

To: Wake 92-10 Triangle Quarry Permit File
From: Brian Wrenn, Division Director *BW*
Date: February 17, 2022
Re: Division of Energy, Mineral, and Land Resources Summary on the Wake Stone Corporation's Triangle Quarry (92-10) Modification Application Denial

The stated purpose of the Mining Act of 1971 is that the "usefulness, productivity, and scenic values of all lands and waters involved in mining within the State will receive the greatest practical degree of protection and restoration." In order to comply with this purpose, the Mining Act contains seven denial criteria which must be considered prior to the issuance or modification of a mining permit. Based on a review of the materials gathered by the Mining Program through the permit modification application, agency comments, public comments, and additional information provided by the applicant to the Program upon request, the application is denied under the fifth criteria, for having a significantly adverse effect on the purposes of a publicly owned park, forest or recreation area. N.C.G.S. 74-51(d)(5)

The State Park and Vicinity

William B. Umstead State Park (the Park) and the East Coast Greenway (ECG) both immediately border the proposed operation (to the north and west, respectively). The Park is made up of approximately 5,600 acres of largely forested area with several lakes and streams and recreational and management facilities. The Park is managed by the Department of Natural and Cultural Resources' Division of Parks and Recreation (DPR). The purposes of the Park are categorized generally by DPR as conservation, recreation, and education. The ECG is a 3,000-mile walking and biking route from Maine to Florida which is managed by a variety of state and local governments, non-profits, and community organizations. It is described as representing "a commitment to public health, environmental sustainability, economic development, and civic engagement." (East Coast Greenway website, <https://www.greenway.org/about/impact/our-impact-the-big-picture>)

The East Coast Greenway Alliance was founded in 1991 and the ECG includes 365 "spine route" miles in NC. The portion adjacent to the proposed quarry site is a part of a small percentage of ECG "greenway" miles in NC. In 2021, the NC General Assembly authorized the addition of the ECG in central and eastern NC to the State Parks System, finding that it would "provide a multitude of economic, recreational, health, environmental, community, and transportation benefits." (Session Law 2021-54).

History of the Wake Stone Triangle Quarry Permit

The Park and the existing Wake Stone Triangle Quarry have existed side by side for approximately 40 years. In 1980, Wake Stone Corporation submitted an application for the existing Triangle Quarry operation. The Division of Land Resources (the Division) originally denied the application for the existing quarry based on significantly adverse effects to the purposes of the Park. In an August 5, 1980 memo, the Division received comments from the NC Department of Natural Resources and Community Development's Division of Parks and Recreation expressing concerns over the proposed original quarry. The Division evaluated identified concerns of potential noise, visual, and traffic impacts to the purposes of the Park from the proposed operation. The Division ultimately concluded that the effects on the purposes of the Park from the proposed operation were significantly adverse and could not be sufficiently mitigated. The application was denied, but ultimately the Division's decision was overturned by the Mining Commission, and the permit was issued in 1981.

Current Park Information

According to a February 10, 2022 letter from DPR, the annual number of visitors to the Park in 1980 was approximately 350,000. Since that time, usership of the Park has increased by 300% with over 1.1 million visitors in 2021. The population in the Raleigh metropolitan area has also grown dramatically during this time increasing from approximately 209,000 in 1980 to almost 1.5 million in 2021 (United Nations Population data, <https://www.macrotrends.net/cities/23110/raleigh/population>>Raleigh Metro Area Population 1950-2022). Furthermore, land development rates from 1976-2005 have averaged 11 acres per day and are projected to increase through 2040 to 17 acres per day (DNCR, 2022). The areas immediately surrounding the Park have experienced tremendous growth in residential, commercial, and industrial development. According to Dwayne Patterson (personal communication, February 10, 2022), Director of DPR, state parks face three main development pressures: airports, highways, and mining operations. This data not only demonstrates the importance of the Park to the area but also the fragility and sensitivity of the Park to outside development pressures.

Application of Mining Act Denial Criteria

In its review of the application, the Division considered each of the seven denial criteria contained within the Mining Act (e.g., impacts on wildlife, air quality, water quality). Based upon the results of the Division's review, the adverse effects on the purposes of the Park remain the same as those evaluated in 1980: noise, visual, and traffic impacts.

Noise Impacts

DEMLR performed a comprehensive review of potential adverse effects from noise utilizing a variety of evaluation methods. To initially assess the potential for significant adverse effects to the purposes of the Park arising from noise impacts, DEMLR requested that Wake Stone conduct a noise study. The study measured existing noise levels in the Park and the surrounding areas. Monitoring was conducted during normal operating hours, maintenance day operation when a majority of the operation was inactive, and outside of operating hours (e.g., Sunday). This information was used to develop a model of the anticipated noise levels from the proposed quarry. Wake Stone used certain assumptions to develop the model, such as a blast being performed hourly, all equipment operating simultaneously, any ground areas not covered by natural forest growth were modeled as being partially reflective, and no sound attenuation for foliage or forested areas. In the noise study report, Wake Stone proposed a noise level increase that identified any increases meeting a 10 dBA increase, equal to a doubling of noise, as a significantly adverse effect. Wake Stone noted in its noise study that NCDOT uses a standard of 10 dBA to determine where noise mitigation techniques should be implemented for road construction.

The Wake Stone model predicted worst case scenario increases in noise levels from the quarry operation in the range of 6-7 dBA in portions of the Park on the east side of Foxcroft Lake and 6-8 dBA at the Dunn residence. As a result of these higher predicted noise levels, DEMLR requested Wake Stone to investigate mitigation techniques that could reduce the noise impacts in these areas. Wake Stone proposed construction of a sound barrier wall along the western and northern borders of the Odd Fellows tract including around the Dunn property and at the proposed bridge over Crabtree Creek. Mitigation of noise impacts resulting from this proposal reduced noise increases at the Dunn residence in a range of 0.9-1.6 dBA. However, very little mitigation was achieved in the Park (0.0-0.4 dBA).

Specifically, Wake Stone's August 12, 2021 additional information reply for the proposed sound barrier wall provided the following results:

Noise Receptor	Current Proposal
	For Worst-Case 280 feet Production Scenario (Leq(h) dBA)
R-1: Residence Property Line	43.1
R-2: Company Mill Trail	52.4
R-3: Picnic Area	52.1
R-4: Residences	35.2
R-5: Reedy Creek Park Trail	38.5
R-6: North Turkey Creek Trail	31.1
R-7: Foxcroft Lake	53.0
R-8: Crabtree Creek	51.0
R-A: Near Foxcroft Lake	55.4
R-B: Foxcroft Property Line	56.7
R-C: Dunn Back Yard	51.7
R-D: Dunn Front Yard	44.1

Note: R-1, the Dunn residence, was measured from an area near the property line for the Dunn residence, but on the Odd Fellows tract. This location is lower in elevation than the actual home which helps explain the variation between R-1 vs. R-C and R-D.

Wake Stone proposed in its noise study that a 10 dBA noise level increase from its operations would be a significant adverse effect to the Park. However, it is DEMLR's position that Wake Stone's 10 dBA noise level increase standard is not conservative enough. Although a 10 dBA increase in noise might be a reasonable standard beside a busy highway, a more conservative standard should be used for the Park given the uses and purposes of the Park. It was determined that an additional safety factor or reduction of the proposed standard was needed for this setting. Often in engineering design, safety factors are applied. For example, the Division's Dam Safety Program uses safety factors that can vary from 1.15 to 1.25, or 15% to 25% over the required design standard, but these are for physical/structural aspects of safety. The Mining Program looked at applying a 15% factor of safety through a reduction to the 10 dBA standard. While the Division recognizes decibels are measured on a logarithmic scale, for the analysis of noise impacts to the purposes of the Park, DEMLR linearly reduced the proposed 10 dBA standard by 15% [$10 \text{ dBA}(1-0.15) = 8.5 \text{ dBA}$].

Therefore, in an effort to implement sound, conservative engineering practices which are transparent and sensitive to a variety of receptors, DEMLR determined that an 8.5 dBA increase over the background noise levels was useful as one indicator for determining significant adverse effect.

To make the comparison, the noise levels of the long-term monitoring stations identified in Wake Stone's noise study on the maintenance day were averaged. The Wake Stone noise study showed that the average background noise level during the hours of 7 AM to 5 PM on the maintenance day was 52.3 dBA. Adding the 8.5 dBA increase to the average maintenance day noise level of 52.3 dBA yielded:

52.3 dBA + 8.5 dBA = 60.8 dBA

Based upon the data presented in Wake Stone's noise study, the predicted noise levels for the proposed operation were modeled to be below 60.8 dBA. It should be noted that Wake Stone believes most of the noise impacts would be dropping as the pit develops. Wake Stone proposed to control noise by developing its pit in a way to deflect the noise upwards. This would be achieved by constructing the sound wall and getting the working areas below ground level as quickly as possible.

The area to the east of Foxcroft Lake (receptors R-A and R-B) is a major concern as it shows the greatest noise impacts in the Wake Stone noise study. Although no mapped trails are located in this area of the Park, the purposes of the Park are still applicable to this area. It would be disingenuous for the purposes of this review to attempt to partition off areas of the Park from consideration because conservation, recreation, or education opportunities are not obvious at those locations. The purposes of the Park are applicable to all areas of the Park within its boundaries.

Furthermore, the Wake Stone analysis shows that noise levels from the quarry operation would increase in a range of 3-5 dBA (3 dBA was used as a floor for perceptible noise increases) deeper into the Park's interior. It is understood that there are other noise sources in the Park area (e.g., RDU airport, I-40). When evaluating noise impacts, USDOT recommends considering the character of the noise and "the nature of the activity of the people occupying the area" (USDOT, 1973). Noises such as blasting, rock hammering, and loading into haul trucks are abrupt and disruptive and would be present in an area where such noises have not occurred in the past with the predicted intensity and frequency. These noises would also be present in a setting where the expectation of the visitors is a natural setting with more consistent background noises. According to comments contained in multiple letters from DPR and thousands from the general public, the introduction of these noises would negatively affect the conservation, recreation, and education purposes of the Park. The Division agrees.

In addition to the noise study and as part of the current evaluation, DEMLR reviewed the historical record for the mining operation. Specifically, in the 1980 noise impact analysis, the Division used a standard of 55 dBA to determine when a significantly adverse effect may occur to the purposes of the Park from quarry operations. This standard was based on the 1970 analysis of the noise impacts to the Everglades National Park from the proposed Everglades Jetport. It's important to note that the standard was applied at the Park boundary and no obvious attempt was made to determine what percentage of the Park would be affected. Noise levels presented in the table above show that the 55 dBA noise level would be exceeded at the Park boundary. This noise level is defined as predicted quarry operation noise only and does not include any potential increases in background noise as a result of the proposed operation. In the previously discussed analysis using an increase in noise of 8.5 dBA, the average measured noise level during a maintenance day was 52.3 dBA. With an increase in noise levels from the quarry in a range of 6-7 dBA, the 55 dBA level would be exceeded at the Park boundary and well into the Park. Based on thousands of comments from the general public and on multiple written and verbal communications with DPR, the level and character of noise from the proposed operation would not meet the expectations of the Park users and would be considered disruptive to recreation, conservation, and education purposes in this natural setting. Therefore, the noise impacts from the quarry expansion would have a significantly adverse effect on the purposes of the Park.

Noise impacts to the ECG are expected to be similar in intensity (5-6 dBA increase). However, the expectations of setting and noise quality are different for the ECG. Where the Park is a natural setting with a focus of ecological conservation, the ECG is routed through a variety of landscapes including

urban, rural, and suburban settings. The overwhelming majority of the ECG in NC travels along State-maintained roads with several portions traveling through major cities such as Wilmington, Fayetteville, and Raleigh. Despite this, the relevant portion of the ECG immediately adjoining the operation remains in a relatively natural state and would be subject to the previously described noise intensity increases. Therefore, while the noise expectations for the ECG includes a wider range of noise impacts and quality statewide, the increase in noise would still have a negative impact on the ECG in this particular location.

Visual Impacts

Visual impact is another primary concern for the Park and ECG. Visual screening is referenced in the Mining Act [§74-51(f)] and in the supporting regulations [15A NCAC 05B .0105(3)]. §74-51(f) addresses visual screening through conditions “to screen the view of the operation from...public parks” that may be included in any permit issued by the Mining Program. 15A NCAC 05B .0105(3) also references permit conditions to screen the operation from “any adjoining property containing...public access.” Neither the Mining Act nor the supporting regulations provide further guidance on how to evaluate visual impacts as a component of a denial criteria. As with the noise impact analysis, setting and expectations are important considerations in determining the level of visual impact that is present. In a February 10, 2022 comment letter, DPR described the Park as a refuge for outdoor recreation enthusiasts. Visitors to the Park expect a natural setting with limited commercial, residential, and industrial development nearby.

Wake Stone’s proposed sound barrier wall would screen much of the operation from view within the Park. However, a portion of the proposed operation would remain visible from the Park in the Foxcroft Lake area, and the wall itself would be visible from numerous vantage points. The proposed wall would stop approximately 150 feet west of Foxcroft Lake. From that point, a chain link fence would be installed leading to the outer edge of the protected Zone 1 Neuse River buffer on Foxcroft Lake and then would continue on the opposite bank from the outer edge of the protected Zone 1 Neuse River buffer to the outer edge of the Zone 1 Neuse River buffer along Crabtree Creek. The existing mature forest to the east of Foxcroft Lake and between Foxcroft Lake and Crabtree Creek would not be disturbed and would provide some visual screening. However, it was observed during a field visit to the area that a ridge line on the east side of Foxcroft Lake and running generally north provides an elevated view of the Odd Fellows Tract. Another ridge line on the west side of Foxcroft Lake limits the line of sight to the remainder of the tract. The proposed pit development would remove this western ridge making the mining operation easily visible from the elevated vantage point. Additional vegetative screening would likely have little mitigating effect on the visual impacts to the purposes of the Park.

As discussed above, no mapped trails are in this area of the Park, but according to DPR, visitors do still access the area (Umstead Park Superintendent Scott Letchworth personal communication, February 9, 2022). During a field visit to the area in question, DEMLR staff also observed worn recreational trails along the Park boundary. Observation of the mining operation from the Park would certainly have a negative impact on the visitor experience and the wall itself could be considered a visual impact to Park users. DPR staff have specifically expressed concerns regarding the sound barrier wall and the negative change in “the visual experience for Umstead visitors” as have separate comments from the general public. Division staff even identified these concerns about visual impacts resulting from a potential operation expansion in the original 1980 application review document. The Odd Fellows tract has been a long term and effective natural buffer to the Park. The loss of this buffer and replacement with a concrete wall and quarry operation would have a significantly adverse effect on the purposes of the Park.

Construction of the sound barrier wall on the western boundary of the Odd Fellows tract along Old Reedy Creek Road (approximately 1,000 feet long) would sufficiently block the operation from view on this portion of the ECG. The ECG in this area sits below or is level with the Odd Fellows tract western border, and the wall would block any views of the operation. The proposed wall would be plainly visible from the ECG while traveling along Old Reedy Creek Road as demonstrated by Wake Stone's and the Park's visual renderings of the wall. As discussed above, the ECG is routed through a variety of landscape settings including highly urban areas and State-maintained roadways. Although the presence of the wall in this area would not be significantly different from other portions of the ECG, the changes to this portion of the ECG would have a negative impact when compared to the current natural state.

Traffic Impacts

In 1980, the Division evaluated the potential for adverse effects to the purposes the Park's Harrison Avenue entrance from truck traffic at the quarry entrance. That evaluation noted that heavy truck traffic could have "some adverse effect upon local traffic" at the Harrison Avenue park entrance. The evaluation went on to say that "present park traffic at this entrance is light" and it is "very doubtful that this possible impact would be significant enough to provide a reason to deny a permit." Based on Wake Stone's proposed sequence of operation, truck traffic would not be expected to increase significantly as a result of the proposed expansion.

As discussed above, the annual number of visitors to the Park in 1980 was 350,000 while today, the Park sees over 1.1 million visitors annually with a Raleigh metropolitan area population 7 times larger than in 1980. Traffic at the Harrison Avenue entrance has increased dramatically with visitors queuing outside of the Harrison Road entrance waiting for the Park to open or for parking spaces to become available (Umstead Park Superintendent Scott Letchworth personal communication, February 9, 2022).

Interactions between Park visitors and quarry and third-party trucks have increased, and traffic safety is a significant concern in this area. The proposed expansion would extend the timeline for truck traffic and would result in negative impacts on the purposes of the Park through public interactions with quarry traffic.

Conclusion

The Division has evaluated the potential for significantly adverse effects on the purposes of a publicly owned park, forest, or recreation area using criteria of noise, visual, and truck traffic impacts with consideration of the increased sensitivity of the Park regarding development pressures at its borders. Individually and in combination, the increased quarry noise levels at the Park boundary and intrusion of quarry noise deeper into the Park, a less desirable visual setting due to the sound barrier wall and quarry operation, and the continued loss of natural buffers around the Park result in a significantly adverse effect on the recreation, conservation, and education purposes of the Park as a result of the proposed activity. Additionally, increased interactions between Park visitors (vehicles, bikers, and pedestrians) and trucks associated with the operation of the quarry will compound these significantly adverse effects. This position has been strongly articulated by DPR in written and verbal comments, as well as by thousands of comments from the general public. The Division agrees. In accordance with 74-51(d)(5), the Division finds that there is a significantly adverse effect to the purposes of a publicly owned park.

References

NC Department of Natural and Cultural Resources, Division of Parks and Recreation, May 8, 2020.

NC Department of Natural and Cultural Resources, Division of Parks and Recreation, February 12, 2021.

NC Department of Natural and Cultural Resources, Division of Parks and Recreation, November 18, 2021.

NC Department of Natural and Cultural Resources, Division of Parks and Recreation, February 10, 2022.

United Nations Population data, Raleigh Metro Area Population 1950-2022,
<https://www.macrotrends.net/cities/23110/raleigh/population>.

US Department of Transportation, Federal Highway Administration, National Highway Institute, 1973.
Fundamentals and Abatement of Highway Traffic Noise. Report No. FHWA-HHI-HEV-73-7976-1.

