

**From:** [Bill Sperry](#)  
**To:** [Wootton, Brian;](#)  
**cc:** [jbishop@mcgillengineers.com](mailto:jbishop@mcgillengineers.com); [Stephen King](#); [Gaither, Allen](#);  
[dpasko@mcgillengineers.com](mailto:dpasko@mcgillengineers.com);  
**Subject:** Response to Questions/  
Concerns - Haywood Blasting Request (Document ID No. 8523)  
**Date:** Thursday, September 03, 2009 2:41:51 PM  
**Attachments:** [09 0903 - Revised - GENERAL BLASTING PLAN \(4\)\\_.docx](#)

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Mr. Wootton,

The following is in response to your additional questions as noted in your e-mail dated Wednesday, September 2, 2009. To facilitate your review, I have included your request followed by the response.

*According to the proposed blasting plan (i.e. cover letter dated August 27, 2009 – by Jeffrey Bishop of McGill Associates); it states in-part on page 1 of the letter, the following: “During the construction of the Municipal Solid Waste Landfill (MSW) Phase 3 waste area, the contractor has encountered rock pinnacles that can not be excavated with standard excavation methods”.*

*Please explain what excavation methods have been attempted to remove the rock (i.e. type and size of equipment, etc).*

The Contractor, Thalle Construction Company, attempted to remove as much of the encountered rock as possible with the following equipment:

Caterpillar D-8 Dozer equipped with a single rear-mounted ripper tooth  
Caterpillar 345 Track Excavator

*According to the proposed blasting plan (i.e. the letter - 8-24-09 - by Jim Shultz of National Quarry*

*Service); it states in-part on page 1 of the letter, the following: "Drill pattern and blast hole size will be manipulated so that a powder factor of 1 pound to 1.25 pounds per cubic yard of rock will be maintained with the holes drilled to a depth of 3' below proposed subgrade. This industry accepted standard for blasting unconfined mass rock will result in desired fracturaztion of the rock while minimizing disturbance outside of the actual blast area".*

*Please provide estimated calculations, explanations, etc., showing how deep (in vertical feet) the blasting will effect the remaining rock after blasting, in order to ensure no or minimal fracturing of rock in these deeper zones (greater than four feet below proposed subgrade elevations).*

The Revised General Blasting Plan (dated September 3, 2009 - a copy of which is attached for reference) further explains how the blast will be set up so as not to fracture the underlying mass of rock. The blast design that is proposed for this particular application is referred to as an "open face" blast design. In general, the blast sequence will be set up to move across the blast area beginning with the outer edges and move sequentially across the drilled area towards the center. This type of sequencing allows each subsequent blast to discharge against an unburdened or previously fractured outer layer. This ensures the maximum energy is used to fracture the intended section of rock and the blast is not confined against a solid outer layer such that it could possibly fracture the underlying rock mass. The blast energy will follow the path of least resistance which is to fracture the rock between it (the immediate blast) and the previous blast discharge. This is much the same way that a quarry operation blasts out sections of a shear wall with out damaging the adjacent rock faces both

behind and below the blast area. The following is the passage from the Revised General Blasting Plan, Section 2.0 Blasting Procedures, 2.2 Blasting Process:

*"Each blast will be fired with an "open face" blast design so that each hole fires a minimum of 25 milliseconds prior to the adjoining holes effectively "unburdening" each hole sequentially. This ensures that maximum energy is used to fracture the intended rock and not confined so to fracture the underlying mass."*

I trust this adequately explains how the blasting process will occur so as not to damage the underlying rock mass while removing the rock in question.

In response to prior comments relative to the attached pdf guidance document (e-mail to Mr. Bishop dated August 31, 2009) titled "blasting-plan-guide", these are construed as conditions that must be adhered to or followed once blasting of the encountered rock is allowed or approved by the NCDENR and not necessarily a specific part of a blasting plan prepared by the licensed blaster/blast contractor. The licensed blaster is only responsible for preparing a portion of the detailed report of the rock blasting activities. The licensed blaster's portion of the report pertains to certifying the drill hole pattern, charge weights, and delays that were selected so as to minimize the amount of energy which may impact the underlying rock. We will ensure the licensed blaster prepares this portion of the report that must be submitted to the Solid Waste Section within 30 days of the completion of rock removal.

The remaining conditions of the aforementioned guidance document will be adhered to by the other various parties (Certifying Engineer, Licensed Professional Geologist, etc.) involved in the construction and certification of the MSW Phase 3 Cell at the Haywood County White Oak MSW Landfill. The required detailed report of the rock blasting activities will be submitted to the Solid Waste Section within 30 days of the completion of rock removal. A discussion will also be included in the CQA Certification Report submitted to the NCDENR at the conclusion of the project. The Solid Waste Section will also be notified when the excavation will be completed so a Section Hydrogeologist may schedule a site visit to inspect the area. Other conditions relative to the groundwater monitoring, as set forth in the guidance document, may or may not be applicable to the project pending the evaluation by the Licensed Professional Geologist.

If modifications to the groundwater monitoring plan are required, then these will be prepared and submitted to the Solid Waste Section for review.

I trust this adequately addresses the site specific conditions that would be applicable to this project once blasting is authorized by the NCDENR.

Again, thanks for your prompt response to our request to remove the encountered rock affecting the construction of Phase 3 and the future construction of the Phase 3/4 tie-in. Should you have any questions or if I can be of further assistance, please do not hesitate to give me a call. I can be reached at the office at (828) 252-0575 or by cell phone at (828) 713-2251.

Sincerely, Bill Sperry



*“Building Partnerships by Providing Superior Service with Professional Integrity”*

**Bill Sperry, P.E.**

McGill Associates, P.A.

55 Broad Street

Asheville, North Carolina 28801

(828) 252-0575

(828) 252-2518 - Fax

**P**

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**REVISED  
GENERAL BLASTING PLAN**

**Haywood County Sanitary Landfill**

**Haywood County, NC**

**September 3, 2009**

## Table of Contents

|              |   |          |
|--------------|---|----------|
| <b>1.0</b>   | <b>Introduction.....</b>                          | <b>3</b> |
| <b>1.1</b>   | <b>Purpose.....</b>                               | <b>3</b> |
| <b>2.0</b>   | <b>Blasting Procedures.....</b>                   | <b>3</b> |
| <b>2.1</b>   | <b>Notifications.....</b>                         | <b>3</b> |
| <b>2.2</b>   | <b>Blasting Process.....</b>                      | <b>3</b> |
| <b>2.2.1</b> | <b>Misfires/Cutoffs.....</b>                      | <b>5</b> |
| <b>2.3</b>   | <b>Restrictions.....</b>                          | <b>5</b> |
| <b>3.0</b>   | <b>Explosives storage and Transportation.....</b> | <b>5</b> |
| <b>4.0</b>   | <b>Safety Measures.....</b>                       | <b>5</b> |
| <b>4.1</b>   | <b>General Safety Measures.....</b>               | <b>5</b> |
| <b>4.2</b>   | <b>Warning Signs and Signals.....</b>             | <b>6</b> |
| <b>4.2.2</b> | <b>Blast Signals.....</b>                         | <b>6</b> |
| <b>5.0</b>   | <b>Standard Safety Operating Procedures.....</b>  | <b>7</b> |

# **GENERAL BLASTING PLAN**

## **1.0 INTRODUCTION**

This Blasting plan identifies measures to be taken by National Quarry Service Inc. to ensure that blasting operations are carried out in accordance with federal, state and local regulations and restrictions.

Measures identified in this blasting plan apply to work within the project area as defined as, the right-of-way, access roads, temporary use areas and other areas used during construction of the project.

Contractors sub – contractors and all site personnel are to be thoroughly familiar with this plan.

### **1.1 Purpose**

The project encounters one or more areas of surface and subsurface rock where mechanical equipment will be unable to rip or excavate rock to allow construction. There is estimated to approximately 25,000 cubic yards of this type of rock on this project. In these areas blasting will be used to fracture the rock to allow for grading and excavation.

This plan describes safety standards and practices that will be implemented during construction to minimize health, safety and environmental concerns related to blasting on the project.

## **2.0 Blasting Procedures**

### **2.1 Notifications**

National Quarry Service Inc. will notify all appropriate federal, state and local authorities at least 24 hours prior storing or using explosives on the project. In addition, the following notifications will be needed throughout the project.

Prior to any detonation of explosives in the vicinity of existing facilities (such as pipelines, dwellings, structures, overhead or underground utilities, farm operations, or public crossings), a minimum of 24 hours notice will be given to appropriate authorities, and the owners or operators of any facilities that may be affected by the blasting.

### **2.2 Blasting Process**

Drilling - Scaled Distance formulas will be used as guidelines to determine maximum pounds within any 8ms delay period and appropriate drill hole spacing and diameter will be applied.

Loading - The rock to be excavated occurs in various depths between elevation 2510' and elevation 2550' with the average cut expected to be 13'. According to borings done

at the site and our experience in this area of North Carolina, we expect to find a medium to hard layer of weathered rock overlying hard granite with layers of gneiss, quartz and feldspar. National Quarry Service intends to use non-electric type blasting caps to initiate high explosive primers approximately 1' above the blast hole bottom. We expect that the area will be free of ground water and will use ammonium nitrate/ fuel oil blasting agent to load the holes to required weight and depth. Explosive type will be determined by drilling reports and ground water encountered. The holes will then be stemmed to the collar with crushed stone for maximum confinement. Drill pattern and blast hole size will be manipulated so that a powder factor of 1 pound to 1.25 pounds per cubic yard of rock will be maintained with the holes being drilled to a depth 3' below proposed sub-grade. This industry accepted standard for blasting of unconfined mass rock will result in desired fracturization of the rock while minimizing disturbance outside of the actual blast area. Each blast will be fired with an "open face" blast designed so that each hole fires a minimum of 25 milliseconds prior to the adjoining holes effectively "unburdening" each hole sequentially. This ensures that maximum energy is used to fracture the intended rock and not confined so to fracture the underlying mass. Maximum pounds per delay will be expected to occur in an area of cut between 27' and 29' which is approximately 450' from existing phase 1. Using the calculated scaled distance of 46.134 and an "H" factor of 160, the maximum peak particle velocity at the nearest corner of the structure is predicted to be less than 0.4 inches per second. In addition, there is an area of excavation to below proposed sub grade separating the blast area from the existing cell which would be expected to reduce the conductivity of ground vibration. We would recommend that a thorough survey be done of the existing conditions of the structures as near prior to blasting as possible. Seismic monitoring will be done at all areas of concern and readings will be reviewed after each blast to assess the effects of the blast and the need for changes to blast designs.

Cartridge and or bulk explosives will be primed with an appropriate primer in the bottom of the blast hole. Once loaded to a predetermined depth, all holes will be stemmed with #78 crushed stone. All delay and ignition caps will be non – electric type and will be connected and inspected a certified blaster. Tail caps of will be of sufficient length that visual inspection after the blast will be possible to insure that all holes have detonated.

Matting/Covering – Whenever necessary blasting mats or earth cover will be used to protect surrounding property from blasting debris.

Warning – The blaster inspects the blast area to ensure that vehicles and personnel have withdrawn to a safe distance. Access to the area is restricted and warning signals are sounded.

Blast – Following the warning signals, the blast will be detonated.

Clearance – National Quarry Service personnel will conduct a thorough post blast inspection of the blast area to ensure that all explosives and blasting caps are detonated prior to any other work proceeding. Once the area is verified clear, the all clear will be sounded.

### **2.2.1 Misfires/Cut-offs**

If during the post blast inspection of any shot it is determined that all of any part of the shot did not detonate, the immediate area of the shot will be secured and will be treated as an area where explosives are being loaded. No additional work, other than that necessary to remove the hazard, shall be performed, and only those persons needed to do such work shall remain at the blast site. As soon as practical, notifications will be given and blasting procedures outlined in section 2.2 will begin.

### **2.3 Restrictions**

Special blasting controls will be required in the vicinity of power lines, telephone lines, fiber optic lines, existing pipeline facilities, structures, water wells, springs, or buildings or where directed by National Quarry Service, Inc. to preclude the possibility of damage due to fly-rock, shock waves, vibrations, or changes to hydraulic conductivity of the bedrock near important springs and wells. This will be accomplished by a combination of blast design, adequate collaring, and matting. Matting to control fly-rock includes, but is not limited to, fabricated mats, overburden, and sand-pad matting.

## **3.0 EXPLOSIVES STORAGE & TRANSPORTATION**

National Quarry Service inc. will obtain necessary permits and comply with 27 CFR Part 55 & 13 NCAC 07F.0707 regulations and NFPA 495 state and local government having jurisdiction as to storage and transportation of explosives. National Quarry Service will maintain an inventory and use record for all explosives and detonating caps that will be reconciled at the end of the working day. Inventory and use records will be available on site for inspection by any jurisdictional authorities at all times.

## **4.0 SAFETY MEASURES**

Standard safety measures will be employed during blasting operations to prevent damage to adjacent resources, residences, utilities, and roadways. As discussed above, these measures will include blasting controls to limit fly-rock, air blast, and vibrations near sensitive areas. Warning signals, signage, and procedures to protect human health and safety are discussed below.

### **4.1 General Safety Measures**

National Quarry Service Inc. will at all times protect its workers and the public from any injury or harm from drilling or the use of explosives. Only workers thoroughly experienced in handling explosives will be permitted to supervise, handle, haul, load or fire explosives. In those jurisdictions where the licensing of blasters is mandatory, National Quarry Service, Inc. will provide proof of the necessary certification for every person so required before any crew assignment.

National Quarry Service Inc. will not leave holes loaded overnight, unattended or unprotected. Explosives will be primed immediately before use. Loading and blasting will be conducted only during daylight hours. No explosives will be abandoned on the right of way.

During the blasting procedure, all personnel not involved in the actual detonation will stand back from the time the “blast imminent” signal is given until the “all clear” has been sounded. The Contractor will post flagmen on all roadways passing the blast area to stop all traffic during blasting operations.

The Contractor will ensure that no members of the general public are in the area when a blast occurs.

## **4.2 Warning Signs and Signals**

The Contractor will install “Blast Zone Ahead” signs along roads, public ways, in the vicinity of occupied buildings immediately adjacent to the blast area, and other locations deemed necessary to warn the public of the blasting area. Additional signs warning to turn off electrical devices shall be required if electric blasting caps are used. NQS will install “Leaving Blast Zone” to notify everyone that they are leaving blast area.

### **4.2.2 Blast Signals**

National Quarry Service will use an acceptable air horn or siren to give the blasting warning and “All – Clear” signals. The warning system used for blast signals will produce a sound that is distinct from any other signals used on the site. Use of vehicle horns as blast signals will not be permitted.

- Three minutes prior to blasting - Blast Imminent; the blaster in charge will give three short blasts of an air horn.
- One minute prior to blasting – The blaster will give two short blasts of an air horn.
- Prior to blasting – the Blaster in Charge will shout “Fire in the Hole” and the explosives will be fired.
- If there is any interruption to the blast routine once the “Blast Imminent” signal has been given, the entire procedure will begin again.
- All Clear Signal – The blaster will check the blast site to ensure all charges have been detonated and give one long blast of the air horn

## **5.0 STANDARD SAFETY OPERATING PROCEDURES**

1. This General Blasting Plan will be made available to all personnel involved in field activities. Prior to the start of field activities, all personnel working on the site will be thoroughly briefed about the type of work to be done, potential hazards, safety equipment to be used and worn, safety precautions, emergency procedures, and procedures for reporting accidents or injuries.
2. A fully stocked first-aid kit will be on site at all times.  
Eye wash kits will be available on-site.  
Drinking water will be available at all times.
3. No blasting activities will be conducted during thunderstorms or during periods of potential lightning.
4. All blasting operations will be restricted to daylight hours.
5. National Quarry Service Inc. will adhere to all Federal, State and Local restrictions.
6. Emergency response procedures will be understood by all site personnel. Any visitors to the site will be briefed by the project manager.

**From:** [Wootton, Brian](#)  
**To:** ["bill.sperry@mcgillengineers.com"](mailto:bill.sperry@mcgillengineers.com);  
**cc:** [jbishop@mcgillengineers.com](mailto:jbishop@mcgillengineers.com); ["jbishop@mcgillengineers.com"](mailto:jbishop@mcgillengineers.com); ["sking@haywoodnc.net"](mailto:sking@haywoodnc.net); [Gaither, Allen](#);  
**Subject:** RE: Haywood Blasting Request - Additional Information Request (Document ID No. 8523)  
**Date:** Wednesday, September 02, 2009 4:15:00 PM

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Mr. Sperry,

Thank you for your e-mail response and also the hard copy drawings you submitted. I have two additional questions:

According to the proposed blasting plan (i.e. cover letter dated August 27, 2009 – by Jeffrey Bishop of McGill Associates); it states in-part on page 1 of the letter, the following: *“During the construction of the Municipal Solid Waste Landfill (MSW) Phase 3 waste area, the contractor has encountered rock pinnacles that can not be excavated with standard excavation methods”*.

Please explain what excavation methods have been attempted to remove the rock (i.e. type and size of equipment, etc).

According to the proposed blasting plan (i.e. the letter - 8-24-09 - by Jim Shultz of National Quarry Service); it states in-part on page 1 of the letter, the following: *“Drill pattern and blast hole size will be manipulated so that a powder factor of 1 pound to 1.25 pounds per cubic yard of rock will be maintained with the holes drilled to a depth of 3’ below proposed subgrade. This industry accepted standard for blasting unconfined mass rock will result in desired fracturaztion of the rock while minimizing disturbance outside of the actual blast area”*.

Please provide estimated calculations, explanations, etc., showing how deep (in vertical feet) the blasting will effect the

remaining rock after blasting, in order to ensure no or minimal fracturing of rock in these deeper zones (greater than four feet below proposed subgrade elevations).

Sincerely,

Brian Wootton

Please call me or e-mail me if you have any questions.

Brian

Brian Wootton, Hydrogeologist  
Solid Waste Section  
Division of Waste Management  
1646 Mail Service Center  
Raleigh, NC 27699-1646  
401 Oberlin Road, Suite 150, 27605  
tel: 919-508-8524, fax: 919-733-4810  
[Brian.Wootton@ncdenr.gov](mailto:Brian.Wootton@ncdenr.gov)

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---

**From:** Bill Sperry [mailto:bill.sperry@mcgillengineers.com]  
**Sent:** Tuesday, September 01, 2009 2:38 PM  
**To:** Wootton, Brian  
**Cc:** jbishop@mcgillengineers.com; Stephen King; Gaither, Allen  
**Subject:** RE: Haywood Blasting Request - Additional Information Request (Document ID No. 8523)

Mr. Wootton,

On behalf of Mr. Bishop, and as a follow-up to our conversation, I would like to respond to your request for clarification and/or additional information relative to the proposed blasting of rock at the Haywood County White Oak Landfill, Permit No. 44-07, as requested in Mr. Bishop's letter to Mr. Allen Gaither dated August 27, 2009 (DENR Document No. 8516.pdf). To facilitate your review, I have included your request and/or comment followed by our response.

· *Actual hard copy drawings from the Permit to*

*Construct (not pdf drawings from Document No. 7008) of Sheet C3A, C3B C22, C23, C24 – specifically, the drawings that depict subgrades and top of bedrock.*

*(The reason for this request; presently, it is difficult to read the contours and elevations from the pdf version of these drawings and also our hard copy documents are in filing transition at this time and are difficult to locate).*

Hard copy drawings of Sheets C3A, C3B, C22, C23 and C24 from the approved Permit to Construct drawing set are being sent to your office by Fed-x. These drawings are going out today (9/01/09) and should arrive at your office on Wednesday, September 2, 2009.

*· On page 1 of your letter (August 27, 2009) you state: “The rock is located within the limits of the Phase 3 waste area and sediment basin #6. The attached drawing shows the approximate location of the rock. Based on a survey of the exposed rock, the rock covers an area of approximately 2 acres”.....We estimate approximately 25,000 cubic yards of rock material needs to be removed”.*

*Figure 1 of the letter titled “Area of Blasting” delineates “Area of Proposed Blasting”. Is rock proposed to be removed within this entire area or just rock pinnacles within this area? Also, approximately half of the blasting area delineated on Figure 1 is located within Phase 4 and a portion for rock removal is delineated for the sediment basin #6. The first page of your letter only refers to Phase 3 and sediment basin No. 6. Please confirm and revise those areas on the drawing that proposed blasting will take place (via a grid pattern of blasting points) and also confirm the actual amount in acreage and cubic yards to be removed from only Phase 3 and the sediment basin.*

As we discussed, our intent is to remove all rock from within the general area outlined on Figure 1, titled "Area of Blasting" included in Mr. Bishop's letter to Mr. Allen Gaither, Regional Engineer, dated August 27, 2009. While a portion of the proposed rock removal area is located within the Phase 4 area, it must be removed at this time as a part of the construction of Phase 3. This is required in order to properly construct the adjacent drainage features (ditches) and the perimeter access road. In addition, Phase 4, as permitted, is a continuation of Phase 3 relative to the base grades and the collection and removal of leachate. It is critical that the permitted grades be attained along this portion of the future tie-in between Phase 3 and Phase 4 to ensure the proper function of the leachate collection system in Phase 4. The removal of the rock at this time will basically eliminate the need to remove additional rock along this interface when Phase 4 is constructed.

An actual grid pattern of blasting points has not been established at this time. This will be done once the licensed blaster arrives on site and begins drilling activities. Since the intent is to basically fracture the rock in order to facilitate its removal, the blasting pattern in the field will be somewhat dependent of the type and hardness of the rock encountered during the drilling process. Basically the drill pattern and blast hole size will be manipulated so that a powder factor of approximately 1 to 1.25 pounds of powder per cubic yard of rock will be maintained.

The exposed rock, affecting the construction of sediment basin #6, Phase 3 and the future tie-in to Phase 4 covers an area comprising approximately 2 acres. We estimate approximately 25,000 cubic yards of rock will need to be removed in order to attain the required 4 feet of separation to the base liner system.

- *On average, how much vertical feet of rock is proposed to be removed to reach the correct grades?*

The rock mass in Phase 3 and 4 is basically a dome shape mass with a few more distinct pinnacles intersected by the western slope of Phase 3 projected on through Phase 4. Our projection is to remove approximately 4 feet of rock around the perimeter of the mass and upwards to approximately 15 feet in the center of the rock mass. The intent is to achieve the 4 foot separation to the designed base liner system.

- *How deep will the charges be placed in reference to the proposed base grades?*

The intent is to drill the blast holes to a depth of 3 feet below the proposed sub-grade. This is an industry accepted standard for blasting unconfined mass rock and should result in the desired fracturization of the rock while minimizing disturbance outside the actual blast area.

*Attached, is a guidance document (“blasting –plan-guide”) the Solid Waste Section has given to consultants and blasting contractors. Note, some of the statements in this guidance were not included in the blasting plan. Revise the blasting plan to include these.*

I have forwarded the "blasting-plan-guide" attached to your e-mail to Mr. Bishop (dated August 31, 2009) on to Thalle Construction Company (site contractor) for inclusion in their blasting plan for the removal of rock at the Haywood County White Oak Landfill. Once I have received and reviewed the revised blasting plan from Thalle Construction, I will forward it on to you for your review.

On behalf of Haywood County, we appreciate your prompt response to our request to remove the encountered rock affecting the construction of Phase 3 and the future construction of the Phase 3/4 tie-in. As mentioned in Mr. Bishop's letter to Mr. Allen Gaither, we are currently under construction and need to expedite the approval of this request so as not to delay the overall construction of this project. Should you have any questions or if I can be of further assistance, please do not hesitate to give me a call. I can be reached at the office at (828) 252-0575 or by cell phone at (828) 713-2251.

Sincerely, Bill Sperry



*“Building Partnerships by Providing Superior Service with Professional Integrity”*

**Bill Sperry, P.E.**

McGill Associates, P.A.

55 Broad Street

Asheville, North Carolina 28801

(828) 252-0575

(828) 252-2518 - Fax



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**From:** [Wootton, Brian](#)  
**To:** ["jbishop@mcgillengineers.com"](mailto:jbishop@mcgillengineers.com);  
**cc:** ["sking@haywoodnc.net"](mailto:sking@haywoodnc.net); [Gaither, Allen](#);  
**Subject:** FW: Haywood Blasting Request - Additional Information Request (Document ID No. 8523)  
**Date:** Monday, August 31, 2009 2:58:00 PM  
**Attachments:** [8516.pdf](#)  
[blasting-plan-guide.pdf](#)

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Mr. Bishop,

On behalf of Allen Gaither and Zinith Barbee, I am reviewing the blasting plan you submitted on August 27, 2009, for Phase 3, White Oak MSW landfill. (Permit No. 44-07). The attached request (Request for Blasting) is Document No. 8516.pdf. Also attached is a blasting plan guidance in pdf format. For reference, a pdf copy of the Permit to Construct Phase 3 and 4 application (Document No. 7008 is located on our the Solid Waste Section's database – it is too large to include in this e-mail), To enhance the review process of the blasting plan, please respond to the following below.

- Actual hard copy drawings from the Permit to Construct (not pdf drawings from Document No. 7008) of Sheet C3A, C3B C22, C23, C24 – specifically, the drawings that depict subgrades and top of bedrock.  
(The reason for this request; presently, it is difficult to read the contours and elevations from the pdf version of these drawings and also our hard copy documents are in filing transition at this time and are difficult to locate).
- On page 1 of your letter (August 27, 2009) you state:  
*"The rock is located within the limits of the Phase 3 waste area and sediment basin #6. The attached drawing shows the approximate location of the rock. Based on a survey of*

*the exposed rock, the rock covers an area of approximately 2 acres”..... We estimate approximately 25,000 cubic yards of rock material needs to be removed”.*

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- On average, how much vertical feet of rock is proposed to be removed to reach the correct grades?
- How deep will the charges be placed in reference to the proposed base grades?

Attached, is a guidance document (“blasting –plan-guide”) the Solid Waste Section has given to consultants and blasting contractors. Note, some of the statements in this guidance were not included in the blasting plan. Revise the blasting plan to include these.

Please call me or e-mail me if you have any questions.

Brian

Brian Wootton, Hydrogeologist  
Solid Waste Section  
Division of Waste Management  
1646 Mail Service Center  
Raleigh, NC 27699-1646  
401 Oberlin Road, Suite 150, 27605  
tel: 919-508-8524, fax: 919-733-4810  
[Brian.Wootton@ncdenr.gov](mailto:Brian.Wootton@ncdenr.gov)

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---

**From:** Gaither, Allen  
**Sent:** Friday, August 28, 2009 10:37 AM  
**To:** Wootton, Brian  
**Cc:** jbishop@mcgillengineers.com; 'Stephen King'  
**Subject:** Haywood Blasting Request

Hey Brian,

Per our phone conversation, I have attached the Request for Blasting – MSW Phase 3 at the Haywood County MSW Landfill (Permit #44-07). I greatly appreciate you taking the time to look at this during Zinith's absence. Contact information for Mr. Jeff Bishop can be found on the cover letter in the document. Contact information for Mr. Stephen King is as follows:

Mr. Stephen King  
Haywood County Solid Waste Director  
278 Recycle Road  
Clyde, North Carolina 28721  
Phone (828) 627-8042  
Fax (828) 627-8137

Thanks again,  
Allen

Allen Gaither - [Allen.Gaither@ncdenr.gov](mailto:Allen.Gaither@ncdenr.gov)  
North Carolina Dept. of Environment and Natural Resources  
Asheville Regional Office  
Division of Waste Management - Solid Waste Section  
2090 U.S. 70 Highway  
Swannanoa, NC 28778  
Tel: 828-296-4500  
Fax: 828-299-7043

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|            |                 |                 |
|------------|-----------------|-----------------|
| Permit No. | Date            | Document ID No. |
| 44-07      | August 28, 2009 | 8516            |



August 27, 2009

Mr. Allen Gaither  
Regional Engineer  
Solid Waste Permitting Section  
Division of Waste Management  
North Carolina Department of Environment and Natural Resources  
2090 U.S. Highway 70  
Swannanoa, North Carolina 28778

RE: Request for Blasting – MSW Phase 3  
White Oak MSW Landfill Permit # 44-07  
Haywood County, North Carolina

Dear Mr. Gaither:

During the construction of the Municipal Solid Waste Landfill (MSW) Phase 3 waste area, the contractor has encountered rock pinnacles that can not be excavated with standard excavation methods. The rock is located within the limits of the Phase 3 waste area and sediment basin #6. The attached drawing shows the approximate location of the rock. Based on a survey of the exposed rock, the rock covers an area of approximately 2 acres. We project from 4' to 15' feet of vertical cut is necessary to reach the proposed grades and to provide the required 4' separation from the base liner system. We estimate approximately 25,000 cubic yards of rock material needs to be removed.

We have calculated approximately 15,000 cubic yards of waste volume would be lost in Phase 3 alone if the rock is not removed. At the current compaction rates, this lost airspace would translate to more than 7,000 tons of waste. In addition, due to the location of the rock, revising the base grades to avoid the rock would also impact the grades and waste airspace for the future Phase 4 waste area. Haywood County can not afford to lose this waste airspace.

We have discussed the situation with the Phase 3 landfill contractor, Thalle Construction. Thalle Construction has experience with rock removal on landfill projects. They have provided the attached Site Specific Blasting Plan for removal of the encountered rock as prepared by National Quarry Service. Based on the attached information, we are confident that we can successfully remove the encountered rock with out detrimental impacts.

Mr. Allen Gaither  
August 27, 2009  
Page 2

On behalf of Haywood County, we are requesting approval to remove the encountered rock for the Phase 3 area to the elevations that allow the landfill to be constructed as permitted. Thank you for your attention to this request. Since we are currently under construction, we would like to expedite the review as soon as possible. Please call should you have any questions or need any additional information.

Sincerely,  
McGILL ASSOCIATES, P.A.

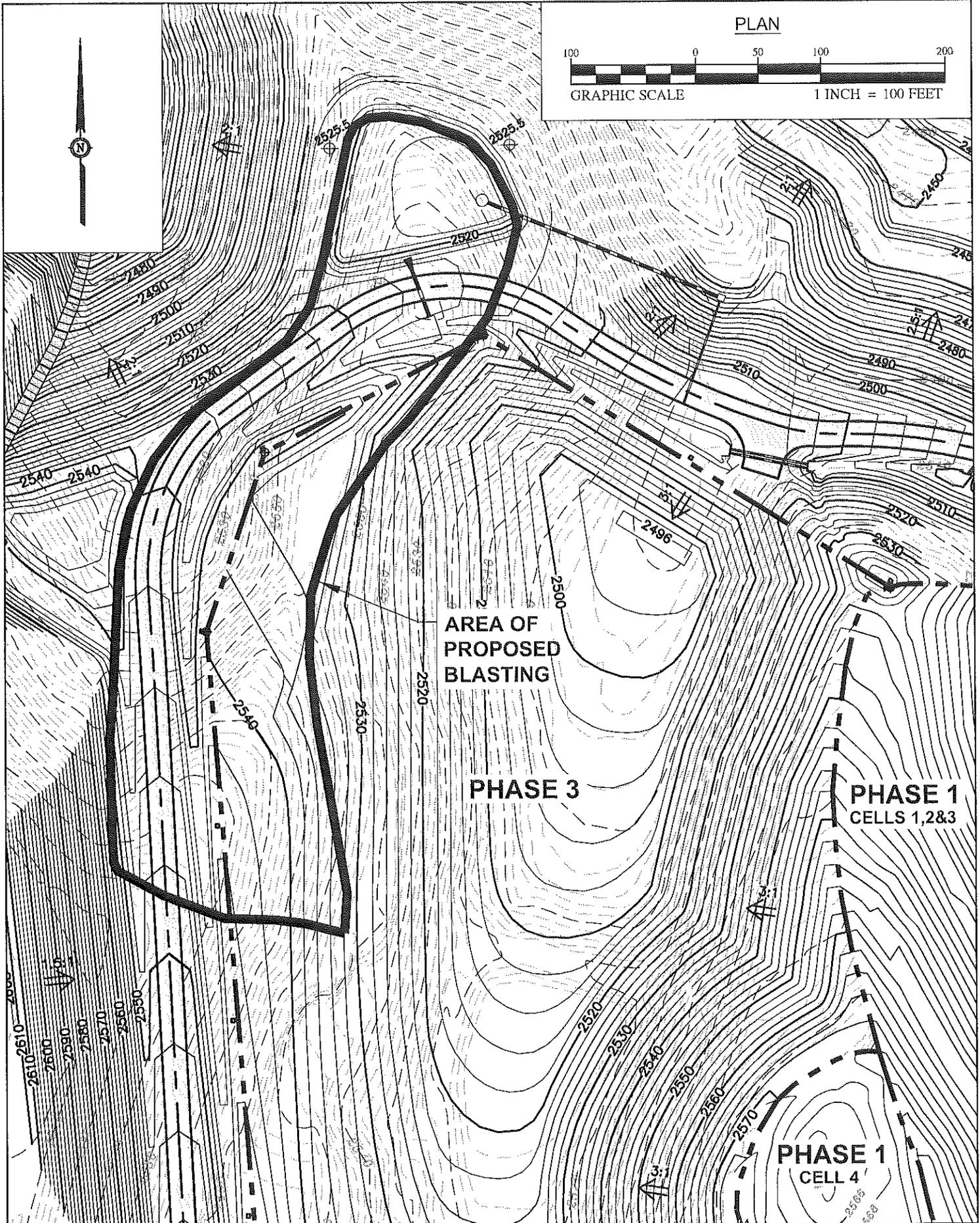
A handwritten signature in black ink, appearing to read "Jeffrey R. Bishop", with a long horizontal flourish extending to the right.

JEFFREY R. BISHOP, P.E.  
Senior Project Manager

Enclosures

cc: Stephen King, Haywood County Solid Waste Director, w/ enc

P:/07518/Letters/ag27aug09-Blasting Request.doc



C:\2007\07518\CONSTRUCTION-DWG\07518-Rack-Worksheet-8-19-09.dwg 8/27/2009 10:53 AM KELLY

**McGill**  
 ASSOCIATES  
 ENGINEERING-PLANNING-FINANCE  
 55 BROAD STREET ARSHEVILLE, NC 28801 PH: (828) 252-0575

WHITE OAK LANDFILL  
 MSW PHASE 3  
**HAYWOOD COUNTY**  
 HAYWOOD COUNTY, NORTH CAROLINA

JOB NO.: 07518  
 DATE: AUGUST 2009  
 DESIGNED BY: KS  
 CADD BY: KS  
 DESIGN REVIEW: \_\_\_\_\_  
 CONST. REVIEW: \_\_\_\_\_  
 FILE NAME:  
 07518-Rack-Worksheet-8-19-09.dwg

AREA OF BLASTING

FIGURE  
 1



8/24/2009

Sarah R. McKee, E.I.

Thalle Construction Company, Inc.

900 NC Hwy 86 North

Hillsborough, NC 27278

Re: Blasting at Haywood County Sanitary Landfill

Ms. McKee,

At your request, National Quarry Service has prepared a site specific blasting plan for removal of the rock encountered in the proposed phase three of the Haywood County Sanitary Landfill. After visiting the site and speaking with Thalle Construction personnel it is sure that all mechanical means of excavation have been exhausted and drilling and blasting is the last resort for the removal of the rock. We believe that well designed and executed blasting would achieve the intended results without risk of damage to the existing cells, underlying bed rock or hydrology of the site.

The rock to be excavated occurs in various depths between elevation 2510' and elevation 2550'. According to borings done at the site and our experience in this area of North Carolina, we expect to find a medium to hard layer of weathered rock overlying hard granite with layers of gneiss, quartz and feldspar. National Quarry Service intends to use non-electric type blasting caps to initiate high explosive primers approximately 1' above the blast hole bottom. We expect that the area will be free of ground water and will use ammonium nitrate/ fuel oil blasting agent to load the holes to required weight and depth. The holes will then be stemmed to the collar with crushed stone for maximum confinement. Drill pattern and blast hole size will be manipulated so that a powder factor of 1 pound to 1.25 pounds per cubic yard of rock will be maintained with the holes being drilled to a depth 3' below proposed sub-grade. This industry accepted standard for blasting of unconfined mass rock will result in desired fracturization of the rock while

minimizing disturbance outside of the actual blast area. Maximum pounds per delay will be expected to occur in an area of cut between 27' and 29' approximately 450' from existing phase 1. Using the calculated scaled distance of 46.134 and an "H" factor of 160, the maximum peak particle velocity at the nearest corner of the structure is predicted to be less than 0.4 inches per second. In addition, there is an area of excavation to below proposed sub grade separating the blast area from the existing cell which would be expected to reduce the conductivity of ground vibration. We would recommend that a thorough survey be done of the existing conditions of the structures as near prior to blasting as possible. Seismic monitoring will be done at all areas of concern and readings will be reviewed after each blast to assess the effects of the blast and the need for changes to blast designs.

All other procedures as to the general blasting on the site are outlined in the General Blasting Plan for the Haywood County Sanitary Landfill. I hope I have included enough information for you to make a determination in proceeding. If you have any questions, please call myself (336) 624-2190 or Chris (518) 210-3353. Thank you for the opportunity to assist in this and all Thalle Construction projects.

Regards,

Jim Schultz

National Quarry Service

Va. Blaster Cert. #691037525



# **GENERAL BLASTING PLAN**

**Haywood County Sanitary Landfill**

**Haywood County, NC**

## Table of Contents

|              |  |          |
|--------------|--|----------|
| <b>1.0</b>   | <b>Introduction.....</b>   | <b>3</b> |
| <b>1.1</b>   | <b>Purpose.....</b>  | <b>3</b> |
| <b>2.0</b>   | <b>Blasting Procedures.....</b>                                    | <b>3</b> |
| <b>2.1</b>   | <b>Notifications.....</b>  | <b>3</b> |
| <b>2.2</b>   | <b>Blasting Process.....</b>                                       | <b>4</b> |
| <b>2.2.1</b> | <b>Misfires/Cutoffs.....</b>                                       | <b>4</b> |
| <b>2.3</b>   | <b>Restrictions.....</b>   | <b>4</b> |
| <b>3.0</b>   | <b>Explosives storage and Transportation.....</b>                  | <b>5</b> |
| <b>4.0</b>   | <b>Safety Measures.....</b>  | <b>5</b> |
| <b>4.1</b>   | <b>General Safety Measures.....</b>                                | <b>5</b> |
| <b>4.2</b>   | <b>Warning Signs and Signals.....</b>                              | <b>6</b> |
| <b>4.2.1</b> | <b>Signs and Access Control.....</b>                               | <b>6</b> |
| <b>4.2.2</b> | <b>Blast Signals.....</b>  | <b>6</b> |
| <b>5.0</b>   | <b>Standard Safety Operating Procedures.....</b>                   | <b>6</b> |
|              | <b>Delay Timing &amp; Typical Hole Design.....</b>                 |          |
|              | <b>Distance to Existing utilities and dwellings with Maps.....</b> |          |
|              | <b>Sample Drill Logs, Blast reports.....</b>                       |          |
|              | <b>Material Data Safety Sheets.....</b>                            |          |

# **GENERAL BLASTING PLAN**

## **1.0 INTRODUCTION**

This Blasting plan identifies measures to be taken by National Quarry Service Inc. to ensure that blasting operations are carried out in accordance with federal, state and local regulations and restrictions.

Measures identified in this blasting plan apply to work within the project area as defined as, the right-of-way, access roads, temporary use areas and other areas used during construction of the project.

Contractors sub – contractors and all site personnel are to be thoroughly familiar with this plan.

### **1.1 Purpose**

The project encounters one or more areas of surface and subsurface rock where mechanical equipment will be unable to rip or excavate rock to allow construction. There is estimated to approximately 25,000 cubic yards of this type of rock on this project. In these areas blasting will be used to fracture the rock to allow for grading and excavation.

This plan describes safety standards and practices that will be implemented during construction to minimize health, safety and environmental concerns related to blasting on the project.

## **2.0 Blasting Procedures**

### **2.1 Notifications**

National Quarry Service Inc. will notify all appropriate federal, state and local authorities at least 24 hours prior storing or using explosives on the project. In addition, the following notifications will be needed throughout the project.

Prior to any detonation of explosives in the vicinity of existing facilities (such as pipelines, dwellings, structures, overhead or underground utilities, farm operations, or public crossings), a minimum of 24 hours notice will be given to appropriate authorities, and the owners or operators of any facilities that may be affected by the blasting.

## **2.2 Blasting Process**

Drilling - Scaled Distance formulas will be used as guidelines to determine maximum pounds within any 8ms delay period and appropriate drill hole spacing and diameter will be applied.

Loading - Explosive type will be determined by drilling reports and ground water encountered. Cartridge and or bulk explosives will be primed with an appropriate primer in the bottom of the blast hole. Once loaded to a predetermined depth, all holes will be stemmed with #78 crushed stone. All delay and ignition caps will be non – electric type and will be connected and inspected by a certified blaster. Tail caps of will be of sufficient length that visual inspection after the blast will be possible to insure that all holes have detonated.

Matting/Covering – Whenever necessary blasting mats or earth cover will be used to protect surrounding property from blasting debris.

Warning – The blaster inspects the blast area to ensure that vehicles and personnel have withdrawn to a safe distance. Access to the area is restricted and warning signals are sounded.

Blast – Following the warning signals, the blast will be detonated.

Clearance – National Quarry Service personnel will conduct a thorough post blast inspection of the blast area to ensure that all explosives and blasting caps are detonated prior to any other work proceeding. Once the area is verified clear, the all clear will be sounded.

### **2.2.1 Misfires/Cut-offs**

If during the post blast inspection of any shot it is determined that all of any part of the shot did not detonate, the immediate area of the shot will be secured and will be treated as an area where explosives are being loaded. No additional work, other than that necessary to remove the hazard, shall be performed, and only those persons needed to do such work shall remain at the blast site. As soon as practical, notifications will be given and blasting procedures outlined in section 2.2 will begin.

## **2.3 Restrictions**

Special blasting controls will be required in the vicinity of power lines, telephone lines, fiber optic lines, existing pipeline facilities, structures, water wells, springs, or buildings or where directed by National Quarry Service, Inc. to preclude the possibility of damage due to fly-rock, shock waves, vibrations, or changes to hydraulic conductivity of the

bedrock near important springs and wells. This will be accomplished by a combination of blast design, adequate collaring, and matting. Matting to control fly-rock includes, but is not limited to, fabricated mats, overburden, and sand-pad matting.

### **3.0 EXPLOSIVES STORAGE & TRANSPORTATION**

National Quarry Service inc. will obtain necessary permits and comply with 27 CFR Part 55 & 13 NCAC 07F.0707 regulations and NFPA 495, state and local governments having jurisdiction as to storage and transportation of explosives. National Quarry Service will maintain an inventory and use record for all explosives and detonating caps that will be reconciled at the end of the working day. Inventory and use records will be available on site for inspection by any jurisdictional authorities at all times.

### **4.0 SAFETY MEASURES**

Standard safety measures will be employed during blasting operations to prevent damage to adjacent resources, residences, utilities, and roadways. As discussed above, these measures will include blasting controls to limit fly-rock, air blast, and vibrations near sensitive areas. Warning signals, signage, and procedures to protect human health and safety are discussed below.

#### **4.1 General Safety Measures**

National Quarry Service Inc. will at all times protect its workers and the public from any injury or harm from drilling or the use of explosives. Only workers thoroughly experienced in handling explosives will be permitted to supervise, handle, haul, load or fire explosives. In those jurisdictions where the licensing of blasters is mandatory, National Quarry Service, Inc. will provide proof of the necessary certification for every person so required before any crew assignment.

National Quarry Service Inc. will not leave holes loaded overnight, unattended or unprotected. Explosives will be primed immediately before use. Loading and blasting will be conducted only during daylight hours. No explosives will be abandoned on the right of way.

During the blasting procedure, all personnel not involved in the actual detonation will stand back from the time the "blast imminent" signal is given until the "all clear" has been sounded. The Contractor will post flagmen on all roadways passing the blast area to stop all traffic during blasting operations.

The Contractor will ensure that no members of the general public are in the area when a blast occurs.

## **4.2 Warning Signs and Signals**

The Contractor will install “Blast Zone Ahead” signs along roads, public ways, in the vicinity of occupied buildings immediately adjacent to the blast area, and other locations deemed necessary to warn the public of the blasting area. Additional signs warning to turn off electrical devices shall be required if electric blasting caps are used. NQS will install “Leaving Blast Zone “to notify the public that they are leaving blast area.

### **4.2.2 Blast Signals**

National Quarry Service will use an acceptable air horn or siren to give the blasting warning and “All – Clear” signals. The warning system used for blast signals will produce a sound that is distinct from any other signals used on the site. Use of vehicle horns as blast signals will not be permitted. The blast warning signals will be given as follows.

Three minutes prior to blasting - Blast Imminent; the blaster in charge will give three short blasts of an air horn.

One minute prior to blasting – The blaster will give two short blasts of an air horn.

Prior to blasting – the Blaster in Charge will shout “Fire in the Hole” and the explosives will be fired.

If there is any interruption to the blast routine once the “Blast Imminent” signal has been given, the entire procedure will begin again.

All Clear Signal – The blaster will check the blast site to ensure all charges have been detonated and give one long blast of the air horn

### **Safety Standard Operation Procedures**

1. This General Blasting Plan will be made available to all personnel involved in field activities. Prior to the start of field activities, all personnel working on the site will be thoroughly briefed about the type of work to be done, potential hazards, safety equipment to be used and worn, safety precautions, emergency procedures, and procedures for reporting accidents or injuries.
2. A fully stocked first-aid kit will be on site at all times.  
Eye wash kits will be available on-site.  
Drinking water will be available at all times.

3. Personal safety protection will be used in the immediate area of drilling by all personnel including hearing protection, safety glasses and hard hats.
4. No blasting activities will be conducted during thunderstorms or during periods of potential lightning.
5. National Quarry Service Inc. will adhere to all Federal, State and Local restrictions.
6. Emergency response procedures will be understood by all site personnel. Any visitors to the site will be briefed by the project manager.

# DRAFT

## ROCK BLASTING AT LINED LANDFILL UNITS

The Solid Waste Section allows blasting for rock removal only after all other options have been explored, including the viability of adjusting base grades.

Generally, the base grades must be designed to maintain four foot of vertical separation from the top of rock as established by the Design Hydrogeologic Study. This study requires a boring density of about one boring per acre for the area of investigation, which includes the footprint for the planned landfill phase of development and the area around the footprint that will be subject to ground-water monitoring. For the purposes of the Design Study the top of rock is defined by auger refusal or a Standard Penetration Resistance blow count of about 50/.2'. The base grades are then designed to maintain four foot of vertical separation from the top of bedrock datum plane as established in the Design Hydrogeologic Study.

If during excavation of the disposal cell, rock pinnacles are found that are above the top of rock datum plane established in the Design Hydrogeologic Study, then the Solid Waste Section will consider authorizing some rock removal. If blasting is necessary the landfill owner/operator or their consultants should submit a blasting plan. This blasting plan should show the location and size of the rock pinnacles, the elevations of the rock, and an estimate of the volume of rock that needs to be removed. The blasting plan must be designed so as to minimize the impact to underlying rock and nearby structures.

If rock removal is determined to be necessary, the Solid Waste Section may authorize blasting with the following conditions:

- Effort shall be made to minimize the amount of blasting necessary, and to minimize the effects of the blasting that is required.
- Blast monitoring shall be conducted at appropriate locations. Monitoring may be required at the edge of the proposed cell, at the location of monitoring wells, at the edge of clay liner of nearby landfill cells, at the edge of nearby structures, etc. Every effort shall be made to limit the peak particle velocity to 1 inch per second at the blast monitoring locations.

# DRAFT

Rock Blasting

Page 2

- A full, detailed report of the rock blasting activities shall be submitted to the Solid Waste Section within 30 days of the completion of the rock removal. The Licensed Blaster shall certify that the drill hole pattern, charge weights, and delays were selected in such a manner as to minimize the amount of energy which may impact underlying rock.
- A Professional Engineer shall certify that rock blasting was kept to a minimum and that controlled blasting techniques were used to minimize the effects of blasting to the underlying bedrock.
- The report of blasting activities shall also include a discussion by a Licensed Professional Geologist on the effect of heavy ripping and/or blasting on the ground-water flow regime at the site. Additional subsurface investigation may be required to determine the effect of heavy ripping and/or blasting on the hydrogeology of the area.
- During and after excavation of the area and prior to backfilling with soil, the Licensed Professional Geologist shall evaluate the excavation for any evidence of structural features that could influence ground-water flow (fractures, dikes, pegmatites, etc.) The Solid Waste Section shall be informed of when the excavation will be completed, so a Section Hydrogeologist may schedule a site visit to inspect the area. The report of blasting activities shall include a report by the Licensed Professional Geologist on the evaluation of the excavated area and recommendations of any modifications that may be needed to the ground-water monitoring system based on this evaluation.
- If modifications to the water quality monitoring plan are necessary, based upon the evaluation of the excavation area or additional subsurface investigation, a revised monitoring plan shall be submitted by the Licensed Professional Geologist to the Solid Waste Section for review.
- The Professional Engineer shall include a discussion in the CQA Report of the location and nature of the rock blasting and the backfill of the over-excavation. This shall be included as part of the certification of the subgrade.