

R E P O R T

STRUCTURAL FILL FACILITY DOCUMENTATION REPORT

**O.N. VAUGHAN PROPERTY
4752 HIGHWAY 301
HALIFAX, NORTH CAROLINA**

Prepared for

Roanoke Valley Energy Facility
290 Power Place
P.O. Box 351
Weldon, North Carolina 27890

July 2009



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August 5, 2009

Mr. Edward Mussler
Permitting Supervisor – Solid Waste Section
North Carolina Department of Environment and Natural Resources
Division of Waste Management
1646 Mail Service Center
Raleigh, NC 27699-1646

Subject: **Coal Ash Structural Fill Site Documentation Report
O.N. Vaughan Property at 4752 Highway 301 - Halifax, NC
36.3708 N Latitude; 77.595 W Longitude
URS Project No. 31826292**

Dear Mr. Mussler:

On behalf of our client, Westmoreland Partners, Roanoke Valley Energy Plant in Weldon, NC, URS Corporation is submitting herein 2 copies of the above referenced report for a Coal Ash Structural Fill Site. This report documents how this structural fill site was designed, operated and closed in accordance with North Carolina Department of Environment and Natural Resources, Division of Waste Management Regulations; Section .1700 Requirements for Beneficial Use of Coal Combustion By-Products (CCB). This report also documents how the appropriate recording process was completed as part of the project.

This structural fill site has met the requirements in Section .1700 and the site has been restored to pasture lands. This site is complete and there should be no more further documentation required. Call us at 919-461-1100 with any questions concerning this report.

Sincerely yours,

Richard K. Lowe
Principal Geotechnical Engineer

Ed Edens, P.E.
Civil/Roadway Engineering Group
Manager





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August 5, 2009

Mr. Chris Hews, Sr.
Environmental Manager
Roanoke Valley Energy Facility
290 Power Place
P.O. Box 351
Weldon, NC 27890

Subject: **Coal Ash Structural Fill Site Documentation Report
O.N. Vaughan Property at 4752 Highway 301 - Halifax, NC
36.3708 N Latitude; 77.595 W Longitude
URS Project No. 31826292**

Dear Mr. Outland:

URS Corporation has completed the above referenced work as outlined in our May 31, 2009 proposal, and authorized by Westmoreland Partners purchase order 2090998 dated June 1, 2009. The purpose of this assignment was to document the operation and closure of the above referenced parcel of property for a Coal Ash Structural Fill site in accordance with the North Carolina Department of Environment and Natural Resources, Division of Waste Management Regulations; Section .1700 Requirements for Beneficial Use of Coal Combustion By-Products (CCB).

This structural fill site has met the requirements in Section .1700 and the site has been restored to pasture lands. The documentation report has been sent to NCDENR as required by Section .1700. We appreciate the opportunity to be of continued service to Westmoreland Partners. Call us at 919-461-1100 with any questions or concerns.

Sincerely yours,

Richard K. Lowe
Principal Geotechnical Engineer

Ed Edens, P.E.
Civil/Roadway Engineering Group
Manager



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1.0 INTRODUCTION

Westmoreland Partners operates a coal-fired power generating facility in Weldon, North Carolina. The Coal Combustion By-Products (CCB) was approved for beneficial use in refilling 7-acre (+/-) soil borrow site situated 4.4 miles south of Weldon at 4752 Highway 301 in Halifax County. The soil borrow site is licensed as a mining facility by the property owner, O.N. (Nat) Vaughan. Mr. Vaughan and Westmoreland Partners have an agreement whereby Westmoreland will provide CCB as a structural fill to restore the borrow site as provided for in Section .1700 of the North Carolina Solid Waste Management 15A NCAC 13B Rules.

This report describes the structural fill placement, erosion control measures and the closure design and provides drawings and photographs documenting that this structural fill site meets the requirements prescribed in Section .1700 of the North Carolina Solid Waste Management 15A NCAC 13B Rules, for Beneficial Use of CCB's.

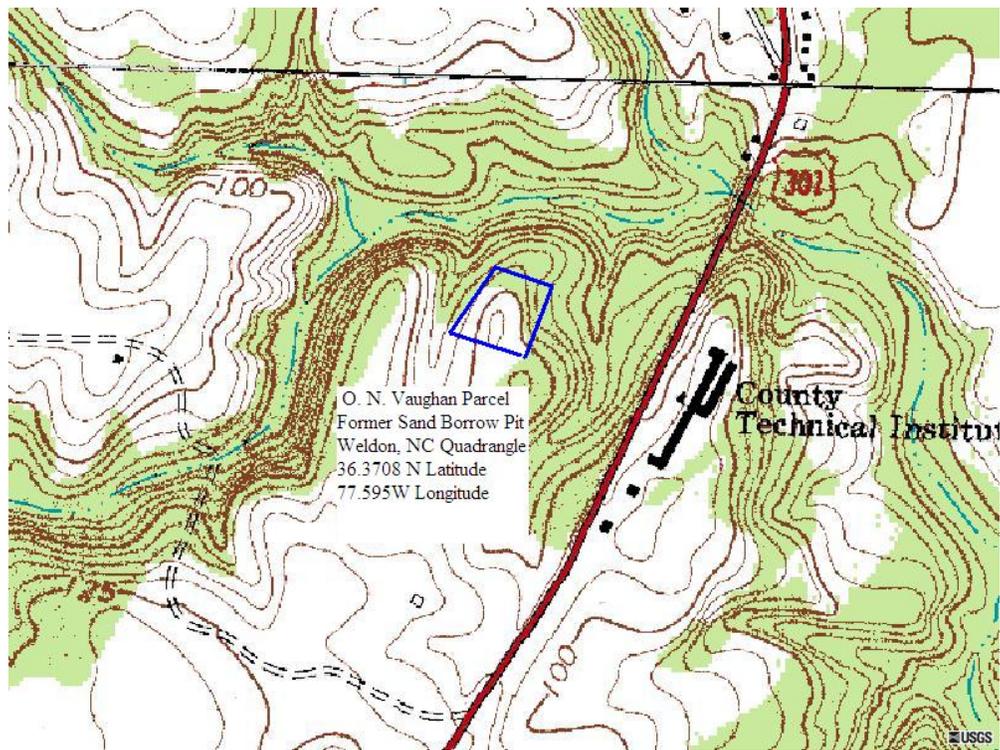


Figure 1-1. USGS Quadrangle Map – Weldon, North Carolina

2.0 STRUCTURAL FILL

The structural fill material is a CCB that was used to restore a former borrow site. The structural fill was transported from the Roanoke Valley Power Plant (ROVA) to Mr. Vaughan's borrow site from February 2008 to April 2009. The material was transported, placed and compacted, and sloped according to Section .1700 of the North Carolina Solid Waste Management 15A NCAC 13B Rules. The following sections outline how the structural fill construction conformed with Section .1700 Rules.

2.1 Transportation

Fly ash from the power plant is collected in silos. The ash is moistened as it is discharged from the silos into open-topped trucks. This quenching increases the water content of the structural fill material to prevent dust generation. Covered trucks were used to haul the structural fill material as another measure to prevent dusting from occurring during transportation.

2.2 Placement/Compaction

The structural fill was unloaded from the trucks in a controlled manner to prevent dust from becoming airborne. After the material was unloaded it was spread in approximately 24" thick lifts and compacted. URS personnel performed several standard Proctor tests (ASTM D 698), and the field density and moisture content tests (ASTM D 2937 & D 2216, respectively) on site. The test results indicated that the structural fill material was adequately compacted. A summary of the Proctor tests and the field moisture/density test results for the structural fill is presented in Appendix B and C, respectively.

2.3 Stability

The structural fill material was placed and graded so that side slopes were less than 4 horizontal : 1 vertical slope. To maintain stability of perimeter slopes and control erosion due to runoff from the final cover.

3.0 EROSION CONTROL MEASURES

Erosion control features were installed and maintained as prescribed in the approved Erosion and Sedimentation Control Plan. The plan was approved by NCDENR on December 13, 2007. Several erosion control features that were installed and maintained throughout this project are discussed below.

3.1 Drainage Features

A stilling basin was constructed, prior to placement of the fill, in the northwest corner of the borrow area, see photo 1 in Appendix A. Discharge from the stilling basin is filtered through two stone check dams, see photo 2 in Appendix A. The base of the borrow site slopes at approximately 1% from the southeast corner to the stilling basin in the northwest corner. An earthen containment berm was constructed between the stilling basin and the floor of the borrow area to prevent fill material from entering the stilling basin.

A perimeter stormwater control ditch was constructed along the borrow site limits to divert stormwater away from the borrow area. The slope of the ditch varied from 2.6% to 1%. To reduce amount of soil being tracked onto Highway 301 the final 50-feet of gravel access road was surfaced with coarse aggregate (2” to 3” nominal size). These features and the earthen sediment trap near the active fill areas provided sufficient erosion control to limit sedimentation from migrating off site.

3.2 Maintenance

The erosion control features were checked periodically throughout this project and especially during and after a major storm event. At times additional rock was added to the check dams and built-up sediment was removed from the channel and dams. During a storm event the drainage channels were checked to see if any water bearing sediment migrated off site. There was no visual evidence of the fill material migrating off site.

4.0 CLOSURE DESIGN

The last time the structural fill material was accepted was on April 9, 2009. From April to May cover material was placed over the structural fill. The cover material was specified and placed according to Section .1705 of the North Carolina Solid Waste Management 15A NCAC 13B Rules. During the month of June the site was seeded to minimize erosion of the cover material.

4.1 Cover Material

After the structural fill material reached final grades the area was covered with soil according to Section .1705 (j) of the North Carolina Solid Waste Management 15A NCAC 13B Rules. Twelve inches of cover soil, plus six inches of topsoil capable of supporting vegetation, was used to cap the structural fill material. Final cover placement was started within 30 working after the filling process has ceased.

While the cover material was being placed URS regularly probed the soil cover on a grid pattern to measure the cover material thickness. Cover soil thickness were field marked using flags. Not all areas where cover thickness were less than 18 inches in thickness were rechecked. The flags used as grade stakes were used by the contractor to control cover thickness. A map was created documenting URS's cover material thickness measurements (see Appendix D). After URS verified that the site was adequately cover with 18 inches of covered soil the Owner began liming, fertilizing and seeding. The site was seeded on June 23-25.

4.2 Configuration

According to Section .1706 of the North Carolina Solid Waste Management 15A NCAC 13B Rules the final surface of the structural fill shall be graded to:

- Minimize erosion of cover material,
- Promote drainage of area precipitation and minimize infiltration,
- Prevent ponding of surface water.

The side slope was graded to a less than 4H:1V slope and the top of the fill material was graded at a 5% slope. These slopes comply with Section .1706 of the Rules intended to prevent ponding and infiltration, but at the same time being gentle enough to prevent erosion.

4.3 Recordation

Section .1707 of the North Carolina Solid Waste Management 15A NCAC 13B Rules requires the land owner to submit a notarized statement describing the volume and location of coal combustion product to the county Register of Deeds within 90 days after completion of the project. On May 11, 2009 the Owner recorded the deed change with Halifax county.



CALCULATION SHEET

PROJECT		ROVA Beneficial Ash Use		JOB NO.	
SUBJECT		July 1, 2007 to April 30, 2009 Records		SHEET NO.	
ORIGINATED BY	DATE	CHECKED BY	DATE	CALC. NO.	REV. NO.
Lenore Gaier	8/1/2009				

Month - Year	ROVA Total (Tons)	Pierce Trucking (Tons)	ASH DESTINATION	
			Arthurs Creek	Vaughan Property
July-07	14,865.50		14,865.50	
August-07	15,922.19		15,922.19	
September-07	10,426.98		10,426.98	
October-07	8,925.19		8,925.19	
November-07	9,551.73		9,551.73	
December-07	14,655.67		14,655.67	
January-08	15,613.76	15,613.76	15,613.76	
February-08	14,136.54	14,136.54	4,107.21	10,029.33
March-08	13,376.93	13,376.93		13,376.93
April-08	13,934.38	13,934.38		13,934.38
May-08	9,855.38	9,855.38		9,855.38
June-08	12,600.45	12,600.45		12,600.45
July-08	16,042.65			16,042.65
August-08	15,093.82			15,093.82
September-08	15,986.76			15,986.76
October-08	11,741.54			11,741.54
November-08	12,955.79			12,955.79
December-08	15,669.70			15,669.70
January-09	16,013.40			16,013.40
February-09	0.00			0.00
March-09	510.23			510.23
April-09	1,690.46			1,690.46
2007-2009 TOTALS	259,569.05		94,068.23	165,500.82

APPENDIX A

Photographic Documentation



QA-1 Stormwater Stilling Basin at Northwest corner of borrow site. - 9/14/07



QA-2 Stone filter dam forming Stormwater Stilling Basin – 9/14/07



QA-3 The final 50' of gravel access road surfaced with coarse aggregate. – 2/6/08



QA-4 Filling the southeast corner of the borrow site with structural fill. – 3/11/08



QA-5 Stormwater Stilling Basin and rock check dam at northwest corner – 6/23/08



QA-6 Looking at the north end of the borrow site. – 9/23/08



QA-7 Top of the structural fill material. (looking south) – 1/23/09



QA-8 Finalizing the grading of the structural fill. (looking northwest) – 1-23-09



QA-9 Erosion control features on the east side of the borrow site. - 6/2/09



QA-10 Placement of cover material. (looking northwest) - 6/2/09



QA-11 Final cover with grass. (east ditch looking north) – 9/15/09



QA-12 Final cover with grass. (south slope looking east) - 9/15/09

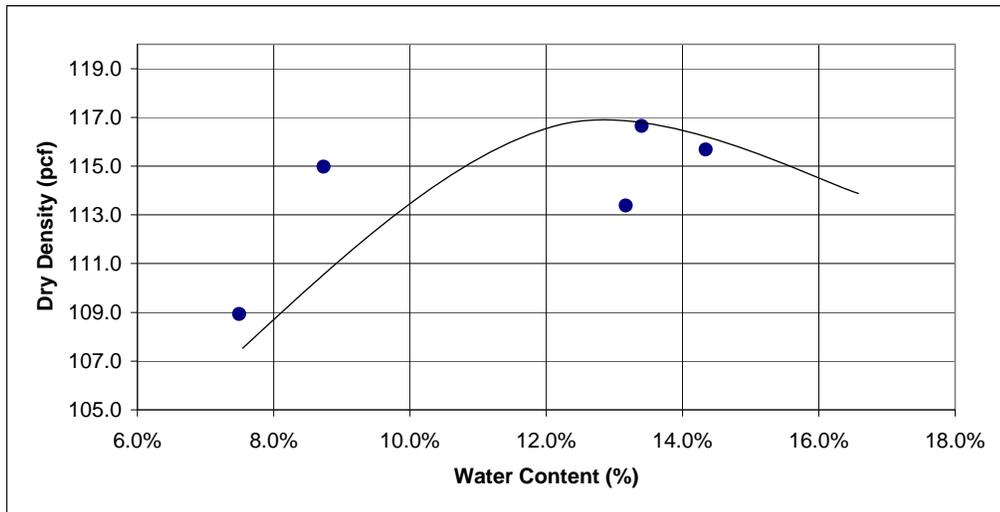
APPENDIX B

Proctor Test

Proctor Test Worksheet

Project Name: ROVA Ash Structural Fill Boring No. _____
 Project Location: ON Vaughan on Hwy 301 Halifax, NC Sample No. _____
 Soil Description: Gravelly clayey fine to coarse sand (SC) Test Method ASTM D-698
 Tested By: RKL Layers/Blows 3layers/25blows
 Test Date: 2/22/2009 Mold Volume: 0.0334 cubic feet
 Project Number: 31826292

Test No.	1	2	3	4	5	6	7	8	9	10
Sample ID	natural moisture	dry	+2	+4	+6	+8	+10			
Mold ID										
Mold Wt. (gm)		4166	4166	4166	4166	4166				
Wet Soil Wt. + Mold (gm)		5940	6060	6110	6170	6170				
Wet Soil Wt. (gm)	0	1774	1894	1944	2004	2004	0			
Mold Volume (cu ft)	0.033	0.033	0.033	0.033	0.033	0.033	0.033			
Wet Density (pcf)	0.0	117.1	125.0	128.3	132.3	132.3	0.0			
Dry Density (pcf)	#DIV/0!	108.9	115.0	113.4	116.6	115.7	#DIV/0!			
Water Content										
Tare ID		1	2	3	4	1				
Tare Wt. (gm)		82.6	81.5	80.5	82.6	82.5				
Wet Soil Wt.+ Tare (gm)		226.0	206.0	218.0	218.0	226.0				
Wet Soil Wt. (gm) (W _t)	0.0	143.4	124.5	137.5	135.4	143.5	0.0			
Dry Soil Wt. + Tare (gm)		216.0	196.0	202.0	202.0	208.0				
Dry Soil Wt. (gm) (W _s)	0.0	133.4	114.5	121.5	119.4	125.5	0.0			
Weight Water (gm) (W _w)	0.0	10.0	10.0	16.0	16.0	18.0	0.0			
Water Content % (W _w /W _s)	#DIV/0!	7.5%	8.7%	13.2%	13.4%	14.3%	#DIV/0!			

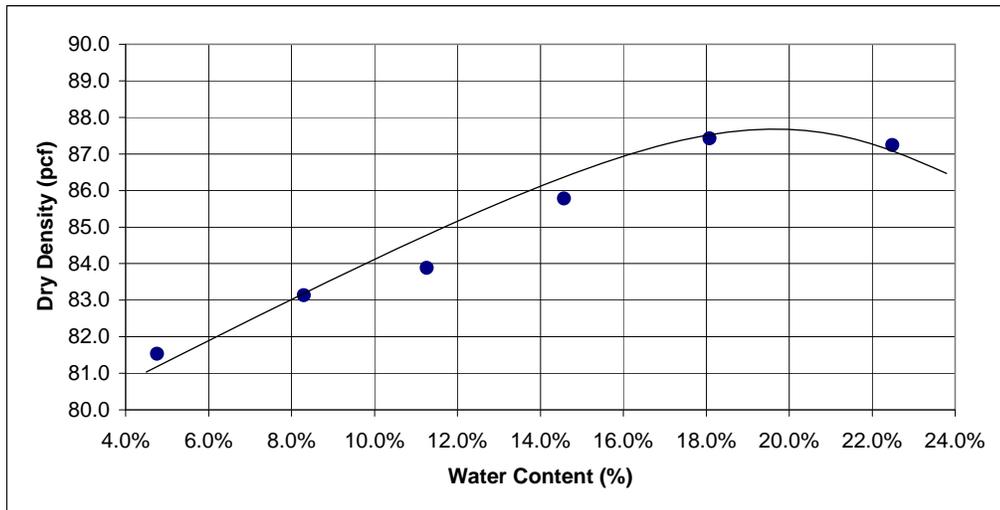


Max. Dry Density (pcf) = 116.6
 Optimum Water Content (%) = 13.4%

Proctor Test Worksheet

Project Name:	<u>ROVA Ash Structural Fill</u>	Boring No.	_____
Project Location:	<u>ON Vaughan on Hwy 301 Halifax, NC</u>	Sample No.	_____
Soil Description:	<u>Bottom Ash</u>	Test Method	<u>ASTM D-698</u>
Tested By:	<u>RKL</u>	Layers/Blows	<u>3layers/25blows</u>
Test Date:	<u>2/22/2009</u>	Mold Volume:	<u>0.0334</u> cubic feet
Project Number:	<u>31826292</u>		

Test No.	1	2	3	4	5	6	7	8	9	10
Sample ID	natural moisture	dry	+2	+4	+6	+8	+10			
Mold ID										
Mold Wt. (gm)		4166	4166	4166	4166	4166	4166			
Wet Soil Wt. + Mold (gm)		5460	5530	5580	5655	5730	5785			
Wet Soil Wt. (gm)	0	1294	1364	1414	1489	1564	1619			
Mold Volume (cu ft)	0.033	0.033	0.033	0.033	0.033	0.033	0.033			
Wet Density (pcf)	0.0	85.4	90.0	93.3	98.3	103.2	106.9			
Dry Density (pcf)	#DIV/0!	81.5	83.1	83.9	85.8	87.4	87.2			
Water Content										
Tare ID		9	10	11	12	2	3			
Tare Wt. (gm)		23.4	23.4	24.8	24.3	81.5	80.4			
Wet Soil Wt.+ Tare (gm)		80.6	82.1	74.2	81.7	186.0	222.0			
Wet Soil Wt. (gm) (W _t)	0.0	57.2	58.7	49.4	57.4	104.5	141.6			
Dry Soil Wt. + Tare (gm)		78.0	77.6	69.2	74.4	170.0	196.0			
Dry Soil Wt. (gm) (W _s)	0.0	54.6	54.2	44.4	50.1	88.5	115.6			
Weight Water (gm) (W _w)	0.0	2.6	4.5	5.0	7.3	16.0	26.0			
Water Content % (W _w /W _s)	#DIV/0!	4.8%	8.3%	11.3%	14.6%	18.1%	22.5%			



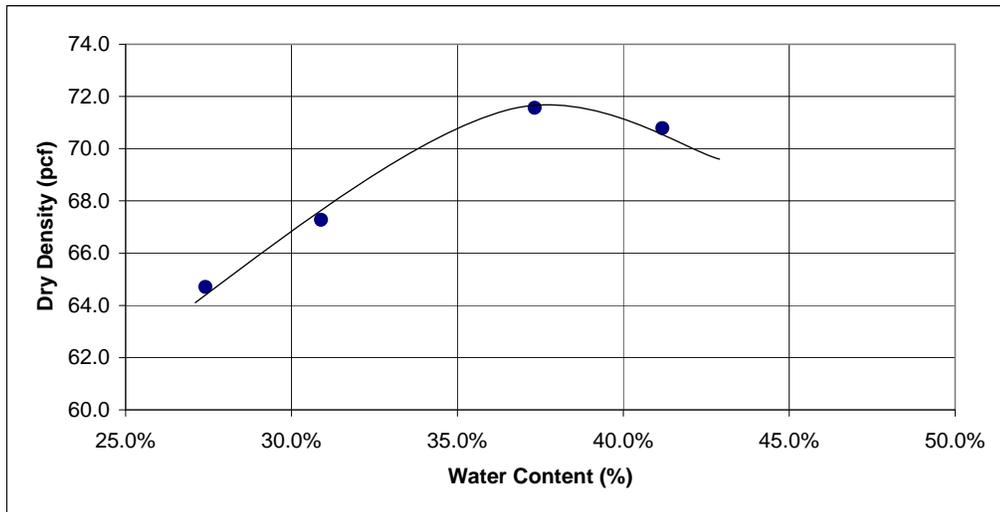
Max. Dry Density (pcf) = 87.4

Optimum Water Content (%) = 18.1%

Proctor Test Worksheet

Project Name:	ROVA Ash Structural Fill	Boring No.	_____
Project Location:	ON Vaughan on Hwy 301 Halifax, NC	Sample No.	_____
Soil Description:	Flyash	Test Method	ASTM D-698
Tested By:	RKL	Layers/Blows	3layers/25blows
Test Date:	2/22/2009	Mold Volume:	0.0334 cubic feet
Project Number:	31826292		

Test No.	1	2	3	4	5	6	7	8	9	10
Sample ID	natural moisture	dry	+2	+4	+6	+8	+10			
Mold ID										
Mold Wt. (gm)		4166	4166	4166	4166					
Wet Soil Wt. + Mold (gm)		5415	5500	5655	5680					
Wet Soil Wt. (gm)	0	1249	1334	1489	1514	0	0			
Mold Volume (cu ft)	0.033	0.033	0.033	0.033	0.033	0.033	0.033			
Wet Density (pcf)	0.0	82.4	88.1	98.3	99.9	0.0	0.0			
Dry Density (pcf)	#DIV/0!	64.7	67.3	71.6	70.8	#DIV/0!	#DIV/0!			
Water Content										
Tare ID		5	6	7	8					
Tare Wt. (gm)		23.9	23.9	22.1	23.1					
Wet Soil Wt.+ Tare (gm)		66.2	72.2	83.9	90.3					
Wet Soil Wt. (gm) (W _t)	0.0	42.3	48.3	61.8	67.2	0.0	0.0			
Dry Soil Wt. + Tare (gm)		57.1	60.8	67.1	70.7					
Dry Soil Wt. (gm) (W _s)	0.0	33.2	36.9	45.0	47.6	0.0	0.0			
Weight Water (gm) (W _w)	0.0	9.1	11.4	16.8	19.6	0.0	0.0			
Water Content % (W _w /W _s)	#DIV/0!	27.4%	30.9%	37.3%	41.2%	#DIV/0!	#DIV/0!			



Max. Dry Density (pcf) = 71.6

Optimum Water Content (%) = 37.3%

APPENDIX C

Drive Tube Density Test

URS Landfill Services Group
Drive Tube Density Worksheet

Project Name: Mr Vaughan Property - Structural Fill Facility

Test Location: _____

Project Number: 31826292

Density Testing Equipment: Drive Tube

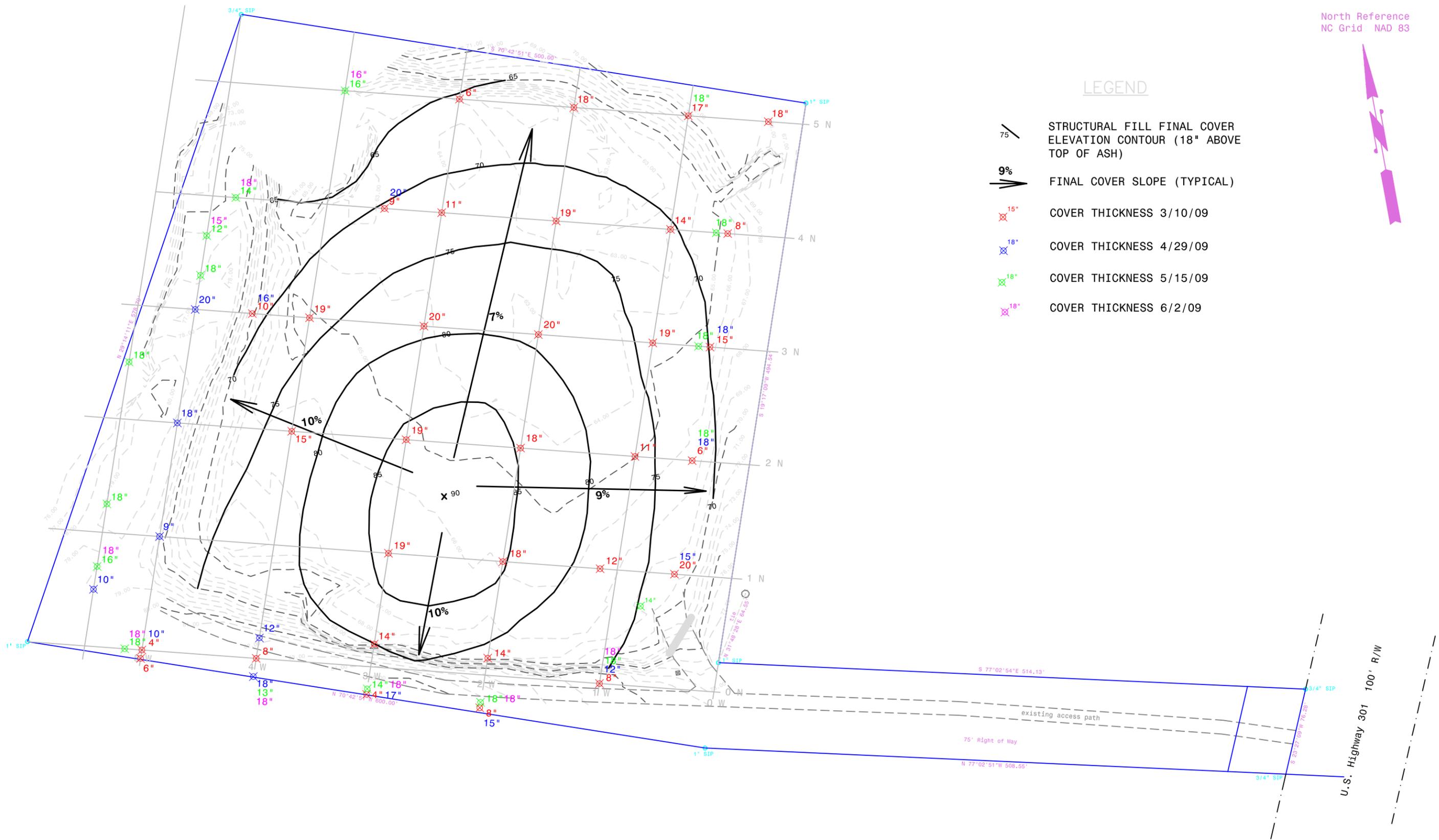
Test No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Test Location	northeast corner of property	southwest corner of property	southwest side of property	east side of center point	3N 3W	2N 2W							
Mold ID	1	2	3	4	1	2							
Tare Wt. (gm)	712	708	708	712	710	708							
Tare + Wet Soil Wt. (gm)	1864	1970	2118	1984	2592	2516							
Wet Soil Wt. (gm) (W_t)	1152	1262	1410	1272	1882	1808	0	0	0	0	0	0.00	0.00
Mold Volume (cu. Ft.) (V)	0.0334	0.0334	0.0334	0.0334	0.0334	0.0334	0.000	0.000	0.000	0.033	0.033	0.033	0.033
Wet Density (pcf) (W_t/V)	76.04	83.30	93.07	83.96	124.22	119.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Weight Water (gm) (W_w)	236.46	257.84	229.57	88.43	209.94	170.08	0.00	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Dry Density (pcf) ($W_t - W_w / V$)	60.4	66.3	77.9	78.1	110.4	108.1	0.0	0.0	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Proctor Max. Dry Density	71.6	71.6	87.4	87.4	116.6	116.6							
Percent Compaction	84.4%	92.6%	89.1%	89.4%	94.7%	92.7%	0.0%	0.0%	0.0%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Water Content													
Tare ID	1	2	3	4	1	2							
Tare Wt. (gm)	82.6	81.6	80.5	82.6	82.5	81.7							
Wet Soil Wt.+ Tare (gm)	181.5	188.3	180.0	176.1	208.0	188.0							
Wet Soil Wt. (gm) (W_t)	98.9	106.7	99.5	93.5	125.5	106.3	0.0	0.0	0.0	0.0	0.0	0.00	0.00
Dry Soil Wt. + Tare (gm)													
Dry Soil Wt. (gm) (W_s)	78.6	84.9	83.3	87.0	111.5	96.3	0.0	0.0	0.0	0.0	0.0	0.00	0.00
Weight Water (gm) (W_w)	20.3	21.8	16.2	6.5	14.0	10.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00
Water Content % (W_w/W_s)	25.8	25.7	19.4	7.5	12.6	10.4	0.0	0.0	0.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

APPENDIX D

Drawings

LEGEND

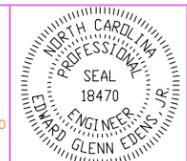
- STRUCTURAL FILL FINAL COVER ELEVATION CONTOUR (18" ABOVE TOP OF ASH)
- FINAL COVER SLOPE (TYPICAL)
- COVER THICKNESS 3/10/09
- COVER THICKNESS 4/29/09
- COVER THICKNESS 5/15/09
- COVER THICKNESS 6/2/09



ROANOKE VALLEY FLY ASH DISPOSAL SITE
OTIS N. VAUGHAN BORROW PIT, HALIFAX COUNTY, NC

AS-BUILT DRAWING

Prepared by
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Morrisville, North Carolina 27560
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JOB NO.	31825952
SURVEYED	BY ODOM
DESIGNED	BY EGE/RL
DRAWN	BY SMS
CHECKED	BY EGE