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June 22, 2017

Mr. Steve McCaslin  
Bureau of Air Quality  
South Carolina Department of Health and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

RECEIVED

JUN 27 2017

BUREAU OF AIR QUALITY

Re: Construction Permit Application  
RDA, LLC  
Andrews, South Carolina

Air Permit # 2320-0049

Dear Steve:

Please find enclosed a construction permit application for the proposed RDA, LLC facility to be located near Andrews, South Carolina. We are submitted three copies of the construction permit application.

Thank you for your assistance with this submittal. If you have any questions or need additional information, please contact me at (843) 769-7378, extension 4489 ([matthew.wike@gel.com](mailto:matthew.wike@gel.com)) or Mr. Clark Wooten with RDA at (910) 567-2625 ([cwooten@buysod.com](mailto:cwooten@buysod.com)).

Regards,



Matthew W. Wike, P.E.  
Senior Engineer

cc: Mr. Clark Wooten, RDA  
Mr. Craig Kennedy, Kennedy Consulting Services

CONSTRUCTION PERMIT APPLICATION  
RDA FACILITY

RDA, LLC  
ANDREWS, SOUTH CAROLINA

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Air Dispersion Modeling Results

Emission Assumptions and Calculations

I	Crushed Stone Mine and Processing
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2	Process Flow Diagram – Facility Wide
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Matthew Wike, P.E.  
SC State Registration No. 22843



GEL Engineering, LLC  
Certificate of Authorization No. C02649

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*Affixed P.E. Seal only covers information provided in the following sections: Summary, Permit Application Forms, and Emission Assumptions and Calculations.*

**CONSTRUCTION PERMIT APPLICATION  
RDA FACILITY**

**RDA, LLC  
ANDREWS, SOUTH CAROLINA**

**1.0 OVERVIEW OF PERMIT APPLICATION**

RDA, LLC (RDA) is submitting this application to obtain a construction permit for a crushed stone mine and processing facility to be located near Andrews, South Carolina. This facility has never been permitted by the South Carolina Department of Health and Environmental Control (DHEC) Bureau of Air Quality (BAQ).

The facility requests federally enforceable conditions limiting criteria pollutants to below applicable major source levels of 100 tons per year. The facility will utilize wet suppression to achieve emissions below major source levels.

This construction permit application is being submitted for the following emission sources associated with the crushed stone mine and processing operations:

- Mining and Material Handling;
- Material Storage;
- Haul Roads; and
- Customer Roads.

The site boundary and location map of the RDA facility is shown as Figure 1. A facility-wide process flow diagram is provided as Figure 2. A process flow diagram for the material handling and storage is provided as Figure 3. A narrative summary of potentially applicable state and federal regulations is provided in Section 3.0.

**2.0 DESCRIPTION OF PROCESSES AND EMISSIONS**

RDA proposes to locate the crushed stone mine and processing facility near Andrews, South Carolina. The facility will be capable of crushing 500 tons per hour from the primary crusher. The process starts inside the pit where the stone will be mined and transported in trucks using plant haul roads. The stone will be dumped into the primary jaw crushing station where stone will be initially crushed and conveyed to the first screening station. At the first screening station, the material will be screened and conveyed to either the first storage pile or conveyed to the second storage pile (surge). Material from the second storage pile (surge) will be tunnel conveyed to the secondary screening/crushing station. At the secondary screening/crushing station, the material will be screened and crushed and then either conveyed to one of two storage piles or conveyed to the tertiary screening/crushing station. At the tertiary screening/crushing station, material will be screened and crushed and then either conveyed to one of two storage piles, or immediately sent to the fines screening station. At the fines screening

station, material will be screened (but not crushed) and then conveyed to one of three storage piles. Lastly, the material will be transferred to customer trucks from one of the storage piles and the trucks will exit the site using the customer haul roads.

Emissions from the crushed stone mine and processing plant will consist of the criteria pollutants particulate matter (PM), PM with an aerodynamic diameter of less than or equal to 10 microns (PM<sub>10</sub>), and PM with an aerodynamic diameter of less than or equal to 2.5 microns (PM<sub>2.5</sub>). A more detailed description of the above operations is provided in the Emission Assumptions and Calculations (EA&C) section of this permit application.

### **3.0 SUMMARY OF REGULATORY COMPLIANCE**

This section contains a comprehensive regulatory review for the air emissions from the proposed crushed stone mine and processing plant at the RDA facility. The regulations that were identified as being potentially applicable are summarized below and discussed in detail in Sections 3.1 through 3.14.

- South Carolina Emissions from Fuel Burning Operations (R.61-62.5, Standard No. 1)
- South Carolina Ambient Air Quality Standards (R.61-62.5, Standard No. 2)
- South Carolina Waste Combustion and Reduction (R.61-62.5, Standard No. 3) and South Carolina Hospital, Medical, Infectious Waste Incinerators (R.61-62.5, Standard No. 3.1)
- South Carolina Emissions From Process Industries Standard (R.61-62.5, Standard No. 4)
- South Carolina Volatile Organic Compounds Standard (R.61-62.5, Standard No. 5)
- South Carolina Control of Oxides of Nitrogen Standard (R.61-62.5, Standard No. 5.2)
- South Carolina Prevention of Significant Deterioration (PSD) Standard (R.61-62.5, Standard No. 7)
- South Carolina Nonattainment New Source Review (NSR) Standard (R.61-62.5, Standard 7.1)
- South Carolina Toxic Air Pollutants Standard (R.61-62.5, Standard No. 8)
- Standards of Performance for New Stationary Sources (40 CFR Part 60)
- National Emission Standards for Hazardous Air Pollutants (40 CFR Part 61)

- National Emission Standards for Hazardous Air Pollutants for Source Categories (40 CFR Part 63)
- Compliance Assurance Monitoring (40 CFR Part 64)
- Greenhouse Gas Tailoring Rule (June 3, 2010 Federal Register)

### **3.1 South Carolina Emissions from Fuel Burning Operations (Standard No. 1)**

The South Carolina Emissions from Fuel Burning Operations Standard (R.61-62.5, Standard No. 1) establishes standards for fuel burning operations including limitations on visible emissions, PM emissions, and sulfur dioxide (SO<sub>2</sub>) emissions (Sections I, II, and III, respectively). There are no fuel burning operations associated with the proposed crushed stone mining and processing operations at RDA. Therefore, the crushed stone mine and processing operations are not subject to this standard.

### **3.2 South Carolina Ambient Air Quality Standards (Standard No. 2)**

The South Carolina Ambient Air Quality Standards (SCAAQS - R.61-62.5, Standard No. 2) establish ambient air quality standards for PM<sub>10</sub>, PM<sub>2.5</sub>, carbon monoxide (CO), SO<sub>2</sub>, nitrogen dioxide (NO<sub>2</sub>), ozone, gaseous fluorides as hydrogen fluoride, and lead. Emissions from the RDA facility will include PM<sub>10</sub> and PM<sub>2.5</sub>. Compliance with Standard No. 2 is demonstrated using air dispersion modeling.

As shown in EA&C, PM<sub>2.5</sub> emissions from all emission sources associated with the crushed stone mine and processing facility are below the 1.14 pound per hour (lb/hr) per emission source de minimis levels established in the DHEC BAQ Guidance document "Facilities/Sources Exempt or Deferred from Modeling - Standard No. 2 and Standard No. 7." Therefore, no air dispersion modeling is required for PM<sub>2.5</sub> emissions from this facility.

PM<sub>10</sub> emissions from all emissions sources associated with the crushed stone mine and processing facility are below the 1.14 lb/hr de minimis level, except the mining and material handling emission source. Therefore, an air dispersion modeling demonstration for PM<sub>10</sub> emissions is required for the mining and material handling operation. As shown in the Air Dispersion Modeling Results section of this application, PM<sub>10</sub> emissions have demonstrated compliance with Standard No. 2.

### **3.3 South Carolina Waste Combustion and Reduction (Standard No. 3) and South Carolina Hospital, Medical, Infectious Waste Incinerators (Standard No. 3.1)**

Both the South Carolina Waste Combustion and Reduction Standard (Standard No. 3) and South Carolina Hospital, Medical, Infectious Waste Incinerators Standard (Standard No.

3.1) establish emission limits and standards for various types of waste combustion sources, hospital, medical, and infectious waste incinerators.

The proposed crushed stone mine and processing facility does not include any waste combustion and reduction sources. Additionally, the proposed crushed stone mining and processing facility is not classified as a hospital, medical, or infectious waste incinerator. Therefore, Standard Nos. 3.0 and 3.1 do not apply to the crushed stone plant.

**3.4 South Carolina Emissions from Process Industries Standard (Standard No. 4)**

The South Carolina Emissions from Process Industries Standard (R.61-62.5, Standard No. 4) establishes emission standards for specific process industries as well as for general process industries. None of the specific process industry categories listed in Sections II through VII apply to RDA. The crushed stone mine and processing operations at RDA are subject to Standard No. 4, Section VIII - Other Manufacturing, Section IX - Visible Emissions (where not specified elsewhere), and Section X – Non Enclosed Operations.

The following section discusses RDA’s compliance with the applicable provisions of Standard No. 4, Section VI.

Particulate Matter Emissions (Standard No. 4, Section VIII)

This standard requires that particulate emissions from general process industries be limited to the value in Table 1 of the Standard No. 4, Section VIII regulation. Interpolation of Table 1 can be obtained by the following equation for process weight rates up to 30 tons per hour:

$$E = F \times 4.10 \times P^{(0.67)}$$

where:

E = allowable particulate emission rate in pounds per hour

F = effect factor (F = 0.25 for acid mists, F = 1.0 for all other pollutants)

P = process weight rate in tons per hour

For process weight rates greater than 30 tons per hour, this standard requires that particulate emissions from general process industries be interpolated by the following equation:

$$E = F \times (55.0 \times P^{(0.11)} - 40)$$

where:

E = allowable particulate emission rate in pounds per hour

F = effect factor (F = 0.25 for acid mists, F = 1.0 for all other pollutants)

P = process weight rate in tons per hour

The proposed crushed stone mine and processing operations are subject to and comply with this standard as shown below:

Process	Process Weight Rate (tons/hour)*	Estimated Controlled Hourly PM Emission Rate (lbs/hr)	Allowable Hourly PM Emission Rate (lbs/hr)
Mining and Material Handling	500	6.74	69.0
Material Storage	500	0.63	69.0
Haul Roads	500	3.65	69.0
Plant Roads	500	1.96	69.0

\*Annual process weight rate divided by 8,760 hours per year

Visible Emissions (Standard No. 4, Section IX)

This standard requires that visible emissions, including fugitive emissions, not exceed 40 percent opacity for existing sources where construction began on or before December 31, 1985, or 20 percent for new sources if constructed after this date (Parts A and B, respectively). All sources are subject to the 20 percent opacity standard.

Non-Enclosed Operations (Standard No. 4, Section X)

This standard requires the following:

- A. *All non-enclosed operations shall be conducted in such a manner that a minimum of particulate matter becomes airborne. In no case shall established ambient air quality standards be exceeded at or beyond the property line.*
- B. *The owner or operator of all such operations shall maintain dust control of the premises and any roadway owned or controlled by the owner or operator by paving or other suitable measures. Oil treatment is prohibited.*
- C. *All crushing, drying, classification, and like operations shall employ a suitable control device acceptable to the Department, and shall discharge no more particulate matter than that specified in Section VIII of this standard.*

The facility will be in compliance with Standards No. 2 and 7 and therefore will not exceed the ambient air quality standards at or beyond the property line.

Additionally, the facility will maintain wet suppression for dust control and will maintain a fugitive dust plan to demonstrate compliance with this regulation. The wet suppression will be maintained on the haul and customer roads to ensure the roads are wet at all times during operation. Wet suppression on the roads will be done by watering trucks. Each crusher, screen, and conveyor will be equipped with wet suppression valves. The wet suppression system will be operated by the control room. Water spray valves will be activated prior to the initiation of operations. Operation of the water spray valves will be controlled in order to minimize water use such as closing water spray valves on non-operating equipment. Water from the County water system or water wells is expected to be used as the water supply.

### **3.5 South Carolina Volatile Organic Compounds Standard (Standard No. 5)**

The South Carolina Volatile Organic Compounds Standard (R.61-62.5, Standard No. 5) applies to specific existing industrial sources constructed before July 1, 1979, or July 1, 1980, that have total potential volatile organic compounds (VOC) emissions of more than 550 pounds in any one day or more than 150 pounds in any one hour. This standard applies to existing processes statewide except in the following six counties: Anderson, Bamberg, Barnwell, Chesterfield, Darlington and Hampton (Standard No. 5, Part B.1). RDA's crushed stone facility will be located in Fairfield County, which is not included in the above list of exempt counties.

The RDA facility will be constructed after July 1, 1980 and is not expected to emit VOCs. Therefore, RDA is not subject to this regulation.

### **3.6 South Carolina Control of Oxides of Nitrogen Standard (Standard No. 5.2)**

The South Carolina Control of Oxides of Nitrogen Standard (R.61-62.5, Standard No. 5.2) applies to any stationary source that emits or has the potential to emit NO<sub>x</sub> generated from fuel combustion that has not undergone a BACT analysis for NO<sub>x</sub> in accordance with Regulation 61-62.5, Standard No. 7, and that meets one or more of the three criteria specified in Section I (a)(1) through (a)(3).

The proposed crushed stone mine and processing operations are not expected to emit NO<sub>x</sub> and therefore is not subject to this standard.

### **3.7 South Carolina PSD Standard (Standard No. 7)**

The South Carolina PSD Standard (R.61-62.5, Standard No. 7) applies if the facility is classified as a "major" source as defined under this regulation, or if the facility is classified as a "minor" source and is located in a county for which Minor Source Baseline Dates (MSBDs) for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, and NO<sub>2</sub> have been established.

### Major Source Review

Mining and crushed stone plants are not one of the 28 source categories subject to the 100 tpy PSD major source threshold. Total uncontrolled potential emissions of particulates exceed the 250 tpy threshold. However, the facility requests federally enforceable facility-wide limits for particulates and below the PSD major source threshold of 250 tpy and Title V thresholds of 100 tpy. The major source applicability under the PSD regulations is determined based on a facility's potential to emit. Potential to emit is defined under Standard No. 7, Part D as:

*The maximum capacity of a plant to emit a pollutant under its physical and operational design. Any physical or operational limitations on the capacity of the plant to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable.*

RDA will operate under the emission limitations described above. Therefore, RDA will not be considered a major source under the PSD regulations.

### MSBD Compliance

The facility will be located in Williamsburg County for which MSBDs have not been established for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, and NO<sub>2</sub>. Since no MSDBs have been established, no compliance demonstration is required.

### **3.8 South Carolina Nonattainment NSR Standard (Standard No. 7.1)**

The South Carolina Nonattainment NSR Standard (R.61-62.5, Standard No. 7.1) applies to major sources constructed or modified in any nonattainment area designated in 40 CFR Part 81.341 if the emissions from such facility will cause or contribute to concentrations of a regulated NSR pollutant for which the nonattainment area was designated as nonattainment.

Since Williamsburg County is not designated as a nonattainment area, Standard No. 7.1 is not applicable at this time.

### **3.9 South Carolina Toxic Air Pollutants Standard (Standard No. 8)**

The South Carolina Toxic Air Pollutants (TAPs) Standard (R.61-62.5, Standard No. 8) requires RDA to identify and quantify emissions of South Carolina TAPs to determine compliance with established ambient air quality standards for these TAPs. This regulation establishes standards for approximately 255 TAPs, including most of the 187 hazardous air pollutants (HAPs) established by Title III of the Clean Air Act Amendments.

Compliance with this standard can be demonstrated using air dispersion modeling. An air dispersion modeling analysis is not required since the facility is not expected to emit TAPs.

### **3.10 Standards of Performance for New Stationary Sources (40 CFR Part 60)**

The following sections describe New Source Performance Standards (NSPS) promulgated under 40 CFR Part 60 that could potentially apply to the crushed stone operations included in this project.

#### **Nonmetallic Mineral Processing Plants (Subpart 000)**

This NSPS applies to nonmetallic mineral processing plants that commenced construction, modification, or reconstruction after August 31, 1983.

A nonmetallic mineral processing plant is defined as any combination of equipment that is used to crush or grind any nonmetallic mineral wherever located, including lime plants, power plants, steel mills, crushed stone concrete plants, portland cement plants, or any other facility processing nonmetallic minerals except as provided in §60.670 (b) and (c). RDA handles and crushes nonmetallic minerals as defined in Subpart 000 and therefore, the crushed stone mine and processing facility is subject to this standard.

Each crusher, screen, and conveyor is subject to the rule. Subpart 000 does not apply to drilling, non-enclosed truck loading, or storage piles as those sources are not listed in §60.670(a). Since the facility is comprised entirely of fugitive emissions, only the fugitive particulate matter emission limits and compliance requirements of Table 3 and §60.672(b) apply. Table 3 of Subpart 000 lists the following requirements that are applicable to a facility that will commence construction after April 22, 2008.

- 7 percent opacity for conveyor transfer points and screens
- 12 percent opacity for crushers.
- Initial Performance Test
- Periodic inspections of water sprays per §60.674 (b)
- Reporting and recordkeeping requirements of water sprays under §60.676

### **3.11 National Emission Standards for HAPs (40 CFR Part 61)**

40 CFR Part 61 establishes National Emission Standards for Hazardous Air Pollutants (NESHAPs) in Subparts A through FF. None of the NESHAPs found in 40 CFR Part 61 applies to the emission sources at RDA.

**3.12 National Emission Standards for HAPs for Source Categories (40 CFR Part 63)**

40 CFR Part 63 establishes technology-based regulations for specific source categories emitting any of the 187 compounds designated by the EPA as HAPs. The EPA regulates emissions of HAPs from major and area sources as promulgated under a NESHAP. Facilities that are required to demonstrate compliance with a particular NESHAP must employ Maximum Achievable Control Technology (MACT) as specified in the regulation.

Under 40 CFR Part 63, a major source is defined as any stationary source emitting 10 tpy or more of any individual HAP, or 25 tpy or more of any combination of HAPs. An area source of HAPs is a facility that is not a major source of HAPs, is not located at a major source, and is not part of a major source of HAP emissions.

Since the facility emits no HAPs, none of the 40 CFR Part 63 standards apply to RDA.

**3.13 Compliance Assurance Monitoring**

The 40 CFR Part 64 Compliance Assurance Monitoring (CAM) regulation was developed in order to provide reasonable assurance that facilities comply with emissions limitations by monitoring the operation and maintenance of their control devices. CAM applies to an emissions unit if all of the following criteria are met:

- the unit is located at a major source for which a Title V permit is required; and
- the unit is subject to an emission limitation or standard; and
- the unit uses a control device to achieve compliance with a federally enforceable limit or standard; and
- the unit has potential pre-control or post-control emissions of at least 100% of the major source amount; and
- The unit is not otherwise exempt from CAM.

The RDA facility will not be a major source and will not need a Title V permit due to federally enforceable emission limitations. Therefore, RDA's proposed operations will not be subject to this standard.

**3.14 Greenhouse Gas Tailoring Rule**

A new industrial source that is major for criteria pollutants and will emit or have the potential to emit 75,000 tpy CO<sub>2</sub> equivalents (CO<sub>2e</sub>) will be subject to PSD permitting requirements for greenhouse gases (GHGs) as long as the source is subject to PSD for another pollutant.

This application does not contain any emission sources that emit GHGs. Therefore, this application is not subject to GHG Tailoring Rule regulations.

Table 1  
 Facility Summary of Emissions  
 RDA, LLC  
 Andrews, South Carolina

Emissions Source Description	Uncontrolled PM		Controlled PM <sup>1</sup>		Uncontrolled PM-10		Controlled PM-10 <sup>1</sup>		Uncontrolled PM-2.5		Controlled PM-2.5 <sup>1</sup>	
	Hourly Emissions (lbs/hr)	Annual Emissions (tpy)	Hourly Emissions (lbs/hr)	Annual Emissions (tpy)	Hourly Emissions (lbs/hr)	Annual Emissions (tpy)	Hourly Emissions (lbs/hr)	Annual Emissions (tpy)	Hourly Emissions (lbs/hr)	Annual Emissions (tpy)	Hourly Emissions (lbs/hr)	Annual Emissions (tpy)
Mining and Material Handling	147.83	647.49	6.74	29.52	43.11	188.84	<b>2.72</b>	11.92	6.53	28.60	0.40	1.74
Material Storage	0.63	2.77	0.63	2.77	0.32	1.39	0.32	1.39	0.05	0.20	0.05	0.20
Haul Roads	36.52	159.94	3.65	15.99	10.38	45.48	1.04	4.55	1.04	4.55	0.10	0.45
Customer Roads	19.62	85.92	1.96	8.59	5.79	25.36	0.58	2.54	0.58	2.54	0.06	0.25
Totals	204.59	896.12	12.99	56.88	59.60	261.06	4.66	20.39	8.19	35.88	0.60	2.65

Note:

1. PM emissions do not require modeling. Controlled emissions requiring modeling due to PM-10 emissions over 1.14 lbs/hr are highlighted in bold and yellow. All PM-2.5 emissions are below 1.14 lbs/hr and do not require modeling.



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Facility Information  
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FACILITY IDENTIFICATION	
SC Air Permit Number (8-digits only) <i>(Leave blank if one has never been assigned)</i> - 2320-0049	Application Date June 2017
Facility Name <i>(This should be the name used to identify the facility at the physical address listed below)</i> RDA, LLC	Facility Federal Tax Identification Number <i>(Established by the U.S. Internal Revenue Service to identify a business entity)</i> 81-4328381

FACILITY PHYSICAL ADDRESS		
Physical Address: Seaboard Road		County: Williamsburg
City: Andrews	State: SC	Zip Code: 29510
Facility Coordinates <i>(Facility coordinates should be based at the front door or main entrance of the facility.)</i>		
Latitude: 32°28' 25"N	Longitude: 79°38' 20"W	<input type="checkbox"/> NAD27 <i>(North American Datum of 1927)</i> Or <input checked="" type="checkbox"/> NAD83 <i>(North American Datum of 1983)</i>

CO-LOCATION DETERMINATION
Are there other facilities in close proximity that could be considered co-located? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes*
List potential co-located facilities, including air permit numbers if applicable: NA
<i>*If yes, please submit co-location applicability determination details in an attachment to this application.</i>

COMMUNITY OUTREACH
What are the potential air issues and community concerns? Please provide a brief description of potential air issues and community concerns about the entire facility and/or specific project. Include how these issues and concerns are being addressed, if the community has been informed of the proposed construction project, and if so, how they have been informed. Normal community issues related to mining activities.

FACILITY'S PRODUCTS / SERVICES	
Primary Products / Services <i>(List the primary product and/or service)</i> Crushed or Broken Limestone and Aggregates	
Primary SIC Code <i>(Standard Industrial Classification Codes)</i> 1422	Primary NAICS Code <i>(North American Industry Classification System)</i> 212315
Other Products / Services <i>(List any other products and/or services)</i> Crushed or Broken Stone and Aggregates	
Other SIC Code(s): 1429	Other NAICS Code(s): 212319

AIR PERMIT FACILITY CONTACT			
<i>(Person at the facility who can answer technical questions about the facility and permit application.)</i>			
Title/Position: Manager	Salutation: Mr.	First Name: Clark	Last Name: Wooten
Mailing Address: 2700 Timothy Road			
City: Dunn	State: NC	Zip Code: 28334	
E-mail Address: cwooten@buysod.com	Phone No.: 910-567-2625	Cell No.: 910-385-4675	
One hard copy of the signed permit will be mailed to the designated Air Permit Contact. If additional individuals need electronic copies of the permit, please provide their names and e-mail addresses.			
<b>Name</b>		<b>E-mail Address</b>	
Craig Kennedy, P.G.		Craigkennedy.kcs@gmail.com	
Matthew Wike, P.E.		Matthew.Wike@gel.com	



**Bureau of Air Quality  
Construction Permit Application  
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**CONFIDENTIAL INFORMATION / DATA**

Does this application contain confidential information or data?  No  Yes\*

*\*If yes, include a sanitized version of the application for public review and **ONLY ONE COPY OF CONFIDENTIAL INFORMATION SHOULD BE SUBMITTED***

**LIST OF FORMS INCLUDED**

*(Identify all forms included in the application package)*

Form Name	Included (Y/N)
Expedited Review Request (DHEC Form 2212)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Equipment/Processes (DHEC Form 2567)	<input checked="" type="checkbox"/> Yes
Emissions (DHEC Form 2569)	<input checked="" type="checkbox"/> Yes
Regulatory Review (DHEC Form 2570)	<input checked="" type="checkbox"/> Yes
Emissions Point Information (DHEC Form 2573)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (If No, Explain )

**OWNER OR OPERATOR**

Title/Position: Manager	Salutation: Mr.	First Name: Clark	Last Name: Wooten
Mailing Address: 2700 Timothy Road			
City: Dunn	State: NC	Zip Code: 28334	
E-mail Address: cwooten@buysod.com	Phone No.: 910-567-2625	Cell No.: 910-385-4675	

**OWNER OR OPERATOR SIGNATURE**

I certify, to the best of my knowledge and belief, that no applicable standards and/or regulations will be contravened or violated. I certify that any application form, report, or compliance certification submitted in this permit application is true, accurate, and complete based on information and belief formed after reasonable inquiry. I understand that any statements and/or descriptions, which are found to be incorrect, may result in the immediate revocation of any permit issued for this application.

*BDA LLC*  *MANAGER* *6-12-17*  
 Signature of Owner or Operator Date



**Bureau of Air Quality  
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<b>PERSON AND/OR FIRM THAT PREPARED THIS APPLICATION</b> <i>(If not the same person as the Professional Engineer who has reviewed and signed this application.)</i>			
Consulting Firm Name:			
Title/Position:	Salutation:	First Name:	Last Name:
Mailing Address:			
City:	State:	Zip Code:	
E-mail Address:	Phone No.:	Cell No.:	
SC Professional Engineer License/Registration No. (if applicable):			

<b>PROFESSIONAL ENGINEER INFORMATION</b>			
Consulting Firm Name: GEL Engineering, LLC			
Title/Position: Senior Engineer	Salutation: Mr.	First Name: Matthew	Last Name: Wike
Mailing Address: P.O. Box 30712			
City: Charleston	State: SC	Zip Code: 29417	
E-mail Address: matthew.wike@gel.com	Phone No.: 843-300-4252	Cell No.: 843-697-2205	
SC License/Registration No.: 22843			

**PROFESSIONAL ENGINEER SIGNATURE**

I have placed my signature and seal on the engineering documents submitted, signifying that I have reviewed this construction permit application as it pertains to the requirements of *South Carolina Regulation 61-62, Air Pollution Control Regulations and Standards.*

 \_\_\_\_\_ Date 6-22-17





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**APPLICATION IDENTIFICATION**  
*(Please ensure that the information list in this table is the same on all of the forms and required information submitted in this construction permit application package.)*

Facility Name <i>(This should be the name used to identify the facility)</i> RDA, LLC	SC Air Permit Number (8-digits only) <i>(Leave blank if one has never been assigned)</i>	Application Date June 2017
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**PROJECT DESCRIPTION**

Brief Project Description (What, why, how, etc.): RDA proposes to locate the crushed stone mine and processing facility near Andrews, South Carolina. The facility will be capable of crushing 500 tons per hour from the primary crusher. The process starts inside the pit where the stone will be mined and transported in trucks using plant haul roads. The stone will be dumped into the primary jaw crushing station where stone will be initially crushed and conveyed to the first screening station. At the first screening station, the material will be screened and conveyed to either the first storage pile or conveyed to the second storage pile (surge). Material from the second storage pile (surge) will be tunnel conveyed to the secondary screening/crushing station. At the secondary screening/crushing station, the material will be screened and crushed and then either conveyed to one of two storage piles or conveyed to the tertiary screening/crushing station. At the tertiary screening/crushing station, material will be screened and crushed and then either conveyed to one of two storage piles, or immediately sent to the fines screening station. At the fines screening station, material will be screened (but not crushed) and then conveyed to one of three storage piles. Lastly, the material will be transferred to customer trucks from one of the storage piles and the trucks will exit the site using the customer haul roads.

**ATTACHMENTS**

<input checked="" type="checkbox"/> Process Flow Diagram	Location in Application: Figures 2 and 3
<input checked="" type="checkbox"/> Detailed Project Description	Location in Application: Summary and Emission Assumptions and Calculations

**EQUIPMENT / PROCESS INFORMATION**

Equipment ID Process ID	Action	Equipment / Process Description	Maximum Design Capacity (Units)	Control Device ID(s)	Pollutants Controlled (Include CAS#)	Capture System Efficiency and Description	Emission Point ID(s)
See EA&C	<input checked="" type="checkbox"/> Add <input type="checkbox"/> Remove <input type="checkbox"/> Modify <input type="checkbox"/> Other	500 tph crushed stone mine and processing facility with wet suppression (See Summary and EA&C for details)	500 tph	NA (Wet Suppression will be used)	PM/PM10/PM2.5	NA	Fugitive

**CONTROL DEVICE INFORMATION**

Control Device ID	Action	Control Device Description	Maximum Design Capacity (Units)	Inherent/Required/Voluntary (Explain)	Destruction/Removal Efficiency Determination
NA (Wet Suppression will be used)	<input type="checkbox"/> Add <input type="checkbox"/> Remove <input type="checkbox"/> Modify <input checked="" type="checkbox"/> Other	NA (Wet Suppression will be used)	NA	Required	Efficiency of Wet Suppression Varies by equipment/process. See EA&C.

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 Construction Permit Application  
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RAW MATERIAL AND PRODUCT INFORMATION			
Equipment ID Process ID Control Device ID	Raw Material(s)	Product(s)	Fuels Combusted
See EA&C	Stone	Aggregates of various sizes	NA

MONITORING AND REPORTING INFORMATION					
Equipment ID Process ID Control Device ID	Pollutant(s)/Parameter(s) Monitored	Monitoring Frequency	Reporting Frequency	Monitoring/Reporting Basis	Averaging Period(s)
See EA&C	Opacity	Initial Method 9	As specified in 40 CFR Part 60 Subpart A and 000	As specified in 40 CFR Part 60 Subpart A and 000	As specified in 40 CFR Part 60 Subpart A and 000
See EA&C	Best Management Practices for Fugitive Dust/Wet Suppression System	As specified in similar quarry air permits and in 40 CFR Part 60 Subpart 000	As specified in similar quarry air permits and in 40 CFR Part 60 Subpart 000	As specified in similar quarry air permits and in 40 CFR Part 60 Subpart 000	As specified in similar quarry air permits and in 40 CFR Part 60 Subpart 000



**Bureau of Air Quality  
Construction Permit Application  
Emissions  
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APPLICATION IDENTIFICATION	
<i>(Please ensure that the information list in this table is the same on all of the forms and required information submitted in this construction permit application package.)</i>	
Facility Name <i>(This should be the name used to identify the facility)</i>	SC Air Permit Number (8-digits only) <i>(Leave blank if one has never been assigned)</i>
RDA, LLC	June 2017

ATTACHMENTS	
<i>(Check all the appropriate checkboxes if included as an attachment)</i>	
<input checked="" type="checkbox"/>	Sample Calculations, Emission Factors Used, etc.
<input checked="" type="checkbox"/>	Supporting Information: Manufacturer's Data, etc.
<input checked="" type="checkbox"/>	Details on Limits Being Taken for Limited Emissions
<input type="checkbox"/>	Detailed Explanation of Assumptions, Bottlenecks, etc.
<input type="checkbox"/>	Source Test Information
<input type="checkbox"/>	NSR Analysis

SUMMARY OF PROJECTED CHANGE IN FACILITY WIDE POTENTIAL EMISSIONS <i>(Calculated at maximum design capacity.)</i>				
Pollutants	Emission Rates Prior to Construction / Modification (tons/year)		Emission Rates After Construction / Modification (tons/year)	
	Uncontrolled	Limited	Uncontrolled	Limited
Particulate Matter (PM)			896.12	56.88
Particulate Matter <10 Microns (PM <sub>10</sub> )			261.06	20.39
Particulate Matter <2.5 Microns (PM <sub>2.5</sub> )			35.88	2.65
Sulfur Dioxide (SO <sub>2</sub> )				NA
Nitrogen Oxides (NO <sub>x</sub> )				
Carbon Monoxide (CO)				
Volatile Organic Compounds (VOC)				
Lead (Pb)				
Highest HAP Prior to Construction (CAS #: NA)				
Highest HAP After Construction (CAS #: NA)				
Total HAP Emissions*				

Include emissions from exempt equipment and emission increases from process changes that were exempt from construction permits.  
 (\*All HAP emitted from the various equipment or processes must be listed in the appropriate "Potential Emission Rates at Maximum Design Capacity" Table)

POTENTIAL EMISSION RATES AT MAXIMUM DESIGN CAPACITY					
Equipment ID / Process ID	Emission Point ID	Pollutants (Include CAS #)	Calculation Methods / Limits Taken / Other Comments		Limited
			Uncontrolled lbs/hr	Controlled lbs/hr	
			tons/yr	tons/yr	tons/yr

See EA&C



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**Construction Permit Application**  
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<b>APPLICATION IDENTIFICATION</b>	
<i>(Please ensure that the information list in this table is the same on all of the forms and required information submitted in this construction permit application package.)</i>	
Facility Name <i>(This should be the name used to identify the facility)</i>	SC Air Permit Number (8-digits only) <i>(Leave blank if one has never been assigned)</i>
RDA, LLC	June 2017

<b>STATE AND FEDERAL AIR POLLUTION CONTROL REGULATIONS AND STANDARDS</b>			
<i>(If not listed below add any additional regulations that are triggered.)</i>			
Regulation	Applicable		How will compliance be demonstrated?
	Yes	No	
Regulation 61-62.1, Section II(E) Synthetic Minor Construction Permits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See Summary Section
Regulation 61-62.1, Section II(G) Conditional Major Operating Permits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See Summary Section
Regulation 61-62.5, Standard No. 1 Emissions from Fuel Burning Operations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NA
Regulation 61-62.5, Standard No. 2 Ambient Air Quality Standards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	PM-10 (24-hour) = 150 µg/m <sup>3</sup>
Regulation 61-62.5, Standard No. 3 Waste Combustion and Reduction	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NA
Regulation 61-62.5, Standard No. 4 Emissions from Process Industries	<input checked="" type="checkbox"/>	<input type="checkbox"/>	See Summary Section
Regulation 61-62.5, Standard No. 5 Volatile Organic Compounds	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NA



**Bureau of Air Quality**  
**Construction Permit Application**  
**Regulatory Review**  
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STATE AND FEDERAL AIR POLLUTION CONTROL REGULATIONS AND STANDARDS <i>(If not listed below add any additional regulations that are triggered.)</i>					
Regulation	Applicable		Explain Applicability Determination	List the specific limitations and/or requirements that apply.	How will compliance be demonstrated?
	Yes	No			
Regulation 61-62.5, Standard No. 5.2 Control of Oxides of Nitrogen	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
Regulation 61-62.5, Standard No. 7 Prevention of Significant Deterioration*	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
Regulation 61-62.5, Standard No. 7.1 Nonattainment New Source Review*	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
Regulation 61-62.5, Standard No. 8 Toxic Air Pollutants	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
Regulation 61-62.6 Control of Fugitive Particulate Matter	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project is subject	See Summary Section	The facility will utilize wet suppression and other best management practices.
Regulation 61-62.68 Chemical Accident Prevention Provisions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
Regulation 61-62.70 Title V Operating Permit Program	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
40 CFR Part 64 - Compliance Assurance Monitoring (CAM)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
40 CFR 60 Subpart A - General Provisions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project is subject	See Summary Section	See Summary Section
Subprt 000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project is subject	See Summary Section	See Summary Section
40 CFR 61 Subpart A - General Provisions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA
40 CFR 63 Subpart A - General Provisions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The project is not subject	NA	NA

\* Green House Gas emissions must be quantified if these regulations are triggered.



**A. APPLICATION IDENTIFICATION**

1. Facility Name: RDA, LLC	3. Application Date: June 2017
2. SC Air Permit Number (if known; 8-digits only): -	
4. Project Description: RDA proposes to locate the crushed stone mine and processing facility near Andrews, South Carolina. The facility will be capable of crushing 500 tons per hour from the primary crusher. The process starts inside the pit where the stone will be mined and transported in trucks using plant haul roads. The stone will be dumped into the primary jaw crushing station where stone will be initially crushed and conveyed to the first screening station. At the first screening station, the material will be screened and conveyed to either the first storage pile or conveyed to the second storage pile (surge). Material from the second storage pile (surge) will be tunnel conveyed to the secondary screening/crushing station. At the secondary screening/crushing station, the material will be screened and crushed and then either conveyed to one of two storage piles or conveyed to the tertiary screening/crushing station. At the tertiary screening/crushing station, material will be screened and crushed and then either conveyed to one of two storage piles, or immediately sent to the fines screening station. At the fines screening station, material will be screened (but not crushed) and then conveyed to one of three storage piles. Lastly, the material will be transferred to customer trucks from one of the storage piles and the trucks will exit the site using the customer haul roads.	

**B. FACILITY INFORMATION**

1. Is your company a Small Business? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	2. If a Small Business or small government facility, is Bureau assistance being requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
3. Are other facilities collocated for air compliance? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4. If Yes, provide permit numbers of collocated facilities: NA

**C. AIR CONTACT**

Consulting Firm Name: GEL Engineering, LLC	First Name: Matthew	Last Name: Wike
Title/Position: Senior Engineer	Salutation: Mr.	
Mailing Address: P.O. Box 30712	State: SC	Zip Code: 29417
City: Charleston	Phone No.: 843-300-4252	Cell No.: 843-697-2205
E-mail Address: matthew.wike@gel.com		

**\*See Air Dispersion Modeling Results Section of this application for all information required for Sections D through Section L below.**

**D. EMISSION POINT DISPERSION PARAMETERS**

Source data requirements are based on the appropriate source classification. Each emission point is classified as a point, area, volume, or flare source. Contact the Bureau of Air Quality for clarification of data requirements. Include sources on a scaled site map. Also, a picture of area or volume sources would be helpful but is not required. A user generated document or spreadsheet may be substituted in lieu of this form provided all of the required emission point parameters are submitted in the same order, units, etc. as presented in these tables.  
Abbreviations / Units of Measure: UTM = Universal Transverse Mercator; °N = Degrees North; °W = Degrees West; m = meters; AGL = Above Ground Level; ft = feet; ft/s = feet per second; ° = Degrees; °F = Degrees Fahrenheit







L. EMISSION RATES						
Emission Point ID	Pollutant Name	CAS #	Emission Rate (lb/hr)	Same as Permitted (1)	Controlled or Uncontrolled	Averaging Period
				<input type="checkbox"/> Yes <input type="checkbox"/> No		
				<input type="checkbox"/> Yes <input type="checkbox"/> No		
				<input type="checkbox"/> Yes <input type="checkbox"/> No		

(1) Any difference between the rates used for permitting and the air compliance demonstration must be explained in the application report.

## **AIR DISPERSION MODELING RESULTS**

**RDA, LLC  
ANDREWS, SOUTH CAROLINA**

### **1.0 INTRODUCTION**

RDA, LLC (RDA) proposes to operate a crushed stone mine and processing facility near Andrews, South Carolina. RDA currently has no permit issued by the South Carolina Department of Health and Environmental Control (DHEC) Bureau of Air Quality (BAQ).

An air dispersion modeling demonstration is required for particulates with aerodynamic diameter less or equal to 10 microns ( $PM_{10}$ ). This air dispersion modeling demonstration was required because  $PM_{10}$  emissions from the mining and material handling emission sources are greater than 1.14 pound per hour (lb/hr). Emissions of particulates with aerodynamic diameter less or equal to 2.5 microns ( $PM_{2.5}$ ) from the mining and material handling operations are less than 1.14 lb/hr, and therefore, no modeling is required for  $PM_{2.5}$  emissions from the mining and material handling operations. Additionally, modeling for  $PM_{10}$  or  $PM_{2.5}$  emissions from the material storage, the haul road process, or customer road process is not required since emissions from those processes are less than 1.14 lb/hr. The 1.14 lb/hr  $PM_{10}$  and  $PM_{2.5}$  de minimis levels are established in the DHEC BAQ Guidance document "Facilities/Sources Exempt or Deferred from Modeling - Standard No. 2 and Standard No. 7."

This modeling analysis was performed to determine compliance with the South Carolina Ambient Air Quality Standards (R.61-62.5, Standard No. 2). A South Carolina Prevention of Significant Deterioration (PSD) Minor Source Baseline Standard (R.61-62.5, Standard No. 7) modeling demonstration is not required since Williamsburg County does not have a minor source baseline date for  $PM_{10}$  or  $PM_{2.5}$ . Additionally, DHEC BAQ no longer requires a Standard No. 7 modeling demonstration for applications that have not triggered PSD. Lastly, the facility is not expected to emit toxic air pollutants and thus a South Carolina Toxic Air Pollutants Standard (R.61-62.5, Standard No. 8) modeling demonstration is not required.

### **2.0 AIR DISPERSION MODELING DATA**

Modeling was performed using the U.S. Environmental Protection Agency's AERMOD air dispersion model and Florence meteorological data from 2002 through 2006. Cavity concentrations are incorporated into the AERMOD model. All model options were chosen in accordance with the DHEC BAQ document entitled "Air Quality Modeling Guidelines," dated July 2001 and AERMOD guidance from the DHEC BAQ website.

A receptor grid with 100 meter spacing was generated around the facility extending out to 1,500 meters. Discrete receptors were placed every 50 meters along the RDA boundary. The volume sources and receptor coordinates used in the modeling were

determined from conversations with RDA and an aerial view of the site using Google Earth. The latest Williamsburg NED terrain data was obtained from DHEC BAQ's website and used in this modeling demonstration. Terrain elevations were calculated within the AERMAP subprogram.

A summary of the modeled hourly emission rates and volume source parameters for the RDA facility is included as Table 1. This table summarizes the pertinent modeling inputs and is included in lieu of the DHEC BAQ Emission Point Information form. A site location and boundary map is included as Figure 1.

### **3.0 AIR DISPERSION MODELING RESULTS**

Copies of the AERMOD model input and output files will be submitted to DHEC via disk or electronic mail.

#### **3.1 South Carolina Ambient Air Quality Standards (Standard No. 2)**

The South Carolina Ambient Air Quality Standards (SCAAQS - R.61-62.5, Standard No. 2) establish ambient air quality standards for criteria pollutants, including PM<sub>10</sub>, PM<sub>2.5</sub>, carbon dioxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), ozone, gaseous fluorides as hydrogen fluoride, and lead.

As stated in Section 1.0, PM<sub>10</sub> was the only criteria pollutant requiring a modeling demonstration to comply with Standard No. 2. To determine compliance with the SCAAQS, the estimated maximum potential ground-level concentrations of criteria pollutants resulting from site emissions were added to corresponding background concentrations for the criteria pollutants. The resultant total concentrations were then compared to the SCAAQS, as shown in Table 2. The modeling results demonstrate that PM<sub>10</sub> emissions from RDA will be in compliance with the applicable ambient air quality standards.

The 2011-2013 three-year average background concentration data for the criteria pollutants was obtained from the most recent monitoring data provided on the DHEC BAQ website.

**Table 1**  
**Summary of Modeled Emission Rates and Volume Source Parameters**

RDA, LLC  
 Andrews, South Carolina

Volume Source ID	Equip ID	Source Description	PM <sub>10</sub> <sup>1</sup> (lbs/hr)	Source Release Height (ft)	Elevated Source Height (ft)	Horizontal Dimension (ft)	Vertical Dimension (ft)	Horizontal Modeling Parameter <sup>2</sup> - σ <sub>y</sub> (ft)	Vertical Modeling Parameter <sup>3</sup> - σ <sub>z</sub> (ft)
V1	CR1	Crusher No. 1 (Primary)	0.270	12	8	5.98	8	1.39	1.86
V2	TP1	Transfer Point No. 1	0.023	12.5	5	3	15	0.70	3.49
V3	TP2	Transfer Point No. 2	0.023	17	15	3	4	0.70	0.93
V4	S1	Screening Station #1 (Scalping)	0.370	12.5	10	10.4	5	2.42	1.16
V5	TP3	Transfer Point No. 3	0.007	12.5	10	3	5	0.70	1.16
V6	TP4	Transfer Point No. 4	0.007	8	6	4	4	0.93	0.93
V7	TP5	Transfer Point No. 5	0.007	22.5	15	3	15	0.70	3.49
V8	TP6	Transfer Point No. 6	0.018	6	4	3.5	4	0.81	0.93
V9	TP7	Transfer Point No. 7	0.018	22.5	15	3.5	15	0.81	3.49
V10	TP8	Transfer Point No. 8	0.018	6	4	3.5	4	0.81	0.93
V11	TP9	Transfer Point No. 9	0.018	6	4	3.5	4	0.81	0.93
V12	TP10	Transfer Point No. 10	0.018	19.25	16.5	3	5.5	0.70	1.28
V13	S2	Screening Station #2 (Secondary)	0.296	13.25	10	13.6	6.5	3.17	1.51
V14	TP11	Transfer Point No. 11	0.002	8	6	3	4	0.70	0.93
V15	TP12	Transfer Point No. 12	0.002	8	6	3	4	0.70	0.93
V16	TP13	Transfer Point No. 13	0.002	22.5	15	3	15	0.70	3.49
V17	TP14	Transfer Point No. 14	0.002	6	4	3	4	0.70	0.93
V18	TP15	Transfer Point No. 15	0.002	6	4	3.5	4	0.81	0.93
V19	TP16	Transfer Point No. 16	0.002	22.5	15	3	15	0.70	3.49
V20	CR2	Crusher No. 2 (Secondary)	0.216	13	10	5.5	6	1.28	1.40
V21	TP17	Transfer Point No. 17	0.018	7.5	5	3.5	5	0.81	1.16
V22	TP18	Transfer Point No. 18	0.018	6	4	3.5	4	0.81	0.93
V23	TP19	Transfer Point No. 19	0.018	19	16	3	6	0.70	1.40
V24	S3	Screening Station #3 (Tertiary)	0.296	12.5	10	10.4	5	2.42	1.16
V25	TP20	Transfer Point No. 20	0.003	8	6	3	4	0.70	0.93
V26	TP21	Transfer Point No. 21	0.003	6	4	5	4	1.16	0.93
V27	TP22	Transfer Point No. 22	0.003	22.5	15	2.5	15	0.58	3.49
V28	TP23	Transfer Point No. 23	0.003	8	6	5	4	1.16	0.93
V29	TP24	Transfer Point No. 24	0.003	6	4	5	4	1.16	0.93
V30	TP25	Transfer Point No. 25	0.003	22.5	15	2.5	15	0.58	3.49
V31	CR3	Crusher No. 3 (Tertiary)	0.216	8.5	6	5.5	5	1.28	1.16
V32	TP26	Transfer Point No. 26	0.013	7.5	5	3	5	0.70	1.16
V33	TP27	Transfer Point No. 27	0.013	6	4	3	4	0.70	0.93
V34	TP28	Transfer Point No. 28	0.013	19	16	3	6	0.70	1.40
V35	S4	Screening Station #4 (Fines)	0.638	12.5	10	11.5	5	2.67	1.16
V36	TP29	Transfer Point No. 29	0.004	8	6	4	4	0.93	0.93
V37	TP30	Transfer Point No. 30	0.004	6	4	4	4	0.93	0.93
V38	TP31	Transfer Point No. 31	0.004	22.5	15	2.5	15	0.58	3.49
V39	TP32	Transfer Point No. 32	0.004	6	4	4	4	0.93	0.93
V40	TP33	Transfer Point No. 33	0.004	6	4	4	4	0.93	0.93
V41	TP34	Transfer Point No. 34	0.004	22.5	15	2.5	15	0.58	3.49
V42	TP35	Transfer Point No. 35	0.003	8	6	4	4	0.93	0.93
V43	TP36	Transfer Point No. 36	0.003	6	4	4	4	0.93	0.93
V44	TP37	Transfer Point No. 37	0.003	22.5	15	2.5	15	0.58	3.49
V45	Tload	Final Product Truck Loading	0.050	5	0	8	10	1.86	2.33
V46	Drill	Drilling inside the Quarry	0.040	1.5	0	8	3	1.86	0.70
V47	HaulLoad	Truck Loading at the Quarry	0.008	5	0	8	10	1.86	2.33

**Notes:**

- 1) Facility is not required to model PM<sub>2.5</sub> emissions since stone processing emissions are below 1.14 lb/hr.
- 2) Horizontal Modeling Parameter - σ<sub>y</sub> = Horizontal dimension divided by 4.3 for a single volume source.
- 3) Vertical Modeling Parameter - σ<sub>z</sub> = Vertical dimension divided by 4.3 for all elevated sources at height greater than 0 ft and divided by 2.15 for all sources at ground level.

Table 2

Comparison of Air Dispersion Modeling Results with  
South Carolina Ambient Air Quality Standards No. 2

RDA, LLC  
Andrews, South Carolina

Pollutant	Averaging Period	Modeled Concentration ( $\mu\text{g}/\text{m}^3$ )	Background Concentration <sup>1</sup> ( $\mu\text{g}/\text{m}^3$ )	Total Concentration ( $\mu\text{g}/\text{m}^3$ )	Allowable Concentration ( $\mu\text{g}/\text{m}^3$ )	Site in Compliance
PM <sub>10</sub>	24 hour	94.70	49	143.7	150	Yes

**Notes:**

1) Background concentration taken from the DHEC 2011-2013 average monitoring data gathered from the following sites for each pollutant:

PM<sub>10</sub> = Jenkins Ave. Fire Station

## EMISSIONS ASSUMPTIONS AND CALCULATIONS I CRUSHED STONE MINE AND PROCESSING

RDA, LLC  
Andrews, South Carolina

The following emissions assumptions and calculations are presented for emissions from the mining and material handling, transportation, and material storage operations associated with RDA, LLC's (RDA) proposed crushed stone mine and processing facility near Andrews, South Carolina. In addition, emissions from the wind erosion of storage piles are presented in this emission assumptions and calculations. Emission calculations are presented for particulate matter (PM), particulates with an aerodynamic diameter of less than or equal to 10 microns ( $PM_{10}$ ), and particulates with an aerodynamic diameter of less than or equal to 2.5 microns ( $PM_{2.5}$ ).

### 1.0 Emission Assumptions

- The facility requests federally enforceable permit conditions limiting the potential to emit of PM to below 100 tons per year.
- Emission sources at the facility can be broken into the following categories:
  - Mining and Material Handling – includes wet drilling and truck loading operations;
  - Material Storage; and
  - Transportation
    - Haul Roads
    - Customer Roads

#### Mining

- PM,  $PM_{10}$ , and  $PM_{2.5}$  are the only criteria pollutants emitted from the emission sources of wet drilling (Drill) and truck loading (HaulLoad) of materials in the mine.
- Emissions were calculated assuming 8,760 hours per year.
- Uncontrolled and controlled PM,  $PM_{10}$ , and  $PM_{2.5}$  emissions from wet drilling and truck loading at the mine are calculated based on the U.S. Environmental Protection Agency (EPA) Compilation of Air Pollutant Emission Factors, AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004.
- AP-42, Table 11.19.2-2 only provides truck loading emission factors for  $PM_{10}$  emissions. PM emissions for the truck loading within the quarry were conservatively assumed to be three times  $PM_{10}$  emissions.
- AP-42 Section 11.19.2 does not provide  $PM_{2.5}$  emission factors for wet drilling or truck loading. In cases where  $PM_{2.5}$  emission factors were not determined, the  $PM_{10}$  emission factor was used and adjusted based on the particle size multiplier ( $0.053 - PM_{2.5}/0.35 - PM_{10}$ ) contained in AP-42 Section 13.2.4 for Aggregate Handling and Storage Piles.

**Material Handling**

- A summary of the material handling and storage related equipment to be installed at RDA is shown below:

Figure 2 ID	Equip ID	Description
1	CR1	Crusher #1 (Primary)
2	C1	Conveyor #1 (CR1 to S1)
3	S1	Screen #1 (Scalping)
4	C2	Conveyor #2 (S1 to C3)
5	C3	Conveyor #3 (C2 to STP1)
6	STP1	Storage Pile #1
7	C4	Conveyor #4 (S1 to STP2)
8	STP2	Storage Pile #2
9	C5	Conveyor #5 (Tunnel, STP2 to C6)
10	C6	Conveyor #6 (C6 to S2)
11	S2	Screen #2 (Secondary)
12	C7	Conveyor #7 (S2 to C8)
13	C8	Conveyor #8 (C7 to STP3)
14	STP3	Storage Pile #3
15	C9	Conveyor #9 (S2 to C10)
16	C10	Conveyor #10 (C9 to STP4)
17	STP4	Storage Pile #4
18	CR2	Crusher #2 (Secondary)
19	C11	Conveyor #11 (CR2 to C12)
20	C12	Conveyor #12 (C11 to S3)
21	S3	Screen #3 (Tertiary)
22	C13	Conveyor #13 (S3 to C14)
23	C14	Conveyor #14 (C13 to STP5)
24	STP5	Storage Pile #5
25	C15	Conveyor #15 (S3 to C16)
26	C16	Conveyor #16 (C15 to STP6)
27	STP6	Storage Pile #6
28	CR3	Crusher #3 (Tertiary)
29	C17	Conveyor #17 (CR3 to C18)
30	C18	Conveyor #18 (C17 to S4)
31	S4	Screen #4 (Fines)
32	C19	Conveyor #19 (S4 to C20)
33	C20	Conveyor #20 (C20 to STP7)
34	STP7	Storage Pile #7
35	C21	Conveyor #21 (S4 to C22)

Figure 2 ID	Equip ID	Description
36	C22	Conveyor #22 (C21 to STP8)
37	STP8	Storage Pile #8
38	C23	Conveyor #23 (S4 to C24)
39	C24	Conveyor #24 (C24 to STP9)
40	STP9	Storage Pile #9

- PM, PM<sub>10</sub>, and PM<sub>2.5</sub> are the only criteria pollutants emitted.
- The hourly production rates were provided by RDA. Annual emissions were calculated assuming 8,760 hours per year.
- Uncontrolled and controlled PM, PM<sub>10</sub>, and PM<sub>2.5</sub> emissions from material handling are calculated based on the EPA Compilation of Air Pollutant Emission Factors, AP-42, Section 11.19.2, Table 11.19.2-2, dated August 2004. Controlled emissions are based on wet suppression.
- AP-42, Table 11.19.2-2 only provides truck loading emission factors for PM<sub>10</sub> emissions. PM emissions for the final product truck loading were conservatively assumed to be three times PM<sub>10</sub> emissions.
- AP-42 Section 11.19.2 only provides PM<sub>2.5</sub> emission factors for some operations. For other operations, PM<sub>2.5</sub> emission factors were not determined. In cases where PM<sub>2.5</sub> emission factors were not determined, the PM<sub>10</sub> emission factor was used and adjusted based on the particle size multiplier (0.053- PM<sub>2.5</sub> /0.35- PM<sub>10</sub>) contained in AP-42 Section 13.2.4 for Aggregate Handling and Storage Piles.
- No PM emissions data was provided in AP-42 for primary or secondary crushing. It was conservatively assumed that primary and secondary crushing emissions were equal to tertiary crushing.

Material Storage

- There will be nine storage piles that will storage various of materials that have been mined, crushed, and screened.
- Emission factors of 3.2 lbs PM per day per acre, 1.6 lbs PM<sub>10</sub> per day per acre, and 0.23 lbs PM<sub>2.5</sub> per day per acre were used for storage pile wind erosion calculations. The PM emission factor is based on an equation in the EPA Document 450/2-92-004 "Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures," Equation 2-12. Based on the referenced document, the fraction of PM which is PM<sub>10</sub> is estimated at 0.5. To obtain the PM<sub>2.5</sub> emission factors, the PM emission factor was used and adjusted based on the particle size multiplier (0.053 PM<sub>2.5</sub> /0.74-

PM) contained in AP-42 Section 13.2.4 for Aggregate Handling and Storage Piles.

- The wind erosion equation used to calculate the PM emission factor is shown below:

$$E = 1.7 \times (s/1.5) \times [(365-p)/235] \times (f/15)$$

Where,

E = lbs PM per day per acre

s = 3.9 silt content % (from AP-42 5<sup>th</sup> Edition Table 13.2.4-1 for various limestone products)

p = 110 number of days with  $\geq 0.01$  inches of precipitation per year (from AP-42 Figure 13.2.2-1)

f = 10 percentage of time that the unobstructed wind speed exceeds 5.4 m/s at the mean pile height (engineering estimate)

- Annual PM, PM<sub>10</sub>, and PM<sub>2.5</sub> emissions are calculated assuming 8,760 hours of operation per year.
- Hourly emissions were calculated using 24 hours per day. Annual emissions were calculated using 365 days per year.

Transportation (Haul and Customer Roads)

- Uncontrolled emissions from the haul roads and customer roads are based on the AP-42, Section 13.2.2 (Unpaved Roads), Equations 1a and 2, for vehicles traveling on unpaved surfaces at industrial sites. The equation is provided below and the variable are defined:

$$E_{ext} = [k (s/12)^a \times (W/3)^b] (365 - P/365)$$

Where:

E<sub>ext</sub> = annual or other long-term average emission factor in the same units as k

k, a, and b = Constants (Table 13.2.2-2)

s = Surface material silt content (%) – (Table 13.2.2-1, mean = 8.3 haul roads and 10 for customer roads)

W = average weight of vehicles (tons)

P = number of hours with at least 0.01 inches of precipitation during the averaging period. (Used 2012 Charleston, SC data from weatherunderground.com - Number of days with 0.01 inches of rain: P = 107 days/yr)

- Controlled emissions from the haul roads and customer roads assume a control efficiency of 90% for keeping the roads wet suppressed during transportation activities.

**2.0 Emission Calculations**

Using the above assumptions and the following equations, PM, PM<sub>10</sub>, and PM<sub>2.5</sub> emissions from the mining and material handling equipment are calculated and shown in Tables 1, 2, and 3, respectively. PM, PM<sub>10</sub>, and PM<sub>2.5</sub> emissions from wind erosion on the storage piles are calculated and shown in Table 4. PM, PM<sub>10</sub>, and PM<sub>2.5</sub> emissions from unpaved roads are calculated and shown in Table 5. The boxed alpha codes in the equations refer to the appropriate columns in the tables.

**Tables 1-3 – Material Handling - PM, PM<sub>10</sub>, and PM<sub>2.5</sub> Emissions**

$$\boxed{A} \frac{\text{tons material}}{\text{hour}} \times \boxed{B} \frac{\text{lbs uncontrolled emissions}}{\text{ton material}} = \boxed{C} \frac{\text{lbs uncontrolled emissions}}{\text{hour}}$$

$$\boxed{C} \frac{\text{lbs uncontrolled emissions}}{\text{hour}} \times \frac{8760 \text{ hours}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lbs}} = \boxed{D} \frac{\text{tons uncontrolled emissions}}{\text{year}}$$

$$\boxed{A} \frac{\text{tons material}}{\text{hour}} \times \boxed{E} \frac{\text{lbs controlled emissions}}{\text{ton material}} = \boxed{F} \frac{\text{lbs controlled emissions}}{\text{hour}}$$

$$\boxed{F} \frac{\text{lbs controlled emissions}}{\text{hour}} \times \frac{8760 \text{ hours}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lbs}} = \boxed{G} \frac{\text{tons controlled emissions}}{\text{year}}$$

**Table 4 – Storage Piles - PM, PM<sub>10</sub>, and PM<sub>2.5</sub> Emissions**

$$\boxed{A} \text{ Pile Size (Acres)} \times \boxed{B} \frac{\text{lbs emissions}}{\text{day-acre}} \times \frac{\text{day}}{24 \text{ hour}} = \boxed{C} \frac{\text{lbs emissions}}{\text{hour}}$$

$$\boxed{C} \frac{\text{lbs emissions}}{\text{hour}} \times \frac{8760 \text{ hours}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lbs}} = \boxed{D} \frac{\text{tons emissions}}{\text{year}}$$

**Table 5 – Unpaved Roads - PM, PM<sub>10</sub>, and PM<sub>2.5</sub> Emissions**

$$E = [k (s/12)^a \times (W/3)^b]$$

$$E_{ext} = E(365 - P/365)$$

Where,

k = constant (lb/Vehicle Mile Traveled (VMT)) **A**

s = Surface Material Silt Loading Content (%) **B**

W = vehicle weight (tons) **C**

P = hours with 0.01 inches of rain

E = emission factor (lb/VMT) **D**

E<sub>ext</sub> = emission factor (lb/VMT) **E**

$$\text{E} \frac{\text{lbs emissions}}{\text{VMT}} \times \text{F} \frac{\text{VMT}}{\text{year}} \times \frac{\text{ton}}{2000 \text{ lbs}} = \text{G} \frac{\text{tons uncontrolled emissions}}{\text{year}}$$

$$\text{G} \frac{\text{tons uncontrolled emissions}}{\text{year}} \times \frac{\text{year}}{8760 \text{ hrs}} \times \frac{2000 \text{ lbs}}{\text{ton}} = \text{H} \frac{\text{lbs uncontrolled emissions}}{\text{hour}}$$

$$\text{G} \frac{\text{tons uncontrolled emissions}}{\text{year}} \times \text{I} \text{ 1-Wet Suppression Control Efficiency \%} = \text{J} \frac{\text{tons controlled emissions}}{\text{year}}$$

$$\text{H} \frac{\text{lbs uncontrolled emissions}}{\text{hour}} \times \text{I} \text{ 1-Wet Suppression Control Efficiency \%} = \text{K} \frac{\text{lbs controlled emissions}}{\text{hour}}$$

**Table 1**  
**Emission Assumptions and Calculation I: PM Emissions from Drilling and Material Handling**  
**RDA, LLC**  
**Andrews, South Carolina**

Emission Source ID	Emissions Source Description	Transfer From	Transfer To	A Design Capacity (tons/hr)	B Uncontrolled PM Emission Factor (lbs/ton)	C Uncontrolled PM Hourly Emissions (lbs/hr)	D Uncontrolled PM Annual Emissions (tpy)	E Controlled PM Emission Factor (lbs/ton)	F Controlled PM Hourly Emissions (lbs/hr)	G Controlled PM Annual Emissions (tpy)
CR1	Crusher No. 1 (Primary)	-	-	500	0.0054	2.70	11.83	0.0012	0.600	2.63
TP1	Transfer Point No. 1	CR1 (Figure ID 1)	C1 (Figure ID 2)	500	0.003	1.50	6.57	0.00014	0.070	0.31
TP2	Transfer Point No. 2	C1 (Figure ID 2)	S1 (Figure ID 3)	500	0.003	1.50	6.57	0.00014	0.070	0.31
S1	Screening Station #1 (Scalping)	-	-	500	0.025	12.50	54.75	0.0022	1.100	4.82
TP3	Transfer Point No. 3	S1 (Figure ID 3)	C2 (Figure ID 4)	150	0.003	0.45	1.97	0.00014	0.021	0.09
TP4	Transfer Point No. 4	C2 (Figure ID 4)	C3 (Figure ID 5)	150	0.003	0.45	1.97	0.00014	0.021	0.09
TP5	Transfer Point No. 5	C3 (Figure ID 5)	STP1 (Figure ID 6)	150	0.003	0.45	1.97	0.00014	0.021	0.09
TP6	Transfer Point No. 6	S1 (Figure ID 3)	C4 (Figure ID 7)	400	0.003	1.20	5.26	0.00014	0.056	0.25
TP7	Transfer Point No. 7	C4 (Figure ID 7)	STP2 (Figure ID 8)	400	0.003	1.20	5.26	0.00014	0.056	0.25
TP8	Transfer Point No. 8	STP2 (Figure 8)	C5 (Figure ID 9)	400	0.003	1.20	5.26	0.00014	0.056	0.25
TP9	Transfer Point No. 9	C5 (Figure ID 9)	C6 (Figure ID 10)	400	0.003	1.20	5.26	0.00014	0.056	0.25
TP10	Transfer Point No. 10	C6 (Figure ID 10)	S2 (Figure ID 11)	400	0.003	1.20	5.26	0.00014	0.056	0.25
S2	Screening Station #2 (Secondary)	-	-	400	0.025	10.00	43.80	0.0022	0.880	3.85
TP11	Transfer Point No. 11	S2 (Figure ID 11)	C7 (Figure ID 12)	50	0.003	0.15	0.66	0.00014	0.007	0.03
TP12	Transfer Point No. 12	C7 (Figure ID 12)	C8 (Figure ID 13)	50	0.003	0.15	0.66	0.00014	0.007	0.03
TP13	Transfer Point No. 13	C8 (Figure ID 13)	STP3 (Figure ID 14)	50	0.003	0.15	0.66	0.00014	0.007	0.03
TP14	Transfer Point No. 14	S2 (Figure ID 11)	C9 (Figure ID 15)	50	0.003	0.15	0.66	0.00014	0.007	0.03
TP15	Transfer Point No. 15	C9 (Figure ID 15)	C10 (Figure ID 16)	50	0.003	0.15	0.66	0.00014	0.007	0.03
TP16	Transfer Point No. 16	C10 (Figure ID 16)	STP4 (Figure ID 17)	50	0.003	0.15	0.66	0.00014	0.007	0.03
CR2	Crusher No. 2 (Secondary)	-	-	400	0.0054	2.16	9.46	0.0012	0.480	2.10
TP17	Transfer Point No. 17	CR2 (Figure ID 18)	C11 (Figure ID 19)	400	0.003	1.20	5.26	0.00014	0.056	0.25
TP18	Transfer Point No. 18	C11 (Figure ID 19)	C12 (Figure ID 20)	400	0.003	1.20	5.26	0.00014	0.056	0.25
TP19	Transfer Point No. 19	C12 (Figure ID 20)	S3 (Figure ID 21)	400	0.003	1.20	5.26	0.00014	0.056	0.25
S3	Screening Station #3 (Tertiary)	-	-	400	0.025	10.00	43.80	0.0022	0.880	3.85
TP20	Transfer Point No. 20	S3 (Figure ID 21)	C13 (Figure ID 22)	75	0.003	0.23	0.99	0.00014	0.011	0.05
TP21	Transfer Point No. 21	C13 (Figure ID 22)	C14 (Figure ID 23)	75	0.003	0.23	0.99	0.00014	0.011	0.05
TP22	Transfer Point No. 22	C14 (Figure ID 23)	STP5 (Figure ID 24)	75	0.003	0.23	0.99	0.00014	0.011	0.05
TP23	Transfer Point No. 23	S3 (Figure ID 21)	C15 (Figure ID 25)	75	0.003	0.23	0.99	0.00014	0.011	0.05
TP24	Transfer Point No. 24	C15 (Figure ID 25)	C16 (Figure ID 26)	75	0.003	0.23	0.99	0.00014	0.011	0.05
TP25	Transfer Point No. 25	C16 (Figure ID 26)	STP6 (Figure 27)	75	0.003	0.23	0.99	0.00014	0.011	0.05
CR3	Crusher No. 3 (Tertiary)	-	-	400	0.0054	2.16	9.46	0.0012	0.480	2.10
TP26	Transfer Point No. 26	CR3 (Figure ID 28)	C17 (Figure ID 29)	290	0.003	0.87	3.81	0.00014	0.041	0.18
TP27	Transfer Point No. 27	C17 (Figure ID 29)	C18 (Figure ID 30)	290	0.003	0.87	3.81	0.00014	0.041	0.18
TP28	Transfer Point No. 28	C18 (Figure ID 30)	S4 (Figure ID 31)	290	0.003	0.87	3.81	0.00014	0.041	0.18
S4	Screening Station #4 (Fines)	-	-	290	0.3	87.00	381.06	0.0036	1.044	4.57
TP29	Transfer Point No. 29	S4 (Figure ID 31)	C19 (Figure ID 32)	90	0.003	0.27	1.18	0.00014	0.013	0.06
TP30	Transfer Point No. 30	C19 (Figure ID 32)	C20 (Figure ID 33)	90	0.003	0.27	1.18	0.00014	0.013	0.06
TP31	Transfer Point No. 31	C20 (Figure ID 33)	STP7 (Figure ID 34)	90	0.003	0.27	1.18	0.00014	0.013	0.06
TP32	Transfer Point No. 32	S4 (Figure ID 31)	C21 (Figure ID 35)	80	0.003	0.24	1.05	0.00014	0.011	0.05
TP33	Transfer Point No. 33	C21 (Figure ID 35)	C22 (Figure ID 35)	80	0.003	0.24	1.05	0.00014	0.011	0.05
TP34	Transfer Point No. 34	C22 (Figure ID 35)	STP8 (Figure ID 36)	80	0.003	0.24	1.05	0.00014	0.011	0.05
TP35	Transfer Point No. 35	S4 (Figure ID 31)	C23 (Figure ID 38)	75	0.003	0.23	0.99	0.00014	0.011	0.05
TP36	Transfer Point No. 36	C23 (Figure ID 38)	C24 (Figure ID 39)	75	0.003	0.23	0.99	0.00014	0.011	0.05
TP37	Transfer Point No. 37	C24 (Figure ID 39)	STP9 (Figure ID 40)	75	0.003	0.23	0.99	0.00014	0.011	0.05
Tload	Final Product Truck Loading	-	-	500	0.0003	0.15	0.66	0.0003	0.150	0.66
Drill	Drilling inside the Quarry	-	-	500	0.0002	0.12	0.53	0.0002	0.120	0.53
HaulLoad	Truck Loading at the Quarry	-	-	500	0.00005	0.02	0.11	0.00005	0.024	0.11
<b>Total</b>	-	-	-	-	-	<b>147.83</b>	<b>647.49</b>	-	<b>6.74</b>	<b>29.52</b>

**Table 2**  
**Emission Assumptions and Calculation: PM-10 Emissions from Drilling and Material Handling**  
**RDA, LLC**  
**Andrews, South Carolina**

Emission Source ID	Emissions Source Description	Transfer From	Transfer To	A Design Capacity (tons/hr)	B Uncontrolled PM <sub>10</sub> Emission Factor (lbs/ton)	C Uncontrolled PM <sub>10</sub> Hourly Emissions (lbs/hr)	D Uncontrolled PM <sub>10</sub> Annual Emissions (tpy)	E Controlled PM <sub>10</sub> Emission Factor (lbs/ton)	F Controlled PM <sub>10</sub> Hourly Emissions (lbs/hr)	G Controlled PM <sub>10</sub> Annual Emissions (tpy)
CR1	Crusher No. 1 (Primary)	-	-	500	0.0024	1.20	5.26	0.00054	0.270	1.18
TP1	Transfer Point No. 1	CR1 (Figure ID 1)	C1 (Figure ID 2)	500	0.0011	0.55	2.41	0.000046	0.023	0.10
TP2	Transfer Point No. 2	C1 (Figure ID 2)	S1 (Figure ID 3)	500	0.0011	0.55	2.41	0.000046	0.023	0.10
S1	Screening Station #1 (Scalping)	-	-	500	0.0087	4.35	19.05	0.00074	0.370	1.62
TP3	Transfer Point No. 3	S1 (Figure ID 3)	C2 (Figure ID 4)	150	0.0011	0.17	0.72	0.000046	0.007	0.03
TP4	Transfer Point No. 4	C2 (Figure ID 4)	C3 (Figure ID 5)	150	0.0011	0.17	0.72	0.000046	0.007	0.03
TP5	Transfer Point No. 5	C3 (Figure ID 5)	STP1 (Figure ID 6)	150	0.0011	0.17	0.72	0.000046	0.007	0.03
TP6	Transfer Point No. 6	S1 (Figure ID 3)	C4 (Figure ID 7)	400	0.0011	0.44	1.93	0.000046	0.018	0.08
TP7	Transfer Point No. 7	C4 (Figure ID 7)	STP2 (Figure ID 8)	400	0.0011	0.44	1.93	0.000046	0.018	0.08
TP8	Transfer Point No. 8	STP2 (Figure 8)	C5 (Figure ID 9)	400	0.0011	0.44	1.93	0.000046	0.018	0.08
TP9	Transfer Point No. 9	C5 (Figure ID 9)	C6 (Figure ID 10)	400	0.0011	0.44	1.93	0.000046	0.018	0.08
TP10	Transfer Point No. 10	C6 (Figure ID 10)	S2 (Figure ID 11)	400	0.0011	0.44	1.93	0.000046	0.018	0.08
S2	Screening Station #2 (Secondary)	-	-	400	0.0087	3.48	15.24	0.00074	0.296	1.30
TP11	Transfer Point No. 11	S2 (Figure ID 11)	C7 (Figure ID 12)	50	0.0011	0.06	0.24	0.000046	0.002	0.01
TP12	Transfer Point No. 12	C7 (Figure ID 12)	C8 (Figure ID 13)	50	0.0011	0.06	0.24	0.000046	0.002	0.01
TP13	Transfer Point No. 13	C8 (Figure ID 13)	STP3 (Figure ID 14)	50	0.0011	0.06	0.24	0.000046	0.002	0.01
TP14	Transfer Point No. 14	S2 (Figure ID 11)	C9 (Figure ID 15)	50	0.0011	0.06	0.24	0.000046	0.002	0.01
TP15	Transfer Point No. 15	C9 (Figure ID 15)	C10 (Figure ID 16)	50	0.0011	0.06	0.24	0.000046	0.002	0.01
TP16	Transfer Point No. 16	C10 (Figure ID 16)	STP4 (Figure ID 17)	50	0.0011	0.06	0.24	0.000046	0.002	0.01
CR2	Crusher No. 2 (Secondary)	-	-	400	0.0024	0.96	4.20	0.00054	0.216	0.95
TP17	Transfer Point No. 17	CR2 (Figure ID 18)	C11 (Figure ID 19)	400	0.0011	0.44	1.93	0.000046	0.018	0.08
TP18	Transfer Point No. 18	C11 (Figure ID 19)	C12 (Figure ID 20)	400	0.0011	0.44	1.93	0.000046	0.018	0.08
TP19	Transfer Point No. 19	C12 (Figure ID 20)	S3 (Figure ID 21)	400	0.0011	0.44	1.93	0.000046	0.018	0.08
S3	Screening Station #3 (Tertiary)	-	-	400	0.0087	3.48	15.24	0.00074	0.296	1.30
TP20	Transfer Point No. 20	S3 (Figure ID 21)	C13 (Figure ID 22)	75	0.0011	0.08	0.36	0.000046	0.003	0.02
TP21	Transfer Point No. 21	C13 (Figure ID 22)	C14 (Figure ID 23)	75	0.0011	0.08	0.36	0.000046	0.003	0.02
TP22	Transfer Point No. 22	C14 (Figure ID 23)	STP5 (Figure ID 24)	75	0.0011	0.08	0.36	0.000046	0.003	0.02
TP23	Transfer Point No. 23	S3 (Figure ID 21)	C15 (Figure ID 25)	75	0.0011	0.08	0.36	0.000046	0.003	0.02
TP24	Transfer Point No. 24	C15 (Figure ID 25)	C16 (Figure ID 26)	75	0.0011	0.08	0.36	0.000046	0.003	0.02
TP25	Transfer Point No. 25	C16 (Figure ID 26)	STP6 (Figure ID 27)	75	0.0011	0.08	0.36	0.000046	0.003	0.02
CR3	Crusher No. 3 (Tertiary)	-	-	400	0.0024	0.96	4.20	0.00054	0.216	0.95
TP26	Transfer Point No. 26	CR3 (Figure ID 28)	C17 (Figure ID 29)	290	0.0011	0.32	1.40	0.000046	0.013	0.06
TP27	Transfer Point No. 27	C17 (Figure ID 29)	C18 (Figure ID 30)	290	0.0011	0.32	1.40	0.000046	0.013	0.06
TP28	Transfer Point No. 28	C18 (Figure ID 30)	S4 (Figure ID 31)	290	0.0011	0.32	1.40	0.000046	0.013	0.06
S4	Screening Station #4 (Fines)	-	-	290	0.072	20.88	91.45	0.0022	0.638	2.79
TP29	Transfer Point No. 29	S4 (Figure ID 31)	C19 (Figure ID 32)	90	0.0011	0.10	0.43	0.000046	0.004	0.02
TP30	Transfer Point No. 30	C19 (Figure ID 32)	C20 (Figure ID 33)	90	0.0011	0.10	0.43	0.000046	0.004	0.02
TP31	Transfer Point No. 31	C20 (Figure ID 33)	STP7 (Figure ID 34)	90	0.0011	0.10	0.43	0.000046	0.004	0.02
TP32	Transfer Point No. 32	S4 (Figure ID 31)	C21 (Figure ID 35)	80	0.0011	0.09	0.39	0.000046	0.004	0.02
TP33	Transfer Point No. 33	C21 (Figure ID 35)	C22 (Figure ID 35)	80	0.0011	0.09	0.39	0.000046	0.004	0.02
TP34	Transfer Point No. 34	C22 (Figure ID 35)	STP8 (Figure ID 36)	80	0.0011	0.09	0.39	0.000046	0.004	0.02
TP35	Transfer Point No. 35	S4 (Figure ID 31)	C23 (Figure ID 38)	75	0.0011	0.08	0.36	0.000046	0.003	0.02
TP36	Transfer Point No. 36	C23 (Figure ID 38)	C24 (Figure ID 39)	75	0.0011	0.08	0.36	0.000046	0.003	0.02
TP37	Transfer Point No. 37	C24 (Figure ID 39)	STP9 (Figure ID 40)	75	0.0011	0.08	0.36	0.000046	0.003	0.02
Tload	Final Product Truck Loading	-	-	500	0.0001	0.05	0.22	0.0001	0.050	0.22
Drill	Drilling inside the Quarry	-	-	500	0.00008	0.04	0.18	0.00008	0.040	0.18
HaulLoad	Truck Loading at the Quarry	-	-	500	0.000016	0.01	0.04	0.000016	0.008	0.04
<b>Total</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>43.11</b>	<b>188.84</b>	<b>-</b>	<b>2.72</b>	<b>11.92</b>

**Table 3**  
**Emission Assumptions and Calculation I: PM2.5 Emissions from Drilling and Material Handling**  
**RDA, LLC**  
**Andrews, South Carolina**

Emission Source ID	Emissions Source Description	Transfer From Equipment ID	Transfer To Equipment ID	A Design Capacity (tons/hr)	B Uncontrolled PM <sub>2.5</sub> Emission Factor (lbs/ton)	C Uncontrolled PM <sub>2.5</sub> Hourly Emissions (lbs/hr)	D Uncontrolled PM <sub>2.5</sub> Annual Emissions (tpy)	E Controlled PM <sub>2.5</sub> Emission Factor (lbs/ton)	F Controlled PM <sub>2.5</sub> Hourly Emissions (lbs/hr)	G Controlled PM <sub>2.5</sub> Annual Emissions (tpy)
CR1	Crusher No. 1 (Primary)	-	-	500	0.00036	0.18	0.80	0.0001	0.050	0.22
TP1	Transfer Point No. 1	CR1 (Figure ID 1)	C1 (Figure ID 2)	500	0.00017	0.08	0.36	0.000013	0.007	0.03
TP2	Transfer Point No. 2	C1 (Figure ID 2)	S1 (Figure ID 3)	500	0.00017	0.08	0.36	0.000013	0.007	0.03
S1	Screening Station #1 (Scalping)	-	-	500	0.0013	0.66	2.89	0.00005	0.025	0.11
TP3	Transfer Point No. 3	S1 (Figure ID 3)	C2 (Figure ID 4)	150	0.00017	0.02	0.11	0.000013	0.002	0.01
TP4	Transfer Point No. 4	C2 (Figure ID 4)	C3 (Figure ID 5)	150	0.00017	0.02	0.11	0.000013	0.002	0.01
TP5	Transfer Point No. 5	C3 (Figure ID 5)	STP1 (Figure ID 6)	150	0.00017	0.02	0.11	0.000013	0.002	0.01
TP6	Transfer Point No. 6	S1 (Figure ID 3)	C4 (Figure ID 7)	400	0.00017	0.07	0.29	0.000013	0.005	0.02
TP7	Transfer Point No. 7	C4 (Figure ID 7)	STP2 (Figure ID 8)	400	0.00017	0.07	0.29	0.000013	0.005	0.02
TP8	Transfer Point No. 8	STP2 (Figure 8)	C5 (Figure ID 9)	400	0.00017	0.07	0.29	0.000013	0.005	0.02
TP9	Transfer Point No. 9	C5 (Figure ID 9)	C6 (Figure ID 10)	400	0.00017	0.07	0.29	0.000013	0.005	0.02
TP10	Transfer Point No. 10	C6 (Figure ID 10)	S2 (Figure ID 11)	400	0.00017	0.07	0.29	0.000013	0.005	0.02
S2	Screening Station #2 (Secondary)	-	-	400	0.0013	0.53	2.31	0.00005	0.020	0.09
TP11	Transfer Point No. 11	S2 (Figure ID 11)	C7 (Figure ID 12)	50	0.00017	0.01	0.04	0.000013	0.001	0.00
TP12	Transfer Point No. 12	C7 (Figure ID 12)	C8 (Figure ID 13)	50	0.00017	0.01	0.04	0.000013	0.001	0.00
TP13	Transfer Point No. 13	C8 (Figure ID 13)	STP3 (Figure ID 14)	50	0.00017	0.01	0.04	0.000013	0.001	0.00
TP14	Transfer Point No. 14	S2 (Figure ID 11)	C9 (Figure ID 15)	50	0.00017	0.01	0.04	0.000013	0.001	0.00
TP15	Transfer Point No. 15	C9 (Figure ID 15)	C10 (Figure ID 16)	50	0.00017	0.008	0.04	0.000013	0.0007	0.0028
TP16	Transfer Point No. 16	C10 (Figure ID 16)	STP4 (Figure ID 17)	50	0.00017	0.008	0.04	0.000013	0.0007	0.0028
CR2	Crusher No. 2 (Secondary)	-	-	400	0.00036	0.15	0.64	0.0001	0.040	0.18
TP17	Transfer Point No. 17	CR2 (Figure ID 18)	C11 (Figure ID 19)	400	0.00017	0.07	0.29	0.000013	0.005	0.02
TP18	Transfer Point No. 18	C11 (Figure ID 19)	C12 (Figure ID 20)	400	0.00017	0.07	0.29	0.000013	0.005	0.02
TP19	Transfer Point No. 19	C12 (Figure ID 20)	S3 (Figure ID 21)	400	0.00017	0.07	0.29	0.000013	0.005	0.02
S3	Screening Station #3 (Tertiary)	-	-	400	0.00132	0.53	2.31	0.00005	0.020	0.09
TP20	Transfer Point No. 20	S3 (Figure ID 21)	C13 (Figure ID 22)	75	0.00017	0.01	0.05	0.000013	0.001	0.00
TP21	Transfer Point No. 21	C13 (Figure ID 22)	C14 (Figure ID 23)	75	0.00017	0.01	0.05	0.000013	0.001	0.004
TP22	Transfer Point No. 22	C14 (Figure ID 23)	STP5 (Figure ID 24)	75	0.00017	0.012	0.05	0.000013	0.0010	0.0043
TP23	Transfer Point No. 23	S3 (Figure ID 21)	C15 (Figure ID 25)	75	0.00017	0.01	0.05	0.000013	0.001	0.00
TP24	Transfer Point No. 24	C15 (Figure ID 25)	C16 (Figure ID 26)	75	0.00017	0.01	0.05	0.000013	0.001	0.004
TP25	Transfer Point No. 25	C16 (Figure ID 26)	STP6 (Figure 27)	75	0.00017	0.012	0.05	0.000013	0.0010	0.0043
CR3	Crusher No. 3 (Tertiary)	-	-	400	0.00036	0.15	0.64	0.0001	0.040	0.18
TP26	Transfer Point No. 26	CR3 (Figure ID 28)	C17 (Figure ID 29)	290	0.00017	0.048	0.21	0.000013	0.0038	0.0165
TP27	Transfer Point No. 27	C17 (Figure ID 29)	C18 (Figure ID 30)	290	0.00017	0.048	0.21	0.000013	0.0038	0.0165
TP28	Transfer Point No. 28	C18 (Figure ID 30)	S4 (Figure ID 31)	290	0.00017	0.048	0.21	0.000013	0.0038	0.0165
S4	Screening Station #4 (Fines)	-	-	290	0.011	3.16	13.85	0.00033	0.097	0.42
TP29	Transfer Point No. 29	S4 (Figure ID 31)	C19 (Figure ID 32)	90	0.00017	0.01	0.07	0.000013	0.001	0.01
TP30	Transfer Point No. 30	C19 (Figure ID 32)	C20 (Figure ID 33)	90	0.00017	0.01	0.07	0.000013	0.001	0.005
TP31	Transfer Point No. 31	C20 (Figure ID 33)	STP7 (Figure ID 34)	90	0.00017	0.015	0.07	0.000013	0.0012	0.0051
TP32	Transfer Point No. 32	S4 (Figure ID 31)	C21 (Figure ID 35)	80	0.00017	0.01	0.06	0.000013	0.001	0.00
TP33	Transfer Point No. 33	C21 (Figure ID 35)	C22 (Figure ID 35)	80	0.00017	0.01	0.06	0.000013	0.001	0.005
TP34	Transfer Point No. 34	C22 (Figure ID 35)	STP8 (Figure ID 36)	80	0.00017	0.013	0.06	0.000013	0.0010	0.0046
TP35	Transfer Point No. 35	S4 (Figure ID 31)	C23 (Figure ID 38)	75	0.00017	0.01	0.05	0.000013	0.001	0.00
TP36	Transfer Point No. 36	C23 (Figure ID 38)	C24 (Figure ID 39)	75	0.00017	0.01	0.05	0.000013	0.001	0.004
TP37	Transfer Point No. 37	C24 (Figure ID 39)	STP9 (Figure ID 40)	75	0.00017	0.012	0.05	0.000013	0.0010	0.0043
Tload	Final Product Truck Loading	-	-	500	0.000015	0.01	0.03	0.000015	0.008	0.03
Drill	Drilling inside the Quarry	-	-	500	0.000012	0.01	0.03	0.000012	0.006	0.03
HaulLoad	Truck Loading at the Quarry	-	-	500	0.000002	0.00	0.01	0.000002	0.001	0.01
<b>Total</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>6.53</b>	<b>28.60</b>	<b>0.40</b>	<b>1.74</b>	<b>1.74</b>

Note:  
1. Since all emissions from each source are below 1 pound per hour, no air dispersion modeling is required.

**Table 4**  
**Emission Assumptions and Calculation: Storage Pile Wind Emissions**  
 RDA, LLC  
 Andrews, South Carolina

Emission Point ID	Emissions Point Description	A Pile Size (acres)	B Emission Factor		C Hourly Emissions		D Annual Emissions			
			(lbs PM/day/acre)	(lbs PM10/day/acre)	(lbs PM/hr)	(lbs PM10/hr)	(tons PM/yr)	(tons PM2.5/yr)		
STP1	Storage Pile No. 1	1.000	3.2	1.6	0.133	0.067	0.010	0.58	0.29	0.04
STP2	Storage Pile No. 2	0.500	3.2	1.6	0.067	0.033	0.005	0.29	0.15	0.02
STP3	Storage Pile No. 3	0.250	3.2	1.6	0.033	0.017	0.002	0.15	0.07	0.010
STP4	Storage Pile No. 4	0.250	3.2	1.6	0.033	0.017	0.002	0.15	0.07	0.010
STP5	Storage Pile No. 5	0.250	3.2	1.6	0.033	0.017	0.002	0.15	0.07	0.010
STP6	Storage Pile No. 6	0.500	3.2	1.6	0.067	0.033	0.005	0.29	0.15	0.021
STP7	Storage Pile No. 7	0.500	3.2	1.6	0.067	0.033	0.005	0.29	0.15	0.021
STP8	Storage Pile No. 8	0.500	3.2	1.6	0.067	0.033	0.0048	0.29	0.15	0.021
STP9	Storage Pile No. 9	1.000	3.2	1.6	0.133	0.067	0.010	0.58	0.29	0.042
<b>Total</b>	-	-	-	-	<b>0.633</b>	<b>0.317</b>	<b>0.046</b>	<b>2.77</b>	<b>1.39</b>	<b>0.20</b>

**Note:**  
 1. Since PM10 and PM2.5 emissions from each source are below 1.14 pounds per hour, no air dispersion modeling is required.

**Table 5**  
**Emission Assumptions and Calculation I: Unpaved Road Emissions**  
**RDA, LLC**  
**Andrews, South Carolina**

Emission Source ID	A		B	C	D	E	F	G	H	I	J	K
	Pollutants	Particle Size Multiplier k (lb/VMT)										
Haul	PM	4.9	8.3	76	16.16	11.42	28,000	159.94	36.52	90	15.99	3.65
	PM10	1.5	8.3	76	4.60	3.25	28,000	45.48	10.38	90	4.55	1.04
	PM2.5	0.15	8.3	76	0.46	0.32	28,000	4.55	1.04	90	0.45	0.10
Customer	PM	4.9	10	30	12.16	8.59	20,000	85.92	19.62	90	8.59	1.96
	PM10	1.5	10	30	3.59	2.54	20,000	25.36	5.79	90	2.54	0.58
	PM2.5	0.15	10	30	0.36	0.25	20,000	2.54	0.58	90	0.25	0.06
<b>Total</b>	<b>PM</b>	-	-	-	-	-	-	<b>245.86</b>	<b>56.13</b>	-	<b>24.59</b>	<b>5.61</b>
	<b>PM10</b>	-	-	-	-	-	-	<b>70.84</b>	<b>16.17</b>	-	<b>7.08</b>	<b>1.62</b>
	<b>PM2.5</b>	-	-	-	-	-	-	<b>7.08</b>	<b>1.62</b>	-	<b>0.71</b>	<b>0.16</b>

**Notes:**

1) Emissions based on calculation found in AP-42, Section 13.2.2, Equation 1a:  $E = [k (s/12)^a \times (W/3)^b]$  with an extension from Equation 2:  $E_{ext} = E * (365 - P / 365)$

Where:  $E_{ext}$  = annual or other long-term average emission factor in the same units as k,

k = particle size multiplier (Table 13.2.2-2)

s = surface material silt content (%) - Table 13.2.2-1, Quarry Haul/Plant (mean)

W = mean weight of vehicles (tons) - obtained from Winnebago Quarry

a, b = empirical constants from AP-42 Table 13.2.2.2

P = number of hours with at least 0.01 in of precipitation during the averaging period, (Used 2012 data from weatherunderground.com for Charleston - Number of days with 0.01 inches of rain: P = 107 days/yr)

Constant	PM2.5	PM10	PM30
k (lb/VMT)	0.15	1.5	4.9
a	0.9	0.9	0.7
b	0.45	0.45	0.45

2) Controlled emissions are based on 90% control efficiency from use of wet suppression to keep the haul roads wet at all times.

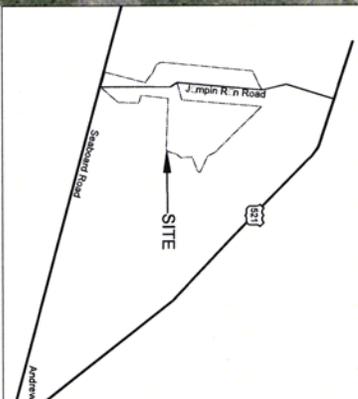


APPROXIMATE SCALE: 1"=400meters  
 0 200m 400m 800m

PROCESSING PLANT

SEE MODELING FILES FOR THE EXACT LOCATION OF THE VOLUME SOURCES

LEGEND  
 --- PROPERTY BOUNDARY



DATE	May 25, 2017
DRAWN APPROVED BY	TJP / MWW
PROJECT NUMBER	rdai00117
FIGURE	1

RDA, LLC  
 ANDREWS, SOUTH CAROLINA

SITE BOUNDARY AND LOCATION MAP

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**FIGURE 2**  
**PROCESS FLOW DIAGRAM - FACILITY WIDE**  
**RDA, LLC**  
**ANDREWS, SOUTH CAROLINA**

