South Carolina Department of
Natural Resources

PO Box 12559
Charleston, SC 29422
843.953.9003 Office
843.953.9339 Fax
JamisonM@dnr.sc.gov

Robert H. Boyles
Director
Lorianne Riggin
Director, Office of
Environmental Programs

March 17, 2022

Kaylin Joye
DHEC
Division of Mining & Solid Waste Management
2600 Bull Street
Columbia, SC 29201

RE: Solutions, LLC - Edge Road Mine, I-002375, Horry County

Dear Ms. Joye,

Personnel with the South Carolina Department of Natural Resources (SCDNR) have reviewed the above-referenced project and offer the following for your consideration.

Project Summary

The proposed project is for a sand/clay mine in Horry County, SC. The entirety of the proposed project area tract is 33.0 acres with the total area to be impacted being 24.1 acres. Impacted areas include 23.2 acres for mining and 0.9 acres of haul road to Edge Road. The proposed mining depth is 50 ft which is proposed to occur in 10 to 20 ft benches. Active mining segments will be dewatered with a series of rim ditches routing groundwater and stormwater to a central sump for that segment. The sump will be pumped to previously mined segments where the water will infiltrate into the ground. A rip-rap channel will convey pit discharges to onsite wetlands which ultimately discharge to Boggy swamp and the Waccamaw River. During mining activity, an undisturbed 50-ft buffer between onsite wetlands and mining activity is proposed; as well as a 50-foot buffer along the property line, except in the area adjacent to the existing driveway, which will have a 20 ft property buffer. The long-term wetland buffer width associated with the proposed reclamation plan is 35 ft. The applicant also proposes to donate the land to SCDNR or Horry County as long-term stewards.

Agency Comments

First and foremost, the agency has not made a commitment to accept a donation of the proposed mining site property. With that said, the agency may accept the donation, but there is a process for such that has not been initiated. Additionally, the agency's first priority is to the existing Lewis Ocean Bay Heritage Preserve (LOBHP) and the concerns regarding impacts related to the mining operations associated with the project as currently proposed.

The proposed project site is located immediately adjacent to the LOBHP. This approximately 10,000-acre Heritage Preserve was acquired to protect South Carolina's best assemblage of Carolina Bays which are found in a mosaic of pine savannas and blackwater swamp forests. LOBHP gets its name from the unique

feature of Carolina bays found throughout the property. Due to the acidic nature of the water within the bay, they also host a plethora of species ranging from unique flora and fauna of rare plants, crayfish, amphibians, reptiles, wading birds and mammals.

Isolated wetlands like Carolina bays are important as numerous amphibian species utilize these habitats to breed in these predominantly fish-free wetlands. The ecotone or transition zone on the edges of bays also are areas where rare plants, such as the Venus flytrap, thrive and where wildlife seek refuge during fires. Carolina bays and other isolated wetlands also serve to filter sediments and other nutrients, recharge groundwater aquifers and mitigate impacts from flooding. Beyond their numerous benefits, the waxy evergreen vegetation of Carolina bays is a volatile source of wildfire fuel. Additionally, the peat soils found in these habitat types ignited under dry conditions can burn underground for months.

Outside of the Carolina bays, LOBHP is comprised of longleaf and pond pine savannas. These habitat types consist of widely spaced trees of varying ages with an open understory that is dominated by a variety of native grasses and herbaceous species. These unique habitats require fire every two to three years to maintain the open early successional ground cover. Longleaf pine and pond pine are fire-adapted species and will not successfully reproduce long-term in the absence of fire. The longleaf pine ecosystem has been reduced drastically from its historical range and is now an endangered ecosystem.

Because of the rarity of the ecosystems found at LOBHP and on it borders, the property harbors equally as rare species on a global and state level. At least 37 rare plant species, most of which are fire dependent, have been documented at LOBHP, the highest richness of any of the State's 76 Heritage Preserves. Two fire-dependent species of global conservation importance that are found on LOBHP include the Venus flytrap (*Dionaea muscipula*) and Raven's primrose willow (*Ludwigia ravenii*).

The abundance and range of Venus flytrap has been decimated by fire suppression and land conversion. It is now known from only a few populations in the world – two populations in Horry County, SC and in a few coastal counties of NC. The largest population of Venus flytrap in the state of South Carolina is found centered at LOBHP and is the only population within the state that is considered to have long-term viability. The species is thought to be extirpated from Georgetown and Berkeley counties because of fire suppression and land use changes. Raven's primrose willow is known globally from a few other locations in North Carolina and Virginia; it is thought to be extirpated from its historic range in Florida.

Other wildlife species that inhabit the ecosystems of LOBHP include the federally endangered red-cockaded woodpecker (*Picoides borealis*) and the pine snake (*Pituophis melanoleucas*), both high conservation priority species in the State's Wildlife Action Plan due to loss of fire-maintained open canopy habitat, and black bear (Ursus americanus) a moderate conservation priority in the State Wildlife Action Plan. LOBHP supports habitat for a large stronghold for the coastal black bear population in South Carolina. The coastal bear population is under continuing threat from development pressure and loss of habitat. Today's LOBHP coastal black bears move from the Carolina Forest area to the Waccamaw River to interact with populations of black bears in the Coastal Plain of North Carolina, maintaining genetic diversity for continued success of this population.

Therefore, because of the importance and rarity of the ecosystems and wildlife that inhabit LOBHP, the SCDNR has concerns regarding the mining operation as proposed.

The mining site consisted of similar habitats to LOBHP, including palustrine wetlands and sandhill scrub uplands; however, the vegetation at the mine site has since been cleared under activity approved by the GP-1002336. The geology in the proposed project area is comprised of unconsolidated interconnected

sands with interspersed clay overlying the Peedee Formation or Crouch Branch aquifer. The top of the Peedee Formation is as shallow as 42 feet below the land surface.

Because of the proximity of the mine site to LOBHP, the potential exists for impacts to sensitive LOBHP habitats and associated management resulting from mine construction, operation, and the dewatering discharge from the project operations into adjoining wetlands. Given the geologic conditions and shallow aquifer, the proposed project could affect the ability of wetlands on LOBHP to hold water, essentially dewatering not only the wetlands within the project footprint but outside of the project area onto the LOBHP. In addition, SCDNR data shows the presence of a shelly carbonate sand, of variable thickness under the aforementioned sand and clay, overlying the Peedee formation. Nearby in North Myrtle Beach and Loris, this carbonate sand is the source of historical sinkholes (Hockensmith and Pelletier 1987). Disturbing or dewatering the carbonate sand could increase the risk of sinkholes outside of the proposed mining footprint on LOBHP and other sites nearby.

In addition to the risk of dewatering wetlands and increased risk of sinkholes, hydrologic changes can impact fire management and associated benefits in the LOBHP. Because of the complex ecosystem mosaic and the long history of fire, the site harbors high biodiversity with a diverse assemblage of rare plants and animals that depend on a fire regime to persist. Prior to European settlement, Coastal Plain ecosystems, in particular pine savannas, were subject to both natural and anthropogenic ignitions and these fires typically occurred at least two to three times per decade. The SCDNR burns portions of LOBHP annually. Without annual burns, ecosystem quality and biodiversity would decline rapidly due to encroachment of hardwood species and the chance of accidental wildfires that pose a risk to both ecosystem integrity and adjacent landowners would increase. The proposed mining operation may alter hydrology of wetlands that connect from the proposed mine site to the LOBHP, causing areas to become dryer and increasing wildfire risk. This would also result in longer smoldering times from dryer peat layers. Additionally, if the hydrology of Boggy Swamp at LOBHP is impacted, this could result in the loss of sensitive plant species that occupy a narrow moist zone at the edge of the Carolina Bays on each side of the swamp, including the federally At-Risk Species Venus flytrap (*Dionaea muscipula*), *Carex elliottii* (G4[1]/S2[2]), *Lachnocaulon beyrichianum* (G4[1]/S2[2]), *Xyris flabelliformis* (G4[1]/S1[3]), *Lechea torrey var. congesta* (G4[1]TNR[4]/S2[2]), and *Oxypolis ternate* (G3[5]/S1[3]). Alterations to wetland hydrology also negatively impact herptiles that depend on these seasonal wetlands for reproduction.

As has been noted in the permit application and according to SCDNR data, there are several records of protected species and/or species of concern near/within the proposed project area. (Please keep in mind that this information is derived from existing databases, and the SCDNR does not assume that it is complete. Areas not yet inventoried by SCDNR biologists may contain other significant species or communities.) This project appears to have the potential to affect multiple listed species, including three state threatened species: the Carolina Pygmy Sunfish (*Elassoma boehlei*), the Southern hognose snake (*Heterodon simus*), both species of highest conservation priority as designated by the by the State Wildlife Action Plan (SWAP), and spotted turtle (*Clemmys guttata*), which is also a federal At-Risk species (ARS) and a SWAP species of high conservation priority. The project also has the potential to affect a

[1] G4 – Global: Apparently Secure - At fairly low risk of extinction or collapse due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
[2] S2 – Subnational: Imperiled - At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
[3] S1 – Subnational: Critically Imperiled - At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
[4] TNR – Infraspecific Taxon, Not Ranked; https://explorer.natureserve.org/AboutTheData/Statuses
[5] G5 – Global: Secure - At very low risk or extinction or collapse due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.

SWAP species of highest conservation priority, the pine snake (*Pituophis melanoleucus*). SWAP species are those species of greatest conservation need not traditionally covered under any federal funded programs. Species are listed in the SWAP because they are rare or designated as at-risk due to knowledge deficiencies; species common in South Carolina but listed rare or declining elsewhere; or species that serve as indicators of detrimental environmental conditions.

Included in the permit application is a report assessing the potential risk to the above-mentioned species. Based on this assessment the applicant determined, "the site is not considered an environmentally sensitive habitat." The SCDNR finds the survey to be inadequate and disagrees with this statement, as well as the statement within the Threatened and Endangered species (T&E) assessment regarding the determination of the existence of spotted turtle and Carolina Pygmy Sunfish habitat onsite. Further, the SCDNR provides the following comments on the limitations of the provided T&E assessment.

- Spotted turtles are a state threatened species and are likely on the tract given the habitat classified on site. While the property was surveyed for this species, the survey was not conducted at the appropriate time of year to detect the presence of the species on the property. As stated by the state herpetologist via email on June 23, 2021, to the applicant's consultant, "The best window for visually identifying spotted turtles as well as successfully trapping is February to early May. Visual surveys are usually most effective February to April and trapping, usually March to May. All of this depends on water levels in the surveyed wetland habitat. If dry or extremely low water levels, neither method will be effective or appropriate." Spotted turtles utilize wetland habitat during certain times of the year, during periods of drought or low water levels, as was observed on the project site during the species assessment, spotted turtles will aestivate in the surrounding forests adjacent to wetlands.
- The state-threatened Southern hognose snake nor the Carolina Pygmy Sunfish would also not have been detectable at the time the surveys were conducted. Southern hognose snakes are a fossorial species, burrowing into sandy soils and spending time underground. This species spends time aboveground during the spring (March-April) and fall (September-early November); therefore, this means this species would have also gone undetected by the survey conducted in June.
- The state-threatened Carolina Pygmy Sunfish reside in ponds, ditches, and streams in the coastal plain. The T&E assessment noted drought conditions on the mine site at the time of the survey; therefore, the likelihood of detection of habitat for this species may not be accurate.

Due to the potential to alter wetland hydrology in LOBHP, the increased risk of wildfire or smoke issues associated with peat smoldering and sinkhole concerns, the SCDNR asks that the permit be held in abeyance until the applicant has further minimized the project footprint including overall acreage of impact and depth of impact. Assurance should demonstrate, with supporting data from a hydrogeologic assessment, any depth proposed by the applicant will not impact the Crouch Branch aquifer and shelly carbonate layer; thereby, eliminating the risk of sinkhole development and any hydrologic impacts to LOBHP.

In the event the permit is not held in abeyance, the SCDNR recommends that the following best management practices be included as permit conditions during the preparation, excavation, extraction, and reclamation phases of this project to ensure that project design and construction-related impacts are minimized.

- Prior to beginning any land-disturbing activity, appropriate erosion control measures, such as silt fences, silt barriers, or other devices, must be placed between the disturbed area and any

nearby waterways and maintained in a functioning capacity until the area is permanently stabilized.

- All necessary measures must be taken to prevent oil, tar, trash, and other pollutants from entering the adjacent offsite areas.
- The project must be in compliance with any applicable local floodplain, erosion and sediment control and/or stormwater ordinances.
- Isolated wetlands provide critical habitat for a variety of reptile and amphibian species. A key aspect of the herp lifecycle includes terrestrial movements and the use of upland habitats adjacent to isolated wetlands. The SCDNR recommends, the placement of a minimum of a 300-foot buffer between the mining activity and adjacent wetlands to encompass and protect terrestrial movements of a variety of important herp species (Semlitsch and Bodie. 2003, Buhlmann et al. 2001, Buhlmann et al. 2009, Litzgus et al. 2004, Veysey Powell and Babbit, 2015).
- Land disturbance should be kept to a minimum and accomplished in phases, when possible. Disturbed areas should be exposed only for the period required to extract the resource and vegetation should be re-established promptly.
- Land clearing should not begin until sediment basins and other conservation practices have been established. Clearing should be limited to the areas to be immediately mined.
- The number of overburden piles should be kept to a minimum and runoff should be diverted into sediment basins until vegetation can be established. Overburden piles should not be placed in drainage-ways or floodways.
- At the time of reclamation of the mine site to a pond, if the final goal for the pond is to provide recreational fishing opportunities, SCDNR recommends that you consult with the Natural Resources Conservation Service and Clemson Extension to determine any modifications needed for increased productivity. These modifications could include the incorporation of as much shoreline variation with the use of peninsulas and islands in reclamation to provide ideal shoreline habitat for wildlife and aquatic vegetation. Care should be taken to create littoral zone habitat near shorelines, approximately 3 feet or less with a gradual slope to the uplands. The deeper portions of the pond should ideally be no more than 8 to 15 feet for recreational fishing. For your reference, the SCDNR Guidelines for Private Recreational Ponds can be found online at www.dnr.sc.gov/environmental/docs/private-ponds.pdf.
- According to the Reclamation Plan, cover and seeding rates will be based on the South Carolina Department of Transportation's (SCDOT) Supplemental Technical Specification for Seeding (SC-M-810-2 (04/11)). Please note that a more current version of this guidance is available (SC-M-810-4 (01/21)). The SCDNR recommends following the most current guidance document with respect to planting techniques; however, the SCDNR recommends against using the seed mix as described in the guidance document. The SCDOT seed mix includes Sericea Lespedeza (*Lespedeza cuneata*), Bermuda grass, and Bahiagrass. Native to eastern Asia, *Sericea Lespedeza* is considered a noxious, invasive plant pest, earning a "severe threat" designation by the South Carolina Exotic Pest Plant Council. A study of a reclaimed mine in Virginia found that northern bobwhite (*Colinus virginianus*) populations were limited due to poor habitat quality resulting from the monoculture plantings of Sericea Lespedeza and turf grasses (Stauffer 2011). At a former surface mine site in Kentucky (now Peabody Wildlife Management Area), a 2015 study demonstrated that areas dominated by Sericea Lespedeza were not preferred habitat for bobwhite (Unger et al.), as it is not a preferred food for bobwhite (Ellis 1961), nor does it contain enough nutritional value to support a bobwhite population (Newlon et al. 1964). Due to its invasive nature and lack of benefit to wildlife, the SCDNR recommends against planting Sericea Lespedeza. Additionally, Bermuda grass, Bahiagrass, and other non-native turf grasses, once established, tend to outcompete native vegetation and may create difficulties in establishing native vegetative habitat. Instead of planting Sericea Lespedeza and non-native turf grasses, the

SCDNR prefers and recommends the use of native warm season grasses and/or other native forbs for stabilization that are beneficial for wildlife and pollinators. Native warm season grass species suggestions include: Indiangrass (Sorghastrum nutans), big bluestem (*Andropogon gerardii*) and little bluestem (*Schizachyrium scoparium*). A list of beneficial pollinator plant species, such as milkweed (Asclepias spp.), for the southeast may be found at www.xerces.org/pollinators-southeast-region/ or by visiting http://www.pollinator.org/guides. Additional South Carolina native pollinator plant species that may be applicable for use at the site during reclamation can be found in Appendix A of the Technical Guidance for the Development of Wildlife and Pollinator Habitat at Solar Farms at https://www.dnr.sc.gov/solar/assets/pdf/solarHabitatGuide.pdf.

To minimize impact to species of conservation concern or state protections, the SCDNR recommends the following:

Southern Hognose Snake

Southern hognose snakes are most active and vulnerable above ground during the spring (March-April) and fall (September-early November). The SCDNR recommends activities during these times be minimized, especially the use of heavy equipment, to reduce impacts to highly fossorial species underground from soil compaction and crushing. In the event these windows cannot be accommodated the SCDNR recommends the following exclusionary methods:

- Erect silt fencing around the project area in the winter when snakes are dormant and spotted turtles will be in the wetlands. If the timing of this would impact project timelines, the SCDNR asks that the silt fencing be erected now and that a monitoring plan be in place to walk the perimeter of the silt fence daily the week prior to construction beginning to ensure that any herpetofauna within the project footprint along the fencing be moved to outside of the project area prior to any work taking place.
- Monitor the silt fencing to ensure it is effectively working properly on a monthly basis prior to construction activities occurring. This should effectively exclude any herpetofauna and other small wildlife species from the project area prior to excavation. Once construction activities begin, it should be monitored weekly.

Spotted Turtles

Prior to habitat disturbance in the proposed work area, the areas of impact be completely surveyed by individuals qualified to identify these species. The SCDNR recommends the survey of the wetlands occur during non-drought conditions and utilize the appropriate assessment method; visual surveys should be utilized from February to April and trapping surveys should be utilized from March to May.

If spotted turtles are detected during one of the survey methods or silt fence monitoring, they may be allowed to be relocated into areas of suitable habitat, management, and conservation status. However, any plans for relocation should be submitted for review to the SCDNR with a detailed description and images of the current and future habitat and proposed work plan and methodologies as it pertains to a relocation project. Pursuant to S.C. Code of Laws §50-15-40 and State Regulation 12-151.1(A), it is unlawful for any person to take, possess, transport, import, export, process, sell, offer for sale, ship, or receive for shipment any spotted turtle without a permit from the department.

Carolina Pygmy Sunfish

The Carolina Pygmy Sunfish inhabits slow-moving acidic waters of ponds, ditches, and streams in the coastal plain, with a preference for areas with abundant aquatic vegetation and shallow water. Impacts to this state threatened species can be reduced by protecting these areas from any increased turbidity

or pollution and the removal or use of aquatic herbicide application to eliminate or greatly reduce aquatic vegetation.

Thank you for the opportunity to review this project and provide comments. Should you have questions regarding these comments or need more information, please contact me at JamisonM@dnr.sc.gov or by phone at 843.953.9003.

Sincerely,

Maggie Jamison
Office of Environmental Programs
Coastal Environmental Coordinator

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