

SECTION 1: ENVIRONMENTAL IMPACTS AND POTENTIAL MITIGATION STRATEGIES

General Approach

TDOT considers the environmental impacts of transportation investments at a number of levels. The degree of analysis becomes more detailed over time as a project progresses through each stage of development:

- **Long Range Plan:** High-level identification of natural and cultural resources that could be impacted. Agencies responsible for managing the resources are involved in consultation at this stage; their comments are incorporated as appropriate and reported in the final Plan document. This is the stage that will be discussed in the remainder of this section.
- **Project Planning Report:** Screening of a project corridor to identify particular resources that could be impacted by various transportation solutions. This stage does not conduct environmental field work, nor does it conduct environmental technical studies since specific project alignments are not established.
- **Environmental Document:** Specific alternatives are evaluated in detail, including environmental field work to confirm the presence and exact location of resources that were identified through screening in the project planning stage. Resource management agencies are formally involved at this stage, with active roles that are clearly defined either by the National Environmental Policy Act (NEPA) or the similar state process known as the Tennessee Environmental Evaluation Report (TEER), depending on the source of project funds.

The Long Range Plan Stage

At this stage, transportation planners consult with resource agencies to identify potential environmental impacts of transportation decisions and potential strategies that can be used to mitigate any negative impacts. Historically, resource agencies have entered the transportation decision-making process at the stage where the environmental document is developed. Based on TDOT's current discussions with these agencies, limited staff resources may mean these agencies will still focus their involvement at the environmental document stage. However, the most recent federal transportation legislation encourages resource agencies to become involved at an earlier stage. The purpose of this initiative is to give the public and resource management agencies the opportunity to become involved as early as possible in transportation decisions. Early communication about potential impacts increases the chance that the impacts can be minimized or completely avoided as the project is developed. In some cases, the project can even be designed to enhance the valued resources.

Federal planning regulations allow the analysis to be general rather than location- or project-specific, although this is desirable if the approximate location can be identified at the long range

planning stage. To the extent that the analysis in this section is related to locations, it has been based on maps and inventories provided to TDOT by the various resource agencies. Other parts of the analysis have been developed from conservation and/or resource management plans provided by the same resource agencies, as well as generally accepted practice.

Within areas covered by Metropolitan Planning Organizations (MPOs), the Long Range Plan adopted by the MPO proposes a list of specific projects and programs. The identification of some environmental impacts can therefore be done somewhat geographically, although most projects in the metropolitan Long Range Plans are still at a corridor planning level and do not have specific alignments. There are also a set of “general” impacts and mitigation strategies that can be anticipated to occur in the development of any roadway project. Each of the following MPOs in Tennessee has or is developing a similar evaluation to include in its Long Range Plan: Bristol MPO; Chattanooga/Hamilton County/North Georgia Regional Transportation Planning Organization; Clarksville MPO; Jackson MPO; Johnson City MPO; Kingsport MPO; Lakeway Area Transportation Planning Organization; Knoxville Urban Area Regional Transportation Planning Organization; Memphis Area MPO; and the Nashville Area MPO.

The state’s Long Range Plan is primarily a policy document that recommends particular programmatic investments; it does not contain a specific project list as in the metropolitan plans. The evaluation of potential environmental impacts and mitigation strategies in this section is therefore focused on the following topics:

1. How the Plan’s Guiding Principles and high-level policies address environmental concerns.
2. General impacts that can be anticipated for major highway projects.
3. Impacts that can be anticipated as a result of the Plan’s various programs.
4. Impacts that can occur where transportation facilities adjoin or intersect particular special resource areas, such as state or national parks, wildlife management areas, and other sensitive areas.

1. The Plan's Guiding Principles and Policies

The state's current Long Range Plan places major emphasis on the relationship between the state's transportation system and the natural and cultural environment. In fact, this issue is addressed in two of the Plan's seven Guiding Principles:

Promote Stewardship of the Environment.

Maintain the integrity of communities and historical sites; minimize impacts on natural resources and conserve energy.

Build Partnerships for Livable Communities.

Provide early and ongoing opportunities for broad public input on plans and programs; work closely with local public and private planning efforts; coordinate land use and transportation planning.

The Plan also sets out 24 high-level policies that provide a framework for making decisions about TDOT operations and investments. Several of these policies are linked to the Guiding Principles that are cited above, and help to define how they will be put into practice. They address impacts on both natural and cultural resources, and are essentially self-explanatory:

- Identify, protect and/or acquire future right-of-way as early as possible to minimize negative impacts on communities and the natural environment.
- Promote and implement Context Sensitive Solutions, taking into consideration safety, mobility, community and environmental goals in all projects.
- Reduce the impact of transportation facilities on air and water quality, watersheds and ecosystems, working to identify and avoid or mitigate impacts to irreplaceable natural resources.
- Seek consistency among local land use policies and strategies, TDOT's efforts to manage access and provide transportation choices, and the state's efforts to preserve and protect private and public open space.
- Build new and stronger partnerships, public and private, to develop and finance transportation projects that maximize public investments *and support community and regional growth strategies.*
- Demonstrate leadership in environmental stewardship by reducing TDOT fleet emissions and fuel consumption, increasing TDOT's use of non-petroleum fuels and technologies and improving public awareness of these efforts.

In addition to the Plan policies noted above, TDOT has recently developed a department-wide Context Sensitive Solutions “Statement of Commitment” which begins with this language:

The Tennessee Department of Transportation (TDOT) uses Context Sensitive Solutions (CSS) as a process to plan, design, construct, maintain and operate its transportation system in order to establish and achieve transportation, community, and environmental goals. Context Sensitive Solutions balances safety and mobility and the preservation of scenic, aesthetic, historic, environmental and other community values. CSS is a philosophy of doing business that impacts both the project development process and project outcomes.

The Department is providing general training on the CSS approach to employees in divisions ranging from Planning to Design to Construction. TDOT is preparing employees to use Context-Sensitive Solutions in all phases of project development, as well as ongoing maintenance and operations. Many of the design and maintenance techniques are described later in this section as potential strategies for avoiding or mitigating natural and cultural impacts, since the purpose of CSS is to balance “transportation, community and environmental goals.”

2. General Impacts Anticipated from Major Highway Projects

There are some environmental impacts that are generally issues whenever a major highway project is developed, i.e. one which requires new or additional right-of-way. In fact, transit and rail projects may have similar impacts if they are establishing a new corridor or widening an existing corridor.

Impact types can be categorized as physical and socioeconomic.

Physical impacts can affect both natural and cultural resources. In some cases there is potential for a resource to be physically displaced; for example, a community building might be purchased and removed, or a group of trees that provide nesting for a type of bird might be cut, so that a highway can be widened. In other cases the resource would remain in place, but its quality or utility might be affected.

Typical physical impacts that can occur during highway development include:

- Land disturbance, including destabilizing/eroding banks
- Accelerating or polluting runoff into waterways
- Loss of wetland areas
- Blocking established patterns of wildlife migration
- Reducing size or quality of areas available for habitat of endangered/threatened species
- Increased noise levels
- Visual impact
- Increasing emissions in areas that are cited as non-attainment for air quality
- Loss of historic buildings or sites, or a change in their context

The strategies used to mitigate these impacts will obviously vary according to the geographic location as well as the degree of anticipated impact. Below is a list indicating the types of strategies that can be considered in additional detail as a project is further developed.

Where specific TDOT documents are referenced, copies can be obtained from the TDOT website (www.tdot.state.tn.us) or by requesting them from TDOT Comments, James K. Polk Building, 505 Deaderick Street, Suite 700, Nashville, TN 37243-0349. Phone 615.741.2848 Fax: 615.741.2508 or e-mail: TDOT.Comments@state.tn.us.

- Highways can be designed to reduce earth disturbance by emphasizing the goal of minimizing cut and fill.
- TDOT's recently completed Statewide Stormwater Management Plan outlines the steps TDOT will take to implement erosion prevention and sediment control materials and practices for state construction projects. A new chapter has also been added to TDOT's Environmental Procedures Manual that describes procedures and guidance the Ecology staff will use to identify and mitigate the impacts roadway projects have on streams, wetlands, and endangered species. For example, the documents provide instruction on low-impact design, as well as specific techniques to be used in streams, such as the use of log deflectors and weirs and the installation of vegetated riprap. They also provide guidance on techniques that minimize temporary construction impacts.
- Where wetlands are eliminated by a highway, additional right-of-way can be purchased to artificially replace the wetlands adjacent to the completed project. Wetland banking is another strategy, which purchases a certain acreage of natural wetland for preservation in exchange for the acreage eliminated by a highway project. Although the purchased wetland areas may not be in the vicinity of the highway project, this strategy is sometimes preferred because artificially constructed wetlands are not always sustainable.
- Where existing wildlife migration corridors are affected, highway designers can look for opportunities to incorporate safe wildlife crossings into the highway design. Where endangered or threatened species are present, the alignment might be shifted and/or specific design elements might be added to reduce impacts (such as noise) on the adjoining habitat.
- Highway-related air pollution might be partially offset by promoting use of lower-polluting vehicles and fuels.
- Noise may be mitigated with the construction of barriers, use of physical separation, vegetative buffers, or choices about pavement texture.
- Visual impact may also be mitigated by vegetative buffers, landscaping, or the inclusion of certain design elements in the project.
- By agreement with the State Historic Preservation Office (SHPO), TDOT has not included any potential mitigation strategies in this document for impacts to historic or archaeological resources. SHPO notes that federal regulations protecting those areas emphasize avoidance, not mitigation.

Socioeconomic impacts

Environmental justice. An important consideration in highway projects is the impact on low-income and minority citizens. There is growing awareness that major highways are often located in areas of a community where low-income and minority citizens live and operate businesses, and that over time those groups often come to bear a disproportionate burden of the impacts of a community's transportation system. Conversely, access to those highways is often less available to disadvantaged neighborhoods, in effect denying them the benefits of the transportation system.

A separate report published as part of the Long Range Plan has been devoted specifically to evaluation and discussion of environmental justice issues that may arise as the Long Range Plan is carried out.

Cumulative/secondary impacts. As described by the Federal Highway Administration, secondary effects are those that are "caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable."¹ These impacts may include changes in land use, economic vitality and population density. Not all changes are necessarily negative ones, but they must be considered during environmental assessment. It should be noted that secondary impacts are listed in this section under the socioeconomic category, but there may also be changes to natural resources (such as water quality), floodplains, etc. due to changes in land use and population density.

Cumulative effects, as defined by FHWA, are impacts "which result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions. ...The cumulative effects of an action may be undetectable when viewed in the individual context of direct and even secondary impacts, but nonetheless can add to other disturbances and eventually lead to a measurable environmental change."

Determining the likelihood of cumulative/secondary impacts can be quite difficult. According to FHWA, "capacity improvements, additional interchanges and construction on new location generally have a greater potential for indirect effects than projects to upgrade existing facilities." In addition, they suggest that communities experiencing moderate to rapid development are more likely to experience cumulative impacts due to highway projects.

Mitigation of these effects – particularly impacts on the natural environment – is more likely to be possible if there are area-wide resource management plans for wetlands, air quality, water quality, etc. Those plans often define particular geographic areas that will remain undeveloped and retain their natural functions as habitat, pollution filters, etc. FHWA describes these areas as able to "absorb" specific impacts of growth as a way of balancing developmental needs with environmental protection.

¹ This and other FHWA citations in this discussion are from *NEPA and Transportation Decisionmaking: Secondary and Cumulative Impact Assessment in the Highway Project Development Process*.

3. Programs in the Long Range Plan

As mentioned earlier, the state's Long Range Plan is primarily focused on policies and programs, rather than specific project locations. However, it is still possible at a general level to identify potential environmental impacts of the programs outlined in the Plan, especially by considering the recommendations for the future direction of these programs.

The discussion below reflects positive impacts as well as adverse ones. In the case of adverse impacts, potential mitigation strategies are also identified.

A) Maintenance

- Continue to maintain Tennessee's existing highway system at current high standards.

ADVERSE IMPACT: Mowing, tree trimming, and use of herbicides can adversely impact native plants, reduce wildlife habitat, and affect stream temperatures. Prolonged use of gas-powered equipment (such as mowers) can also contribute to air pollution.

POTENTIAL MITIGATION: Native plants can be used in highway medians and other non-paved areas to minimize the need for frequent mowing. Certain plants may also be especially useful in filtering the pollutants typically found in highway stormwater runoff.

- Prioritize certain highways for regular shoulder sweeping, based on frequency and desirability of use by bicyclists.

POSITIVE IMPACT: Although this maintenance approach is intended to improve safety for bicyclists, it may also improve water quality by resulting in less polluted stormwater runoff.

- Accelerate replacement of public transit vehicles, including city buses.

POSITIVE IMPACT: Newer buses are likely to have cleaner engine technology than the vehicles they are replacing. Even more benefit can be realized if adequate funding is available to replace an older diesel bus with an electric or propane-fueled bus.

B) Operational strategies

- Expand the use of the Intelligent Transportation Systems (ITS) approach, which seeks ways to optimize existing highway capacity rather than adding more lanes. Examples include incident management programs, signal synchronization, and real-time traffic information.
- Also expand efforts in Travel Demand Management (TDM), such as carpool/vanpooling programs, and employer policies such as telecommuting and flexible work schedules.

POSITIVE IMPACT: In addition to avoiding the adverse impacts associated with widening a highway, these strategies can help improve air quality by reducing transportation-related emissions. There may also be socioeconomic benefits from reducing the number of person-hours spent in highway congestion.

C) Transit

- Increase state operating support to existing rural and urban transit services.

POSITIVE IMPACT: There are socioeconomic benefits when citizens have more and better travel options available. These services provide people with access to employment and shopping, providing broader participation in the state's economy. Communities are also strengthened when more citizens are able to reach and participate in neighborhood activities, including civic organizations and volunteering programs.

- Provide capital funding assistance for four new urban high-performance transit corridors.

POSITIVE IMPACT: Improvements to transit service may help transit gain a larger share of future trips made, and therefore an overall reduction in transportation-related emissions. High-quality transit service also tends to attract surrounding development that is more compact, resulting in less overall land consumption. As noted above, there are socioeconomic benefits in providing more and better travel options to citizens who do not own a car or cannot drive.

ADVERSE IMPACT: New or enhanced transit service may require additional right-of-way, which potentially impacts natural and cultural resources and in an urban area, is likely to displace homes and businesses. As with any other high-volume transportation facility, there may also be significant noise and visual impact.

POTENTIAL MITIGATION: It is likely that many of the strategies would be those described earlier under the heading of "General Impacts Anticipated from Major Highway Projects." As noted in that discussion, establishing a major transit corridor often results in many of the same impacts as a highway corridor.

D) Rail

- Consider cost-sharing with railroads on projects that show strong likelihood of diverting some freight shipments from truck to rail.

POSITIVE IMPACT: Promoting rail as an important mode of freight transportation may help reduce transportation-related emissions that result from high volumes of thru-truck traffic in Tennessee.

ADVERSE IMPACT: Some improvements may require additional right-of-way. For adverse impacts, see those identified for general highway or transit projects.

POTENTIAL MITIGATION: Mitigation strategies would be the same ones identified for general highway or transit projects that require right-of-way.

- Work cooperatively with railroads on grade crossing improvements and other projects that improve safety and/or operations for state-managed transportation systems.

POSITIVE IMPACT: Grade crossing improvements reduce the number of fatalities and serious injuries resulting from collisions. Grade separations, especially at major highways, can reduce congestion on both the rail line and the intersecting highway.

ADVERSE IMPACT: Many grade crossing improvements can be done within existing right-of-way. Those that require additional right-of-way would have similar adverse impacts and potential mitigation strategies as general highway and transit projects.

E) Waterways

- Promote importance of waterways transportation in Tennessee and its relationship to the highway system.

POSITIVE IMPACT: The existing waterways system allows many oversize, overweight materials to move within and through Tennessee without severe physical stresses on highways and bridges. Barges also transport high volumes of bulk materials that, if carried by highway, would require major highway widenings to accommodate the vast increase in the number of trucks.

- Consider cost-sharing with other agencies for projects that show strong likelihood of diverting some freight shipments from truck to barge.

POSITIVE IMPACT: As with rail, promoting waterways as an important mode of freight transportation may help reduce transportation-related emissions by substituting barge shipments for some of the anticipated growth in thru-truck traffic.

ADVERSE IMPACT: However, barges also carry fuels and solvents that, if not handled properly, may actually add to the air emissions problem. Increases in barge traffic may also result in more accidental fuel spills and other water pollution concerns. Shoreline erosion may be accelerated by an increase in traffic on the state's waterways. As banks erode, water quality and wildlife habitat are also adversely impacted.

POTENTIAL MITIGATION: Increased effort could be put into enforcing existing regulations such as those regarding maximum vessel speeds, fuel handling, and shoreline vegetation management by landowners. Resource agencies are also actively promoting best practices for bank preservation and stabilization.

F) Aviation

- Continue current levels of support for Tennessee airports, programs and facilities.

POSITIVE IMPACT: The availability of air passenger and cargo service is an important factor in the local/regional economy of many Tennessee communities. Where passenger service is available, there are also socioeconomic benefits of having greater access to the nationwide network.

ADVERSE IMPACT: Development located adjacent to airports, particularly if it is residential, is adversely impacted by noise. Major commercial air service in Chattanooga, Knoxville, Memphis and Nashville may also contribute to the air pollution problems identified in these regions by the U.S. EPA.

POTENTIAL MITIGATION: Existing programs help Tennessee airports develop plans to recognize and avoid issues of incompatible land uses. In some cases, funding is provided to acquire nearby property where the noise impact is greatest.

G) Safety

- Continue to place a high priority on safety, emphasizing the reduction of fatalities and serious injuries. Where possible, use low-cost approaches that can be both effective and made widely available across the state.

POSITIVE IMPACT: There are clear socioeconomic benefits from saving lives, reducing the number of persons who are permanently disabled, and minimizing lost work time.

ADVERSE IMPACT: Certain installations, such as median barriers and guardrail, can block wildlife migration corridors. These installations may also reduce the aesthetic appeal of a corridor. Policies that require vegetation clearance for a specified “buffer width” on either side of a major highway can cause soil erosion as well as reducing wildlife habitat and aesthetic appeal.

POTENTIAL MITIGATION: Assess existing wildlife migration patterns before installing barrier materials. In special areas such as state parks, conservation areas, scenic highways, etc., consider using wood or painted barriers that blend with the surrounding environment. When establishing “clear zones” for vegetation, consider the posted highway speed and whether the buffer area exceeds the minimum required by state/federal regulations. Consider whether the

buffer area can be planted with a lower-growing type of native vegetation as a permanent solution, instead of repeated episodes of major, traumatic vegetation clearance.

H) Bridge rehabilitation and replacement

- Continue to repair or replace all local bridges in Tennessee that are considered structurally deficient; address backlog of bridges that are in need of replacement because they are functionally obsolete.

POSITIVE IMPACT: The program for structurally deficient bridges reduces fatalities and injuries, and ensures that emergency services, school bus transportation, etc. can continue to reach the affected portions of a community. The program for functionally obsolete bridges addresses situations where multi-lane highways suddenly narrow into a two-lane bridge. It therefore produces the economic benefits of faster travel time and reduced crashes at the location.

ADVERSE IMPACT: Construction activities can result in siltation, removal of aquatic habitat and related temperature changes.

POTENTIAL MITIGATION: Design the project in a way that minimizes bank disturbance and the physical footprint of the structure. Follow best management practices to control siltation during construction.

I) Transportation Enhancements

- Promote projects that benefit walking, bicycling, and the integration of transportation facilities with a community's character.

POSITIVE IMPACT: Walking and bicycling are healthy alternatives to driving a car for short distances, promoting physical activity as well as reducing emissions and gas consumption. Streetscaping and similar projects to enhance a transportation corridor can be of economic benefit (example: a Main Street revitalization) and add to a community's ability to attract new investment.

ADVERSE IMPACT: Unlikely, but possible. Most enhancement projects are minor and require no right-of-way or environmental permits. Major projects will be similar to general highway or transit projects in terms of adverse impacts and potential mitigation strategies.

4. Impacts to Special Resource Areas

General impacts from highway projects take on additional significance when a project crosses or adjoins a special resource area. In Tennessee, formally designated resource areas include state and national parks, national forests, state natural areas, wildlife management areas, and historic areas. State resource agencies have also been working together to identify priority conservation areas, particularly focusing on locations where a number of environmental interests physically coincide.

Project design is typically the principal issue discussed when highway improvements impinge on a protected area. One option to reduce impact to waterways is the use of bridges rather than culverts, where feasible. Transportation professionals may also make carefully considered decisions to use the flexibility that is available in most design manuals. For example, the standard lane width for a major highway is considered to be 12 feet; however, design manuals acknowledge that a narrower lane can be acceptable in some cases. In a special resource area, it may be desirable to use modified design standards in order to minimize the footprint of the project.

Visual impacts are especially important in parks and similar areas where the public visits. Guardrail, signage, etc. can be made of materials that blend with the surroundings in both texture and color; retaining walls might be made of timbers.

Road construction sometimes introduces non-native vegetation into a protected area, which may then threaten the sustainability of native plants. To help guard against this accidental transfer, specifications can be written to control the type of fill material that is used in the project. Road construction equipment can also be cleaned each time it comes on-site, to ensure that seeds are not carried in from other areas.

Maintenance practices can also be critical when roadways run through or adjacent to important habitat areas. Clearing vegetation is of course an aesthetic concern, but the frequency and timing of mowing/trimming is critical to ensure that seasonal food sources (such as berries and flowers) are available to wildlife.

A full inventory of special resource areas in Tennessee is available and is used by TDOT project planning staff at the stage where particular projects enter the screening process. For purposes of this section, resource areas have been noted below which intersect or closely border one of the statewide or regional strategic corridors shown in the state's Long Range Plan. Future development and/or widening of these corridors should anticipate the need for special mitigation, as described above.

Special resource areas that may be impacted by Strategic Corridors:

(Note: Wildlife Management Area is abbreviated as WMA.)

State Route 111:

White County: Hampton Crossroads WMA, Anderson Pond WMA

Corridor J (State Route 52):

Overton County: Standing Stone State Forest & WMA
Dale Hollow Lake (Corps of Engineers land management area)

US-79

Montgomery County: Dunbar Cave State Park
Stewart County: Fort Donelson National Military Park, Land Between the Lakes
Henry County: Paris Landing State Park, Holly Fork WMA, Big Sandy WMA
Carroll County: Jarrell Switch WMA

US-45E

Weakley County: Bean Switch WMA

US-45

Madison County: Col. Forrest V. Durand Wetland,
Pinson Mounds State Archaeological Area

US-64

Hardeman County: Whiteville Lake WMA
Wayne County: Eagle Creek WMA
Lawrence County: Natchez Trace Parkway and Laurel Hill WMA,
David Crockett State Recreational Area

US-412

Lewis County: Natchez Trace Parkway

US-51

Obion County: Gooch WMA

US-27

Rhea County: Whites Creek WMA
Hamilton County: North Chickamauga State Natural Area

US-411

Monroe County: Tellico Lake WMA
McMinn/Polk County: Cherokee National Forest, Gee Creek National Wilderness

US-25E

Claiborne County: Cumberland Gap National Park

Note: this corridor is itself a scenic highway for which a corridor management plan is underway.

I-26

Washington, Unicoi counties: Unaka Mountain Scenic Area

I-81

Sullivan County: Warriors Path State Park

I-75

Bradley County: South Mouse Creek WMA, Rogers Creek WMA, Candies Creek WMA
Campbell County: Royal Blue WMA

I-24

Hamilton County: Chickamauga & Chattanooga National Military Park

I-65

Maury County: Yanahli WMA

I-40

Haywood County: Hatchie National Wildlife Refuge
Madison County: South Fork Waterfowl Refuge
Henderson County: Natchez Trace State Forest & WMA
Cumberland/Roane counties: Mt. Roosevelt WMA
Roane County: Kingston Refuge WMA
Cocke County: Great Smoky Mountains National Park

SECTION 2: CONSISTENCY OF TRANSPORTATION IMPROVEMENTS WITH STATE/LOCAL PLANNED GROWTH

The state's current Long Range Transportation Plan puts new emphasis on the commitment to coordinate transportation improvements with publicly adopted goals and plans. The Plan approaches this objective from multiple perspectives.

1. Coordination with state and local partners can be viewed as an "environmental issue." As described in *Section 1: Environmental Impacts and Mitigation Strategies*, early communication about the nature and location of sensitive resources increases the likelihood that they can be protected from roadway impacts. This perspective is communicated well by this Guiding Principle:

Promote Stewardship of the Environment.

Maintain the integrity of communities and historical sites; minimize impacts on natural resources and conserve energy.

Certain policies are tied to this Guiding Principle, such as the ones below, which specifically include references to understanding community goals in order to reduce transportation impacts.

- Promote and implement Context Sensitive Solutions, taking into consideration safety, mobility, community and environmental goals in all projects.
 - Identify, protect and/or acquire future right-of-way as early as possible to minimize negative impacts on communities and the natural environment.
2. TDOT has emphasized its commitment to increased communications with local communities; in fact, the commitment is reflected not only in the Plan document, but in the process through which it was developed. TDOT created "Regional Working Groups" who provided input at key milestones during in the Plan's development. Those groups formed the basis for the concept of more formal Rural Planning Organizations (RPOs). Note that in the state's urban areas, there are Metropolitan Planning Organizations (MPOs) with professional planning staff who frame the communications among local governments and TDOT about long-range planning goals. The MPOs have recently updated their own Long Range Plans to document how this process is carried out in their urban areas.

TDOT has now incorporated regular meetings with RPO local government members into its ongoing statewide planning process. Membership on the RPO technical committees was explicitly designed to include staff and officials who play key roles in local planning and economic development. Members include local planning staff from the State Department of Economic and Community Development, planning commission representatives, and members from each county's Joint Economic and Community Development Board.

The RPOs provide a forum in which local officials can discuss current development trends and help identify future needs for the state transportation system. They also participate in project planning studies. In fact, they are now in a position to contribute much more significantly to the report by helping TDOT locate a broader range of stakeholders to better clarify the community's vision and intentions for future development. The Rural Planning Organization program has greatly facilitated TDOT's ability to apply this particular Guiding Principle from the Long Range Plan:

Build Partnerships for Livable Communities.

Provide early and ongoing opportunities for broad public input on plans and programs; work closely with local public and private planning efforts; coordinate land use and transportation planning.

Specific policies tied to this Guiding Principle reinforce the importance of understanding local/regional growth policies and plans:

- Seek consistency among local land use policies and strategies, TDOT's efforts to manage access and provide transportation choices, and the state's efforts to preserve and protect private and public open space.
- Build new and stronger partnerships, public and private, to develop and finance transportation projects that maximize public investments *and support community and regional growth strategies* [emphasis added].

One challenge TDOT currently faces is the inconsistency of local and regional planning activities within the state. Many communities, particularly outside the urban areas, do not have land use plans or formal policies that guide future growth. Nearly all counties do have a legally mandated "growth plan," but in many cases these plans focus primarily on boundaries for areas anticipated for future annexation by cities. The growth plans often provide little detail about the type or intensity of development that is desired. Unfortunately, this information is critical to determine the type of transportation facilities (and programs, such as transit) that will be needed. TDOT continues to encourage communities to develop at least a vision and a set of goals about future development, and continues to communicate why those are needed for effective transportation planning.

3. TDOT also recognizes the importance of developing transportation systems and programs that complement the goals of other state agencies. Section 1 discusses the approach used to coordinate long range planning efforts with state resource agencies. Paragraph 2 (just above) also notes that staff from the state's Local Planning Assistance program participate in regular RPO meetings.

TDOT has recently placed a strong focus on strengthening the links between transportation planning and economic development strategies at the state, regional and local levels. The following Guiding Principle in the Long Range Plan has guided these efforts:

Support the State's Economy

Make transportation investments that support economic growth, competitiveness and tourism; build partnerships with communities and regions to link employment, commercial/retail areas and other key activity centers.

- Coordinate transportation investment strategies with other state agencies to support balanced economic growth across Tennessee with particular focus on tourism and similar industries that are highly dependent on the transportation system.

An intentional decision was made to contract with the state's 9 regional Economic Development Districts to hire RPO coordinators who help facilitate this type of communication. One of the key functions of the Development Districts is to lead the development and implementation of economic development plans. Since they also assist smaller communities in drafting grant applications for industrial development grants and other infrastructure needs, the RPO coordinators already have some awareness of communities' intentions for economic growth.

At the state level, the Tennessee Department of Economic & Community Development (ECD) offers a "3-Star Program" to help communities build capacity and develop strong strategies for local economic and community development. Participating communities are guided through a strategic planning process that helps establish their objectives for growth and enhancement of unique community resources. As mentioned earlier, these are the factors so critical to efficient transportation planning. TDOT is therefore working through the RPO network to help ECD promote participation in the 3-Star Program. The Department also obtains copies of adopted 3-Star Plans and uses them, as feasible, in the state's transportation planning process.

Several regions have expressed interest in tourism, especially nature-based tourism, as a component of the rural economy. This is also a key strategy being promoted by ECD. A number of highways have been proposed and/or are being studied as potential scenic highways. TDOT is providing assistance by compiling and analyzing traffic and safety data for those corridors. The information is provided to the region to be incorporated with their own summary of the natural and cultural resources along the corridor.

TDOT is partnering with other agencies to perform studies of the potential economic benefits of new transportation facilities. Recent examples include a study performed for "Corridor J," a new highway funded through the Appalachian Regional Commission with the purpose of promoting economic development for rural counties in the Upper Cumberland area. Another study is currently underway in Southeast Tennessee where another Appalachian highway, "Corridor K," is proposed. A regional economic strategy is being developed with communities to help them define their economic vision more clearly, including the market clusters that best match their workforce, local terrain and environmental issues, and their unique community qualities. The resulting regional strategy will help guide decisions about the Corridor K project to ensure a positive economic outcome.

SECTION 3: PLANNING FOR THE SAFETY AND SECURITY OF THE TRANSPORTATION SYSTEM

SAFETY

TDOT is not solely responsible for activities related to transportation safety; it is one of many partner agencies. The state has a Strategic Highway Safety Plan (SHSP) developed and implemented by a committee comprised of:

- Tennessee Department of Transportation
- Tennessee Department of Safety
- Tennessee Department of Health
- Governor's Highway Safety Office
- Federal Highway Administration
- Federal Motor Carrier Safety Administration
- Tennessee Trucking Association
- Representative of the 11 Metropolitan Planning Organizations (MPOs)
- Representative of the 12 Rural Planning Organizations (RPOs)
- District Attorney General's Office.

This section summarizes the priority goals and strategies of the SHSP, many of which are focused on achieving short-term results. The plan's focus is on reducing a particular category of crashes: those that result in fatalities or serious injuries. It relies on a coordinated set of strategies from the so-called 4 E's: education, enforcement, engineering, and emergency response initiatives.

Goals of the current plan:

1. Improve Decision Making Process and Information Systems

A complete traffic records program is necessary to identify problems, operational management or control, and evaluation of a state's highway safety activities.

Strategies include projects to improve and expand the warehousing and accessibility of safety data; increased coordination, communication, and cooperation with the MPOs; and assistance to local agencies to ensure they have needed resources to improve safety.

2. Keep Vehicles in the Proper Lane and Minimize the Effects of Leaving the Travel Lane

A large number of crashes in Tennessee occur as "run-off-the-road" incidents or drifting into other lanes. Strategies are based around the need to (1) alert the driver that he/she has left the travel lane; (2) assist the driver in returning to the travel lane safely; and (3) create clear zones along the roadside to minimize harm if the driver does run off the road.

After identifying the most frequent locations for this type of safety concern, a variety of low-cost devices can be installed to improve safety. This could include rumble strips, stripes, or raised pavement markers along the road centerline and shoulder; longitudinal and median barriers; guardrail; and improved highway signage (such as posting chevron signs at problem curves).

3. Improve Intersection Safety

Based on the number of total crashes, intersections often appear to be the worst location for safety concerns, particularly in urban areas. However, many of the crashes that occur there involve relatively slow speeds, so they are not necessarily the locations with the most fatalities and serious injuries.

Strategies include the use of the latest designs and technology for traffic equipment and lane design. Some cities in Tennessee are using “red light cameras” to detect drivers who run red lights without having to re-allocate valuable law enforcement resources. Highway-rail grade crossings need attention, including increased enforcement and improved traffic control at passive highway-rail grade crossings. Finally, the public needs information on the importance of compliance with traffic control devices.

4. Improve Work Zone Safety

Although safety signs for roadway work zones often emphasize the safety of construction workers, 85% of those killed in a work zone are drivers or occupants. Rear-end crashes (i.e., running into the rear of a slowing or stopping vehicle) are the most common. Strategies to improve work zone safety include public service announcements and training for public works agencies, industry personnel, and targeted efforts to teenagers. Motor carriers are also identified as a group to target for training and policies on safe driving in work zones.

The SHSP also emphasizes more funding to state and local law enforcement to help control speeding in major work zones; installation of appropriate work zone traffic control, including pavement marking and signing; and continued use of the new “Merge Left” lane drops wherever practical. Expanded use of coordinated incident management (such as the HELP trucks program) in work zones is recommended, since it helps minimize the effects on traffic flow and decrease secondary incidents.

5. Improve Motor Carrier Safety

During 2005, more than half of all fatalities related to commercial motor vehicles occurred in the major urban counties: Davidson, Knox, Shelby, Marion, Bradley, Madison, Wilson, Rutherford, Hamilton, Sullivan, Sumner, and Washington. Strategies to improve safety include reducing the speed limit for trucks; restricting trucks to the right two lanes in urban areas; and developing/implementing targeted enforcement initiatives, i.e. traffic enforcement, increased vehicle and driver inspections, seat belt usage, etc.

6. *Improve Driver Behavior*

- More than a third of the fatalities in 2005 were alcohol related.
- More than half of those killed were not wearing safety restraint devices.
- More than 20% were driving too fast or exceeding the speed limit.

Strategies to improve behavior-related safety problems are focused on enforcement and education. Public information and education are part of the plan for all behavior-related issues.

To address alcohol, the plan also proposes a statewide tracking system for DUI incidents, shared by all law enforcement agencies, and linked databases to track offenders or citations through the complete legal process. Specialized prosecution of DUI cases is recommended by assigning specific personnel in each judicial district. Finally, the plan supports the recommendations of the Governor's DUI Task Force, which include "transdermal monitoring" and the use of vehicle ignition interlocks to help monitor offenders and prevent repeat DUI offenses.

A recommended strategy to reduce aggressive driving is a new statutory traffic law that clearly defines aggressive driving, to help with enforcement efforts.

Use of vehicle restraints in Tennessee went up 15% between 2000 and 2005, the latest available data. However, unrestrained drivers and passengers still make up a majority of traffic fatalities. The plan recommends more training and technical assistance on the importance of safety belts, and how to properly seat children in child passenger safety seats and air bag equipped vehicles. It suggests a number of groups to provide this assistance: law enforcement agencies, emergency medical services personnel, health care providers, healthcare educators, pediatric nurses, foster care and human service social workers, child care providers, firefighter personnel, rural transportation supervisors and highway safety advocacy representatives.

The five major contributing factors to fatal crashes for young drivers are speeding, driving on the wrong side of the road, failure to yield, reckless driving, and drinking. In addition to more education, the SHSP proposes to continue and improve the Graduated Drivers License (GDL) program.

Strategies to improve safety among older drivers include partnership with AARP and other organizations to retrain older drivers, both to increase their proficiency and help them understand their limitations. Certain road improvements are also identified to enhance safety for older drivers, such as increasing the size and legibility of street signs, improved lighting at problem areas, and better road markings to help visibility when in low light or inclement weather situations.

7. *Legislation for Improved Safety*

Types of legislation proposed in the plan include an open container law, mandatory drivers' education, a clearer definition for aggressive driving, vehicle safety inspections, and removal of hazardous obstacles on road rights-of-way, such as private mailboxes.

8. *Safety Training Programs*

The plan recommends additional training for safety professionals on emerging technologies and processes, intersection safety improvements, highway and roadside safety design, and safety data analysis. A "safety circuit rider" program has recently been established to provide a person to travel to local communities to conduct training. Local government staff from MPOs and RPOs will be trained in the Road Safety Audit Review process. Special law enforcement work zone training will be provided, as well as work zone driving training for teenagers.

SECURITY

In most routine incidents, TDOT works in a supporting role to local law enforcement, local emergency management agencies, or with the State Highway Patrol to provide traffic control and to return the transportation system to its normal function. In more widespread or serious incidents, the department's Emergency Services Coordinator (ESC) is called upon through the Tennessee Emergency Management Agency (TEMA) to coordinate the department's response within the combined statewide emergency response plan.

TDOT Emergency Preparedness Plan (TEPP)

In 2006, TDOT developed a TDOT Emergency Preparedness Plan (TEPP) which outlines the actions to be taken during emergency operations. The TEPP includes plans for each of the four operational TDOT Regions, with discrete disaster risks identified and addressed within those plans, as well as actions to be taken in the event that the TDOT Headquarters facility is not operational. The plan is a living document and is periodically reviewed and updated as necessary to reflect changes within the Department, as well as changes to law and TEMA requirements. The TDOT Maintenance Division has responsibility for maintaining the TEPP and performing periodic reviews.

The TEPP is designed to anticipate what will be requested of TDOT, and to identify the actions necessary from each functional area within the department. "Emergency action checklists" are provided for a broad range of disaster types. For example, checklists are available to guide emergency response to natural hazards such as winter storms, tornadoes, floods, landslides, wildfires and earthquakes. Also addressed are technological hazards such as power failures, an incident involving the transportation of hazardous materials, and accidents involving death or serious injury to passengers on air and rail transportation. A high intensity earthquake on the New Madrid fault is considered the most potentially damaging of these possible disasters, not

only to the citizens of the State of Tennessee, but to the state's transportation system. This event serves as the baseline for the Department's basic plan, and provides a consistent guideline for any incident.

During TDOT's normal daily operations, a problem is solved at the lowest possible level. When a problem exceeds the capabilities at a particular level, a Maintenance District for example, then it is elevated until sufficient resources are applied to solve the problem. The same philosophy governs emergency operations.

The TEPP outlines and describes TDOT's general responsibilities in disaster response:

- Provide an Emergency Services Coordinator
- Coordinate Traffic Movement
- Assimilate Reconnaissance Information (to assess the condition of routes)
- Provide Logistical Support
- Maintain Communications Systems
- Furnish Personnel, Equipment, and Materials
- Coordinate with Railroads
- Administer Special Permits (for oversize/overweight vehicles needed for response)
- Coordinate with Federal Transportation Agencies
- Route Clearance
- Inspect Bridges
- Remove Debris
- Provide Staging Areas for Response Equipment

Of the TDOT responsibilities listed above, traffic coordination is one of the most critical. In major emergencies, large quantities of personnel, equipment, and supplies will be moving into the affected areas. It is the responsibility of TDOT and supporting agencies to coordinate the movement of these emergency resources into affected areas. Most importantly, the Department must identify routes that are available for incoming resources to utilize. This in turn requires the identification and acquisition of information concerning the status and availability of roads and bridges, as well as information about major accidents or other incidents that could create bottlenecks or otherwise hinder the flow of emergency traffic.

Specific known facilities that may be affected by disasters are listed in each of the TEPP's plans for the 4 Regional Offices. For example, a regional TEPP plan includes a list of dams, known gas or oil pipeline locations, and routes where hazardous materials are regularly transported. Accompanying the inventories are the state routes that would be affected in case of an incident involving these facilities. The regional TEPP plans also include:

- A detailed inventory of TDOT equipment and personnel at various sites that are available to respond to emergencies.
- Contact information for mayors, highway superintendents and local emergency management officials to be notified when appropriate.

Ongoing activities

In addition to maintaining and following its TEPP, the department also participates in exercises with the Tennessee Emergency Management Agency (TEMA) and other state agencies to identify and recognize plan weaknesses, and improve the likelihood for response success during a large scale disaster.