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Environmental Justice in Transportation Planning and Projects:

A Desk Guide for Tennessee

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Prepared by
Mary R. English,
Institute for a Secure and Sustainable Environment
with Frederick J. Wegmann, Jerry D. Everett, Shih-Lung Shaw, and Yibin Zhao

Prepared for
Tennessee Department of Transportation
Research Office

Institute for a Secure and Sustainable Environment
311 Conference Center Building
Knoxville, Tennessee 37996-4134
Phone: (865) 974-4251
Fax: (865) 974-1838
E-mail: isse@utk.edu
URL: isse.utk.edu

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1.0 Introduction

1.1 Why Title VI and environmental justice are important

In the past, public agencies have sometimes discriminated against certain population groups. Whether this discrimination was intentional or not, it has disadvantaged these groups. To prevent these practices from continuing, Title IV of the Civil Rights Act was enacted in 1964. It addressed discrimination on the grounds of race, color, or national origin. Title VI was augmented in 1994 by then-President Clinton's Executive Order 12898, which was directed toward preventing disproportionately high and adverse environmental impacts of federal actions on both low-income and minority people.

The statutes, regulations, and orders discussed in Chapter 2 are the legal underpinnings for environmental justice. But environmental justice is not simply a legal responsibility. It is a moral responsibility.

1.2 Potential for both negative and positive impacts of transportation investments

Executive Order 12898 referred to "disproportionately high and adverse human health or environmental effects." According to environmental justice guidelines from the Council on Environmental Quality (CEQ) in 1997, "the environment" includes the built as well as natural environment, and "adverse effects" may include ecological, cultural, human health, economic, or social impacts.

DOT's order on environmental justice (Order 5610.2), which was issued several months earlier than the CEQ guidelines, went further. It referred to adverse effects as including "the denial of, reduction in, or significant delay in the receipt of, benefits of DOT programs, policies, or activities." More recently, the Federal Highway Administration (FHWA) has referred to preventing the unfair distribution of benefits as a separate and distinct environmental justice principle from the principle of avoiding, minimizing, or mitigating disproportionately high and adverse human health or environmental effects. (www.fhwa.dot.gov/environment/ejustice/facts)

In summary, however, transportation investments can provoke concerns about both *disproportionately low benefits* and *disproportionately high and adverse impacts.* Benefits can arise from *improved* safety, mobility, accessibility, environmental quality, business and job opportunities, and so forth. Adverse impacts can arise from *decreased* safety, mobility, accessibility, environmental quality, business and job opportunities, and so forth. While this desk guide focuses on the latter – on disproportionately high and adverse impacts – the disproportionate distribution of positive impacts can be at least as important.

1.3 Complementary components: analysis and consultation

To identify and address disproportionate impacts on environmental justice populations, both *analysis* and *consultation* are needed. Chapters 5 and 6 give information on analytic techniques: Chapter 5, on analyzing the demographic composition of an affected area; Chapter 6, on analyzing disproportionately high and adverse impacts. These analytic techniques, while important, are not sufficient. Chapter 7 describes consultation practices that should be used as well. Consultation – including public involvement and, where appropriate, additional, targeted means of consultation – are essential to get local knowledge and local perspectives.

1.4 Who needs to be aware of Title VI and environmental justice … and when

Who? … According to DOT's 1997 order, environmental justice principles are to be incorporated into all DOT programs, policies, and activities. By extension, this applies to all state activities, including those that do not involve federal-aid funds. Statewide and metropolitan transportation planning is subject to environmental justice requirements. In addition, state and metropolitan transportation projects and programs must consider environmental justice requirements. Many of the projects with the potentially most significant impacts are undertaken at the state level.

When? … FHWA notes that "at the start of the planning process, planners must determine whether Environmental Justice issues exist …" However, FHWA also notes that "communities are constantly changing, so evaluation of human impacts must be given attention throughout planning, project development, implement-

tation, operation, and maintenance" (www.fhwa.dot.gov/environment/ejustice/facts). A formal environmental justice assessment at the beginning of a plan, program, or project is essential, but it may not be sufficient. Subsequent assessments may be needed.

1.5 Scope of this desk guide

This desk guide is a handbook on transportation and environmental justice in Tennessee. Its purpose is to familiarize practitioners with environmental justice requirements, analytic techniques, consultation practices, and resources. It is not a cookbook. Each transportation plan or project is unique.

The desk guide is accompanied with a demographic screening tool based on Geographic Information System (GIS) software. The tool, which has been developed as part of this project, is described in Chapter 5. It provides a valuable means to make an initial determination of whether a study area includes a significant number of low income and/or minority people.

The desk guide briefly covers the following:

- key federal legal and regulatory requirements (Chapter 2)
- current and prospective practices in Tennessee at the state, MPO, and RPO levels (Chapter 3)
- changes on the horizon at the federal and state levels (Chapter 4)
- analytic practices for assessing the demographic composition of an affected area (Chapter 5)
- analytic practices for assessing disproportionately high and adverse impacts (Chapter 6)
- consultation practices (Chapter 7)

Resources are listed at the end of chapters or within chapter sections. Where available online, they are hyper-linked.

Resources

For a tutorial from the Title VI Program of TDOT's Office of Civil Rights, see: http://www.tdot.state.tn.us/civil-rights/titlevi/training/EnvironmentalJustice.pdf

For FHWA's website on environmental justice, see:
http://www.fhwa.dot.gov/environment/ej2.htm

For facts about environmental justice from FHWA, see:
http://www.fhwa.dot.gov/environment/ejustice/facts/

2.0 Key Statutory and Regulatory Requirements

Title VI of the 1964 Civil Rights Act laid the foundation for contemporary environmental justice law. Title VI was reinforced by the 1969 National Environmental Policy Act, which required assessment of major federal actions affecting the human environment. During the next two decades, the environmental justice movement grew. With increased attention to the possibility of disparate environmental impacts on low-income and minority populations, President Clinton issued Executive Order 12898 in 1994. While this executive order targeted the plans and actions of federal agencies, the effects of the order have cascaded to state and local governments.

2.1 1964 Civil Rights Act, Title VI

Title VI states that "no person in the United States shall, on the grounds or race, color or national origin be excluded from participation, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance."

A 1984 Supreme Court decision limited the applicability of nondiscrimination requirements to those parts of a recipient's operation that directly benefited from federal assistance. The Civil Rights Restoration Act of 1987 clarified that it was the intent of Congress to include *all* programs and activities of federal-aid recipients, sub-recipients, and contractors.

Resources

For more information on Title VI, see:
http://www.tdot.state.tn.us/civil%2Drights/titlevi/
http://www.fhwa.dot.gov/environment/title_vi.htm
http://www.usdoj.gov/crt/grants_statutes/legalman.html

For the U.S. Department of Justice's Title VI coordinating regulations, see:
http://www.usdoj.gov/crt/cor/byagency/28cfr424.htm#Sec.%2042.405%20Public%20dissemination%20of%20Title%20VI%20information

For U.S. DOT regulations in response to Title VI, see:
http://www.access.gpo.gov/nara/cfr/waisidx_99/49cfr21_99.html

For the definitions section of the Title VI program for highways, see:
http://www.fhwa.dot.gov/environment/ejustice/200_5.htm

For state highway agency responsibilities under Title VI, see:
http://www.fhwa.dot.gov/environment/ejustice/200_7.htm

For guidance on the 1987 Civil Rights Restoration Act as it applies to highway programs, see:
http://www.fhwa.dot.gov/legsregs/directives/notices/n4720-6.htm

2.2 1969 National Environmental Policy Act (NEPA)

NEPA requires that an environmental impact statement be prepared for any "major Federal action significantly affecting the quality of the human environment." The Council on Environmental Quality (CEQ) issued regulations for implementing NEPA procedures, including the requirement that federal agencies adopt procedures to supplement the CEQ regulations. In December 1997, in response to Executive Order 12898, the CEQ issued *Environmental Justice Guidance under the National Environmental Policy Act*.

Resources

For CEQ's central information hub with links to the text of NEPA, regulations, recent updates, etc, see:
http://ceq.eh.doe.gov/NEPA/nepanet.htm

For the text of the CEQ's *Environmental Justice Guidance under the National Environmental Policy Act*, see:
http://ceq.eh.doe.gov/nepa/regs/ej/justice.pdf

2.3 Executive Order 12898

Executive Order 12898, titled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," was issued by President Clinton in February 1994. It directs federal departments and agencies to identify and address disproportionately high and adverse human health or environmental effects of their policies, programs, and activities on minority and/or low-income populations.

Executive Order 12898 goes beyond Title VI by addressing *low-income* as well as minority populations and by making it clear that *unintentional* as well as intentional disproportionately high and adverse impacts are to be avoided. Executive Order 12898 is more limited than Title VI in one respect, however. While Executive Order 12898 focuses on the discriminatory distribution of *burdens* from a federal action, Title VI also considers the discriminatory distribution of *benefits* from the action.

Resources

For the text of the executive order, see:
http://www.epa.gov/fedrgstr/eo/eo12898.pdf

2.4 DOT Order 5610.2

DOT Order 5610.2 was issued in April 1997 by the U.S. Department of Transportation in response to Executive Order 12898. Order 5610.2 stresses the importance of addressing environmental justice concerns early in the development of a program, policy, or activity. The order requires that where relevant, appropriate, and practical, information be obtained on the population served and/or affected, including information on race, color, or national origin and income level; on proposed steps to guard against disproportionately high and adverse impacts; and on membership in any planning or advisory body which is part of the program.

Regarding populations protected by Title VI, a project that has a disproportionately high and adverse impact may be carried out only if (1) there is a substantial need for the project, and (2) alternatives to it would have other adverse impacts or would involve costs of extraordinary magnitude. Regarding populations protected by Executive Order 12898 but not by Title VI, a project that has a disproportionately high and adverse impact may be carried out only if alternatives or further mitigation measures are not practicable. Social, economic, and environmental considerations are to be taken into account in determining what is practicable.

Resources

For DOT Order 5610.2, see:
http://www.fhwa.dot.gov/environment/ejustice/dot_ord.htm

2.5 FHWA Order 6640.23

Order 6640.23, issued in December 1998, is the Federal Highway Administration's response to DOT Order 5610.2. It echoes much of Order 5610.2, and it requires that findings identified during implementation of the order be included in planning or NEPA documentation.

Resources

For FHWA Order 6640.23, see:
http://www.fhwa.dot.gov/legsregs/directives/orders/6640_23.htm

2.6 FHWA and FTA Memorandum, October 7, 1999

This memorandum clarifies that Title VI and environmental justice must be taken into account, not only during project development, but also during planning processes.

Resources

For the text of the October 7, 1999, FHWA and FTA memorandum, see:
http://www.fhwa.dot.gov/environment/ejustice/ej-10-7.htm

3.0 Current and Prospective Practices in Tennessee

This chapter covers Title VI/environmental justice practices in transportation planning and projects at the state and regional levels in Tennessee.

3.1 Increased awareness of Title VI and environmental justice

The 1997 U.S. DOT order and subsequent communications from DOT have stressed three basic principles regarding low-income and minority groups:

(1) Ensure their involvement in transportation decision making
(2) Prevent disproportionately high and adverse impacts of transportation projects on them
(3) Assure that they receive a timely and proportionate share of the benefits from transportation projects

In Tennessee at the state and regional (MPO and RPO) levels, these three principles are receiving increased attention.

3.2 Tennessee Department of Transportation

3.2.1 State-wide plans

TDOT released a Long-Range Transportation Plan (LRTP) in December 2005—its first since 1994. The plan, called "PLAN *Go*," is multimodal, covering Highway and Intelligent Transportation Systems; Public Transportation, Transportation Demand Management, and Bicycle/Pedestrian; and Aviation, Rail, and Waterways. For each, three types of investments are considered: (1) maintenance and system preservation, (2) safety and modernization, and (3) system expansion and enhancement.

The plan, which was developed over 18 months with extensive input from people across the state, has three main elements:

- A 25-Year Vision Plan, to broadly define how TDOT will respond to transportation trends and challenges;

- A 10-Year Strategic Investments Program, to identify aspects of TDOT's transportation program requiring accelerated funding or special attention; and

- A Project Evaluation System, to be used in preparing the 3-year program of projects presented to the legislature.

To provide continuity through these three elements, seven Guiding Principles were adopted for the LRTP:

1. Preserve and manage the existing transportation system
2. Move a growing, diverse, and active population
3. Support the state's economy
4. Maximize safety and security
5. Build partnerships for livable communities
6. Promote stewardship of the environment
7. Emphasize financial responsibility

To achieve the goals and objectives of the 25-year Vision Plan, 24 policies were developed to guide TDOT's investments and operations. Among these is the policy to:

> Actively engage minority and disadvantaged communities in identifying transportation needs, developing alternative strategies to meet those needs, and implementing solutions that are affordable and sensitive to a community's heritage and supportive of local economic institutions.
>
> *LRTP Summary* (December 2005), p. 14

The Project Evaluation System (PES) uses a two-tiered approach to project prioritization and selection. Tier 1 evaluates projects based on mode-specific technical measures that address Guiding Principles 1 through 4. Tier 2 evaluates projects based on mode-neutral, generally qualitative measures (public and community support, environmental impacts, funding considerations) that address Guiding Principles 5 through 7. Regarding "environmental impacts," the PES Technical Report notes that:

> To prioritize projects that promote good stewardship of the environment, criteria include impacts on neighborhoods, homes, businesses, schools, churches, wetlands, watersheds, ecosystems, water quality, air quality, and historic/archaeological sites. Projects that preserve or improve neighborhoods, cultural resources, and the natural environment are prioritized accordingly.
>
> *PES Technical Report* (December 2005), p. 19

Resources

For the 2005 LRTP, see:
http://www.tdot.state.tn.us/plango/library.htm#FinalDocs

For more information on the LRTP's Public Involvement Plan for Traditionally Underserved Populations (PIPTUP), see Chapter 7 of this desk guide.

3.2.2 Projects

According to TDOT officials, the preference is to address Title VI and environmental justice issues early in project planning – for example, in the needs assessment or scoping studies. Initial studies use a 2-mile radius from a proposed project, but this typically is refined to 500 or 1000 feet as alternative alignments are considered. These boundaries are not rigid, however: they can vary from project to project, and they can change during project development. TDOT holds the view that, in general, the best approach is to define alternatives that avoid Title VI and environmental justice issues. An especially important issue is right-of-way (ROW) acquisition.

In general, potential environmental justice neighborhoods are identified from census data, local on-site observations, and meetings with local officials. Currently, the EPA's Environmental Justice Geographic Assessment Tool also is used. Minority population is determined as a percentage of a census block's population. "Low income" is determined by the median household income in a census block group.

Typically, environmental justice assessments are undertaken in the greatest detail during environmental studies for transportation projects. As required by NEPA, a transportation project receiving federal funding necessitates an environmental study: a Categorical Exclusion (CE) study, an Environmental Assessment (EA), or a full-blown Environmental Impact Statement (EIS).

For state-funded projects, TDOT has specified the following:

> State-funded transportation projects that require the acquisition of right-of-way and/or the construction of new roadways or other transportation facilities are subjected a rigorous environmental review that is documented in an Tennessee Environmental Evaluation Report (to be referred to as TEER) that is made available for public review. …Approval of the environmental evaluation rests with the Commissioner of Transportation.
>
> *Tennessee Environmental Procedures Manual*, 2007, p. 1-19

TDOT's Environmental Division determines the need for a Tennessee Environmental Evaluation Report (TEER). Chapter 10 of the *Tennessee Environmental Procedures Manual* (2007) details when the TEER requirement applies and how the report is to be prepared.

The *Tennessee Environmental Procedures Manual* (2007) specifies procedures for conducting environmental justice impact assessments as part of environmental studies. Key sections of the manual include 5.2.4, 5.3.10.1., and 5.3.10.2:

5.2.4 Environmental Justice

This section states that:

> During environmental screening, it is advisable to conduct research to preliminarily determine whether environmental justice issues may exist in a proposed project area. This can be done through any of the following methods: use of GIS to determine if minority populations exist in the project area, mapping of census data by other methods, conversations with local government and lastly, through field observation. (p. 5-8)

5.3.10.1 Social/Community Impacts

This section gives advice for profiling communities and details questions that should be addressed when analyzing impacts on communities. It also notes that public involvement is integral to community impact assessment (CIA) and to developing measures to avoid, minimize, or mitigate impacts. (For more on CIA and public involvement, see Chapter 7 of this guide.)

5.3.10.2 Environmental Justice and Non-discrimination

This section reviews the Title VI and Executive Order 12898 requirements, as well as CEQ and FHWA guidance. It stresses that three factors are to be considered:

1. Whether there is or will be an impact on the environment that significantly and adversely affects a minority or low-income population; and
2. Whether these impacts exceed or are likely to appreciably exceed those on the general population or other appropriate comparison group; and
3. Whether the environmental effects occur or would occur in a minority or low-income population affected by cumulative or multiple exposures from environmental hazards.

Resources

For the *Tennessee Environmental Procedures Manual* (2007), see:
http://www.tdot.state.tn.us/environment/tepm.htm

For the web-based "Environmental Guidebook" of the FHWA (a comprehensive site that includes FHWA contact information, FHWA policy and guidance, training opportunities, transportation and environment websites, state practices, etc.), see:
http://www.environment.fhwa.dot.gov/guidebook/index.asp

For relevant federal regulations in Title 23 (Highways) of the Code of Federal Regulations (CFR) as revised April 1, 2006, see:

23 CFR 450 (Planning Assistance and Standards):
http://www.access.gpo.gov/nara/cfr/waisidx_06/23cfr450_06.html

23 CFR 771 (Environmental Impact and Related Procedures):
http://www.access.gpo.gov/nara/cfr/waisidx_06/23cfr771_06.html

For EPA's Environmental Justice Geographic Assessment Tool, see:
http://www.epa.gov/enviro/ej/

3.3 Metropolitan Planning Organizations (MPOs) and Transportation Planning Organizations (TPOs)

Tennessee currently has 11 MPOs. (They are called TPOs in the Knoxville and Chattanooga regions, but here they will be referred to generically as MPOs.) An MPO's general responsibilities regarding Title VI and environmental justice are summarized well in the following statements from the Knoxville TPO:

> **The Long-Range Transportation Plan (LRTP):**
>
> The Long-Range Transportation Plan examines the transportation system needs over the next twenty-five years. The current Knoxville LRTP has 187 roadway projects identified. This large number of projects does not include the transit, pedestrian, and bicycle projects also in the LRTP. Because the LRTP is not always precise as to a project's exact location, size, and design, the Title VI assessment of a project's impact cannot be specific. Generalizations can be drawn and attention can be given to project selection and funding distribution.
>
> **The Transportation Improvement Program (TIP):**
>
> As projects move from the LRTP into the TIP stage, a greater level of analysis can occur. However, even at the TIP level, exact impacts are hard to determine. A project's placement into the TIP does not always mean that an Advance Planning Report or even an exact alignment has been determined. Even at the TIP level, many questions concerning a roadway's impact can not be fully understood until final construction alignments are determined. Therefore, it is the TPO staff's belief that its role is to alert the responsible jurisdiction that there are community concerns, to help inform the community about the project, and to act as a liaison between the community and the jurisdiction if the community still feels uncomfortable about the project.
>
> **Project Development and Implementation:**
>
> As a project begins to move into implementation, the TPO staff tries to stay involved with the project. Once exact alignments are known, a better assessment of the project's impacts can be made. TPO staff has been fairly effective in this regard. Staff has participated or is participating in working groups that have had significant input into whether a project is to be implemented, and if so, how it can be

> implemented with the least impact. Staff has worked on committees or helped review projects …. In all cases, staff has had a seat at the table and has been able to be sure that Title VI impacts are being considered by the implementing agency.
>
> Knoxville Regional Transportation Planning Organization, *Title 6 Update 2005* (May 2, 2005)

More details about the MPOs and their Title VI/environmental justice analyses regarding LRTPs and TIPs are given below.

3.3.1 Long-Range Transportation Plans (LRTPs)

Of the 11 MPOs, eight had LRTPs due in 2005. The following synopsis is based on August 2005 contacts with seven of those MPOs.

The application of environmental justice and Title VI to the LRTP effort varies by MPO. A consistent approach across MPOs has not been established, but some general patterns are emerging:

- The U.S. Census and EPA's Environmental Mapper have been the most commonly used data resources.
- All of the MPOs have GIS tools, and ArcView is commonly available. Many MPO staff members work directly with the GIS databases; a few work through city governments.
- The unit of geographic analysis varies among the MPOs. Other than the Nashville MPO (which uses TAZs from their 1990 traffic model), most MPOs use 2000 census data units: census tracts, block groups, or blocks.
- Minority is defined as "non-white" population. Some MPOs focus on Hispanic as a separate population.
- "Low income" usually is not explicitly defined but is assumed to be households below the poverty level.
- Thresholds for target populations are defined somewhat differently by different MPOs.
  The seven MPOs contacted in August 2005 used the following thresholds:

	Nashville	*Knoxville*	*Kingsport*	*Lakeway*	*Bristol*	*Clarksville*	*Cleveland*
Minority: threshold for protected pop.	Greater than zonal average	Greater than TPO area average	Greater than area average	Greater than area average	Greater than area average	(1) Equal to or greater than MPO's regional percentage, or (2) where minority pop. percentage is double that of the MPO area	Greater than 5%
Low-inc: threshold for protected pop.	Greater than 20%	None	Greater than area average	Greater than area average	Greater than area average	Where percentage of those below the Federal poverty level is double that of the MPO area	Greater than 5%

While the MPOs are not required to follow precisely the same analytic procedures, June 2005 guidelines from TDOT's Office of Civil Rights, Title VI Program, provided the following advice (summarized from June 20, 2005 et seq. e-mails from Lori Kirby of TDOT's Title VI Program):

(1) In its Title VI/environmental justice section, the LRTP should address the following questions:

- Are all individuals receiving transportation benefits and sharing the cost equally? (e.g., identify any disparities of transportation benefits by the following categories: racial, ethnic, income level, gender, national origin, disability and urban vs. suburban.)
- What percentage of road and transit dollars is allocated to areas with high proportions of minority and low-income residents, and how does this investment pattern compare with the population pattern in the region or state? … Is funding being devoted to maintain older areas with high minority and low-income populations, or is the bulk of funding being devoted to new projects in newly developing areas?
- What are the different transportation modes utilized by population groups?
- Are low-income and minority communities receiving older, less reliable transportation equipment and vehicles than wealthier communities?
- What is wrong with the present system, and how should these problems be ameliorated?

(2) In its Title VI/environmental justice section, the LRTP should include:

- Demographic data and analysis
- Performance measures
- Public involvement strategies

(3) The technical file of the LRTP should include documentation that the traditionally under-served population has been engaged in the public involvement process. Also, if the population demographics indicate that a particular ethnic group represents 5% or more within that study area, outreach techniques to engage the non-English speaking citizens should be documented.

(4) Regarding defining thresholds to determine whether a TAZ, census tract, etc. is a "Title VI/environmental justice" area, no specific template has been adopted for Tennessee. NCHRP Report 532 discusses two basic approaches: (1) establish a working group to evaluate and determine appropriate threshold levels and present those thresholds to the public for comment; or (2) set thresholds to equal either state or county level averages, depending on the size and geography of the study area. For a LRTP, the second approach seems the most suitable. (E.g., thresholds could be determined by calculating average percentages for protected population groups within the entire service area within individual counties.) However, this type of assessment and threshold levels are for regional planning purposes only and should not be used at the project level. Assessing data on a project level requires using smaller scale spatial data.

3.3.2 Transportation Improvement Programs (TIPs)

In the August 2005 interviews, MPO coordinators stated that they are incorporating Title VI and environmental justice considerations into TIPs. Several noted, however, that they are encountering the following issues in both their LRTPs and their TIPs:

(1) the problem of using 2000 demographic data to assess 2030 road projects;

(2) whether "touching a community" and other proximity measures actually capture the impacts of a transportation project on a neighborhood;

(3) the need to consider benefits of a project for Title VI/environmental justice communities, such as improved accessibility to jobs; and

(4) the difficulty of tying pedestrian and bicycle route investments into Title VI and environmental justice assessments.

It appears that only the Knoxville TPO requires that Title VI/environmental justice issues be considered in the project prioritization process for CMAQ funds. Regarding Title VI/environmental justice, this process asks:

> How does the project provide transportation services to individuals or groups who need some form of transportation due to an inability to utilize other forms of transportation; this can include service to the elderly and disabled or economically disadvantaged individuals (5 points)? Briefly describe any adverse or positive benefits this project may have on the transportation disadvantaged including minorities, elderly and disabled residents. For instance, does this project disrupt a minority neighborhood by separating it or providing adverse effects (5 points for positive, -5 points for negative impacts).

Concerning Title VI/environmental justice assessments in TIPs, however, the Knoxville TPO goes on to say:

> Even at the TIP level, many questions concerning a roadway's impact can not be fully understood until final construction alignments are determined. Therefore, the TPO believes its role is to alert the responsible jurisdiction that there are community concerns, to help inform the community about the project, and to act as a liaison between the community and the jurisdiction if the community still feels uncomfortable about the project. Another issue is that many of the community's concerns are not necessarily with a project itself but with the temporary disruption that the construction of a project can cause.

Knoxville Regional Transportation Planning Organization, *Title 6 Update 2005* (May 2, 2005)

Resources

For the October 7, 1999, memorandum from FHWA and FTA regarding Title VI/Environmental Justice Requirements in Metropolitan and Statewide Planning, see: http://www.fhwa.dot.gov/environment/ejustice/ej-10-7.htm

For a follow-up memorandum dated January 7, 2000, see: http://www.fhwa.dot.gov/environment/ejustice/ej-1-7.htm

3.4 Rural Planning Organizations (RPOs)

Twelve Rural Planning Organizations (RPOs) have been created recently for non-metro areas in Tennessee. The RPOs are roughly aligned with portions of Tennessee's Development Districts. As planned, one staff member for transportation planning purposes will be funded in each RPO. It is expected that the RPOs will have processes similar to MPOs.

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4.0 Changes on the Horizon

Several changes are in the works that will affect environmental justice assessment and consultation for transportation plans and projects. These include:

- The 2005 federal surface transportation act – i.e., the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)

- The Statewide Environmental Management System (SEMS) being developed for TDOT

- The transition within TDOT to a web-based Geographic Information System

4.1 SAFETEA-LU

SAFETEA-LU was signed into law on August 10, 2005. Its predecessors include the Intermodal Surface Transportation Efficiency Act (ISTEA) enacted in 1991 and the Transportation Equity Act for the 21st Century (TEA-21) enacted in 1998. As described below, SAFETEA-LU includes several important changes relevant to environmental justice. These include changes regarding (1) metropolitan and statewide planning, (2) "Major Projects," and (3) environmental review processes.

Resources

For "SAFETEA-LU: A Summary of Highway Provisions" (August 2005), see: http://www.fhwa.dot.gov/safetealu/safetea-lu_summary.pdf

4.1.1 Metropolitan and statewide planning

Sections 1107 and 6001 of SAFETEA-LU specify requirements for metropolitan planning processes. For LRTPs by MPOs, new requirements include the following:

- The LRTP is to include a discussion of potential environmental mitigation activities.

- Representatives of users of pedestrian walkways, users of bicycle transportation facilities, and the disabled must be provided with the opportunity to participate in the planning process.

- In consultation with interested parties, the MPO is to develop a participation plan that provides reasonable opportunities for all parties to comment.

- To carry out the participation plan, public meeting are to: be conducted at convenient and accessible locations at convenient times; employ visualization techniques to describe plans; and make public information available in an electronically accessible format such as on the Web.

Section 6001 of SAFETEA-LU also specifies requirements for statewide planning processes. These include several requirements similar to those for MPOs:

- The Long-Range Statewide Plan is to include a discussion of potential environmental mitigation activities.

- Representatives of users of pedestrian walkways, users of bicycle transportation facilities, and the disabled must be provided with the opportunity to participate in the planning process.

- To enhance the public participation process, the State should: conduct public meetings at convenient and accessible locations at convenient times; employ visualization techniques to describe plans; and make public information available in an electronically accessible format such as on the Web.

Resources

For a fact sheet on SAFETEA-LU's requirements regarding metropolitan planning, see:
http://www.fhwa.dot.gov/safetealu/factsheet/mp.htm

For a fact sheet on SAFETEA-LU's requirements regarding statewide planning, see:
http://www.fhwa.dot.gov/safetealu/factsheet/statewide.htm

For a December 2005 memorandum providing "clarifying information/guidance" on the transition and implementation of SAFETEA-LU's planning provisions, see:
http://www.fhwa.dot.gov/hep/planning transition.htm

For a May 2006 memorandum on the timing of SAFETEA-LU's planning requirements, see:
http://ww.fhwa.dot.gov/hep/plandeadline.htm

4.1.2 Major Projects

SAFETEA-LU made several significant changes in the requirements for "Major Projects." The definition of a "Major Project" was changed by lowering the minimum monetary threshold from $1 billion to $500 million. In addition, a Project Management Plan (PMP) is now required on all Major Projects. The PMP serves as a "roadmap" for the project and is prepared prior to starting the project's environmental study.

One purpose of the PMP is to identify major issues that may arise with the project. The Division Administrator of FHWA uses the "FHWA Checklist of Major Project Questions" to do an initial assessment of issues and to develop an oversight strategy. One major issue on this checklist is "community and human environment issues," including environmental justice issues.

Resources

For a January 2006 memo regarding issuance of Major Project guidance, see:
http://www.fhwa.dot.gov/programadmin/mega/012706.cfm

For the Interim FHWA Major Project Guidance document, see:
http://www.fhwa.dot.gov/programadmin/mega/012706.cfm#guidance

For the FHWA Checklist of Major Project Questions, see:
http://www.fhwa.dot.gov/programadmin/mega/majorquestions.cfm

4.1.3 Environmental review process

As provided in SAFETEA-LU, Sections 6002-6005, 6007, 6009, and 6010, a new environmental review process is established for highway, transit, and multimodal

projects. The process applies to new projects requiring environmental impact statements. At the discretion of the federal agency (FHWA or FTA), the process also may apply to new projects developed with environmental assessments or categorical exclusions.

FHWA and FTA issued joint proposed guidance on the environmental review process in June 2006. For environmental justice, Section 2 of the guidance, which focuses on the management of the environmental review process – including coordination and scheduling, public involvement, issue resolution, mitigation commitments, etc – is particularly relevant to environmental justice.

Appendix D to the joint proposed guidance, "Linking the Transportation Planning and NEPA Processes," is also relevant to environmental justice. This document, which was first issued in February 2005, clarifies the circumstances under which transportation planning may be incorporated into the process required by NEPA. While voluntary, this linkage can expedite the NEPA process. Relevant factors include, for example, whether the information gathered for planning purposes is still valid, whether adequate public involvement occurred in the planning process, and whether information from the planning process is useful in describing a baseline for the NEPA analysis of indirect and cumulative impacts.

Resources

For a fact sheet on SAFETEA-LU's environmental review requirements, see:
http://www.fhwa.dot.gov/safetealu/factsheets/enviroreview.htm

For the FHWA/FTA proposed guidance on the environmental review process issued in the Federal Register in June 2006, see:
http://www.fta.dot.gov/section6002.doc

For guidance on "Linking the Transportation Planning and NEPA Processes," see:
http://www.fhwa.dot.gov/hep/plannepa050222.pdf

For the web-based "Environmental Guidebook" of the FHWA (a comprehensive site that is intended to include updated FHWA policy and guidance), see:
http://www.environment.fhwa.dot.gov/guidebook/index.asp

4.2 A Statewide Environmental Management System (SEMS) for TDOT

Within TDOT's Bureau of Environment and Planning, the Environmental Division is spearheading a major new initiative: a Statewide Environmental Management System (SEMS). As planned, SEMS will be an organizational structure, together with a Geographic Information System (GIS), to integrate environmental considerations into TDOT's ongoing management and decision-making process. It will be linked with other agencies that may be involved in the environmental aspects of the state's transportation decisions.

Already used in a few other states – for example, in Florida and Texas – the SEMS approach is in its beginning stages at TDOT. The planning phase of the SEMS initiative began in early 2006 and is expected to conclude in late 2006. As now envisioned, the system will become operational in a basic form during 2008. Due to the system's complexity, it is expected to take several more years to refine the system and add various data layers.

The GIS-based demographic screening tool that accompanies this desk guide (see Chapter 5) eventually will be integrated into SEMS. In the meantime, it can operate as a stand-alone tool.

4.3 Transition to web-based GIS

TDOT is in the process of transitioning from various GIS applications to a web-based application. ArcGIS Server is an example of a web-based GIS application.

ESRI, the software developer of ArcGIS Server, describes it as:

> a comprehensive Web-based GIS that comes with out-of-the-box, end user applications and services for spatial data management, visualization, and spatial analysis.
>
> http://www.esri.com/software/arcgis/arcgisserver/

The transition to a web-based GIS for TDOT is being coordinated by TDOT's Information Technology Division. The GIS-based demographic screening tool accompanying this guide (see Chapter 5) is an ArcGIS Desktop application, but it can be transitioned to a web-based application.

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5.0 Analytic Practices: Assessing the Demographic Composition of an Affected Area

Two key reasons for understanding the demographic characteristics of an affected area are:

(1) To identify population groups who may need to be targeted for special outreach and consultation efforts, and

(2) To determine whether groups should be considered protected under either Title VI or the environmental justice standards specified in Executive Order 12898.

Both reasons are important. This chapter deals mainly with the latter – identifying populations protected by Title VI or Executive Order 12898 – but the demographic analysis methods also are a prelude to determining appropriate outreach and consultation efforts, as discussed in Chapter 7.

Apart from people protected under either Title VI or Executive Order 12898, other groups – for example, people who are disabled, elderly, or have limited English proficiency – are protected by other federal statutes and regulations. This desk guide does not directly address these other groups, but the demographic analysis methods described in Sections 5.2 and 5.3 may be appropriate for them as well.

5.1 Considerations in defining populations, boundaries, and thresholds

In determining whether a population qualifies as a "protected population" under Title VI or Executive Order 12898, a number of issues arise: how to define protected populations, study area boundaries, and population thresholds.

5.1.1 Protected populations

Definition of "minority" According to the Appendix to DOT Order 5610.2, as augmented by a March 2000 bulletin from the Office of Management and Budget

(OMB Bulletin No. 00-02, "Guidance on Aggregation and Allocation of Data on Race for Use in Civil Rights Monitoring and Enforcement"), "minority" means a person whose origins are:

> Black
> Hispanic
> Asian American
> American Indian
> Native Hawaiian
> Pacific Islander

Definition of "low income" "Low-income" is defined in the Appendix to DOT Order 5610.2 as:

> a person whose median household income is at or below the Department of Health and Human Services (HHS) poverty guidelines.

However, FHWA guidance allows states or localities to use higher (that is, more inclusive) thresholds as long as they are not selectively implemented.

According to one study of the environmental justice practices of MPOs across the United States, 78 percent of MPOs use the HHS guidelines, while others use a higher threshold to adjust for higher cost-of-living than the national average (Paul R. Lederer, Teak Kim, and Louis F. Cohn, "In-Use Definitions of Environmental Justice Terminology in Long-Range Transportation Plans," University of Louisville, July 30, 2004).

Resources

For DOT Order 5610.2, see:
http://www.fhwa.dot.gov/environment/ejustice/dot_ord.htm

5.1.2 Boundaries of the study area

DOT and FHWA guidance assumes that the affected area is the same as a project, program, or planning study area. (A more accurate way to define the affected area would be to consider the geographic patterns of all of the potential impacts first; then arrive at a rough approximation of the affected area. This often is not practical, however.)

Resources

For a discussion of alternative ways to define study areas, especially areas *indirectly* affected by a transportation project, see:

NCHRP Report 466, *Desk Reference for Estimating the Indirect Effects of Transportation Projects* (2002), http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_466.pdf, pp. 31-35

5.1.3 Thresholds: Determining whether the population within the study area qualifies as a "protected population"

DOT and FHWA do not specify thresholds for determining whether a target population qualifies as "minority" and/or "low income." In fact, FHWA policy states that even if the minority or low-income population in a project, study, or planning area is very small, that does not eliminate the possibility of a disproportionately high and adverse effect on this population (http://www.fhwa.dot.gov/environment/ejustice/facts/#QA).

In contrast, CEQ's environmental justice guidance under NEPA recommends that minority populations should be identified where either:

> (a) the minority population of the affected area exceeds 50 percent, or
>
> (b) the minority population percentage is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.
>
> http://ceq.eh.doe.gov/nepa/regs/ej/justice.pdf , p. 25

According to a national study (Lederer et al. 2004), many MPOs use some variant of approach (b)—that is, they compare the demographic composition of the affected area with that of some other unit of geographic analysis. Some MPOs, however, use approach (a)—that is, they specify an absolute threshold such as 51 percent or greater minority population.

CEQ guidelines do not specify an "appropriate unit of geographic analysis" for comparison purposes. Thus, the low-income and minority composition of the population in the affected area could be compared with national averages, state averages, county averages, etc.

CEQ guidelines also do not define "meaningfully greater than." MPOs across the nation have interpreted this term in different ways, ranging from "greater than" to more demanding thresholds such as "twice as great as" (Lederer et al. 2004).

5.2 GIS-based demographic screening tool

The GIS-based demographic tool that complements this desk guide has several uses. It also has several limitations. Both are described below. The tool is valuable for a preliminary screening, but – as described in Section 5.3 – other demographic assessment methods may be needed as well.

5.2.1 Uses

Using data from the most recent U.S. Census, the tool makes possible a basic screening of the racial/ethnic makeup of the study area as well as the percentage of the area's households that are below poverty level. The tool also makes possible a basic analysis of whether households in the study area have limited English proficiency (LEP), and if so, which other languages are used.

With the tool, the user can define a study area by:

- Selecting a study area by county; *and*
- Identifying a political jurisdiction (e.g., a county); *or*
- Identifying one or more census units (e.g., block groups); *or*
- Identifying one or more existing roads and then specifying a buffer around it (e.g., ½ mile), *or*
- Drawing a line (e.g., a proposed road) and then specifying a buffer around it; *or*
- Drawing a polygon-shaped area.

Once the study area has been defined, the user can:

- Specify a racial or ethnic type (e.g., black or Asian) and then determine the number and percentage of the population in the area who are of that type
- Determine the number and percentage of households in the area who are below household poverty level

- Determine the number and percentage of LEP households in the study area, and identify languages used by those households

The user also can set a percentage threshold (e.g., 20 percent or greater Hispanic population) for the study area and then determine which census units in the area meet that threshold.

The screening tool has display capabilities as well. The user can make illustrative maps, charts, and tables displaying the information that has been distilled using the tool.

The tool is described in much greater detail in its accompanying user's guide.

5.2.2 Limitations

Because the GIS-based demographic screening tool relies on the most recent U.S. Census for its demographic data, it has several unavoidable limitations.

Units of geographic analysis: driven by census units—the screening tool relies on the census "building blocks": census blocks, block groups, and tracts. When drawing the study area, whole census units can be included. It is assumed that the demographic characteristics are evenly distributed across the unit.

Smallest-scale analysis: limited data—the U.S. Census does not make income or LEP data available for the smallest census units (census blocks).

Data "decay"—the U.S. Census is only conducted every 10 years. In addition, some of the most detailed data files do not become available until several years after the census has been conducted. Thus, the census data used in the screening tool may become out of date by 10 years or more. (The American Community Survey, now in its early stages of development, offers the possibility of annually updated data but, because it relies on relatively small samples, it is not likely to be useful for an environmental justice analysis at the project or corridor level.)

Inability to forecast future demographic characteristics—with transportation plans and projects, it may be important to predict what the area's demographics will be like 20 years in the future. The screening tool does not have forecasting capability, because it is extremely difficult to quantitatively forecast demographic characteristics (e.g. race, income), especially at scales such as census block groups or census tracts.

Inability to include non-residents in the screening analysis—the U.S. Census collects demographic information based on residency; thus, the screening tool only takes into account residents of the study area. For an environmental justice analysis, however, it may be important to consider non-residents as well: in particular, people such as workers and school children who spend many of their waking hours in the area. (DOT guidance notes that, in addition to people living close by each other, circumstances may warrant taking into account geographically dispersed or transient groups.)

5.3 Techniques to augment the GIS-based demographic screening tool

To get a fine-grained understanding of the demographic makeup of the study area, now and in the future, additional sources of information and additional methods can help.

For a more exhaustive environmental justice analysis, the GIS-based screening tool should be augmented with one or more of the techniques described below. The extent to which these other demographic assessment methods are needed depends upon the particular project or plan. As with the impact analysis described in Chapter 6 and the consultation practices described in Chapter 7, projects and plans with significant potential impacts will merit the closest and most detailed attention.

5.3.1 Additional sources of demographic information

Beyond the most recent U.S. Census data, other sources of information include:

1. Within the study area:

- Neighborhood organizations
- Schools
- Major employers
- Local businesses
- Churches

2. ***Within the local political jurisdiction:***

- Elected officials
- Social service agencies and organizations
- Health agencies and organizations
- Economic development agencies and organizations
- Transit agencies
- Chamber of commerce

Contacting a combination of these information sources can "fill in the gaps" on what the demographic makeup of the study area is *now* (as opposed to when the last census was taken), and what its makeup is likely to be in the coming years. These sources also can supply information on non-residents, especially workers and school children, who spend much of their time in the study area.

Resources

For a discussion of some of these information sources, see:
California Department of Transportation, *Desk Guide: Environmental Justice in Transportation Planning and Investments* (January 2003), http://www.dot.ca.gov/hq/tpp/offices/opar/EJDeskGuideJan03.pdf , pp. 71-73

5.3.2 Additional methods of demographic analysis

NCHRP Report 532, *Effective Methods for Environmental Justice Assessment* (2004), details several methods for identifying protected populations. Three methods that complement the GIS-based demographic screening tool are described below. These methods range from simple to complex. In choosing the appropriate method(s), the size of the study area and the complexity and importance of the foreseen impacts should be considered.

1. **Field survey**

This method – also known as a "dashboard" or "windshield" survey – requires traveling around the area and taking notes. Steps include (1) obtaining maps, (2) planning the route, (3) performing the field survey and collecting field notes, and (4) conducting follow-up activities such as talking with community members (see Method 2 below). In step (3) of the field survey, it is important to note key locations such as schools, playgrounds, hospitals, and nursing homes. Mapping locations can be aided with Global Positioning System (GPS) technology. Photographs can be useful for documenting information about appearance and relative location. If a large study area or a corridor is to be covered, it may be advisable to select specific locations for the field survey.

Uses:	corridor; project
Data needs:	low/medium
Expertise required:	GPS and photo interpretation (optional)

Resources

For a discussion of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 34-36

2. **Local knowledge and public input**

This method draws on the sources of information listed under 5.3.1 as well as on members of the public more generally. Techniques to get public input and access to local knowledge include interviews, focus groups, surveys, and feedback from public meetings.

Uses:	system; corridor; project
Data needs:	low
Expertise required:	public-participation-based techniques

Resources

For a discussion of this method and its techniques, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 24-26

3. Environmental justice index

Using census units (e.g., block groups), this method combines information on minority population, low-income population, and population density to develop a single environmental justice index (EJI). As typically formulated, the EJI scoring ranges from 0 to 100. A very high EJI "score" indicates that a high population density is present and that a high percentage of that population is both minority and low income.

The EJI is best suited for relatively large study areas. While useful for showing concentrations of protected populations, the EJI should not be used as a definitive means to identify protected populations. Groups without very high EJI scores may still need consideration.

Uses:	system; corridor; project
Data needs:	medium/high
Expertise required:	census data, GIS

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 47-50

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6.0 Analytic Practices: Assessing Disproportionately High and Adverse Impacts

6.1 Factors to consider

In assessing the potential for disproportionately high and adverse impacts on protected populations, judgments are needed regarding several crucial questions. As described below, these include:

- What are adverse impacts? … and to be considered, how significant must they be?
- What does "disproportionate" mean?
- How should cumulative and multiple impacts be taken into account?
- Which impacts are the most important, and how extensively should they be analyzed?

6.1.1 What are adverse impacts, and what does "significant" mean?

DOT Order 5610.2 states that adverse effects

> may include, but are not limited to: bodily impairment, infirmity, illness or death; air, noise, and water pollution and soil contamination; destruction or disruption of man-made or natural resources; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality; destruction or disruption of the availability of public and private facilities and services; vibration; adverse employment effects; displacement of persons, businesses, farms, or nonprofit organizations; increased traffic congestion, isolation, exclusion or separation of minority or low-income individuals within a given community or from the broader community; and the denial of, reduction in, or significant delay in the receipt of, benefits of DOT programs, policies, or activities.

While this list is extensive, judgment is needed about whether an adverse effect is significant enough to merit consideration. The *Tennessee Environmental Procedures Manual* includes by reference the definition of "significantly" used in

NEPA regulations from the CEQ (http://ceq.eh.doe.gov/nepa/regs/ceq/1508.htm#1508.27).

The *Manual* specifies the following:

3.1.1 Significance

In essence, the level of analysis and the class of documentation are tied to a project's potential to have "significant" adverse environmental effects. The term "significant," as used in NEPA, requires considerations of context and intensity, terms that are defined below.

3.1.1.1 Context

The potential significance of an action must be analyzed in several contexts, such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the physical setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

3.1.1.2 Intensity

The assessment of significance must also consider the severity or intensity of the impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

- Impacts that may be both beneficial and adverse. A significant effect may exist even if the federal agency believes that, on balance, the effect will be beneficial.
- The degree to which the proposed action affects public health or safety.
- Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
- The degree to which the effects on the quality of the human environment are likely to be highly controversial.

- The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
- The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.
- The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
- Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.

6.1.2 What does "disproportionate" mean?

DOT Order 5610.2 specifies that "disproportionate" refers to an impact that either (1) will be predominantly borne by the protected population, or (2) will be more severe or greater in magnitude for the protected population than for others. This leaves unanswered a number of questions, however. For example:

- Over what time period should a burden or benefit be evaluated?

- What should the comparison population group be?

- What is being compared? … an *absolute* measure of performance (e.g., of air quality) for a protected population vs. other populations? … the *pre- and post-project change* in the performance measure for the protected population? …the *relative pre- and post-project change* for the protected population vs. other populations?

- What if a transportation project will create a net burden for one part of the protected population but a net benefit for another part of the protected population?

(For questions such as these, see NCHRP Project 8-36 (11), *Technical Methods to Support Analysis of Environmental Justice Issues* (April 2002), p. 4-33 http://www.transportation.org/sites/planning/docs/nchrp11.pdf .)

6.1.3 Secondary and cumulative impacts

DOT Order 5610.2 states that:

> Adverse effects means the totality of significant individual or *cumulative* human health or environmental effects, including interrelated social and economic effects… (emphasis added)

Similarly, CEQ's environmental justice guidance for NEPA (1997) directs agencies to consider, among other things, whether adverse effects will occur in a minority or low-income population that is already affected by cumulative or multiple exposures to environmental hazards.

As noted above, Section 3.1.1.2 of the *Tennessee Environmental Procedures Manual* (2007) states that in evaluating the intensity of an impact, consideration should be given to "whether the action is related to other actions with individually insignificant but cumulatively significant impacts."

Section 5.1 of the *Tennessee Environmental Procedures Manual* (2007) identifies three types of impacts that must be addressed under NEPA and many other environmental regulations. These include

1) direct impacts from a project – e.g., property acquisition, noise, etc.;

2) indirect (or secondary) impacts from a project that, while removed in time and/or distance from the project, are reasonably foreseeable—e.g., land use changes; and

3) cumulative impacts resulting from the incremental impact of the project when added to past, current, or reasonably foreseeable actions by this or other agencies—e.g., increased air pollution.

The *Manual*, then, uses the term "cumulative" to encompass impacts from multiple sources as well as impacts that accrue over time. Both need to be considered when assessing individual adverse impacts.

6.1.4 Project-dependent depth of analysis and priority of impacts

Each transportation project is unique. As the *Tennessee Environmental Procedures Manual* notes, projects vary in type, size, and complexity as well as in their potential to affect the environment. Chapter 3 of the *Manual*, drawing on NEPA terminology, distinguishes three basic classes of action:

> Categorical Exclusion (CE) projects: projects that cause minimal social, economic, or environmental impact
>
> Projects requiring an Environmental Assessment (EA): i.e., larger scale projects that do not meet the requirements of a Categorical Exclusion, or those for which the significance of the environmental impact is not clearly established.
>
> Projects requiring an Environmental Impact Statement (EIS): i.e., projects that will cause a significant adverse impact on the environment.

(These three classes roughly correspond to Levels Two through Four, respectively, in TDOT's 2006 *Public Involvement Plan.* For more information, see http://www.tdot.state.tn.us/documents/pip0206.pdf for the plan in full or Chapter 7 of this desk guide for a brief summary.)

These classes and levels suggest that, for more complex projects with more significant potential impacts, the depth of analysis should be correspondingly greater. However, even seemingly simple projects that appear to have minimal impacts may raise environmental justice issues that bear careful investigation. Moreover, transportation projects will vary in which impacts are significant: in one project, for example, noise may be the greatest concern, while in another project, displacement of residents may be the most significant impact.

Resources

For more information on defining disproportionately high and adverse impacts for transportation projects in Tennessee, see:
Tennessee Environmental Procedures Manual (2007)

http://www.tdot.state.tn.us/environment/tepm.htm

For the homepage of EPA's Office of Environmental Justice, see:
http://www.epa.gov/environmentaljustice/index.html

For EPA's *Toolkit for Assessing Potential Allegations of Environmental Injustice*, see:
http://www.epa.gov/compliance/resources/policies/ej/ej-toolkit.pdf

For EPA's *Environmental Justice Smart Enforcement Assessment Tool* (EJSEAT), see:
http://www.epa.gov/compliance/resources/policies/ej/ej-seat.html

For EPA's *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses*, see:
http://www.epa.gov/compliance/resources/policies/ej/ej_guidance_nepa_epa0498.pdf

6.2 Assessment techniques for potential adverse impacts

The techniques briefly described in this section cover thirteen types of potential impacts. They include impacts on:

1. Accessibility and mobility
2. Safety
3. Property values
4. Jobs and business income
5. Displacement and relocation
6. Community Cohesion
7. Cultural resources
8. Green spaces
9. Noise
10. Visual quality
11. Air quality
12. Water quality
13. Hazardous materials

The section is prefaced with several caveats.

First, the assessment techniques given in this section are drawn mainly although not exclusively from NCHRP Report 532, *Effective Methods for Environmental Justice Assessment* (2004), available on-line at http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf.

The techniques briefly described here should be accompanied with a review of the extensive material on impact analysis in Chapter 5 of the *Tennessee Environmental Procedures Manual* (2007). That chapter is approximately 65 pages long and covers the following:

5.1 TYPES OF IMPACTS
- 5.1.1 Definition of Impact
  - 5.1.1.1 Direct Impacts
  - 5.1.1.2 Indirect and Cumulative Impacts
  - 5.1.1.3 Level of Impact

5.2 RECORDS CHECK IN EARLY PROJECT PLANNING PHASE
- 5.2.1 Cultural Resources
- 5.2.2 Natural Resources
- 5.2.3 Hazardous Materials
- 5.2.4 Environmental Justice
- 5.2.5 Map Review

5.3 TECHNICAL STUDIES AND OTHER IMPACT ANALYSES
- 5.3.1 Overview
- 5.3.2 Cultural Resources (Section 106 and Section 4(f))
  - 5.3.2.1 Applicable Regulations
  - 5.3.2.2 Agency Coordination and Public Involvement
  - 5.3.2.3 Study Process for Architectural/Historical Resources
  - 5.3.2.4 Study Process for Archaeological Resources
- 5.3.3 Natural Resources
  - 5.3.3.1 Applicable Regulations
  - 5.3.3.2 Study Process for Natural Resources
- 5.3.4 Noise
  - 5.3.4.1 Applicable Regulations
  - 5.3.4.2 Study Process for Noise
- 5.3.5 Air Quality
  - 5.3.5.1 Applicable Regulations
  - 5.3.5.2 Study Process for Air Quality

5.3.6 Hazardous Materials
5.3.6.1 Applicable Regulations
5.3.6.2 Study Process for Hazardous Materials
5.3.7 Conceptual Stage Relocation Plan
5.3.7.1 Applicable Regulations
5.3.7.2 Study Process for Relocations
5.3.8 Soils and Geology Analysis
5.3.8.1 Applicable Regulations
5.3.8.2 Study Process for Soils and Geology
5.3.9 Sections 4(f) and 6(f) Analyses
5.3.9.1 Section 4(f) of the Department of Transportation Act
5.3.9.2 Section 6(f) of the Land and Water Conservation Fund Act
5.3.9.3 Section 6(f) and 4(f) Differences
5.3.10 Other Impact Analyses
5.3.10.1 Social/Community Impacts
5.3.10.2 Environmental Justice and Non-discrimination
5.3.10.3 Economic and Business Impacts
5.3.10.4 Land Use Planning and Land Use Impacts
5.3.10.5 Farmland Impacts
5.3.10.6 Visual Quality Impacts
5.3.10.7 Traffic and Crash Impacts
5.3.10.8 Construction Impacts
5.3.10.9 Wild and Scenic Rivers Impacts
5.3.10.10 Floodplain Impacts
5.3.10.11 Pedestrian and Bicycle Considerations
5.3.10.12 Energy Impacts
5.3.10.13 Indirect and Cumulative Impacts

5.4 REFINE ALTERNATIVES, AS WARRANTED BY IMPACT FINDINGS

Second, the techniques discussed in this section do not encompass secondary and cumulative impacts. Those other impacts will need to be factored into the total environmental justice assessment.

Third, the techniques covered below are intended for evaluating potential impacts within low-income and minority communities. They do not address how those impacts, once understood, should be weighed against impacts outside these

communities to determine whether the impacts are disproportionate. Instead, they set the stage for that qualitative evaluation.

Fourth, the techniques described for each type of impact generally are arrayed from simple to complex techniques (with the latter often more costly and time-consuming). It may be advisable to start with the simple techniques as a basis for determining whether more detailed analytic methods are needed.

And fifth, many of the techniques described here entail engagement with the potentially affected community. As stressed in Chapter 7, consultation is an important complement to analysis. Often, in fact, once basic information and maps have been assembled, consultation becomes the central means for effective analysis in an environmental justice assessment.

6.2.1 Accessibility and mobility

In these days of the Internet, it is possible to accomplish a great deal without leaving home. Accessibility is just a click away. For many activities, goods, and services, however, travel outside the home remains necessary.

In terms of travel, accessibility is determined by both the ability to reach desired destinations and the ease of doing so. Mobility is the ability to move and the ease of doing so. Mobility is a means to achieve accessibility. For people with limited mobility (e.g., people who don't own vehicles), achieving accessibility may require proximity—that is, living close to schools, workplaces, shops, medical care, churches, playgrounds, etc.

A transportation improvement typically improves the mobility of the transportation facility users. It may get them to their destination more rapidly, or it may offer an alternative means of travel. At the same time, however, a transportation improvement may decrease mobility and accessibility for other people. It may impede walking or bicycling, as discussed under "Safety," and it may prompt destination shops, services, workplaces, etc. to move to inconvenient locations, as discussed under "Jobs and Business Income." The assessment methods below focus on the ability of people living within a particular area to travel by vehicle to desired destinations. These methods do not take into account *indirect* positive or negative impacts of transportation projects on mobility and accessibility.

Assessment methods. NCHRP Report 532 describes six methods for estimating accessibility. The first three methods are trip-based approaches that use a four-step procedure: trip generation, trip distribution, mode split, and traffic assignment. While these methods can indicate *aggregate* travel patterns, they are not well-suited to analyzing the accessibility effects of transportation improvements on protected populations. Method 4, which uses the Highway Economic Requirement System – State model, estimates the performance of road segments most frequently used by protected populations. All four of these approaches have limitations: they usually do not take non-motorized transit into account, nor do they account for "chained" (multiple destination) trips. In contrast, activity-based approaches take into account interdependencies of trip decisions and may be more suited to an environmental justice analysis. Activity-based approaches are more difficult, however, as Methods 5 and 6 illustrate.

1. Unmodified transportation demand (TD) models

Measures travel time between Traffic Analysis Zones (TAZs) before and after a transportation improvement.

Uses:	TD between TAZs
Data needs:	medium
Expertise required:	TD modeling; census data analysis

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 171-173

For information on TAZs and their use with census data, see:
http://www.census.gov/geo/www/cob/tz_metadata.html

2. Adapted TD models

Similar to Method 1, but redefines TAZs into smaller areas such as individual census tracts.

Uses:	TD between census tracts
Data needs:	medium/high
Expertise required:	TD modeling; census data analysis

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 173-175

3. Advanced adapted TD models

Similar to Methods 1 and 2, but disaggregates TAZs using census-block-group data.

Uses:	TD between census blocks
Data needs:	high
Expertise required:	TD modeling; census data analysis

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 175-176

4. Highway Economic Requirements System – State (HERS-ST) model

Estimates changes in average vehicle speed or levels of congestion. Taken with the GIS-based TransCAD, the model enables an assessment of how an existing road network serves protected populations and how improvements will affect that service. This model requires data on average annual daily traffic (AADT), highway capacity, pavement condition, and line width. These data may be available from the Highway Performance Monitoring System (HPMS) database.

Uses:	traffic congestion and/or travel cost
Data needs:	medium
Expertise required:	HERS-ST application; TransCAD

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 176-180

For information on the HPMS database, see:
http://www.fhwa.dot.gov/policy/ohpi/hpms/index.htm

5. **Activity-based travel simulation**

Contains modules that enable the combination of stated and revealed preference data with baseline activity pattern data, network and land-use data, and socio-economic and demographic data. This method can provide a fairly accurate analysis of travel-time savings; however, it is complex and data-intensive.

Uses:	traffic congestion and/or travel cost
Data needs:	high
Expertise required:	advanced modeling tools and techniques

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 180-182

6. **Transportation Analysis and Simulation System (TRANSIMS)**

An activity-based travel demand model that has four primary modules with a feedback mechanism. The modules include 1) a population synthesizer, 2) an activity generator, 3) a route planner, and 4) a traffic micro-simulator. Input files required include census data, population forecasts, traveler surveys, and transportation network data (routes and destination points). The household travel and activity surveys are particularly important for accurate results. TRANSIMS is supported by the FHWA's Travel Model Improvement Program (TMIP).

Uses:	traffic congestion and/or travel cost
Data needs:	high
Expertise required:	advanced modeling tools and techniques

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 182-186

For information on TRANSIMS, see:
http://tmip.fhwa.dot.gov/transims/

6.2.2 Safety

Two types of safety must be considered: the safety of those using the transportation facility, and the safety of those coming into sometimes fatal contact with it. A 2003 report by the National Center for Health Statistics indicated that African-American children are three times more likely than white children to be killed in traffic crashes; Hispanic children, two times more likely than white children. This disparity may be due to differences of culture, education, or income, especially poverty that keeps parents from acquiring car seats for children.

The greater environmental justice concern – in the sense of disparate impacts – concerns passersby (pedestrians and bicyclists) who come in contact with vehicles. High-speed, high-volume traffic as well as curb parking can create hazards to those near by, especially children. Studies have indicated that children playing in the street, living in multi-family housing, or living near major streets and highways are especially at risk of being struck by a vehicle.

Safety improvements for roadway users may not translate into increased safety for pedestrians and bicyclists. Instead, these improvements may have the reverse effect.

Assessment methods. NCHRP Report 532 describes nine methods for analyzing the safety effects of transportation projects to, variously, road users, pedestrians, and bicyclists. Methods 1 and 2 address road users and pedestrians. Methods 3 and 4 address pedestrians and non-motorized vehicles. Methods 5 and 6 specifically address bicyclists; Methods 7 and 8, pedestrians. Method 9 is the most comprehensive but challenging.

1. Analysis of national data

Uses national data on crashes to assess the safety effects of a transportation improvement. This method uses data on motor vehicle traffic fatalities and injuries to reach estimates based on roadway functional classes. It can give a general idea of the changes in road user and pedestrian safety that may result from a roadway upgrade. However, it assumes that the roadway will perform like the national average.

Uses: road users; pedestrians
Data needs: low
Expertise required: spreadsheet

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 140-142

2. Comparison approach

Overcomes some of the limitations of Method 1. Rather than relying on national statistics, this approach uses crash rates on roads in the region that are similar to the project under consideration.

Uses: road users; pedestrians
Data needs: medium
Expertise required: spreadsheet

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 142-143

3. User demand and evaluation surveys

Can be used to gather use information from people who walk or bike, as well as information on specific barriers and other problems.

Uses: pedestrians; cyclists
Data needs: low
Expertise required: survey design; spreadsheet

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 161-162

4. **Barrier effect analysis**

Estimates the "barrier effect" that highways and traffic can have on pedestrians and cyclists, including travel time delays they will experience due to crossing difficulties. This can be a significant problem for protected populations.

Uses:	pedestrians; cyclists
Data needs:	medium
Expertise required:	spreadsheet

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 157-161

5. **Bicycle compatibility index**

Can be used to estimate the effects of transportation projects on bicycle travel. This method is based on the Bicycle Compatibility Index (BCI) developed for FHWA (Harkey et al. 1998).

Uses:	cyclists
Data needs:	medium
Expertise required:	spreadsheet

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 150-154

For information on the BCI, see:
Harkey, David L., Donald W. Reinfurt, and Alex Sorton. 1998. *The Bicycle Compatibility Index: A Level-of-Service Concept.* Federal Highway Administration, FHWA-RD-98-095. Washington, DC: U.S. Department of Transportation.

6. **Bicycle safety index**

Can be used to estimate how bicycle safety may be affected by road changes. This method is based on the Bicycle Safety Index (BSI) as developed by Davis (1987) and modified by Epperson (1994).

Uses:	cyclists
Data needs:	medium/high
Expertise required:	spreadsheet

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 147-150

For information on the BSI, see:

Davis, J. 1987. *Bicycle Safety Evaluation.* Chattanooga, TN: Auburn University, City of Chattanooga, and Chattanooga-Hamilton County Regional Planning Commission.

Epperson, Bruce. 1994. "Evaluating Suitability of Roadways for Bicycle Use: Toward a Cycling Level-of-Service Standard." *Transportation Research Record 1438.* Washington, DC: Transportation Research Board, National Research Council, pp. 9-16.

7. Pedestrian street crossings

Evaluates the likelihood that pedestrians will cross intersections unsafely, based on (1) whether an intersection is signalized, and (2) the average pedestrian delay at the intersection. GIS then can be used to show areas of high pedestrian demand and the effects of the project.

Uses:	pedestrians
Data needs:	low
Expertise required:	spreadsheet; GIS

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 154-155

8. Pedestrian danger index

Assesses the relative danger that a roadway passing through several neighborhoods may pose to pedestrians, using population data, pedestrian

data, and pedestrian crash data at the neighborhood level. This method can help to identify where funds should be targeted to improve pedestrian safety.

Uses:	pedestrians
Data needs:	medium
Expertise required:	spreadsheet

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 155-157

9. Regression analysis

Predicts crash rates on the basis of road segment characteristics such as grade, curves, traffic volume, lane width, pavement quality, etc. For the statistical method – regression analysis – to produce reasonably accurate predictions, extensive data are needed. The Mapping and Statistics Office of TDOT's Planning Division is a source of traffic and accident data.

Uses:	safety effects of road improvements
Data needs:	high
Expertise required:	statistical analysis

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 143-147

6.2.3 Property values

Property values reflect the market desirability of the property. Market desirability is based on many factors, not just transportation, but a transportation project can trigger changes in property values. These changes arise partly because of various impacts of the transportation project – for example, increased noise on the one hand and increased accessibility on the other, Property values are not, however, a fully accurate summary measure for all other impacts, because markets are not based on "perfect information."

Some considerations that arise in performing an environmental justice assessment of property values include the need to (1) *predict* property value changes, (2) consider property value impacts on both *owners and renters*, and (3) consider both *residential and commercial* property values.

Assessment methods. NCHRP Report 532 describes three methods for analyzing property values. It also notes (p. 279) that collecting needed data for the more elaborate methods can be quite costly. It recommends starting with the first method, to make a preliminary determination of whether a more extensive analysis is needed.

Resources

For sources of additional information on (1) housing prices and local amenities or disamenities, (2) housing prices and transportation distances, (3) commercial property prices and location, and (4) property value increases near transit stations, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 286-289

1. Expert opinion and market studies

Local real estate experts can be consulted, or a more systematic market study can be conducted. The market study may include both expert opinion and one or more of the methods listed below.

Uses:	corridor; project
Data needs:	low
Expertise required:	data collection, interview

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 279-281

2. Property comparisons and appraiser opinion

To do property comparisons, an appraiser finds recently sold properties in the same vicinity and with similar characteristics to the properties in question.

Uses:	corridor; project
Data needs:	medium
Expertise required:	property appraisal

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 281-282

3. Hedonic regression

This method uses a statistical regression technique to evaluate how various factors – ranging from basic building attributes to location attributes – can affect property values. The method requires that input data cover a wide range of properties.

Uses:	system; corridor; project
Data needs:	high
Expertise required:	statistical methods

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 282-285

6.2.4 Jobs and business income

Transportation projects can positively or negatively affect business income and job opportunities by making business locations more or less accessible. During construction and after construction, accessibility may be affected in different ways.

Transportation projects also may cause a redistribution of business activity within the project area or between the project area and other areas. These redistributive effects depend not only on the accessibility of the businesses that are the focus of attention, but also on the relative attractiveness and convenience of other, competing businesses.

The assessment methods discussed below focus on businesses *within* the project area. However, indirect impacts on businesses that are *outside* the project area may merit consideration as well.

Assessment methods. According to NCHRP Report 532, an environmental justice assessment for the economic impacts of a transportation facility such as a highway involves two steps: assessing the spatial distribution of the positive and negative impacts; then overlaying this assessment on demographic information about minority and low-income areas to assess whether the distributional impacts are disparate. Chapter 5 of this guide discusses methods for gathering demographic information about a potential environmental justice area. NCHRP Report 532 summarizes three methods for assessing the spatial distribution of positive and negative economic impacts.

1. Map and GIS assessment

The core idea of this method is to identify businesses that are likely to be affected either during construction or after construction of a transportation project, due to their proximity to the project. These can be identified using a "windshield survey" and then mapped. A preliminary assessment of the nature and extent of economic impacts can be based on rules of thumb such as walking or driving distances, or on expert judgment. It may then be necessary to consider the viability of competing businesses within the market area surrounding the project area.

Uses:	corridor; project
Data needs:	low
Expertise required:	GIS

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 219-221

2. Surveys or focus groups

Surveys and/or focus groups can help analysts to understand subjective attitudes toward the economic impacts of a transportation project: for example, expected business losses during construction, expected benefits after construction is complete, and changed competitiveness due to changed accessibility.

Uses:	system; corridor; project
Data needs:	medium
Expertise required:	surveying or group interaction and facilitation

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 221-224

3. Gravity models

Gravity models have two basic elements – scale and distance – to determine the interaction between pairs of geographic locations. They can be adapted to assess the environmental justice impacts of transportation projects by analyzing how changes in accessibility affect the relative attractiveness of neighborhoods. They are best suited for large transportation projects that cause major changes in accessibility over a wide area.

Uses:	project
Data needs:	high
Expertise required:	accessibility modeling

Resources
For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 224-228

6.2.5 Displacement and relocation

Displacing residents and businesses within areas that are predominantly minority or low-income is potentially very controversial. So is displacing low-income or minority individuals in areas that are not considered environmental justice communities.

Historically, displacement of low-income and minority populations has occurred because of major public transportation and economic redevelopment projects – the highway and urban renewal projects of the 1960s, for example. More recently, it has occurred because of private gentrification of neighborhoods that, while sometimes in disrepair, have provided inexpensive housing and been the cores of long-standing communities. Displacement also is a sensitive issue because of past discrimination in rental and ownership opportunities as well as redlining by banks denying loans based on location. All of these factors have helped to make displacement a "hot button" issue.

To address equity in displacement and relocation, regulations pursuant to Title VI ban discriminatory practices based on race, color, or national origin. Another federal act – the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended in 1987 – provides for uniform and equitable treatment of persons displaced by government projects. Within TDOT, procedures for relocation have been spelled out.

Resources

For U.S. DOT regulations pursuant to Title VI, see:
http://www.usdoj.gov/crt/cor/byagency/dotvi.htm

For a FHWA website on real estate, see:
http://www.fhwa.dot.gov/realestate/

For a FHWA document, "Your Rights and Benefits as a Displaced Person under the Federal Relocation Assistance Program," see:
http://www.fhwa.dot.gov/realestate/rights/index.html

For TDOT procedures on the "Conceptual Stage Relocation Plan," see:
Section 6.3.2.6 of the *Tennessee Environmental Procedures Manual* (2006).

For TDOT's brochure for residential, business, and farm displacees, see:

http://www.tdot.state.tn.us/Chief_Engineer/assistant_engineer_design?row/relocation.pdf

Assessment methods. The assessment method for displacement is seemingly simple. In the early stages of a transportation plan or project, the likelihood of displacing residences, farms, businesses, and other organizations because of right-of-way (ROW) acquisition can be preliminarily assessed. A determination can be made of whether the affected area is predominantly low-income or minority, and if so, whether it is being disproportionately affected. Several complicating factors arise, however:

- The final ROW may not be known until the project development stage.
- Rumors about the project and ROW acquisition can have unsettling psychological effects on potentially displaced people, whose futures are now uncertain.
- Low-income or minority people living outside of a protected area (i.e., a predominantly low-income or minority area) also may be displaced because of ROW acquisition for the project.
- A business or other organization in a protected neighborhood, even if it is not owned by a low-income or minority person, may provide goods and services to the neighborhood and jobs for local residents.
- A farm in a rural area, even if it is not owned by a low-income or minority person, may provide jobs for low-income or minority workers.
- If a transportation project will impinge on a property, people's desires concerning buyouts and relocation cannot be known without talking with them. Some may want to stay; others, to move.

Because of these factors, *personal interviews* with potentially displaced owners and occupants are an important complement to counting the number of potential displacements and developing a demographic profile of their owners and occupants. If the plan or project is protracted, these interviews may need to be repeated – either because owners and occupants have changed, or because their circumstances and wishes have changed.

6.2.6 Community cohesion

A community is not primarily a physical place. It is a social entity characterized by the community members' interaction with each other, common ties, and mutual aid. A sense of community contributes to feelings of belonging, camaraderie, security, and identity. Community cohesion is an indication of the strength of the community. While community cohesion is largely social and psychological, it can be dramatically affected – for better or for worse – by changes in the physical setting: for example, by a new road in its midst.

Predicting changes in community cohesion relies mainly on qualitative methods: in particular, communication with community members and common sense judgment. It is likely to be a blend of public discussion and careful analysis.

Assessment methods. NCHRP Report 532 reviews five steps in assessing the possible impacts of a transportation project on community cohesion:

1) define the impact area and identify communities or neighborhoods within it;
2) collect information from community members about important local activities and gathering places;
3) spend time in the study area, including site walks and visits to gathering places;
4) estimate the existing level of community cohesion, in part by consulting with community members; and
5) predict the project's impacts on cohesiveness.

NCHRP Report 532 describes three methods for Step 4 (Methods 1 through 3 below). All use standard qualitative social science techniques and are particularly helpful in the planning phase of a project. The report also describes two methods for Step 5 (Methods 4 and 5 below).

1. Focus groups

Brings together small groups (about six to eight people each) to discuss key issues regarding a proposed project. This method can be used to elicit views on a number of potential impacts of the project (e.g., physical barriers, travel times, noise levels outdoors, community open space) that could in turn affect community cohesion.

Uses: assess current level of cohesion; identify sensitive issues

Data needs: low
Expertise required: group facilitation

Resources

For a description of this method, including a list of questions that could be used for the focus groups, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 207-209

2. Personal interviews

Uses one-on-one interviews with community leaders. This method is especially useful early in the planning phase of a project, to assess the geographic area of concern and the current community cohesiveness within the area. The interviews typically are semi-structured, with open-ended questions that allow for follow-on discussion.

Uses: assess geographic area of concern; current level of cohesion; sensitive issues
Data needs: low
Expertise required: conducting interviews

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 209-211

3. Deliberative polling

Convenes diverse members of an affected area to deliberate on key issues. A representative sample of residents is brought together to participate in an intensive one-or-two-day information session. During the session, the participants are briefed on the project and its possible impacts and are encouraged to raise questions. The participants then take part in an "issues" session that is televised locally, to allow others to learn about the project and communicate their concerns to the participants. This is followed by a second televised session in which the project's pros and cons, as well as possible modifications, are further deliberated. Because the method is expensive, it usually is reserved for high-cost, high-controversy projects where the affected communities are large and direct citizen involvement may be difficult.

Uses: assess current level of cohesion; identify sensitive issues

Data needs: low
Expertise required: TV production; polling techniques

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 211-212

4. Stop watch and distance wheel

Uses simple means – a stop watch and a distance wheel – to measure walking time and distance between various origins and destination points. The key assumption is that facilities contributing significantly to community cohesion are located within walking distance of residents. This method is best-suited to projects with a relatively small, well-defined impact area.

Uses: evaluate pedestrian travel times and distances
Data needs: low
Expertise required: none

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 214-215

5. Travel demand (TD) model with GIS capability

Uses models such as TransCAD to predict prospective changes in distance and travel time between places that are important to affected residents. This method is best suited to projects with a relatively large impact area.

Uses: estimate TD between census blocks
Data needs: high
Expertise required: TD modeling; census data analysis; GIS

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 212-214

6.2.7 Cultural resources

"Cultural resources" is a vague term. In the United States, taken most narrowly, it sometimes is thought to refer to places (districts, sites, structures, objects, etc.) listed in or eligible for the National Register of Historic Places (NRHP). The NRHP was authorized under the 1966 National Historic Preservation Act and is maintained by the National Park Service.

Sec. 110 of the National Historic Preservation Act as amended spells out the responsibilities of federal agencies regarding historic preservation. Sec. 106 of the Act requires that federally funded projects include an analysis of historic resources that may be affected by the project. (In Tennessee, the State Historic Preservation Office (SHPO) is the Tennessee Historical Commission, within the Tennessee Department of Environment and Conservation.) Other federal laws governing cultural resources – especially the Archaeological Resources Protection Act and Sec. 4(f) of the Department of Transportation Act – also may be relevant to a transportation project.

Usually, however, the term "cultural resources" is treated broadly to include aspects of the built and natural environment that are treasured by a community or group whether they are protected by law or not. Identifying cultural resources can take the combined efforts of professionals (e.g., historic preservationists, archeologists, ethnographers, and sociologists), local governments, local non-government organizations, and community members.

Resources

For information on the NRHP, see:
http://www.cr.nps.gov/nR/about.htm

For the National Register Information System (NRIS), a database of properties listed in or eligible for the NHRP, see:
http://www.nr.nps.gov/

For guidelines to Sec. 110 of the National Historic Preservation Act, see:
http://www.cr.nps.gov/hps/pad/sec110.htm

For Sec. 106 regulations as revised August 5, 2004, see:
http://www.achp.gov/regs-rev04.pdf

For other potentially relevant federal laws, regulations, guidelines, and executive orders, see:
http://www.cr.nps.gov/linklaws.htm

For more information on the Tennessee Historical Commission, see:
http://tennessee.gov/environment/hist/

For NCHRP Report 542, *Evaluating Cultural Resource Significance: Implementation Tools* (2005) – a report focused on evaluating historic properties – see:
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_542.pdf

Assessment methods. According to NCHRP Report 532, a cultural resource evaluation for a transportation project involves three general steps:

- Determine the area of potential effect (APE). There may be different APEs for different cultural resources.
- Inventory the cultural resources within the APE(s).
- Determine the physical, economic, and social impacts of the transportation project on the cultural resources.

Resources

For more information on these steps, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 295-298

NCHRP Report 532 describes three methods for analyzing cultural resources.

1. Multi-level impact valuation

Produces a summary of how a project would affect cultural resources in an area. Impacts are categorized as economic, environmental, and social. Interviews are conducted with local knowledgeable people, and a questionnaire is used to obtain input from local experts and representative community members. This method is recommended as an initial assessment technique. It also allows comparisons of alternative locations.

Uses:	project
Data needs:	low
Expertise required:	survey; interview

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 298-301

2. Site visit and survey with a community leader

Uses a well-known, well-respected member of the protected population to "bridge the gap" with that population and gather their opinions during a site visit. This method is especially appropriate if both the area of potential effect and the protected population are small.

Uses:	project
Data needs:	medium
Expertise required:	interview

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 301-302

3. Stakeholder and expert charrette

Used when people have varied perspectives and interests. The objective is to reach a consensus about cultural resources in the study area, their importance, and how to balance the cultural resources and the needs of the project.

Uses:	system; corridor; project
Data needs:	high
Expertise required:	group process; qualitative data analysis

Resources

For a description of this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 302-304

6.2.8 Green spaces

"Green spaces" include areas that can be used by members of the public – for example, parks, natural areas, outdoor recreation areas, and riverfront walks and other greenways. Uses will vary. Some areas can be used for intensive recreation; others just for walking. Some areas may be protected by Section 4(f) of the Department of Transportation Act or Section 6(f) of the Land and Water Conservation Fund Act.

"Green spaces" also include notable off-limits areas which, while not accessible to the public, have natural features that contribute significantly to the local quality of life. A notable off-limits area might be as small as a patch of ground with a single towering tree.

Resources

For information on Section 4(f) of the Department of Transportation Act and Section 6(f) of the Land and Water Conservation Fund Act, see:
Tennessee Environmental Procedures Manual (2007), Section 5.3.9 (pp. 5-36 – 65-47)
http://www.tdot.state.tn.us/environment/tepm.htm

Assessment methods. As with cultural resources (see Section 6.2.7), an assessment of the potential impacts of a transportation project on green spaces involves three steps:

- Determine the area of potential effects (APE). There may be different APEs for different green spaces.
- Inventory the green spaces within the APE(s).
- Determine the physical impacts of the transportation project on the green spaces, along with their associated social, psychological, and health impacts.

Analytical methods similar to those for cultural resources can be used. These include:

1. **Multi-level impact valuation**
2. **Site visit and survey with community leader**
3. **Stakeholder and expert charrette**

For details on these methods, see Section 6.2.7 above.

6.2.9 Visual quality

Inevitably, a transportation project will alter the appearance of the surrounding built and natural environment. For example, existing buildings may be removed; new structures such as bridges may be erected; natural features such as trees, streams, topography, etc. may be altered; new lighting may be installed.

The question is not whether alterations will occur, but how. Visual quality is thought to be highly subjective. Nevertheless, some values about what does and does not look good are widely shared. In addition, even to the extent that visual quality is subjective, its impacts on local people should be taken into account as an integral part of the project's design and development. Visual impacts on protected populations are especially important, if only because they often cannot afford to move elsewhere.

A variety of techniques are available to help with visual documentation, analysis, and communication: for example, photographs; illustrative sketches, plans, and sections; three-dimensional models; videos; and more technically demanding methods such as photo simulation, computer imaging and animation, and GIS viewshed analysis. For a discussion of these techniques, see http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 253-263

Visual documentation, analysis, and communication are not enough, however. In addition, methods are needed to assess the visual impacts of project on protected populations, and to determine whether those impacts are disproportionate.

Assessment methods. According to NCHRP Report 532 (p. 265), an EJ assessment of visual quality effects consists of four major steps:

(1) Identify protected populations.
(2) Identify visual values of the impacted populations.
(3) Communicate visual impacts to the affected populations.
(4) Analyze distributive effects.

NCHRP Report 532 details two methods for identifying the visual values of affected populations (Methods 1 and 2 below) and one method for analyzing distributive effects (Method 3 below).

1. **Visual preference survey**

This method can be used to assess people's values about current visual quality, proposed changes, and alternative design choices. Conducting surveys of both protected and nonprotected populations sets the stage for a subsequent analysis of distributive effects. The method relies on selecting relevant images or scenes that are then ranked for their appeal by respondents.

Uses:	project: select among design choices; compare values of populations
Data needs:	low
Expertise required:	survey methods; statistical methods

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 266-268

For a book on visual preference surveys, see:
A.C. Nelessen. 1994. *Visions for a New American Dream*. Chicago, IL: American Planning Association.

2. **Contingent choice method**

The contingent choice method asks respondents to make choices based on alternative hypothetical scenarios. Various choice formats can used, such as contingent ranking (rank alternatives), discrete choice (identify the preferred alternative), and paired ranking (rate two alternatives in terms of strength of preference). Respondents' choices are statistically analyzed using "discrete choice" techniques to determine the relative values for different characteristics of the scenarios. If one of the characteristics is monetary cost, the value to a respondent of the other characteristics can be indirectly monetized.

Uses:	project: compare values of populations
Data needs:	medium
Expertise required:	survey methods; statistical methods; economic analysis

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 268-272

3. Distributive effects analysis

This method can be used when preliminary screening has indicated that visual impacts on protected populations may be disproportionately great. The distributive effects analysis involves computing the visual quality impacts, as measured, for each protected and nonprotected population within "analysis areas" of the study area. (Analysis areas are subdivisions of the total study area that can be characterized with respect to their number of protected and nonprotected populations.) The results are then displayed on GIS-based maps.

Uses:	project: analyze distributive effects
Data needs:	medium/high
Expertise required:	statistical methods; GIS

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 272-273

6.2.10 Noise

Roadway noise arises from engines, tires on pavement, horns, and so forth. Noise increases with traffic volume and speed and varies depending upon the mix of vehicle types as well as the grade of the roadway. Trucks are especially noisy. Noise from other transportation modes can arise from engines, wheels on tracks, and so forth. Noise also can occur because of construction or maintenance of a transportation facility. In general, people located nearest a transportation project incur the greatest noise levels. Vibration also may occur from rail transit.

Except for people such as road workers exposed frequently to high-decibel noise from transportation, it is unlikely that hearing loss will occur from transportation noise. However, persistent noise can be a source of annoyance and stress for people who live, work, or try to play and relax near road traffic and other forms of transportation. Noise also may be especially disruptive to local uses that need quiet environments – for example, schools, hospitals, and churches. Not only noise levels but also noise pitch and noise patterns (continuous, repeated, random) should be considered.

The FHWA and FTA have developed methods to determine (1) project noise levels, and (2) whether these levels are significant enough to be considered an impact. The FTA uses three classifications – no impact, impact, and severe impact – based on the transportation project noise exposure, the nearby land use, and the existing noise exposure. NCHRP Report 532 argues, however, that:

> In general, environmental justice assessments of distributive noise effects should use these standard impact classifications and threshold levels only as a starting point. Evaluating the level of effects against standard thresholds is not acceptable as a final determination of "adverse effect"… . Perceptions of what constitutes an adverse noise effect can vary considerably from individual to individual and from community to community. For transportation projects, the noise impact criteria … may be used as a guide to determine whether levels of an effect *must* be mitigated according to regulation.
>
> NCHRP Report 532, p. 231,
> emphasis in the original

Resources

For FHWA, *Highway Traffic Noise and Abatement Policy and Guidance* (1995), see:
http://www.fhwa.dot/gov/legregs/directives/fapg/cfr0772.html

For FTA, *Transit Noise and Vibration Impact Assessment* (1995), see:
http://www.hmmh.com/rail_manuals.html

Assessment methods. NCHRP Report 532 describes three methods for assessing transportation noise impacts on protected populations. The first is an initial screening that can be used in most situations; in other words, for either highway or transit or for multiple modes. The second and third are more detailed assessments for highway projects and transit projects, respectively.

1. Initial evaluation

This method involves a data review to (1) identify protected populations in the study area, and (2) estimate the level of potential noise impact, typically by using "look-up" tables. A crucial first step is defining the impact area. Using this method, it can be determined whether protected populations are likely to experience noise impacts and whether more detailed analysis is merited.

Uses:	system; corridor; project
Data needs:	low
Expertise required:	spreadsheet; knowledge of census data and GIS

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 238-240

For information on FHWA's highway traffic noise models and look-up tables, see:
http://www.trafficnoisemodel.org/main.html

2. **Highway project noise analysis**

This method involves running a detailed highway noise model and then overlaying the results with demographic information. Distributive effects are estimated, and alternative scenarios may be explored.

Uses:	project
Data needs:	high
Expertise required:	noise modeling; knowledge of demographic data and GIS

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 240-247

For information on FHWA's highway traffic noise models and look-up tables, see:
http://www.trafficnoisemodel.org/main.html

3. **Transit project noise analysis**

This method addresses the noise and vibration impacts that may occur from transit projects. It provides for three levels of analysis: a screening procedure, to determine whether further analysis is needed; a general assessment, to identify the location and severity of noise and vibration in areas targeted by the screening procedure, and to consider alternative scenarios; and a detailed analysis, which identifies site-specific impacts and possible mitigation measures.

Uses:	project
Data needs:	medium/high
Expertise required:	noise/vibration evaluation methods; knowledge of demographic data, spreadsheets, and GIS

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 247-248

6.2.11 Air quality

Air quality is important to human health and the natural environment. Poor air quality can be especially harmful to sensitive populations such as children, seniors, and people with breathing problems such as asthmatics. While air quality may be affected by natural factors such as pollen, man-made sources can be major contributors to air pollution. Both outdoor and indoor air quality can affect a person's health. The worse the air quality, the more attention a potential new pollution source should receive. Road projects can contribute to diminished regional air quality and also to microscale "hot spots," especially from increased levels of carbon monoxide, nitrogen oxide, sulfur dioxide, and particulate matter caused by idling engines and congested, slow-moving traffic.

Resources

For more information on air pollutants and federal air quality standards, see: http://www.epa.gov/oar/oaqps/

For FHWA's Transportation Conformity Reference Guide, see: http://www.fhwa.dot.gov/environment/conformity/ref_guid/

Assessment methods. NCHRP Report 532 details four methods for assessing adverse air quality impacts. Each has a somewhat different purpose and degree of difficulty.

1. General air quality review

Documents local and regional air quality; identifies protected populations. This method can be used as an initial assessment to determine whether a more detailed analysis (microscale or regional) is needed.

Uses:	system; corridor; project
Data needs:	low
Expertise required:	spreadsheet; survey; public-participation-based techniques

Resources

For steps in this method, see: http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf, pp. 66-70

2. Detailed microscale analysis

Hot spot analysis, typically performed at selected "worst case" intersections. This analysis is recommended for controversial projects, for projects where a general air quality review has indicated that protected populations may be affected, or for any regionally significant transportation project or plan within an area that – under the National Ambient Air Quality Standards (NAAQS) program – has been labeled "maintenance" (previously out of attainment with an air pollution standard) or "nonattainment" (currently out of attainment).

Uses:	corridor; project
Data needs:	medium
Expertise required:	modeling

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 70-75

For a discussion of hot spot analyses, see:
http://www.fhwa.dot.gov/environment/conformity/ref_guid/chap14.htm

3. Detailed regional analysis

Builds on Method 1. Method 3 includes a regional air quality analysis using a travel demand model and a mobile source emissions model (e.g., MOBILE6), plus documentation of air quality concerns raised by protected populations. A limitation of this method is its inability to predict air quality effects at the sub-regional level.

Uses:	system; large project
Data needs:	medium
Expertise required:	modeling; survey or public-participation-based technique

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 75-77

4. Analysis using pollution surfaces

Assesses overall air quality at the sub-regional scale. Using this method, predictions can be made of how changes in the transportation system will affect the cumulative air quality of a sub-region such as an environmental justice community. Using either a model-based or a statistical technique, a map called a "pollution surface" is developed that provides an estimate of ground-level air pollutant concentrations for each grid cell of a study area. A population surface map is then developed, and the two maps are overlaid using GIS and relational database software. The results can then be analyzed for patterns of distributive effects.

Uses:	system; corridor; project
Data needs:	high
Expertise required:	database; modeling; statistical analysis; GIS

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 77-92

For background on this method, see:
Bachman et al., "Modeling Regional Mobile Source Emissions in a Geographic Information System Framework," *Transportation Research*, Vol. 8C, Nos. 1-6 (2000), pp. 205-229.

6.2.12 Water quality and quantity

Both water quality and drainage patterns can be of concern. In general, an assessment of whether a transportation project will affect water quality and quantity includes an evaluation of (1) existing conditions; (2) federal, state, and local regulatory requirements; (3) likely project impacts on groundwater quality and quantity; and (4) likely project impacts on surface water quality and quantity. With a transportation project, regulations typically require either no net change in water quantity and quality characteristics or an improvement in these characteristics. Nevertheless, protected populations may disproportionately experience adverse impacts if one or more of the following conditions hold:

- The protected population is the predominant user of the impacted water resource.
- The protected population uses the resource differently – e.g., for fishing.
- Impacted areas and mitigation areas are not distributed equally across the population.
- The proposed project, with its water management improvements, will affect the aesthetic quality of the project site(s).

Assessment methods. NCHRP Report 532 recommends a three-step process for evaluating impacts due to water quality and drainage improvements:

(a) identify the scope of the improvements and alternative improvements, based on engineering judgment and applicable regulations;
(b) evaluate whether the improvements affect protected populations, using the five checklists noted below; and
(c) modify the improvements, as necessary and practical, to prevent or minimize adverse impacts on protected populations.

1. Land acquisition checklist

Water-related improvements may require that land be acquired for swales, culverts, holding ponds, etc. This checklist addresses whether land acquisition will adversely affect protected populations.

Uses:	corridor; project
Data needs:	low
Expertise required:	records review; survey; interview

Resources

For specifics about this checklist and possible mitigation techniques, see: http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 127-128

2. Visual quality checklist

Water-related improvements can be attractive and enhance the surrounding environment, or they can be merely functional. If protected populations are affected, their input on design should be sought.

Uses:	corridor; project
Data needs:	low
Expertise required:	visual quality design and communication; public-participation-based techniques

Resources

For specifics about this checklist and possible mitigation techniques, see: http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 129-130

3. Accessibility checklist

The water-related aspects of a transportation project may restrict access to water used for fishing, swimming, boating, etc. Existing water uses should be determined, and the effects of the project on water accessibility assessed.

Uses:	corridor; project
Data needs:	low
Expertise required:	survey; interview

Resources

For specifics about this checklist and possible mitigation techniques, see: http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 130-131

4. Groundwater quality checklist

The water-related aspects of a transportation project can lower groundwater levels in local areas, adversely affecting shallow wells and surface water features such as springs.

Uses:	corridor; project
Data needs:	medium
Expertise required:	groundwater modeling

Resources

For specifics about this checklist and possible mitigation techniques, see: http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 131-132

5. Surface water quality checklist

Transportation projects typically require that storm water be carried away from the roadway, which may affect the water quality and dynamics of existing rivers, streams, lakes, ponds, and wetlands. These changes may in turn adversely affect protected populations – for example, by contributing to erosion and water pollution problems.

Uses:	corridor; project
Data needs:	medium
Expertise required:	surface water modeling

Resources

For specifics about this checklist and possible mitigation techniques, see: http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 132-133

6.2.13 Hazardous materials

Chemical, biological or radioactive materials can pose risks to human health and the environment if they meet all of the following conditions:

(1) Exposure to the material can do damage.
(2) The material migrates from its source to the human or environmental receptor.
(3) The material is taken up by its receptor. (For humans, uptake can occur through breathing, eating, drinking, or skin contact.)
(4) The "dose" of the material – i.e., the amount taken up – is sufficient to provoke a harmful response. (Dose/response varies from person to person. Some people such as children may be far more sensitive to small doses. In addition, cumulative, low-level exposure to a toxic substance may increase sensitivity.)

Risks can be posed by hazardous materials in the construction and the operation phases of a transportation project. During construction, previously contaminated property may be uncovered, allowing hazardous materials to migrate from the property; hazardous materials may be used as part of the project; and construction and demolition debris may need to be landfilled. During operation, hazardous materials transported through the region can be accidentally spilled and released into the ground, water, or air. All of these situations are addressed by federal, state, and sometimes local regulations, as well as emergency response guidelines. Nevertheless, these risks may remain a concern.

Assessment methods. NCHRP Report 532 discusses four methods for analyzing how the risk of exposure to hazardous materials is distributed across a study area.

1. Phase 1 desktop assessment

Uses as its basis a Phase 1 Environmental Site Assessment (ESA) – now a common tool for assessing the potential liability for cleaning up historical hazardous wastes when acquiring a property. A Phase 1 ESA typically includes a site/corridor reconnaissance, a review of environmental records and regulatory databases, and interviews with people familiar with the prior uses of the property(ies) in question. A Phase 1 ESA investigation may indicate that a Phase 2 ESA, which includes on-site testing, is needed.

Phase 1 investigations can be used to assess the locations of contaminated sites, the presence of large-quantity hazardous waste generators, and the

locations of storage or disposal sites for hazardous waste as well as solid waste (e.g., garbage, demolition and construction waste). This information is then integrated with a desktop demographic review.

Uses:	initial assessment – presence of hazardous waste sites
Data needs:	low
Expertise required:	data analysis

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 103-105

2. Phase 1 computer-based assessment

An enhancement of Method 1. This method uses GIS to plot hazardous materials and demographic information, plus a statistical test (e.g., the chi-square test) to validate or reject subjective impressions from the desktop assessment.

Uses:	second-tier assessment – presence of hazardous waste sites
Data needs:	medium
Expertise required:	GIS; statistical analysis

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 105-108

3. Hazardous materials transport screening study

Used to roughly estimate the risk of a hazardous materials transport accident along a route or set of routes, and to assess whether the risk to protected populations is disproportionately high. This method includes determining likely routes for hazardous materials transport in the study area, and then determining the number of people (protected and unprotected populations) living near enough to the route(s) to be affected. It can be accompanied with a test to determine whether any discrepancy between potential impacts on

protected populations and on unprotected populations is statistically significant.

This method should be used as a screening tool for Method 4: If results indicate that protected populations would be disproportionately impacted by a release of hazardous materials in transport, a more detailed risk assessment may be needed.

Uses:	initial assessment – transport routes for hazardous materials
Data needs:	low
Expertise required:	data analysis; statistical analysis (optional)

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 108-112

4. Hazardous materials transport – probability modeling

Uses a hazardous material flow survey to estimate the types and volumes of materials transported through segments of the transportation corridor. The probability of an accidental release in each corridor segment is then estimated using an event-tree analysis, and the level of impact of a given type of release is estimated using the worst-case Protective Action Distance (PAD) and hazardous material dispersion distances. Risk functions are then used to develop a "risk surface" (a GIS layer that indicates the maximum risk of exposure for each grid cell of the study area), after which a comparable "population surface" is developed. Distributive effects can then be evaluated by overlaying the risk surface and the population surface.

Uses:	risk modeling – hazardous materials release and exposure
Data needs:	medium/high
Expertise required:	quantitative risk analysis methods; dispersion modeling; GIS

Resources

For steps in this method, see:
http://gulliver.trb.org/publications/nchrp/nchrp_rpt_532.pdf , pp. 112-117

For information on performing a hazardous materials flow survey, see:
U.S. DOT, *Guidance for Conducting Hazardous Materials Flow Surveys* (1995) at http://hazmat.dot.gov/training/state/hmep/guide_flow_surveys.pdf

7.0 Consultation Practices

This chapter could be a book in itself. *Consultation* is a crucial complement to *assessment*. Here, basic methods for offering public involvement opportunities to environmental justice communities, as well as targeted methods to supplement public involvement, are briefly reviewed in Sections 7.1 and 7.2.

Section 7.3 discusses how both the *methods for* and the *intensity of* public involvement should be appropriate to the scale and complexity of the plan or project at hand. Section 7.4 briefly discusses how public involvement and related methods can lay the groundwork for identifying appropriate means to redress adverse impacts.

7.1 Public involvement in plans and projects

As noted in Chapter 3 of this guide, the 1997 U.S. DOT order on environmental justice and subsequent communications from DOT have stressed three related principles regarding low-income and minority groups:

- Ensure their involvement in transportation decision making
- Prevent disproportionately high and adverse impacts of transportation projects on them
- Assure that they receive a timely and proportionate share of the benefits from transportation projects

The first principle – to ensure the involvement of low-income and minority groups in transportation decision making – has been refined and expanded in recent years. (Most recently, as discussed in Chapter 4, the guidelines being adopted pursuant to SAFETEA-LU include specifications regarding public involvement.)

7.1.1 Whose involvement should be sought?

Within TDOT, the *Public Involvement Plan for the Traditionally Underserved Populations* (PIPTUP) was released as a draft report in August 2005. PIPTUP was an integrated part of the overall public involvement plan for the state's 2005 Long-Range Transportation Plan. The draft report, called *Traditionally Underserved Populations Outreach and Analysis Approach*, provides a list of the

traditionally underserved populations as defined by TDOT. These include

1. Environmental justice populations (see Chapter 5)
2. Elderly populations
3. Disabled populations
4. Those with limited English proficiency (LEP)
5. Low-literacy populations (those with Level 1 literacy, as defined by the U.S. Dept. of Education – in general, those with lower than fifth grade reading and comprehension skills)
6. Transportation-dependent populations (based on U.S. Census information concerning occupied units with no vehicles)

The first four population groups are protected by various federal acts and executive orders: the Civil Rights Act of 1964, Title VI; the Age Discrimination Act of 1975; the Americans with Disabilities Act of 1990; Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," released in 1994; and Executive Order 13166, "Improving Access to Services for Persons with Limited English Proficiency," released in 2000. The last two population groups listed above – low-literacy populations and populations lacking access to personal vehicles – are not given special federal protection but have distinct vulnerabilities and public involvement constraints.

While environmental justice populations are the focus of this desk guide, specially-tailored public involvement opportunities may be needed for other traditionally underserved populations. In addition, as the August 2005 *Traditionally Underserved Populations* report notes, these groups frequently overlap. For example, low-income populations may be more likely to be low-literacy and transportation-dependent. They also may be more likely to be elderly and/or disabled.

7.1.2 How should public involvement be undertaken?

Public involvement approaches ideally will be tailored to target audiences and their different capabilities and constraints. A crucial first step is to identify the types of populations that live or spend significant time in areas that may be affected by a transportation plan or project.

The GIS-based demographic screening tool that accompanies this desk guide can help. It can aid in identifying the following:

- minority populations (at the census tract, block group, or block level)
- low-income populations (at the census tract or block group level)
- LEP populations (at the census tract or block group level)

Regarding LEP populations, the GIS tool uses census data to provide information on numbers of linguistically isolated households and their dominant languages. (A linguistically isolated household is one in which all members 14 years old and over have at least some difficulty with English.)

Methods for interacting with traditionally underserved groups and others can be developed in consultation with TDOT's Community Relations Division and its Office of Constituent Services. This office is the main link between TDOT and its constituents, and it works to improve the department's public involvement processes. An initial step is to consult TDOT's *Public Involvement Plan*.

In February 2006, TDOT released its *Public Involvement Plan: A Complete Guide to Public Involvement in Decision-Making*. TDOT's Community Relations Division developed the plan in cooperation with TDOT's three main bureaus (Environment and Planning, Engineering, and Administration), in order to facilitate public involvement and outreach in the state. The plan documents TDOT's public involvement principles and procedures and is intended to fulfill FHWA and FTA requirements to submit a description of the public involvement component of TDOT's plans, programs, and projects.

Although broadly directed, the *Public Involvement Plan* includes reference to environmental justice populations as well. One of its public involvement objectives is to:

> Work with traditionally underserved communities to understand and consider their special needs by implementing procedures recommended for environmental justice by the USDOT, FHWA and other federal transportation agencies.
>
> *Public Involvement Plan*, p. 10

The *Plan* identifies several performance measures for this objective:

- Beginning at the early planning state, the project impact community is assessed to determine the presence of those traditionally underserved by transportation facilities.

- Notices of involvement opportunities and informational materials are prepared in language that is easily understood by the traditionally underserved.
- Notices are placed in grocery stores, laundromats and other places frequented by the traditionally underserved.
- Leaders of these communities are identified and made part of the process.
- Techniques other than public meetings are conducted when appropriate to obtain input.

Public Involvement Plan, p. 27

As discussed under Section 7.3, the *Public Involvement Plan* describes five levels of public involvement, ranging from limited public involvement for simple projects with virtually no adverse impacts to extensive public involvement for complicated projects with significant potential impacts. The *Plan* includes several appendices that give information on notice requirements and procedures; public meeting and public hearing definitions, with checklists for their preparation; media strategies and procedures; and document samples. In addition, Appendix G to the *Plan* gives a list of environmental justice resources and advocacy groups.

The *Plan* also lists a number of ways to enhance public involvement. These may be especially useful for environmental justice populations and other traditionally underserved populations. The list of "Potential Enhanced Public Involvement Activities" includes the following:

- Expand media activity to include media kits, media conferences, media interviews.
- Meet with community organizations such as faith-based organizations, civic clubs, school groups and any organizations serving those traditionally underserved.
- Invite community/group leaders to serve on stakeholder committees, advisory groups and project development teams.
- Utilize lists of minority media outlets and environmental justice stakeholders.
- Place documents in libraries, schools and government buildings (including the public involvement plan).
- Utilize newspaper and radio advertising to announce meetings or request input from citizens.
- Use facilitators for meetings/hearings.
- Create specialized information for publishing on the web.
- Hold neighborhood meetings or information forums.

- Advertise and encourage use of TDOT's toll-free telephone number (Record-A-Comment).
- Expand, maintain and utilize the Speakers Bureau to educate the public.
- Create, locate and staff information booths at regional and statewide public events; consider temporary booths at shopping malls.
- Use surveys to gather input on the preferences and thoughts of the public.
- Utilize focus groups to garner public views and better understand the concerns of the public.
- Place meeting announcements in publications and locations used by traditionally underserved groups (Department of Human Services Offices, laundromats, YMCA, YWCA, Boys Clubs, neighborhood schools, grocery stores, etc.).
- Use fact sheets, news articles, press releases, brochures, fliers, newspaper inserts, video tape broadcasts, public access channels and public service announcements.
- Use interpreters (language and hearing impaired).
- Print materials and post signs or flyers in other languages, Braille or large type.

Public Involvement Plan, p. 24

Resources

For a discussion of methods to identify and engage traditionally underserved populations, see:
TDOT. *Tennessee Long-Range Transportation Plan: Traditionally Underserved Populations Outreach and Analysis Approach*. January 2006.
http://www.tdot.state.tn.us/plango/pdfs/tup.pdf

For TDOT's 2006 *Public Involvement Plan: A Complete Guide to Public Involvement in Decision-Making*, see:
http://www.tdot.state.tn.us/documents/pip0206.pdf

For a discussion of TDOT's public involvement process, including a review of federal public involvement requirements, see:
TDOT. *Tennessee Environmental Procedures Manual*, Chapter 7. 2007
http://www.tdot.state.tn.us/environment/tepm.htm

For *Public Involvement Techniques for Transportation Decision-Making* (2005), a 256-page reference work from FHWA on a variety of public involvement techniques, see:
http://www.planning.dot.gov/PublicInvolvement/pi_documents/toc-foreword.asp

For a discussion of environmental justice, transportation, and public involvement, see:
Shannon Cairns, Jessica Greig, and Martin Wachs. *Environmental Justice & Transportation: A Citizen's Handbook.* Institute of Transportation Studies, Berkeley, CA. 2003.
http://www.its.berkeley.edu/publications/UCB/2003/M/UCB-ITS-M-2003-1.pdf

For the Transportation Research Board (TRB) Committee on Public Involvement, see:
http://www.trbpi.com/index.asp

7.2 Targeted methods to supplement public involvement

This section briefly discusses three similar, well-recognized processes for local consultation on key aspects of a transportation project: Community Impact Assessment, Context Sensitive Solutions, and Context Sensitive Design. Typically, each process takes place over the course of several weeks or months. In addition, each may entail selecting citizens to engage in the process. These processes are *supplemental* to the methods discussed in Section 7.1; they do not replace more general public involvement.

7.2.1 Community Impact Assessment (CIA)

With Community Impact Assessment (CIA), one or more analysts typically work in close consultation with the potentially impacted community. (If community members do the analysis, the CIA becomes a form of participatory research.) The term "community" is significant: A community is not simply or necessarily a geographic place. It is a social entity composed of people who interact with each other, have common ties, and may be inter-dependent. Consultation with a community assumes that some key values and beliefs are shared by community members.

CIA has become increasingly prominent as a way to assess the local impacts of transportation projects. *Community Impact Assessment: A Quick Reference for*

Transportation, prepared for FHWA and published in 1996 (FHWA-PD-96-036), remains a useful guide to CIA in transportation. As described in *Community Impact Assessment*, CIA includes the following components:

Define the Project Study Area
In coordination with engineers, develop various project alternatives that satisfy the project purpose and need, and identify areas of potential impact.

Develop a Community Profile
Determine the characteristics of the affected area, such as neighborhood boundaries, locations of residences and businesses, demographic information, economic data, social history of communities, and land use plans. The development of the profile is supported by the information collected from a variety of sources.

Analyze Impacts
Examine the impacts to the community of the proposed action versus no action. Identify and investigate the consequences of the transportation action. A number of analysis tools can be used to examine these relationships and estimate impacts.

Identify Solutions
Identify and recommend potential solutions to address adverse impacts.

Use Public Involvement
Use public participation as a basis to develop project alternatives, a source of information to develop the community profile, a tool to identify and evaluate impacts, and a method to identify acceptable ways to address impacts. Public involvement is an integral element of all the above steps.

Document Findings
In addition to oral presentations, present the findings of the community impact assessment in written form for use by decision makers, to record findings, to disseminate to interested parties, and to support subsequent decisions.

Community Impact Assessment notes that CIA often is an iterative process. Although the components are sequential (except for public involvement, which should occur throughout), in practice they overlap and may involve loopbacks. For example, analyzing impacts may require going back and fleshing out the

community profile. CIA also is iterative over the longer term. As communities and options change, findings may need to reevaluated and adjusted, especially if a long time lag occurs in project development.

Resources

For more on the components of CIA and their interactions, see the text of *Community Impact Assessment*:
http://www.ciatrans.net/CIA_Quick_Reference/Purpose.html

For a useful FHWA-sponsored website providing links to resources, workshops, research, etc. on CIA and transportation, see:
http://ciatrans.net

For the TRB Joint Subcommittee on CIA, see:
http://www.ciatrans.net/ciajsc.html

7.2.2 Context Sensitive Solutions (CSS)

Context-Sensitive Solutions (CSS) are flexible processes that involve a range of stakeholders, often with different interests and affiliations, consulting with a multi-disciplinary professional team to consider alternative solutions to issues raised by a transportation project. Ideally undertaken from the earliest stages of project development, the CSS process typically is scaled to the physical and social complexity of the project.

TDOT has adopted CSS as a central philosophy. According to TDOT's "CSS Statement of Commitment":

> 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.
>
> http://www.tdot.state.tn.us/css/

TDOT began using CSS processes on selected projects in 2004, and a number of these processes have been completed.

Resources

For more information on TDOT's commitment to and use of CSS, see:
http://www.tdot.state.tn.us/css/

For NCHRP Report 480, *A Guide to Best Practices for Achieving Context Sensitive Solutions* (2002), see:
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_480.pdf

For a CSS Online Resource Center, see:
http://www.contextsensitivesolutions.org/

7.2.3 Context Sensitive Design (CSD)

Context Sensitive Design (CSD) is akin to CSS. The difference is a matter of emphasis. Whereas CSS emphasizes the broad scope of the project beginning with its early planning stages, CSD emphasizes design. They have much in common, however, including their guiding principles.

At a 1998 workshop held in Maryland – *Thinking beyond the Pavement: A National Workshop on Integrating Highway Development with Communities and the Environment* – the following "qualities in excellence in transportation design" were articulated:

1. The project satisfies the purpose and needs as agreed to by a full range of stakeholders.
2. This agreement is forged in the earliest phase of the project and amended as warranted as the project develops.
3. The project is a safe facility for both the user and the community.
4. The project is in harmony with the community, and it preserves environmental, scenic, aesthetic, historic, and natural resource values of the area, i.e., exhibits context sensitive design.
5. The project exceeds the expectations of both designers and stakeholders and achieves a level of excellence in people's minds.
6. The project involves efficient and effective use of the resources (time, budget, community) of all involved parties.

7. The project is designed and built with minimal disruption to the community.
8. The project is seen as having added lasting value to the community.

As with CSS, CSD uses multi-disciplinary teams working in consultation with stakeholders to identify design approaches that can achieve these eight qualities of excellence.

Resources

For the FHWA's website on CSD, see:
http://www.fhwa.dot.gov/csd/

For the website of the American Association of State Highway and Transportation Officials (AASHTO), which includes information on CSS and CSD, see:
http://www.transportation.org/

For the FHWA's *Flexibility in Highway Design* (1998), which laid technical groundwork for CSD, see:
http://www.fhwa.dot.gov/environment/flex/index.htm

For selected sections from AASHTO's *A Guide for Achieving Flexibility in Highway Design* (2004), see:
http://www.contextsensitivesolutions.org/content/reading/guide-for-achieving-flexibility/

For *Context Sensitive Street Design*, a December 2001 publication of the Atlanta Regional Commission, see:
http://www.contextsensitivesolutions.org/content/reading/context-sensitive-2/

7.3 Levels of public consultation

Good sense suggests that the nature and intensity of public consultation activities should be appropriate to the physical and social complexity of the plan or project at hand. This is recognized in TDOT's 2006 *Public Involvement Plan*, which identifies five levels of public involvement opportunities. These levels are identified to establish minimums while ensuring flexibility. During the project planning and development process, the level can be elevated as needed. The levels are:

- **Level One** – These projects pose minimal or no impact to the surrounding community, require minimal or no right-of-way acquisition, will be of short duration and pose no disturbance to local communities during construction. Projects in this category could include smaller construction projects that require no formal planning or design process. Examples might include median removal, signalization and intersection realignment. Also included in this category are those unfunded projects for which a planning study is being prepared. (An unfunded planning study is considered to be a preliminary report to determine whether a project will proceed. If/when it does move forward, it will be reassigned to Level Two, Three, Four or Five, as appropriate.)

- **Level Two** – These projects include those defined as Categorical Exclusions (CE) by the FHWA, or classified as corridor feasibility or other general planning projects.

- **Level Three** – Projects in this category constitute those that require completion of an Environmental Assessment (EA), or other environmental documentation (for example – Part 150 documents related to aviation facilities). Generally speaking, these projects would have some impact, but not significant, and would be of moderate size, requiring less time for planning, design and construction.

- **Level Four** – These projects are those that would require an Environmental Impact Statement (EIS) to be completed, or are large-scale efforts in terms of both design and construction. Generally speaking, these projects would significantly impact local communities, require substantial acquisition of right-of-way, and require more time for planning, design and construction.

- **Level Five** – This category involves statewide or systems-level efforts undertaken by the Department, including the Statewide Long-Range Transportation Plan, the Statewide Transportation Improvement Plan (STIP), the Statewide Rail Plan, Statewide Aviation Plan and Statewide Transit Plan.

Public Involvement Plan, p. 11

For Levels One through Four, the *Plan* specifies (1) required minimum public involvement, and (2) enhanced public involvement. For Level Five, the *Plan* notes that public involvement will be treated differently from the other levels in that the minimum will be determined based on the effort to be undertaken.

Resources

For more information on the five levels of public involvement identified in TDOT's *Public Involvement Plan* (2006), see:
http://www.tdot.state.tn.us/documents/pip0206.pdf, pp. 11-21

7.4 Developing measures to redress adverse impacts

With transportation projects, as with other potentially controversial projects, there is a hierarchy of measures to address adverse impacts. As described in Section 11.1 of the *Tennessee Environmental Procedures Manual* (2006), these include:

(1) **Prevent/avoid.** Modify the project so that impact does not occur.
(2) **Minimize.** Modify the project to reduce the severity of the impact.
(3) **Enhance.** Add desirable features to allow the project to blend in more harmoniously.
(4) **Compensate**. Offset impacts by with replacement land or facilities.

While this hierarchy is widely recognized, applying it is complicated. It can be especially difficult to determine appropriate enhancement and/or compensation measures. Specifics are best worked out through close consultation with affected people in the local area, using methods such as those described in Section 7.2.

In addition, collaboration among various organizations, groups, and individuals may be needed to identify and implement creative solutions to potentially controversial transportation issues.

Resources

For Chapter 9, "Environmental Commitments and Coordination with Design and Construction Activities," of the *Tennessee Environmental Procedures Manual*, 2007, see:
http://www.tdot.state.tn.us/environment/tepm.htm

For NCHRP Report 536, *From Handshake to Compact: Guidance to Foster Collaborative, Multimodal Decision Making* (2005), see:
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_536.pdf

For a chapter on addressing impacts in FHWA's *Community Impact Assessment: A Quick Reference for Transportation* (1996), see:

http://www.ciatrans.net/CIA_Quick_Reference/Chapter7.html

For FHWA's *Community Impact Mitigation: Case Studies* (1998) – a companion document to FHWA's *Community Impact Assessment* (1996) – see: http://www.ciatrans.net/Community_Impact_Mitigation/CIM_Introduction.html

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Appendix A

Glossary

AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
APE	Area of Potential Effect
BCI	Bicycle Compatibility Index
BSI	Bicycle Safety Index
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CIA	Community Impact Assessment
CSD	Context Sensitive Design
CSS	Context Sensitive Solutions
DEIS	Draft Environmental Impact Statement
DOT	Department(s) of Transportation
EA	Environmental Assessment
EJ	Environmental Justice
EJI	Environmental Justice Index
EJSEAT	Environmental Justice Smart Enforcement Assessment Tool
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GIS	Geographic Information System
GPS	Global Positioning System
HERS-ST	Highway Economic Requirements System – State
HHS	Department of Health and Human Services
HPMS	Highway Performance Monitoring System
ISTEA	Intermodal Surface Transportation Act (1991)
LEP	Limited English Proficiency
LRTP	Long Range Transportation Plan
MPO	Metropolitan Planning Organization
NCHRP	National Cooperative Highway Research Program

NEPA	National Environmental Policy Act (1969)
NRHP	National Register of Historic Places
NRIS	National Register Information System
OMB	Office of Management and Budget
PAD	Protective Action Distance
PES	Project Evaluation System
PIPTUP	Public Involvement Plan for Traditionally Underserved Populations
PMP	Project Management Plan
RPO	Rural Planning Organization
ROW	Right of Way
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
SEMS	Statewide Environmental Management System
SHPO	State Historic Preservation Office
SIA	Social Impact Assessment
STIP	Statewide Transportation Improvement Program
TAZ	Traffic Analysis Zone
TD	Travel Demand
TEA-21	Transportation Equity Act for the 21st Century (1998)
TEER	Tennessee Environmental Evaluation Report
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TIP	Transportation Improvement Program
TMIP	Travel Model Improvement Program
TPO	Transportation Planning Organization
TRANSIMS	Transportation Analysis and Simulation System
USDOT	US Department of Transportation

Appendix B

Case Example:
The James White Parkway Extension

The purpose of Appendix B is to illustrate how the analytic practices described in this desk guide might be applied. This is a purely hypothetical example; it is not a recommendation to those engaged in analysis of or plans for the James White Parkway Extension.

History of the James White Parkway Extension

The James White Parkway (JWP) Extension is a proposed state arterial in the southern sector of Knoxville and Knox County. Historically known as the South Knoxville Boulevard, it was intended to link downtown and East Knoxville with Chapman Highway (US 441) and Governor John Sevier Highway (SR 168).

A final EIS for the South Knoxville Boulevard project was approved in 1977, and the South Knoxville Bridge – the first section of the project – was completed in 1983. A divided, 4-lane, access-controlled section approximately 1 mile long between the bridge and Moody Avenue was completed in the early 1990s. The remainder, which was to be about 3 miles long and terminate at Chapman Highway to the northwest of Governor John Sevier Highway, was put on hold, due in part to controversy over plans for its completion. Right-of-way had not yet been acquired.

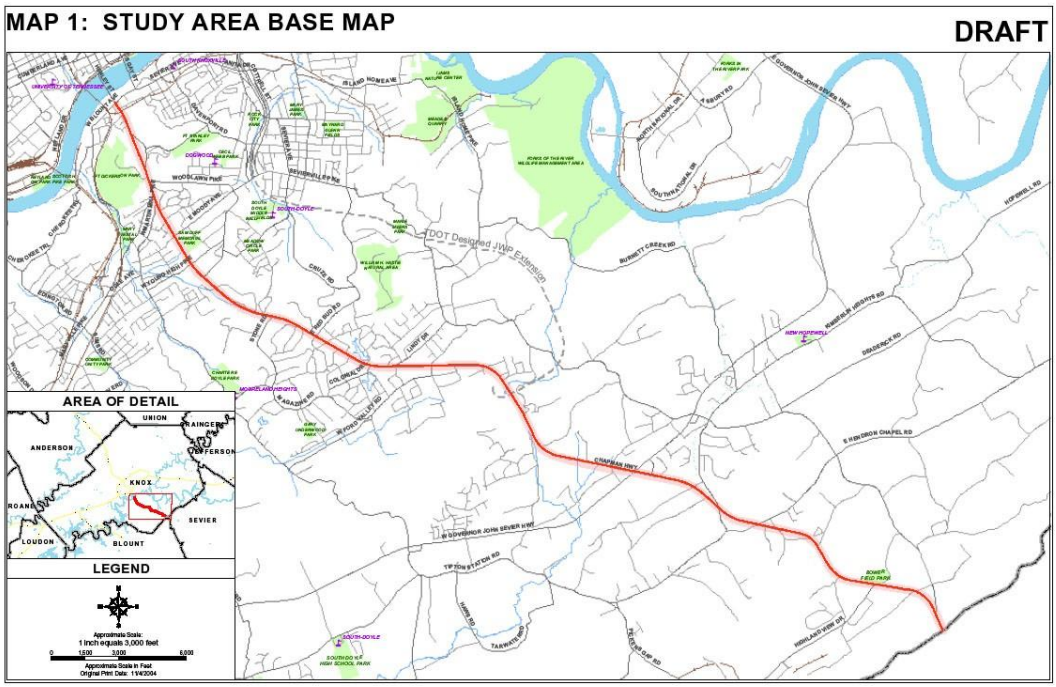
The South Knoxville Boulevard (renamed the JWP Extension, with its linkage to the recently completed James White Parkway in the downtown area) would be built through residential neighborhoods as well as some environmentally sensitive areas. Some people favored no further building of the JWP Extension beyond Moody Avenue; others favored its completion as a boulevard rather than a freeway facility; still others favored extending it all the way to Governor John Sevier Highway.

An Advanced Planning Report (APR) prepared by TDOT at the request of the City of Knoxville had considered a freeway-type facility and a boulevard-type facility, both following the alignment that was to terminate at Chapman Highway.

The APR approved by TDOT had recommended the freeway alternative. In the wake of the subsequent controversy, the Knoxville City Council authorized the creation of a JWP Extension Task Force in January 2002. The task force had 11 members, some with very different perspectives. Their October 2003 report identified a number of issues and questions needing resolution. (For their report, see http://archive.knoxmpc.org/jwhite/pdfs/tf_2003.pdf .)

At about the same time, a study conducted in 2003 by the University of Tennessee Center for Transportation Research (CTR) at the request of TDOT Commissioner Nicely concluded that the decision process for the JWP Extension needed to be partly in local hands. See "Tennessee Department of Transportation 15 Project Case Study, Project Assessment Final Report, James White Parkway Extension – Knoxville" http://www.tdot.state.tn.us/news/2003/listening/James%20White%20Parkway%20Extension-Knoxville.pdf . (English, primary author of this desk guide, and Wegmann, a contributing author of the guide, were on the CTR research team for the 2003 15-project case study.)

A larger task force, the James White Parkway – Chapman Highway Corridor Study Task Force, was created by the City of Knoxville in March 2004. This 30-member task force included most of the members of the prior task force. In addition, it had members selected by the City Mayor, the County Mayor, and the two City Councilmen and the one County Commissioner whose districts were most directly affected. The task force was staffed by the Knoxville Regional TPO, with facilitation assistance from Leadership Knoxville. In addition to meeting ten times as a group, the task force members were organized into three subcommittees – community impact and opportunities, economic development, and transportation and mobility – that each met four times early in the task force process. The process also included a number of public meetings. Below is the study area base map that the task force used.



Source: http://www.knoxmpc.org/jwhite/index.htm

The report of the task force, "James White Parkway Extension Recommendation," was released in January 2005. (For the report, see http://www.knoxmpc.org/jwhite/index.htm.) This report conveys both the majority and minority views of the task force. A dozen conceptual alternatives had been considered, including improvements to Chapman Highway and related roads in lieu of building the JWP Extension. The "common ground" of the majority was to extend JWP as a full access control, parkway-type facility with a terminus at or close to the intersection of Chapman Highway and Governor John Sevier Highway, while also making safety and operational improvements to Chapman Highway. Some members of the task force preferred that JWP not be extended and that attention be focused on improvements to Chapman Highway and associated roads. Major concerns with the JWP Extension included environmental issues, urban sprawl, and the possibility that it would usurp funding for Chapman Highway improvements.

Shortly after its release, the report was accepted in resolutions of the Knoxville City Council, the Knox County Commission, and the TPO Executive Board. In November 2005, Governor Bredesen and TDOT Commissioner Nicely announced that the state had agreed to use the majority-view recommendations in the January

2005 report as a guideline for developing a full EIS for the JWP Extension. Arrangements for the EIS were being made in 2006.

Demographic Analysis

At the suggestion of TDOT staff, we defined the study area by using a ½-mile buffer around (1) the alignment for the JWP Extension as recommended in January 2005 by the James White Parkway – Chapman Highway Corridor Study Task Force, from the South Knoxville Bridge to Governor John Sevier Highway; and (2) Chapman Highway, from the Henley Street Bridge to Governor John Sevier Highway. Figure 1 gives a map, using the GIS-based screening tool, which depicts the two alignments with their buffer areas.

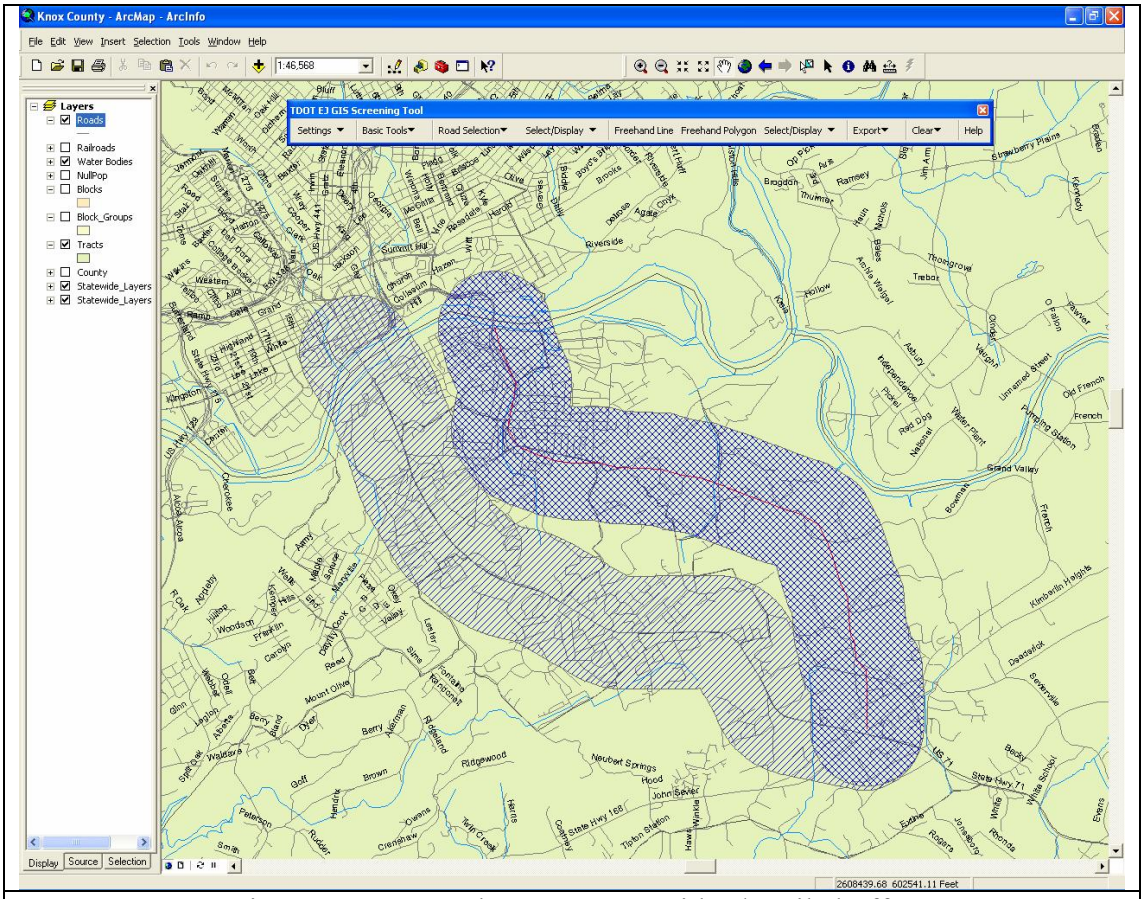


Figure 1. JWP & Chapman Hwy with 1/2 mile buffer

Because of the proximity of these two alignments and their buffer areas, we treated them as a single study area for purposes of demographic analysis.

Results of the GIS-based demographic screening tool

It is important to note that the GIS-based screening tool uses census units as its "basic building blocks." It cannot distinguish populations located within the study area from those located outside. Thus, the smaller the census unit, the more closely the screening tool can approximate the makeup of the study area. The maps in Figures 2, 3, and 4 show the census units – tracts, block groups, and blocks, respectively – that are located partially or completely within the study area, using the 2000 U.S. Census.

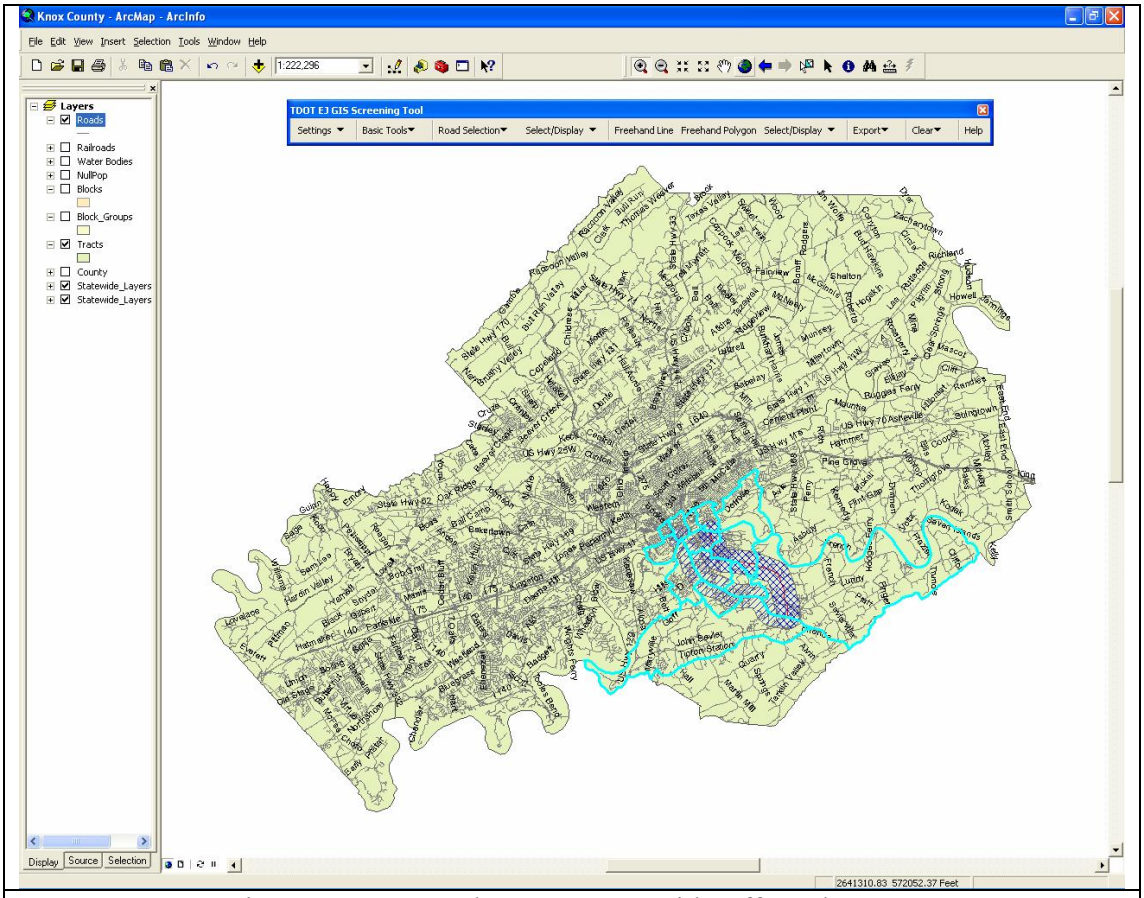


Figure 2. JWP & Chapman Hwy with Affected Tracts

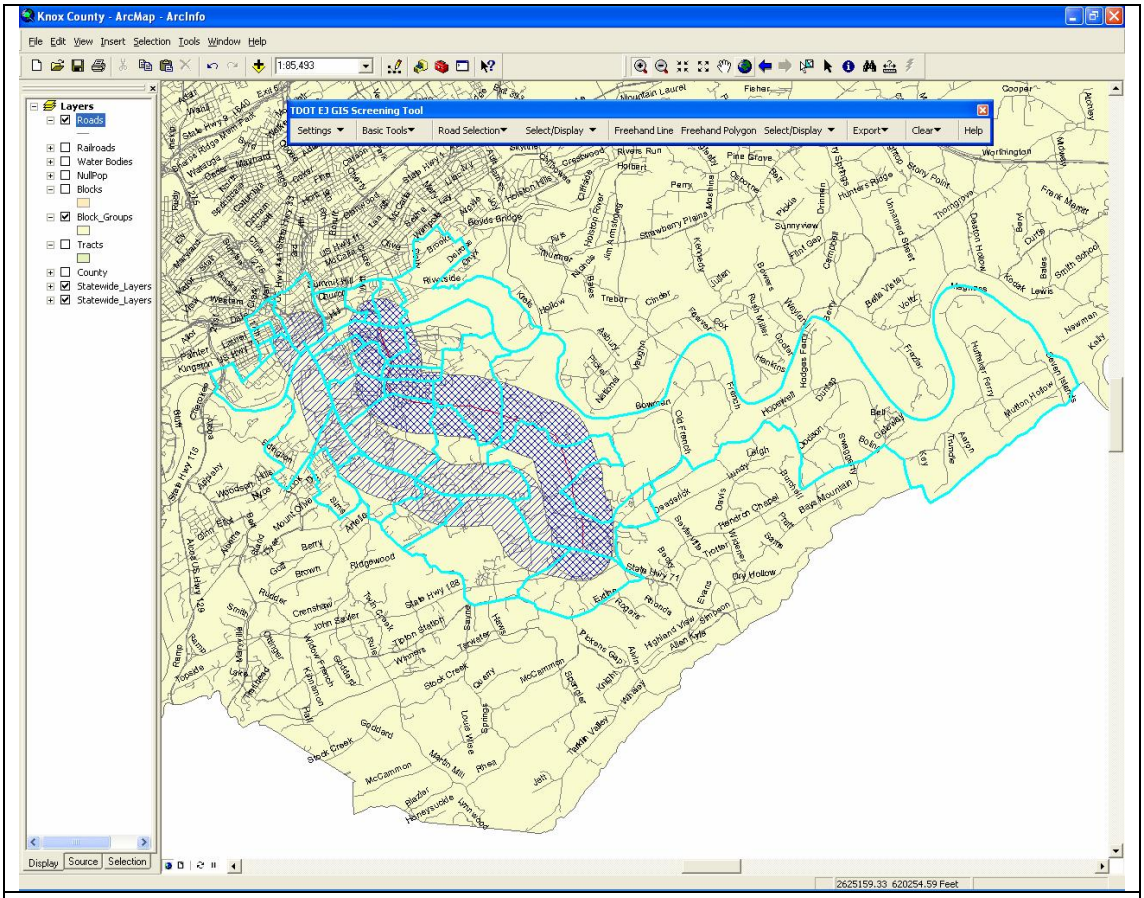


Figure 3. JWP & Chapman Hwy with Affected Block Groups

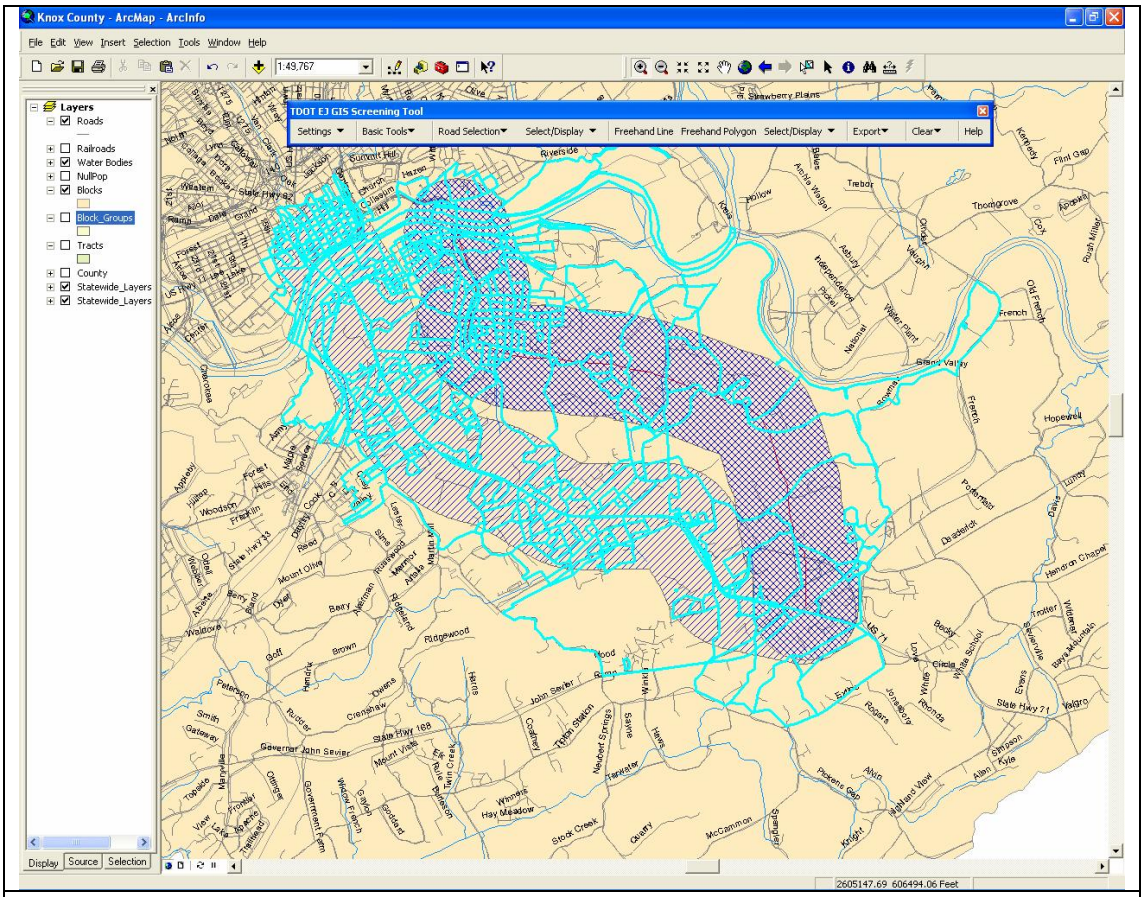


Figure 4. JWP & Chapman Hwy with Affected Blocks

Table 1 gives the 2000 census results of the demographic screening for the study area at the tract, block group, and block levels. (Income and English proficiency information are only available at the tract and block group levels, not at the block level.) The study area includes parts of 13 census tracts (total census population, 48,676). As shown in Figure 1, however, much of that population lies outside the study area. In contrast, the 28 block groups that are completely or partially within the study area (see Figure 3) have a total census population of 34,152, while the 510 blocks that are completely or partially within the study area (see Figure 4) have a total census population of 20,746. The block-level total – 20,746 – most closely approximates the actual 2000 Census population of the study area, but even that total slightly over-estimates the study area population, because parts of some census blocks are outside the study area. Similarly, the estimated numbers of affected minority populations, low-income populations, and LEP populations

within the study area become more accurate when smaller census units are used, but even then, they are only approximations.

Table 1. Demographic Characteristics of the Study Area

Census Level	*Number of Census Units Affected*	*Total Affected Pop.*	*Total Affected Hholds*	*Affected Minorities (Black or African American)*	*% of total*	*Affected Low Income (≤ poverty level)*	*% of total*	*Affected Hholds with Linguistic Isolation (Spanish Isolated)*	*% of total*
Census Tract	13	48,676	18,757	7,567	16	10,707	22	57	0.3
Block Group	28	34,152	14,838	4,550	13	7,781	23	45	0.3
Block	510	20,746	N/A	1,773	9	N/A	N/A	N/A	N/A

If the demographics of the study area are compared with those of Knox County, it becomes evident that the study area differs significantly from the county as a whole only in the study area's higher proportion of low-income people. According to the 2000 U.S. Census, of Knox County's total population (382,032), 33,069 (9%) are identified as black or African-American. Of Knox County's total number of households (157,758), 397 (0.3%) are Spanish-speaking households with linguistic isolation. Of Knox County's total population for whom poverty status was determined (369,111), 46,572 (13%) are at or below poverty level.

Attention should be paid to minority and linguistically isolated populations as well as low-income populations in the study area. For the purpose of identifying the study area as an "environmental justice community," however, the meaningfully greater percentage of people at or below poverty level (23%, in contrast with 13% for Knox County as a whole) is the most notable demographic characteristic of the study area.

Augmenting the GIS-based demographic screening tool

The GIS tool uses the most recent U.S. census data – in this case, the 2000 census – for its demographic information. While useful, this information becomes dated as the years between the decennial censuses pass. In addition, the tool cannot forecast future demographic trends, nor can it take into account non-residents who frequent the study area. To augment the tool, several methods might be used:

- Conducting a field survey. It is important to get to know the study area by driving (or, better, walking or bicycling) around it, taking along a map that can be marked up to show key locations (schools, churches, playgrounds, etc.) and a camera to photograph key visual features.

- Consultation with staff of the Knoxville-Knox County Metropolitan Planning Commission and examination of plans that include the study area.

- Consultation with members of the 2004 James White Parkway – Chapman Highway Corridor Study Task Force. Members of the task force, especially those who live or work in the study area, may be able to comment on (1) how closely the results of the demographic screening tool reflect their understanding of the demographic composition of the study area; (2) changes they have observed in the demographic composition of the study area since 2000; and (3) minority and low-income people within the study area who should be sought out for consultation.

- Consultation with schools, churches, and major businesses within the study area. Schools and churches can be located using the map in the GIS-based demographic screening tool. Questions similar to those posed to members of the 2004 task force might be asked. In addition, it would be useful to ask about people who live outside the study area but attend local schools, churches, etc.

- Consultation with city and county services and their branches in or near the study area about current demographics and anticipated demographic changes in the study area: for example, the Knoxville Department of Community and Neighborhood Services, including its Parks and Recreation program; the Knoxville Community Development Division; the Knox County Office of Neighborhoods; the Knoxville-Knox County Community Action Committee (CAC), with its South Center; the Knox Area Transit, especially bus drivers with lines in the study area; the South Knoxville Senior Center; and the South Knoxville Branch Library.

Assessing Disproportionately High and Adverse Impacts

The above techniques will help to identify populations of concern, now and prospectively, in the study area. These techniques also provide the beginning for assessing disproportionately high and adverse impacts, in that they can lead

analysts to specific people and groups in the study area who, from an environmental justice standpoint, should be consulted during the impact assessment.

Types of impacts and their assessment

The initial list of impacts to be considered includes the following:

- accessibility and mobility
- safety
- property values
- jobs and business income
- displacement and relocation
- community cohesion
- cultural resources
- green spaces
- visual quality
- noise
- air quality
- water quality and quantity
- hazardous materials

Techniques described in the desk guide (and also the *Environmental Procedures Manual*) can be used to conduct a preliminary assessment. During the preliminary assessment, simple techniques should be emphasized, in order to prioritize which impacts are likely to be significant and which are not. Consultation with people in the study area should occur from the early stages of the preliminary assessment on, in order to target significant impacts and also identify impacts that might otherwise have been overlooked.

Once potentially significant impacts have been targeted, they can be examined in greater depth. For a more intensive examination of selected impacts, the more complex techniques described in the desk guide and the *Environmental Procedures Manual* can be used, accompanied with continued, in-depth consultation with selected people in the study area.

Secondary and cumulative impacts

As noted in the *Environmental Procedures Manual* (Section 6.1.1.2), NEPA and CEQ regulations require that secondary impacts (i.e., indirect impacts) and cumulative impacts (i.e., impacts from various sources over time) be taken into account also. Typically, the sphere of influence of secondary and cumulative impacts will be somewhat larger than the study area. For example, land use changes triggered by the JWP Extension within the study area might be examined within the larger context of land use changes external to the study area. The *Manual* and FHWA material referenced therein should be consulted for details on assessing secondary and cumulative impacts.

"Disproportionate" determination

In determining whether an impact on a population of concern is disproportionate, the *Environmental Procedures Manual* (Section 6.3.4.2) references the advice of FHWA and says that three factors should be considered:

(1) whether the impact significantly and adversely affects the population of concern, and
(2) whether the impact on that population is likely to appreciably exceed the impact on the general population, and
(3) whether the population of concern affected by the impact is already affected by cumulative exposures from environmental hazards.

It appears that, once (1) has been established, either (2) or (3) is sufficient to make the case for a disproportionately high and adverse impact. For example, with the JWP Extension, if a low-income group would be significantly and adversely affected by the new highway, and if *either* the impact on them was greater than on other, non-low-income people in South Knoxville *or* that low-income group was already experiencing adverse impacts from other sources (including but not limited to other highways), then the impact would be considered disproportionate. Again, the *Manual* and FHWA guidance should be consulted for details on this determination.

Consultation

Consultation should be an integral part of the environmental justice assessment; it should not be an add-on. As noted above, consultation can begin at the early

stages of the assessment, when the present and prospective demographic composition is being analyzed, and can continue throughout the assessment process, with discussion of measures to avoid or minimize impacts where possible, as well of discussion of compensatory features where reducing the severity of the impact is not feasible.

As described in the desk guide, public involvement might include both "come-one-come-all" settings and targeted, smaller-group settings. For the JWP Extension, neighborhood meetings might be appropriate – for example, if space allows, meetings at some of the venues mentioned above (CAC's South Center, the South Knoxville Senior Center, the South Knoxville Branch Library). One or more small advisory groups might also be created, using contacts made through the demographic analysis as well as at the public meetings as a basis for identifying potential members. While some members of prior task forces should be potential candidates for targeted consultation about the environmental justice assessment, it should not be assumed that they can speak for all of the populations of concern that potentially would be affected by the JWP Extension.

Throughout the process of analyzing impacts on environmental justice populations, consultation is a crucial thread that holds the process together and results in a well-grounded understanding of local impacts and local concerns. Honoring the importance of meaningful two-way consultation is an essential part of the analytic process.

Appendix C

Case Studies and Best Practices: Selected Examples from Other States

Many states, including Tennessee, have made significant strides to systematically improve their consideration of environmental justice. In Tennessee, an example is the Draft EIS prepared in 2004 for State Highway 397 (the Mack Hatcher Parkway Extension).

The State Highway 397 DEIS evaluated the feasibility of building a four-lane, divided, limited-access new highway around the City of Franklin. Section 4.4 of the DEIS provides a detailed analysis of the demographic composition of the study area (i.e., the area within a two-mile radius of any of the six build alternatives). This analysis mainly used 2000 census race and income data at the block and block group level. The DEIS also assessed the number of potential relocations and the probability that these relocations would include minority populations. The DEIS concluded that none of the proposed build alternatives are expected to a have a disproportionate impact on minority or low-income populations; it also noted, however, that after the preferred alternative is selected, TDOT will conduct a community outreach program to further assess potential impacts on minority and low-income populations in the study area.

The remaining case studies and procedures described below are drawn from other states.

Case Studies

FHWA maintains a web site that gives 10 case studies of effective practices to promote environmental justice in transportation investments. See http://www.fhwa.dot.gov/environment/ejustice/case/index.htm

The 10 cases are synopsized below. They include:

1. Madison, Wisconsin: Verona Road and West Beltline Needs Assessment Study

A predominantly minority community was isolated from much of Madison by several major roads. Two arterials were the focus of the needs assessment. The assessment was carried out with extensive community involvement, including meetings, charrettes, open houses, and targeted youth involvement on bicycle and pedestrian concerns.

See http://www.fhwa.dot.gov/environment/ejustice/case/case1.htm

2. Northern New Jersey and Statewide: Job Access and Reverse Commute Planning

A GIS-based study was conducted of potential use of the bus transportation network by welfare clients reentering the work force. The study was attentive to such spatial factors as the known locations of child care centers, job training centers, and prospective jobs as well as bus routes.

See http://www.fhwa.dot.gov/environment/ejustice/case/case2.htm

3. Durham, North Carolina: East-West Expressway EIS

The FHWA determined that a half-completed 10-mile connector between two interstates required an EIS. The uncompleted portion was to cut through an African-American neighborhood known as Crest Street. Following extensive multi-faceted dialogue involving Crest Street residents and others, a mitigation and enhancement plan was developed to preserve community cohesiveness.

See http://www.fhwa.dot.gov/environment/ejustice/case/case3.htm

4. California: Southern California Regional Transportation Plan

The Southern California Association of Governments (SCAG) developed a 20-year regional transportation plan (RTP) following three years of dialogue with community members about issues of equity and accessibility. In the RTP, SCAG used performance measures to address these social policy objectives as well as more conventional mobility and air quality objectives. Equity issues are

addressed by assessing the distribution of benefits and burdens across income quintiles.

See http://www.fhwa.dot.gov/environment/ejustice/case/case4.htm

5. Oakland, California: Cypress Freeway Replacement Project

Built in the 1950s, the first Cypress Freeway cut through West Oakland. After the freeway collapsed in the October 1989 earthquake that struck the Bay Area, the West Oakland community successfully brought pressure to move the freeway further west along the Southern Pacific railway. In addition, a Freeway Performance Agreement provided for other mitigation and enhancement measures as well as for minority set-asides in the construction contracts.

See http://www.fhwa.dot.gov/environment/ejustice/case/case5.htm

6. Oakland, California: Fruitvale BART Transit-Oriented Development Project

The Fruitvale community in Oakland is a mix of primarily low-income Latino, African-American, and Asian people. In 1991, the Bay Area Rapid Transit (BART) initially proposed a parking garage next to its Fruitvale station, but after it held a community meeting, this proposal was shelved. Instead, BART agreed to work with the local community development corporation and others on a pedestrian plaza that would connect the station to nearby local businesses and encourage BART users to shop locally.

See http://www.fhwa.dot.gov/environment/ejustice/case/case6.htm

7. Columbus, Ohio: MPO Environmental Justice Analysis

The Mid-Ohio Regional Planning Commission (MORPC) is the MPO for the Columbus, Ohio region. At the beginning of 2000, it convened a task force to develop a process for ensuring transportation planning compliance with environmental justice requirements. The process developed combines analysis and public involvement. It has four steps: (1) map locations of low-income and minority communities, (2) identify their transportation needs, (3) evaluate the MORPC's public involvement efforts, and (4) quantitatively assessment the

benefits and burdens of planned transportation improvements on these communities. A draft *Environmental Justice Report* was released in March 2000.

See http://www.fhwa.dot.gov/environment/ejustice/case/case7.htm

8. Tucson, Arizona: South Park Avenue Improvement Project

In the mid-1990s, Tucson received a Federal Transit Administration "Livable Communities" grant to enhance a one-mile stretch of South Park Avenue, to the southeast of downtown. South Park is a predominantly low-income, minority neighborhood settled by African-Americans in the 1940s. The grant program was intended to help transit-dependent communities with economic recovery. The Tucson Department of Transportation worked with local residents and business owners to plan for and carry out transit, pedestrian, bicycle, and aesthetic improvements.

See http://www.fhwa.dot.gov/environment/ejustice/case/case8.htm

9. Yavapai County, Arizona: Cordes Junction Interchange Environmental Assessment

When an environmental assessment (EA) was conducted on an I-17 interchange that was being considered for reconstruction to improve capacity, staff archeologists of the Arizona DOT found several aboriginal-use sites. Tribal governments were informed and given the opportunity to examine the sites and comment on the transportation project. Two tribes asked to visit the sites. With the completion of the EA, these site visits and informal follow-up discussions will form the basis for a formal memorandum of agreement between the tribes and state and federal agencies.

See http://www.fhwa.dot.gov/environment/ejustice/case/case9.htm

10. South Carolina: State Route 72 Environmental Assessment

A proposed widening of Route 72 includes a bypass of the village of Calhoun Falls, because local officials were concerned that the widening could damage the village's downtown. Bypass alternatives put forward by local officials included an alternative that could have disproportionately high and adverse impacts on

Bucknelly, a low-income, African-American community. When Bucknelly residents did not attend public meetings, additional public involvement efforts were made, including a special meeting in a neighborhood community center with hand-delivered meeting notices beforehand. This meeting was well-attended, and those who came spoke out candidly.

See http://www.fhwa.dot.gov/environment/ejustice/case/case10.htm

In addition to the 10 case studies compiled for FHWA, three recent MPO efforts to incorporate environmental justice into their long-range planning are particularly worth noting:

- **Atlanta Regional Commission**. The ARC completed an *Environmental Justice Report* in 2004 as part of its Mobility 2030 Regional Transportation Plan. This report summarizes the process used, which included engaging minority and low-income communities in the planning process, assessing the changing composition of the region, analyzing both demographic composition and the distribution of benefits and burdens, and establishing environmental justice criteria to evaluate projects. See http://www.atlantaregional.com/cps/rde/xbcr/SID-3F57FEE7-FC120C17/arc/EJRptPart1.PDF and http://www.atlantaregional.com/cps/rde/xbcr/SID-3F57FEE7-FC120C17/arc/EJRptPart2.pdf

- **Oakland, California, Metropolitan Transportation Commission.** In 2004, the Oakland MTC prepared an extensive *Equity Analysis Report* for its Transportation 2030 Plan. This report includes chapters of defining communities of concern as well as methods for and results of modeling and forecasting such factors as access and travel time to essential destinations. See http://www.mtc.ca.gov/planning/2030_plan/equity.htm

- **South Jersey Transportation Planning Organization.** In June 2002, the South Jersey TPO completed an *Environmental Justice Evaluation and Strategy* report. The report includes chapters on the TPO's existing policies, methods for identifying communities of concern, an assessment of general travel characteristics, an accessibility analysis, a TIP evaluation, and interviews and outreach for communities of concern. The report concludes with recommended strategies and actions. See http://www.sjtpo.org/ejtable.html

Best Practices

The case studies summarized above illustrate how analytical and public involvement methods can effectively be put to use on potential environmental justice issues in specific transportation projects and plans. Other best practices are embedded in the more general procedures that have been developed by state DOTs to address Title VI and environmental justice requirements. A few descriptions and analyses of other states' practices are briefly noted below.

Arizona

What is the Best Way to Address Environmental Justice Issues? (January 2002) is a 50-page report for the Arizona DOT. The report centers on the results of two surveys: a survey of state DOTs around the nation, to gather information on their environmental justice practices; and a survey of a few leaders in local agencies within Arizona, to gather their concerns and impressions about environmental justice and transportation.

The report concludes with two sets of findings and recommendations: one at the macro-level; one at the micro, or project, level. At the macro level, it stresses the need to (1) coordinate efforts among transportation agencies, jurisdictions, and communities; (2) create detailed, formal policies, procedures, and guidance; (3) communicate those policies and procedures to staff; and (4) periodically evaluating the effectiveness of policies and procedures. At the micro level, it stresses the need to (1) define the project study area, (2) develop a community profile, (3) analyze impacts, (4) identify solutions, and (5) document findings.

The full report is not available on-line. For a four-page summary, see http://www.azdot.gov/TPD/ATRC/publications/research_notes/PDF/506RN.pdf

California

California's *Desk Guide: Environmental Justice in Transportation Planning and Investments* (January 2003) is a detailed guide with more than 150 pages covering topics such as:

- the economic, social, and environmental effects of transportation investments on communities;
- the legal and regulatory context for environmental justice;

- how environmental justice should be incorporated into both agency activities and long-range planning; and
- the role of environmental justice in transportation project development.

See http://www.dot.ca.gov/hq/tpp/offices/opar/EJDeskGuideJan03.pdf

Florida

Florida Trends and Conditions 2001-2002: Transportation and Environmental Justice (November 2002) was prepared for the Florida DOT by researchers at Florida Atlantic University. This report of about 40 pages both critiques the lack of research on the relationships between transportation and environmental justice and applauds FDOT for its initiatives regarding social impact assessment, public outreach, and environmental justice.

See http://www.dot.state.fl.us/planning/publications/trendsresearch/ej.pdf

Maryland

Maryland's *Environmental Justice Guidelines for MD State Highway Administration's Projects* (August 2001) provides succinct guidance for all projects requiring NEPA documentation. This 20-page document has sections covering:

- environmental justice and Title VI, definitions,
- public outreach,
- identification of minority and low-income populations,
- assessment of disproportionately high and adverse impacts, and
- avoidance, minimization, mitigation, and enhancement.

The sections on identifying minority and low-income populations and assessing disproportionate impacts (pp. 7-14) are particularly useful.

Not available on-line.

Missouri

Integration, Status and Potential of Environmental Justice and the Social Impact Assessment Process in Transportation Development in Missouri (December 2003)

is a 300-page document prepared by Ernest Perry as a dissertation for the University of Missouri-Columbia and as a technical report for the Missouri DOT. The report centers on the Social Impact Assessment (SIA) process as used by MoDOT. It finds that while SIA is under-utilized by MoDOT, it holds the potential for opening transportation decision-making to greater citizen influence.

See http://168.166.124.22/RDT/reports/Ri02012/RDT04020.pdf

Western States Roundtable

A "peer roundtable" sponsored by FHWA and FTA, with representatives of 11 western states, met on September 27-29, 2005 to identify best practices for implementing Title VI and environmental justice requirements. The roundtable participants stressed the importance of a *systematic*, *consistent* approach to implementing these requirements. Break-out sessions addressed four key topics: (1) data collection, (2) LEP practices, (3) assessment of DOT and MPO practices regarding Title VI and environmental justice, and (4) public engagement and participation. The results are summarized in a 19-page *Peer Roundtable Report*.

See http://www.planning.dot.gov/Peer/California/sacramento_2005.htm

Resources

For FHWA's *Transportation and Environmental Justice: Effective Practices CD-ROM* (January 2002), which provides other examples of how environmental justice has been integrated into transportation programs, plans, policies, and projects, see:
http://www.fhwa.dot.gov/environment/ejustice/effect/index.htm