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Commissioner's Office
Tennessee Department of Transportation, Project Comments
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Re: Comments on Transportation Planning Report, US 64, Benton – Ducktown, Public Meetings
Feb 16-17, 2010

To Whom It May Concern:

This communication serves as my input to the public meetings referenced above regarding TDOT's preparation of a Transportation Planning Report (TPR) for US64 through the Ocoee gorge. The project is designed "to implement a safe, reliable, and efficient east-west transportation route between UT411 and SR68 in Polk County, TN that will both improve regional transportation linkages and preserve environmental attributes." The Citizens Resource Team Vision Statement mentions that the project "should address the unique safety, access and traffic flow issues caused by the different types of traffic and corridor users, as well as the difficult topography in the Ocoee River area. The project should creatively minimize adverse impacts to the human and natural environment, preserving unique attributes of the Cherokee National Forest (CNF), Ocoee River, and regional cultural resources." The project claims also that the goals of the Appalachian Regional Commission should be met. Deficiencies with the current roadway include lack of adherence to "National Truck Network design standards", lack of shoulders and guardrails, minimal site distance, lack of detours, and obstruction of passage due to accidents, inclement weather, and rock slides. It is noted that there is a mix of user needs, due to nearby recreational opportunities, higher accident rates than normal, and topography and road limitations.

In order to meet all of these goals, it is necessary to fully understand the limitations of the topography and geology. One cannot both "preserve environmental attributes" and build a new road through undisturbed forested lands. The geology is such that pyretic rocks will be disturbed, resulting in irreversible acidification of impacted streams and increased costs that are not currently accounted for in any of these options. Please see detailed discussion below. These facts are unavoidable despite what will undoubtedly be TDOT's best efforts at reducing impacts. New road construction will inevitably disturb pyretic rocks and mitigation is a process that is required both during and long after construction. Mitigation is also merely a process for decreasing these effects and cannot fully prevent most or all of the short- and long-term impacts of stream acidification.

Further, new roadbeds will not be immune from rockslides that are currently plaguing many

roads through our Appalachian mountains. Again I realize that TDOT will attempt to design any new alignment to minimize these effects and that newer road construction has improved since US64 was built. However, the rocks in this area are fine-grained and have cleavage and bedding planes at high angles. Thus they are not designed to weather in the open in humid climates and therefore will not be stable over the long term in any configuration. In fact, the best method for making the most stable roadbeds involves lowering the slope on roadcuts. This engineering method, however, exposes even larger swaths of rocks, which will (1) cause more weathering of pyretic rocks, (2) will inhibit passage over the highway by native biota, (3) increase disturbance of the wilderness and forested area and (4) will degrade the visual landscape of the entire area. Thus building a new road presents real problems for the stated goals of “preserving environmental attributes” or “minimizing adverse impacts to the human and natural environment, and preserving unique attributes of the Cherokee National Forest (CNF), Ocoee River, and regional cultural resources.”

I suggest that of the proposed options, Options 2 and 2a, which involves improvements to US 64, best meets these requirements. Options 6 and 7 are particularly egregious because they disturb large swaths of land to the south of the existing alignment. Option 3 is probably the worst, as it cuts of the Little Frog Wilderness from the rest of the contiguous forest. Options 4, 5, 8 and 8a are closer to the existing alignment but ultimately will disturb equally large swaths of land just to the north of the gorge. All of these areas have extremely steep topography and many stream crossings that mean construction which is difficult, costly, and environmentally destructive.

I am fully convinced of TDOT’s abilities to carry out the improvements in Options 2 and 2a, and that negative impacts to the community and the environment can be minimized. It is claimed that these improvements might take 4-8 years. Since it is also likely that building a new road would take this much time, I don’t consider this to be a roadblock. I suggest that TDOT should request maximum state and federal support to complete the job in less time. I am also fully confident that TDOT can utilize truly advanced engineering techniques to complete this work. This area is probably the most sensitive in the state, and deserves our highest consideration. By advanced techniques, I mean those which have been used in the western US and in Europe, and not the normal status quo for road projects in TN. I also suggest that a few of the existing alternative routes used by locals using a variety of county and state routes (not the “official” detour), should be improved before the US64 work is undertaken. This would provide alternatives for local people, improved access to forest lands, and still maintain the wild character of this area.

The February workshop claimed that the improvement approach would not meet the National Truck Network (NTN) or Appalachian Regional Commission (ARC) standards, and would not therefore receive ARC funds. I don’t understand why the ARC and the NTN should exert such a stranglehold on our construction approaches. I don’t find complying with these standards to be very “context sensitive” to local needs. I suggest that instead, TDOT and our TN government should explain the need for preservation of the wild character of this area and lobby the ARC for funds, regardless of ARC’s 1960’s era standards. I realize this will take extra creativity and

effort, but I really think it is worth it. Many things are possible if you simply ask and make a good case when you do so.

Finally, I think that the true economic development of this area does not lie in manufacturing and “connection” to eastern ports. We need to face our new economic reality – we don’t build things in America anymore, and another road through the mountains will not change this fact. My dad and my uncles were machinists and skilled workers in the Midwest. Most of them lost their jobs in the 1980s, and only a few remain today. Those jobs are not coming back. As such, the Economic Development and Transportation Study is flawed. The real economic development in this area lies in attracting people like me to this area for recreation. If we destroy it with 4-lane highways and highways through the forest and wild areas, then folks will no longer want to come here. We need to preserve what we have.

Thank you so much for listening.

Sincerely,



Melanie A. Mayes, PhD

Detailed Discussion of Geological Issues, from July 2009 Comment on Context Sensitive Solutions Process

Any of the proposed “build” options will involve traversing a complete section of the Ocoee Supergroup, which has both physical and chemical features that contribute to acute (i.e., during road building) and chronic (i.e., after road completion) problems in the roadbed itself and in the watershed. There are two major (acute and chronic) geological issues associated with road construction in this location: slope failure and acid-drainage. The Ocoee consists of three major lithologies (rock types) of metamorphosed sedimentary rocks, a fine-grained phyllite, a coarse-grained metagraywacke, and a very coarse-grained metaconglomerate (Hatcher and Milici, 1986). Primarily within the fine-grained phyllite, the Ocoee contains significant proportions of pyrite- and pyrrhotite-containing rocks that produce sulfidic acid drainage when contacted with water (2003 DEIS; Hatcher and Milici, 1986). In addition, the fine-grained phyllite tends to weather quickly, has decreased competency, and is thus prone to slope failure (2003 DEIS; Hatcher and Milici, 1986). Both of these chemical and physical issues are exacerbated by exposure of fresh rock materials, and since any of the “build” options will result in significant exposures of fresh minerals, at this point all of the “build” options are approximately equal in terms of potential impact to the area. Note that below I will refer to the 2003 Draft Environmental Impact Statement (2003 DEIS) to provide comments regarding the impact of any potential road construction to the geology of the area and any impacts to stream water quality. I

understand that the current process is different in some ways from the 2003 DEIS, but the effects and costs of any of the “build” options can be readily gauged by examining the 2003 DEIS.

Physically, the fine-grained rocks are intensely folded and have steeply inclined cleavages and/or bedding planes with respect to horizontal (i.e., roadbed) orientations. Because the cleavages and bedding planes are steeply inclined, and because the rocks are fine-grained and weather readily, the phyllite facies are very subject to repeated slope failure. Many good examples of this are found north of Newfound Gap in the Great Smoky Mountains National Park where once vegetation was removed from these rocks, soil eroded away leaving nothing but exposed rock. As described in the 2003 DEIS, potential impacts that could result from rock slope instability or rock fall include:

- Damage to vehicles,
- Damage to roadways, which may slow traffic or close single or multiple lanes of highway,
- Injury or death to highway users,
- Economic loss due to closure of the roadway, and
- Potential discharge of hazardous substances should transportation vehicles be damaged and spill materials onto the highway.

Extreme precipitation events (e.g., hurricanes and intense storms) which frequent the area will exacerbate slope failure occurrences. These events are intensified in the mountains due to high precipitation, greater intensity, and a greater range of temperatures in comparison to the Valley and Ridge and the Piedmont geologic provinces (where most of us live). In addition the permeability (i.e., the conductivity of water) of these fine-grained units is quite low because of their small pore sizes, which sometimes results in perching of soil water during extreme precipitation events. Perching of water can also contribute to slope failure. In addition, freeze-thaw action associated with wet or perched zones can continue to decrease the competency of the rocks over time and result in continued zones of weakness that may be subject to repeated slope failures. A good example of repeated slope failures in highway lineages through sloping rocks in a mountainous region is the I-40 gorge near the Pigeon River between Newport TN and Canton, NC (2003 DEIS p.4-11). One of the major ways to prevent slope failure is to build wide cut-backs of low angles, e.g., a 2:1 slope. The 2003 DEIS notes that each slope would have to be handled “on a case-by-case basis” (p4-11). The problem with this solution, other than the expense involved, is that in the Ocoee Gorge is that larger cut-backs will expose larger areas of acid-containing rock and produce larger volumes of acid-containing rock for disposal. The 2003 DEIS notes the balance that will have to be maintained between considerations for slope stability and acid drainage (p 4-11). In addition, of course, large cut-backs also impact the visual environment of the area which is important here due to the proximity of recreational opportunities. From my experience traveling the forest service road up to Big Frog Wilderness Area, the area is extremely steep. Any road construction, particularly a four-lane divided highway (which has not been eliminated from consideration), will expose huge volumes of rock and devastate the natural environment of a large area that is currently a wonderful, natural place.

Chemically, the fine-grained materials have higher proportions of pyrite and pyrrhotite, both of

which are iron sulfides (2003 DEIS; Hatcher and Milici, 1986). When these materials contact water they produce acidic sulfide drainage. It is notable that the devastation of nearby Ducktown, TN, is a result of industrial production of initially, iron ores and later, sulfuric acid, produced from a high concentration of iron sulfides in the local rocks. A good example of acid-drainage exacerbated by road construction is the pollution of the North River associated with construction of the Cherohala Skyway (TN165) from Tellico Plains TN to the NC state line. The 2003 DEIS spent a considerable amount of space (Appendix B is 8 pages long) describing the importance of the acid drainage issue and providing a number of potential remedial options that will be necessary during and after construction. The 2003 DEIS concludes that their proposed actions will be sufficient to mediate the effects of road construction on the Ocoee (and possibly Hiwassee) watershed(s). The 2003 DEIS also makes a number of claims that “modern” road construction in which these effects are planned for results in much less drastic effects to water quality as were observed in the past. Professionally, I have no doubt that this is true, but these statements do not tell the entire story. It is essential to remember that the proposed *mediation* schemes are exactly that and nothing more – they ARE the best management practices (BMPs) of the current times and as such they are designed to *mediate to the best of their ability* the impacts of road construction and existence of a new road – but that they are NOT a silver bullet to ensure that there will be no effects to the watersheds. In fact, strong storm events will occur both during and after construction. These events will wash sediment and acid-containing chemicals into the Ocoee/Hiwassee watersheds. The larger the roadcuts, the more volume of rock exposed, and the larger volume of acid-containing waters that drain into the watersheds. As described in Appendix B the Tennessee Department of Transportation (TDOT) will add lime to the streams and to the massive piles of rubble generated during construction (“encapsulation” method) (2003 DEIS). TDOT will spend enormous amounts of dollars and time trucking the most acidic piles of rock (after testing) to a storage area away from the watershed where it may be treated. But where would such a storage area be and how large would it need to be and how many truck trips will it take to move the rocks to such a location? Further liming is a very temporary solution, because once the carbonate is exhausted, the acidic pH will return with time. As noted in the 2003 DEIS, “Results of the neutralization treatments showed temporary improvements in water quality, benthic macro invertebrate community structure, and fish survivability; however, pH fell to pre-treatment levels immediately following termination of chemical treatments.” (p.4-14). This implies that continued remediation will be required, and observation of other road construction projects suggests that decades of continued remediation will be required. Essentially, acid drainage will continue until most of the sulfuric acid is leached away and the outer surfaces of the reduced iron minerals are oxidized to Fe(III). The act of blasting the rocks will exacerbate this problem because it will drastically increase the surface area of the rocks and expose even larger volumes of rock to water. A road through these types of materials has never been constructed without significant acute and chronic effects due to acid drainage. This one runs through the entire Ocoee series and is therefore not a trivial example of the issue. Will TDOT have the funds and personnel to maintain the long-term monitoring necessary to prevent the chronic acid-drainage problems? Will the funds be available to perform the necessary remediation to minimize observed chronic impacts? Will TDOT commit to a long-term monitoring and remediation plan *before* the road is constructed? Specific details are

required because this area is a treasured natural area used by hikers, horseback riders, and rafters, and is an ecological refuge for a number of wild plant and animal species.

As noted in the 2003 DEIS, it will take a good deal of field and lab work, consisting of among other things water and soil sampling, geochemical analyses, predictive computer modeling, drilling, photographing, surveying, and analysis to decide between the various loosely considered routes and to pick the least impactful “build” option (p. 4-12 2003 DEIS). Of note is the fact that the 2003 plan crossed approximately 30 streams (2003 DEIS). It would therefore be likely that approximately 30 streams would be traversed by any revised corridor, and 30 streams that would need to be monitored and possibly remediated for the effects of acid drainage. Because of the importance and sensitivity of the area due to the outstanding natural resources of the Ocoee River, Cherokee National Forest, and Big and Little Frog Wilderness Areas and due to the tremendous potential for tourism in the area, such an effort will have to be undertaken with great care, professional scholarship, and research dollars. This in and of itself is the first drawback to all of the “build” options, and it is a significant limitation considering the state of our economy and fiscal resources and the backlog of road maintenance that already exists in our state and nation.

References:

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