

## ***MEMORANDUM***

DATE: March 20, 2002

TO: Gary A. Davis, Esq.

FROM: Ian M. Lockwood, P.E.

RE: Review of the DEIS (Draft Environmental Impact Statement) for Route 475  
(Knoxville Bypass)  
GJ#16650.01

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### **Does the DEIS address its own stated need and purpose?**

From Section 1.E.2, the “need” for the Knoxville Bypass has to do with the bypass’s ability to quickly move large numbers of motor vehicles in the face of what appears to be huge increases in motor vehicle-dependant development.

In Section 1, the DEIS points out its inability to accurately predict the consequences of highway building in this area. For example, the DEIS states that the forecast for 1985 for I-40/I-75 was 35,000 motor vehicles per day, yet the actual result was 75,000. The current DEIS’ forecasts indicate that there will be 206,900 motor vehicles on I-40/I-75 between Papermill Road and Hollywood Road. The DEIS states that 16 lanes would be needed in this section but that such a widening is infeasible. The DEIS also points out that its growth estimates are “conservative” and historically forecasting has underestimated increases in motor vehicle use by, “as much as 50%.”

Consequently, Section 1.E.2 inadvertently demonstrated that the DEIS’ forecasts are unreliable. But further examination indicates that they are flawed. The DEIS forecasted more motor vehicle use than can be accommodated. By definition, the rate of motor vehicle flow cannot exceed the motor vehicle carrying capacity of the highway. This is analogous to a glass bottle with a capacity of one pint of liquid water. It cannot hold more than one pint. I-40/I-75 could never carry the forecasts because it does not have, and will not have, the motor vehicle carrying capacity to do so. Therefore, the forecasted increases in motor vehicle use cannot come true. Therefore, the DEIS’ forecasted increases in motor vehicle are false.

Considering the false results, the DEIS’ model that produced the forecasts deserves some focus. Though the information was absent from the DEIS document, the model likely

assumed that the motor vehicle carrying capacity of network would be augmented by one of the proposed highway bypasses. Therefore, the DEIS' forecasts are hypothetical. The value of the entire DEIS is compromised because the forecasts, upon which the DEIS relied so heavily, requires one of the new highway bypasses to be built. It becomes a self-fulfilling prophecy. It is also misleading.

Similarly, the DEIS' dire forecasts about safety, travel time, motor vehicle miles traveled, and motor vehicle use without the highway bypasses amount to scare tactics, because the forecasts upon which these assertions are made cannot come true.

The DEIS increasingly lacks credibility when, on one hand, it predicts "extreme congestion" without the bypass due to huge, yet "conservative," growth rates in motor vehicle use and, other the other hand, it predicts diversions of tens of thousands of motor vehicles from I-40/I-75 and other parts of the network. A simple comparison of Figures 1-2 and 1-4 indicates that I-40/I-75 is at "LOS F" in 2005 and 2025 with and without the bypasses in place. There was no change.

Later on, the DEIS makes the impossible claim that the highway is functioning at "136% above absolute capacity" during peak times. This is like saying the glass bottle is functioning with, "136% more water in it than can actually fit in the bottle." It's impossible; the bottle had to have had a capacity that was at least "136% above" the original estimate of its capacity. Consequently, what is more plausible is that the DEIS is in fundamental error and that it has seriously underestimated the motor vehicle carrying capacity of the highway. Again, the DEIS' results with regard to levels of service, motor vehicle capacity, etc. are highly questionable.

From Section 1.E.1, the purpose of the Knoxville Bypass is "to provide a transportation facility that will improve the regional transportation network in an area north and west of Knoxville ..." The remainder of the Section on "purpose" lists various desirable-sounding predictions about safety, levels of service for motor vehicle users, and travel speed that support the proposed bypass.

The first sentence of the report states that the proposed Route 475 is a Knoxville "Beltway" (a highway bypass around Knoxville). The first sentence of the DEIS' summary states that, "The Tennessee Department of Transportation (TDOT) is proposing to construct a full access-controlled, divided highway that connects I-75 south of Knoxville with I-75 north of Knoxville." About four of the 200 or so pages of the DEIS were dedicated to all of the non-bypass options (less than the length of the DEIS' Table of Contents). The purpose and result

of the DEIS were clear from the beginning. The only viable option was going to be a highway bypass. By the time the reader gets to Section 1.E, the “purpose,” the purpose of the exercise is very clear.

**Does the project’s stated purpose and need align with the goals of the community?**

It is unlikely that the DEIS’ and the project’s purpose and need align with those of the community. The General Plan update by the Knoxville-Knox County Metropolitan Planning Commission (MPC) contains all sorts of visions, which relate to quality of life, economic, social, and environmental well being of the area. Typically, bypasses violate these visions in the long run by: i) hurting the existing commercial centers; ii) encouraging suburban sprawl; iii) reducing the viability of public transportation; iv) increasing vehicle miles traveled (VMT); v) etc.

The DEIS spends a great deal of time claiming that this particular highway bypass will be different and it will actually reduce (VMT), help public transport, reduce travel time, and increase safety. The DEIS relies on some shaky, theoretic, model to support its claims and fails to produce any comparable real-life bypasses that actually achieved all these wonderful things. Though many of the DEIS’ claims sound plausible on the surface, the likely outcome is that the bypass will reshape the development and travel characteristics/habits of the area into the sprawling future that is typical to highway bypasses. Consequently, the DEIS and its bypass projects are likely not in alignment with the community values, assuming that the MPC’s visions are truly reflective of the community.

**Does the traffic study specifically, its scope, adhere to standard travel forecasting methods?**

Determining if standard travel forecasting methods were used is impossible because the details of the methodology and all the assumptions were not contained in the DEIS documentation. However, as was pointed out earlier, the results of the modeling were seriously flawed (e.g. forecasted motor vehicle use above the motor vehicle capacity of the highway), as were some of the underlying assumptions (e.g. overly low estimates of motor vehicle carrying capacities.)

The DEIS and the bypass solution seems to have relied a great deal on the influence of, and information supplied by, the Knoxville Area Chamber Partnership, the local chamber of commerce. The DEIS alludes to this information as the basis for its traffic figures justifying the Beltway without referencing a report or document. We obtained a copy of the 1999 report that was relied upon, entitled, “Case for a Knoxville Area Beltway,” from the Knoxville Area Chamber Partnership Transportation Committee. This raises several red flags. Typically, Chambers of Commerce are interested in the economic welfare of their memberships and not the general public welfare. A good example of this occurred when the Chamber of Commerce lamented, in their bypass support document, that, “Knoxville development over the past 20 years has occurred haphazardly in a narrow strip along I-75/I-40,” and then claimed that the bypass, “opens previously inaccessible property and creates opportunity to regain control of zoning and long-range community planning issues.” The Chamber

recognizes the area's inability to control sprawl along interstates and then wants the public to quickly buy into another interstate that will open up "inaccessible property" (e.g. get more sprawl) with a hollow assurance of an "opportunity" to control zoning and land use. This "opportunity," in actuality, would be made hugely more difficult with the bypass in place. Obviously, controlling sprawl would be easier without the bypass. Despite, their obvious Chamber-like interests, the Chamber's information played a large role in the rationalization for the bypass in the DEIS.

The current MPC General Plan's land use policy speaks of a land use pattern that will sustain Knox County's excellent quality of life. In many places like Knoxville, conventional patterns of development rely on interchange-driven commercial uses as their growth engine. Several major problems appear with the sustainability of this pattern. As Knoxville is experiencing with its existing interchanges, the new interchanges will develop up and perpetuate the "need" for more freeways and interchanges. The development itself will exhaust the interchanges' intended functions, as expressed in the DEIS, and the linear nature of the development will discourage the compact development which is the goal of the Knox County Growth Plan under Tennessee's Public Chapter 1101.

A useful model is Charlotte, North Carolina, where there is a similar radial/linear growth pattern to Knoxville's. Circumferential travel has historically been difficult in Charlotte, as it is in Knoxville. Charlotte has been constructing a bypass (I-485), similar to what Knoxville is contemplating. Despite the best efforts of Charlotte, a pattern of decentralized strip development has followed the bypass. As new sections of the bypass open, their peak hour problems are the same or worse than the routes that the bypass was built to relieve. Similar patterns occurred in Atlanta decades ago with I-285. Many people in that region are now calling for the construction of an additional outer bypass.

These patterns are not unique to Charlotte, Atlanta, and Knoxville. They are a result of induced motor vehicle use. A leading source of research in the field, the University of California at Berkeley, found that, for major freeways, the induced travel within five years amounts to 91% of the new motor vehicle carrying capacity. Research on induced travel in the US Mid-Atlantic region, reported to the Transportation Research Board, arrived at comparable conclusions. In a review of Travel Demand Modeling (2001), Norm Marshall and Brian Grady concluded that conventional travel demand models fail to "account properly for induced traffic that will be attracted to new roads" and "this biases the model against investment in strategies favoring transit, walking, bicycling, and transit-oriented development." They looked at a five recent studies on induced travel and concluded that, "adding a new lane of capacity adds, on average, traffic equal to 83 percent of what is currently on the adjacent lane of traffic." The Eno Transportation Foundation sponsored a recent symposium of more than forty experts in planning, environment, land use, travel demand modeling, and research which said, "rather than dogmatic arguments about induced demand, public decision making would be improved if forecasting processes were improved to include realistic land use and population income growth effects" (i.e., induced travel). The Federal Highway Administration concluded, in a recent research paper, that "the inducement of travel due to highway expansion is an issue that needs to be and can be addressed," and it provided a simple spreadsheet methodology for computing induced travel; with ranges supportive of the research.

Induced travel has been recognized as an important environmental impact by the courts. A Federal Court in North Carolina noted that it was "common sense" to expect that a new road would induce new development (*Mullin v. Skinner*, 1990). A Federal Court in Illinois found an EIS to be inadequate

because it did not account for the feedback effect of induced travel (*Sierra Club, Illinois Chapter v. US Department of Transportation 1997*). A conclusion was, in the absence of an analysis of induced travel, the environmental documentation “does not adequately justify its reliance on projected needs and this fails to observe the procedures required by law.”

Notwithstanding the previous concerns about the modeling used in the DEIS, the methods used for forecasting motor vehicle use and estimating savings in travel time are highly suspect due to the unlikely inclusion of induced travel in the DEIS forecasts. No mention was made of induced travel calculations in the DEIS. Hence several of the DEIS’ purported benefits of the highway bypass will likely not materialize. For example, the small reductions in motor vehicle use predicted along I-75/I-40, would be eclipsed by induced travel. Consequently, the highway bypass “need and purpose” is on shaky ground.

The basis for much of the Chamber’s/DEIS’ rationalization came from “Tab 3” of the Knoxville Chamber Partnership report, which contains the projections for traffic on various sections of I-75/I-40. The tables in Tab 3 show a linear increase in motor vehicle use each year from 1999 to 2019. Each year after 1999, the expectation is that 5,787 more daily motor vehicle use will take place between Papermill and I-640; and 5,147 more between West Hills and Papermill. The acceptability of the Chamber’s and the DEIS’ choice to linearly perpetuate past trends in motor vehicle use in this manner is questionable, particularly in an environmental report. First, this trend cannot continue due to the real motor vehicle carrying capacity limits, acknowledged in the DEIS. Second, even if it were feasible to continue the trend, would supporting the trend through highway building be responsible?

### **Was a full set of alternatives fairly evaluated?**

Despite the focus on transit on the web page of the Knoxville Urban Area Metropolitan Planning Organization (e.g. before and after pictures of dedicated public transit facilities, etc.), the potential of transit in the DEIS was considered low and it was dismissed. It is interesting that the prospects of public transportation will always be low (and increasingly lower) if low density, highway-dependant, suburban sprawl is continually supported through projects like the DEIS’ proposed bypasses. It was truly amazing that the DEIS actually suggested that the highway bypass would help public transport when so much of the DEIS is dedicated to demonstrating that the comparative advantages to private motor vehicle use are so high.

“Reduced” facility design, transportation system management, and altering existing highways were all dismissed as well. The non-highway bypass alternatives, that were considered, did not meet the purpose and need for the project. This should come as no surprise because the purpose and need for the project was to build a bypass. No other outcome was likely from this DEIS.

From the perspective of building a bypass in the project area, adequate bypass options were likely evaluated. However, to answer the question, “Was a full set of alternatives fairly evaluated?” one would have to first ask, “Was the problem defined correctly?” From a broader perspective, it is easy to imagine a planning effort with a larger or different study area, a greater number of community concerns, a greater number of number of tools on the table, and a vastly different outcome. So there are two answers. Yes, if the intent of the DEIS was to build a highway bypass and, no, if the intent was to develop the area in a sustainable and responsible way.

### **Is the project cost effective? Do the benefits support the costs?**

Twenty-five years from now, assuming that one of the bypasses is built, the motor vehicle use will be much higher than it is today and the problem will have grown to include more square miles of sprawl. The current generation of decision makers will have managed to spend hundreds of millions of dollars promoting the inefficient use of land and energy through highway-dependent development. The next generation's burden will be magnified due to the unsustainable outcome that will accompany the DEIS and the bypass. The current generation of decision makers cannot hide behind the DEIS and claim that the best technical information available in 2002 directed them to build highway bypasses, because they know better and probably always have known better. Any decision to build a bypass will be a conscious decision in favor of a sprawl vision and increasing motor vehicle dependence.

The capital costs of the bypasses are high, but they also represent opportunity costs. \$250,000,000 to \$400,000,000 could go a long way to further a variety of public goals that would help the area reach a more sustainable future. The social and environmental costs of the bypass, the accompanying development, and the motor vehicle dependency have not been calculated. The DEIS purports to be about building the area out of congestion with a highway bypass, a highly improbable pursuit. However, the DEIS is really about reshaping the development pattern and travel behavior of the area. The DEIS and the bypass represent a highway-oriented development vision for the area. Building the bypass is likely the biggest community design decision that the area will make in the next decade or so. In fact, Section 2.6 of the DEIS, which is about "economic needs," provides a very kind description of the sprawl vision that goes along with the bypass, complete with predictions of "accompanying cultural benefits" of sprawl.

Consequently, there is no point in trying to answer the question about the project being cost effective or the question about the benefits supporting the costs. The bigger question is, "Will decision makers favor a sprawl vision that began some time ago with several rounds of highway building and sprawl and will continue with an expensive highway bypass and an accompanying new round of sprawl?" It is the difference between following a community vision that favors sustainability/smart growth and a vision that perpetuates unsustainable trends in motor vehicle use and land consumption.

The DEIS goes to great lengths to state that the proposed bypass is an independent project. However, a reading between the lines indicates that the area is sliding on a slippery slope in which past highway projects and sprawl lead to this DEIS and bypass, which will lead to more of the same in the future. The statement of independence indicates that the DEIS wants to give an illusion that this bypass is somehow distinct and disconnected with the unsustainable trends that have gripped the area up until now, and by all indications in the DEIS will continue to grip the area in the future. It is ironic that the DEIS makes assertions about long term energy conservation, increases in safety, and increases in economic success as a result of the bypass, while it tries to contain any obvious extensions of the highway/sprawl vision, which it is clearly a part of.

Consequently, from a cost-benefit perspective one also needs to consider the relative feasibility of switching to a sustainable vision following the huge public investment in the bypass and the sprawl related changes that will accompany it. From the discussion about the forecasts in the DEIS, one is

lead to believe that the area has been very ineffective at land use control on sprawl and will continue to be ineffective for a long time to come. The building of a bypass would indicate that there is a similar lack of transportation control on sprawl in the area. It is no wonder that the DEIS wants to limit the discussion on the independence of the bypass project, because if it did not, the logical extensions of the highway/sprawl vision would likely paint a truly ugly picture that nobody would like, killing the bypass project. Consequently, switching visions with this decision and not placing the burden on the next generation of decision makers would be fortunate.

### **Other Observations**

Given that DEISs are supposed to be objective and inclusive of many perspectives, an examination of the neutrality of the language used in the transportation sections was done. The DEIS' language indicates a bias and a predisposition toward favoring the real or perceived needs of motor vehicle users over other considerations. Though the transportation profession uses much of this language commonly, the bias needs to be exposed so that regular readers of the DEIS can understand the bias and, thus, be able to evaluate the DEIS and its recommendations more objectively. Combined with other factors about the completeness and objectivity of the DEIS, the biased language likely contributed to the DEIS' recommended highway bypass direction for the area and away from a more environmentally sustainable direction.

“Improve,” and other variations of that word, were widely used in the DEIS. A typical example is in Section 2.A, where the DEIS states, “...assumes that the existing roadway system would remain with planned and programmed improvements implemented as scheduled.” Likely the changes inferred by this DEIS statement include adding through lanes, turn lanes, canalization, or other means of increasing motor vehicle carrying capacity. “Improvement” implies making the situation better. However, more often than not, such changes make the situation worse from many other perspectives. For example, pedestrians are required to cross a wider intersection when lanes are added; customer access to stores is decreased when on-street parking is removed in front of the stores; more cars pass people's houses as more motor vehicles are accommodated on, or attracted to, the street; impervious surfaces increase as more land is paved; aesthetics being ruined; natural environment is lost; etc. Using a subjectively charged term like “improvement” in these circumstances indicates a bias toward motor vehicle users and their mobility and against the other stakeholders and considerations. Using biased language is also unnecessary because objective words are readily available, such as “modification” or “change.” Using objective language allows readers to make up their own minds, whether the changes or modifications are indeed improvements once all the issues and stakeholders' interests are considered. The language does not predispose the reader to the value sets and predispositions inherent in the language chosen by the authors.

In the Summary, the DEIS states, “The segments that follow existing highways will identify any laneage improvements required as part of the alternative analysis.” Here the DEIS

equates “improvements” with “increases” in motor vehicle lanes. However, “improvements” does not mean “increases” and only people who understand or share the biases of the DEIS would realize that “increases” was meant. Again, more motor vehicle lanes may not be better from a variety of perspectives. Again, objective words readily exist, such as “increases,” which would allow readers to determine for themselves if these increases were indeed improvements once all the issues and stakeholders’ interests were considered.

In Section 1.3, the DEIS states that, “At this time, the proposed action is the only improvement under consideration.” By definition, an “improvement” is a good thing. The continued use of this biased language indicates the DEIS’ continual predisposition toward the motor vehicle interests and bypasses over a myriad of other interests and non-bypass options. Perfectly good, objective language exists, such as, “project, bypass, etc.”

“Traffic” is used throughout the DEIS. In addition to motor vehicle traffic, bicycle traffic and pedestrian traffic use the roads. Yet, in most occurrences, the DEIS uses “traffic” as an equivalent to “motor vehicle traffic” which makes the DEIS appear inclusive of more users of the street than the DEIS really is. Had the DEIS used “motor vehicles” or “motor vehicle traffic,” when that is what was meant, and had the DEIS used “traffic” when it meant all types of traffic, then the DEIS would be clear and more objective. The current choice of language underscores the attention that the DEIS gave toward motor vehicles, while giving readers the impression of a wider scope.

Roads have the capacity to achieve a number of goals and objectives such as: support adjacent businesses; host social activity; provide access to property; carry pedestrian traffic, motor vehicle traffic, and bicycle traffic; add beauty; host recreation; etc. However, the traffic engineering profession typically, and the DEIS in particular, use a rather narrow definition of the “capacity” of a road; the maximum number of motor vehicles that can pass a point on the road over a set period of time (maximum rate of motor vehicle flow), usually measured over an hour. Though the use of the narrow interpretation of “capacity” is normal in engineering circles, the term’s continued use in the DEIS will likely cause either: i) some unsuspecting readers to develop the narrow impression that the only role, or the most important role, for streets has to do with how many motor vehicles they can process: or ii) focus the discussion on mainly that. Not addressing the narrow view on the role of streets also has the effect of concealing the DEIS’ focused and lengthy discussion of motor vehicle carrying capacity while leaving the other aspects relatively unaddressed. Using “motor vehicle carrying capacity” instead of “capacity” would be an objective means to let readers know what is really meant and, equally importantly, to remind and reinforce to readers that the DEIS’ focus is indeed quite narrow in this regard.

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