

November 6, 2013

Mr. Brian Wootton, Hydrogeologist
NC DENR Division of Waste Management
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

**RE: Davidson County Phase 2 MSW Landfill
Area 2 Cell 1 Rock Blasting**

Dear Mr. Wootton:

On behalf of Davidson County, Smith Gardner, Inc. (S+G) is presenting this plan for performing rock blasting to allow the construction of portions of Area 2 Cell 1. A detailed blasting plan from JT Russell and Sons, Inc. (JTR) is attached for your review.

As shown in the Figure located within the blasting plan there are two rock areas that extend above proposed subgrade. It is estimated that up to approximately 10,000 CY of rock will require removal for installation of this portion of the cell.

The blasting will be performed by JTR who is also the general contractor for the project. The drill hole pattern, charge weights, and delays were selected to minimize the amount of energy which may impact the underlying rock (i.e. peak particle velocities at blast monitoring locations are anticipated to be < 1 inch/sec.). Additionally, all blasting will be performed during daylight hours.

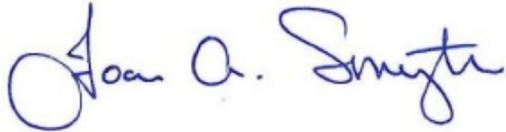
During the actual blasting, monitoring using a seismograph is proposed at three locations (two adjacent to Area 1 and one adjacent to the leachate tanks). These are the closest locations that may be affected by the blasting.

Documentation of blasting activities (including monitoring results) will be prepared by S+G and submitted to the Solid Waste Section within 30 days of the rock removal. This documentation, which will include observations of the excavation by S+G staff and an evaluation by a licensed geologist, will also be placed in the construction quality assurance (CQA) report for the project.

The blasting activities are scheduled to begin on Friday, November 8th. We appreciate your attention in this matter. Should you have any questions or require clarification or further information, please contact us at your earliest convenience.

Mr. Wootton
November 6, 2013
Page 2 of 2

Sincerely,
SMITH GARDNER, INC.

A handwritten signature in blue ink that reads "Joan A. Smyth". The signature is written in a cursive style with a large initial "J".

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

A handwritten signature in blue ink that reads "Pieter K. Scheer". The signature is written in a cursive style with a large initial "P".

Pieter K. Scheer, P.E.
Vice President, Senior Engineer
pieter@smithgardnerinc.com

Attachment

Cc: Charlie Brushwood – Davidson County



**JTR BLASTING PLAN
DAVIDSON COUNTY LANDFILL**

**JT RUSSELL & SONS INC
BLASTING PLAN FOR DAVIDSON COUNTY LANDFILL**

OWNER:

DAVIDSON COUNTY INTERGRATED SOLID WASTE FACILITY

CONTRACTOR:

**J.T. Russell and Sons, Inc
1721 US Hwy 52 N
Albemarle, NC 28001**



Table of Contents

Section Page

Scope of Blasting Project

Types of Blasting

Safety Procedure For Blasts

Blast Site Dimensions

Drill Pattern

Explosives Loading and Initiation

Ground Control

Flyrock Control Plan

Selection of Blasting Products and Methods

Monitoring, Blast Effects

Peak Particle Velocity Monitoring and Control

Blast Warning Signals

Environmental Concerns

Fire Prevention

Appendix A – Blasting Location

Appendix B – Example of Blasting Daily Log

Appendix C – Davidson County Blasting Permit Check List



1) SCOPE OF BLASTING PROJECT

Blasting will take at the Davidson County Landfill. J. T. Russell and Sons, Inc., plans to blast in Phase 2 Area 2 Cell 1. Only in the areas where the rock cannot be excavated by conventional means will blasting occur. JTR will work closely with the owner and engineer during the blast phase.

2) TYPES OF BLASTING

Primary type of blasting will be for excavation removal purposes. Blasting may also require blasting in storm drain trenches.

3) SAFETY PROCEDURE FOR BLASTS

All operations for transporting, handling, and loading explosives shall observe applicable industry standards and regulations as defined by the appropriate city, county, state, or federal governing agency. All blast events will be conducted in such a manner that complies with all safety cautions, procedures or regulations of the applicable city, county, state, or federal governing agency. This includes, but is not limited to: clearing the blast zone, guarding the blast area and vehicular or pedestrian traffic control. There will be no on-site, overnight storage of explosives.

4) BLAST SITE DIMENSIONS

The blast will consist from 50-200 holes covering approximately 2-3 acres. The depth of each borehole will be around 10 - 24 feet including sub drill. Estimated 10,000 CY of blasting to take place.

5) DRILL PATTERN

The proposed pattern is to drill 3" - 4" diameter boreholes with a pattern of 5'x5' or 10'x10'.

6) EXPLOSIVES LOADING AND INITIATION

- a) It is proposed to use an Austin Ex-Gel for the main charge in each borehole, initiated with an appropriate detonating blasting cap. This cartridge weighs approximately 2.5 pounds per for 16 inches of 2-inch borehole. Surface (non-electric) delays will be used to minimize the vibrations at adjacent structures. The blast delay intervals used will be



**JTR BLASTING PLAN
DAVIDSON COUNTY LANDFILL**

9ms, 17ms, 25ms, and 42ms. Each blast will be designed to have a max of 10-15 pounds of explosive per delay.

- b) As one means to control ground movement, a minimum of 4' of inert stemming material will be loaded at the top of each borehole, beginning below the depth where competent rock was encountered. Stemming height will be determined by the discretion, experience and judgment of the blaster in charge, and site-specific conditions for each shot.

7) GROUND CONTROL

All blasts will be designed to prevent excessive movement of material from the blast zone. The blaster will include in his considerations such factors as rock type, geologic condition, borehole depth, charge weight and any other relevant, site specific conditions for each shot.

8) FLYROCK CONTROL PLAN

All shots will be carefully designed by the qualified blaster to control fly rock. All hole loading activity will be supervised by the qualified blaster. The qualified blaster will communicate with the driller to obtain geological information for each shot. JTR will haul and place soil over blast area for a protective cover from flyrock.

9) SELECTION OF BLASTING PRODUCTS AND METHODS

These blasting products were chosen because of many years of dependable use and positive results which are demonstrated by the:

- Quality, safety and reliability of the product
- Support offered by the manufacturer
- Availability
- Price

10) MONITORING BLAST EFFECTS

It is not expected that this type of rock will fracture in such a way as to cause any kind of ground displacement. Following each blast, the area will be examined for signs of ground cracking. Any indication of overbreak will be brought to the attention of the blaster and noted on the blast report. The shot pattern and/or loading will be adjusted to minimize or eliminate



JTR BLASTING PLAN DAVIDSON COUNTY LANDFILL

overbreak. Vibration monitoring will be conducted at the structures located nearest the blasting. The closest blasting conducted to any occupied structure will be greater than 300 feet. The vibration levels produced by the blasting are estimated to be less than 1 inch per second PPV and 132 dBI at the closest location. The blasting will be monitored at the buildings closest to the blast. The blaster in charge will design each blast to minimize vibration and over pressure and to prevent fly rock.

11) PEAK PARTICLE VELOCITY MONITORING AND CONTROL

Each blast will be monitored by a licensed blaster or other person experienced in monitoring blasts using a seismograph machine. The seismograph will be placed at the “point of interest”. In most cases, this will be next to the foundation of the closest building, power line foundation, utility or well. In all cases, both the sensor and seismograph will be protected from flyrock.

12) BLAST WARNING SIGNALS

Warning signals for each blast will be as follows:

- One long horn one minute before blast
- One long horn 10 seconds before blast
- One long horn for all clear after the blast

13) ENVIRONMENTAL CONCERNS

The Davidson County Fire Marshal will be notified prior to blasting.

14) FIRE PREVENTION

Following the required waiting period after each shot, the blast area will be inspected for any indication of fire or fire hazard. Particular attention will be paid to the vegetated areas outside of the right-of-way. Normally, the explosives vaporize at the instant of detonation and there is no fiber or other material left to smolder or be a source of



**JTR BLASTING PLAN
DAVIDSON COUNTY LANDFILL**

concern. Any plastic shock tube from the initiation system that remains after the blast will be picked up for proper disposal immediately after the blast.

The blasting operation will generally take place after the grading operation has graded the right-of-way to bare mineral soil. The blaster shall ensure that the initiating detonator is placed on bare mineral soil and that there is no vegetation within a 20-foot radius.

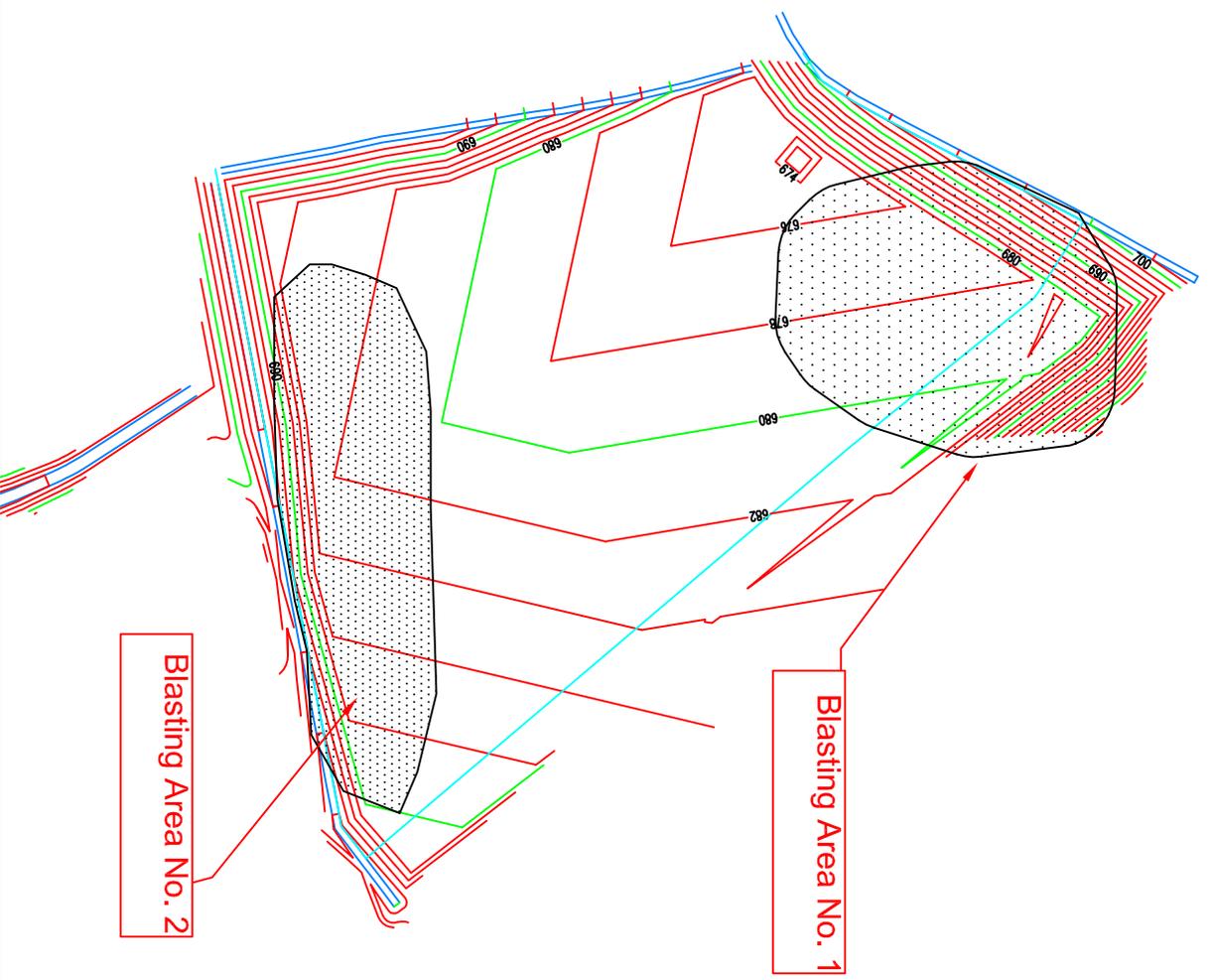
The initiating detonator will be a minimum of 400 feet from the nearest loaded hole.



Appendix A

Locations and Typicals

SEE ATTACHED



BLASTING IN PHASE 2 AREA 2
CELL 1
JTR BLASTING PLAN -
DAVIDSON COUNTY



Appendix B

Example of Blasting Daily Log

JT Russell & Sons, Inc.
Blast Operations Report

1721 N Hwy 52
Albemarle NC 28001

Client _____		License # _____	
Blaster _____		Time of Blast _____	
Date _____	Blast # _____		
Exact Site Location _____			
Weather: Clouds _____		Humidity _____	
Wind & Direction _____		Temperature _____	
Distance, Direction, & Address of Nearest Structure to Blast Site: _____			
How measured: _____	Pace _____	GPS _____	Tape _____
Drill log used: _____	Yes _____	No _____	Map _____
Burden _____ ft	Spacing _____ ft	Subdrill _____ ft	
# of Holes _____	Hole Dia. _____ in	Depth(s) _____ ft	
Avg. Stem _____ ft	Type _____	Avg. Water Depth _____ ft	
Shot cover used: Blasting Mat _____		Backfill _____	# of Decks: _____
Make and Type of Explosives Used:		Make _____	Detonators Used:
		Length _____	Delay _____
		# Used _____	
	lbs.		
TOTAL POUNDS IN SHOT: _____			
Calculated Scaled Distance: $SD = D + \sqrt{W}$ = _____		50 - (0-300')	
W = max. lbs. / delay limit _____		D = min. feet to nearest structure _____	55 - (301-5,000')
Holes / Delay _____			63 - (> 5001')
Loaded "Max" lbs. / delay _____		lbs/delay _____	
(1) Seismograph(s) Unit Number _____		Person Setting Up _____	
(2) Seismograph(s) Unit Number _____		Person Setting Up _____	
(3) Seismograph(s) Unit Number _____		Person Setting Up _____	
Exact Location, Distance and Direction of Seismograph(s) from Blast Site:			
1) _____			
2) _____			
3) _____			
Seismic Readings (1)	T _____	V _____	L _____
Seismic Readings (2)	T _____	V _____	L _____
Seismic Readings (3)	T _____	V _____	L _____
Frequency (1)	_____		RPPV(1) _____ in/sec
Frequency (2)	_____		RPPV(2) _____ in/sec
Frequency (3)	_____		RPPV(3) _____ in/sec
Signature of Blaster _____			

Attach printout of seismograph(s) to this record.



Appendix C Davidson County Blasting Permit Check List

- 1) **See Attached Sketch in Blasting Plan Appendix A**
- 2) **Attached Blasting Plan**
- 3) **Hours of Blasting**

Blasting will be performed during the hours of 9am and 5 pm

- 4) **Explosives WILL NOT be stored on site**