



# The South Carolina Environmental Law Project

Lawyers for the Wild Side of South Carolina

January 8, 2018

a 501c3  
non-profit organization

**Amy E. Armstrong**  
Executive Director  
**Michael G. Corley**  
Staff Attorney  
**Amelia A. Thompson**  
Staff Attorney  
**Jessie A. White**  
Staff Attorney

**MAIN OFFICE**  
430 Highmarket Street  
Georgetown, SC 29440

**MAILING ADDRESSES**  
P.O. Box 1380  
Pawleys Island, SC 29585

P.O. Box 5761  
Greenville, SC 29606

(843) 527-0078  
(864) 412-7921  
Fax (843) 527 0540  
E-mail: amy@scelp.org  
michael@scelp.org  
amelia@scelp.org  
jessie@scelp.org

**BOARD OF DIRECTORS**

**Greg VanDerwerker, MD**  
Chairperson

John Barton, Esq.  
Barbara Burgess, Esq.  
Nancy Cave  
Paula Feldman, PhD  
Allen Grumbine, Esq.  
Susan Hilfer  
Liz Igleheart  
Justin Lucey, Esq.  
Clarkson McDow  
Leon Rice, Esq.  
Nancy Vinson  
Wendy Zara

**BOARD MEMBER EMERITI**  
Daryl Hawkins, Esq.  
Robert Schofield

**ADVISORY COUNCIL**  
Josh Eagle, Esq.

Joe Koon  
SCDHEC - BLWM  
2600 Bull Street  
Columbia, SC 29201

Ann Eaddy  
USACE, Charleston District  
1949 Industrial Road, Room 140  
Conway, SC 29526

Re: RDA, LLC  
DHEC Application I-002171  
Corps NWP 44 Application

Dear Mr. Koon & Ms. Eaddy:

I am writing on behalf of the Coastal Conservation League, the Winyah Rivers Foundation and the S.C. Wildlife Federation regarding the above-referenced permit application for a limestone mining operation on a 968.4-acre tract in the Earle community near Andrews in Williamsburg County. We reiterate and incorporate by reference the comments previously submitted in the letter dated November 17, 2017. In addition, please find enclosed a copy of the "RDA Mine Operating Permit—Technical Review" by Zuzulock Environmental LLC (the "Technical Review"), which is based on the information and materials currently available on the DHEC website for this project. As additional information or materials are made available, we will review and provide additional comments as needed.

The Technical Review sets forth our concerns, comments and recommendations regarding the proposed mining and processing project. While we will continue to be concerned with this project, we welcome the opportunity for further discussion with the agencies and/or applicant on these and other issues and expect DHEC to continue to have dialogue with us and the community.

In particular, we restate that anticipated impacts go way beyond the scope of Nationwide Permit coverage for the major mining and processing activities proposed for this rural, forested wetland area. Such authorization is entirely inappropriate and must be denied and processed as an individual permit. Further, due to the significant impacts on the quality of the human

environment, we believe **an Environmental Impact Statement ("EIS")** in accordance with the National Environmental Policy Act ("NEPA"), 42 U.S.C. 4321, *et seq.*, and associated regulations and guidance **is required.**

Finally, we ask that the agencies take into serious consideration the many ways in which this permit application falls short, as outlined in great detail in the Technical Review. Moreover, we implore DHEC to meet its mission: *"To improve the quality of life for all South Carolinians by protecting and promoting the health of the public and the environment."* The proposed limestone mining and processing project runs contrary to the letter and spirit of the agency's directive and should not be permitted.

We request notification of any decision related to this permit application via email to [jessie@scelp.org](mailto:jessie@scelp.org) or by regular U.S. mail to P.O. Box 1380, Pawleys Island, SC 29585.

Respectfully,



Jessie A. White

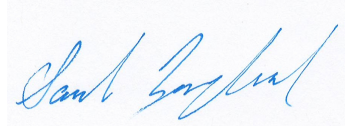
cc: Alyson Hayes, SCDHEC BAQ  
Brett Caswell, SCDHEC BOW  
Chuck Hightower, SCDHEC BOW  
Greg Mixon, SCDNR

# +Zuzulock Environmental Services LLC

514 Henderson Street  
Bozeman, Montana 59715

Phone 1.406.581.5891  
sarah@zuzulockenvironmental.com

Date: January 5, 2018  
To: Erin Hardwick Pate, South Carolina Coastal Conservation League  
From: Sarah Zuzulock, PE, MS  
Re: RDA Mine Operating Permit –Technical Review



The RDA Mine submitted an application for a Mine Operating Permit with the South Carolina Department of Health and Environmental Control (DHEC) in June 2017, and proposes to operate a drill and blast limestone mine with a process plant consisting of several crushers near the Earle community in Williamsburg County. Mine operations are proposed for 20 years over a 968 acre permit area, and will require lowering of the groundwater table throughout the life of the mine. The South Carolina Coastal Conservation League (SCCCL) has identified concerns with the proposed project, and is conducting a technical review of the RDA Mine Operating Permit Application (OP Application) as part of their evaluation of the proposed facility. Preliminary concerns identified by SCCCL include impacts to regional wetlands, water quality, impacts from dewatering, air quality, noise, reclamation and post-mining land use.

Zuzulock Environmental Services (ZES) has prepared technical comments related to the proposed RDA Mine on behalf of the SCCCL. With over 16 years of experience, ZES provides the required expertise to assist in the evaluation of a mine permit application with respect to assessment of predicted environmental impacts and mitigations. ZES has worked with grass roots conservation organizations, communities, county and tribal government and federal agencies on hard rock mining and environmental management issues including water resources and soil monitoring plan design and implementation, wastewater treatment and management, water quality monitoring and reporting, mine operation and closure activities, reclamation and financial assurance review and calculation. ZES has extensive experience providing technical assistance to community members working cooperatively with Sibanye-Stillwater through the Good Neighbor Agreement. The Good Neighbor Agreement is a partnership between the local community and underground mining company that has worked successfully for 17 years to monitor for water quality change and protect water resources with water quality standards that go above and beyond state requirements, and provide processes for citizen oversight of operations to minimize environmental and community impacts. Additionally, ZES has been involved in numerous projects related to mine permitting with a focus on water resources, development of mitigations, reclamation and closure planning and financial assurance.

The following comments have been prepared by Zuzulock Environmental Services on behalf of the South Carolina Coastal Conservation League (SCCCL) related to the proposed limestone mine development, the RDA Mine. The proposed mine is expected to continue operations for 20 years, and will result in a permanent loss of forest and wetland areas as mining progresses and pit lakes are developed. The potential impacts on environmental and community resources associated with the proposed RDA Mine need to be carefully evaluated by South Carolina DHEC and cooperating regulatory agencies as required under Title 48 of the South Carolina Mining

Act, and the identification of both best management practices and mitigation of predicted impacts should be considered as requirements in their issuance of a permitting decision.

In general, the OP Application materials provided by the project applicant are preliminary, and do not provide sufficient information to confidently assess and mitigate for the impacts to water resources, wetlands and land resources associated with mine dewatering and development activities proposed for the RDA Mine. Most significantly, the RDA Mine appears to underestimate the impact to and permanent loss of wetlands associated with this project in their application for a Nationwide 44 permit. The application materials are based upon limited and preliminary hydrogeologic and water resource evaluations that do not provide sufficient analysis to determine that the jurisdictional wetlands planned to be avoided will not be impacted by dewatering activities, and the permanent loss of several isolated wetlands within the permit boundary is planned as part of mine operations. As detailed in the comments below, the impacts to wetlands are likely underestimated and the application for Nationwide 44 permit should not be approved. The mine applicant should apply for a Section 404 Permit as required by the Clean Water Act to evaluate for potential impacts to the local jurisdictional wetlands and the Black River. Federal and state agencies should then evaluate the project impacts as required by the National Environmental Policy Act (NEPA). The RDA Mine will result in reasonable and foreseeable impacts to water resources and the project footprint, along with the identification of direct, indirect and cumulative impacts on the regional environment and community resources over the 20-year mine life; and for these reasons the Corps of Engineers should require an Environmental Impact Statement.

Specific comments and recommendations related to the OP Application are described below and include the following:

- Water Quantity and Quality
- Wetland and Stream Impacts
- Wildlife
- Reclamation and Closure Planning and Financial Assurance
- Noise and Lights
- Air Quality
- Traffic
- Blasting Practices

#### Water Quantity and Quality

The Application for a Mine Operating Permit (OP Application) submitted to DHEC by RDA Mine proposes pumping of groundwater to lower groundwater levels approximately 55 feet below the ground surface, with a maximum depth of 65 feet, to support mining of limestone over a mine permit area of approximately 968 acres. The application includes a *Hydrogeologic Evaluation of the RDA, LLC Property Williamsburg County, South Carolina* prepared by Groundwater Management Associates, Inc. (GMA) on April 11, 2017. The proposed mine will require a National Pollutant Discharge Elimination System (NPDES) permit for point source discharge.

The GMA study objectives were to predict the volume of water withdrawn from the proposed mining operation, the depth of water level projected in the pit, and the predicted water level elevations outside of the mine. Additionally, the GMA study reviewed local topography maps to

indicate possible karst locations. The hydrogeologic study provided to support the OP Application does not provide an analysis sufficient to confidently predict the impacts to water resources and wetlands associated with mine dewatering proposed for the RDA Mine. ZES has reviewed the GMA study and has the following questions and concerns that should be addressed and considered as part of the permit review and evaluation:

1. The GMA study describes the proposed RDA Mine as a 278-acre open pit limestone aggregate quarry. The basis of the 278-acre open pit area used to determine the groundwater drawdown area in the GMA study is unclear, and inconsistent with OP Application acreages depicted on the map *RDA Mine, Sheet 1, Revision 3 (09/08/17)* prepared by Kennedy Consulting Services, LLC (KCS) where approximately 420 acres over 10 segments are depicted for open pit mining.

Section 6.0 of the GMA study summarizes the mining assumptions used for the predictive calculations including a total mine area of 315 acres and area of the limestone mine cut at 278 acres. These values are not consistent with the OP Application acreages where the total mine area is reported as 968 acres and limestone mine cut area of 420 acres (as estimated by ZES on the RDA Mine Map), and are likely to represent an underestimate of pumping rates and drawdown boundaries. The assumptions used in the hydrogeologic evaluation need to be updated to reflect the current mine plan, proposed open pit area and mine development sequencing over the proposed life of mine. The GMA study acknowledges the limitations of the preliminary analysis completed and recommends further study before operation of the RDA Mine. It is recommended that DHEC require the applicant to complete a hydrogeologic evaluation based upon up-to-date mine plan information and additional groundwater monitoring data.

2. Field exploration efforts described in Section 4.0 of the GMA study are preliminary in nature, and not adequate to characterize the proposed 968-acre mine permit area. The study conclusions are based on data collected from one temporary test well and one temporary monitoring well. Analysis is based on one water quality sample and a 17-hour constant-rate pumping test between the 2 wells located 60 feet apart to estimate aquifer characteristics (transmissivity and storage coefficient) and groundwater drawdown levels. The temporary wells developed for this study are located within or near Segment 5 where mine activity is proposed to begin. The RDA Mine Map (Sheet 1) as well as the Conceptual Reclamation Map (Sheet 2) illustrates the development of three (3) open pits that are proposed to form separate pit lakes at closure. It is unclear based on the information provided in the application and supporting studies whether or not the pit lakes will share a hydrologic connection, which will have an impact of the effects to groundwater.

It is recommended that DHEC require the applicant to conduct a more robust aquifer characterization study including development of a groundwater and surface water monitoring network designed to complete baseline studies, operational, and long-term monitoring. This should include additional testing as recommended in the GMA study, including determination of groundwater flow direction and baseline groundwater levels and groundwater quality throughout the site.

An additional recommendation to consider is a requirement to complete aquifer pump tests within each of the three proposed open-pit mining areas to assess regional groundwater drawdown impacts.

3. The GMA study recommends mitigations, such as use of a phased block-mining approach, to minimize water withdrawal volumes required that should be further evaluated and considered by DHEC as permit requirements to ensure protection of the surrounding environment. It is recommended that DHEC and cooperating agencies require the RDA Mine to submit a more detailed mine plan describing development of the limestone mine area over the 20-year period proposed, including analysis of alternative mining plans to minimize impacts to regional water resources, such as the phased block-mining approach recommended in the GMA study.

This information should be used to complete a revised hydrogeologic study and predictive modeling to ensure that the analysis completed to determine water quantity and quality impacts is based on sufficient data to characterize the regional water dynamics, and confidently predict the maximum extent of disturbance and potential for impacts including development of sinkholes. The hydrogeologic evaluation should extend estimates of groundwater drawdown beyond the permit boundary to assess long-term impacts to regional surface water, wetland, and domestic water resources within the cone of depression created for dewatering.

Additionally, flow dynamics between the roadside and drainage ditches delineated between the jurisdictional wetland units (RDA Mine Map Sheet 1 and Revised Waters Mapping) need to be better understood, in particular within Jumpin Run Tract. The ditches shown on the maps don't appear to be restored with the preservation of wetlands and recovery of groundwater to natural levels; however it is not known whether or not these ditches are critical for maintaining the drainage and connection of wetlands to adjacent wetland units within this watershed.

4. Appendix D-2: *RDA Quarry Groundwater Monitoring and Remediation Plan with Well Complaint Investigation Protocol* includes a process for DHEC to address well complaint / water loss. The investigation protocol provides a process to evaluate potentially mine related impacts to a residential well; however, the process should be revised to include provisions for immediate replacement of water to the landowner while a determination of responsibility is made.

Additionally, the investigation process relies upon an evaluation of the RDA groundwater monitoring well network, which, as proposed does not provide adequate baseline data to determine if water level changes are seasonal or mine related. The monitoring well network proposed might not provide for a location in close proximity to the well being evaluated that allows for a determination of responsibility. Collection of baseline data as recommended above to include domestic water resources will provide essential background data that could prove important to all parties in the future should a domestic water loss be attributed to mine related activities.

The current groundwater-monitoring plan is included in the *Sinkhole Monitoring and Contingency Plan* prepared by GMA, Inc. (November 20, 2017). The monitoring plan is focused on monitoring for the formation of sinkholes proximal to Segment 5, a 45-acre segment, where mining is planned for the first several years of operations. This information will be used to inform future monitoring efforts. Figure 5 shows the locations of 9 groundwater-monitoring

wells proposed for development before operation of the RDA Mine, and includes locations proximal to Segment 5 as well as sites along the perimeter of the permit boundary.

The reviewer is in agreement with the *Sinkhole Monitoring and Contingency Plan* report recommendation to conduct additional field investigation before initiation of mining in Segment 5. In addition to the aerial survey proposed, it is recommended that groundwater monitoring wells are installed prior to permitting of proposed mine operations to allow for baseline data collection required to evaluate potential water quality impacts from the operations. It is standard practice to collect and evaluate 2-3 years of baseline water quantity and quality data, collected monthly or quarterly basis, to understand seasonal trends in water levels.

The monitoring locations proposed in the GMA report are limited to the mine permit boundary, and locations selected without an apparent basis. It is recommended that the report provide a site description and basis for the selection of each location (e.g. outside of mine influence, within groundwater drawdown zone) proposed, along with a more detailed monitoring schedule. Wells should be installed prior to operations to understand pre-mining conditions. In addition to the locations proposed, RDA Mine is encouraged to develop a voluntary domestic well monitoring program for wells of concerned residents and those adjacent to mine operations. The USGS guide *Ground-Water-Level Monitoring and the Importance of Long-Term Water-Level Data Circular 1217*<sup>1</sup> includes recommendations for selection of observation wells and continuous water level monitoring equipment.

The *Sinkhole Monitoring and Contingency Plan* proposes monthly monitoring of groundwater levels but does not indicate the duration planned for monitoring, mitigation or reporting requirements. It is recommended that key monitoring wells are identified and outfitted to include continuous groundwater level monitoring equipment during pit dewatering activities. A best management practice could be developed to automatically alert mine managers of any water level changes outside of those predicted in the dewatering analysis. Additionally, the *Sinkhole Monitoring and Contingency Plan* should include a process to mitigate the development of sinkholes on property within and adjacent to the mine permit area. A mitigation or permit requirement to consider is to establish a perimeter adjacent to and outside of the mine permit area for which RDA Mine would be responsible for mitigation associated with sink holes.

### Wetland and Stream Impacts

The RDA Mine submitted a request to the US Army Corps of Engineers for a jurisdictional determination of wetlands in May 2017 delineating approximately 95 acres of jurisdictional wetlands and 25 acres of isolated, or non-jurisdictional, wetland areas. Subsequently, the Revised Nationwide 44 Permit Application (dated September 11, 2017) applies for authorization to impact 0.394 acres of wetlands associated with the RDA Mine. This includes the conveyor and roadbed areas in Murray Swamp that are planned for fill with concrete, backfill with gravel, or drain/excavate to support mining activities. The application states that over 99% of the jurisdictional waters of the US have been avoided. To mitigate the loss of 0.394 acres associated with this project the applicant is proposing to purchase a 3.93 acres wetlands credit.

The proposed project contains several areas described as isolated wetlands to be mined that will result in a permanent loss of wetlands over the proposed mine area. The “Revised Waters

---

<sup>1</sup> Ground-Water-Level Monitoring and the Importance of Long-Term Water-Level Data, Circular 1217, USGS, 2001. <https://pubs.usgs.gov/circ/circ1217/pdf/circular1217.pdf>

Mapping” schematic prepared by Environs (9/12/2017) delineates 91.50 acres of jurisdictional wetlands, and a total of 887.97 acres of non-jurisdictional features including 26.12 acres of non-jurisdictional wetlands and 861.85 acres of uplands. Whether defined as isolated or jurisdictional wetlands, these areas provide an important function in the regional ecosystem. Wetlands provide critical habitat, food and water sources for wildlife and are well documented for their importance with groundwater recharge and nutrient cycling processes. Further study is needed to determine the potential impact on regional flora, fauna and water resources associated with the RDA Mine.

The planned loss of 0.394 acres of jurisdictional wetlands is to allow for construction of road access and a conveyor belt that includes a proposed crossing over the Murray Swamp Channel (Exhibit for Proposed RDA Mine Conveyor and Roadbed, 12-5-2017). This claim is not supported by the mine maps and the proposed mine operating plan that will result in long-term regional dewatering, and potential for significant impacts to wetlands within and beyond the permit boundary. The application materials do not provide sufficient analysis to determine that the jurisdictional wetlands planned to be avoided will not be impacted by dewatering activities. Additionally, the permanent loss of several isolated wetlands within the permit boundary is planned as part of mine operations. For these reasons, the impacts to wetlands are likely underestimated and the application for Nationwide 44 permit should not be approved. The mine applicant should apply for a Section 404 Permit as required by the Clean Water Act and once adequate hydrogeologic characterization has been completed to determine the potential and planned impacts to wetlands associated with the RDA Mine.

South Carolina DHEC should address wetlands as one of the key issues in their review of this project, and every effort made to determine if alternatives exist to the proposed destruction of potentially 640-acres of existing wetlands (isolated and jurisdictional). Alternatives should be considered and developed to avoid or otherwise minimize wetlands impacts, including alternative locations for placement of overburden/waste rock and operational alternatives for processing and mining that could reduce or eliminate wetlands impacts. Similarly, alternatives to any proposed usage of surface water streams or other discharge points that would utilize or impact existing surface water resources should be considered. In addition, groundwater hydrology impacts as a result of mine dewatering and other activities should be addressed, including the potential of lowered water tables to impact wetlands.

The *Murray Swamp Flow Analysis for RDA Mine* prepared by Georgia Civil, Inc. on November 20, 2017 describes RDA Mine plans to discharge water at a maximum rate of 11.6 cubic feet per second (cfs) into the Murray Swamp Creek basin just downstream of the Jumpin Run Road crossing. The report does not predict the inflow from RDA Mine will have an impact on water elevations in the creek basin at 100-year peak flows (1,053 cfs), and therefore will not have any negative downstream flow rate effects (e.g. flooding) on Murray Swamp from the addition of groundwater and stormwater dewatering from the pit. While the modeling analysis may support this conclusion, observations from community members should be taken into account. At both the November 30, 2017 community meeting hosted by SC DHEC in Andrews and the community meeting hosted by SCCCL in Earle on November 16, community members reported that current conditions in Murray Swamp Creek basin result in areas of significant flooding and backed-up water from small storm events. The project applicant and agencies should take this information into account when evaluating for mine related impacts and developing planned mitigations. The discharge proposed into Murray Swamp could have an impact on regional water levels that is not predicted in modeling exercises, where the analysis is based upon limited information and does not reflect real-world conditions.



The *Murray Swamp Water-Quality Assessment* prepared by GMA, Inc. (November 13, 2017) includes three water quality samples collected from Murray Swamp. The samples appear to be upstream, adjacent to, and downstream of proposed mine facilities; which is a good approach for site selection to understand baseline conditions. The data collected from the water quality assessment is very limited including only field parameter measurements, and should at a minimum include a laboratory analysis for general water chemistry, cations/anions, nutrients and metals.

In order to characterize baseline water quality and quantity conditions in the vicinity of RDA Mine, the monitoring network needs to be expanded to include other surface water and swamp features. Best practice to determine baseline water quality conditions is typically quarterly monitoring for a period of two to three years, which allows for an understanding of natural trends and seasonal fluctuations in water quality and quantity.

### Wildlife

The OP Application materials included two reports describing the habitat and threatened/endangered species prepared by Environs, LLC – the *Preliminary Protected Species Report Proposed RDA Limestone Mine* (April 30, 2017) and the *Protected Species Evaluation* (August 28, 2017). The protected species surveys describe the project site as located in the Black River drainage within the Carolina Flatwoods eco-region. A majority of the proposed site was and is currently used for silvicultural practices, and was previously farmed for cotton and other crops. There are currently six threatened and/or endangered species within Williamsburg County.

The results presented in these studies are preliminary in nature and are based primarily upon observations of field personnel on-site “several times” during wetland evaluation work in late 2016 and early 2017. The *Protected Species Evaluation* encompasses 804 acres of the proposed permit area of 968 acres. This study notes there are areas of the project site that provide possible habitat for the state listed Rafinesque’s big-eared bat and the northern long-eared bat. “It is possible maternity roost trees or winter hibernacula are on the project site within older cypress or tupelo trees, but the proposed mine plan should not affect the wetland areas where those type trees occur. (page 4).” These areas should be delineated, and the agencies consider a permit requirement to avoid these areas in the mine development.

Although this habitat is identified, both evaluations conclude there is no evidence to support the presence of threatened or endangered species in the proposed mine area, and the terrain has been altered therefore habitat for listed species is limited. This conclusion should be supported by a formal study with a defined objective, delineated study area and robust evaluation to demonstrate the absence of endangered/threatened species. It is recommended that DHEC require a consultation with the USFWS or SCDNR biologist regarding the presence of, or habitat available for, threatened or endangered species.

### Reclamation and Closure Planning and Financial Assurance

The RDA Mine Reclamation Plan (Form MR-500) is included as part of the Operating Permit Application, and includes general descriptions of planned reclamation activities. The affected

area is reported as 622.7 acres of the 968.4 acres, and the estimated costs for completion of reclamation tasks \$330,944<sup>2</sup>.

The Reclamation Plan and Cost Estimate provided does not provide enough information to ensure successful reclamation and closure of the proposed mine facilities as required by Section 48, Chapter 20 of the South Carolina Mining Act. For example, the plan narrative describes plans for stabilizing overburden piles with vegetation, but lacks standard details typical of a reclamation plan, and required to complete successful reclamation and estimate reclamation costs for financial assurance requirements. Typically a reclamation plan would include details on the location, size and final shaping requirements of the overburden piles, the volume of overburden that requires re-grading to final slope, requirements for cover materials and or soil amendments, the surface area required for revegetation, and specifics on the seed mix planned.

Section 2 of the Reclamation Plan calculates total affected acreage (page 3 of 11). This information was updated in a letter to DHEC dated October 11, 2017 due to a change where RDA Mine no longer anticipates closure of Jumpin Run Road. The affected acreage for each sub-category in the reclamation plan was modified with this submittal reducing the total affected acreage estimate from 147.9 acres (7/17 application) to 119.0 acres (10/17 revision). The basis for this change is unclear to the reviewer. The most significant change in acreage estimates occurs in sub-category G “Area for excavation during the period of this permit,” where the October 2017 application assumes mining in 7-acre segments, by 3 segments, resulting in 21 acres estimated for excavation during the permit period. The basis of this change is unclear to the reviewer, however this approach appears to underestimate the area planned for mining and open pit development along with the associated reclamation liability in the event of unplanned mine closure.

The Reclamation Cost Estimate, provided upon request from SCDHEC, estimates a cost of \$330,944 for grading, vegetating and removal of structures from the RDA Mine, with a total reclamation area estimated at 119.0 acres. In general the cost estimate lacks sufficient detail to evaluate the adequacy of estimated reclamation costs, and provides only acreages and unit costs for re-grading and vegetation of mine areas. The cost estimate should provide a justification for all material and equipment costs based upon published rates (RS Means) and/or local contractor bids. The notes and assumptions provide some information on the basis of the RDA cost estimate, and could be improved with the following recommendations:

- Spoil Berms (Note C) describes plans to build visual berms as mining progresses in the vicinity of active mine operations and assumes that only 1/3 of the earthen berms (15.4 acres) planned will require grading and vegetation. It is best practice when estimating mine closure costs for reclamation bond determination to include the area of maximum disturbance planned for each mine feature. In this case, the earthworks and revegetation costs should be applied to the entire 45.3 acres planned for Spoil Berms.
- The basis for the estimated building area of 14,000 ft<sup>2</sup> and dismantling rate at \$2.51/ft<sup>2</sup> needs to be provided (Note D). In addition, costs for hauling and disposal of building materials should be included in this cost estimate.

<sup>2</sup> RDA Reclamation Cost Estimate received electronically on December 19, 2017 upon request from Joe Koon, SC DHEC.

- Haul Roads (Note F) planned for reclamation do not include tasks for earthworks and only include costs for revegetation. Haul roads often require ripping or scarification to break up the compacted road surface, then grading prior to revegetation. These tasks and costs should be included in this reclamation plan and cost estimate.
- Vegetate \$/Acre costs include costs for light grading and application of seed and fertilizer. It is standard practice for mine reclamation costs for revegetation to include material costs for soil amendments (mulch, fertilizer), seed mix, live plants; and costs for erosion, weed control and re-seeding as needed until revegetation has been successfully established and, if applicable, reclamation bond release criteria have been met.
- Unit costs provided should each include a basis and/or reference for the estimated costs.
- Monitoring and maintenance tasks and costs should be included in the reclamation plan and cost estimate to ensure successful mine closure and reclamation of disturbed areas to meet post-mining land use objectives.

The SC Mining Act (89-200B) states, “For mining operations with affected lands greater than twenty-five (25) acres, the Department may require the operator to prepare a written estimate of the cost of reclamation activities. Cost estimates prepared by the operator may be used by the Department in establishing reclamation bond amounts. The cost estimate shall reflect the customary and prevailing rate for performing and completing all reclamation requirements.” It is recommended that DHEC require the applicant to submit a more detailed, and written reclamation plan and cost estimate based upon estimates of time, equipment, and materials to ensure the tasks and costs estimated reflect the maximum liability for reclamation and closure of the mine facilities.

Section 9 of the Reclamation Plan, Revegetation parameters, (seed mix, soil amendments, etc.) for the RDA Mine have not been determined and will be based on seed mix based on SC DOT’s *Supplemental Technical Specification (SC-M-810-2(04/11)) for Seeding*. Typically the seed mix and required soil amendments are known at the time of mine permitting, or a field evaluation is planned to test and determine a successful reclamation seed mix and amendment requirements.

The application lists the post-mining land use as grassland and lake formation, but this is not consistent with the current land use described as predominately forestland. It is recommended that the project applicant solicit feedback from the local community members to determine their desired post-mining land use.

The Reclamation Schedule (Reclamation Plan page 6 of 8) provided includes descriptions and quantities for planned reclamation tasks, however there is not sufficient detail to evaluate the accuracy or adequacy of the planned tasks. It is not clear if and/or how these tasks correspond to the Reclamation Plan Cost Estimate. The first task, for example, is to “Establish 50’ wide upland buffers for wetlands to be avoided along the access and haul roads in RDA-South”. It is unclear when referencing the RDA Mine Map and Conceptual Reclamation Map (both dated 1-24-17) if this task includes the “protected wetland buffers” and which areas are specifically covered. The schedule accounts for 1,200 feet of protected wetland buffers to be completed in 2018, then does not include establishment of future wetland buffers throughout the site in the future while site wide there are roughly 13,300 feet of protected wetland buffers to be established. The

reclamation plan should describe the specific tasks and subtasks required at closure for removal of the established buffer (e.g. fencing removal and disposal, erosion control) and ongoing monitoring, maintenance and repairs.

It is recommended that DHEC request a formal, written, reclamation plan and cost estimate from RDA Mine that provides sufficient detail to ensure protection of the surrounding environment and for reclamation of the area of land affected by mining as required by the SC Mining Act.

### Noise and Lights

Impacts associated with noise and lights required to support the RDA Mine are not specifically addressed in the OP Application. There are several sources with the potential to result in nuisance noise impacts associated with the RDA Mine – including operation of air rotary drill rigs, generators, pumps, crushers, heavy equipment – some of which are likely to require 24-hour operation. Section V.3 of the OP Application references the use of dense vegetation and distance as mitigations for visual and impacts, and construction of vegetated berms if needed for visual screening or noise abatement.

According to the application, there are approximately 51 residential structures located from within 400 feet to ½ mile of the permit boundary. In these areas off-site impacts from the proposed RDA Mine operations, such as noise and lighting, have the potential to cause significant impacts at times throughout the operation. While there is not a regulatory requirement to do so, it is recommended that RDA Mine develop a mitigation plan to address noise and lighting issues associated with the proposed operations that is consistent with current best practice for construction and mining industries. The Mine Safety and Health Administration *Noise Control Resource Guide – Underground Mining* (May 2012)<sup>3</sup> includes best practices that are applicable to open pit mining. An effective mitigation plan using modern technology and best practices can be developed to address public concerns in a manner that benefits all parties. Mitigations to consider include restriction of hours for blasting, restriction of hours for off-site hauling and use of designated routes, installation of white-noise backup alarms on equipment, shielding of lights to limit travel distance, and other engineered controls. Current best practice recognizes noise and lighting as significant issues to the public, and addressing these concerns should be taken seriously and resolved through communication with impacted residents.

### Air Quality

The OP Application (Section IV.3) states that the “process plant will require an Air Quality Operating Permit issued by SC DHEC to operate.” There are numerous activities proposed in the OP Application that will result in the emission of fugitive dust outside of activities associated with the processing plant at the RDA Mine that should be considered in this application; including drilling, blasting, loading, hauling and crushing and conveyance of crushed materials.

The RDA Mine should develop and submit a formal dust monitoring and mitigation plan as a requirement of the Operating Permit to ensure consistency with best management practices and current industry practice to minimize fugitive dust emissions and associated air quality impacts. The plan should identify sources and operational practices to reduce fugitive dust emissions through application of BMPs as suggested by the *Dust Control Handbook for Industrial*

<sup>3</sup> Mine Safety and Health Administration, *Noise Control Resource Guide – Underground Mining*, May 2012 Revision, <https://arlweb.msha.gov/1999noise/Guides/ugtotalFinal.pdf>

*Minerals Mining and Processing*<sup>4</sup> prepared by the Department of Health and Human Services, Centers for Disease Control and Prevention, and the National Institute of Safety and Health in 2012; and the Centre for Excellence in Mining Innovation's *Fugitive Dust Best Practices Manual*<sup>5</sup> prepared in 2010.

Control measures to reduce fugitive dust emissions must take into account: a) identification and classification of fugitive dust emission sources; b) identification of the sources of fugitive dust emissions; c) fugitive dust characterization; d) development and implementation of the BMP plan; plus training and inspection/maintenance. Best practices to minimize dust emissions include covering or dampening materials prior to haulage, and concurrent reclamation of stockpiles and overburden areas to minimize erosion and dust. The proposed conveyor to transport crushed stone across Murray Swamp should include operational controls such as secondary containment to prevent fugitive and particulate dust emissions through vibrational losses or operational upset conditions.

An air quality monitoring and mitigation plan for RDA Mine should also consider the installation of portable air monitors near haul road and/or rock processing areas given the number of residences in close proximity to the mine site. Real-time monitoring to demonstrate compliance with permit requirements and/or the effectiveness of mitigations limiting migration of fugitive dust to off-site areas can be an effective way to demonstrate efforts undertaken to reduce community impacts. The Met One E-BAM particulate monitor is a common and accepted instrument used to monitor fugitive dust emissions using EPA methods for particulate measurement. The E-BAM system offers real-time data reporting capability and links to EPA's AIRNOW website to provide the public with near real-time air quality information.

### Traffic

The OP Application describes plans for off-road hauling to support the mine operation, but does not describe the planned traffic associated with employee and contractor travel plus material and supply delivery for the RDA Mine, which can have a significant impact on the adjacent communities and infrastructure.

The RDA Mine should provide an estimate of daily off-site traffic associated with facility construction, operation and closure. This includes mobilization and demobilization of heavy equipment and supplies, daily contractor and employee traffic, delivery of materials and supplies during operations, transport of limestone off-site for sale, and other associated mine traffic. It is recommended that DHEC and other cooperating agencies consider the impacts of traffic and work with the impacted community members and local government to develop mitigations of predicted impacts. An increase in the daily traffic volume with the additional wear and tear on rural roads from haul truck traffic can have a significant impact to local infrastructure and increase repair and maintenance costs. It is recommended that RDA Mine develop a mitigation plan in consultation with community members, local church leadership, nearby school officials, the Town of Andrews and regulatory agencies to minimize traffic-related impacts with the proposed operations that is consistent with current best practice for construction and mining industries.

---

<sup>4</sup> Department of Health and Human Services, CDC, NIOSH, Dust Control Handbook for Industrial Minerals Mining and Processing, [http://www.spray.com/pdf/dust\\_control\\_hanbook\\_ri9689.pdf](http://www.spray.com/pdf/dust_control_hanbook_ri9689.pdf)

<sup>5</sup> Centre for Excellence in Mining Innovation, Fugitive Dust Best Practices Manual, <https://www.cemi.ca/SustainMine/fugitive-dust-best-practices-manual/>

## Blasting Practices

Blasting operations are generally described in the OP Application and state that operations will be conducted under the direction of a SC Licensed Blaster, and measures will be taken to prevent injury to persons or damage to property (Section V.2). RDA Mine commits to conduct pre-blast inspections to establish baseline conditions will be offered to owners of all structures within a half a mile of the blasting activities.

While the information provided in the OP Application might satisfy the requirements of DHEC, it is recommended that the RDA develop and provide a detailed blasting plan including a schedule for planned blasting activities, expected impacts, and mitigations that can be shared with the public. Current industry best practice recognizes blasting impacts as a significant issue to nearby community members, and to address public concerns and perceptions is an important part of a successful operation.

McKown<sup>6</sup> addresses the subject in a report *Drilling and Blasting Issues and Recommended Mitigations Measures for Residences at South Brookline (Hancock Village)* that provides the principals and impacts of blasting. He notes that blasting has multiple side effects other than flyrock including vibrations, blast pressure, and permanent ground deformations, such as cracks or slides. The report recommends a number of protective measures and mitigations, which could be implemented at the RDA Mine. This includes the need to provide for a public relations plan that establishes meetings with residents to review blast impacts, mitigation measures, likely things they will notice when blasting takes place, and answer any questions or address concerns. The blasting plan should be responsive to community needs and, for example, establish a blasting schedule that minimizes disturbance to nearby residents. The report also recommends that pre-blast condition surveys take place, as already planned by the RDA Mine, and that there be periodic progress meetings with residents.

## Summary

In conclusion, the OP Application materials provided by the project applicant are preliminary in nature, and do not provide sufficient baseline data collection and assessment for SC DHEC to confidently evaluate and mitigate for the impacts to water resources, wetlands and land resources associated with mine dewatering and development activities proposed for the RDA Mine as required by the South Carolina Mining Act. Most significantly, the RDA Mine underestimates the impact to and permanent loss of wetlands associated with this project in their application for a Nationwide 44 permit. The applicant should apply for a Section 404 Permit as required by the Clean Water Act to evaluate for potential impacts to the local jurisdictional wetlands and the Black River. Federal and state agencies should then evaluate the project impacts as required by the National Environmental Policy Act (NEPA). The RDA Mine will result in reasonable and foreseeable impacts to water resources and the project footprint, along with the identification of direct, indirect and cumulative impacts on the regional environment and community resources over the 20-year mine life; and for these reasons the Corps of Engineers should require an Environmental Impact Statement.

---

<sup>6</sup> McKown Associates, <http://www.brooklinema.gov/DocumentCenter/View/6563>