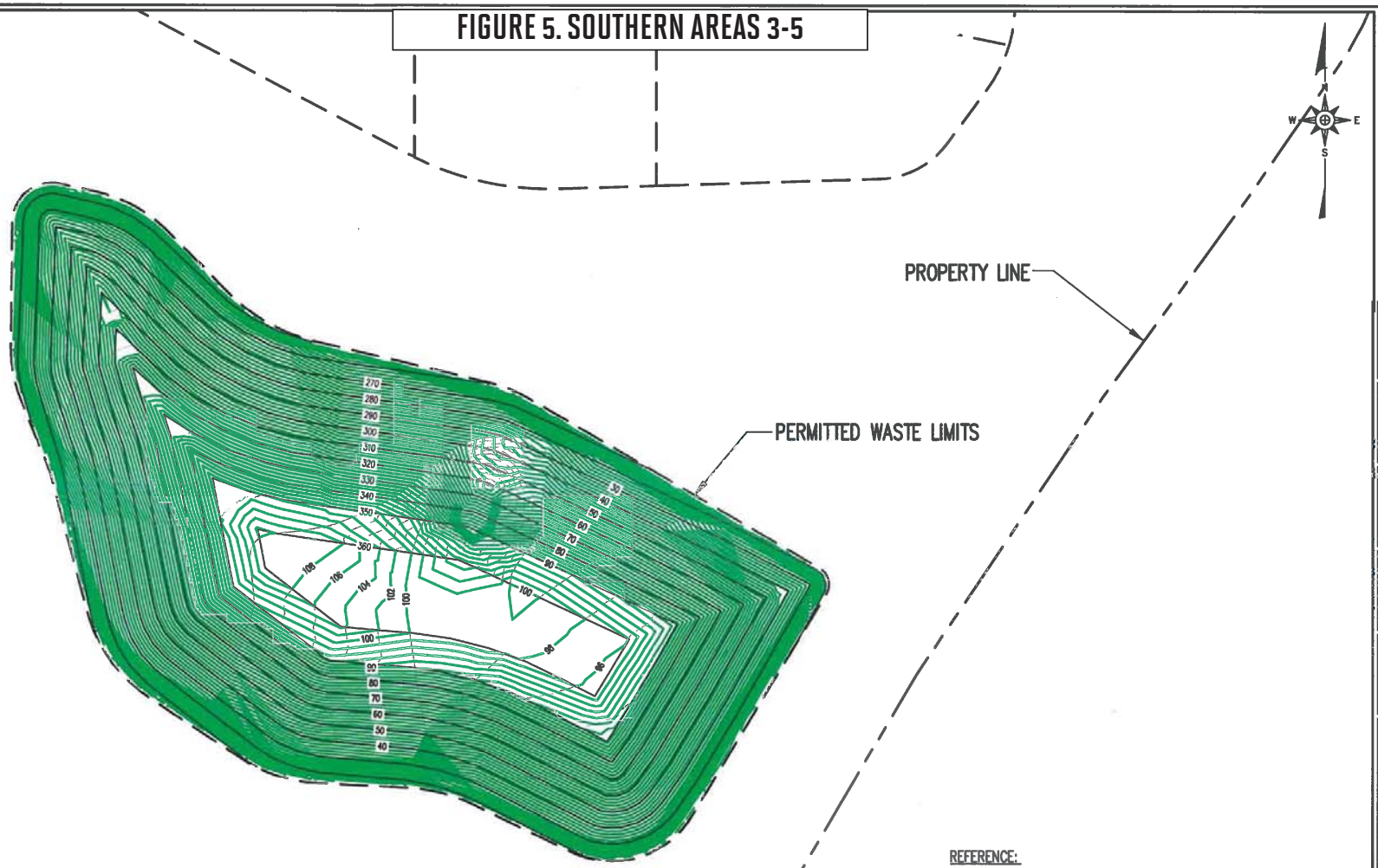


FIGURE 5. SOUTHERN AREAS 3-5



REFERENCE:

1. FACILITY PROPERTY LINE FROM A MAP ENTITLED "MATERIAL RECOVERY, LLC. & MAGARET TALTON" PREPARED BY TRC TRIANGLE, DATED 7/16/03, RECORDED IN BOOK OF MAPS 2003, PAGE 1508, WAKE COUNTY REGISTER OF DEEDS.

0 400' 800'

Volume

Base Surface	JOYCE_SOUTHERN DA_BASE GRADES
Comparison Surface	JOYCE_SOUTHERN DA_FCVR
Cut volume (unadjusted)	0.00 Cu. Yd.
Fill volume (unadjusted)	2,223,134.44 Cu. Yd.
Net volume (unadjusted)	**2,223,134.44 Cu. Yd.<Fill>**

RICHARDSON SMITH GARDNER & ASSOCIATES
14 N. Boylan Ave.
Raleigh, N.C. 27603
ph: 919-828-0577
fax: 919-828-3899
nc. l.c. no. c-0205 (engineering)
www.rsgandassociates.com

DRAWN BY: C.T.J.	CHECKED BY: T.B.M.	SCALE: AS SHOWN	FIGURE NO.
DATE:	PROJECT NO.		FILE NAME:

TITLE: WAKE RECLAMATION, LLC
BROWNFIELD ROAD C&D LANDFILL

G:\CAD\WCA\WCARFAS 12-1\sheets\WCAR-B0769.dwg - 6/22/2012 4:13 PM

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SMITH+GARDNER

Jorge Montezuma <jorge@smithgardnerinc.com>

Permit 9231-CDLF-2012 Material Recovery C&D Landfill (Brown Field Rd)

1 message

Backus, Pat <pat.backus@ncdenr.gov> Tue, Sep 23, 2014 at 4:37 PM
To: "Stacey Smith, (Smith Gardner)" <stacey@smithgardnerinc.com>, "Jorge Montezuma (jorge@smithgardnerinc.com)" <jorge@smithgardnerinc.com>

Please update the capacity table based on the recent construction and make any corrections. Thanks. Pat

The following table lists the dimensions and details for the landfill, both existing and planned. Total gross capacity is defined as the volume measured from the bottom of waste through the top of final cover. The estimated life of the landfill, for both northern and southern areas, is approximately 21.9 years from 2010.

Phase	Acres	Gross Capacity	Status
1	20	1,636,000	Partially filled
2A (Cell 1)	4.8	366,000	Approved for fill
2A (remaining area)	11.9	1,034,000	Approved for construction
2B	8.2	1,400,000	future
2C	*	1,400,000	future
Total northern area	45	5,836,000	
Southern area 3-5	24.2	2,300,000	future
Total northern and southern areas	**69.2**	**8,136,000**	

*Phase 2C will be vertical fill over Phases 1, 2A, and 2B.

Patricia M. (Pat) Backus, P.E.

NC Department of Environment and Natural Resources

Division of Waste Management - Solid Waste Section

Office Location: 217 W. Jones St.

Mail & Delivery: 1646 Mail Service Center

Raleigh, NC 27699-1646

Telephone & Fax: (919) 707-8257

pat.backus@ncdenr.gov

http://portal.ncdenr.org/web/wm/sw

****

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SMITH+GARDNER
ENGINEERS

ADDRESS 14 N. Boylan Avenue, Raleigh NC 27603 TEL 919.828.0577 WEB www.smithgardnerinc.com

September 22, 2014

Patricia Backus, P.E.
Environmental Engineer II
North Carolina Department of Environment and Natural Resources
Waste Management Division - Solid Waste Section Permitting Branch
1646 Mail Service Center
Raleigh, NC 27699-1646

RE: Brownfield Road C&D Landfill (State Permit No. 92-31)
Closure, Post-Closure, and Assessment/Corrective Action Cost Estimates

Dear Ms. Backus:

On behalf of Wake Reclamation, LLC, Smith Gardner, Inc. (S+G) is pleased to submit the cost estimates related to closure, post-closure, and potential assessment & corrective action costs for the Brownfield Road C&D Landfill. The following are the estimated closure, post-closure, and assessment/corrective action costs as of the date of this letter:

Phase 1 – Phase 2A Cell 2 Closure Cost (29.2 acres):	$1,450,910
Phase 1 – Phase 2A Cell 2 Post-Closure Cost (30-Yr) (29.2 acres):	$1,086,360
Potential Assessment and Corrective Action Cost (SB 734):	$1,000,000
Total:	**$3,537,270**

Please find **attached** a detailed breakdown of closure, post-closure, and assessment and corrective action costs.

S+G has performed these types of estimates for a number of our clients and through our extensive work in the solid waste industry we maintain an up to date understanding of construction, maintenance, and monitoring costs related to landfills.

Please contact me at your earliest convenience if you have any questions or comments on this matter.

Sincerely,
SMITH GARDNER, INC.

Stacey A. Smith, P.E.
Senior Engineer
stacey@smithgardnerinc.com
Attachments: Closure and Post-Closure Cost Estimates
cc: David Pepper, Waste Industries USA, Inc.
Donald Plessinger, Waste Industries USA, Inc
File

SMITH+GARDNER

DATE: 04-Sep-14
BY: JLM

Brownfield Road C&D Landfill (NC Solid Waste Permit No. 92-31)
Engineer's Closure Construction Cost Estimate

Item No.	Item Description	Unit	Contractor Quantity	Unit Price	Total Price	Comments
	Closure Area (Horizontal Plan) ---->	AC	29.2			
1.0	Pre-Construction			Subtotal	$24,600.00	
1.1	Construction Documents & Bidding	AC	29	$10k + $500/AC	$24,600.00	S+G Estimate
2.0	Construction				$1,213,990.00	Reference 1
2.1	Surveys and Layout	AC	29	$250.00	$7,300.00	S+G Historical Estimate
2.2	Mobilization	AC	29	$1,600.00	$46,720.00	~4% of Construction Cost
2.3	Site Preparation (repairs to intermediate cover layer)	AC	29	$1,000.00	$29,200.00	Assumed estimate for repair of erosion rills.
2.4	18" On-site Low Permeability Soil	CY	70,664	$8.00	$565,312.00	S+G Historical Estimate
2.5	18" Vegetative Support Layer	CY	70,664	$3.25	$229,658.00	S+G Historical Estimate
2.6	Landfill Gas Venting System	AC	29	$1,200.00	$35,040.00	S+G Historical Estimate
2.7	Cap Drainage Structures (berms, piping, etc.)	AC	29	$7,500.00	$219,000.00	S+G Historical Estimate
2.8	Erosion & Sediment Control (grading, silt fence, maintenance, etc.)	AC	29	$800.00	$23,360.00	S+G Historical Estimate
2.9	Revegetation	AC	29	$2,000.00	$58,400.00	S+G Historical Estimate
3.0	Quality Assurance, Certification, & Deed Notation				$175,820.00	
3.1	Field Monitoring	AC	29	$3,000.00	$87,600.00	S+G Estimate
3.2	Laboratory Testing	AC	29	$2,500.00	$73,000.00	S+G Estimate
3.3	Engineering Certification	AC	29	$5k + $250/AC	$12,300.00	S+G Estimate
3.4	Surveying and Deed Notation	AC	29	$100.00	$2,920.00	S+G Historical Estimate
4.0	Miscellaneous Costs to Close				$36,500.00	
4.1	Erosion and Stormwater Control (outside landfill footprint)	AC	29	$1,000.00	$29,200.00	S+G Historical Estimate
4.2	Engineering and Reporting	AC	29	$250.00	$7,300.00	S+G Historical Estimate
5.0	Total Closure Costs					
	Construction Estimate ----->				$1,450,910	(2014$)
	Cost per Acre ----->				*$49,688.70*	
	Total Estimate ---->				$1,450,910	(2014$) (See Notes 1 & 2)

Notes:

1. All costs are presented in current dollars and should be increased at an inflation rate prescribed by the NCDENR Division of Waste Management per http://portal.ncdenr.org/web/wm/sw/financialassurance if additional review is not performed annually.
2. This ESTIMATE has been prepared for financial assurance purposes only and shall not be considered a replacement for an actual bid from a licensed contractor and is considered acceptable within a +/- 10% of the Total Estimate value.

References:

1. Material Recovery, LLC, Brownfield Road C&D Landfill, Phase 2 Permit Modifications, June 2008, Revised and Updated June 2010, prepared by David Garrett & Associates, Inc.

Denotes values calculated in spreadsheet.

SMITH+GARDNER

DATE: 08-Sep-14
BY: JLM

Brownfield Road C&D Landfill (NC Solid Waste Permit No. 92-31)
Engineer's Post Closure Cost Estimate

Item	Quantity	Unit	Comments
Groundwater Monitoring			
Monitoring wells	12	wells	Reference 1
Surface water point	3	points	Reference 1
Sampling frequency	2	events	Reference 1
Field sampling, collection, and shipping	$800	per event	S+G estimate
Laboratory Analysis	$325	per well	S+G estimate
Data review, statistics, and reporting	$2,000	per event	S+G estimate
Maintenance and repair	$100	per well	S+G estimate
Subtotal Cost	$16,550	per year	Compares to current pricing by Golder
Landfill Gas Management			
Control System Vents	15	vents	Pro-rated @ one (1) per two (2) acres
Sub-Surface Perimeter Monitoring Probes	10	probes	Per Ref. 1
Control system monitoring, maintenance and repair	$50	per vent per year	S+G estimate
Semi-Annual Perimeter Monitoring	$100	per probe per year	S+G estimate
Subtotal Cost	$1,730	per year	Averaged over post-closure period
Final Cover Management			
Area of maintenance	29.2	acres	Extends to area immediately around landfill.
Mowing	$100	per acre	S+G estimate
Erosion and sediment control maintenance	$200	per acre	S+G estimate
Topdressing (seed & fertilizer)	$150	per acre	S+G estimate
Vector and rodent control	$10	per acre	S+G estimate
Maintenance Mobilization	$1,000	per year	S+G estimate
Subtotal Cost	$14,432	per year	
Administration, Inspections, and Reporting			
Administration and record keeping	$1,000	per year	S+G estimate
Inspection	$1,000	per year	S+G estimate
Miscellaneous engineering	$1,500	per year	S+G estimate
Subtotal Cost	$3,500	per year	
Subtotal Post-Closure Costs			
Estimated Average Annual Costs	$36,212	per year (2014$)	
Number of Years for Post-Closure	30	years	
Cost per Acre	$1,240.14	per year	
Subtotal Post Closure Costs	$1,086,360	(2014$) (See Notes 1 & 2)	
Potential Assessment and Corrective (Remedial) Action			
Minimum amount required by NCDENR Division of Waste Management	$1,000,000	lump sum	Regulatory requirement (SB 734)
Total Post Closure and Remedial Costs	$2,086,360	(2014$) (See Notes 1 & 2)	
Total Closure, Post Closure and Remedial Costs	$3,537,270	(2014$) (See Notes 1 & 2)	

Notes:
1. All costs are presented in current dollars and should be increased at an inflation rate prescribed by the NCDENR Division of Waste Management per http://portal.ncdenr.org/web/wm/sw/financialassurance if additional review is not performed annually.
2. This ESTIMATE has been prepared for financial assurance purposes only and shall not be considered a replacement for an actual bid from a licensed contractor and is considered acceptable within a +/- 10% of the Total Estimate value.

References:
1. Material Recovery, LLC, Brownfield Road C&D Landfill, Phase 2 Permit Modifications, June 2008, Revised and Updated June 2010, prepared by David Garrett & Associates, Inc.

Denotes values calculated in spreadsheet.

Construction Quality Assurance Report

Brownfield Road C&D Landfill Phase 2A Cell 2
Raleigh, North Carolina

Prepared For:

Wake Reclamation, LLC
(A Subsidiary of Waste Industries USA, Inc.)
Raleigh, North Carolina

S+G Project No. BROWNFIELD-14-1

Jorge L. Montezuma, E.I.
Staff Engineer

Thomas B. Maier, P.E.
Senior Project Engineer

NORTH CAROLINA PROFESSIONAL SEAL 025671 ENGINEER THOMAS B. MAIER 8/27/14

August 2014

NC LIC NO C-0828 (ENGINEERING)

SMITH+GARDNER

14 N. Boylan Avenue. Raleigh NC 27603 | 919.828.0577

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Brownfield Road C&D Landfill Phase 2A Cell 2
Raleigh, North Carolina

Construction Quality Assurance Report

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Table 1 Summary of Material Control and Record Tests - Structural Fill

APPENDICES

Appendix A Solid Waste Permit
Appendix B Change Order
Appendix C Photographic Log
Appendix D Subgrade Inspection Report
Appendix E CQA Meeting Minutes

APPENDICES (continued)

Appendix F Earthwork CQA Data
CQA Test Results - Control Tests
CQA Test Results - Record Tests
Geotechnics Memo
Appendix G Geotextile CQA Data (Manufacturer's Product Data Submittals and Quality Control Certificates)
Appendix H Record Drawing

1.0 OVERVIEW

This Construction Quality Assurance (CQA) Report has been prepared to document the CQA activities performed during the construction of Phase 2A Cell 2 of the Brownfield Road Construction and Demolition (C&D) Landfill. The landfill facility is located on Brownfield Road in Raleigh, North Carolina and is owned and operated by Wake Reclamation, LLC under North Carolina Solid Waste Permit No. 92-31. A Permit to Construct for Phase 2A (including Phase 2A Cell 2) was issued by the North Carolina Department of Environment and Natural Resources Division of Waste Management (NCDENR-DWM) on March 20, 2012.

2.0 PROJECT DESCRIPTION

2.1 General

Phase 2A Cell 2 is a 4.4 acre C&D landfill unit. The construction documents were prepared by Smith Gardner, Inc. (S+G). The subgrade consists of soil or partially weathered rock overlying soil, partially weathered rock, or bedrock. In addition to the subgrade, the Phase 2A Cell 2 design also includes associated perimeter berms and erosion and sedimentation control (E&SC) measures.

2.2 Reference Documents

Phase 2A Cell 2 was constructed in accordance with the following documents with clarifications as described in Section 2.3.

Construction Documents – Brownfield Road C&D Landfill - Phase 2A Cell 2: Includes general and technical specifications, CQA manual, and contract addenda prepared by Smith Gardner, Inc. (S+G) and dated May 2014.

Construction Drawings - Brownfield Road C&D Landfill - Phase 2A Cell 2: Includes construction drawings prepared by S+G and dated May 2014.

Permit To Construct - Brownfield Road C&D Landfill - Phase 2A Cell 2: Permit to Construct issued by NCDENR-DWM on March 20, 2012 (copy provided in Appendix A)).

Erosion and Sedimentation Control Plan for Brownfield Road C&D Landfill - Phase 2A Cell 2, submitted by Smith Gardner, Inc., June 2014, to combine and update two previous permits, as follows:

- Permit S#998008 submitted by Joyce Engineering, April 2002 and permitted by Wake County on May 28, 2002; and
- Permit No. S#2148 prepared by G. David Garrett August 2008, revised by John A. K. Tucker March 2011, approved by Wake County Environmental Services Sedimentation & Erosion Control on June 7, 2012.

2.3 Change Order

A change order to the E&SC measures is provided in **Appendix B**.

2.4 Project Participants

The following parties were involved in the construction and CQA of Phase 2A Cell 2:

2.4.1 Owner

Wake Reclamation, LLC
2600 Brownfield Road
Raleigh, NC27610
Phone: (336) 883-3215

Contact: Donald Plessinger, Landfill Manager

2.4.2 Engineer/CQA Engineer

Smith Gardner, Inc. (S+G)
14 N. Boylan Ave.
Raleigh, NC 27603
Phone: (919) 828-0577
Fax: (919) 828-3899

Contacts: Thomas B. Maier, P.E., Senior Project Engineer
Jorge L. Montezuma, E.I., Staff Engineer

2.4.3 CQA Testing - Earthwork & Construction Monitoring

Geotechnics (Soil Testing)
2200 Westinghouse Blvd., Suite 103
Raleigh, NC 27604
Phone: (919) 876-0405
Fax: (919) 876-0460

Contacts: Michael Smith, Regional Manager
Jacob Buda, Field Technician

2.4.4 Contractor

Baxter Johnson Contracting (BJC)
PO Box 33343
Raleigh, NC 27636

Phone: (919) 851-2617

Contacts: Brady Johnson, President
Brad Murray, Site Superintendent

2.4.5 Owner's Surveyor

Surveying Solutions, PC
PO Box 376
Louisburg, NC 27549
Phone: (919) 340-2250

Contact: Dwayne Kroeze, PLS

3.0 SUMMARY OF CONSTRUCTION ACTIVITIES

Major elements of the project are discussed below. Photos documenting the construction of Phase 2A Cell 2 can be found in **Appendix C**. Prior to BJC beginning work, a project Pre-Construction Meeting was held on May 27, 2014.

3.1 Site Preparation

Construction of Phase 4 began on May 28, 2014 with the surveying/staking of the limits of construction and the initiation of site preparation activities by BJC.

3.2 Erosion and Sedimentation Control Measures

The construction of erosion and sedimentation control measures took place in conjunction with project activities and under the site permits issued by Wake County Erosion and Sedimentation Control Services. Permanent and temporary drainage channels were added as areas were brought to grade. Once areas reached final grade, the areas were matted and vegetated in accordance with project requirements.

3.3 Excavation, Embankment, and Rock Removal

The work area was cleared and grubbed. Afterwards, excavation and stockpiling activities were performed. Excavated materials including stripped topsoil, and structural fill were identified and separated. Topsoil was taken to the stockpile area for later use by BJC on the perimeter berm or future use as daily/intermediate cover by the Landfill. The soils within the Phase 2A Cell 2 footprint identified for use as structural fill were excavated and placed and compacted where needed.

Per the approved design, the southern berm was constructed first, followed by the eastern berm and the cell excavation. The drainage channels were built as construction

on their respective areas progressed. The access road north of Phase 2A Cell 2 and south of the stockpile was built after cell excavation was completed.

As anticipated, areas with rippable rock were encountered. These areas were able to be excavated. However, unrippable rock was encountered on two locations on the northern slope of the cell. After the second construction progress meeting, it was agreed that a hoe ram would be used to attempt remove the rock. After one week of hoe ram operation, the majority of the rock remained in place and the rock was covered with soil per contract and state requirements.

Upon completion of construction, Mr. Kroeze performed the record survey, and Madeline German, P.G. from S+G conducted a post-construction subgrade inspection. As documented in Ms. German's report (**Appendix D**) no adverse conditions were observed.

An as-built drawing showing completed subgrade elevations is provided in **Appendix H**.

4.0 CQA PROGRAM

4.1 Scope of Services

In satisfying the requirements of the Project CQA Manual for Phase 2A Cell 2, the following activities were performed:

- Observation and documentation of construction of prepared subgrade and structural fill.
- Field and/or laboratory testing of embankment material.
- Review of submittals from the Contractor for conformance with project specifications and CQA requirements.
- Review/preparation of record drawings.
- Preparation of the final CQA report.

5.0 EARTHWORK CQA

The criteria for construction of embankment per the project specifications included the following:

Materials:	SP, SW, SM, SC, ML, or CL (ASTM D 2487) with no topsoil or other deleterious material and no stones or rocks in excess of one half the lift thickness as compacted;
Density:	100% for Embankment beneath structures and roads; 95% for embankment, backfill around structures, and backfill in pipe trenches (ASTM D 698);
Moisture Content:	As necessary for compaction; and

Lift Thickness: 8-inch max. (compacted).

The number and results of material control and record tests performed on the structural fill are summarized in **Table 1**. Other tests performed on an on-going basis during construction included visual classification of soils (ASTM D 2488) and monitoring of loose lift thickness. Note that the number of tests required was based on an approximate quantity of 16,800 CY of embankment material placed (in-place measure). The results of field and laboratory testing of structural fill can be found in **Appendix E**. An as-built drawing showing completed subgrade elevations is provided in **Appendix H**.

6.0 GEOTEXTILE CQA

6.1 Material Approval

S+G reviewed and approved the geotextile product submittals provided by BJC. The selected materials were SKAPS GT-180 (Type GT-S geotextile) as manufactured by SKAPS Industries of Athens, Georgia. Copies of selected product submittals for this product can be found in **Appendix G1**.

6.2 Manufacturer's Quality Control Submittals

S+G reviewed and approved SKAPS' quality control certificates upon delivery to the site. Copies of these certificates can be found in **Appendix G1**.

7.0 RECORD DRAWINGS

The subgrade record (as-built) drawing depicting the construction of Phase 2A Cell 2 can be found in **Appendix H**.

8.0 PROJECT CERTIFICATION

Based on the observations and results of the CQA program documented herein, it is our professional opinion that the construction of Phase 2A Cell 2 of the Brownfield Road C&D Landfill was completed in accordance with the following:

i. The Project CQA Manual;
ii. The conditions of the Permit to Construct Phase 2A Cell 2;
iii. The requirements of Wake County Article 10 -20-11; and
iv. Acceptable engineering practices.

SMITH GARDNER, INC.

NORTH CAROLINA PROFESSIONAL SEAL 025671 ENGINEER THOMAS B. MAIER

8/22/14

Thomas B. Maier, P.E.
Senior Project Engineer

Jorge L. Montezuma, E.I.
Staff Engineer

TABLE 1
SUMMARY OF MATERIAL CONTROL AND RECORD TESTS STRUCTURAL FILL

	Property		
	Control Tests	Record Tests	
	Moisture-Density Relationship (Proctor)	In-Place Density	In-Place Moisture Content
Units	-----	% Std. Proctor	%
Test Method	ASTM D 698	ASTM D 6938[1]	ASTM D 6938[2]
Required Test Frequency	5,000 CY per each soil	20,000 ft^2 per lift & 1 per 500 LF of Berms (<200 ft. base width) (+/- 1 Per 500 CY)	20,000 ft^2 per lift & 1 per 500 LF of Berms (<200 ft. base width) (+/- 1 Per 500 CY)
No. of Tests Required	4	34	34
No. of Tests Performed	3 (See Note 3)	47	47
Specified Value	-----	≥ 95% Std. Proctor	As Required for Density
Minimum Value	-----	95.6	% Opt.
Maximum Value	-----	102.9	% Opt.
Average Value	-----	98.4	% Opt.
Quantity of Structural Fill (In-Place):		16,800 CY	

Notes:

1. Nuclear density values verified periodically by sand cone (ASTM D 1556), rubber balloon (ASTM D 2167), and/or drive cylinder (ASTM D 2937) test methods.

2. Nuclear moisture values verified periodically by oven (ASTM D 2216), microwave oven (ASTM D 4643), and/or direct heating (ASTM D 4959) test methods.

3. Soils were sufficiently uniform so that the fourth moisture-density relationship test was not needed.

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Appendix A

Solid Waste Permit

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Cell 2
Raleigh, North Carolina

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North Carolina Department of Environment and Natural Resources
Division of Waste Management

Beverly Eaves Perdue
Governor

Dexter R. Matthews
Director

Dee Freeman
Secretary

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT
SOLID WASTE SECTION

CONSTRUCTION AND DEMOLITION LANDFILL FACILITY
Permit No. 92-31

MATERIAL RECOVERY, LLC
and WCA WASTE SYSTEMS, INC., wholly owned subsidiaries of
WCA WASTE CORPORATION
are all hereby issued a

PERMIT TO CONSTRUCT
MATERIAL RECOVERY C&D LANDFILL
Phase 2A, and a

PERMIT TO OPERATE
MATERIAL RECOVERY C&D LANDFILL
Phase 1 (Cells A, B, and C), and Phase 2A (Cell 1)

Located at 2600 Brown Field Road, southeast of Raleigh, Wake County, North Carolina, in accordance with Article 9, Chapter 130A, of the General Statutes of North Carolina and all rules promulgated thereunder and subject to the conditions set forth in this permit. The legal description of the site is identified on the deeds recorded for this property listed in Attachment No. 1 of this permit.

Edward F. Mussler, III, P.E.,
Permitting Branch Supervisor
Solid Waste Section

ATTACHMENT 1

PART I: PERMITTING HISTORY

Permit Type	Date Issued	Doc ID
Site Suitability Approval Letter	January 24, 2003	10050
Original Issue PTC (Phase 1 – Cells A, B, & C)	January 31, 2003	3232
PTO Phase 1, Cell A	October 1, 2003	10050
PTO Modification - New franchise / Wood waste processing area added	February 18, 2005	3600
PTO–Phase 1, Cell B	May 23, 2006	230
PTO– Phase 1, Cell C, and ownership change	January 28, 2008	3612
PTC Phase 2A	January 28, 2011	12346
PTO – 5 year amendment Phase 1, Cells A, B, and C	January 28, 2011	12346
PTO – Phase 2A, Cell 1	March 20, 2012	16327

1. In 2003, a Permit to Construct for Phase 1, and Permit to Operate for Phase 1 Cell A were issued to Material Recovery, LLC, owned by MRR Southern, LLC. The Permit to Construct was recorded on February 14, 2003, at Book 9914, Pages 701 – 720 in the Wake County Register of Deeds.

2. On or about April 5, 2005, business entities which were wholly owned by WCA Waste Corporation purchased four solid waste management facilities in North Carolina owned by MRR Southern, LLC, including the construction and demolition waste landfill permitted to Material Recovery, LLC. Subsequent to the purchase of the facility, WCA obtained a franchise for the landfill from Wake County and applied for the permit to operate the facility to be re-issued to WCA Waste Systems, Inc. and Material Recovery, LLC. During this period, WCA continued to operate the landfill as previously permitted to Material Recovery, LLC. The permit that approved the ownership change was issued in January 2008.

PART II: LIST OF DOCUMENTS FOR THE APPROVED PLAN

1. *Volume One - Site Application, Material Recovery, LLC/Brown-field Road Construction & Demolition Landfill*. December 2001. Joyce Engineering, Inc., Greensboro, NC. Revised through 2003. Doc ID 3602 (partial, Section II).

2. *Volume Two - Site Application, Material Recovery, LLC/Brown-field Road Construction & Demolition Landfill*. December 2001. Joyce Engineering, Inc., Greensboro, NC. Revised through 2003. Doc ID 10463.

3. *Construction Certification, Phase 1, Cell A.* Prepared by Joyce Engineering, Greensboro, NC. September 16, 2003.

4. Modification: Letter dated 25 March 2004 requesting the use of soils off-site with less than 10 ppm nitrate and addressing that soils with greater than 10 ppm nitrate levels be utilized on-site. Doc ID 10051.

5. Modification: New franchise approvals for Material Recovery, LLC. 20 January 2004 and 2 February 2004, Wake Board of Commissioners. The franchise changes include adding Franklin County to the service area and increasing the daily disposal amount. Doc ID 10551.

6. *Construction Quality Assurance Report, WCA Brownfield Road C&D Landfill Cell B.* Prepared by: David Garrett, P.G., P.E, Raleigh, NC. May 22, 2006. Doc ID 232.

7. Letter from Stephen R. Berlin to Paul Crissman, dated November 16, 2006, requesting issuance of permit to WCA Waste Corporation and providing information to support the request for permit issuance. Doc ID 823.

8. *Construction Quality Assurance Report, WCA Brownfield Road C&D Landfill Cell C*. Prepared by: David Garrett, P.G., P.E, Raleigh, NC. April 13, 2007. Doc ID 3828.

9. *Application for Permit to Construct, Phase 2A*. Prepared by David Garrett, P.G., P.E, Raleigh, NC. June 25, 2008, revised through December 2010. Doc ID 12363.

10. *Application for Permit to Construct, Phase 2A, Design Hydro Report, Water Quality Monitoring Plan, and Landfill Gas Monitoring Plan.* Prepared by David Garrett, P.G., P.E, Raleigh, NC. June 25, 2008, revised through March 2010. Doc ID 10041. Approval letter Doc ID 10047.

11. *Construction Quality Assurance Certification Report, Phase 2A, Cell 1.* Prepared by Joyce Engineering, Greensboro, NC. September 2011, revised through December 2011. Doc ID 16328.

PART III: PROPERTIES APPROVED FOR THE SOLID WASTE FACILITY

Wake County, N.C. Register of Deeds					
Book	Page	Grantee	Grantor	Tract	Acres
8806	845	Material Recovery, LLC	William A. Turner and wife, Debra C. Turner	1	113.55
8806	849	Material Recovery, LLC	Ashley Turner Enterprises, Inc.	N/A	98.41
Book of Maps 2002	791	Material Recovery, LLC	Material Recovery, LLC	1A and 1B	211.96
Book of Maps 2003	1508	Material Recovery, LLC	Material Recovery, LLC and Margaret Talton	1	210.19
				Total Site Acreage	210.19

The Wake County property ID is 174 163 9103, and the Real Estate ID is 4648.

PART IV: GENERAL PERMIT CONDITIONS

1. This permit is issued by the North Carolina Department of Environment and Natural Resources, Division of Waste Management, Solid Waste Section (Section). In accordance with North Carolina Solid Waste Management Rule 15A NCAC 13B .0201(d), a solid waste management facility permit shall have two parts: a Permit to Construct and a Permit to Operate. The Permit to Construct shall expire January 28, 2016. The Permit to Construct shall be implemented in accordance with Attachment 2 of this permit. The Permit to Operate shall expire January 28, 2016. The Permit to Operate must be implemented in accordance with Attachment 3 of this permit.

2. The persons to whom this permit is issued ("permittee") are the owners and operators of the solid waste management facility.

3. (Intentionally Blank)

4. When this property is sold, leased, conveyed, or transferred in any manner, the deed or other instrument of transfer must contain in the deed description section, in no smaller type than that used in the body of the deed or instrument, a statement that the property has been used as a sanitary landfill and a reference by book and page to the recordation of the permit.

5. By beginning construction or receiving waste at this facility the permittee shall be considered to have accepted the terms and conditions of this permit.

6. Construction and operation of this solid waste management facility must be in accordance with the Solid Waste Management Rules, 15A NCAC 13B, Article 9 of Chapter 130A of the North Carolina General Statutes (NCGS 130A-290, et seq.), the conditions contained in this permit, and the approved plan. Should the approved plan and the rules conflict, the Solid Waste Management Rules shall take precedence unless specifically addressed by permit condition.

7. This permit is issued based on the documents submitted in support of the application for permitting the facility identified in Attachment 1, "List of Documents for Approved Plan," which constitutes the approved plan for the facility. Where discrepancies exist, the most recent submittals and the Conditions of Permit shall govern.

8. This permit may be transferred only with the approval of the Section, through the issuance of a new or substantially amended permit in accordance with applicable statutes and rules. In accordance with NCGS 130A-295.2(g), the permittee must notify the Section thirty (30) days prior to any significant change in the identity or business structure of either the owner or the operator, including but not limited to, a proposed transfer of ownership of the facility or a change in the parent company of the owner or operator of the facility.

9. The permittee is responsible for obtaining all permits and approvals necessary for the development of this project including approval from appropriate agencies for sedimentation and erosion control, and a General or Individual National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permit, if applicable. Issuance of this permit does not remove the permittee's responsibilities for compliance with any other local, state or federal rule, regulation or statute.

- End of Section -

ATTACHMENT 2
CONDITIONS OF PERMIT TO CONSTRUCT

1. Pursuant to the NC Solid Waste Management Rules (Rule) 15A NCAC 13B .0201(c) and (d)(1), this permit approves construction for Phase 2A of the landfill, consisting of approximately 16.7 acres with a projected operating capacity of 1,400,000 cubic yards of airspace.

2. The initial, substantial, construction authorized by this Permit to Construct must commence within 18 months from the issuance date of this permit. If substantial construction does not begin within 18 months from the issuance date of this permit, then the permit to construct shall expire. Substantial construction includes, but is not limited to, issuance of construction contracts, mobilization of equipment on site, and construction activities including installation of sedimentation and erosion control structures. The permittee may reapply for the Permit to Construct prior to the expiration date. The re-application will be subject to the statutes and rules in effect on that date and may be subject to additional fees.

3. Construction of all solid waste management units within this facility must be in accordance with the pertinent approved plans and only for those phases of development approved for construction as described in Attachment I, Part II, List of Documents for the Approved Plan.

4. The permittee must conduct a preconstruction meeting at the facility prior to initiating construction of any unit/cell and must notify the Section at least 10 days prior to the meeting.

5. Modifications or revisions of the approved documents or changes during construction of any landfill unit/cell require approval by the Section, and may constitute a permit modification and be subject to a permitting fee.

6. The following conditions must be met prior to operation of Cell 2 and subsequent cells of Phase 2A:

   a. Construction Quality Assurance (CQA) documentation and a certification by the project engineer that the landfill was built in accordance with approved plans and the conditions of the permit must be submitted to the Section for review and approval.

b. The edge of the waste footprint must be identified with permanent physical markers, for both existing units and the new unit.

c. The Permittee must contact the appropriate regional environmental specialist and permitting engineer to determine whether the Section chooses to hold a pre-operative meeting with key landfill personnel and representatives of the Section.

d. Documentation of financial assurance mechanisms must be submitted to the Section. The financial assurance amount must include closure and post-closure costs including the new phase to receive the PTO, in accordance with 15A NCAC 13B .0546, and must include costs for potential assessment and corrective action, in accordance with NCAC 13A 295.2 (h).

e. The Permittee must obtain a Permit to Operate for the phase from the Section in accordance with 15A NCAC 13B .0201(d).

7. If dried sludge from the site's previous use as a composting/sludge application site are encountered during excavation of the landfill cell, the dried sludge must be stockpiled separately from the insitu soils and must not be used in the cell construction.

8. No rock blasting is allowed in construction without written approval of a blasting plan by the Section.

9. Prior to construction of Phases 2B through 5, a Permit to Construct application must be submitted for approval to the Section. The application must be prepared in accordance with applicable statutes and rules in effect on that date and will be subject to a permitting fee.

10. Pursuant to Rule 15A NCAC 13B .0542(i)(2), burning of land-clearing debris generated on-site, as a result of construction activities, requires approval by the Section prior to initiating the burn. In addition, the Division of Air Quality and local fire department must approve the activity prior to burning.

Geologic, Water Quality, and Landfill Gas Monitoring Requirements

11. Prior to construction of the phase or cell(s) within the phase, all piezometers, borings, and groundwater and landfill gas monitoring wells within the footprint must be properly abandoned by overdrilling first (exception of non-cased borings) and sealed with grout in accordance with 15A NCAC 2C .0113 (d)(2), entitled "Abandonment of Wells."

12. In areas where soil is to be undercut, abandoned piezometers, groundwater and landfill gas monitoring wells and borings must not be grouted to pregrade land surface, but to the proposed base grade surface to prevent having to cut excess grout and possibly damage the wells.

13. A Licensed Geologist must report any pertinent geological feature(s) exposed during phase or cell excavation. Prior to placing any landfill liner, the geologist must submit to the Section hydrogeologist a written report that includes an accurate description of the exposed geological feature(s) and effect of the geological feature(s) on the design, construction, and operation of the cell, phase, or unit.

14. A Licensed Geologist must supervise the installation of groundwater monitoring wells and landfill gas monitoring wells. Each groundwater monitoring well and landfill gas well must be surveyed for location and elevation. Each groundwater monitoring well and landfill gas monitoring well must have an identification plate permanently attached to the well, in accordance with 15A NCAC 2C .0108(o).

15. Any modification to the approved water quality monitoring, sampling, landfill gas, and analysis plan must be submitted to the Section Hydrogeologist for review.

16. Groundwater and landfill gas monitoring well construction and abandonment must meet the requirements of 15A NCAC 02C.

17. Within 30 days of completed construction of each new groundwater and landfill gas monitoring well, a well construction record, well schematic, boring log, field log and notes, and description of well development activities, certified by a Licensed Geologist, must be submitted to the Section. Form GW-1(b) must be used for both groundwater and landfill gas wells. The submittal must also include a scaled topographic map, showing the location and identification of new, existing, and abandoned wells and piezometers.

18. Within thirty (30) days of the abandonment of any groundwater monitoring well or landfill gas monitoring well, the well abandonment record and any additional information included in the abandonment record must be certified by a Licensed Geologist, and submitted to the Section. Form GW-30 must be used for both groundwater and landfill gas wells.

19. All forms, reports, maps, plans, and data submitted to the Section must include an electronic (pdf) copy.

20. Proper abandonment records must be submitted to the Section for the residential drinking water well located in the center of Phase 2. The records must be submitted with the CQA report for the construction area of Phase 2 containing the well.

Erosion and Sedimentation Control Requirements

21. All sedimentation and erosion control activities must be conducted in accordance with the Sedimentation Control Act N.C.G.S. 113A-50, et seq., and rules promulgated under 15A NCAC 4. All required sedimentation and erosion control measures must be installed and operable to mitigate excessive on-site erosion and to prevent silt from leaving the area of the landfill unit during the service life of the facility.

22. Facility construction, operations or practices must not cause or result in a discharge of pollution, dredged material, and/or fill material into waters of the state in violation of the requirements under Sections 401 and 404 of the Clean Water Act, as amended.

23. Modifications to the approved sedimentation and erosion control activities require approval by the North Carolina Land Quality Section. The Section must be notified of any sedimentation and erosion control plan modifications.

- End of Section -

ATTACHMENT 3
CONDITIONS OF OPERATING PERMIT

PART I: OPERATING CONDITIONS

1. The Permit to Operate shall expire January 28, 2016. Pursuant to 15A NCAC 13B .0201(g), no later than September 28, 2015, the permittee must submit to the Section a permit amendment application prepared in accordance with 15A NCAC 13B .0535 (b).

2. This permit approves operation of Phase 2A, Cell 1 and the continued operation of Phase 1, Cells A, B, and C of the landfill, as well as the onsite environmental management and protection facilities as described in the approved plans. Operation of future phases or cells requires written approval of the Section after documentation has been submitted that the area has been constructed in accordance with applicable statutes and rules.

3. The following table lists the dimensions and details for the landfill, both existing and planned. Total gross capacity is defined as the volume measured from the bottom of waste through the top of final cover. The estimated life of the landfill, for both northern and southern areas, is approximately 21.9 years from 2010.

Phase	Acres	Gross Capacity	Status
1	20	1,636,000	Partially filled
2A (Cell 1)	4.8	366,000	Approved for fill
2A (remaining area)	11.9	1,034,000	Approved for construction
2B	8.2	1,400,000	future
2C	*	1,400,000	future
Total northern area	45	5,836,000	
Southern area 3-5	24.2	2,300,000	future
Total northern and southern areas	**69.2**	**8,136,000**	

*Phase 2C will be vertical fill over Phases 1, 2A, and 2B.

4. The permittee must maintain permanent markers that accurately identify the edge of the approved waste disposal boundary.

5. Fill operations must be contained within the approved elevation contours as shown on the approved application drawings. The maximum approved fill elevation for Phase 2A is 310 feet mean sea level, as shown on Drawing 8 (E2), Doc ID 12363.

6. The landfill is permitted to receive the following waste types:

   a. "C&D solid waste" as defined in 15A NCAC 13B, Rule .0532(8) means solid waste generated solely from the construction, remodeling, repair, or demolition operations on pavement and buildings or structures. C&D waste does not include municipal and industrial wastes that may be generated by the on-going operations at buildings or structures.

   b. “Inert debris” as defined in G.S. 130A-290 (a)(14) means solid waste that consists solely of material such as concrete, brick, concrete block, uncontaminated soil, rock, and gravel.

   c. “Land-clearing debris” as defined in G.S. 130A-290 (a)(15) means solid waste which is generated solely from land clearing activities, limited to stumps, trees, limbs, brush, grass, and other naturally occurring vegetative material.

   d. “Asphalt” in accordance with G.S. 130-294(m).

7. Regulated asbestos-containing material must be managed in accordance with 40 CFR 61. Disposal of asbestos waste must be in accordance with 15 NCAC 13B .0542 (c).

8. Those wastes listed in 15A NCAC 13B .0542 (e) must not be accepted for disposal including, but not limited to, hazardous waste, municipal solid waste, liquid waste, commercial and industrial wastes, and yard trash.

9. Wastewater treatment sludge is not approved for disposal. Wastewater treatment sludge may be accepted, with the approval of the Section, for utilization as a soil conditioner and incorporated into or applied onto the vegetative growth layer. The wastewater treatment sludge must not be applied at greater than agronomic rates nor to a depth greater than six inches.

10. The facility is approved to accept approximately 1100 tons per day, approximately 286 days per year (5.5 days per week), with a maximum variance in accordance with GS 130A-294(b1)(1) and consistent with the approved franchise granted by the County of Wake dated February 2, 2004.

11. This facility is permitted to receive solid waste generated within the following counties: Chatham, Durham, Franklin, Johnston, Orange, and Wake and the municipalities contained within those counties, consistent with the approved franchise approved by the Wake County Board of Commissioners.

12. The permittee must not knowingly dispose of C&D waste that is generated within the boundaries of a unit of local government that by ordinance:

    a. Prohibits generators or collectors of C&D waste from disposing of that type or form of C&D waste.

    b. Requires generators or collectors of C&D waste to recycle that type or form of C&D waste.

13. The facility operator must complete an approved operator training course in compliance with G.S. 130A-309.25.

    a. A responsible individual certified in landfill operations must be on-site during all operating hours of the facility at all times while open for public use to ensure compliance with operational requirements.

    b. All pertinent landfill-operating personnel must receive training and supervision necessary to properly operate the C&D landfill unit in accordance with G.S. 130A-309.25 and addressed by memorandum dated November 29, 2000.

14. The permittee must actively employ a training and screening program at the facility prepared in accordance with Section .0544(e) for detecting and preventing the disposal of excluded or unauthorized wastes. At a minimum, the program must include:

    a. Random inspections of incoming loads or other comparable procedures.

    b. Records of any inspections.

    c. Training of personnel to recognize hazardous, liquid, and other excluded waste types.

    d. Development of a contingency plan to properly manage any identified hazardous, liquid, MSW, or other excluded or unauthorized wastes. The plan must address identification, removal, storage, and final disposition of these wastes.

15. The use of alternative periodic cover requires approval, prior to implementation, by the Section. Requests for alternative periodic cover approval must include a plan detailing the comprehensive use and a demonstration of the effectiveness of the alternative cover,

developed according to Section guidelines. Plans that are approved by the Section will be incorporated into, and made a part of, the approved documents listed in Attachment 1.

16. Financial assurance must be continuously maintained for the duration of the facility in accordance with Rule 15A NCAC 13B .0546, 15A NCAC 13B .0547 (2), and NCGS 130A 295.2 (h). The owner and operator must annually adjust cost estimates including closure and post-closure activities, and potential assessment and corrective action costs, for inflation within 60 days prior to the anniversary date of the establishment of the financial instrument(s), pursuant to 15A NCAC 13B .0546.

17. All sedimentation and erosion control activities must be conducted in accordance with the Sedimentation Control Act N.C.G.S. 113A-50, et seq., and rules promulgated under 15A NCAC 4. All required sedimentation and erosion control measures must be installed and operable to mitigate excessive on-site erosion and to prevent silt from leaving the area of the landfill unit during the service life of the facility.

18. Facility construction, operations or practices must not cause or result in a discharge of pollution, dredged material, and/or fill material into waters of the state in violation of the requirements under Sections 401 and 404 of the Clean Water Act, as amended.

19. Modifications to the approved sedimentation and erosion control activities require approval by the North Carolina Land Quality Section. The Section must be notified of any sedimentation and erosion control plan modifications.

20. An updated closure and post-closure plan must be submitted for approval at least 90 days prior to closure or partial closure of any landfill unit. The plan must include all steps and measures necessary to close and maintain the C&D unit in accordance with all rules in effect at that time. At a minimum, the plan must address the following:

    a. Design of a final cover system in accordance with 15 NCAC 13B .0543(c), or the solid waste management rules in effect at the time of closure;

    b. Construction and maintenance/operation of the final cover system and erosion control structures; and

    c. Surface water, ground water, and explosive gas monitoring.

PART II: MONITORING AND REPORTING REQUIREMENTS

21. Groundwater, surface water, and landfill gas monitoring locations must be established and monitored as identified in the approved plans (Doc ID 10041 and 10047). Any proposed modification to an approved plan must be submitted to the Section and approved prior to implementation.

22. The permittee must obtain approval from the Section for the modification of any groundwater or landfill gas monitoring well. Design, construction, abandonment, surveying, and well plate identification of groundwater and landfill gas monitoring wells must be implemented in accordance with the conditions in Attachment 2, Geologic, Water Quality, and Landfill Gas Monitoring Requirements.

23. Groundwater monitoring wells and surface water sampling locations must be sampled at least semi-annually in accordance with 15A NCAC 13B .0544, the approved water quality monitoring plan, and the current policies and guidelines of the Section in effect at the time of sampling. In accordance with 15A NCAC 13B .0544(d), landfill gas monitoring must be conducted quarterly, unless otherwise specified by the Section.

24. Monitoring reports of the analytical results for surface water and groundwater monitoring sampling events must be submitted to the Section within 120 days of the sample collection date. Analytical laboratory data must be submitted in electronic portable document format (pdf) and in a spreadsheet format in an Electronic Data Deliverable (EDD) Template. All monitoring reports must contain:

    a. a potentiometric surface map for the current sampling event,

    b. analytical laboratory reports and summary tables,

    c. a completed Solid Waste Environment Monitoring Data Form, and

    d. laboratory data submitted in accordance with the EDD Template.

25. A readily accessible unobstructed path must be maintained so that groundwater and landfill gas monitoring wells and surface water sampling locations are accessible using four-wheel drive vehicles.

26. Documentation of well completion, development details, repair, abandonment, and all other pertinent activities associated with each groundwater and landfill gas monitoring well must be maintained in the facility operating record. The permittee must maintain a record of all groundwater, surface water, and landfill gas monitoring events and analytical data in the operating record.

27. All forms, reports, maps, plans, and data submitted to the Section must include an electronic (pdf) copy.

28. All landfill gas monitoring events must be conducted by properly trained personnel and must include monitoring for all explosive gases, including hydrogen sulfide. Landfill gas monitoring must include interior monitoring of onsite buildings.

29. Landfill gas monitoring results must be recorded on forms provided by the Section and be maintained in the facility's operating record.

REPORTING AND RECORDKEEPING

30. Copies of this permit, the approved plans, and all records required to be maintained by the permittee must be maintained at the facility and made available to the Section upon request during normal business hours.

31. The owner or operator must maintain records of the following. Scales must be used to weigh the amount of waste received. The daily reports are to be summarized into a monthly report for use in the required annual reports.

    a. The amount of all accepted solid waste materials as (i) C&D wastes, (ii) material used as alternate periodic cover, and (iii) recyclable material.

    b. Daily records of waste received, and origins of the loads.

32. On or before August 1 annually, the Permittee must submit an annual facility report to the Section, on forms prescribed by the Section.

    a. The reporting period shall be for the previous year beginning July 1 and ending June 30.

    b. The annual facility report must list the amount of waste received in tons and be compiled:
        i) On a monthly basis.
        ii) By county, city or transfer station of origin.
        iii) By specific waste type.
        iv) By disposal location within the facility.
        v) By diversion to alternative management facilities.

c. A measurement of volume utilized in the landfill cells must be performed during the second quarter of the calendar year. The date and volumes, in cubic yards, must be included in the report.

d. The amount of waste, in tons from scale records, disposed in landfill cells from October 1, 2003 through the date of the annual volume survey must be included in the report.

e. The tons of C&D waste recycled, recovered or diverted from disposal including a description of how and where the material was ultimately managed, as applicable, must be included in the report.

f. The completed report must be forwarded to the Regional Environmental Senior Specialist for the facility by the date due on the prescribed annual facility report form.

g. A copy of the completed report must be forwarded to each county manager for each county from which waste was received the facility. Documentation that a copy of the report has been forwarded to the county managers must be sent to the Regional Environmental Senior Specialist by the date due on the prescribed annual facility report form.

PART III: MISCELLANEOUS SOLID WASTE MANAGEMENT CONDITIONS, (SPECIFY)

33. The reclamation pad operation as shown on the application drawings is not approved for construction or operation.

34. The wood waste/land clearing debris storage and processing operation as shown in the application text and on drawings is not approved for operation at this time.

- End of Permit Conditions -

Appendix B

Change Order

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Cell 2
Raleigh, North Carolina

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BAXTER JOHNSON
CONTRACTING

PO Box 33343
Raleigh, NC 27636

(919) 851-2617 (t)

Change Order 1

June 4, 2014

GC: Jorge Montezuma
Smith Gardner, Inc.

Project: Brownfield Phase 2A Cell 2

Scope: Additional erosion control measures

DESCRIPTION

ITEM		QTY	UNIT	RATE	TOTAL
	Drainage Channels: ECB w/ Check Dams (DC-33, DC-34)	(830.00)	LF		
	Drainage Channels: ECB w/ Check Dams (TDC-5)	(350.00)	LF		
	Custom Basin	(2.00)	EA		
	Level Spreader	(2.00)	EA		
	Check Dams in Channels DC-33, DC-34, TDC-5	(18.00)	EA		
	Silt Fence Outlet	10.00	EA		
	ECB	32,670.00	SF		
	Check Dam	4.00	EA		
TOTAL AMOUNT DUE					

Approvals:

Baxter Johnson Contracting, Inc. **Date**

Smith Gardner, Inc. **Date**

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Appendix C

Photographic Log

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Cell 2
Raleigh, North Carolina

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S+G ENGINEERS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Wake Reclamation, LLC	Raleigh, North Carolina	BROWNFIELD-14-1

Photo No.	Date:
1	6/10/14

Direction Photo Taken:

Description:

Perimeter E&S controls were established.

Photo No.	Date:
2	6/10/14

Direction Photo Taken:

Looking East

Description:

The southern perimeter berm (right) was constructed using the initial cut from Cell 2 (left).

S+G ENGINEERS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Wake Reclamation, LLC	Raleigh, North Carolina	BROWNFIELD-14-1

Photo No.	Date:
3	6/16/14

Direction Photo Taken:

Looking West

Description:

Completed southern perimeter berm with erosion control blanket on outer slope and aggregate base course road surface.

Photo No.	Date:
4	6/24/14

Direction Photo Taken:

Description:

Perimeter channel with erosion control blanket and stone check dams.

S+G ENGINEERS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Wake Reclamation, LLC	Raleigh, North Carolina	BROWNFIELD-14-1

Photo No.	Date:
5	6/23/14

Direction Photo Taken:

Looking East

Description:

Excavation of Cell 2 in progress.

Photo No.	Date:
6	6/30/14

Direction Photo Taken:

Looking North

Description:

Excavation of Cell 2 in progress.

S+G ENGINEERS

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Wake Reclamation, LLC	Raleigh, North Carolina	BROWNFIELD-14-1

Photo No.	Date:
7	7/28/14

Direction Photo Taken:
East

Description:

Established vegetation on outer slopes of perimeter berm.

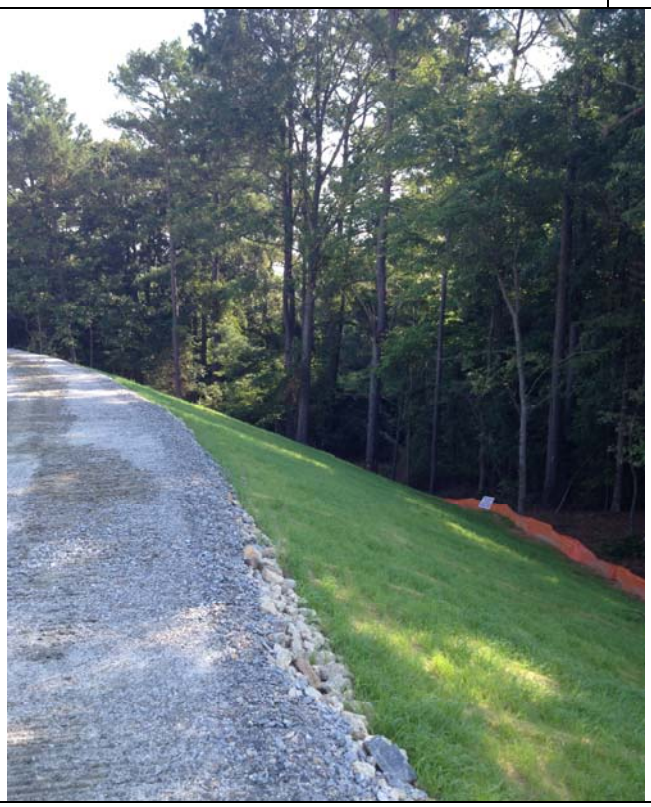

Photo No.	Date:
8	8/11/14

Direction Photo Taken:

Southwest

Description:

Phase 2A Cell 2 Subgrade

Appendix D

Subgrade Inspection Report

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Cell 2
Raleigh, North Carolina

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SMITH+GARDNER
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August 27, 2014

Ms. Elizabeth Werner
Hydrogeologist
NC Department of Environment and Natural Resources- DWM
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

RE: Phase 2A Cell 2 Subgrade Certification
Wake Reclamation, LLC - Brownfield Road CDLF– Permit No. 92-31
Raleigh, North Carolina

Dear Ms. Werner:

On behalf of Wake Reclamation, LLC (a subsidiary of Waste Industries USA, Inc.), I am pleased to submit this letter for subgrade certification for the Brownfield Road C&D landfill (Permit No. 92-31) in Raleigh, North Carolina.

On August 19, 2014, I visited the Brownfield Road C&D landfill to inspect the subgrade in the 4.4 acre Phase 2A Cell 2 portion of the site. On the day of inspection, I found soil types were consistent with those encountered during drilling (primarily silty sand/sandy silt and PWR above bedrock). Bedrock was identified during permitting; however subgrade and cell construction was engineered to be above bedrock with the required 4 feet of vertical separation.

During construction two rock outcrops were identified on the northern side slope. Using equipment available, the proposed subgrade elevations could not be reached in these areas. During construction, it was determined the outcrops were bedrock. These outcrops were covered with soil and the subgrade has been adjusted to reflect the new base grades for this area. Approximate locations are shown on **Figure 1**. As-built and construction drawings will be included in the CQA report.

Based on my observations, I certify that the subgrade soils are materially consistent with the soil types found during the site investigation.

Should you have any questions or require clarification, please contact us at (919) 828-0577 or by email below.

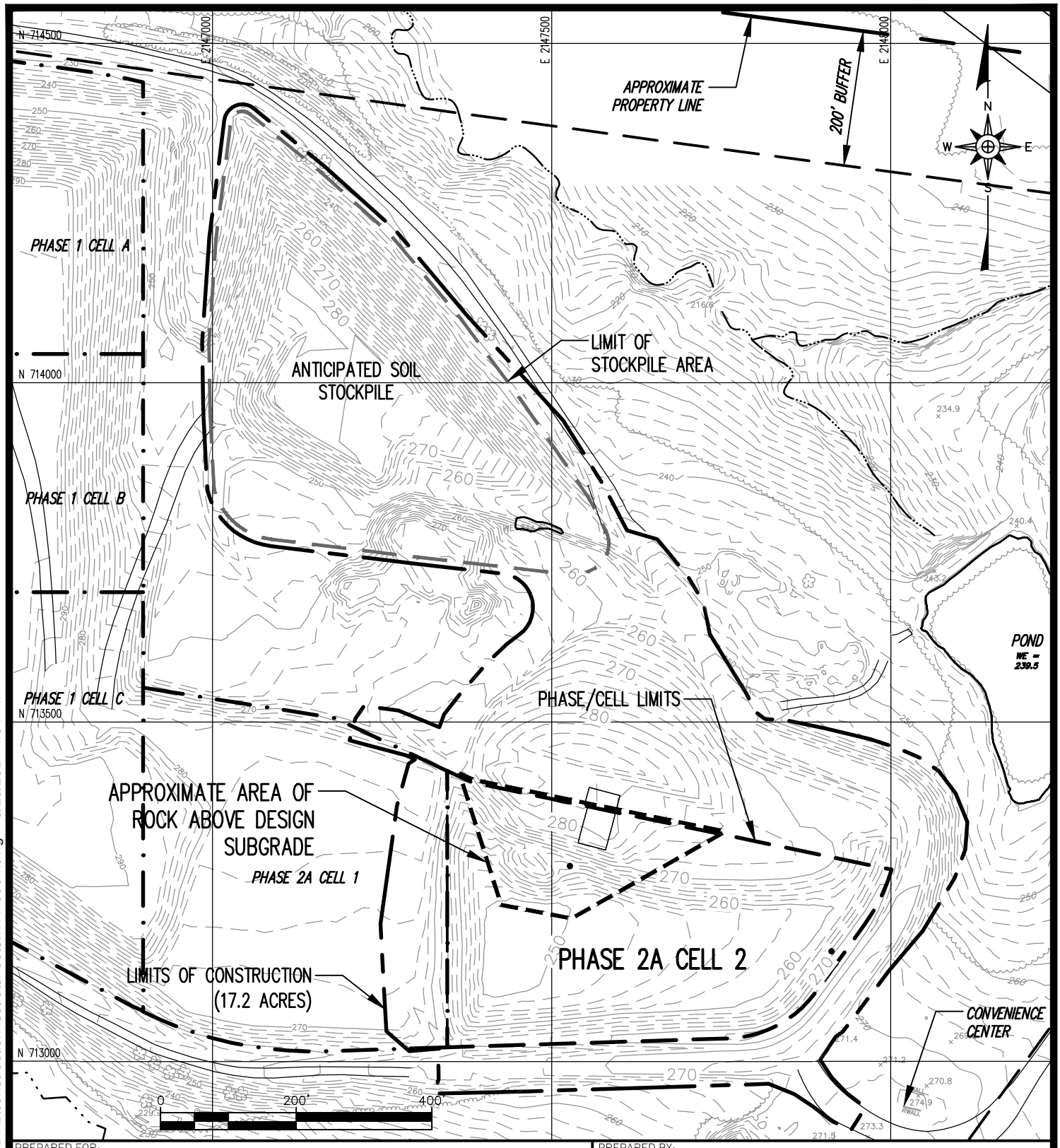
Sincerely,
SMITH GARDNER, INC.

NORTH CAROLINA LICENSED SEAL 2275 GEOLOGIST MADELINE GERMAN 8/27/14

Madeline German, P.G.
Project Geologist
madeline@smithgardnerinc.com

Joan A. Smyth, P.G.
Senior Hydrogeologist
joan@smithgardnerinc.com

cc: Donald Plessinger, Waste Industries
David Pepper, Waste Industries
File



PREPARED FOR:

WAKE RECLAMATION, LLC
BROWNFIELD ROAD C&D LANDFILL
PHASE 2A CELL 2
AREA OF ROCK ENCOUNTERED

PREPARED BY:

NC LIC. NO. C-0828 (ENGINEERING)

SMITH+GARDNER

14 N. Boylan Avenue, Raleigh NC 27603 | 919.828.0577

DRAWN:	APPROVED:	SCALE:	DATE:	PROJECT NO.:	FIGURE NO.:	FILE NAME:
J.A.L.		AS SHOWN	Aug 2014	BROWNFIELD 14-1	1	WI-A0964

G:\CAD\WCA Brownfield\Brownfield 14-1\construction Issue\sheets\WI-A0964.dwg - 8/26/2014 4:54 PM

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Appendix E

CQA Meeting Minutes

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Cell 2
Raleigh, North Carolina

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BROWNFIELD ROAD C&D LANDFILL PHASE 2A CELL 2
PRE-CONSTRUCTION MEETING SUMMARY
MAY 27, 2014 – 9AM

1. Attendance (Sign-in sheet is attached.)
    a. Thomas B. Maier (Smith + Gardner (S+G))
    b. Stacey A. Smith (S+G)
    c. Jorge L. Montezuma (S+G)
    d. David Pepper (Waste Industries (WI))
    e. Richard Call (WI)
    f. Shawn Springer (Wake County Environmental Services)
    g. Brady Johnson (Baxter Johnson Contracting (BJC))
    h. Brad Murray (BJC)

2. Contract Documents
    a. 2 copies distributed to Waste Industries and 2 copies to BJC.

3. Lines of Communication
    a. Jorge will be the main contact between BJC, S+G, and WI.
    b. BJC will let S+G know when soil density testing will be needed
    c. Richard will be the main contact for Shawn.
    d. Submit Submittals and Pay Apps to Jorge.

4. Erosion Control Permitting and Inspections
    a. Stacey presented an overview of the two existing erosion control plans previously approved by Wake County (Plan S#998008 prepared by Joyce Engineering in 2002 and Plan S#2148 prepared by John Tucker in 2011) and described that the landfill's solid waste permit is due for a 5-year renewal early 2016. In the process of preparing the solid waste permit renewal drawings in 2015, S+G intends to prepare a revised erosion control plan that would combine and replace the two existing plans.
    b. Shawn stated that there is an outstanding balance of $850 from the last permitting process (S#2148) and that additional fees totaling $1,750 would need to be paid before the initial E&S inspection could be done. After paying the fee, the E&S features can be placed, and then BJC can coordinate with Shawn to schedule a compliance inspection. After this, grading can commence. Inspections will happen weekly until final stabilization. A 20-foot wide path can be cleared for installation of perimeter controls.
    c. Shawn mentioned that in terms of monitoring basin outfall that if a problem is not addressed, an NOV would be issued that could lead to a fine. Any discharge needs to be reported to DWQ and NPDES forms need to be used for reporting.
    d. David Pepper said that S+G will send a letter to Wake County today summarizing today's meeting and addressing the previous unpermitted area.
    e. S+G will submit letter report with an exhibit showing the 75 acres of total limits of disturbance combined from both of the previously permitted plans.

5. Construction Overview
    a. Tom presented the overview of the Phase 2A Cell 2 construction sequence as well as the E&S features.
    b. Tom presented the changes to the construction drawings as follows:
        i. Do not build the proposed southern and eastern custom basins.
        ii. Do not build the channels DC-33, DC-34, and TDC-5.
        iii. Move silt fence to where the center of the channels is shown.
        iv. Add silt fence outlets every 100 feet on the silt fence.
        v. Add erosion control blanket on outboard embankment slopes.
        vi. Add four 6-inch high 57 stone check dams alongside the western slope.
    c. Brad asked Shawn if combination fence was okay to use, and Shawn said ok.
    d. Shawn asked how the lowest point of the cell will be managed for stormwater and Tom said that it will be pumped to the existing basin on the west side.
    e. Shawn approved of house demolition to occur since it did not incur in earth disturbance.
    f. Brady said that Don Plessinger (Site Manager) has asked for smaller than surge stone on construction entrance to prevent stone from getting stuck on the hauling service trucks' tires and potentially escaping at high speeds while traveling on the paved roads outside of the landfill. Shawn approved the change of stone size.
    g. Brady gave the following schedule:
        i. This week they will install E&S features, followed by clearing and demolition.
        ii. Next week: start embankment
        iii. End of June: mass excavation
    h. Stacey requested BJC to send E&S submittals to Jorge.
    i. Brady said that their typical work hours will be 7-5pm (and only if needed on Saturdays)
    j. Richard asked BJC to bring their own lock and said that personal cars can be parked next to the scale house.
    k. David Pepper requested BJC to initially check in at the scale house until Terry becomes familiar with BJC personnel.
    l. Additional work for BJC:
    m. S+G requested BJC to provide an estimate on how much it would cost to decommission the custom basins CB-1, CB-2, CB-3, and CB-7 and related channels as shown on Joyce's drawings.

The meeting adjourned at 10:00 am.

* * * * *

Brownfield Road C&D Landfill
Phase 2A Cell 2 Pre-Construction Meeting

Sign-In Sheet

Name	Organization	Phone Numbers
Thomas B. Maier	Smith+Gardner	919-815-0813
Stacey A. Smith	Smith+Gardner	919-815-0803
Jorge Montezuma	Smith+Gardner	919-980-0019
David Pepper	Waste Industries	919-427-1506
Richard Call	Waste Industries	919-669-6729
Shawn Springer	Wake County Environmental Services	919-369-6135
Brady Johnson	Baxter Johnson Contracting	919-624-0110
Brad Murray	Baxter Johnson Contracting	919-669-5387

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SMITH + GARDNER
ENGINEERS

ADDRESS 14 N. Boylan Avenue, Raleigh NC 27603 | TEL 919.828.0577 | WEB www.smithgardnerinc.com

MEMORANDUM

Date:	July 2, 2014
To:	Brownfield Road C&D Landfill Phase 2A Cell 2 Construction Stakeholders
From:	Jorge L. Montezuma, E.I. Smith Gardner, Inc. 7/2/14
RE:	**Brownfield Road C&D Landfill** **Phase 2A Cell 2 Construction** **Construction Progress Meeting Summary**

The meeting was held in the Brownfield Road C&D Landfill office on Tuesday July 1, 2014 and began at 9am.

1. **Attendance (Sign-in sheet is attached.)**
   a. Thomas B. Maier (Smith + Gardner (S+G))
   b. Jorge L. Montezuma (S+G)
   c. Don Plessinger (WI)
   d. Richard Call (WI)
   e. Jacob Buda (Geotechnics)
   f. Brady Johnson (Baxter Johnson Contracting (BJC))
   g. Brad Murray (BJC)

2. **Erosion and Sedimentation Control**
   a. After the June 2 inspection, no additional inspections have occurred from Wake County.
   b. E&S features are being maintained and preventing sediment from leaving the work area.
   c. Grass is present on the outer slope of the southern embankment.

3. **Schedule**
   a. Southern embankment and road are finished, including the outside slope erosion control blanket and seeding, and channel DC-25 (matting, seeding, and check dams).
   b. Eastern embankment is almost done. On-site crushed concrete is being used as a base for the ABC. It has compacted well and seems to be a good base. The ABC will arrive Wednesday July 2. Channel DC-32 will be excavated after the ABC is laid on top of the crushed concrete.
   c. Mass excavation has begun.
   d. BJC will send an updated schedule.

4. **Decommissioning of Sediment Traps (Custom Basins)**
   a. Waste Industries has requested BJC to decommission four (4) sediment traps. Any impediments to sheet flow will need to be removed, including flattening diversion berms. All disturbed areas will need to be revegetated. Steep areas,

as determined by BJC, will be covered with erosion control blanket. Sediment Trap CB-2 on the southwestern part of the site is the steeper one, so at least this one will need silt fence until vegetation stabilizes the area. BJC will look at the areas and provide a cost estimate.

b. This work will be performed under a separate change order. The change order request has not yet been prepared by BJC.
c. This work is proposed to take place after the construction of the cell to not slow down the construction progress.

5. **Pay Applications**
   a. Quantities on pay applications need to be checked by field personnel prior to sending them to the S+G office. Jorge is available to go over them on site with Brad as well.

6. **Crushed Concrete**
   a. Crushed concrete (refer to Field Order 1) has been observed to provide a suitable road base.

7. **Submittals**
   a. BJC will send the seed submittal to S+G.
   b. No other submittals are needed at this time.

8. **Farm Pond**
   a. Potential maintenance activities at the old farm pond on site were discussed. JBC will be asked to provide a price for this work after the scope has been defined.

9. **Embankment**
   a. The first phase of the embankment (southern and eastern sections) should be finished Wednesday July 2.
   b. The remainder of the embankment will take place at the end of the project.

10. **Rock**
    a. Rock, as described on the Contract Documents, has not been encountered yet. Boulders have been removed from the excavation areas and placed on a pile.

Meeting adjourned at 9:30AM.

* * * * *

BROWNFIELD ROAD C&D LANDFILL PHASE 2A CELL 2
CONSTRUCTION PROGRESS MEETING
JULY 1, 2014, 9-10AM

NAME	ORGANIZATION
JORGE MONTEZUMA	SMITH + GARDNER
Jacob Buck	Geotechnics
Richard Hall	Waste Industries
Brad murray	Baxter Johnson
Brady Johnson	BJC
Don Plessinger	Waste Industries
Tom Maier	Smith Gardner

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SMITH+GARDNER
ENGINEERS

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MEMORANDUM

Date:	August 4, 2014
To:	Brownfield Road C&D Landfill Phase 2A Cell 2 Construction Stakeholders
From:	Jorge L. Montezuma, E.I. Smith Gardner, Inc. 8/4/14
RE:	**Brownfield Road C&D Landfill** **Phase 2A Cell 2 Construction** **2nd Construction Progress Meeting Summary**

The meeting was held in the Brownfield Road C&D Landfill office on Friday August 1, 2014 and began at 8am.

1. **Attendance (Sign-in sheet is attached)**
   a. Thomas B. Maier (Smith + Gardner (S+G))
   b. Jorge L. Montezuma (S+G)
   c. Don Plessinger (Waste Industries)
   d. David Pepper (Waste Industries)
   e. Brady Johnson (Baxter Johnson Contracting (BJC))
   f. Brad Murray (BJC)

2. **Progress Update**
   Brad said that excavation will be finished in 2 days, then stone will be placed on the back road alongside the channels and culvert. After this is done, the sediment will be removed from the Sediment Basin. Estimated time on site is a week and a half.

3. **E&S Features**
   Shawn Springer, with Wake County, will need to be contacted after construction is finished and areas have been stabilized to schedule an inspection. Seeding on existing channels and slopes needs to be checked, and reseeded if needed. Reseeding of flow lines of TRM-lined channels is needed.

4. **Inner Slope Stabilization**
   It was decided that the inner slope of the cells, where some minor rutting was observed, was going to be left as it is instead of adding topsoil or seeding to prevent further rutting. Wake County does not require this to be stabilized.

5. **Eastern outside slope railing**
   Previous discussions included adding a roadside railing to the eastern embankment crest to prevent traffic from getting close to the edge. Since the road will not be frequently used for hauling trucks, this item will be revisited later in the life of the landfill.

6. **Decommissioning of Sediment Traps**
   There are 3 sediment traps that need to be decommissioned (they were used during past construction events to control runoff and decrease off-site erosion and vegetation has been fully established). A quote was provided by BJC to Waste Industries for $12,000 for the decommissioning of the sediment traps and related channels. It was decided that site personnel would decommission them.

7. **Farm Pond Update**
   Since BJC would need different equipment to perform this potential additional work, it was agreed that the design of the farm pond spillway repair does not need to be completed prior to BJC demobilizing from the site.

8. **Rippable Rock**
   Two rock outcrops were encountered above the base grades on the northern slope of the cell. S+G took rough measurements of the area prior to the meeting and planned to provide Waste Industries an estimate of the amount of potential airspace loss (to cover the non-rippable rock with a 2-foot soil layer and 2:1 slopes), and to provide BJC the approximate amount of rock to estimate (as one option) the cost to break up the rock with a hoe ram.

Meeting adjourned at 8:30AM.

* * * * *

BROWNFIELD ROAD C&D LANDFILL PHASE 2A CELL 2
2ND CONSTRUCTION PROGRESS MEETING
AUGUST 1, 2014, 8-9AM

NAME	ORGANIZATION
Jorge Montezuma	S+G
Brad Murray	BJC
Brady Johnson	BJC
David W. Pepper	WI
Don Pfennigir	WI
Tom Maier	S+G

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Appendix F

Earthwork CQA Data

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Cell 2
Raleigh, North Carolina

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June 6, 2014

Project No. 2014-700-01

Mr. Tom Maier
Smith + Gardner,Inc.
14 N. Boylan Ave.
Raleigh, NC 27603

tom@smithgardnerinc.com
cc: Jorge@smithgardnerinc.com

Transmittal
Laboratory Test Results
Brownfield – 14 - 1

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

Michael P. Smith
Regional Manager

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

2200 Westinghouse Blvd., Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460 • www.geotechnics.net

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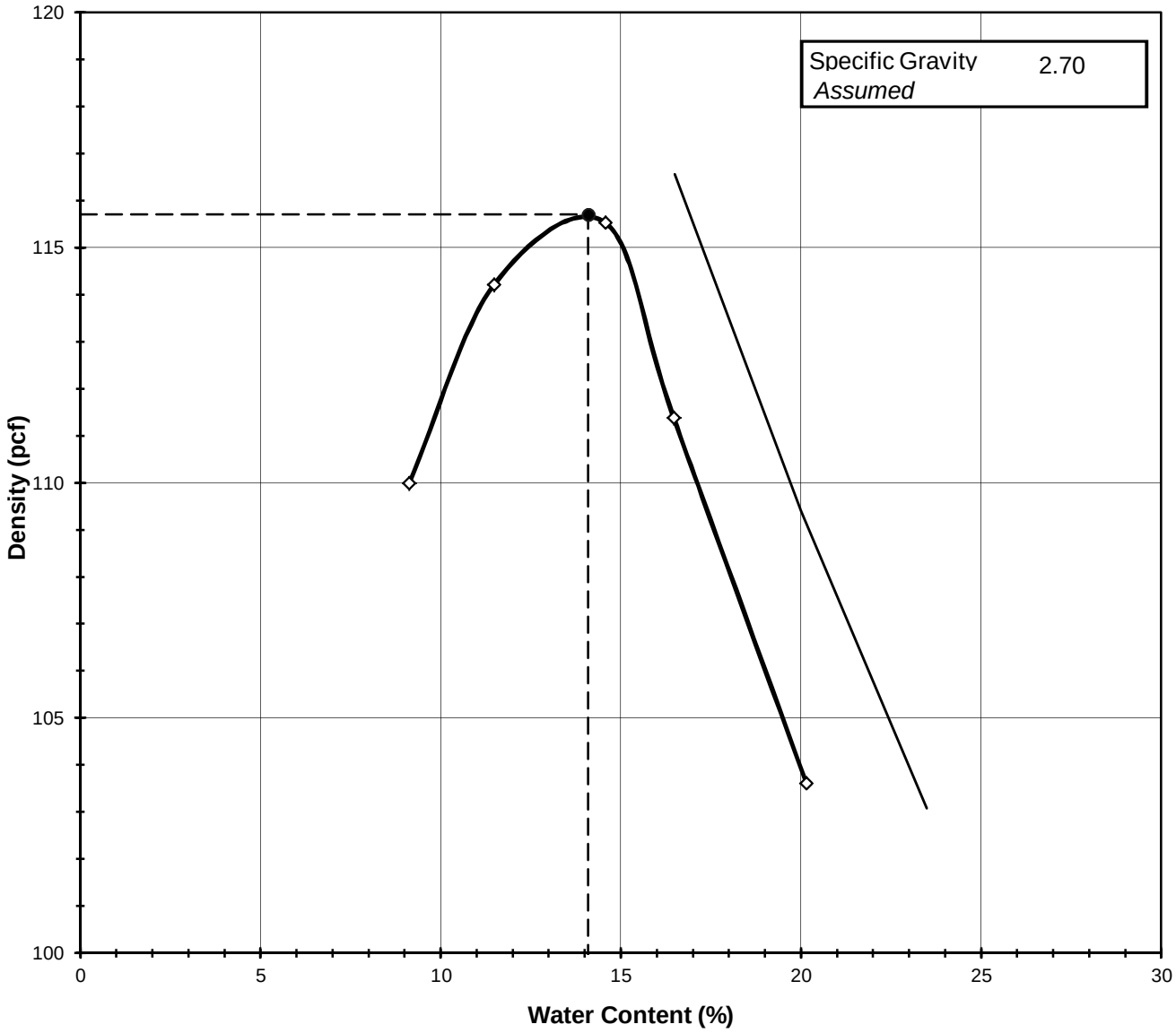
MOISTURE DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD - 14 - 1	Depth (ft):	NA
Project No.:	2014-700-01	Sample No.:	BF-SF-1
Lab ID:	2014-700-01-01	Test Method	**STANDARD**

Visual Description: BROWN CLAYEY SAND

Optimum Water Content **14.1**
Maximum Dry Density **115.7**



Tested By *BW* *Date* *6/5/14* *Checked By* *GEM* *Date* 6/6/14

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD - 14 - 1	Depth (ft):	NA
Project No.:	2014-700-01	Sample No.:	BF-SF-1
Lab ID:	2014-700-01-01		

Visual Description: BROWN CLAYEY SAND

Total Weight of the Sample (g)	24950
As Received Water Content (%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	1
Percent Retained on 3/8"	3
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	B

Test Type		**STANDARD**
Rammer Weight (lb)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	461
Mold diameter		4"
Weight of the Mold (g)		4182
Volume of the Mold (cm^3)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & Wet Sample (g)	5985	6095	6170	6131	6052
Wt.of Mold (g)	4182	4182	4182	4182	4182
Wt. of Wet Sample (g)	1803	1913	1988	1949	1870
Mold Volume (cm^3)	937	937	937	937	937

Moisture Content / Density

Tare Number	310	300	314	866	399
Wt. of Tare & Wet Sample (g)	419.90	414.50	463.40	479.90	427.60
Wt. of Tare & Dry Sample (g)	393.96	383.20	415.18	424.27	370.36
Wt. of Tare (g)	109.70	110.70	84.30	86.50	86.30
Wt. of Water (g)	25.94	31.30	48.22	55.63	57.24
Wt. of Dry Sample (g)	284.26	272.50	330.88	337.77	284.06

Wet Density (g/cm^3)	1.92	2.04	2.12	2.08	2.00
Wet Density (pcf)	120.0	127.3	132.4	129.7	124.5
Moisture Content (%)	**9.1**	**11.5**	**14.6**	**16.5**	**20.2**
Dry Density (pcf)	**110.0**	**114.2**	**115.5**	**111.4**	**103.6**

Zero Air Voids

Moisture Content (%)	16.5	20.0	23.5
Dry Unit Weight (pcf)	116.6	109.4	103.1

Tested By *BW* *Date* *6/5/14* *Checked By* *GEM* *Date* 6/6/14

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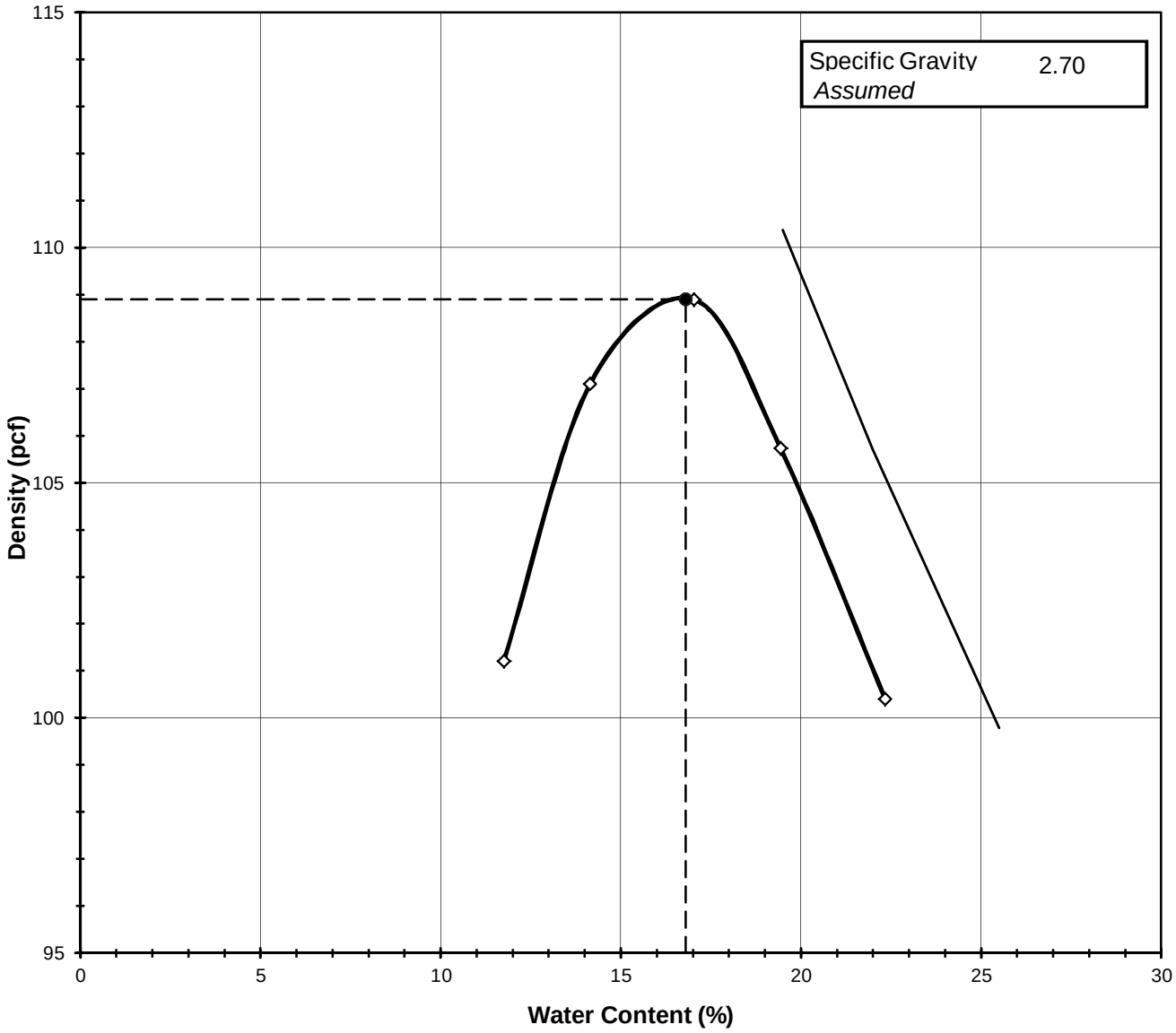
MOISTURE DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD - 14 -1	Depth (ft):	NA
Project No.:	2014-700-01	Sample No.:	BF-SF-2
Lab ID:	2014-700-01-02	Test Method	**STANDARD**

Visual Description: BROWN CLAYEY SAND

Optimum Water Content	**16.8**
Maximum Dry Density	**108.9**



Tested By *BW* *Date* *6/4/14* *Checked By* *GEM* *Date* 6/5/14

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	NA
Client Reference:	BROWNFIELD - 14 -1	Depth (ft):	NA
Project No.:	2014-700-01	Sample No.:	BF-SF-2
Lab ID:	2014-700-01-02		

Visual Description: BROWN CLAYEY SAND

Total Weight of the Sample (g)	19550
As Received Water Content (%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	3
Oversize Material	Not included
Procedure Used	B

Test Type		**STANDARD**
Rammer Weight (lb)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	461
Mold diameter		4"
Weight of the Mold (g)		4182
Volume of the Mold (cm^3)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & Wet Sample (g)	5881	6018	6096	6079	6027
Wt.of Mold (g)	4182	4182	4182	4182	4182
Wt. of Wet Sample (g)	1699	1836	1914	1897	1845
Mold Volume (cm^3)	937	937	937	937	937

Moisture Content / Density

Tare Number	305	303	317	312	307
Wt. of Tare & Wet Sample (g)	391.10	402.90	417.80	419.10	474.90
Wt. of Tare & Dry Sample (g)	358.88	366.71	369.22	364.57	408.21
Wt. of Tare (g)	84.70	110.90	84.10	84.00	109.60
Wt. of Water (g)	32.22	36.19	48.58	54.53	66.69
Wt. of Dry Sample (g)	274.18	255.81	285.12	280.57	298.61

Wet Density (g/cm^3)	1.81	1.96	2.04	2.02	1.97
Wet Density (pcf)	113.1	122.2	127.4	126.3	122.8
Moisture Content (%)	**11.8**	**14.1**	**17.0**	**19.4**	**22.3**
Dry Density (pcf)	**101.2**	**107.1**	**108.9**	**105.7**	**100.4**

Zero Air Voids

Moisture Content (%)	19.5	22.0	25.5
Dry Unit Weight (pcf)	110.4	105.7	99.8

Tested By *BW* *Date* *6/4/14* *Checked By* *GEM* *Date* 6/5/14

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June 13, 2014

Project No. 2014-700-02

Mr. Tom Maier
Smith + Gardner,Inc.
14 N. Boylan Ave.
Raleigh, NC 27603

tom@smithgardnerinc.com
cc: Jorge@smithgardnerinc.com

Transmittal
Laboratory Test Results
Brownfield Road C & D Landfill

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

Michael P. Smith
Regional Manager

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

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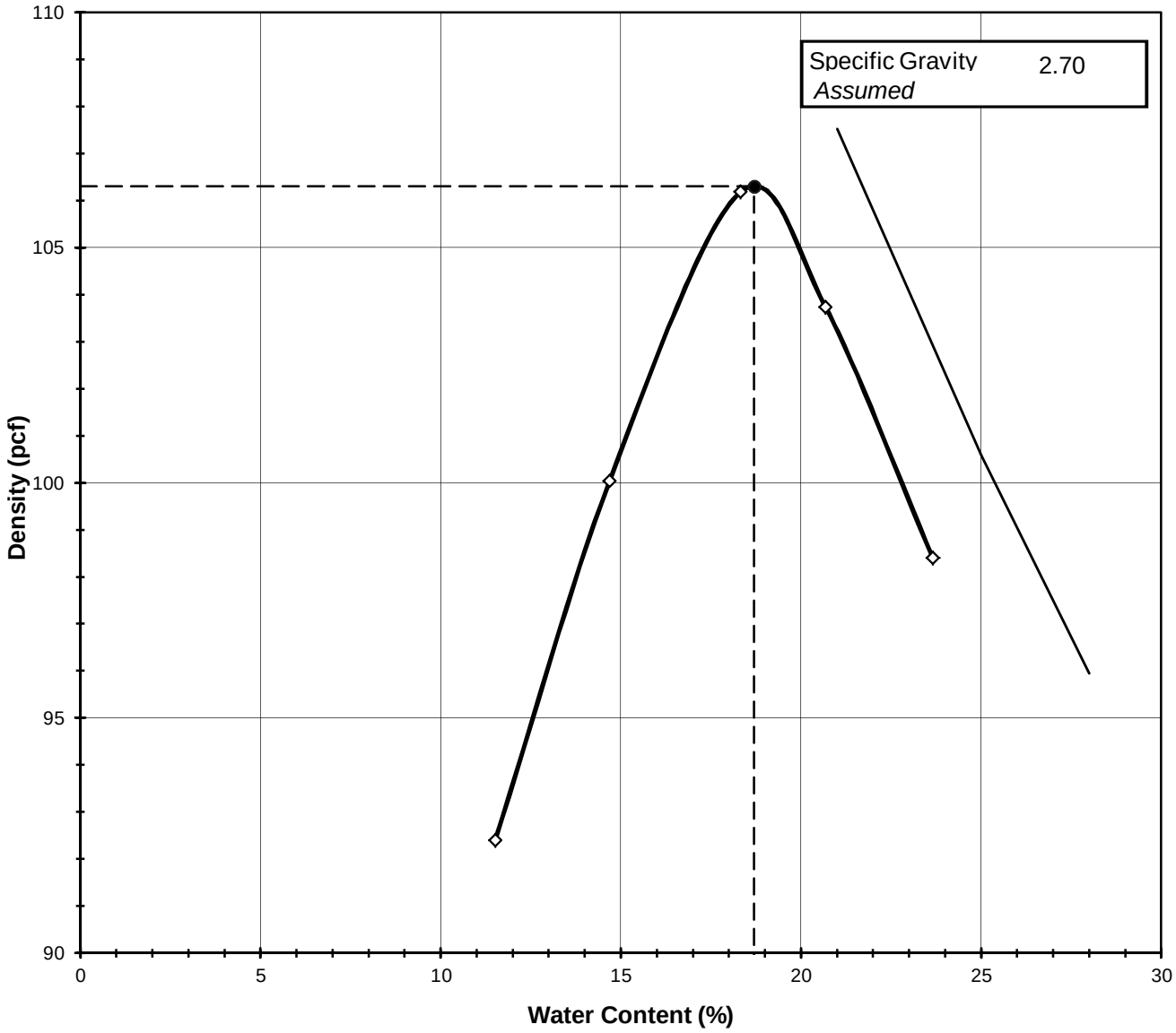
MOISTURE DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	SOUTHFILL
Client Reference:	BROWNFIELD ROAD C & D LF	Depth (ft):	NA
Project No.:	2014-700-01	Sample No.:	BF-SF-03
Lab ID:	2014-700-02-01	Test Method	**STANDARD**

Visual Description: LIGHT BROWN SANDY CLAY

Optimum Water Content	**18.7**
Maximum Dry Density	**106.3**



Tested By SFS *Date* *6/12/14* *Checked By* GEM *Date* 6/13/14

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client:	SMITH + GARDNER, INC.	Boring No.:	SOUTHFILL
Client Reference:	BROWNFIELD ROAD C & D LF	Depth (ft):	NA
Project No.:	2014-700-01	Sample No.:	BF-SF-03
Lab ID:	2014-700-02-01		

Visual Description: LIGHT BROWN SANDY CLAY

Total Weight of the Sample (g)	17950
As Received Water Content (%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	.5.8
Percent Retained on 3/8"	1
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

Test Type		**STANDARD**
Rammer Weight (lb)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	461
Mold diameter		4"
Weight of the Mold (g)		4181
Volume of the Mold (cm^3)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & Wet Sample (g)	5729	5905	6069	6062	6009
Wt.of Mold (g)	4181	4181	4181	4181	4181
Wt. of Wet Sample (g)	1548	1723	1887	1880	1828
Mold Volume (cm^3)	937	937	937	937	937

Moisture Content / Density

Tare Number	310	866	314	300	305
Wt. of Tare & Wet Sample (g)	490.00	573.80	522.90	608.60	583.80
Wt. of Tare & Dry Sample (g)	450.76	511.41	455.00	523.31	488.27
Wt. of Tare (g)	110.00	86.70	84.50	111.00	84.50
Wt. of Water (g)	39.24	62.39	67.90	85.29	95.53
Wt. of Dry Sample (g)	340.76	424.71	370.50	412.31	403.77

Wet Density (g/cm^3)	1.65	1.84	2.01	2.01	1.95
Wet Density (pcf)	103.0	114.7	125.6	125.2	121.7
Moisture Content (%)	**11.5**	**14.7**	**18.3**	**20.7**	**23.7**
Dry Density (pcf)	**92.4**	**100.0**	**106.2**	**103.7**	**98.4**

Zero Air Voids

Moisture Content (%)	21.0	25.0	28.0
Dry Unit Weight (pcf)	107.5	100.6	95.9

Tested By *SFS* *Date* *6/12/14* *Checked By* *GEM* *Date* 6/13/14

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Day:	**Mon.**
Date:	**6.9.14**
Log No.:	**01**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	Brown Field C&D LF	**Project No.:**	2014-700
Client Name:	Smith & Gardner	**Client Contact:**	Tom Maier
Site Location:	Garner, NC	**Time on Site:**	**Arrived:** 10:00am **Departed:** 3:00pm
General Contractor:	Baxter Johnson Contracting	**Superintendent:**	Brad

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Sunny	**Temperature:**	70's - 90's

Contractor's Equipment: 2 CAT D6K and 1 D6T Tracked Tractors, 2 Terex TA 400 and 1 CAT 725 Offroad Trucks, 1 CAT 345C and 1 320C Trackhoes, 1 Sakai Sheepsfoot Roller, 1 I.R. Smoothdrum Roller, 1 Water Truck

Contractor's Personnel: 1 Superintendent, 7 Operators

Description of Daily Activities & Events

- Geotechnics Rep. Jacob Buda (JRB) arrived onsite.
- Baxter Johnson Contracting (BJC) continued stripping and grubbing of Phase 2A - Cell 2.
- BJC continued clearing operations.
- BJC began Structural Fill placement and compaction in the South Access Road fill area.
- JRB performed CQA Moisture / Density including 1pt. Proctor testing of placed and compacted Structural Fill.
- Testing results demonstrated a material change from previously sampled Structural Fill material. While test results produced low compaction, roller and construction traffic produced a firm and unyielding surface. JRB will continue to monitor material change.
- Geotechnics Rep. departed the site.

Prepared By:	JRB	**Date:**	6.9.14	**Checked By:**	JRB	**Date:**	7.3.14

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Day:	**Tues.**
Date:	**6.10.14**
Log No.:	**02**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	Brown Field C&D LF	**Project No.:**	2014-700
Client Name:	Smith & Gardner	**Client Contact:**	Tom Maier
Site Location:	Garner, NC	**Time on Site:**	**Arrived:** 10:30am **Departed:** 3:00pm
General Contractor:	Baxter Johnson Contracting	**Superintendent:**	Brad

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title
Smith + Gardner	Jorge Montezuma - Staff Engineer

Weather Conditions:	Sunny	**Temperature:**	70's - 90's

Contractor's Equipment: 2 CAT D6K and 1 D6T Tracked Tractors, 2 Terex TA 400 and 1 CAT 725 Offroad Trucks, 1 CAT 345C and 1 320C Trackhoes, 1 Sakai Sheepsfoot Roller, 1 I.R. Smoothdrum Roller, 1 Water Truck

Contractor's Personnel: 1 Superintendent, 7 Operators

Description of Daily Activities & Events

- Geotechnics Rep. Jacob Buda (JRB) arrived onsite.
- Baxter Johnson Contracting (BJC) continued stripping, grubbing and clearing of Phase 2A - Cell 2.
- BJC continued Structural Fill placement and compaction in the South Access Road fill area.
- JRB performed CQA Moisture / Density including 1pt. Proctor testing of placed and compacted Structural Fill.
- JRB obtained a bulk sample of Structural Fill for lab testing.
- Smith + Gardner Rep. Jorge Montezuma was onsite to inspect erosion control features and do a site walk through.
- Geotechnics Rep. departed the site.

Prepared By:	JRB	**Date:**	6.10.14	**Checked By:**	JRB	**Date:**	7.3.14

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Day:	**Wed.**
Date:	**6.11.14**
Log No.:	**03**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	Brown Field C&D LF	**Project No.:**	2014-700
Client Name:	Smith & Gardner	**Client Contact:**	Tom Maier
Site Location:	Garner, NC	**Time on Site:**	**Arrived:** 9:00am **Departed:** 3:30pm
General Contractor:	Baxter Johnson Contracting	**Superintendent:**	Brad

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Sunny	**Temperature:**	70's - 90's

Contractor's Equipment: 2 CAT D6K and 1 D6T Tracked Tractors, 2 Terex TA 400 and 1 CAT 725 Offroad Trucks, 1 CAT 345C and 1 320C Trackhoes, 1 Sakai Sheepsfoot Roller, 1 I.R. Smoothdrum Roller, 1 Water Truck

Contractor's Personnel: 1 Superintendent, 7 Operators

Description of Daily Activities & Events

- Geotechnics Rep. Jacob Buda (JRB) arrived onsite.
- Baxter Johnson Contracting (BJC) continued clearing of Phase 2A - Cell 2.
- BJC continued Structural Fill placement and compaction in the South Access Road fill area.
- BJC began Structural Fill placement and compaction in the East Access Road fill area.
- JRB performed CQA Moisture / Density including 1pt. Proctor testing of placed and compacted Structural Fill.
- Geotechnics Rep. departed the site.

Prepared By:	JRB	**Date:**	6.11.14	**Checked By:**	JRB	**Date:**	7.3.14

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Day:	**Thurs.**
Date:	**6.12.14**
Log No.:	**04**
Page:	**1 of 1**

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Daily Field Activity Log

Project Name:	Brown Field C&D LF	**Project No.:**	2014-700
Client Name:	Smith & Gardner	**Client Contact:**	Tom Maier
Site Location:	Garner, NC	**Time on Site:**	**Arrived:** 7:30am **Departed:** 8:45am
General Contractor:	Baxter Johnson Contracting	**Superintendent:**	Brad

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Sunny	**Temperature:**	70's

Contractor's Equipment: 2 CAT D6K and 1 D6T Tracked Tractors, 2 Terex TA 400 and 1 CAT 725 Offroad Trucks, 1 CAT 345C and 1 320C Trackhoes, 1 Sakai Sheepsfoot Roller, 1 I.R. Smoothdrum Roller, 1 Water Truck

Contractor's Personnel: 1 Superintendent, 7 Operators

Description of Daily Activities & Events

- Geotechnics Rep. Jacob Buda (JRB) arrived onsite.
- Baxter Johnson Contracting (BJC) made no progress today due to wet site conditions. +1.0" of rain has accumulated onsite overnight.
- Southeastern Erosion Control was onsite to install Erosion Control Blanket (ECB) on the slope of the South Access Road.
- BJC continued clearing operations.
- BJC repaired silt fence outlets at the toe of the East Fill area.
- Geotechnics Rep. departed the site.

Prepared By:	JRB	**Date:**	6.12.14	**Checked By:**	JRB	**Date:**	7.3.14

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Client: SMITH + GARDNER
Project Name : BROWNFIELD RD. C&D LF PHASE 2A - CELL 2
Project Number : 2014-700

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Field Density Report

Report Number :	**SFFDR-01**	Geotechnics Representative :	JACOB R. BUDA
Date (s) :	**6.9. - 6.12.-14**	Reviewed By : JRB	DATE: 7.3.14

Contractor :	BAXTER JOHNSON CONTRACTING	Borrow Source :	Onsite Excavation

Gauge Number	Gauge Model	Compaction Equipment :	1 Sakai Sheepsfoot Roller and construction traffic
33577	3440		

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
ND 01	SOUTH FILL	LIFT 1	6"	700-02-01	106.3	18.7	**120.6**	**15.9**	**104.1**	**97.9%**	**95.0%**	6.9.14
ND 02	SOUTH FILL	LIFT 2	6"	1pt.-01 & 02	97.0	21.2	**112.4**	**19.4**	**94.1**	**97.0%**	**95.0%**	
ND 03	SOUTH FILL	LIFT 3	6"	1pt.-01 & 02	97.0	21.2	**111.9**	**18.9**	**94.1**	**97.0%**	**95.0%**	
ND 04	SOUTH FILL	LIFT 4	6"	700-02-01	106.3	18.7	**121.6**	**16.2**	**104.6**	**98.4%**	**95.0%**	6.9.14
ND 05	SOUTH FILL	LIFT 5	6"	1pt.-01 & 02	97.0	21.2	**110.5**	**19.1**	**92.8**	**95.6%**	**95.0%**	6.10.14
ND 06	SOUTH FILL	LIFT 5	6"	1pt.-01 & 02	97.0	21.2	**111.0**	**19.2**	**93.1**	**96.0%**	**95.0%**	
ND 07	SOUTH FILL	LIFT 5	6"	1pt.-01 & 02	97.0	21.2	**113.9**	**18.5**	**96.1**	**99.1%**	**95.0%**	6.10.14
ND 08	SOUTH FILL	LIFT 6	6"	700-02-01	106.3	18.7	**119.0**	**16.6**	**102.1**	**96.0%**	**95.0%**	6.11.14
ND 09	SOUTH FILL	LIFT 6	6"	700-02-01	106.3	18.7	**120.0**	**17.2**	**102.4**	**96.3%**	**95.0%**	
ND 10	EAST FILL	LIFT 1	6"	1pt.-01 & 02	97.0	21.2	**110.2**	**16.2**	**94.8**	**97.8%**	**95.0%**	
ND 11	SOUTH FILL	LIFT 7	6"	700-02-01	106.3	18.7	**121.3**	**17.1**	**103.6**	**97.4%**	**95.0%**	
ND 12	SOUTH FILL	LIFT 7	6"	1pt.-01 & 02	97.0	21.2	**113.9**	**18.8**	**95.9**	**98.8%**	**95.0%**	
ND 13	EAST FILL	LIFT 2	6"	700-01-02	108.9	16.8	**122.0**	**12.7**	**108.3**	**99.4%**	**95.0%**	
ND 14	EAST FILL	LIFT 3	6"	1pt.-01 & 02	97.0	21.2	**111.2**	**16.9**	**95.1**	**98.1%**	**95.0%**	
ND 15	EAST FILL	LIFT 4	6"	1pt.-01 & 02	97.0	21.2	**111.5**	**18.1**	**94.4**	**97.3%**	**95.0%**	
ND 16	EAST FILL	LIFT 5	6"	1pt.-01 & 02	97.0	21.2	**111.7**	**17.6**	**95.0**	**97.9%**	**95.0%**	6.11.14

Client: SMITH + GARDNER
Project Name : BROWNFIELD RD. C&D LF PHASE 2A - CELL 2
Project Number : 2014-700

Report Number : **SFFDR-01**
Date (s) : 6.9.- 6.12.14

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-01	DC-02
Nuclear Test Number :	ND-05	ND-10
Location:	SOUTH FILL	EAST FILL
Depth (ft):	LIFT 5	LIFT 1
Date :	6.10.14	6.11.14

Mold

Cylinder ID	JB-DC-06	JB-DC-06
Weight of Cylinder (lbs.)	1.50	1.50
Volume of Cylinder (ft^3)	0.033	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.19	5.17
Wt. of Cylinder (lbs.)	1.50	1.50
Wt. of WS	3.69	3.67
Cylinder Volume (ft^3)	0.033	0.033

Moisture / Density

Tare Number	Z-1	Z-1
Wt. of Tare & WS (gm)	543.78	412.04
Wt. of Tare & DS (gm)	491.06	383.10
Wt. of Tare (gm)	214.06	214.06
Wt. of Water (gm)	52.72	28.94
Wt. of DS (gm)	277.00	169.04
Wet Density (pcf):	111.8	111.2
Moisture Content (%):	**19.0**	**17.1**
Dry Density (pcf):	**93.9**	**95.0**

Geotechnics Representative : JACOB R. BUDA

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Client: SMITH + GARDNER
Project Name : BROWNFIELD RD. C&D LF PHASE 2A - CELL 2
Project Number : 2014-700

Report Number : **SFFDR-01**
Date (s) : 6.9.- 6.12.14

ONE POINT PROCTOR - Method for Soil Identification

Test Information

Test Number :	1pt-01	1pt-02
Location:	SOUTH FILL	SOUTH FILL
Depth (ft):	LIFT 2	LIFT 5
Date :	6.9.14	6.10.14

Mold

Weight of Mold (lbs.)	4.49	4.49
Volume OF Mold (ft^3)	0.033	0.033

Specimen

Weight of Mold & WS (lbs)	8.15	8.19
Weight of Mold (lbs)	4.49	4.49
Weight of WS (lbs)	3.66	3.70
Volume OF Mold (ft^3)	0.033	0.033

Moisture / Density

Tare Number	JB-01	JB-01
Wt. of Tare & WS (gm)	408.40	398.60
Wt. of Tare & DS (gm)	356.50	349.60
Wt. of Tare (gm)	87.00	87.10
Wt. of Water (gm)	51.90	49.00
Wt. of DS (gm)	269.50	262.50
Wet Density (pcf):	110.9	112.1
Moisture Content (%):	**19.3**	**18.7**
Dry Density (pcf):	**93.0**	**94.5**

Geotechnics Representative : Jacob R. Buda

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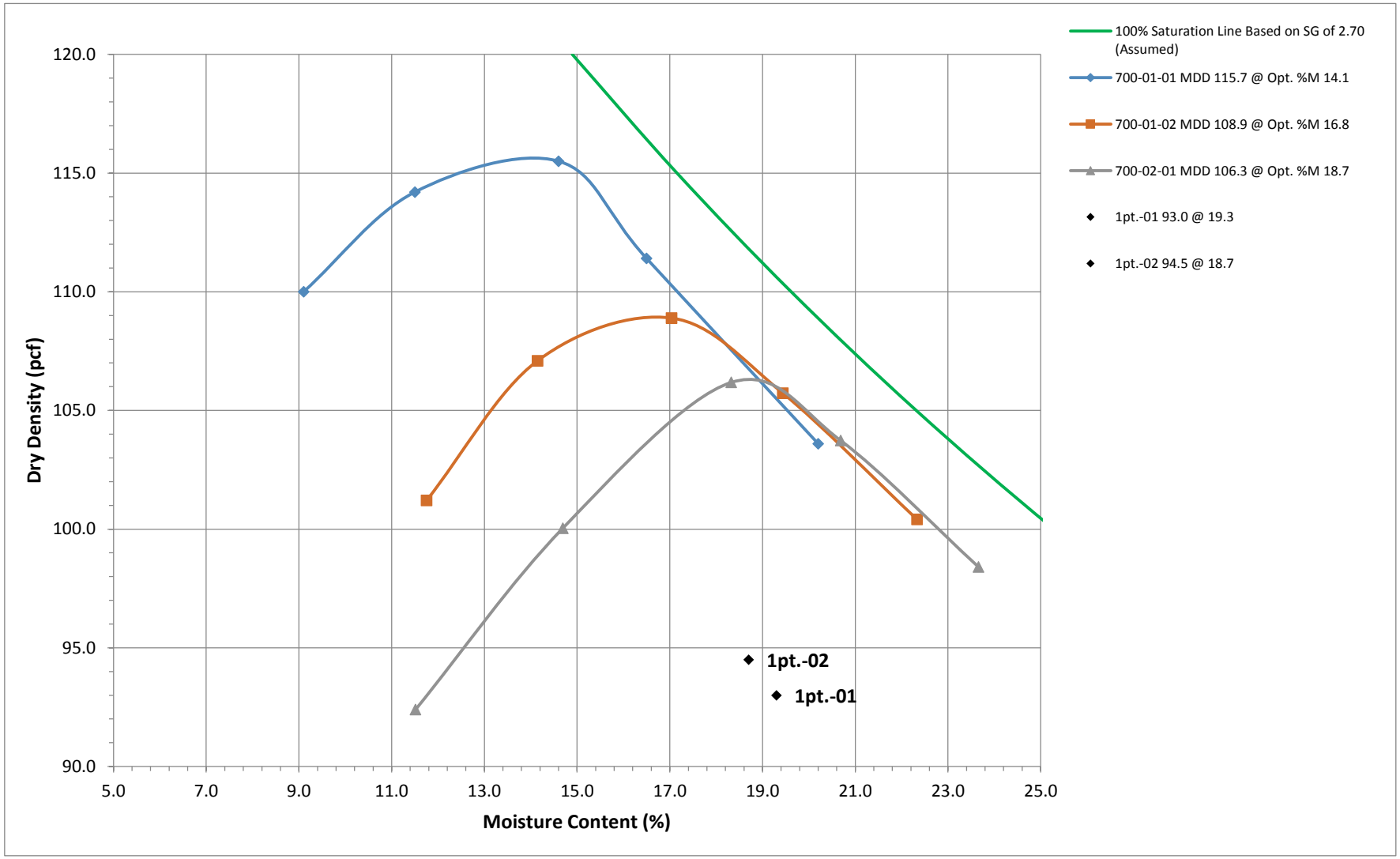
Phase 2A - Cell 2 Structural Fill Proctors

Client: Smith + Gardner Engineers
Project Name : Brownfield Road C&D LF Phase 2A - Cell 2
Project Number : 2014-700



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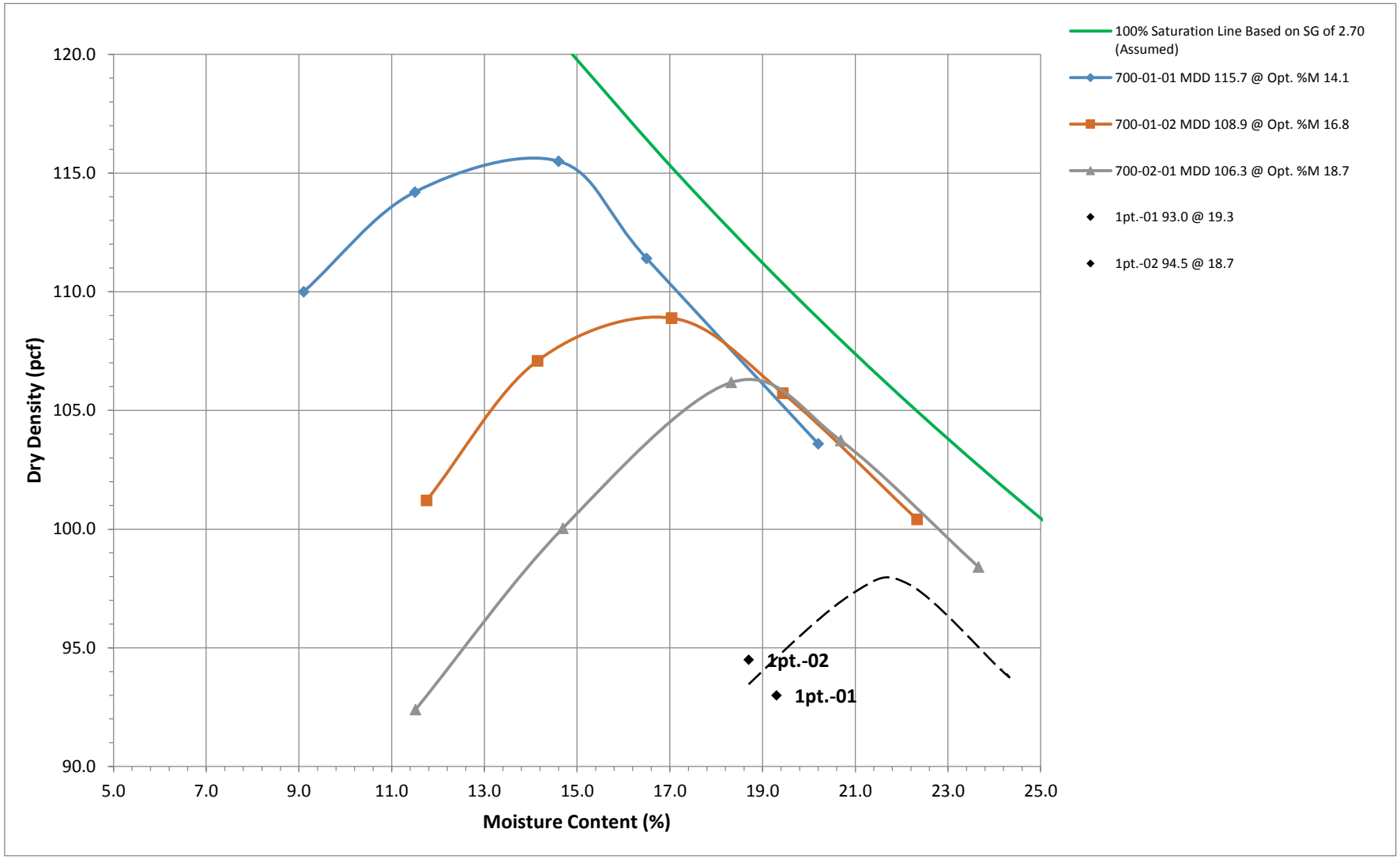
Phase 2A - Cell 2 Structural Fill Proctors

Client: Smith + Gardner Engineers
Project Name : Brownfield Road C&D LF Phase 2A - Cell 2
Project Number : 2014-700



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Day:	**Mon.**
Date:	**6.16.14**
Log No.:	**05**
Page:	**1 of 1**

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Daily Field Activity Log

Project Name:	Brown Field C&D LF	**Project No.:**	2014-700
Client Name:	Smith & Gardner	**Client Contact:**	Tom Maier
Site Location:	Garner, NC	**Time on Site:**	**Arrived:** 7:30am **Departed:** 11:30am
General Contractor:	Baxter Johnson Contracting	**Superintendent:**	Brad

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Sunny	**Temperature:**	70's - 80's

Contractor's Equipment: 2 CAT D6K and 1 D6T Tracked Tractors, 2 Terex TA 400 and 1 CAT 725 Offroad Trucks, 1 CAT 345C and 1 320C Trackhoes, 1 Sakai Sheepsfoot Roller, 1 I.R. Smoothdrum Roller, 1 Water Truck

Contractor's Personnel: 1 Superintendent, 7 Operators

Description of Daily Activities & Events

- Geotechnics Rep. Jacob Buda (JRB) arrived onsite.
- Baxter Johnson Contracting (BJC) continued stripping, grubbing and clearing of Phase 2A - Cell 2.
- BJC installed Geotextile and compacted ABC stone for the South Perimeter Access Road.
- BJC continued Structural Fill placement and compaction in the East Fill area.
- JRB performed CQA Moisture / Density of placed and compacted Structural Fill
- Geotechnics Rep. departed the site.

Prepared By:	JRB	**Date:**	6.16.14	**Checked By:**	JRB	**Date:**	7.3.14

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Day:	**Tues.**
Date:	**6.17.14**
Log No.:	**06**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	Brown Field C&D LF	**Project No.:**	2014-700
Client Name:	Smith & Gardner	**Client Contact:**	Tom Maier
Site Location:	Garner, NC	**Time on Site:**	7:30am 9:30am 11:00am 1:00pm
General Contractor:	Baxter Johnson Contracting	**Superintendent:**	Brad

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title
Smith + Gardner	Jorge Montezuma - Staff Engineer

Weather Conditions:	Sunny	**Temperature:**	70's - 90's

Contractor's Equipment: 2 CAT D6K and 1 D6T Tracked Tractors, 2 Terex TA 400 and 1 CAT 725 Offroad Trucks, 1 CAT 345C and 1 320C Trackhoes, 1 Sakai Sheepsfoot Roller, 1 I.R. Smoothdrum Roller, 1 Water Truck

Contractor's Personnel: 1 Superintendent, 7 Operators

Description of Daily Activities & Events

- Geotechnics Rep. Jacob Buda (JRB) arrived onsite.
- Baxter Johnson Contracting (BJC) continued stripping, grubbing and clearing of Phase 2A - Cell 2.
- BJC continued Structural Fill placement and compaction in the East Fill area.
- JRB performed CQA Moisture / Density of placed and compacted Structural Fill
- Geotechnics Rep. departed the site.

Prepared By:	JRB	**Date:**	6.17.14	**Checked By:**	JRB	**Date:**	7.3.14

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Day:	**Wed.**
Date:	**6.18.14**
Log No.:	**07**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	Brown Field C&D LF	**Project No.:**	2014-700
Client Name:	Smith & Gardner	**Client Contact:**	Tom Maier
Site Location:	Garner, NC	**Time on Site:**	7:30am 9:30am 1:00pm 3:00pm
General Contractor:	Baxter Johnson Contracting	**Superintendent:**	Brad

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Sunny	**Temperature:**	70's - 90's

Contractor's Equipment: 2 CAT D6K and 1 D6T Tracked Tractors, 2 Terex TA 400 and 1 CAT 725 Offroad Trucks, 1 CAT 345C and 1 320C Trackhoes, 1 Sakai Sheepsfoot Roller, 1 I.R. Smoothdrum Roller, 1 Water Truck

Contractor's Personnel: 1 Superintendent, 7 Operators

Description of Daily Activities & Events

- Geotechnics Rep. Jacob Buda (JRB) arrived onsite.
- Baxter Johnson Contracting (BJC) continued stripping, grubbing and clearing of Phase 2A - Cell 2.
- BJC continued Structural Fill placement and compaction in the East Fill area.
- JRB performed CQA Moisture / Density of placed and compacted Structural Fill
- Geotechnics Rep. departed the site.

Prepared By:	JRB	**Date:**	6.18.14	**Checked By:**	JRB	**Date:**	7.3.14

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Day:	**Thurs.**
Date:	**6.19.14**
Log No.:	**08**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	Brown Field C&D LF	**Project No.:**	2014-700
Client Name:	Smith & Gardner	**Client Contact:**	Tom Maier
Site Location:	Garner, NC	**Time on Site:**	**Arrived:** 7:15am **Departed:** 8:15am
General Contractor:	Baxter Johnson Contracting	**Superintendent:**	Brad

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Sunny	**Temperature:**	70's

Contractor's Equipment: 2 CAT D6K and 1 D6T Tracked Tractors, 2 Terex TA 400 and 1 CAT 725 Offroad Trucks, 1 CAT 345C and 1 320C Trackhoes, 1 Sakai Sheepsfoot Roller, 1 I.R. Smoothdrum Roller, 1 Water Truck

Contractor's Personnel: 1 Superintendent, 7 Operators

Description of Daily Activities & Events

- Geotechnics Rep. Jacob Buda (JRB) arrived onsite.
- Baxter Johnson Contracting (BJC) continued stripping, grubbing and clearing of Phase 2A - Cell 2.
- BJC continued Structural Fill placement and compaction in the East Fill area.
- JRB performed CQA Moisture / Density of placed and compacted Structural Fill
- Geotechnics Rep. departed the site.

Prepared By:	JRB	**Date:**	6.19.14	**Checked By:**	JRB	**Date:**	7.3.14

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Day:	**Fri.**
Date:	**6.20.14**
Log No.:	**09**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	Brown Field C&D LF	**Project No.:**	2014-700
Client Name:	Smith & Gardner	**Client Contact:**	Tom Maier
Site Location:	Garner, NC	**Time on Site:**	7:30am 9:30am 11:30am 2:00pm
General Contractor:	Baxter Johnson Contracting	**Superintendent:**	Brad

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Sunny	**Temperature:**	70's - 80's

Contractor's Equipment: 2 CAT D6K and 1 D6T Tracked Tractors, 2 Terex TA 400 and 1 CAT 725 Offroad Trucks, 1 CAT 345C and 1 320C Trackhoes, 1 Sakai Sheepsfoot Roller, 1 I.R. Smoothdrum Roller, 1 Water Truck

Contractor's Personnel: 1 Superintendent, 7 Operators

Description of Daily Activities & Events

- Geotechnics Rep. Jacob Buda (JRB) arrived onsite.
- Baxter Johnson Contracting (BJC) continued stripping, grubbing and clearing of Phase 2A - Cell 2.
- BJC continued Structural Fill placement and compaction in the East Fill area.
- JRB performed CQA Moisture / Density of placed and compacted Structural Fill
-
- BJC repaired silt fence outlets at the toe of the East Fill area.
- Geotechnics Rep. departed the site.

Prepared By:	JRB	**Date:**	6.20.14	**Checked By:**	JRB	**Date:**	7.3.14

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Client: SMITH + GARDNER
Project Name : BROWNFIELD RD. C&D LF PHASE 2A - CELL 2
Project Number : 2014-700

Field Density Report

Report Number :	**SFFDR-02**	Geotechnics Representative :	Jacob Buda
Date (s) :	**6.16. - 6.20.-14**	Reviewed By : JRB	DATE: 7.3.14

Contractor :	BAXTER JOHNSON CONTRACTING	Borrow Source :	Onsite Excavation

Gauge Number	Gauge Model	Compaction Equipment :	1 Sakai Sheepsfoot Roller and construction traffic
33577	3440		

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
ND 01	SOUTH FILL	~ GRADE	6"	700-02-01	106.3	18.7	**121.5**	**12.6**	**107.9**	**101.5%**	**95.0%**	6.16.14
ND 02	SOUTH FILL	~ - 1'	6"	700-02-01	106.3	18.7	**124.5**	**14.7**	**108.5**	**102.1%**	**95.0%**	
ND 03	SOUTH FILL	~ - 2'	12"	700-02-01	106.3	18.7	**123.7**	**13.7**	**108.8**	**102.3%**	**95.0%**	
ND 04	EAST FILL	LIFT 6	6"	700-01-02	108.9	16.8	**122.9**	**13.3**	**108.5**	**99.6%**	**95.0%**	
ND 05	EAST FILL	LIFT 6	6"	700-01-02	108.9	16.8	**123.7**	**12.4**	**110.1**	**101.1%**	**95.0%**	6.16.14
ND 06	EAST FILL	LIFT 7	6"	700-01-02	108.9	16.8	**122.9**	**11.9**	**109.8**	**100.9%**	**95.0%**	6.17.14
ND 07	EAST FILL	LIFT 7	6"	700-01-02	108.9	16.8	**125.5**	**12.0**	**112.1**	**102.9%**	**95.0%**	6.17.14
ND 08	EAST FILL	LIFT 8	6"	700-01-02	108.9	16.8	**119.4**	**13.5**	**105.2**	**96.6%**	**95.0%**	6.18.14
ND 09	EAST FILL	LIFT 8	6"	700-01-02	108.9	16.8	**120.1**	**11.1**	**108.1**	**99.3%**	**95.0%**	
ND 10	EAST FILL	LIFT 9	6"	700-01-02	108.9	16.8	**121.4**	**13.2**	**107.2**	**98.5%**	**95.0%**	
ND 11	EAST FILL	LIFT 9	6"	700-01-02	108.9	16.8	**122.7**	**14.2**	**107.4**	**98.7%**	**95.0%**	6.18.14
ND 12	EAST FILL	LIFT 10	6"	700-02-01	106.3	18.7	**120.7**	**15.7**	**104.3**	**98.1%**	**95.0%**	6.20.14
ND 13	EAST FILL	LIFT 10	6"	700-02-01	106.3	18.7	**119.8**	**14.7**	**104.4**	**98.3%**	**95.0%**	
ND 14	EAST FILL	LIFT 11	6"	700-02-01	106.3	18.7	**121.4**	**14.5**	**106.0**	**99.7%**	**95.0%**	
ND 15	EAST FILL	LIFT 11	6"	700-02-01	106.3	18.7	**119.7**	**15.7**	**103.5**	**97.3%**	**95.0%**	
ND 16	EAST FILL	LIFT 11	6"	700-02-01	106.3	18.7	**120.4**	**15.0**	**104.7**	**98.5%**	**95.0%**	6.20.14

Client:	SMITH + GARDNER
Project Name :	BROWNFIELD RD. C&D LF PHASE 2A - CELL 2
Project Number :	2014-700

Report Number :	**SFFDR-02**
Date (s) :	6.16. - 6.20.14

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-03
Nuclear Test Number :	ND-08
Location:	EAST FILL
Depth (ft):	LIFT 8
Date :	6.18.14

Mold

Cylinder ID	JB-DC-06
Weight of Cylinder (lbs.)	1.50
Volume of Cylinder (ft^3)	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.48
Wt. of Cylinder (lbs.)	1.50
Wt. of WS	3.98
Cylinder Volume (ft^3)	0.033

Moisture / Density

Tare Number	JB-01
Wt. of Tare & WS (gm)	341.80
Wt. of Tare & DS (gm)	310.70
Wt. of Tare (gm)	86.40
Wt. of Water (gm)	31.10
Wt. of DS (gm)	224.30
Wet Density (pcf):	120.6
Moisture Content (%):	**13.9**
Dry Density (pcf):	**105.9**

Geotechnics Representative : JACOB R. BUDA

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Day:	**Wed**
Date:	**6.25.14**
Log No.:	**10**
Page:	**1 of 2**

geotechnics
INTEGRITY IN TESTING

Daily Field Report

Project Name:	BrownField C&D Landfill	**Project No.:**	2014-700
Client Name:	Smith + Gardner Inc.	**Client Contact:**	Tom Maier
Site Location:	Garner, NC	**Time on Site:**	**Arrived:** 12:30 PM **Departed:** 4:30 PM
General Contractor:	Baxter Johnson Contracting	**Superintendent:**	Brad

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Sunny **Temperature:** 78-87 F

Contractor's Equipment: (2) CAT D6 Dozers, (3) Terex TA 400 Off-Road Haul Trucks, (1) Sakai Sheep Foot Compactor, (1) I R Smooth Drum Roller, (1) CAT 345C Excavator, (1) Water Truck.

Contractor's Personnel: 8

Description of Daily Activities & Events

- Geotechnics CQA Representitive Abe Gaeta arrived on-site.
- Baxter Johnson Contracting operators continued excavating fill material from areas within Phase 2A - Cell 2. Workers placed fill material within east road. Compacted lifts of 8" were tested by Geotechnics Rep.
- Geotechnics Rep. performed (3) In-place nuclear density tests along east road.
- In addition Geotechnics Rep. took a 1-point proctor on-site using material at test location ND-18.
- Geotechnics Rep. departed jobsite.

Prepared By:	APG	**Date:**	6.25.14	**Checked By:**	MPS	**Date:**	6.30.14

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Day:	Thursday
Date:	6.26.14
Log No.:	11
Page:	2 of 2

Geotechnics
INTEGRITY IN TESTING

Daily Field Report

Project Name:	BrownField C&D Landfill	**Project No.:**	2014-700
Client Name:	Smith + Gardner Inc.	**Client Contact:**	Tom Maier
Site Location:	Garner, NC	**Time on Site:**	**Arrived:** 10:00 AM **Departed:** 12:00 PM
General Contractor:	Baxter Johnson Contracting	**Superintendent:**	Brad

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Sunny **Temperature:** 70-83 F

Contractor's Equipment: (2) CAT D6 Dozers, (3) Terex TA 400 Off-Road Haul Trucks, (1) Sakai Sheep Foot Compactor, (1) I R Smooth Drum Roller, (1) CAT 345C Excavator, (1) Water Truck.

Contractor's Personnel: 8

Description of Daily Activities & Events

- Geotechnics CQA Representitive Abe Gaeta arrived on-site.
- Baxter Johnson Contracting operators continued excavating fill material from areas within Phase 2A - Cell 2. Workers placed fill material within east road. Compacted lifts of 8" were tested by Geotechnics Rep.
- Geotechnics Rep. performed (4) In-place nuclear density tests along east road.
- Geotechnics Rep. departed jobsite.

Prepared By:	APG	**Date:**	6.26.14	**Checked By:**	MPS	**Date:**	6.30.14

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Client: Smith + Gardner Inc.
Project Name : BrownField C&D Landfill
Project Number : 2014-700

Geotechnics
INTEGRITY IN TESTING

Field Density Report

Report Number : **SFFDR-03**		Geotechnics Representative : Abe Gaeta	Page : 1 of 3
Date (s) : **6.25, 6.26, & 6.30.14**		Reviewed By : MPS	Date : 6.30.14
Contractor : Baxter Johnson Contracting		Borrow Source : On-site Undercut @ Cell Phase 2A - Cell 2	
Superintendent : Brad			
Gauge Number	Gauge Model	Compaction Equipment :	(1) Sakai Sheepsfoot Compactor, (1) I R Smooth Drum Roller, and (1) CAT D6 Dozer.
32387	3440		
Moisture Offset = N/A	WD Offset = N/A	Rod Depth= 8"	MS= 685 DS= 2266

Test Number		Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
						MDD pcf	Opt. %M	WD (pcf)	%M	DD (pcf)	% C	Req %	
ND -	17	East Fill	Lift 13	8"	700-02-01	106.3	18.7	**116.5**	**13.4**	**102.7**	**96.6%**	**95.0%**	Tested on 6.25.14
ND -	18	East Fill	Lift 13	8"	700-01-02	108.9	16.8	**123.2**	**15.1**	**107.0**	**98.3%**	**95.0%**	Tested on 6.25.14 / 1pt.01 location
DC -	19	East Fill	Lift 13	8"	700-02-01	106.3	18.7	**119.9**	**13.6**	**105.5**	**99.3%**	**95.0%**	Tested on 6.25.14
ND -	20	East Fill	Lift 14	8"	700-01-02	108.9	16.8	**125.1**	**14.5**	**109.3**	**100.3%**	**95.0%**	Tested on 6.26.14
ND -	21	East Fill	Lift 14	8"	700-02-01	106.3	18.7	**119.2**	**14.0**	**104.6**	**98.4%**	**95.0%**	Tested on 6.26.14
ND -	22	East Fill	Lift 14	8"	700-02-01	106.3	18.7	**120.5**	**15.7**	**104.1**	**98.0%**	**95.0%**	Tested on 6.26.14
ND -	23	East Fill	Lift 14	8"	700-02-01	106.3	18.7	**117.6**	**13.5**	**103.6**	**97.5%**	**95.0%**	Tested on 6.26.14
ND -	24	East Fill	Lift 15	8"	700-02-01	106.3	18.7	**119.4**	**14.3**	**104.5**	**98.3%**	**95.0%**	Tested on 6.30.14
ND -	25	East Fill	Lift 15	8"	700-02-01	106.3	18.7	**118.9**	**14.9**	**103.5**	**97.3%**	**95.0%**	Tested on 6.30.14
ND -	26	East Fill	Lift 15	8"	700-01-02	108.9	16.8	**123.8**	**15.6**	**107.1**	**98.3%**	**95.0%**	Tested on 6.30.14
ND -	27	East Fill	Lift 15	8"	700-02-01	106.3	18.7	**120.7**	**15.2**	**104.8**	**98.6%**	**95.0%**	Tested on 6.30.14

Client: Smith + Gardner Inc.
Project Name : BrownField C&D Landfill
Project Number : 2014-700

Report Number : **SFFDR-03**
Date (s) : 6.25.14

ONE POINT PROCTOR - Method for Soil Identification

Test Information

Test Number :	1pt-01
Location:	ND-18
Depth:	Lift 13
Date:	6.25.14

Mold

Weight of Mold (lbs.)	9.25
Volume OF Mold (ft^3)	0.033

Specimen

Weight of Mold & WS (lbs)	13.49
Weight of Mold (lbs)	9.25
Weight of WS (lbs)	4.24
Volume of Mold (ft^3)	0.033

Moisture / Density

Tare Number	Z-1
Wt. of Tare + WS (gm)	724.40
Wt. of Tare + DS (gm)	654.00
Wt. of Tare (gm)	206.60
Wt of water (gm)	70.40
Wt. of DS (gm)	447.40
Wet Density (pcf):	128.5
Moisture Content (%):	**15.7**
Dry Density (pcf):	**111.0**

Comments: 1pt-01 was performed on-site. Water was added to material prior to testing.

Geotechnics Representative : Abe Gaeta

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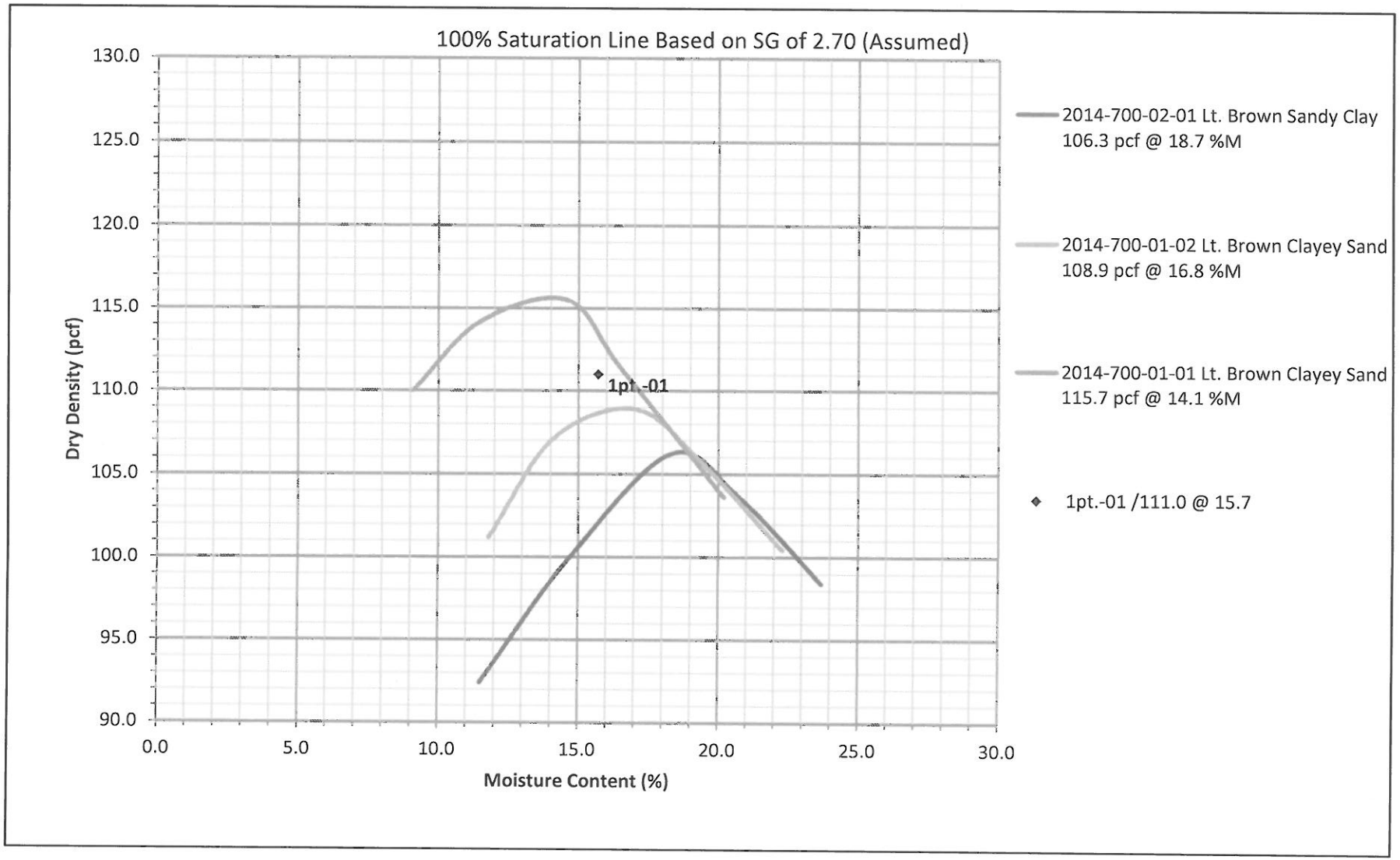
INTEGRITY IN TESTING

Fly Ash Moisture Density Relationships

Date: 6.25.14
Client: Smith + Gardner Inc.
Project Name : BrownField C&D Landfill
Project Number : 2014-700



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Day:	**Tues.**
Date:	**7.1.14**
Log No.:	**12**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	Brown Field C&D LF	**Project No.:**	2014-700
Client Name:	Smith + Gardner	**Client Contact:**	Tom Maier
Site Location:	Garner, NC	**Time on Site:**	**Arrived:** 8:45am **Departed:** 9:45am
General Contractor:	Baxter Johnson Contracting	**Superintendent:**	Brad Murray

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Sunny	**Temperature:**	70's - 80's

Contractor's Equipment: 2 CAT D6K and 1 D6T Tracked Tractors, 2 Terex TA 400 and 1 CAT 725 Offroad Trucks, 1 CAT 345C and 1 320C Trackhoes, 1 Sakai Sheepsfoot Roller, 1 I.R. Smoothdrum Roller, 1 Water Truck

Contractor's Personnel: 1 Superintendent, 7 Operators

Description of Daily Activities & Events

- Geotechnics Rep. Jacob Buda (JRB) arrived onsite.
- Baxter Johnson Contracting (BJC) continued excavation of Phase 2A - Cell 2.
- BJC continued Structural Fill placement and compaction in the East Fill area.
- JRB performed CQA Moisture / Density of placed and compacted Structural Fill.
- A Progress Meeting was held at approx. 9:00am. WI, Smith + Gardner, BJC, and Geotechnics Reps. were in attendance (see Meeting Minutes for details).
- Geotechnics Rep. departed the site.

Prepared By:	JRB	**Date:**	7.1.14	**Checked By:**	JRB	**Date:**	7.8.14

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Day:	**Wed.**
Date:	**7.2.14**
Log No.:	**13**
Page:	**1 of 1**

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	Brown Field C&D LF	**Project No.:**	2014-700
Client Name:	Smith + Gardner	**Client Contact:**	Tom Maier
Site Location:	Garner, NC	**Time on Site:**	**Arrived:** 10:00am **Departed:** 11:00am
General Contractor:	Baxter Johnson Contracting	**Superintendent:**	Brad Murray

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Sunny	**Temperature:**	70's - 80's

Contractor's Equipment: 2 CAT D6K and 1 D6T Tracked Tractors, 2 Terex TA 400 and 1 CAT 725 Offroad Trucks, 1 CAT 345C and 1 320C Trackhoes, 1 Sakai Sheepsfoot Roller, 1 I.R. Smoothdrum Roller, 1 Water Truck

Contractor's Personnel: 1 Superintendent, 7 Operators

Description of Daily Activities & Events

- Geotechnics Rep. Jacob Buda (JRB) arrived onsite.
- Baxter Johnson Contracting (BJC) continued excavation of Phase 2A - Cell 2.
- JRB performed CQA Moisture / Density of placed and compacted Structural Fill.
- Geotechnics Rep. departed the site.

Prepared By:	JRB	**Date:**	7.2.14	**Checked By:**	JRB	**Date:**	7.8.14

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Client: SMITH + GARDNER
Project Name : BROWNFIELD RD. C&D LF PHASE 2A - CELL 2
Project Number : 2014-700

geotechnic INTEGRITY IN TESTI

Field Density Report

Report Number :	**SFFDR-04**	Geotechnics Representative :	Jacob Buda
Date (s) :	**7.1. - 7.2.14**	Reviewed By : JRB	DATE: 7.8.14

Contractor :	BAXTER JOHNSON CONTRACTING	Borrow Source :	Onsite Excavation

Gauge Number	Gauge Model	Compaction Equipment :	1 Sakai Sheepsfoot Roller and construction traffic
33577	3440		

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
ND 01	EAST FILL	LIFT 12	6"	700-01-01	115.7	14.1	**128.3**	**13.4**	**113.1**	**97.8%**	**95.0%**	
ND 02	EAST FILL	LIFT 12	6"	700-02-01	106.3	18.7	**114.1**	**11.1**	**102.7**	**96.6%**	**95.0%**	
ND 03	EAST FILL	LIFT 13	6"	700-02-01	106.3	18.7	**117.6**	**15.4**	**101.9**	**95.9%**	**95.0%**	
ND 04	EAST FILL	LIFT 13	6"	700-01-02	108.9	16.8	**124.7**	**15.6**	**107.9**	**99.1%**	**95.0%**	

Geotechnics

Memo

To: Tom Maier, Jorge Montezuma

From: Jacob Buda & Abram Gaeta

CC: Michael Smith, Randy O'Rourke

Date: 7/18/2014

Re: Brownfield Rd Landfill Compaction Observations 6/9/14 through 7/3/14

While onsite for compaction testing at the above referenced Brownfield Rd Landfill, we observed no rutting or pumping in the placed compacted fill. Additionally no signs of deflection were observed under construction traffic. Visually the material appeared to be well compacted throughout all of the lifts observed. The attached picture is further evidence of how well compacted the fill material is.

Thank You,
Jacob Buda & Abram Gaeta
Geotechnics

Photo of compacted soil at Brownfield Rd Landfill on 6/10/14.

Appendix G

Geotextile CQA Data

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Cell 2
Raleigh, North Carolina

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Baxter Johnson Contracting, Inc.
PO Box 33343
Raleigh, NC 27636
919-851-2617

LETTER OF SUBMITTAL

To: Jorge Montezuma
Smith Garner, Inc.
14 N Boyland Avenue
Raleigh, NC 27603

Date: 5/28/2014
Job: Brownfield Rd. C&D Landfill
Re: CMP pipe, erosion control & fabric submittals

We are sending you : _X_ Attached __ Under separate cover via ____ the following items:

__ Shop Drawings __ Prints __ Plans

__ Specifications __ Samples __ Copy of Letter

__ Change Order __ Other: _____

Copies	Date	Description
1	5/28/2014	GT-S Fabric - GT180

These are being transmitted as checked below:

_X_ For Approval __ Approved as Submitted __ Resubmit ___ Copies for Approval

__ For Your Use __ Approved as Noted __ Submit __ Copies for Distribution

_X_ As Requested __ Returned for Corrections __ Return __ Corrected Prints

_X_ For Review and Comments __ For Bids Due on _____ __ Executed and Returned

SHOP DRAWING

☐ **Furnish as Submitted**

☑ **Furnish as Noted (See Attached Comments)**

☐ **Revise and Resubmit**

☐ **Rejected**

By: _____

Date: 6/2/2014

Note that the Engineer's review is confined to the general arrangement and compliance with the Contract Documents and does not relieve the Contractor of the responsibility of correcting all errors, deviations, and/or omissions which may be related to the submittal.

Remarks:

S+G Note: The geotextile must be strength class 2 as per AASHTO M 288. Geotextile must meet Required Geotextile Properties as outlined on Construction Contract page "Geotextiles Page 02240-5".

Sincerely,

William Hernandez
Estimator/Project Manager

Sales Office:
Engineered Synthetic Products, Inc.
Tel (770) 564-1857
Fax (770) 564-1818
www.espgeosynthetics.com

Geotextile Product Description Sheet

SKAPS GT-180
Nonwoven Geotextile

SKAPS GT-180 is a needle-punched nonwoven geotextile made of 100% polypropylene staple fibers, which are formed into a random network for dimensional stability. SKAPS GT-180 resists ultraviolet deterioration, rotting, biological degradation, naturally encountered basics and acids. Polypropylene is stable within a pH range of 2 to 13. SKAPS GT-180 conforms to the physical property values listed below:

PROPERTY	TEST METHOD	UNIT	M.A.R.V. (Minimum Average Roll Value)
Weight (Typical)	ASTM D 5261	oz/yd^2 (g/m^2)	8.0 (271)
Grab Tensile	ASTM D 4632	lbs (kN)	205 (0.911)
Grab Elongation	ASTM D 4632	%	50
Trapezoid Tear Strength	ASTM D 4533	lbs (kN)	85 (0.378)
CBR Puncture Resistance	ASTM D 6241	lbs (kN)	535 (2.38)
Permittivity*	ASTM D 4491	sec^{-1}	1.35
Water Flow*	ASTM D 4491	gpm/ft^2 (l/min/m^2)	90 (3657)
AOS*	ASTM D 4751	US Sieve (mm)	80 (0.180)
UV Resistance	ASTM D 4355	%/hrs	70/500

PACKAGING	
Roll Dimensions (W x L) – ft	12.5 x 360 / 15 x 300
Square Yards Per Roll	500
Estimated Roll Weight - lbs	250

* At the time of manufacturing. Handling may change these properties.

This information is provided for reference purposes only and is not intended as a warranty or guarantee. SKAPS assumes no liability in connection with the use of this information.

SKAPS Industries,
335 Athena Drive, Athens GA 30601
Phone:(706)-354-3700, Fax(706)-354-3737,
www.skaps.com

Made in U.S.A.

Appendix H

Record Drawings

Construction Quality Assurance Report
Brownfield Road C&D Landfill Phase 2A Cell 2
Raleigh, North Carolina

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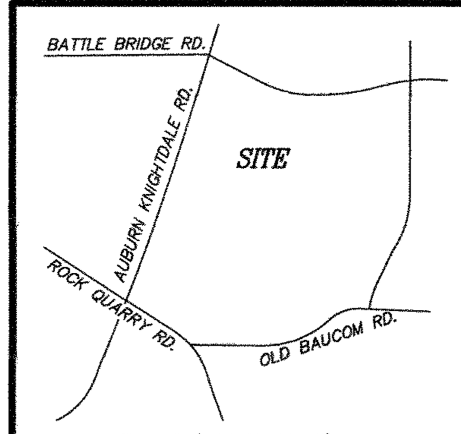


VICINITY MAP (NOT TO SCALE)

I, DWAYNE R. KROEZE, HEREBY CERTIFY THAT THIS MAP WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION, THAT THE ELEVATIONS REPRESENTED BY ANY CONTOUR LINE AS PLOTTED DO NOT HAVE A VERTICAL ERROR GREATER THAN 0.5' OVER 90% OF THE AREA COVERED, ALL LOCATIONS SHOWN ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

8/23/14

DWAYNE R. KROEZE, P.L.S. L-3911 DATE

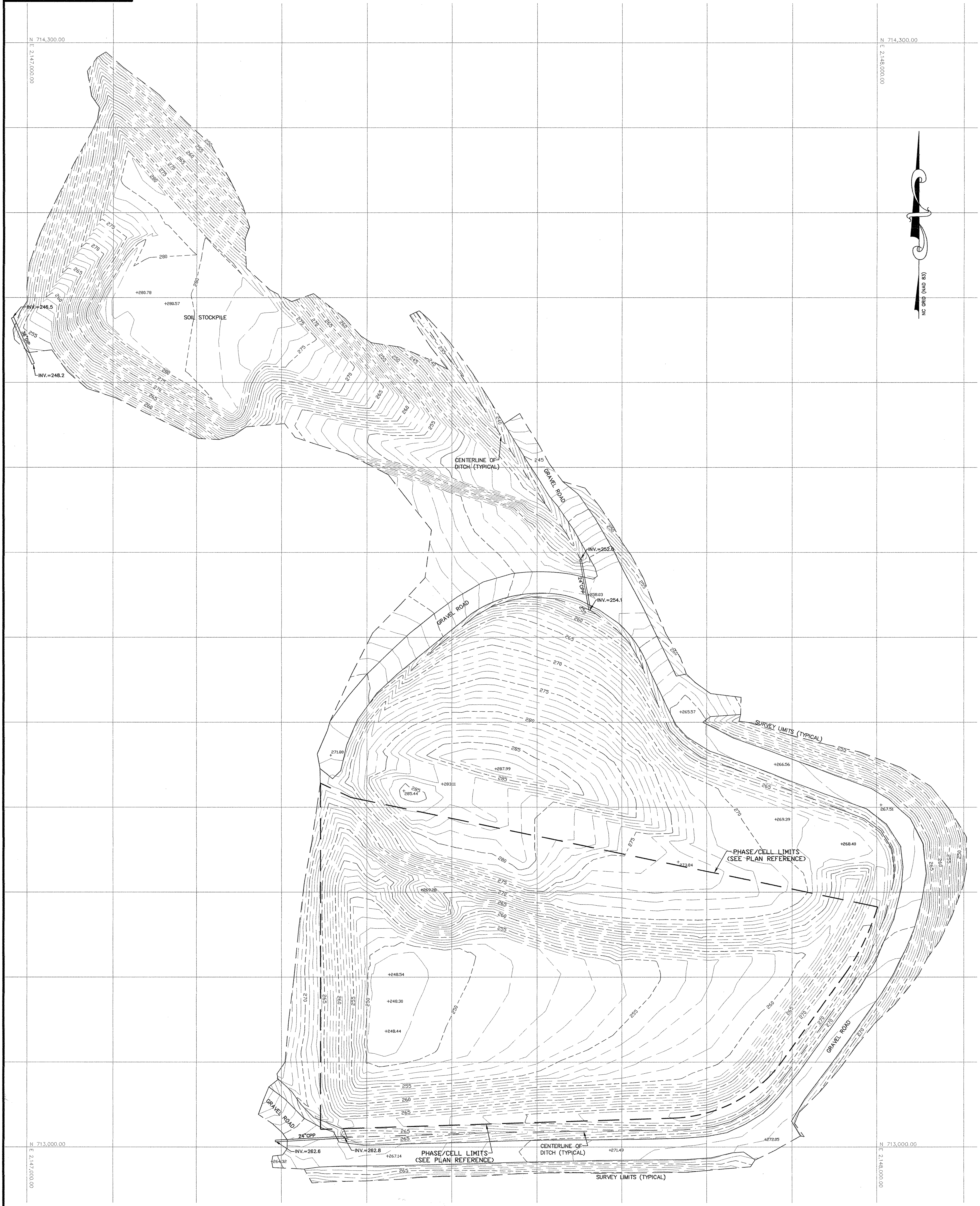
NORTH CAROLINA PROFESSIONAL SEAL L-3911 LAND SURVEYOR DWAYNE R. KROEZE

NOTES

1. COORDINATES SHOWN ARE NC GRID NAD 83 2011 AND ELEVATIONS ARE NAVD 88.

CONSTRUCTION PLAN REFERENCE

PLANS ENTITLED "BROWNFIELD ROAD C&D LANDFILL, PHASE 2A CELL 2 CONSTRUCTION DRAWINGS", DATED MAY 2014 BY SMITH + GARDNER ENGINEERS



SURVEYING SOLUTIONS, P.C. C-1948
295 KINGFISHER WAY P.O. BOX 376
LOUISBURG, NC 27549
(919)-340-2250

TOPOGRAPHIC SURVEY OF
BROWNFIELD ROAD C&D LANDFILL
PHASE 2A CELL 2

ST. MARY'S TOWNSHIP	WAKE COUNTY	NORTH CAROLINA
SCALE 1"=50'	SURVEY DATE: AUGUST 20, 2014	PROJECT 14-018

REVISIONS:

50 0 25 50 100 200