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16. Abstract

The past two federal surface transportation authorization bills, the Intermodal Surface Transportation Efficiency Act in 1991 and the Transportation Equity Act for the 21st Century (TEA-21) in 1998, have emphasized the need to consider environmental issues in the transportation planning process. While new federal regulations to guide the implementation of planning and environmental provisions in TEA-21 have not been issued, the intent of the legislation is known. This project resulted in a guidebook to provide Texas Department of Transportation and its partner entities (metropolitan planning organizations) with tools and techniques to consider environmental issues, including environmental justice, early on and throughout the planning and project selection process. The guidebook recommends a preliminary environmental process, at the earliest planning stages, to identify impacts and possibly avoid problems that would cause delays and complications in detailed project planning, design, and implementation. The process has been named the "preliminary review environmental process."

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DEVELOPING A PROCESS FOR EARLY CONSIDERATION OF ENVIRONMENTAL ISSUES

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DISCLAIMER

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of the Federal Highway Administration (FHWA) or the Texas Department of Transportation (TxDOT). This report does not constitute a standard, specification, or regulation. The researcher in charge was Cinde Weatherby Gilliland.

ACKNOWLEDGMENTS

The authors acknowledge individuals who contributed to and assisted with the research and preparation of this report. The authors especially thank the project coordinator, Mr. Walter Crook; the project director, Ms. Melissa Neeley; and members of the Project Monitoring Committee, Mr. Orlando Jamandre, Ms. Jackie Anderson, Ms. Jo Jarrell, and Mr. Michael Leary. The authors would also like to acknowledge the assistance of Mr. John Overman and Ms. Kelly West of Texas Transportation Institute, who shared materials and efforts from a complementary research study on environmental streamlining. This project was conducted in cooperation with TxDOT and FHWA.

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CHAPTER 1:
EARLY ENVIRONMENTAL REVIEW

BACKGROUND

Environmental analysis should be a continuing, iterative process that occurs throughout the life of a transportation project. It should begin as soon as a project is identified for inclusion in the transportation plan and continue through construction and monitoring. Environmental analysis in transportation planning is a process designed to conduct a preliminary environmental review for projects that are placed in the transportation plan. The level of effort is significantly less than that required for completing an environmental assessment or an environmental impact statement during later stages of project development, but thorough enough to identify major environmental and community issues. These guidelines use the term "preliminary review environmental process" (PREP) to indicate this level of effort.

Why Is Early Environmental Review Needed?

Transportation plans are generally developed for a 20-year planning horizon. However, many projects will remain in the plan for a longer period because the area needs and funding levels change over time, and projects may be delayed to accommodate those that become a higher priority. In the past, environmental analysis has not consistently been conducted at the transportation system planning stage. Once a project is in the area transportation plan, it is often dormant until it is moved into the next stage of project development. During that time period the urban development pattern, demographic profile, and local political climate can change significantly, causing a once environmentally and politically feasible project to face opposition.

Environmental analysis in the planning process is designed to accomplish several outcomes:

- establish a project's purpose and need,
- identify major environmental issues that may prohibit a project from obtaining environmental clearance, and
- initiate and maintain a dialog with affected community members so that their concerns will be addressed and their needs accommodated in the project planning.

Thus, a major transportation improvement project may be less likely to encounter costly delays.

PROJECT OBJECTIVES AND APPROACH

The research team's work plan anticipated a review of the TxDOT manuals, in particular the TxDOT environmental manual. It was the plan that the early environmental review would be expressed in terms of amendments to the manuals. However, as the project progressed it became clear that a major target audience for the research effort would also be TxDOT's partners at the metropolitan planning organizations (MPOs). Also, the TxDOT environmental manual was not completed during the project time frame. Thus, the major result of the project is the guidebook, *Preliminary Review Environmental Process Guidebook*, that can be used by planners at TxDOT and MPOs alike. A copy of the guidebook is provided in the Appendix.

The research team coordinated with a concurrent TxDOT research project, 0-4015, during the study period. The other project reviewed the planning process to identify possibilities for environmental streamlining. Researchers used an identical format for guidebooks resulting from both projects.

Work Tasks

Tasks employed by researchers in the development of the early environmental review process and the guidebook included the following:

- Task 1. Investigation of Best Practice and Detailed Literature Review
- Task 2. Review of Federal Requirements and Current TxDOT Processes
- Task 3. Detailed Review of TxDOT Design, Environmental, and Planning Manuals
- Task 4. Development of Recommended Process and Procedures for Early Environmental Planning
- Task 5. Draft Guidebook Text

Researchers were somewhat hampered in their efforts because no federal regulations were put in place to implement the planning provisions of the Transportation Equity Act for the 21st Century (TEA-21). Rules were promulgated for consideration and published in the *Federal Register*; however, they were placed in limbo when President George W. Bush took office. Joint

memoranda issued by the Federal Highway Administration and Federal Transit Administration planning executives were instead reviewed.

Researchers developed a draft recommended process and procedures for early environmental planning and presented them to the project monitoring committee for discussion. Researchers incorporated suggestions of the committee and also responded to the direction to provide a name for the process.

The committee recommended that researchers develop a process name that would not be confused with any of the other federal or state required processes. Thus, the terminology Preliminary Review Environmental Process resulted. Researchers avoided any references to "assessment" so as not to confuse the process with the federally prescribed term "environmental assessment" or "statement" so as not to confuse the process with any part of the federally prescribed "environmental impact statement (EIS)" or "preliminary environmental impact statement (PEIS)."

In the guidebook, researchers describe the steps to be used in incorporating early environmental considerations in the planning process. There is also emphasis in the guidebook on providing resources to be used in executing the process. Each section of the guidebook provides extensive references to available data or other information.

Overview of the Preliminary Review Environmental Process

Once the transportation needs have been identified and formulated into specific projects for inclusion in the transportation plan, early environmental analysis should be conducted. This analysis should be conducted prior to adoption of the transportation plan and reviewed with each plan revision or update. This is not a process of conducting a full environmental assessment as required during later stages of project planning and design. It is intended to be broad in scope and designed to take little time. A basic environmental review process incorporates the following steps. Sections of the guidebook provide detail on the various analyses.

Step 1: Assemble Database

With each transportation plan, a number of different projects located throughout the planning region will need to be reviewed. Planners should assemble a database of information and maps encompassing the entire planning region prior to beginning the environmental review. After assembling this database, planners can quickly update the information to reflect changes

and subsequent environmental reviews for updates, or revisions to the transportation plan can be conducted more quickly. Specific maps and other information, as well as sources, are discussed in the individual sections of the guidebook.

Step 2: Determine Projects Needing an Early Environmental Review

Not all projects listed in a transportation plan will require environmental review because they may be minor improvements that require no additional right-of-way, additional travel lanes, or added capacity. Each project listed in the transportation plan should be reviewed to determine whether an environmental review is needed.

Table 1 provides guidance on identifying projects for which early environmental review should be conducted.

Table 1. Environmental Review Decisions.

If the project involves….	Then the review should probably be…
Minor improvement; no additional right-of-way; no additional travel lanes; no obvious environmental impacts. Examples include installation of traffic signals, signage, roadway lighting.	None
Little or no additional right-of-way; no additional travel lanes; no obvious environmental impacts. Examples include shoulder widening, bridge replacements, and roadway reconstruction.*	None
Improvements that you are uncertain about the extent of impacts.	Conduct PREP
Improvements that you are certain will have significant impacts.	Conduct PREP
Improvements that you believe will impact a park or historic site, affect an endangered species, or require permits.	Conduct a full environmental review
Improvements that were analyzed more than five years ago, and there have been substantial project changes or land use and demographic changes.	Reevaluate to include such changes

* Some of these projects, particularly bridge replacements, will likely require some environmental review to ensure any possible impact is identified and avoided when possible.

Step 3: Determine the Level of Assessment

During this stage, planners should map the location and alignment of each project to determine the level of effort required for conducting the different environmental analyses.

Planners should review each project for impacts to natural resources, cultural resources, communities, air and noise quality, and hazardous materials, as well as the need for public involvement. However, the level of effort for these analyses may vary for each project.

For example, a major highway extension or widening in an already fully developed area may indicate little problem with regard to natural resources, but it may have major community impacts. On the other hand, a new roadway or major widening in a rural area may have a significant impact on natural resources but little impact on the built or human environment. Mapping of each project will also be used to define the study area for each project to be reviewed. Because the project alignment, amount of right-of-way, and facility design are not set at this stage, the study area should cover the broad, general corridor area where the project will be located.

Step 4: Compile Data and Prepare Environmental Profile

In this step, planners collect sufficient data to establish the project's purpose and need and to identify areas of potential impacts and possible mitigation. Assuming that a database of information has been prepared, planners should compile this information for the project study area to develop a profile of the natural, cultural, social, and economic characteristics. The profile should be sufficient to identify any major impacts or issues associated with the project.

Step 5: Analyze Impacts and Identify Solutions

Planners should investigate each project to identify the impacts of implementing the proposed project versus no action. Potential solutions for each impact should be developed. A number of analysis tools may be used to compare this relationship and estimate the impacts of a project.

- **Mapping Overlays** – Plots of various physical characteristics, demographics, economic impacts, and project alternatives. These plots can be superimposed to create a composite image and illustrate impacts.

- **Statistical Comparison** – Use of statistical analyses to compare the changes with and without the project.

- **Case Studies** – Use of similar transportation actions in other locations to estimate changes and impacts.

- **Public Meetings** – Workshops with citizens and local elected officials to identify issues, concerns, impacts, and potential solutions.

Step 6: Conduct Public Involvement

Public involvement is an important component of transportation planning and the environmental review of planned projects. Planners should conduct some level of public involvement for any project in an early environmental review to identify issues and develop alternative solutions. For other projects, such as signalization or signage, the public involvement can be included with public meetings held to discuss the transportation plan. Assessing the impact of projects on the community is an integral part of all aspects of transportation planning and project development.

Step 7: Reevaluate Projects Based on Findings

Planners can use the results of Steps 5 and 6 to reevaluate the project's need and purpose and potential costs based on the identified impacts and the need for mitigation.

Step 8: Monitor and Update

Project coordinators should monitor changes in the natural and man-made environment surrounding planned projects and update the database as needed. Monitoring changes will reduce the time associated with future environmental reviews conducted for plan revisions or updates.

CHAPTER 2:
GUIDEBOOK DEVELOPMENT

Researchers organized the guidebook to provide the process and techniques for addressing environmental factors during transportation systems planning. Chapters included are as follows:

- Chapter 1 – Introduction
- Chapter 2 – The Preliminary Review Environmental Process
- Chapter 3 – Natural Resources
- Chapter 4 – Cultural Resources
- Chapter 5 – Community Impact Assessment
- Chapter 6 – Noise Impacts
- Chapter 7 – Hazardous Materials
- Appendices – Directory of Contacts, National Environmental Protection Act (NEPA) Compliance Categories, Environmental Documents

Each chapter of the guidebook provides an overview of an early review process for that particular area of the environment and data and information sources. Whenever possible, researchers provided Internet links to allow practitioners to directly connect to the most up-to-date data and information. This information is critical to developing profiles for the specific environmental analysis being accomplished.

Researchers who routinely work directly in the particular field covered by the chapter developed guidebook chapters. Thus, resources suggested by these researchers reflect their regular use of the Internet websites or other documents.

CHAPTER 3:
RECOMMENDATIONS FOR IMPLEMENTATION

The *Preliminary Review Environmental Process Guidebook* will be a valuable tool for MPO planners and TxDOT district planners to use in promoting the early incorporation of environmental considerations in the planning process. Full benefits of the guidebook are realized by using the guidebook in electronic form, either as a CD-ROM or online, to facilitate access to a myriad of resources on the Internet. While most MPOs have ready access to the Internet, research indicates that not all environmental and advanced planning TxDOT staff have general access. This research suggests that such access could be very beneficial in executing the preliminary review environmental process, as well as all other aspects of environmental-related planning and implementation efforts.

USE OF THE GUIDEBOOK

Direct contact with MPO and TxDOT staff to provide an overview of the guidebook could increase the utility of the document. Opportunities for promoting use of the guidebook include the following:

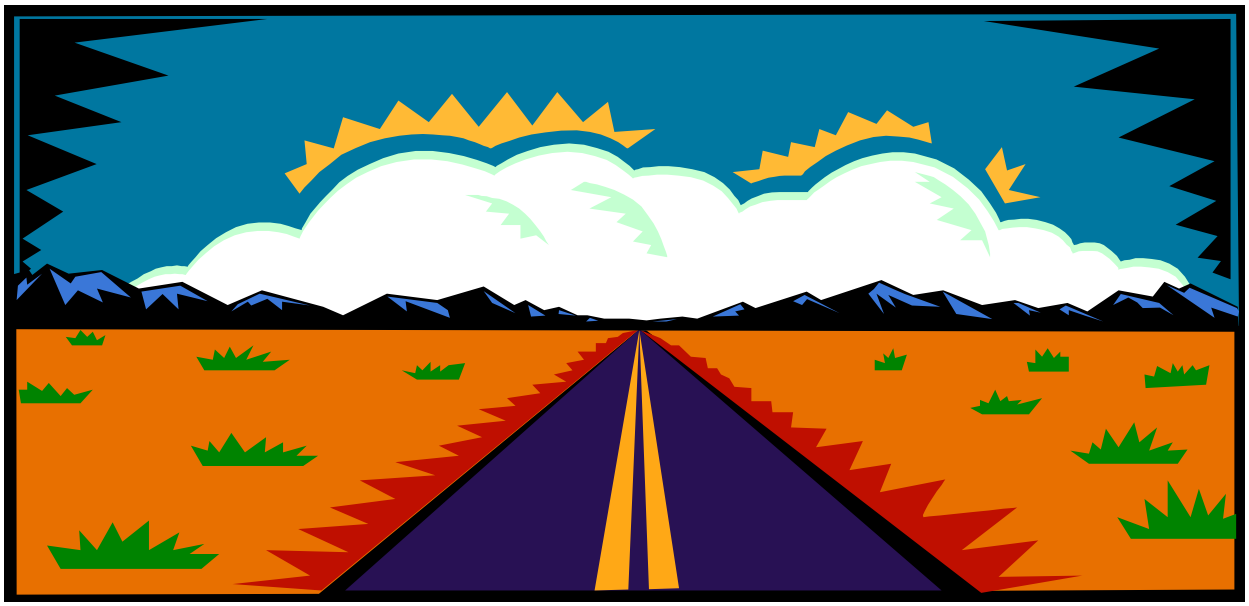
- scheduling a session on the guidebook at the annual TxDOT Environmental Affairs Conference;
- suggesting a session on the guidebook at Texas Metropolitan Planning Organization (TEMPO) meetings, and posting of the guidebook's availability on the organization's website; and
- suggesting a session on the guidebook at meetings of the Texas Chapter of the American Planning Association.

These suggested sessions could also include subject matter experts to talk about recent developments in the subject as well as feature discussions on the use of the document. Authors of the guidebook chapters could be considered as participants in these session presentations, along with the most appropriate TxDOT Environmental Division or district personnel.

As the TxDOT Environmental Manual is finalized, TxDOT could include specific references to the PREP.

APPENDIX:
PRELIMINARY REVIEW ENVIRONMENTAL PROCESS GUIDEBOOK

PRELIMINARY REVIEW ENVIRONMENTAL PROCESS GUIDEBOOK



Prepared for the Texas Department of Transportation

By the Texas Transportation Institute

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Chapter 1 – Introduction

Guidebook Organization

The guidebook is organized to provide the process and techniques for addressing environmental factors during transportation systems planning.

- Chapter 1 – Introduction
- Chapter 2 – The Preliminary Review Environmental Process
- Chapter 3 – Natural Resources
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What Is Environmental Review in the Planning Process?

Environmental analysis should be a continuing, iterative process that occurs throughout the life of a transportation project. It should begin as soon as a project is identified for inclusion in the transportation plan and continue through construction and monitoring. Environmental analysis in transportation planning is a process designed to conduct a preliminary environmental review for projects that are placed in the transportation plan. The level of effort is significantly less than that required for completing an environmental assessment or an environmental impact statement during later stages of project development, but thorough enough to identify major environmental and community issues. These guidelines use the term "preliminary review environmental process" (PREP) to indicate this level of effort.

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Environmental analysis in the planning process is designed to accomplish several outcomes:

- Establish a project's purpose and need.
- Identify major environmental issues that may prohibit a project from obtaining environmental clearance.
- Initiate and maintain a dialog with affected community members so that their concerns will be addressed and their needs accommodated in the project planning.

Thus, a major transportation improvement project may be less likely to encounter costly delays.

Purpose and Need (P&N) Statement Development

The purpose and need statement is like the trail boss on a Texas cattle drive. It guides the herd of project issues toward development. The statement briefly specifies the underlying purpose and need for which alternatives are being proposed. It must clearly demonstrate that a need exists, and how the need will be met based on tangible and quantifiable data. The P&N includes a written description of the transportation problem(s) that a transportation improvement project is intended to address. Planners, decision makers, and the public use the P&N statement to identify and compare project

alternatives against their associated impacts, and to ultimately select a preferred alternative.

Basic P&N requirements include:

- Definition of the transportation need that the project is intended to address;
- Establishment of the logical project termini and intermediate control points; and
- Demonstration that the project has independent utility (i.e., is a usable and reasonable expenditure if no other transportation improvements were made in the area).

Early Coordination

A well thought out purpose and need statement can help carry the needed environmental information forward from planning stages into project development. Use the P&N statement as a tool to identify critical environmental issues. Have planners and environmental coordinators attend preliminary design conferences. Establish a project coordination team for large and complicated projects to maintain project memory.

Content of Purpose and Need Statements

The purpose and need statement is a living document that should evolve and be reexamined as project information develops. For example, if an alternative originally suggested in the P&N does not serve the critical elements of the project as more information develops, then subsequent plans can eliminate that alternative.

Purpose and need should include the following elements:

- **Project Status** – describe the history of the project including participating agencies and actions taken to date. State where the proposed action is described in the Metropolitan Transportation Plan (MTP), Long-Range Plan (LRP), Transportation Improvement Program (TIP), and Statewide Transportation, Improvement Program (STIP), as applicable.
- **System Linkages** – describe how the proposed project links to the transportation system.
- **Capacity** – describe current, projected, and ultimate capacity and level of service for the proposed facility.

- **Legislation** – identify any federal, state, or local mandates for the action.
- **Social and/or Economic Development** – identify economic and land use changes that support the need to add capacity (e.g., a new school).
- **Modal Relationships** – describe how the proposed action will interact, connect, or complement other modes such as airports, bus, rail, trails, or other transportation service.
- **Safety** – describe, if applicable, how the project will improve safety. Use accident data if available.
- **Roadway Deficiencies** – describe existing roadway deficiencies such as load limits or high maintenance costs and how the action will improve the deficiencies.

Example of Purpose and Need Statements

> TxDOT proposes to upgrade US 29 from Plain Rd. to Polk St. from a two-lane rural roadway to a four-lane divided, non-controlled access highway facility. The proposed upgrade is needed because of the high accident rate related to vehicles stopping to make left turns. Rear-end accidents have increased 106 percent along this section of road during the past five years due to development and the subsequent 200 percent increase in traffic volume. The proposed facility will provide for protected left turns and sufficient capacity to accommodate current and anticipated future traffic volumes.

Organizational Issues and Objectives (Roles and Responsibilities)

Transportation plans include federal, state, and local projects. Thus, coordination is required between the Texas Department of Transportation (TxDOT) district offices and Environmental Division (ENV), the Metropolitan Planning Organization (MPO), and other local planning agencies.

In metropolitan areas, the MPO, coordinating with the TxDOT district, should hold the primary responsibility for conducting the environmental review during planning. In rural areas, the TxDOT district office, in cooperation with TxDOT ENV, holds the primary responsibility to conduct the environmental analysis during planning. It is strongly encouraged, however, that each area establishes strong coordination and division of responsibilities appropriate for their needs.

Coordination with Other Agencies

Coordination with other agencies such as the Texas State Historical Commission, Texas Parks and Wildlife, U.S. Corps of Engineers and others, will not generally be required at this stage of environmental review when projects are minor in scope. However, the purpose of PREP is to identify major environmental issues early in the planning stage so that coordination with such agencies can begin at the earliest possible moment. Thus, when major environmental issues are identified in PREP, the coordination with the appropriate agencies should be initiated.

Legal Basis and Policy Directives

Consideration of environmental impacts is legally required by a variety of federal legislation, policy, and executive orders. TxDOT also supports preservation and enhancement of the environment in its own policy.

> TxDOT Environmental Policy
>
> It is the policy of the Texas Department of Transportation (TxDOT) to preserve and, where practicable, enhance the environment. TxDOT includes environmental considerations in its vision, mission, and goals. Increasing regulatory requirements, greater public awareness, and greater demands from policy makers are reasons to address TxDOT impacts on the environment.

NEPA Background

The National Environmental Policy Act (NEPA) affects nearly all aspects of transportation development. In 1969, Congress passed and President Richard Nixon signed into law the National Environmental Policy Act of 1969. The act set forth the basic policy for protection of the environment and accomplished three major goals:

- It set national environmental policy.
- It established a basis for environmental impact statements (EISs).
- It created the Council on Environmental Quality (CEQ). http://www.whitehouse.gov/ceq/. (The CEQ no longer exists, and its duties have been absorbed by the EPA.)

NEPA requires many government agencies to use an interdisciplinary approach in planning and decision making for actions that impact the environment. It requires an assessment of environmental impacts on human environment and consideration of alternatives and mitigation where feasible. The CEQ developed regulations for the environmental impact assessment process and documentation, but it needs to be emphasized that the focus and ultimate goal should be on using the information developed during the environmental process for making informed decisions. In addition to NEPA, the provisions of other statutes, regulations, and executive orders affect the decision making on federally assisted transportation projects. (http://ceq.eh.doe.gov/nepa/nepanet.htm.)

23 CFR 771

The United States Department of Transportation environmental regulations are in 23 CFR 771. These regulations are the basis for surface transportation projects. In general, 23 CFR 771 requires:

- documentation to demonstrate compliance,
- an evaluation of alternatives including the "no-build" alternative,
- public involvement, and
- mitigation when necessary (www.fhwa.dot.gov/).

Again, it should be emphasized that the goal is not to simply comply with the requirements for environmental analysis and documentation. The focus should be on developing quality data and analyses to improve on the decision-making process.

Chapter 2 – The Preliminary Review Environmental Process

Environmental analysis during the systems planning process is intended to identify major environmental issues associated with a project that will be incorporated in the transportation plan. Early environmental planning will also initiate data collection, public involvement, agency coordination, and environmental tracking for early identification of potential environmental problems and any needed mitigation.

The early environmental review will not likely flow in a fixed, predictable series of steps because each project will present its own issues that may require additional investigation. The process is designed to cover the major areas of environmental analysis required for transportation projects at a level that will serve to highlight problems and the need for alternatives or mitigation.

Overview of the Preliminary Review Environmental Process

Once the transportation needs have been identified and formulated into specific projects for inclusion in the transportation plan, early environmental analysis should be conducted. This analysis should be conducted prior to adoption of the transportation plan and reviewed with each plan revision or update. This is not a process of conducting a full environmental assessment as required during later stages of project planning and design. It is intended to be broad in scope and designed to take little time. A basic environmental review process incorporates the following steps. Other sections of this guidebook provide additional detail on the various analyses.

Step 1: Assemble Database

With each transportation plan, a number of different projects located throughout the planning region will need to be reviewed. A database of information and maps encompassing the entire planning region should be assembled prior to beginning the environmental review. Once this database is assembled, it can be quickly updated to reflect changes and subsequent environmental reviews for updates or revisions to the

transportation plan can be conducted much quicker. Specific maps and other information as well as sources are discussed in the individual sections in this guidebook.

Step 2: Determine Projects Needing an Early Environmental Review

Not all projects listed in a transportation plan will require environmental review because they are minor improvements that require no additional right-of-way, additional travel lanes, or added capacity. Each project listed in the transportation plan should be reviewed to determine whether an environmental review is needed.

The following tables provide guidance on identifying projects for which early environmental review should be conducted.

Table 2-1. Environmental Review Decisions

If the project involves….	Then the review should probably be…
Minor improvement; no additional right-of-way; no additional travel lanes; no obvious environmental impacts. Examples include installation of traffic signals, signage, and roadway lighting.	None
Little or no additional right-of-way; no additional travel lanes; no obvious environmental impacts. Examples include shoulder widening, bridge replacements, and roadway reconstruction*.	None
Improvements that you are uncertain about the extent of impacts.	Conduct early environmental review
Improvements that you are certain will have significant impacts.	Conduct early environmental review
Improvements that you believe will impact a park or historic site, affect an endangered species, or require permits.	Conduct a full early environmental review
Improvements that were analyzed more than five years ago and there have been substantial project changes or land use and demographic changes.	Reevaluate to include such changes

* Some of these projects, particularly bridge replacements, will likely require some environmental review to ensure any possible impact is identified and avoided when possible.

Step 3: Determine the Level of Assessment

During this stage the location and alignment of each project should be mapped to determine the level of effort required for conducting the different environmental analyses.

Each project will be reviewed for impacts to natural resources, cultural resources, community impacts, air and noise quality, hazardous materials, and the need for public involvement. However, the level of effort for these analyses may vary for each project.

For example, a major highway extension or widening in an already fully developed area may indicate little problem with regard to natural resources, but may have major community impacts. On the other hand, a new roadway or major widening in a rural area may have a significant impact on natural resources, but little impact on the built or human environment. Mapping of each project will also be used to define the study area for each project to be reviewed. Because the project alignment, amount of right-of-way, nor the facility design is not set at this stage, the study area should cover the broad, general corridor area where the project will be located.

Step 4: Compile Data and Prepare Environmental Profile

In this step sufficient data are collected to establish the project's purpose and need and to identify areas of potential impacts and possible mitigation. Assuming that a database of information has been prepared, this information should be compiled for the project study area to develop a profile of the natural, cultural, social, and economic characteristics. The profile should be sufficient to identify any major impacts or issues associated with the project.

Step 5: Analyze Impacts and Identify Solutions

Each project should be investigated to identify the impacts of implementing the proposed project versus no action. Potential solutions for each impact should be developed. A number of analysis tools may be used to compare this relationship and estimate the impacts of a project.

- **Mapping Overlays** – Plots of various physical characteristics, demographics, economic impacts, and project alternatives. These can be superimposed to create a composite image and illustrate impacts.

- **Statistical Comparison** – Use of statistical analyses to compare the changes with and without the project.

- **Case Studies** – Use of similar transportation actions in other locations to estimate changes and impacts.

- **Public Input** – Workshops with citizens and local elected officials to identify issues, concerns, impacts, and potential solutions.

Step 6: Conduct Public Involvement

Public input is an important component of transportation planning and the environmental review of planned projects. Planners should conduct some level of public outreach for any project in an early environmental review, to identify issues and develop alternative solutions. For minor projects, such as signalization or signage, the public involvement occurring in plan development may suffice. For more major projects, public involvement should be individually tailored for each project to ensure that all interested and affected persons or groups have the opportunity to have their concerns addressed. Assessing the impact of projects on the community is an integral part of all aspects of transportation planning and project development.

Step 7: Re-Evaluate Projects Based on Findings

Use the results of Steps 5 and 6 to re-evaluate the project's need and purpose and potential costs based on the identified impacts and the need for mitigation.

Step 8: Monitor and Update

Project coordinators should monitor changes in the natural and man-made environment surrounding planned projects and update the database as needed. Monitoring changes will reduce the time associated with future environmental reviews conducted for plan revisions or updates.

Chapter 3 – Natural Resources

Introduction

A natural resource assessment conducted at the transportation planning stage should include a broad evaluation of the potential for impacts on water quality (including lakes, streams, rivers, wetlands, and aquifer recharge areas), endangered species, wildlife or waterfowl management areas, state or local parks, geologic formations, and coastal waterways. This evaluation should identify the potential impacts of individual projects and the transportation plan as a whole. The intent of this early evaluation of natural resources is to identify major issues or impacts that might preclude or significantly delay future environmental clearance for a project. Early identification will provide the opportunity to either avoid the resource or identify mitigation opportunities.

Natural Resource Assessment Process

The basis for performing an early review of natural resource impacts is the development of a natural resource profile. The profile will form the baseline of information used in the early environmental review as well as identify base conditions for future work. The major steps in developing the baseline profile include identification of the study area, determining the level of assessment, developing a natural resources profile, identifying impacts and solutions (including avoidance), and documenting findings.

Define the Study Area

Each project that will be considered in the PREP should be mapped. Because projects at this stage may be conceptual, the exact alignment and necessary right-of-way may be unknown. Thus, the map will be an approximation of the planned project location and right-of-way based on the type and size of the proposed facility.

As with other aspects of the environmental process, the study area boundaries may be classified into two levels – primary and secondary. The primary study area would be that immediately adjacent to and surrounding the project. This study area would likely have the greatest impacts. The secondary study area may include areas that are some distance

away from the immediate project. Because such areas may not be known during the initial mapping, identification of the secondary study area for a project may be somewhat of an iterative process. For example, during development of the natural environment profile for the primary study area, it might be determined that an adjacent creek feeds a wetland area miles away from the project, and the stormwater runoff may have an impact on that wetland. In such a case, the wetland area would then be considered part of the secondary study area.

Determine the Level of Assessment

Not all projects require the same level of assessment. Major new facilities planned in undeveloped or developing areas are likely to need greater review than minor improvements in fully developed areas. Professional judgment should be used to determine the level of data collection and review based on the project's scope and complexity. More minor projects in existing urban areas may be able to be reviewed based on existing secondary data while major new facilities may require some primary data collection to determine the existing natural resources. As a result, a certain amount of data collection and review may be required before the level of assessment needed can be ascertained. Table 3-1 provides a series of questions that may provide guidance on determining the level of assessment. A positive answer to any of the questions suggests a more thorough review regarding the specific natural resource.

Develop the Natural Resource Profile

A natural resources profile is a compilation and summary of data that detail current baseline conditions in the study area. These data will define and describe the natural resources within the project area so that potential impacts can be identified and either avoided or mitigated.

Table 3-1. Guidance on Determining the Level of Assessment Needed for Natural Resources

Answering "yes" to any of the following questions indicates a more in-depth project review:
• **Does the project bisect or cross or is the project adjacent to any lake, river, stream, creek, floodplain, or wetland?** • **Is the project adjacent to a state or local park?** • **Does the project bisect or cross or is the project adjacent to any endangered species habitat or areas of habitat connectivity?** • **Does the project bisect or is the project adjacent to any wildlife or waterfowl management areas?** • **Is the project adjacent to a coastal waterway?** • **Is the project within or adjacent to an aquifer recharge area?**

Assemble Database

As discussed in Chapter 2, PREP calls for developing an area wide database containing easily assembled data from existing secondary sources. The basic data needed to conduct the natural resources assessment includes:

- hydrography including complete water features (all wetlands, streams, lakes, rivers, floodplains, and bays);
- boundaries of state parks;
- endangered species populations and habitat connectivity;
- wildlife or waterfowl management areas;
- aquatic and terrestrial vegetation;
- geological formations;
- coastal waterways (sand dunes, bird rookeries, sensitive shorelines, etc.); and
- location of any aquifer recharge areas.

Data and Sources

Because the PREP is to be done at the earliest stage of project consideration, most of the natural resources data to be considered can be from existing data sources. Collection of new data would come at a later stage in the project's development unless sufficient data is not available to complete the initial review.

There is an abundance of natural resource data available, much of it at no cost, for use in planning. Most of the data are readily available via the Internet for immediate downloading. Other data may be ordered through systems in place on the particular websites via the Internet.

Keep in mind that Internet website addresses are subject to change. It is, however, often easy to get to the new address by dropping back to the agency's base address or by doing a search for the data you are seeking through a general search engine such as www.google.com.

The following sections provide a number of data sources to assist you in building the natural resource profile for any geographic area being considered.

- Data and Sources – Texas Natural Resources Information System

The Texas Natural Resources Information System (TNRIS), a division of the Texas Water Development board, is the state's clearinghouse for natural resources data. TNRIS serves as a distribution center for U.S. Geological Survey (USGS) maps and has numerous other map collections available for in-house use or reproduction. Digital data available through TNRIS pertain to water resources, geology, U.S. Census, and other natural resources spatial data.

TNRIS resources are available on its website at http://www.tnris.state.tx.us/. Information about workshops and training classes offered by TNRIS is also posted on the website.

Texas Department of Transportation Urban Files are also available on the TNRIS website. TxDOT provides the Urban Files to TNRIS in .dgn format, which is a CAD format created by Intergraph's Microstation® software. TNRIS then converts the files to

AutoCAD® drawing format (.dwg) and ESRI export format (.e00). The agency suggests using the .dgn format files.

The TNRIS website provides the information shown in Table 3-2 as a guide to which formats popular software packages can use.

Table 3-2. Formats Used by Popular Software Packages[1]

Software	Useable File Format
ArcExplorer	Use the free ArcExplorer 1.1 Import utility (available at www.esri.com/software/arcexplorer/aedownload.html) to convert .e00 files to coverages, which can be read by ArcExplorer
ArcInfo	Can import .dgn and .e00 files
ArcView	Can import .e00 files to converges, which ArcView can read. If you have the CAD reader extension you can read .dgn or .dwg files directly (no import necessary)
AutoCAD Map	Can import .dgn files
MapInfo	Can import .dgn and .e00 files
Microstation	Can directly read .dgn files
GeoMedia	Can directly read .dgn and .e00 files
ERDAS	Can import .e00 files and .dgn files
ENVI	Can directly read .e00 files

- Data and Sources – Texas General Land Office (GLO)

The Texas General Land Office has historically provided maps and other tools to organize information about the natural resources of the state. Today, in addition to historical maps and research data, the GLO uses GIS data, global positioning systems (GPS), and computer-aided design (CAD) systems to compile, analyze, and distribute information about the location of natural and human-made resources.

General information about the maps, research, and data available from the Texas General Land Office can be found at http://www.glo.state.tx.us/. This website leads to the following databases, among others, which are in geographic spatial projection

[1] Source: Texas Natural Resources Information System Website

(latitude/longitude decimal degree) and are presented in ArcInfo® coverage export files and/or ArcView shape file formats.

Base map data files include:

- **County Boundaries** – Boundaries and names of the 254 Texas counties. Digital boundaries provided by the Texas Natural Resource Conservation Commission (TNRCC).

- **Elevation** – Elevation contours for mapping of the state of Texas at relatively small scales.

- **Hydrography (General)** – Major water features (major streams, lakes, rivers, and bays) used in statewide mapping. Features extracted from TxDOT digital county map files.

- **Hydrography (Detailed)** – Complete water features (all streams, lakes, rivers, and bays) in Texas. Features extracted from TxDOT digital county map files. In separate arc and polygon files.

- **Place Names** – Names of cities, towns, rivers, and lakes in Texas.

- **Railroads** – Railroad network for entire state. From TxDOT digital county map series files.

- **Roads/Highways** – State and federal highways in Texas mapped from U.S. Department of Transportation (U.S. DOT) data.

- **Shoreline** – Texas Gulf Coast shoreline data provided by the National Oceanic and Atmospheric Administration.

- **State Submerged Lands** – State-owned tracts in offshore waters and coastal bays. These tracts are owned and leased by the GLO.

- **Topography** – Topography (shaded relief) in ArcInfo GRID format. Derived from the USGS digital elevation model data.

- **Urban Areas** – Boundaries of urbanized areas in the state of Texas.

Statewide data files include:

- **National Parks** – National Park Service (NPS) areas, data provided by the NPS.
- **Natural Regions** – Geographic regions of Texas based on ecological and cultural factors; data provided by the Texas Parks and Wildlife Department (TPWD).
- **State Parks/Wildlife Management Areas** – Boundaries of state parks and wildlife management areas owned or managed by the TPWD.
- **Vegetation Areas** – Vegetation types occurring in Texas mapped by McMahan et al. (1984) and digitized by TPWD personnel (see www.tpwd.state.tx.us/gis/veg/index.htm).

Coastal data files include:

- **Audubon Sanctuaries** – Coastal tracts containing waterbird colonies leased to the National Audubon Society.
- **Colonial Waterbird Rookery Areas** – Locations of waterbird rookery sites in the coastal counties of Texas. Information compiled by the Texas Colonial Waterbird Society.
- **National Wildlife Refuges** – Approximate boundaries of national wildlife refuge lands. Digitized from U.S. Fish and Wildlife Service (USFWS) maps.

Coastal management data files include:

- **Archeological Sites** – Density of archeological sites in each USGS 1:24,000 quad in the coastal zone.
- **Land Use/Land Cover Imagery** – Landsat Thematic Mapper imagery classified by land cover and vegetation types available for coastal Texas counties.

- **National Register of Historic Places** – Historic structures and sites listed in the National Register of Historic Places located in coastal counties of Texas.

- **National Wetlands Inventory Data** – Wetland/land cover data mapped by USFWS. Data classified from 1992-93 aerial photography by USFWS. Historical data (pre-1992) available by request for some areas.

➢ Data and Sources – GeoCommunity

This Internet resource offers free data and data for sale through its GIS DataDepot®. The website address for Texas-related information in the DataDepot is: http://www.gisdatadepot.com/catalog/US/61085/datalist.html. The website offers access to data at the statewide level and at the county level. For example, statewide data available includes:

- administrative and political boundaries,
- environmental and natural resources,
- geologic,
- hydrography,
- land use/land cover,
- soils survey data,
- wetlands,
- transportation,
- utilities, and
- vegetation.

As an example of the sort of data found in each of the data areas, the land use/land cover data available statewide include:

- coastal county outfalls,
- landfills,
- statewide superfund sites, and
- vegetative cover.

Data at the county level are also available at the website. As an example, the following data are available for Tarrant County:

- city of Arlington digital orthomosaics at the 1-foot resolution,
- digital elevation models,
- digital orthophotos (at a variety of levels),
- digital raster graphics,
- hydrography,
- hypsography,
- land use/land cover, and
- transportation.

➢ Data and Sources – Miscellaneous Data Sources

Additional data resources that may be helpful in developing a natural resources profile are provided in Table 3-3.

Table 3-3. Miscellaneous Websites Providing Natural Resource Data

Agency or Entity	Internet Address
Texas Parks and Wildlife Department	http://www.tpwd.state.tx.us/
Brazos River Authority	http://www.brazos.org
Edwards Aquifer Authority	http://www.edwardsaquifer.org
Guadalupe-Blanco River Authority	http://www.gbra.org
Lower Colorado River Authority (LCRA)	http://www.lcra.org
LCRA Water Services	http://www.lcra.org/water
National Weather Service (Texas Hydrological Summary)	http://iwin.nws.noaa.gov/iwin/tx/hydro.html
Nueces River Authority	http://nueces-ra.tamucc.edu
Recreational Boating and Fishing Foundation	http://www.rbff.org
Red River Authority	http://www.rra.dst.tx.us
Rio Grande Institute	http://www.riogrande.org
Sabine River Authority	http://www.sra.dst.tx.us/basin/recreation.asp
San Antonio River Authority	http://www.sara-tx.org/
San Jacinto River Association	http://216.161.14.72/groups/sanjacintoriverassociation77049.htm
Texas Chapter of the American Fisheries Society	http://www.sdafs.org/tcafs/default.htm
Trinity River Authority	http://www.trinityra.org/trahp.htm
Trinity River Information Network	http://www.nctcog.dst.tx.us/envir/trin
U.S. Army Corps of Engineers – Fort Worth District	http://swf67.swf-wc.usace.army.mil
U.S. Army Corps of Engineers – Tulsa District	http://www.swt-wc.usace.army.mil
U.S. Army Corps of Engineers – River Basin Information	http://www.swt-wc.usace.army.mil/stations.htm
U.S. Geological Survey	http://www-wmc.wr.usgs.gov/doq/

Analyze Potential Project Impacts and Identify Possible Solutions

Geographic Information System (GIS) mapping systems can give a primary review of potential impacts. Mapping of environmental boundaries such as wildlife habitat can illustrate wildlife habitat connectivity or migration patterns, and endangered species, that otherwise might not be readily apparent.

Determination of the potential impacts on natural resources involves accounting for the broad scope of the natural environment. First, decide whether the project will have an

impact on a certain natural resource. If that impact can be avoided while still meeting the need for the project, the planned project should be revised to avoid the issue. Avoidance is always the first and best solution. If the impact cannot be avoided, then it should be determined if the impact is mitigable or irreparable. If the impact appears mitigable, appropriate solutions such as wetland banking, acquisition and restoration, detention and sedimentation ponds, stormwater filtration devices, wildlife underpasses, or overpasses, should be identified.

Documentation

Documentation should be provided to describe the base year conditions. Relevant findings regarding the existence of natural resources, potential impacts, and possible solutions should be included. Also, all avoidance and minimization efforts should be documented.

Monitor for Changes

Just as with the social, economic, and cultural environment, flora and fauna change over time. Changes in water resources will have a profound affect upon both vegetation and wildlife. Monitoring for these may be as easy as updating the maps used for the initial review. In this age of technology, the review process will be made easier as more data, in particular maps, become available in a digital format.

Chapter 4 – Cultural Resources

Introduction

The preliminary review of cultural resources during the transportation planning stage is essential. This review will help to avoid important cultural resource sites, assure knowledge of the site area when dealing with other agencies or local citizens, and aid in future compliance with the review process required under Section 106 of the National Historic Preservation Act.

The Cultural Resource Assessment Process

Review of cultural resources during transportation planning will develop baseline information for use in the PREP as well as for use in later environmental work. The goal of the early review of cultural resources is to avoid a significant resource if at all possible, identify early on where additional research will be needed, and consider how changes to resources can be mitigated.

Because there are so many different types and sizes of cultural resources, mapping is especially important to manage the data collected. The most efficient and effective way to map them is through use of a GIS database. Many of the map information sources presented in this guidebook will be difficult to use if not put into a GIS system so that a precise location or boundary can be determined. An additional advantage for the future development of the project is that a GIS database allows the accumulation of data collected over time from different sources for different projects, thus eliminating repeated work.

The major steps in conducting a cultural resources review include defining the study area, determining the level of assessment, identifying cultural resources, potential impacts, and possible solutions.

Define the Study Area

Each project that will be reviewed in the PREP should be mapped. Although the exact alignment or facility design may not be known, the general location and necessary right-of-way can be estimated based on the type of facility and size being planned. If alternative locations are being considered, these should be mapped as well.

Identification of the cultural resources study area for each project may be an iterative process. As a starting point, it might be useful to define the primary study area as that area within 0.5 mile either side of the planned project location. This distance will allow for identification of cultural resources that may be directly impacted by the project due to proximity of project to the resource and those that may be indirectly impacted by a proposed project due to changes in noise, air quality, or access. Subsequent to the review of cultural resources within this study area, and depending on the initial findings, it may be necessary to expand the study area. Professional judgment combined with knowledge of cultural resources will be needed to ensure the appropriate study area is considered.

Determine the Level of Assessment

Not all planned transportation projects will require the same level of review. As noted in Table 2-1 in Chapter 2, minor projects that require little or no right-of-way are less likely to involve significant cultural resources than major new facilities. However, because cultural resources involve such a wide range of objects, care should always be taken so that no resource is overlooked. Additionally, as with other environmental resources, a certain amount of data collection may be required to fully identify the depth of analysis required to determine the impacts.

Identify Cultural Resources

Identification of potential cultural resources requires an understanding of cultural resources, what cultural resources encompass, and why they are important.

Understanding Cultural Resources

The term cultural resource refers to any human-made or influenced object, landscape, or structure. These cultural resources may be prehistoric (before written history), historic (generally more than 50 years old), or contemporary cultural properties of great significance to one or more communities. Traditional cultural properties are discussed in detail in National Register Bulletin (NRB) #38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties* available on the Internet at http://www.cr.nps.gov/nr/publications/bulletins/nrb38

Cultural resources may be both above the ground (known as historic sites) and below ground (archaeological remains). The term "cultural resources" represents a far more diverse group of human products than were considered in historic preservation before the 1970s. As a working definition cultural resources will be all physical remains that are potentially historically and culturally important to any group in the state of Texas.

Although specific types of cultural resources are discussed in this chapter, it would not be possible to list all that should be considered. Further guidance is provided by the National Register of Historic Place (NRHP) bulletins available at http://www.cr.nps.gov/nr/publications/bulletins.htm and from the State Historic Preservation Officer (SHPO) at the Texas Historical Commission (THC).

- What Do Cultural Resources Look Like?

Some cultural resources could be as ephemeral as traces in or on the ground, including stains left in the soil, artifacts such as pottery or fabric, foundations of buildings, or remnants of fence lines. This sort of resource leaves limited indications on the surface, but skilled observers or various technologies can aid in identifying such places (discussed later).

They may be ruins in which only a small part of the cultural resource remains above ground. Abandoned or derelict buildings and places that have begun to decay could be considered cultural resources, as well as structures or sites that have been preserved or restored to their original state. A reconstructed structure located on a new site would

generally not be considered a cultural resource unless it had been built in that new location over 50 years ago—an example of this might be a building reconstructed in a town park as part of Texas' centennial celebration in 1936.

The aesthetic appearance of a cultural resource is not particularly important; that is, they do not have to be big, expensive, beautiful, colorful, etc.

- What Kinds of Human-Made or Influenced Sites Would Be a Cultural Resource?

Cultural resources are associated with every cultural group, whether that group is identified by race, ethnicity, religion, gender, etc. Any property that is more than 50 years old, or more recently created properties with outstanding qualities and associations, can be considered a cultural resource. The National Register Bulletin #22 (http://www.cr.nps.gov/nr/publications/bulletins/nrb22) provides more detail on consideration of recent properties as cultural resources.

Most national programs utilize the 50-year-old standard for determining whether a resource is of sufficient age to be "historic." Since PREP aims at early planning and most transportation projects require a number of years to develop, it is suggested that resources 45 or more years initially be considered historic. Remember this time period is a guide and some resources, including traditional cultural properties, may be younger.

Some specific types of resources may be typically encountered in looking at the impact of transportation project development, either above ground or as remains below ground, as shown in Table 4-1.

Table 4-1. Potential Cultural Resources Most Typically Encountered in Transportation Development

Resource	Description / Notes
Buildings	Can be designed or vernacular (meaning the common style of that area or cultural group – as an example, dogtrot-style houses found in eastern Texas are a vernacular style)
Structures	Built features that are self contained individual elements, that either stand alone or are an important part of a larger cultural resource (examples are aircraft, bandstands or gazebos, railroad grades)
Highway structures	Bridges, older highway alignments, or pavements
Objects	Small distinct features, such as fountains, sculpture
Natural sites with cultural meaning	Also known as "traditional cultural properties." Places or features of the landscape that have become cultural artifacts through the symbolic or traditional meaning given them. These types of places are most often associated with cultural minorities, although they can be associated with any group in society. Examples include the peyote fields of south Texas that are important to Native American groups or the lawn in front of the Memorial Student Center at Texas A&M University, which is considered a memorial to the war dead. See National Register Bulletin #38 for more detail -- http://www.cr.nps.gov/nr/publications/bulletins/nrb38/.
Designed landscapes	Places such as cemeteries, parks, residences, subdivisions, that were built according to designs of a known professional designer or that follow popular design trends of its day, such as the Llano Cemetery in Amarillo or the Mayfield-Guetch Park in Austin. See National Register Bulletin #18, *How to Evaluate and Nominate Designed Historic Landscapes* -- http://www.cr.nps.gov/nr/publications/bulletins/nrb18/.
Vernacular properties	Places that reflect the traditional ways of arranging areas or designing sites that do not change significantly with new trends nor require professional designers. They often reflect the traditional patterns associated with particular cultural groups. Examples include German-built farmsteads or the raked house yards or bulb gardens found at rural African American residences.

Table 4-1. Potential Cultural Resources Most Typically Encountered in Transportation Development (cont.)

Resource	Description / Notes
City or neighborhood plans or districts	Settlements that have distinctive plans or a distinctive physical or social character. Generally, important plans are those by known designers (such as Hare and Hare in Houston), those that reflect the planning traditions of a particular cultural group (such as the town plans of Fredericksburg or Bastrop, with their wide streets typical of German-settled areas, or those that may be locally distinctive, such as Southgate in College Station. Often such areas have been or can be identified as districts, which have known boundaries or have been given names (examples include River Oaks in Houston or Hyde Park in Austin).
Religious sites	Sites could include camp meeting or revival locations, churchyards, cemeteries, roadside shrines, or traditional religious sites associated with minority cultures. Special care should be taken when dealing with religious sites to avoid perceived infringement of religious freedom.
Rural historic landscapes	Often large rural areas consisting of agricultural lands and villages follow a distinctive pattern that makes them cultural resources. These patterns might be found in field arrangements, fencing style or location, design of farmsteads, or style of buildings among others. These distinctive patterns are typically associated with a particular cultural group. Examples include the German-established farms around Westphalia or the acequia-fed (canal) areas near San Antonio that date from the Spanish period. For more details, refer to National Register Bulletin #30, *Guidelines for Evaluating and Documenting Rural Historic Landscapes* -- http://www.cr.nps.gov/nr/publications/bulletins/nrb30/.
Important individual plants or vegetation groups	Plants with some significant meaning or that are associated with important events in history. A good example is the Treaty Oak in Austin.

- What Makes Cultural Resources Important and Worthy of Consideration?

There are two measures of the importance of cultural resources:

(1) importance to the local community, and

(2) importance as measured by national standards.

First is the importance to a community or sub-group within a community. This is the most difficult to determine, since things that seem insignificant to an outsider may have deep meaning or attachment to local residents.

Second is importance (referred to technically as significance) as determined by national standards, usually those established by the National Park Service (NPS).

In determining what can be listed on the National Register of Historic Places, NPS uses four areas of significance. The four areas of significance are:

- properties that are associated with a person or an event whose importance in history can be established,
- properties that are associated with an era or trend important in history,
- properties that are clearly important in design or construction, and
- properties that are resources that have the potential to reveal information (generally applied to archeological sites).

Significance and Standards

The meaning of significance and the standard for demonstrating it may differ between local communities who "know" their place both through what is considered common, orally conveyed knowledge and National Park Service or other official bodies that have standards for acceptable "proof" of significance.

➢ Why Are Below Ground Cultural Resources Considered Worthy of Consideration in Planning Transportation Projects?

Much information about both prehistoric and historic events and peoples exists only in remains found in the ground. In order to provide useful information about the past, and build a picture of how our environment has evolved over time, scientific methods from fields such as archaeology and paleontology must be used to investigate these sites. Such investigation takes a great deal of time and money, which means that it cannot all be done

immediately. Hence the need to protect sites that offer the potential to yield information in the future.

In addition, new and improved techniques for study of these remains are constantly being developed and areas where these techniques can be applied in the future should be preserved. As an example, ground-penetrating radar, which allows researchers to look for below ground disturbances without digging, has been widely utilized only since the 1980s.

Identification of Cultural Resources

Unfortunately there is no single process, research aid, or set of steps that will work for all project areas. Cultural resource data are far less completely synthesized than natural resources data. In addition, the existing collection of cultural resource data is based to a large extent on previous random research. You will find some areas well documented, while others have little useful information. This is all to say that there is not a quick and dirty way to do an initial PREP for all cultural resources.

Data and Sources

Table 4-2 of this guidebook provides a listing of the most important information sources. The sources are sorted by whether the project is considered minor or major in nature, the type of cultural resource (below ground or above ground), and the typical place or way information can be found (on-site, in libraries and archives, remotely sensed, and other). The rationale for this separation into two sections is that in minor projects many of the cultural resources near the road would have already been affected by the project or previously documented. Since the area affected is small as well, road changes would be less likely to affect an unknown resource. In general, the research tools listed for major projects may require an original specific-to-the-site investigation, while the research materials listed for minor projects are drawn largely from searching existing materials.

Table 4-2. Sources for Gathering Cultural Resources Data

Source	Below Ground Sites	Above Ground Sites
Minor Projects		
Libraries and Archives		• Historic aerial photos[2] • Early soil surveys with aerial photos • Sanborn Fire Insurance Maps • County histories • Historic U.S.G.S. maps[3] • Historic postcards of scenes • Historic photos of scenes • Lithographic town aerial views • National Register nominations • Historical marker nominations • County historical marker records • Historic highway and town maps • Postal route maps • Civil War field maps • Miscellaneous historical maps and plans
On-Site		• Surface survey
Other		• Texas Historical Commission • County Historical Commission • Old plat books and records • Local planning department
Major Projects		
Libraries and Archives	• All of those listed for minor projects • Results from earlier on-site and remote tests	
On-Site	• Geophysical testing in general • Ground-penetrating radar • Conductivity • Surface survey • Field testing • Trench excavation	
Remote Sensing	• Site specific aerial photographs • Published black and white aerial photographs • Infrared aerial photographs • Low angle aerial photographs • Sideways-looking airborne radar (SLAR)	
Other	• Contact state archaeologist	• Tribal consultation

[2] The few earliest in Texas date to the 1920s, but the earliest for most of central and eastern Texas date to the 1930s and 1940s.

[3] A few U.S.G.S. maps date from the very end of the 19th Century, but most of the first maps for an area will date from the 1910s or 1920s at the oldest.

In Table 4-1, four source types are suggested:

- **Libraries and archives** – Libraries may be local public libraries or research libraries such as those found at major colleges and universities. Major research libraries in Texas include:

    - The Institute of Texas Cultures [http://www.texancultures.utsa.edu/public/index.htm]
    - The Center for American History at the University of Texas [http://www.cah.utexas.edu]
    - The Texas State Library [http://www.tsl.state.tx.us]
    - The East Texas Archive [http://www.lib.sfasu.edu/etrc/etrchome.htm]

  There are other regional archives in the state, as well as local history collections at local libraries, universities, and colleges. A listing of special collections in Texas is available at the University of Idaho website – http://www.uidaho.edu/special-collections/west.html. An updated listing of the resources is also provided in Table 4-4 of this guidebook at the end of this chapter.

Level of Effort

Review of archival collections takes a lot of time. For early research, only nearby archives should be consulted for visual materials, such as maps or aerial photography.

- **On-Site** – This is information collected at the site through geophysical testing or that may have come to the surface, such as artifacts, soil stains, or remains of the cultural resource.

- **Remote Sensing** – This refers to information collected on-site through various technologies that can provide information from afar and consists primarily of

aerial photography. For additional information, consult: http://www.colorado.edu/geography/gcraft/notes/remote/remote_f.html.

- **Other** – Other entities to be contacted in the collection of data, primarily those of governmental agencies or related organizations.

➢ Tools To Be Used in Gathering Data on Cultural Resources

Below is a general discussion of the tools that can be helpful in gathering data on cultural resources.

- Geophysical Testing
  - *What it does*: General term used to describe a variety of non-intrusive testing methods, including more unusual ones not included here (such as magnetrometry), because of limited usefulness at the PREP stage
  - *Found at or through*: Professional consultants—many can be found on the Internet or through THC consultant lists
  - *Best for:* Identification of absence or presence of subsurface features, suggesting the potential for cultural resources
  - *Limitations:* Interpretation of results cannot tell you with precision what is below the surface or suggest whether further investigation should be undertaken. All geophysical testing requires special equipment and is costly.
- Ground-Penetrating Radar
  - *What it does:* A non-invasive field survey method that creates an underground cross-sectional image of the subsurface, using radar waves. It can test below ground for the presence of artifacts (large individual pieces or groups) and disturbed soil areas. For additional information, see: http://www.geomodel.com/gprtext.htm and http://www.g-p-r.com/.

- *Found at or through:* Either earlier reports or through site specific testing by a qualified operator and interpreter (for contractor search web with Keyword=ground-penetrating radar)

- *Best for:* Testing when there are few surface deposits or no known cultural resources; suggest the extent of the possible resource

- *Limitations:* Costly; results will not tell you exactly what is below ground, for instance many natural and human caused soil disturbances may have very similar radar signatures

- Resistivity

  - *What it does:* A non-intrusive method of subsurface detection that measures changes in conductivity by passing electrical current through ground soils. This is generally a consequence of moisture content, and in this way, buried features can be detected by differential retention of groundwater.

  - *Found at or through:* Professional testing

  - *Best for:* Determination of unknown site location

  - *Limitations:* Costly; will only identify artifact types or disturbances or soil changes that do not cause changes in resistivity

- Surface Survey

  - *What it does:* A skilled observer (archaeologist or related professional) walks over the site in a fixed pattern then records artifacts or observations.

  - *Found at or through:* Archaeologist or related professional

  - *Best for:* Identifying supposed but uncertain sites; Known sites when additional information such as land use or extent is needed

- *Limitations:* Some cost, but slight when compared to the methods discussed above; gives incomplete results, but results should be sufficient for most PREP work

- Field Testing
  - *What it does:* Consists of digging test excavation sites at fixed distances to determine the presence or density of artifacts or soil changes
  - *Found at or through:* Done on site by a qualified archaeologist, since interpretation of findings is critical
  - *Best for:* Sites for which little information such as precise location or size are known
  - *Limitations:* Costly; may require waiting time for interpretation; area selected for testing may not be area that would yield best results

- Trench Excavation
  - *What it does:* One or more trenches are dug at fixed locations and archaeological excavations conducted within the limits of the trench; findings are then interpreted.
  - *Found at or through:* Qualified archaeologist
  - *Best for:* Any site where more detail is needed or that cannot be tested by non-intrusive means.
  - *Limitations:* Costly; can disturb a large area of the site; area selected for testing may not be area that would yield best results; may require waiting time for interpretation

- Site-Specific Aerial Photographs
  - *What it does:* Especially useful for detecting archaeological sites that are difficult to see from the ground.

- *Found at or through:* Aerial photo companies and libraries for existing images taken for earlier customers; aerial photographer for new site photographs

- *Best for:* Large sites; large project areas

- *Limitations:* Costly; weather could delay the flight

- Published Black-and-White Photographs

  - *What it does:* Various government agencies and private sources have photographed most of the state over the years from at least the 1930s. Although not every area will have full coverage, over time there should be at least one aerial shot for most proposed areas. These black and white photographs are often shot as "stereo pairs," which when viewed through special glasses show the area in 3-D.

  - *Found at or through:* Libraries; http://www.landinfo.com/index.htm; http://terraserver.microsoft.com

  - *Best for:* Overview of cultural resource potential; by comparing early (1930s) photographs to contemporary ones there can be an instant identification of above ground cultural resources.

  - *Limitations:* Although very detailed, they do not show everything and are not always effective in indicating the presence of below ground resources. (Black and white photos work best when coupled with some other type of aerial photograph, such as infrared or low altitude.).

- Infrared Aerial Photographs

  - *What it does:* Uses special wavelengths to differentiate living from non-living materials; changes to vegetation influenced by human-made artifacts or land uses may show up more clearly than in other types of aerials.

- *Found at or through:* Aerial photographers
- *Best for:* Land changes not visible at ground level; for larger resource areas
- *Limitations:* Costly; will not always yield additional results

- Low-Angle (a.k.a. oblique) Aerial Photographs
  - *What it does:* Color or black-and-white photographs shot at an angle (that is not directly from above)
  - *Found at or through:* Aerial photographer
  - *Best for:* Exposing the marks left by cultural resources that cannot be clearly revealed through overhead aerial views; most suitable on land with low vegetation
  - *Limitations:* Costly; not useful for heavily wooded sites

- Sideways-Looking Airborne Radar (SLAR)
  - *What it does:* An advanced aerial technology that sends and receives pulses of radiation; pulses are used to form a detailed picture of the terrain below and around an aircraft's flight path
  - *Found at or through:* Aerial photographer
  - *Best for:* Locating sites under the dense canopy of forests
  - *Limitations:* Costly

- Office of State Archaeologist
  - *What it does:* Gives general supervision and sets standards for archaeology across the state; conducts important excavations (the LaSalle ship for example); nominates archaeological sites to the NRHP

- *Found at or through:* For details, contact: http://www.thc.state.tx.us/archeologyaware/aastarch.html.

- *Best for:* Information about known archaeological sites, including those not located on any official maps or documents (To avoid vandalism this information is often kept private but is available to transportation planners.)

- *Limitations:* Will not have information on sites that have not been previously located via field or remotely sensed methods; there is no complete statewide survey

- Tribal Consultation

  - *What it does:* Meetings with authorized tribal representative regarding land under tribal control, claimed by the tribe, or on which a traditional cultural property has been identified

  - *Found at or through:* Federally identified tribal groups; Bureau of Indian Affairs http://www.doi.gov/bureau-indian-affairs.html

- Handbook of Texas

  - *What it does:* An encyclopedic reference to many individuals, sites, communities, and topics about the state. Many communities have their own website devoted to their listing in the Handbook (example: http://www.tsha.utexas.edu/handbook/online/articles/view/HH/hfh9.html for Hewitt, TX).

  - *Found at or through:* Hard copy at libraries or online at: http://www.tsha.utexas.edu/handbook/online/articles/view/SS/qes4.html

  - *Best for:* General leads and information

  - *Limitations:* Not much site-specific information, except for major known resources

- Atlas of Texas
  - *What it does:* Regional maps with leads to non-extant historic towns and potential site locations
  - *Found at or through:* Libraries or online at: http://atlas.thc.state.tx.us
  - *Best for:* General information for major projects
  - *Limitations:* Most information not at a scale useful for minor projects
- Old Highway and Town Maps
  - *What it does:* Show locations of abandoned roadways and town sites
  - *Found at or through:* Libraries and archives; some may be in published books; TxDOT files
  - *Best for:* Location and extent of abandoned roadways and townsites
  - *Limitations:* Not available in all areas; accuracy unknown since some were documents produced individually with little consistency
- Early Soil Surveys with Aerial Photographs
  - *What it does:* General soil surveys from 1950 and before, which used aerial photographs to map soil type locations; photographs are themselves historic documents and can be used to locate lost resources
  - *Found at or through:* Libraries; Extension Office; Bureau of Nature Resources (formerly Soil Conservation Service); local government offices
  - *Best for:* Old photographs to compare to contemporary ones
  - *Limitations:* Most were taken within a 20-year time frame and will not go back farther than 1930

- Sanborn Fire Insurance Maps
  - *What it does:* Town maps produced by a private company to be used by insurance firms in determining premiums for buildings
  - *Found at or through:* Libraries and archives; on microfilm at Evans Library, Texas A&M University; http://sanborn.umi.com
  - *Best for:* Location, height, and material type for buildings or blocks within larger towns and cities
  - *Limitations:* Not available for all locations; no information for structures outside towns
- County Histories
  - *What it does:* Books detailing aspects of the history of one county
  - *Found at or through:* Local libraries
  - *Best for:* General information and leads for local sources; some published maps and photographs may be helpful
  - *Limitations:* Usually presents information on families and businesses, often limited site-specific information
- Historic U.S. Geological Survey Maps
  - *What it does:* Part of a national mapping program that locates key natural resources, but may also indicate some cultural resources
  - *Found at or through:* Libraries or online at: http://www.usgs.gov/
  - *Best for:* General overview of area; clues to possible resource locations
  - *Limitations:* Cultural resources were not a specific focus of the mapping effort.

- Historic Postcards of Scenes
  - *What it does:* Views of key scenes throughout the state, may indicate the former presence of key resources, and clues to their location
  - *Found at or through:* Some libraries have collections; some, for example, Texas Women's University http://mikecochran.net/Postcards/TWUPostcards.html, are available on the Internet.
  - *Best for:* Aerial views of towns and regions; site-specific location information
  - *Limitations:* Postcards generally taken of only the major local sites, so many areas will not be covered; some postcards have been touched up and objects may have been covered up or changed; many sites will be difficult to locate with precision
- Historic Photographs of Scenes
  - *What it does:* Image of a cultural resource as it was at a particular time
  - *Found at or through:* Libraries; books, especially county histories; some may be online
  - *Best for:* Much wider coverage than postcards; detailed information about location, design, and spatial relationships among resources
  - *Limitations:* Viewpoint of camera may not fully show extent of site; may be biased regarding what was photographed due to economic factors, age of resource, etc.; many sites may be difficult to locate with precision
- Lithographic Town Views
  - *What it does:* Aerial views etched on stone then printed showing entire communities (for examples of views from outside Texas see: http://www.system.missouri.edu/upress/otherbooks/repsmiss.htm)

- *Found at or through:* Libraries for published views; archives for unpublished; http://www.lib.utexas.edu/maps/texas_cities.html

- *Best for:* Overview of extent of town sites at a specific date

- *Limitations:* Details are not reliable—building elements not existing were added, etc; available only for major cities and not many from Texas; more limited in coverage than Sanborn maps

- National Register of Historic Places Nominations

  - *What it does:* Records information necessary for the determination of eligibility for a site to be placed on the National Register of Historic Places; contains a more detailed history of specific site or area than is found in other sources such as county history; often includes historic maps and photographs

  - *Found at or through:* Texas Historical Commission; http://www.thc.state.tx.us/

  - *Best for:* Detailed synthesis of the history and locations of known cultural resources; research has often been done by a professional historian, especially for large sites or districts; information has been reviewed for accuracy

  - *Limitations:* Available nominations limited to those resources that someone has undertaken to document; limits of sites may not be the same as those of the project area

- State Historical Marker Applications

  - *What it does:* Documents a request for a state historical marker

  - *Found at or through:* THC http://www.thc.state.tx.us/; local libraries; county historical commission

- *Best for:* General information about local resources and their locations
- *Limitations:* Records limited to those sites for which someone has initiated a marker nomination; minority sites may be under-represented

- County or City Historical Marker Records
  - *What it does:* Some county historical commissions or city governments have their own marker programs, distinct from the state program.
  - *Found at or through:* Local libraries or government agencies
  - *Best for:* General local information
  - *Limitations:* May not have good location information; minority or ethnic sites may be under-represented

- Postal Route Maps
  - *What it does:* Detailed maps of rural postal routes showing locations of farms, houses, and other potential resources
  - *Found at or through:* Uncommon, but may be found in libraries and archives; some at Map Room of Evans Library, Texas A&M University
  - *Best for:* Locations of potential resources in rural areas
  - *Limitations:* Not all areas mapped; do not fully cover the 50-year plus target period

- Civil War Field Maps
  - *What it does:* Very detailed maps primarily of coastal areas in preparation for attack
  - *Found at or through:* Very limited sources; maps for Galveston area found at Rosenberg Library in Galveston http://www.rosenberg-

library.org/; other specific sources are unknown, but always worth requesting them in areas affected by the war

  - *Best for:* Very detailed location and design information; will show every street and structure including outbuilding and, in some cases, will show trees, sidewalks, etc.

  - *Limitations:* Very limited geographical coverage; limited to the 1860s

- Miscellaneous Historical Maps or Plans

  - *What it does:* Old maps that located resources while they were still visible or plans of original site designs, such as subdivisions; include historic U.S.G.S. maps

  - *Found at or through:* Libraries and archives http://www.lib.utexas.edu/maps/texas_cities.html; U.S.G.S. general Internet search; General Land Office http://www.glo.state.tx.us

  - *Best for:* Locations of non-extant resources or through comparison to current maps and aerial photographs knowledge of the relative age of an existing feature

  - *Limitations:* Many were selectively made thus random coverage; may have unknown inaccuracies and omissions

- Texas Historical Commission

  - *What it does:* State agency responsible for protection of cultural resources; key initial source for information and local contact names

  - *Found at or through:* Office in Austin with separate departments for archaeology; National Register nominations; architectural review and assistance; local government programs http://www.thc.state.tx.us

- *Best for:* Any work related to a Memorandum of Agreement or other official required compliance documentation; information on archaeological sites, National Register nominations, state marker nominations, local history contact people

- *Limitations:* This is not a library or archive, so they do not have all information you might need, rather it is a starting place to get some information about information sources in the community

- County Historical Commission
  - *What it does:* Local volunteer groups charged with representing their county to the THC; primary work involves preparation of historical marker nominations and organizing local events
  - *Found at or through:* Some commissions may have websites (example: http://www.tamu.edu/baum/bchc.html for Brazos County)
  - *Best for:* Contact with knowledgeable local people
  - *Limitations:* Information limited to what they already know; many focus primarily on genealogy; some commissions may not fully represent all minority or ethnic groups

- Old Plat Books and Records
  - *What it does:* Legal record of land subdivision and ownership. Plat books generally have maps and legal descriptions of property
  - *Found at or through:* County Tax Assessor's office; some early plats and records may be on microfilm at local libraries
  - *Best for:* General locations of deed land plots; occasionally site features are mentioned or located
  - *Limitations:* May have insufficient detail to show cultural resources

- Local Planning Departments
  - *What it does:* Generally an urban and regional planning group within city or county government that may have some information about local cultural resources acquired as an adjunct to their normal work
  - *Found at or through:* City or county governments
  - *Best for:* Leads on local resources or knowledgeable people
  - *Limitations:* Cultural resource monitoring is a small portion of their work, if at all; may offer much or little depending on local circumstances

Mapping

The key result of the data collected on cultural resources should be mapped information, whether available digitally or in hard copy. It is the single best starting point for any preliminary review. Mapped information gives the quickest access to resource locations, which is the first step in any PREP. When tied to a GIS system, locations from a variety of sources can be compiled and tied to site-specific data such as resource age and significance.

Consult existing maps or aerial photographs to determine locations of resources present at the time the map or photograph was made. Compare the mapped cultural resources to what is still extant. If a resource that appears in a 45-year-old or older map or photograph is shown on a contemporary map or photograph, its location should be noted as a potential resource needing further investigation. [Note: Some old buildings are replaced on the same foundation with a new one and some old buildings have new additions, so a close comparison is necessary.] If a resource no longer exists, then its location becomes an archaeological site that will require further research as a potential resource.

Location of Known Sites

Determine the location of known sites that are not shown on any maps or photographs. A literature review can accomplish this determination. Conversations with local historians

can also be helpful in identifying potential sites. This outreach can occur during public involvement in PREP's Step 6. When discussions with local citizens about the project are initiated, the public (either in one-on-one conversations or in group meetings) should be queried about the existence of known cultural sites.

Location of Unknown Sites

As the project progresses, and the location alternatives are narrowed, there will possibly be a need to determine as yet unknown sites through a field survey or geophysical testing of the area. The Texas Historical Commission can aid you in determining if the site is likely to be important. Your outreach with the community may also point to the possible existence of as yet unknown sites.

Document Findings

As you prepare the cultural resources profile, be sure to document the resources of your findings. The profiles should continue to evolve as the project is further defined. The cultural resources that are documented, along with all of the other environmental considerations, will be considered as project decisions are made to either modify the project location or design, to select a new location, or to determine appropriate mitigation.

Mitigation of negative impacts on cultural resources is possible, but is not as standardized as for natural resources. An example of cultural resource mitigation on a minor project would be to add fill over an archaeological site to protect it for future excavation. Always consult with the THC to determine what would be considered an acceptable mitigation.

Some important recommendations for completing the cultural resources preliminary review and eventually the entire Section 106 review:

- start early—the length of time required will differ for each project;
- consult the THC early;
- select reliable professional firms for outside research;
- develop a standardized map-related format for assembling data collected; and
- although coverage is not complete, check early in the process to see if National Register nominations or notes exist for all or part of your project area.

The cultural resources within the state of Texas are part of a heritage that is important to every Texan. In addition, many are important to the state's economy. We can have both the heritage preservation that we desire and the quality transportation system that we have come to expect if planning incorporates all of the required considerations, including cultural resources, at an early planning stage. Table 4-3 lists the terms used in cultural resources management.

Table 4-3. Terms Used in Cultural Resources Management[4]

Term	Definition
Analysis	The archaeological study of the properties of artifacts and other objects (e.g., bones and seeds), their associations, and their provenience. This involves the cataloging and labeling of the artifacts, as well as special studies such as floral and faunal analyses.
Archaeology/Archeology	The study of the undocumented remains of the past, also the techniques used in such studies. Among American archaeologists, archaeology is commonly divided into prehistoric and historic (after the arrival of Europeans in the New World) periods.
Architectural Historian	An individual with a degree in the history of architecture capable of identifying the age, style, and social context of historic structures.
Artifact	Any object made or modified by man.
Assessment	The process of determining whether a site or structure is significant. Also called Phase II. (See Testing.)
Background Research	The first step on a project wherein previously recorded information (whether archaeological, historical, cartographic, etc.) is sought about the project area.
Cataloging	Making a list or catalog of the artifacts found during a project.
Crew Chief	An archaeological technician with considerable field experience and usually a B.A. degree who supervises a crew (generally 2 or more technicians) in the field.
Cultural Period	A period of time that has similar artifacts, social organization, and other factors, and is located within a defined geographic area. The major Cultural Periods of the Eastern United States are the Paleoindian, the Archaic, the Woodland, the Mississippian, and the Historic.
Cultural Resources	A term coined with the appearance of historic preservation laws in the 1960s and 1970s and intended to mean all archaeological and historical properties and data in a given area.
Data Recovery	Term meaning a large-scale excavation of an archaeological site; the detailed recording of structures; or the gathering of extensive historic data on a site. Data Recovery is conducted during Phase III.
Dig	Term for an archaeological excavation, rarely used by archaeologists. The term "excavation" is more common.
Eligible for the NRHP	Term meaning that a site or structure is intact, significant, and appears to meet one or more of the National Register of Historic Places criteria.

[4] Adapted from http://www.newsouthassoc.com/CRMBrochure.html

Table 4-3. Terms Used in Cultural Resources Management (cont.)

Excavation Block	Term meaning a large square or rectangular area of ground, usually excavated by hand in smaller sections, or squares, called units.
Feature	Soil discoloration or arrangement of artifacts in the soil that represents past human activity. Examples are postmolds, privies, trash pits, building foundations, builders' trenches, and burials.
Floral or Ethnobotanical Analysis	The study of seeds, and sometimes pollen (palynology), and larger plant remains.
Faunal or Zooarchaeological Analysis	The study of non-human bones and animal remains from archaeological sites.
HABS/HAER	Historic American Building Survey and Historic American Engineering Record. Two national agencies that set the standards for recording standing architecture and historic structures such as bridges and canals.
Integrity/Intact	Terms used to mean that all parts or major portions of a site are undisturbed.
In situ	A term that refers to an artifact that is still in the location where it was discarded or left by an occupant of a site.
Labeling	Writing numbers on artifacts, which identify the provenience of the artifact and occasionally the type of artifact.
Level	A horizontal layer of soil in a unit that is usually excavated together, although it may be excavated in sub-levels. A level may be arbitrary (10 cm deep, for example) or natural (yellow sandy clay, for example).
Listed on the NRHP	A site that has been nominated to the National Register of Historic Places and has been officially accepted.
Mitigation	Term meaning to alleviate the adverse effects of project construction. Mitigation may take the form of data recovery (thereby obtaining the data contained in the site) or by avoidance (thereby not affecting the site at all). Also referred to as Phase III.
NHPA	**NHPA** (National Historic Preservation Act): An act passed in 1968 to govern federal involvement in cultural resource management. NHPA includes Section 106.
Nominated to the NRHP	A site that appears eligible for nomination and which has been formally nominated, but not yet accepted.
NRHP	(National Register of Historic Places): A listing of historically or archaeologically significant sites maintained by each state. The NRHP does not contain all significant sites. It only lists those currently identified and that the owner has allowed to be listed. There are many eligible sites that have not been registered, either because they have not been found or the owner is unwilling or has not had the chance to nominate them.
Potentially Eligible for NRHP	An informal designation for sites found during survey that appear to be significant and therefore eligible, but which require evaluation to be certain.

Table 4-3. Terms Used in Cultural Resources Management (cont.)

Prehistory	Term dealing with the archaeology of preliterate peoples.
Property	Generic term used to refer to any type of cultural resource; not used in the legal sense related to ownership.
Principal Investigator	A person, usually with an M.A. or Ph.D. degree or extensive experience, who designs research projects and oversees the field and laboratory tasks, and has the principal responsibility for preparing the report.
Profile	The drawing of the stratigraphy or vertical wall of an excavation unit.
Preservation	The degree to which the environmental conditions of a site have preserved bone, seeds, shell, and other organic material.
Reconnaissance	A very preliminary walkover of a site to see if it requires more intensive survey. It sometimes includes background research and a written report of findings.
Remote Sensing	A set of field techniques that permits the location of underground features and/or concentrations of artifacts without excavation. To date, remote sensing techniques have limited usefulness since excavation is still required to obtain artifacts for analysis purposes. Remote sensing techniques often represent an unnecessary added cost to a project where excavation will be required anyway. However, these techniques are often useful in locating burials in cemeteries or on sites where virtually nothing is known of the occupation.
Screen	Term used to describe the equipment and procedures used to sift (a term rarely used by archaeologists) soil to provide for uniform recovery.
Section 106	The section of the NHPA dealing with the enforcement of federal preservation activities. Ground-disturbing activities that involve a federal permit, land, funding, or other assistance fall under Section 106.
Sherd	A broken piece of pottery or glass. Infrequently termed shard.
Shovel Test	(Shovel Test Pit, ST, STP, etc.) -- a survey and testing method used to determine the horizontal limits of a site where ground cover prevents examination of the ground surface. These are usually the size of a shovel and are dug to sterile (no artifacts) soil. Soil is usually screened to find artifacts.
SHPO	(State Historic Preservation Officer) -- the federally mandated person and office responsible for federal cultural resource compliance at the state level. Every state has one, with a staff that varies in size and specialties. There is usually at least one archaeologist and one architectural historian on the SHPO's staff. The SHPO plays a crucial role mediating between you, the federal agency, the ACHP, and your consultant.

Table 4-3. Terms Used in Cultural Resources Management (cont.)

Significant	Term used to refer to a cultural resource that is important in local, regional, and national prehistory or history, or which is likely to yield answers to current research questions in archaeology and history.
Site or Archaeological Site	A frequently vague term used to describe a horizontal and vertical area of ground that has been used intensively by people in the past and which contains or is likely to contain artifacts and features associated with that past activity. The actual boundaries of sites may be based on the density of features and artifacts or on other criteria.
Soil Sample	Soil retained by the archaeologist during excavation for further study in the laboratory. Soil samples are studied for floral and faunal analysis, as well as other types of analysis.
State Archaeologist	In some states, an archaeologist employed by the state to run the state archaeological program and represent the state in archaeological matters. May or may not be in the SHPO.
Stratigraphy	The soil levels and strata at a site and how these are associated with each other and the cultural aspects of the site (artifacts and features, etc.).
Survey	A phase of archaeological investigation during which surface collection and limited subsurface techniques are employed to identify archaeological sites or their absence. Also referred to as Phase I.
Temporal	Archaeological jargon, adjectival form of "time."
Testing	A phase of archaeological investigation that assesses the horizontal and vertical extent of a particular site, its degree of preservation, and its potential for containing significant data. It usually involves STPs and Test Units. Also referred to as Phase II.

Table 4-4. Key Repositories of Primary Source Material in Texas[5]

Repository	Internet Address
Abilene Christian University	http://www.acu.edu/academics/library/cfm.htm
American Airpower Heritage Museum	http://www.airpowermuseum.org/aahmoral.html
Amistad National Recreation Area	http://www.cr.nps.gov/museum/collections/amis.html
Amon Carter Museum	http://www.cartermuseum.org/
Angelo State University	http://www.angelo.edu/services/library/wtxcoll/
Archives of the Episcopal Church	http://episcopalarchives.org/index.html
Austin College	http://www.austincollege.edu
Austin History Center at Austin Public Library	http://www.ci.austin.tx.us/library/lbahc.htm
Baylor University – Armstrong Browning Library	http://www.browninglibrary.com/index.htm
Baylor University – Collections of Political Materials	http://www.baylor.edu/Library/LibDepts/BCPM/
Baylor University – Texas Collection	http://www.baylor.edu/Library/LibDepts/Texas/
Big Bend National Park	http://www.cr.nps.gov/museum/collections/bibe.html
Catholic Archives of Texas	http://www.onr.com/user/cat/
City of Austin	http://www.ci.austin.tx.us/cityclerk/r_research.htm
Dallas Historical Society	http://www.dallashistory.org/
Dallas Municipal Archives and Records Center	http://www.ci.dallas.tx.us/cso/rmp.htm#dmarc
Dallas Public Library	http://dallaslibrary.org/CTX/ctx.htm
Daughters of the Republic of Texas Library	http://www.drtl.org/
Diocese of Galveston-Houston	http://www.diocese-gal-hou.org/admin_archives.htm
El Paso Public Library – Southwest Collection	http://www.ci.el-paso.tx.us/
Fort Davis National Historic Site	http://www.cr.nps.gov/museum/collections/foda.html
Fort Worth Public Library	http://www.fortworthlibrary.org/archive.htm
Guadalupe Mountains National Park	http://www.cr.nps.gov/museum/collections/gumo.html
Hardin-Simmons University	http://rupert.alc.org/library/right.htm#special
Houston Academy of Medicine – Texas Medical Center Library	http://www.library.tmc.edu/abcc/
Houston Grand Opera	http://www.houstongrandopera.org/about/history/archives.aspx
Houston Public Library	http://www.hpl.lib.tx.us/hpl/hmrc.html

[5] Source: University of Idaho Library -- http://www.uidaho.edu/special-collections/west.html

Table 4-4. Key Repositories of Primary Source Material in Texas (cont.)

Houston Space Institute	http://www.houstonspacesociety.org/hsi/AOCML.html
Huntsville Public Library – City of Huntsville Public Records	http://www.huntsville.lib.tx.us/resources.html
Huntsville Public Library – Texana Collection	http://www.huntsville.lib.tx.us/specialcollections.html
Irving Public Library – Irving Archives	http://www.ci.irving.tx.us/library/archives/index.html
Irving Public Library – Local History and Genealogy	http://www.irving.lib.tx.us/genealogy.html
J.R. Huffman Library	http://www.toledo-bend.net/library/special.html
J.C. Penney Archives and Historical Museum	http://www.jcpenney.net/company/history/archive2.htm
Lamar University	http://almark.lamar.edu/htbin/ps.com?nxtfile=[pub.graylib2.dept]Spe.html&sessid=16150614
Laredo Public Library	http://www.laredolibrary.org/historical.html
LeTourneau University	http://www.letu.edu/academics/library/
National Archives and Records Administration – Southwest Region	http://www.archives.gov/facilities/tx/fort_worth.html
Navarro College	http://www.nav.cc.tx.us/library/index.htm
Our Lady of the Lake University	http://lib.ollusa.edu/libinfo/info/collections.htm
Padre Island National Seashore	http://www.cr.nps.gov/museum/collections/pais.html
Panhandle-Plains Historical Museum	http://www.panhandleplains.org/#
Prairie View A&M University	http://www.tamu.edu/pvamu/library/about/special.html
Rice University	http://www.rice.edu/fondren/woodson/index.html
Rosenberg Library	http://rosenberg-library.org/Departments/sepccolec.htm
Rosenberg Library – Galveston Texas History Center	http://www.geocities.com/Athens/Delphi/5181/gthc.html
Sam Houston Regional Library and Research Center	http://www.tsl.state.tx.us/shc/countyrecs/index.html
San Antonio Missions National Historical Park	http://www.cr.nps.gov/museum/collections/saan.html
San Antonio Public Library	http://www.sat.lib.tx.us/central/texana.htm
San Jacinto College Central	http://www.sjcd.cc.tx.us/district/lib/Special.htm
San Jacinto College North	http://www.sjcd.cc.tx.us/district/lib/collec~1.htm
San Jacinto College South	http://www.sjcd.cc.tx.us/district/lib/Stexana.htm
San Jacinto Museum of History	http://www.sanjacinto-museum.org/Herzstein_Library
Schreiner University	http://library.schreiner.edu/libxspeccoll.htm
Sixth Floor Museum at Dealey Plaza	http://www.jfk.org/Research/Research_Center.htm
Sophienburg Museum and Archives	http://www.nbtx.com/sophienburg/archcol.htm
South Texas College of Law	http://www.stcl.edu/library/SpecialColl.html

Table 4-4. Key Repositories of Primary Source Material in Texas (cont.)

Southern Methodist University – DeGolyer Library	http://www.smu.edu/cul/degolyer/collections.html
Southern Methodist University – Hamon Arts Library	http://www.smu.edu/cul/hamon/collections/collections.htm
Southern Methodist University – Perkins School of Theology	http://www.smu.edu/bridwell/html/collect.html
Southwest Texas State University	http://www.library.swt.edu/
Southwestern Baptist Theological Seminary	http://www.swbts.edu/libraries/index.shtm
Southwestern University	http://www.southwestern.edu/library/special-collections.html
St. Edward's University	http://libr.stedwards.edu/info/archives.htm
St. Mary's University	http://library.stmarytx.edu/acadlib/collect/collect2.htm#spec
Stephen F. Austin State University	http://libweb.sfasu.edu/etrc/etrchome.htm
Texas A&M University, Commerce	http://multimedia.tamu-commerce.edu/Library/arc.htm
Texas A&M University, Corpus Christi	http://rattler.tamucc.edu/dept/special/sp_title.html
Texas A&M University, Kingsville	http://www.tamuk.edu/
Texas A&M University – Cushing Library	http://library.tamu.edu/cushing/
Texas A&M University – George Bush Presidential Library	http://bushlibrary.tamu.edu/
Texas African American Photography Archive	http://www.docarts.com/photos.html
Texas Baptist Historical Collection	http://www.bgct.org/tbhc/default.htm
Texas Christian University	http://libnt2.lib.tcu.edu/SpColl/Index.htm
Texas General Land Office Archives	http://www.glo.state.tx.us/archives/
Texas Ranger Hall of Fame and Museum	http://www.texasranger.org/ReCenter/RCenter.htm
Texas Southern University	http://www.tsu.edu/about/library/special.asp
Texas State Library and Archives	http://www.tsl.state.tx.us
Texas Tech University – CNN World Report Television Archive	http://www.orgs.ttu.edu/cnnworldreport/
Texas Tech University – Southwest Collection	http://swco.ttu.edu/
Texas Woman's University – University Archives	http://www.twu.edu/library/archive/index.htm
Texas Woman's University – Woman's Collection	http://www.twu.edu/library/collections.htm
Trinity University	http://lib.trinity.edu/
University of Dallas	http://www.udallas.edu/library/
University of Houston Law Library – Frankel Rare Book Collection	http://www.law.uh.edu/libraries/frankel.htm

Table 4-4. Key Repositories of Primary Source Material in Texas (cont.)

University of Houston Law Library – Judge John R. Brown Papers	http://www.law.uh.edu/libraries/JRBrown/brownauto.html
University of Houston – Clear Lake	http://nola.cl.uh.edu/archives.html
University of Houston – Conrad N. Hilton College Library and Archives	http://www.hrm.uh.edu/library/
University of Houston – Special Collections and Archives	http://info.lib.uh.edu/sca/collections/index.html
University of North Texas	http://www.library.unt.edu/exhibits/default.htm
University of Texas Medical Branch – Moody Medical Library	http://library.utmb.edu/blocker/
University of Texas of the Permian Basin	http://pblib.utpb.edu/archives.HTML
University of Texas – Pan American	http://www.lib.panam.edu/libserv/speccoll/index.asp
University of Texas at Arlington	http://libraries.uta.edu/SpecColl/
University of Texas at Austin – Alexander Architectural Archive	http://www.lib.utexas.edu/apl/aaa/index.html
University of Texas at Austin – Benson Latin American Collection	http://www.lib.utexas.edu/benson/
University of Texas at Austin – Center for American History	http://www.cah.utexas.edu/
University of Texas at Austin – Harry Ransom Humanities Research Center	http://www.hrc.utexas.edu/
University of Texas at Austin – Lyndon Baines Johnson Library	http://www.lbjlib.utexas.edu/
University of Texas at Austin – Tarlton Law Library	http://www.law.utexas.edu/rare/
University of Texas at Brownsville	http://library.utb.edu/
University of Texas at Dallas	http://www.utdallas.edu/library/special/index.html
University of Texas at El Paso	http://libraryweb.utep.edu/speccoll/
University of Texas at San Antonio	http://www.lib.utsa.edu/Special_Collections/
Victoria College – University of Houston at Victoria	http://lois.vic.uh.edu/
West Texas A&M University	http://www.wtamu.edu/research.htm

Chapter 5 – Community Impact Assessment

Introduction

A community impact assessment (CIA) is an evaluation of the effects a planned transportation project may have on the community and the quality of life of the residents. A CIA review conducted at the transportation planning stage should include a broad evaluation of the social, economic, land use, and relocation impacts of individual planned projects and the transportation plan as a whole. The assessment of community impacts at the planning stage provides vital information on the public concerns and key community/neighborhood issues relative transportation projects. It also provides the opportunity to open communication with residents and increases the opportunity to address those issues early.

The Community Assessment Process

The key to performing a community assessment of projects in the planning stage is to develop a community profile. This profile will form the baseline of information used in the early environmental review as well as identify base conditions for future environmental work. The major steps in conducting an early community impact assessment include defining the study area, determining the level of the assessment, developing a community profile, identifying impacts and possible solutions, and documenting the findings.

For More Detailed Information on Community Impact Assessments…

Community Impact Assessment – A Quick Reference for Transportation. Federal Highway Administration, FHWA-PD-96-036, September 1996. For ordering information: http://www.fhwa.dot.gov/environment/cia.htm

Community Impact Assessment Handbook. Center for Urban Transportation Research, University of South Florida, November 2000. Available online at: http://www.cutr.usf.edu/index2.htm

Define the Study Area

Map each project that will be reviewed in the transportation planning process stage. Because most projects at this stage are conceptual, the exact alignment, facility design, or right-of-way limits may not be known. Thus, the map will be an approximation of the project location and required right-of-way based on the type and size of facility being planned. If the study will consider alternative locations or alignments, map these and use them to determine the study area boundaries.

For each project it will be necessary to define the community in order to define the study area. A community may be defined in part by geographic boundaries or perceived neighborhoods. But behavior patterns, common values and attitudes, use of local common facilities and participation in local area events, shared ethnicity, or religious affiliation should also be used to define the community. Thus, some data must be collected in order to confidently define the project community area.

For this type and level of assessment, the study area boundaries may be classified into two levels; primary and secondary. The primary study area would be that immediately adjacent to and surrounding the project, generally the area within approximately one-quarter mile of the project. This study area would likely have the greatest impacts. The secondary study area may encompass a much larger area so that entire neighborhoods and impacts that affect a broader community can be identified and addressed.

Professional judgment combined with type of project and knowledge of the community/area will be needed to define the secondary study area. Some guidelines are provided in Table 5-1.

Table 5-1. Suggested Information for Defining CIA Study Area

Identify and map: • Neighborhoods adjacent to project location • All schools and school boundaries • Locations of all churches, parks, community, and or recreation centers • Local neighborhood commercial sites

What is a community?

A community may be defined by geographic boundaries of an area, a neighborhood, or a specific area of development. But, it may also be determined by common values, ethnicity, group or religious affiliations, income levels, or shared perceptions.

Determine Level of Assessment

Obviously, not every project will require the same level of assessment at this stage of project planning. Professional judgment should be used to determine what level of CIA is required for each project based on the project scope and complexity. In the planning stage, many projects can be quickly reviewed based on secondary information collected regarding population, economic, and housing characteristics. For other projects, particularly major or controversial projects, additional primary data collection may be needed in order to fully identify potential impacts and solutions. Additionally, projects that are likely to move quickly into project development, design, and construction should be given more attention.

A certain amount of data collection and analysis may need to be accomplished before it becomes apparent what depth of analysis is required to fully identify impacts and issues. Table 5-2 provides a series of questions that will provide guidance on the level of analysis that may be needed. It is suggested that a positive answer to any of the questions in Table 5-2 may indicate the need to conduct a more in-depth review of the project.

Table 5-2. Guidance on Determining the Level of Assessment Needed

Answering "yes" to the following questions indicates a more in-depth project review:

- **Does the project split or bisect an existing neighborhood?**
- **Does the project create a barrier to accessing community centers, churches, parks, medical facilities, neighborhood commercial centers, or schools?**
- **Does the project potentially affect a certain demographic segment of the community such as:**
  - **low-income households**
  - **specific race or ethnic group**
  - **senior citizens**
  - **school-aged children**
  - **other groups?**
- **Does the project impact areas of low-income or affordable housing?**

Develop a Community Profile

A community profile is a compilation and summary of data that detail current baseline conditions in a community or study area. These data will enumerate and describe the population, housing, and economic conditions throughout the study area and compare the area to the larger community, region, county, and/or state.

Assemble Database

As discussed in Chapter 2, PREP calls for developing an area wide database containing easily assembled data from existing secondary sources. The basic data needed to conduct community impact assessments include information that will define and describe the population, housing, and economic trends within the study area or community, and compare those elements to the larger planning area (i.e., metropolitan area boundary or county). Information on neighborhoods, school boundaries, and other characteristics that define the community and bind it together will serve to identify the study area, the affected community, and the community issues and attitudes.

➢ Data and Sources

Information on the general characteristics of the population, housing, and economy are needed to describe the community within the study area relative to other parts of the metropolitan area, county, region, and state. Data should be sufficient to provide information on the population size, density, ethnicity, and age, changes or differences in the level of economic activity (i.e., sales tax receipts), and housing characteristics.

The following should be collected for the state, the county, the metropolitan area as a whole, and to the extent possible, at the traffic analysis zone or block group level for the study area. For projects not in a metropolitan area, collect the data for the state, the county, for any nearby cities, and at the census tract and/or block group level for the study area. Suggested data elements and sources for data are provided in Table 5-3.

Table 5-3. Data and Data Sources Needed for Community Impact Assessment

Data Type	Data Details Needed	Sources for the Data
Population Characteristics	• Number • Racial/ethnic breakdown • Age distribution • Median household income • Number of households receiving public assistance • Number of households • Average household size	• U.S. Census Bureau http://www.census.gov/ Phone: 301-763-4636 Fax: 888-249-7295 (orders only) 301-457-4717 (data inquiries) • Texas State Data Center http://txsdc.tamu.edu Phone: 979-845-5115 Fax: 979-862-3061 • Texas Natural Resources Information System (TNRIS) http://www.tnris.state.tx.us Phone: 512-463-8337 • Other possible source: Local libraries
Housing Characteristics	• Average or median house value • Number of owner and renter occupied houses • Year structure is built • Presence or lack of utilities • Length of residency	• U.S. Census (see above) • Texas A&M Real Estate Center http://recenter.tamu.edu/ Phone: 979-845-2031; 800-244-2144 • Other possible source: Local realtors

Table 5-3. Data and Data Sources Needed for Community Impact Assessment (cont.)

Data Type	Data Details Needed	Sources for the Data
Economic Characteristics	• Unemployment rates • Employment of residents by industry group (SIC) • Major employers and industries • Dominant business types	• U.S. Census (see above) • Texas Workforce Commission http://www.twc.state.tx.us/twc.html Phone: 512-491-4922 • U.S. Bureau of Economic Analysis http://www.bea.doc.gov/ • Texas Comptroller http://www.window.state.tx.us/ • Texas A&M Real Estate Center (see above)
Transportation	• Public transit service routes • Major pedestrian movements	• Public transit service providers • Visual observations of pedestrian movements
Other Data	• School district boundaries • Neighborhood boundaries • Location of religious facilities • Location of community centers and type of services provided • Location of medical and health care facilities • Recreational facilities and how used • Zoning maps	• Local school districts • City planning or community development departments, neighborhood associations, local residents • Visual/windshield survey of area
Supporting Data	• Consumer Price Index (CPI) – All area urban	• Federal Reserve Bank http://data.bls.gov/

The population, housing, and economic data are available from a variety of government and other agency sources. Generally, the most widely accepted source of population, housing, income, and ethnic/racial data is the U.S. census. Census data is available from the U.S. Bureau of the Census, the Texas State Data Center, other state and local agencies, as well as local libraries.

Some data such as population, number of households, sex, race, age, number of children, school enrollment, number on public assistance income, and other data are available at the state, county, census tract, and block group level from data on CD ROM. Other data, particularly, income data, are available only at the block group level. Much of these data, including population, number of households, and median household income, will have

already been prepared at the traffic analysis zone level within metropolitan areas and is available from the MPO.

For areas not located within a metropolitan area and for data not compiled by the MPO, the Texas State Data Center will be able to compile much of the data required at the block, block group, or census tract level. Other sources of these data include cities, school districts, and various social service agencies.

Much has been said about the problems with census data, particularly for identifying low income and ethnic/racial characteristics. In some cases, the level of data aggregation may be too large to identify the small pockets of low-income households or detailed racial data. Additionally, there are generally claims that the census tends to undercount certain ethnic or racial groups and that income may be underestimated because of a reluctance to divulge this information. Despite these problems, U.S. census data are widely accepted and legally defensible for use in transportation and environmental work.

Another problem with census data is that they are often several years old and thus do not reflect current conditions. However, there are methods to update the census data. The following section provides some simple methods for updating data.

Data and information on economic and employment characteristics are available from the Texas Workforce Commission for the state, county, metropolitan statistical area (MSA), and workforce development area (similar to Council of Government areas) levels. Data at these levels include current employment statistics, covered employment and wages, industry profiles, maps, MSA current economic snapshots, unemployment rates, and affirmative action data that include labor force and unemployment statistics by gender and race.

Information on employment by industry group, labor force, and unemployment is also available from the U.S. Census Bureau. Additional descriptive information on state, local, and regional economies is available from the Texas State Comptroller's Office and the U.S. Bureau of Economic Analysis.

Sales tax information is an excellent measure of economic activity within an area. Figures for total retail sales and sales subject to tax are available from the Texas Comptroller's Office at the county, city, and zip code levels.

Another source of data for MSAs is the real estate market overviews produced by the Real Estate Center at Texas A&M University. These reports are updated annually and provide information on population, employment, major industries (including the top 10 employers in the area), and numerous statistics on housing and the housing market.

Data at smaller geographic levels for economic characteristics are more difficult to obtain due to privacy considerations. However, some data for smaller levels may be available from the Texas Workforce Commission on a case-by-case basis. Other data such as dominant business types can be determined through windshield surveys.

Updating Data to Current Year

Generally the year in which the analysis is being conducted is not the same as the census year. Thus, the census data will need to be updated to the analysis year. There are reasonably simple ways to update some of the data. Recent estimates of other data will need to be made through primary data collection, visual observation, and /or contact with knowledgeable persons. In some cases, professional judgment must be used to estimate changes.

Population - Population estimates for the state, county, metropolitan statistical areas as well as most cities or towns are made each year by the Texas State Data Center. These area wide estimates can be used in conjunction with building permit data, demolition data, utility connections/disconnections, water well, or septic tank permits (rural areas) to estimate the population changes at smaller geographic areas.

Estimates of race and age are available from the Texas State Data Center under the Texas Population Estimates and Projections Program for the county level only. Changes in race characteristics within the study area will have to be estimated through visual observation of the area and contact with persons or groups knowledgeable with the

community. Changes to the general age composition may be available from the school district.

Households - You can estimate the number of households by using average household size from the census for the geographic level of analysis and dividing the updated population by that average. While average household size does change, it changes slowly over time, and the larger the area of analysis, the slower the rate of change. Areas that show large change in average household size are generally formerly undeveloped areas that have undergone a great deal of population growth. When dealing with a rapidly developing area use visual observation to determine the character of the development and the type of household (i.e., apartments, single family, presence of children). Match the new development with an area that existed at the time of the last census and use the same or similar average household size from the older area.

Income - Median household income can be updated using the CPI to update median household income from the census to the year needed. Typically, median household income changes very slowly, which means that adjusting the census information on income for inflation should give a reasonable estimate of income.

You can update to a current estimate of household income, by using the CPI data. Determine the CPI of the current plan year at the current month and the CPI of the census year at six months. Remember that census income reflects the income of the year prior to the census (i.e., income reported in the 2000 census is 1999 income). Determine the percent growth in the CPI using the following formula: CPI base year minus CPI census year divided by CPI census year. Next add 1 to the percentage increase determined above and multiply that number by the census year median household income. The result will give you an estimate of current household income.

Housing Characteristics - Updates to the average housing value can be accomplished with the assistance of a realtor knowledgeable of the area. Recent information on sale prices and/or appraisals will serve to provide a basis for current housing value. Realtors may also be able to estimate the current split between rental and owner-occupied housing for specific areas.

Identification of Community Issues

Many impacts cannot be identified simply through the analysis of population, housing, economics, and land use. There is a need to understand the community values and attitudes toward the project. Although at this level of environmental analysis a full CIA is not being performed, it is recommended for the more controversial projects that some investigation be conducted to provide a base understanding of those values and attitudes.

Several methods for investigating the community values and attitudes toward a project are available. They include a review of secondary information such as transcripts from previous public meetings, local studies, editorials, and media reports or stories. Such sources may provide some insight into the community and identify major stakeholders. Interviews with major stakeholders should be conducted. These interviews may be one-on-one interviews or could consist of public workshops, forums, or meetings.

Local knowledge and professional judgment are required to determine what projects will require an investigation of community values and attitudes. Some general guidelines for determining when this might be needed are provided in Table 5-4. A "yes" to any of these questions would indicate a project that may require investigation of community attitudes and values.

Table 5-4. Questions to Guide When to Further Investigate Community Values and Attitudes

- **Does the planned project split an existing neighborhood?**
- **Does the planned project impact a specific population group more than others?**
- **Does the planned project alter access to schools, churches, community centers, medical or recreational facilities, or local commercial centers?**
- **Is the project designed to improve or serve regional interests as opposed to improving local neighborhood transportation interests?**
- **Will the project require any relocation of residences or businesses?**
- **Does the project alter access to major employers in the area?**

Summarize the Data

Data should be compiled in formats that are useful in comparing conditions in the study area to those for the metropolitan area, the county, or the region as a whole. In some cases charts or graphs that compare and contrast descriptive characteristics are useful. In other cases geographical representation in the form of maps and overlays can locate specific characteristics of the area.

One of the most helpful items to prepare is a map of the socioeconomic conditions. This map should compile key information for the region and each project area. Specifically, special populations, defined neighborhoods, community facilities and schools, areas of low-income housing, and other notable features should be compiled on separate maps or overlays. These maps provide an important tool for developing and analyzing project impacts.

Table 5-5 highlights useful information appropriate to data summaries.

Table 5-5. Suggested Data to be Mapped or Compared for Use in Identifying Impacts

Data Type	Data to be Mapped
Population Characteristics	• Mapping of race/ethnicity and age • Mapping of concentrations of low-income households • Comparison of race/ethnicity and age with that of the metropolitan area, county, and/or state • Comparison of median household income • Comparison of percentage of households in area receiving public assistance
Housing Characteristics	• Mapping of low-income housing • Mapping of housing units immediately impacted by the project • Comparison of average median house value • Comparison of percentage of owner- and renter-occupied houses • Comparison of average age of housing stock • Comparison of presence or lack of utilities • Comparison of average length of residency or vacancy rates

Table 5-5. Suggested Data to be Mapped or Compared for Use in Identifying Impacts (cont.)

Data Type	Data to be Mapped
Economic Characteristics	• Mapping of pockets of high unemployment areas • Mapping of major employers and industries • Comparison of employment by industry type

Other Data	• Mapping of:
	  ○ Churches
	  ○ Neighborhood boundaries
	  ○ School boundaries
	  ○ School locations
	  ○ Community centers
	  ○ Locally significant structures or sites

Identify Potential Impacts

Use the data and maps prepared for the base year or plan year conditions to identify potential impacts of projects and the transportation plan as a whole. For this stage of environmental work it is suggested that several broad impact areas be evaluated. These include social impacts (including Title VI or environmental justice impacts), economic impacts, land use impacts, and relocation impacts.

Social Impacts

Social impacts consist of those elements that affect community cohesion, community facilities and services, mobility or accessibility, and safety. These impacts generally affect the neighborhoods immediately adjacent to the planned project. The easiest way to identify potential social impacts is to map the planned facility onto a map of the base year socioeconomic conditions and answer the questions found in Table 5-6.

Table 5-6. Questions to Ask When Identifying Social Impacts[6]

• Will the project bisect and create a barrier within an existing neighborhood? • Will the project impact any special population groups within the neighborhood? (Groups such as school-aged children, low-income households, specific racial or ethnic groups, or elderly) • Will the project displace any residents? If yes, approximately how many? • Will the project create a barrier to accessing community facilities, medical facilities, schools, churches, recreation, parks, or commercial centers? If yes, what facilities? • Will the project adversely affect public transit service? • Will the project negatively affect vehicle movements within the neighborhood? • Will the project increase traffic within the neighborhood?

Title VI

Title VI of the 1964 Civil Rights Act, 42 U.S.C. 2000, provides in section 601 that:

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

Economic Impacts

Economic impacts resulting from transportation projects can be positive or negative, short or long term in nature. To compound the difficulty in assessing economic impacts, what may be a positive impact for some can be a negative impact for others. Negative impacts that may occur include those that adversely affect access to employment of neighborhood residents and the operation of businesses (during or after construction), lower property values, or the reduction in the tax base through loss of property to right-of-way or loss of tax revenue from sales and operations. Positive impacts may include an increase in property values, increased accessibility to employment and other activities, and an increase in tax revenue.

[6] Adapted from the *Community Impact Assessment Handbook,* Center for Urban Transportation Research, University of South Florida, November 2000.

In this early stage of environmental review a detailed economic impact study is not performed. Rather, a quick assessment of potential economic impacts on businesses, residents, and government agencies can be made using the guidelines found in Table 5-7.

Table 5-7. Questions to be Asked When Identifying Potential Economic Impacts[7]

Type of Impact	Questions to Ask
Business Impacts	• Will the project require additional right-of-way? • Will this right-of-way likely take any businesses? If yes, how many, what type, and what is the loss of employment? • Will the project alter regional travel patterns? If yes, will traffic volumes to local businesses be reduced? • Will the accessibility of business in terms of vehicles, pedestrians, or transit patrons be altered? • Will any specific business be substantially adversely impacted?
Residential Impacts	• Will the project take any residences? If yes, how many? • Will the project adversely impact residences adjacent to the project by taking right-of-way? • Will the project increase traffic volumes and/or travel speeds? • Will the project alter accessibility of the neighborhood areas? If yes, how? Will this change in accessibility likely increase or decrease property values?
Government Agency Impacts	• Will the property convert currently taxable property to public use? If yes, what is the estimated loss of property tax revenue? • Will the impact to or loss of business result in loss of sales tax revenue? If yes, what is the estimated loss of sales tax revenue?

Land Use Impacts

As with economic impacts, land use impacts may be positive or negative, short- or long-term. In some instances a transportation project may increase the growth and development in an area by improving the accessibility of the property. On the other hand, the changes caused by a transportation project in an established residential neighborhood may be a factor in the decline of the area as increased accessibility promotes conversion of residences to commercial, office, and/or industrial uses.

[7] *Ibid*.

Short-term impacts are those direct, immediate changes to land use that result from construction of a transportation project such as removal of existing uses and conversion of productive land to transportation use. Long-term impacts are those indirect land use impacts that occur over time such as a general overall redevelopment of an existing area or the shifting of business activity from an older area to the newly accessible area. Table 5-8 provides some guidelines to assessing the potential land use impacts during planning.

Table 5-8. Questions to be Asked When Identifying Potential Land Use Impacts[8]

Type of Impact	Questions to Ask
Direct Impacts	• Will the project require additional right-of-way? If yes, approximately how many acres? • Will the project remove any existing uses? If yes, how many and what type?
Indirect Impacts	To determine the potential for induced growth and/or conversion of land answer the following questions. The more "yes" answers, the greater the potential for growth. • Is the population increasing rapidly (greater than 15% every 10 years) in the region as a whole? In the local project area? • Is the regional growth in the direction of the local project area? • Are there any major growth generators within the region? (universities or colleges, tourist attractions, high demand industries) • Is the regional or local vacancy rate for office and commercial space low (generally lower than 10%)? • Are the plans and policies of the region favorable to growth? • Is the local project area characterized by higher income (greater than the region median household income)? • Are there any plans or policies designed to promote growth in the local project area?

[8] *Ibid*.

Relocation Impacts

Relocation impacts are those associated with the need to acquire right-of-way that requires removing existing residences or businesses. Relocation affects not only those being relocated, but also those remaining. The impacts of relocation can be financial, physical, social, or psychological. Many relocation impacts are closely associated with social impacts. At this early stage of environmental review, the exact alignment and right-of-way requirements will not be known. However, given a general alignment and facility size, the right-of-way can be estimated and the potential for relocation identified. Guidelines provided in Table 5-9 will assist in identifying potential relocation impacts.

Table 5-9. Questions to Ask When Identifying Relocation Impacts[9]

- Is the project likely to cause the relocation of any neighborhood residents? If yes, how many? How many residents of the following groups will be affected?
  - Elderly (65+)
  - Low-income
  - Racial or ethnic minority
  - Households with school-aged children
- Is adequate comparable replacement housing available in the same neighborhood?
- Will the project require the relocation of any businesses that are dependent on their specific location? If yes, what kind and how many?
- Are there adequate sites within the neighborhood for these businesses to relocate?
- Will the project require the relocation of any community facilities? Are there adequate sites within the neighborhood to replace these facilities?

Documentation

Brief documentation should be prepared to describe the base year conditions. Significant and relevant findings such as the potential taking of low-income housing units, the division of a closely knit neighborhood, relocation of residents or businesses, any obvious burdens on a special population group, and other major community impacts should be

[9] *Ibid*.

highlighted. It is recommended that the documentation take into account each project separately, but also the "sum" impact of all projects on the region.

Chapter 6 – Noise Impacts

Introduction

A traffic noise analysis is required for Type I highway projects that involve federal, federal-aid, or state funds. A Type I highway project is one that involves:

- construction of a highway on a new location; or
- improvement to an existing highway that substantially alters the horizontal or vertical alignment or increases the number of traffic lanes.

Completion of a traffic noise analysis as required by 23 CFR 772, the Federal Highway Administration (FHWA) Highway Traffic Noise Analysis and Abatement Policy and Guidance, and TxDOT's Guidelines for Analysis and Abatement of Highway Traffic Noise is a prerequisite for granting federal funding.

The Noise Assessment Process

In a usual traffic noise analysis, the FHWA approved traffic noise model, STAMINA 2.0/OPTIMA, is used to conduct traffic noise analysis for projects. The data required to run this model includes existing traffic, predicted traffic for the design hourly volume (DHV), speed limits, the design of the roadway including horizontal and vertical alignment, the percent trucks, and the location of identified receivers by land use activity category. However, in the transportation plan development stage, roadway design, precise alignment, and detailed design traffic for a facility may not be known. As a result, completion of noise modeling is not possible.

In the PREP, the analysis of noise impacts for a project is designed to identify the relative potential for noise impacts associated with a general project alternative. This information can be used to communicate the possible need for land use planning in undeveloped or underdeveloped corridors to prevent noise receivers from being built within impact distance of the planned facility.

The major steps in conducting an early noise impact analysis include determining the need for the analysis, defining the study area, identifying receivers, identifying potential impacts, and documenting the findings.

Determine the Need for Noise Analysis

A planning stage noise review should be performed for all Type I highway projects with the exception of projects that have no land use activities (undeveloped areas) adjacent to or within 1,000 feet of the general location. For projects in undeveloped areas, a check should be made to determine if there is any currently planned development or development for which there is an approved subdivision plat or building permit. If development is planned within the potential noise impact area, a noise analysis should be conducted based on the type and location of planned development.

Define the Study Area

The TxDOT noise analysis guidelines call for identification of all noise receivers within 150 meters (approximately 500 feet) of the centerline for high volume roadways (over 1,200 vehicles per day), and within 60 meters (approximately 200 feet) of the centerline for low volume roadways. For projects that will involve widening of an existing roadway, the existing centerline can be used as the point of measurement. For new location projects where the centerline is more difficult to estimate, it is suggested that all receivers within 1,000 feet of the general location of the facility centerline be identified.

Identify Potential Receivers

Collect Data

Although a complete noise model analysis will not be prepared, data that will identify potential noise impacts can be collected. Data on existing and currently planned land use activities should be compiled to identify potential receivers within the project corridor. These data, in combination with existing average daily traffic and the predicted average

daily traffic made for development of the transportation plan, are sufficient to identify the potential for noise impacts.

The FHWA defined land use activity categories for noise analysis are given in Table 6-1. These are the land use categories that will need to be identified and are equivalent to the term "receiver" (i.e., the land use activity of church is a receiver, a hospital is a receiver, etc.).

Table 6-1. FHWA Land Use Activity Categories

Category	Description of Land Use Activity
A	Exterior -- Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	Exterior -- Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
C	Exterior -- Developed lands, properties or activities not included in categories A or B above
D	Undeveloped lands
E	Interior -- Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

In order to identify the above listed land use activities, certain data will need to be collected. Table 6-2 lists the data needed and possible sources.

Table 6-2. Noise Analysis Data and Sources

Data Item	Data Source
Land Use Maps	Local city planning and/or development departments
Planned Development	Local city planning and/or development departments
Building Permit Information	Local building inspection department
Aerial photographs (current)	Local planning and/or development department, county engineer, metropolitan planning organization (MPO), private providers
Specific Locations of Land Uses Listed in Table 6-1	Windshield survey of corridor
Existing Traffic	TxDOT District Office, TxDOT Transportation Planning and Programming Division (TP&P), MPO, local city engineering department
Predicted Traffic	TxDOT District Office or TP&P, MPO

Summarize Data

The land use activity and traffic data should be compiled on a series of map overlays such that the existing and currently planned land use (listed in Table 6-1) within the defined noise study area (600 feet on either side of the centerline for existing roadways and 1,000 feet either side of the general alignment for new location in undeveloped areas) can be located and identified.

The existing and predicted traffic along the roadway should also be mapped and the percentage increase in traffic (increase from existing to predicted) should be determined. Although noise modeling relies on design hour volume, those estimates are not prepared until much later in the project development process. The use of average daily traffic is sufficient at this stage of environmental review to identify the potential for noise impacts.

Identify Potential Noise Impacts

The FHWA uses two terms for identifying noise impacts - absolute criterion and relative criterion. The absolute criterion sets a noise level for each of the land use categories, and a noise impact occurs when the predicted noise level (i.e., the modeled noise level) approaches, equals, or exceeds the specific decibel level in the FHWA Noise Abatement Criteria (NAC). At this stage the noise model is not being used and, thus, the total noise level cannot be determined for the identified receivers.

The relative criterion is used when the predicted noise level substantially exceeds the existing noise level at a receiver even if the predicted noise level does not approach, equal, or exceed the NAC. The term substantially exceeds is defined as an increase of 10 decibels or more. The relative criterion does not apply to undeveloped land. The relative criterion will be used to identify the potential for noise impacts in this stage of environmental work.

Using the land use activity maps and traffic data, the relative potential for noise impacts can be identified. The approximate distance of each receiver should be noted as well as any apparent physical features that might serve to increase or decrease the traffic noise. Physical features that might lessen traffic noise would include bands of vegetation, high-

rise buildings, fences, or walls. Features that might increase the noise levels include higher roadway elevations or breaks in fences or walls. When identifying receivers and estimated distance to the project, it is not necessary to identify every individual residence. The units closest to the planned project can be used to identify potential noise impacts for broad areas of residential development.

Next use the traffic information to estimate the potential for increased noise at the identified receivers. Identify the percent increase in traffic at the planned project location closest to each receiver. A doubling of traffic (i.e., an increase from 20,000 vehicles per day to 40,000 vehicles per day is an increase of 100 percent) will result in a 3 decibel increase in noise. Thus, for every 10 percent increase in future year traffic volumes over existing traffic there would be a 0.3 decibel increase in noise. Table 6-3 provides estimates of increased noise relative to the predicted increase in traffic.

Table 6-3. Estimates of Noise Increase Due to Increase in Traffic

Percent Increase In Predicted Traffic	Estimated Noise Increase in Decibels (dBA)
10%	0.3
20%	0.6
30%	0.9
40%	1.2
50%	1.5
60%	1.8
70%	2.1
80%	2.4
90%	2.7
100%	3.0
150%	4.5
200%	6.0

Table 6-4 provides a checklist of questions for identifying the potential noise impacts of a project. For new location projects, the identification of noise impacts is simply a

compilation of receivers within the study area. This is because such a project does not have "existing" traffic and thus a predicted increase in traffic cannot be made.

Table 6-4. Questions to Ask When Identifying Potential Noise Impacts

- Are there any land use activities within 60 feet of an existing roadway, or 1,000 feet of a planned new location?
- If yes, how many and what are they? List the number of each and the distance from the roadway for each in the following categories:
  - Category A
  - Category B
  - Category C
  - Category D
  - Category E
- Is the planned project a new location project? If yes, stop here. If the project involves improvements to an existing facility, continue with the next questions.
- What is the percentage increase in traffic along the roadway part closest to each of the identified receivers?
- What is the estimated increase in noise over existing noise levels? (Use Table 6-5 to estimate)
- Is the estimated increase in noise greater than 10 decibels?

Documentation

The information collected for each receiver located within the study area should be documented for future reference in the environmental process. It is suggested that the information be compiled in a tabular format such as the one shown in Table 6-5. For new location projects not all of the information shown in the table will be available.

Table 6-5. Format to Use in Summarizing Potential Noise Impacts

Receiver	Land Use Activity Category	Approximate Distance to Centerline	Existing Traffic	Predicted Traffic	Percent Change	Estimated Decibel Increase
R1						
R2						
R3						
R4						
R5						
R5						
R6						
R7						

Chapter 7 – Hazardous Materials

Introduction

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also referred to as the Superfund, was enacted in 1980 in order to address uncontrolled releases of hazardous substances that may endanger public health welfare or the environment. CERCLA assigns liability to responsible parties to clean up uncontrolled hazardous waste sites.

The Superfund Amendments and Reauthorization Act of 1986 revised various sections of CERCLA, extended the taxing authority for the Superfund, and created a free-standing law, SARA Title III, also known as the Emergency Planning and Community Right-to-Know Act (EPCRA).

CERCLA uses the term *hazardous substance* to include those substances listed in 40 CFR Table 302 (over 300 chemicals), listed hazardous wastes, characteristic hazardous wastes, toxicity characteristic wastes, and listed radionuclides. A *hazardous substance* may also include any substance that presents an imminent and substantial danger to public health or welfare. There are many hazardous substances that are not hazardous wastes as defined by the Resource Conservation and Recovery Act (RCRA). A hazardous material is used to describe a product that requires special handling. When spilled or not handled properly, a hazardous material may become a hazardous waste or a hazardous substance.

One of the most common environmental liabilities affecting transportation development is the occurrence of contamination on properties owned or managed by the department. If the contamination from hazardous substances occurs in the right-of-way, the department may be designated as the responsible party regardless of whether they caused or knew of the contamination.

Departments of transportation can be involved as responsible parties if they are:

- current owners or operators of the facility,
- former owners or operators at the time the hazardous substance was disposed,
- the party who arranged for disposal, or
- the party who transported the substance.

CERCLA liability is joint, several, and strict; meaning that any party that is identified as responsible must share the cost of cleanup. There are exclusions and defenses to CERCLA liability for government agencies and use of eminent domain, and involuntary acquisitions, but neither would likely apply to transportation agencies.

The most common way to minimize liability is by assessing and managing potential environmental risks as they are discovered. Environmental risks are identified and documented by conducting environmental site assessments. The Phase I environmental site assessment, as it is commonly known, is intended to discover environmental conditions that could affect liability with respect to the intended use of that property. Subsequent phases of environmental assessments may be needed to further define and mitigate environmental risks or contamination.

Environmental and Regulatory Liability

The term liability can take on different forms. A legal definition of liability means an enforceable obligation, either through a voluntary contractual obligation or a unilaterally imposed obligation. The law establishes both the liability and the party responsible for the liability. In terms of accounting practices, a liability is a present obligation to make an expenditure or provide a service in the future.

In general, an environmental liability, such as contamination in right-of-way or at a facility, is a legal obligation to make a future expenditure due to the past or ongoing use, release or threatened release of a particular substance, or other activities that adversely

affect the environment. A potential liability is one in which there is a potential obligation in the future. Its potential may depend on future events or future laws. What makes potential liability different from existing liability is that for potential liabilities the responsible party has an opportunity to mitigate or prevent future obligations by its own practices.

Liabilities may come from a wide variety of sources. These include federal, state, and local rules and regulations that can be enforced by governmental agencies, or in some cases, citizen suits. Common law also provides numerous sources of liability in the form of nuisance and trespass suits, personal injury suits, and toxic tort.

Table 7-1 lists the basic categories of environmental liabilities and the potential future obligations that may arise.

Table 7-1. Liability and Future Obligation Issues

Liability	Future Obligation
Compliance obligations	• Administrative costs • Employee training • Enacting management construction practices • New or upgraded facilities • Site monitoring • Site/activity inspections
Remediation obligations	• Cleanup of soil or groundwater • Pollution prevention • Remediation systems installation • Operation and maintenance • Site monitoring
Fines and penalties	• Civil and criminal fines and penalties
Compensation for personal injury, economic loss, or property damages under common law	• Expenses from settlements • Legal defense • Contractor claims • Occupational/worker health and safety claims
Punitive damages, professional negligence	• Expenses from settlement or legal defense
Natural resource damages	• Originating from CERCLA, CWA, and OPA, the cost of restoration of natural resources, not including private property
NEPA obligations	• Cost of mitigation, civil suits

The liability to a DOT may include all of these sources in addition to state-specific laws and regulations. The liability to the individual is usually limited to those issues founded in common law, but some environmental regulations include criminal penalties and fines for individuals. Most notable of these is CERCLA, which may impose fines on individuals who fail to act or make proper notifications.

Joint, Several, and Strict Liability

The terms "joint and several liability" are common law methods for assigning liability. As found in CERCLA, it is used to define the scope of liability. Simply put, joint and several liability means that each and every responsible party could possibly be held liable individually for the entire cost (obligation) of cleanup. In other words, if you are liable for any damages you can be liable for all damages. If a company contributed in any way to the presence or release of a hazardous substance, then the company can be responsible for the entire liability, unless it can show that its contribution was distinct and divisible. This usually results in an allocation of responsibility among responsible parties.

Strict liability refers to the standard of liability and means the government does not need to prove any intent, negligence, or intentionally wrongful act. The government must only show that the responsible party contributed to the release of a hazardous substance. A responsible party is liable for cleanup under strict liability if they have contributed to hazardous conditions based simply on the occurrence of a release regardless of fault. Strict liability may fall upon those who, even with proper care, expose the community to a dangerous risk. At the state level, strict liability is most commonly used because it does not require proof of negligence or willful intent. Texas uses joint, several, and strict liability as liability standards for the state superfund program.

Worker Health and Safety Liability

The use of certain materials requires safe handling procedures to assure that worker safety and health do not become a liability issue. The authority for protecting worker health and safety originates from the Occupational Health and Safety Act (OSHA).

OSHA covers nearly all employers in the private sector to provide safe and healthful working conditions for every working man and woman in the nation. In most cases, environmental pollution protection standards will be stricter than OSHA standards. The liability arising from OSHA regulations will more likely arise from new construction or maintenance activities that occur in existing contaminated areas.

Strategies to Limit Liability

Environmental liabilities and risks are managed just as one would take the care to manage safety risk. The strategy used most often to limit liability is due diligence, and in some cases use of indemnification.

Due Diligence

Due diligence should involve taking all reasonable measures necessary to minimize liability. Due diligence includes, but is not limited to:

- monitoring the compliance with pertinent environmental regulations,
- record keeping and knowing the potential impacts of using the material, and
- documenting the usage and location of the material and its use, storage, and placement.

Indemnification

Although liability cannot be contracted away, there are contractual ways to reduce an agency's portion of payment for cleanup if it occurs. Indemnification agreements are contractual instruments that may be used to reduce future potential cleanup costs. It is important to note that indemnification agreements do not shield an agency from liability, but can provide a basis to recover cleanup cost, if necessary. The agreements can be for a specified amount, an amount defined by the cost of the cleanup, a portion of the cleanup, or the amount of the contract with the supplier. In many instances, suppliers and contractors only enter into indemnification agreements for the amount of the contract.

Environmental site assessments (ESAs) are designed to identify environmental hazards. The environmental site assessment process has three general phases of work:

- A Phase I ESA is typically a **qualitative** investigation using only visual observations and review of existing information to recognize potential hazards.
- A Phase II ESA is a **quantitative** investigation where samples are collected to further define or characterize suspected environmental hazards or risks.
- A Phase III ESA uses the results of Phase I and II investigations to develop management and/or corrective actions that address the environmental hazards known to exist at the site.

Although the Phase I assessment may typically be performed prior to, or concurrent with, the purchase of right-of-way, early screening for potential hazardous materials can be helpful in project planning. The primary indicator of potential hazardous material is land use.

Current and past land uses that involved the storage, treatment, or distribution of materials that become hazardous when unmanaged can be readily identified through existing on-line databases and aerial photographs. The most notable of these types of land uses are gas stations. The TNRCC maintains a database of petroleum storage tank (PST) facilities and leaking PST (LPST) facilities. The TNRCC also maintains a database of registered hazardous waste generators and waste storage facilities.

Phase I Assessments

Phase I assessments are usually performed to screen a property for potential environmental hazards prior to transfer or development. A Phase I should be conducted on all property transfers, acquisitions, property management, and/or construction projects.

For the purposes of conducting a preliminary environmental review, a preliminary site assessment may be adequate to identify potential hazardous material issues prior to

performing a formal Phase I ESA. It is also important to note that there are sometimes different names for a Phase I ESA. For example, TxDOT refers to a Phase I ESA as the "Initial Site Assessment." Other organizations may refer to them as "Level One Site Assessment." Regardless of the name, all Phase I ESAs have the same basic content and format. For specific requirements of a Phase I ESA, contact the sponsoring agency for the latest format and content requirements.

Initial Site Assessment Report

The basic Initial Site Assessment report may vary in length and complexity depending on the site. In many instances, Phase I initial site assessments are presented as a form, checklist, or brief report. For large or more complex sites, a Phase I may include extensive historical and regulatory reviews and sampling data. Initial site assessments are used as a screening tool to determine if further detailed assessment may be needed. The site location and condition determine the level of analysis that is required. If the initial site assessment is going to be performed by a consultant or contractor, be sure to agree on a detailed scope of work before the assessment begins.

Regardless of the site and its complexity, environmental professionals trained to recognize potential environmental hazards should perform environmental site assessments. For preliminary work, the use of database queries should be sufficient.

A typical Phase I ESA report usually includes the following sections:

- cover page, disclaimer, table of contents;
- executive summary, introduction, scope of services;
- site description, site history, site environmental history;
- review of regulatory agency information and records search;
- findings of the site inspection;
- review of surrounding properties;

- summary of findings and conclusions;
- recommendations;
- maps and figures;
- ownership history documentation (chain-of-title);
- aerial photographs and site inspection photographs;
- list of contacts and references;
- information on suspected environmental hazards;
- relevant material safety data sheets, operational information, or site records; and
- environmental compliance documentation of the site or facility.

Site Assessment Standards

The American Society of Testing and Materials (ASTM) has published standards for conducting Phase I site assessments. These include ASTM E-1527-94: "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process," and E 1528-97: "Standard Practice for Environmental Site Assessments: Transaction Screen Process." Most Phase I assessments are based around these standards.

TxDOT Requirements for Initial Site Assessments

Following the Preliminary Review Environmental Process, the first detailed site assessment will include, at a minimum:

- a review of the project design, right-of-way, and/or site requirements;
- a review of existing and previous land use;
- a review of regulatory agency databases and files;

- a project site visit and surrounding area field survey;
- interviews with persons knowledgeable about the site; and
- a determination if further investigation is needed, or action is required, to resolve environmental risks discovered in the assessment.

Thus, information captured and documented in the PREP will facilitate the next step of evaluation.

Determining Project Requirements

An examination and review of the project requirements should be performed to evaluate the potential for encountering potentially hazardous material or contamination. This may include demolition and construction plans, property and/or right-of-way being acquired to determine the project's "footprint," and how the proposed activities may encounter environmental hazards now and in the future. Establishing the project requirements will determine how much inquiry and investigation is needed for each component of the site assessment.

Existing and Previous Land Use

The purpose of reviewing existing and previous land use is to identify uses and/or occupants of the site that may have caused an environmental hazard or contamination. The review of land uses should also include adjacent properties that may have had releases or contamination that could migrate onto the subject site. Property uses should be identified from the present back to its first development and use. Future land use plans should also be considered. Land uses can be reviewed using:

- aerial photographs;
- city zoning and land use maps, certificate of occupancy records, and tax records;
- fire insurance maps, street directories, and city directories;

- USGS topographic maps;
- USDA Soils Conservation Surveys; and
- land titles and deed records.

Regulatory Agency Review

The purpose of reviewing regulatory agency files is to identify recorded incidents of contamination, spills, or facilities with potential for contamination or violations. The review should also include activities on adjacent sites. Information from local, state, and federal agencies should be reviewed. Many of these databases are available on-line through EPA or TNRCC websites. Typically, the databases to be reviewed will include the following:

- National Priorities List for 1 mile radius (http://www.epa.gov/enviro/html/hazard.html),
- Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) for 0.5 miles radius (http://www.epa.gov/enviro/html/hazard.html),
- RCRA Treatment Storage and Disposal Facilities (TSDF) for 1 mile radius (http://www.epa.gov/enviro/html/rcris/rcris_id_info.html) or (http://www.tnrcc.state.tx.us/permitting/remed/ihw.html),
- RCRA generators for project limits and adjacent properties (http://www.epa.gov/enviro/html/rcris/rcris_id_info.html) or (http://www.tnrcc.state.tx.us/permitting/remed/ihw.html),
- Texas Superfund Sites for 1 mile radius (http://www.tnrcc.state.tx.us/permitting/remed/superfund/index.html),
- Leaking Petroleum Storage Tank Sites and Registered PSTs for 0.5 mile radius (http://www.tnrcc.state.tx.us/permitting/remed/rpr/pstquery.htm),

- Municipal Solid Waste Landfills for 0.5 mile radius (http://www.tnrcc.state.tx.us/permitting/wasteperm/mswperm/), and

- Emergency Response Notification System (ERNS) for project limits.

Additional inquiry and review of agency files on specific facilities may be required to determine the extent and potential risks presented by the known or registered sites.

Site Reconnaissance

Site reconnaissance may be required in the planning stage; it is a necessity later in the project development. The site walk-through involves a visual identification of the presence of contamination or hazardous structures that could affect project development. The assessment should also include an on-site visit and "windshield" survey of the surrounding area. A photographic record should be made to document conditions at the time of the on-site visit.

Interviews

Interviews should be conducted with persons who are knowledgeable about the site and the adjacent areas to determine the nature and extent of suspected hazards. The interviews should include property owners, operators, residents, and employees. Interviews should also be conducted with appropriate local regulatory agencies, fire officials, and inspectors.

Determining the Need for Additional Investigation, Action, or Coordination

Based on the information collected and reviewed during the assessment, a determination should be made if further investigation or action is needed. All initial site assessments should include a recommendation either for no additional action or investigation, or specifically identify what actions should be taken. The assessment findings and report should become part of the project development record just as any other plans or specifications. If additional investigations, actions, or considerations are needed, they should be specific in nature as to how they would affect the project or site development.

These recommendations may include directions on avoiding certain areas of suspected contamination, or recommendations for additional subsurface investigation to determine the nature and extent of contamination.

Additional Data Resources

Additional data resources that can be used in the preliminary assessment for hazardous materials include those at the following Internet sites:

- The American Society of Testing and Materials Standard Practice for Environmental Site Assessments: http://www.astm.org/
- TNRCC Remediation Division: http://www.tnrcc.state.tx.us/permitting/remed/ihw.html
- TNRCC Innocent Owner/Operator Program: http://www.tnrcc.state.tx.us/permitting/remed/vcp/iop.html
- TNRCC Glossary of Terms: http://www.tnrcc.state.tx.us/permitting/remed/superfund/glossary.html
- US EPA Search Your Community: http://www.epa.gov/epahome/commsearch.htm
- US EPA EnviroFacts Website: http://www.epa.gov/enviro/index_java.html

APPENDIX A – Directory of Contacts

To contact TxDOT District Environmental Contacts:

http://www.dot.state.tx.us/env/pdf/distENVcontacts.pdf

Phone: Environmental Division (512) 416-3001

APPENDIX B – NEPA Compliance Categories

Natural Resources Protection Compliance

NEPA requires the assessment of human and natural environment for federal actions. The following is a list of federal and state laws, rules, and executive orders that protect the human and natural environment.

Endangered Species Act of 1973 as Amended (15 USC 1531-1543)

The Endangered Species Act (ESA) of 1973 ensures that federal actions (or actions using federal funds) do not jeopardize the existence of any listed endangered or threatened species, or adversely modify or destroy critical habitat of such species. The purpose of the act is to conserve threatened and endangered species and their habitats. Consult with the United States Fish and Wildlife Service for more information.

Migratory Bird Treaty Act 16 USC §703-712

Please check with TxDOT's Environmental Division on the requirements of the Migratory Bird Act Treaty requirements.

Fish and Wildlife Coordination Act of 1958 (16 USC 661-666[C])

The Fish and Wildlife Coordination Act (FWCA) of 1958 requires that federal agencies obtain comments from the USFWS and the state agency responsible for fish and wildlife. This coordination is required whenever a project impacts a stream channel or other body of water.

Farmland Protection Policy Act (FPPA)

The Farmland Protection Policy Act (7 USC 4201 et seq.) is implemented by federal regulations published in 7 CFR 658. The purpose of the act is to prevent unnecessary conversion of farmland.

Coastal Barrier Resources Act (CBRA)

The Coastal Barrier Resources Act outlines requirements to minimize the loss of life and damage to the coastal barrier systems along the Atlantic and Gulf coasts. CBRA identifies coastal areas that will be protected by placing restrictions on the use of federal funds for developmental activities, including federally funded highway projects.

Texas Coastal Management Program (TCMP)

The TCMP is based primarily on the Coastal Coordination Act of 1991 (33 Tex. Natl. Res. Code ann. 201 *et. seq*.). The TCMP established a Coastal Coordination Council (CCC) headed by the Texas Land Commissioner. The CCC (a multi-agency panel) reviews projects and proposed rules to determine whether projects or actions in coastal counties conform to the TCMP.

Rivers and Harbors Act of 1899

The U.S. Army Corps of Engineers (USACE) began regulating activities in navigable waters with the Rivers and Harbors Act of 1899. The act includes waters defined as navigable by the Coast Guard but may also include rivers which were historically navigable or which with modification may be available for future use to transport interstate commerce.

Federal Water Pollution Control Act/Clean Water Act (CWA) of 1972

The CWA (33 USC 1251B1387, as amended) was enacted to maintain and restore the chemical, physical, and biological integrity of the waters of the U.S. The broader jurisdiction under this law includes not only navigable waters, but most waters of the country and adjacent wetlands.

National Pollutant Discharge Elimination Control System (NPDES) 1990

The purpose of this legislation is to improve the quality of the nation's rivers, lakes, and streams by reducing pollution from nonpoint sources. NPDES requires stormwater

discharge permits (EPA C Section 402, Water Quality Act of 1987). (See Chapter 6 of this manual.)

National Flood Insurance Act (NFIA) of 1968

The purpose of the NFIA is to provide flood insurance to property owners in flood-prone areas. The National Flood Insurance Program (NFIP) was established to reduce future flood losses through local floodplain management and requires participating cities, counties, or states, to adopt floodplain management ordinances containing certain minimum requirements intended to reduce future flood losses. Federal Emergency Management Agency (FEMA) has jurisdiction.

Executive Order 11988

Executive Order 11988 requires all federal agencies to comply with NFIP criteria. It is the basis for assessment of flood hazards that may be related to highway improvements encroaching on or affecting base flood level.

Executive Memorandum of April 26, 1994

The subject of the Executive Memorandum signed by President Clinton is landscaping on federal projects. In addition, TxDOT issued "Guidance on Environmentally Beneficial Landscaping Practices & NEPA Compliance," dated July 5, 1996. The guidance requires that federal projects be designed to:

- use regionally native plants for landscaping;
- design, use, or promote construction practices that minimize adverse effects on the natural habitat;
- seek to prevent pollution by, among other things, reducing fertilizer and pesticide use; and
- implement water-efficient and runoff reduction practices. (See the TxDOT *Landscape and Aesthetics Manual* for more information.)

Section 404 Regulatory Program

The Council of Environmental Quality (CEQ) established the 404 Regulatory Program making it unlawful to discharge dredged or fill material into waters of the U.S. without first receiving authorization from the U.S. Army Corps of Engineers. The Section 404 Program can issue *Nationwide Permits* and individual *404 permits.*

Cultural/Socio-Economic Resources Protection Compliance

Texas Antiquities Code

The Texas Antiquities Code and its implementing rules require that TxDOT notify the THC when proposed projects have the potential to affect cultural resources that may qualify as State Archeological Landmarks. For more information on the Texas Antiquities Code, see the TxDOT *Project Development Policy and Practice Manual*.

National Historic Preservation Act of 1966

The NHPA (Section 106) requires federally funded and permitted projects to consider historic properties and to coordinate these effects with the THC and interested parties, and to avoid or mitigate any adverse effects on historic properties. Historic properties are any buildings, structures, objects, or archeological sites eligible for the National Register of Historic Places (National Register). (See http://www.achp.gov/regs.html.)

FHWA has executed a programmatic agreement with THC, the Advisory Council on Historic Preservation, and TxDOT, setting for TxDOT's Section 106 responsibilities. FHWA has executed a separate programmatic agreement with the THC, the Advisory Council on Historic Preservation, and TxDOT for enhancement projects. Each programmatic agreement requires that TxDOT complete the Section 106 coordination on behalf of FHWA.

U.S. Department of Transportation Act of 1966

Section 4(f) of the USDOT Act requires documentation when right-of-way will be taken from publicly owned parks, recreation areas, wildlife or waterfowl refuges, publicly or privately owned historic sites, and archeological sites that merit preservation in place. For federally funded projects, the documentation must prove that there is no prudent or feasible alternative to the proposed action and that the project includes all possible planning to minimize harm to the resource.

Section 4(f) evaluations require TxDOT to prepare documentation that describes a wide range of project alternatives that would avoid taking the resource and includes a plan to minimize harm to any affected historic properties.

Transportation Equity Act for the 21st Century (TEA-21)

The Intermodal Surface Transportation Act of 1991 had a strong focus on transportation planning and the environment. TEA-21 continues that focus, requiring the integration of certain aspects of transportation planning into the environmental process. TEA-21 calls for a proactive public involvement process that provides complete information, timely public notice, full public access to key decisions, and early and continuing public involvement in the development of an intermodal transportation system. For more information on TEA-21, see the TxDOT *Project Development Policy and Practice Manual*.

Title VI of the Civil Rights Act of 1964

Title VI of the Civil Rights Act of 1964 assures that individuals are not excluded from participation in, denied the benefit of, or subjected to discrimination on the basis of race, color, national origin, religion, age, sex, or disability. TxDOT certifies all project-related public hearings for compliance with Title VI. For a copy, see http://www.fhwa.dot.gov/environment/title_vi.htm.

Uniform Relocation Assistance and Real Properties Acquisitions Act (URARPAA)

The URARPAA of 1970, amended in 1987, mandates that property owners receive compensation for properties acquired for transportation projects and requires non-discriminatory right-of-way policies with regard to appraisals and acquisitions of homes and businesses and residential relocations.

Executive Order 12898 – Environmental Justice

Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994) requires that federally funded projects identify and address disproportionately high and adverse health and environmental impacts to minority populations and low-income populations. (See http://www.epa.gov/docs/oejpubs/execordr.txt.html.)

Native American Graves Protection and Repatriation Act (NAGPRA)

The NAGPRA requires that agencies and museums receiving federal funds must identify tribal affiliations for Native American remains and return those human remains to the interested groups. (See http://www.cast.uark.edu/products/NAGPRA/nagpra.dat/lgm003.html.)

Executive Order 13007 (EO 13007)

EO 13007 states that agencies shall attempt to avoid damaging "Indian sacred sites" on federal and Indian lands. EO 13007 is concerned with adverse effects to locations of "traditional cultural properties" (TCP) and the need to maintain accessibility by Indian religious practitioners to TCPs.

Air Quality

This Clean Air Act (CAA) (42 USC 7401-7626) established permanent federal support for air pollution research and provided federal assistance to states for development of

pollution control agencies. The act has been amended several times. The 1990 CAAA established specific criteria that must be met for air quality nonattainment areas.

Resource Conservation and Recovery Act

RCRA governs the management of non-hazardous (solid) waste, hazardous waste, and underground storage tanks. Specifically, the RCRA program regulates solid waste recycling and disposal; federal procurement of products containing recycled materials; waste minimization; hazardous waste generators and transporters; and hazardous waste treatment, storage, and disposal facilities (TSDFs). The assessment should seek to avoid liability by identifying known or possible hazardous waste and contamination.

Comprehensive Environmental Response, Compensation Liability Act

CERCLA of 1980, commonly referred to as "Superfund," provides EPA authority to respond to releases or threatened releases of hazardous substances, pollutants, or contaminants that may endanger human health or the environment. CERCLA requires reporting of releases, establishes the liability of persons responsible for releases of hazardous substances, and establishes a trust fund to provide for cleanup when no responsible party can be identified.

Texas Water Code

Under Chapter 26 of the Texas Water Code, Texas Hazardous Substances Spill Prevention and Control Act, a "person responsible" or "responsible person" for discharges or spills of hazardous substances includes owner or operators of either a vessel or of a facility from which a spill emanates, and any other person who causes, suffers, allows, or permits a spill or discharge. The current property owner is ultimately responsible for contamination leaving the property or affecting groundwater.

Community Impacts

Community impacts require analysis of the social and economic resources in a community and how they are affected by the project. See FHWA's "Community Impact Assessment: A Quick Reference for Transportation" (FHWA-PD-96-036).

The community impact assessment may include considering land use changes, economic and business effects, mobility and access issues, public safety, displacements, and other transportation modes. Be sure to include the positive community effects a project may have and encourage public involvement and participation.

APPENDIX C – Environmental Documents

Documentation of the environmental assessment process is required for nearly all actions. The documents provide a description of the social, economic, and environmental impacts of a project. There are four basic categories of documents. Each successive document builds upon the previous one and becomes more detailed. The level of environmental analysis and documentation generally increases for larger and more complex projects. See Figure C-1 for an overview of the environmental documentation process.

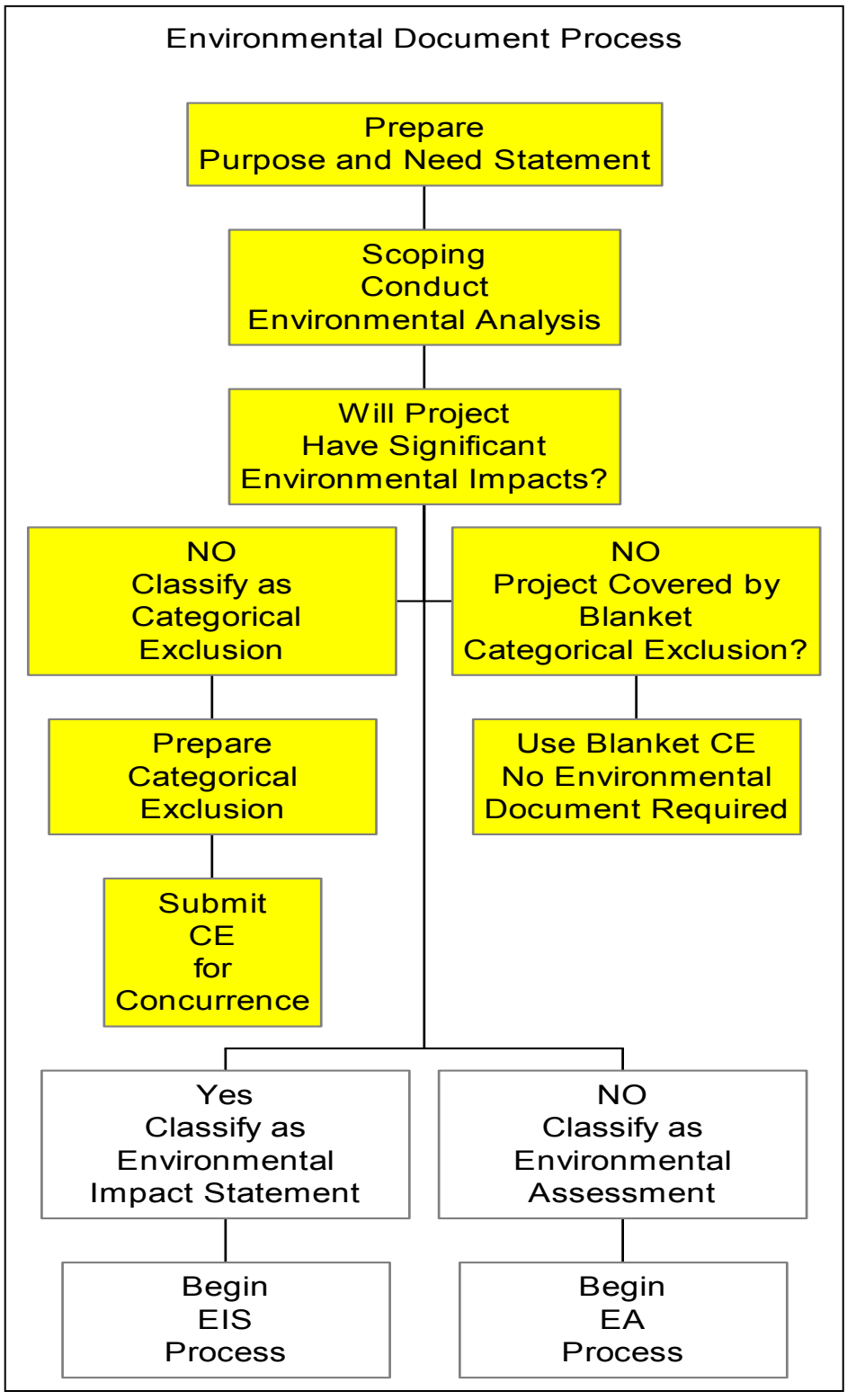

Figure C-1. NEPA Documentation Process

Categorical Exclusions (CE)

A categorical exclusion is a document for projects that have minimal social, economic, or environmental impact. These projects typically involve maintenance, improvement, or routine actions and projects that do not significantly affect the environment. CEs constitute the vast majority of projects or actions that would be encountered for small urban or rural transit providers.

Some types of CEs require little or no documentation. These are known as ***Blanket CEs*** and include projects or activities such as installing small passenger facilities, landscaping, traffic signals, bus rehabilitation, facility and vehicle upgrades, or ridesharing.

Programmatic CEs can be used for projects meeting a specific criteria where TxDOT and USDOT have agreements with the resource agencies. These types of projects must conform to the State Implementation Plan (SIP), be consistent with the Coastal Zone Management Plan, and not impact any federally listed endangered species or habitat.

The CE document should include and describe:

- the proposed action;
- alternatives;
- right-of-way requirements, costs, and funding sources;
- characteristics of the project area with a site map and location;
- potential impacts;
- a description of mitigation, if any; and
- public and/or agency comments including supporting comments from local entities.

A summary of TxDOT's project development process and environmental clearance process is provided in Figure C-2.

Project Development Process

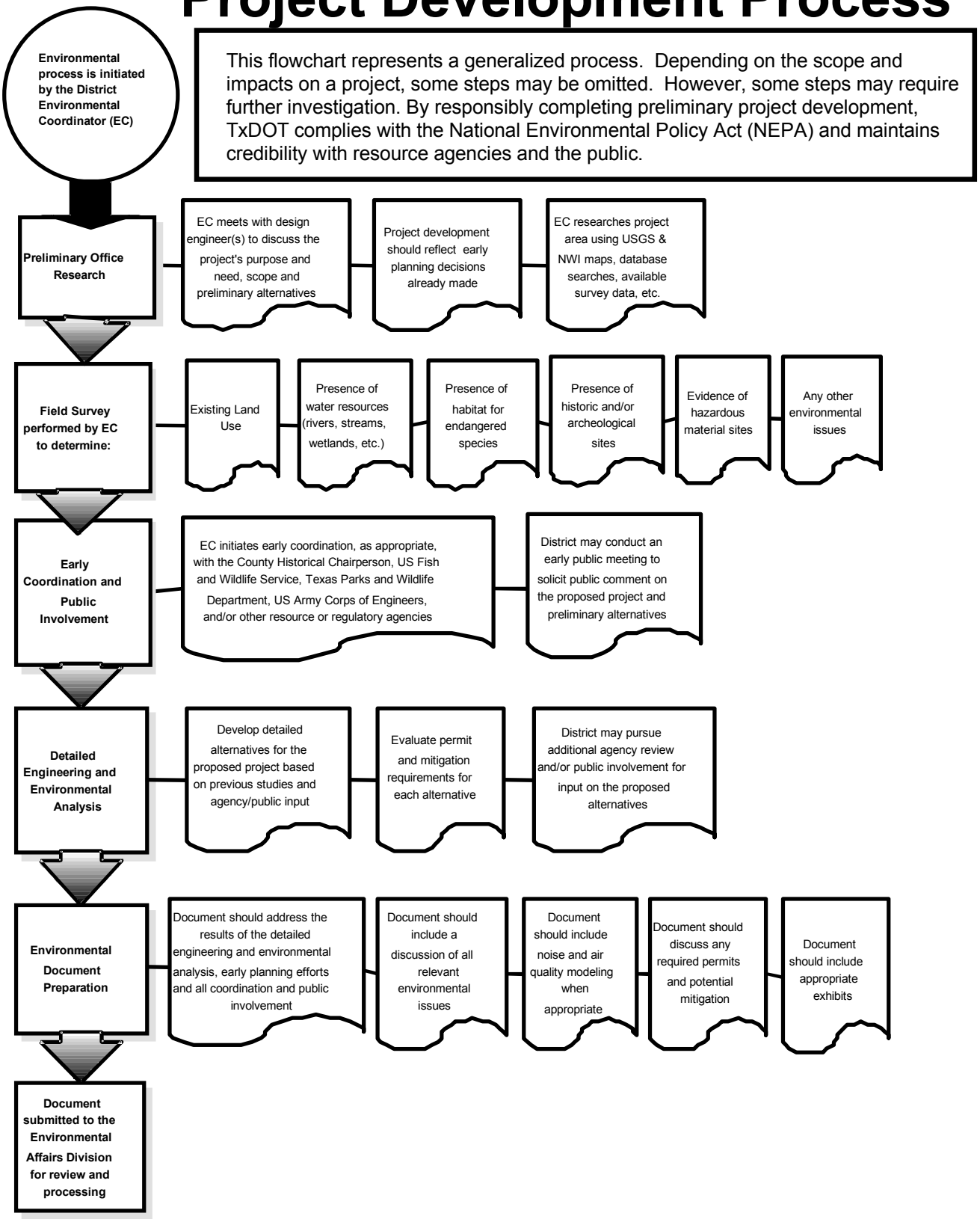

Figure C-2. Project Development Process

NEPA Document Preparation Resources

NEPA NET at http://ceq.eh.doe.gov/nepa/nepanet.htm

FTA Office of Planning at: http://www.fta.dot.gov/

Council on Environmental Quality: http://www.whitehouse.gov/ceq/

FHWA Office of Planning, Environment, and Real Estate:
http://www.fhwa.dot.gov/environment/index.htm

Community Impact Assessment Guide:
http://environment.fhwa.dot.gov/projdev/tdmcia.htm

C-1. Total Process Time for Environmental Clearance, R.O.W. and P.S.&E.*

Based on Documents Received in ENV: Oct 01, 2001

Project Type	ROW	Parcels	Scientific Surveys (a)	Date Document Received in ENV	ENV Review Complete/Possible Revision Request Sent to District	District Revision submitted to ENV (b)	Agency Coordination completed (if required) 45 days allowed per MOU (c)	Public Involvement (d)	FHWA Reviews Environmental Document and Grants Approval for Further Processing	Public Hearing or Public Hearing Opportunity Advertised Held (e)	District Submit Public Hearing Summary and Analysis/Certification Documentation/FHWA Approval 30 days	NEPA Approval (F) and 404 Authorizations	Receipt of P.S.&E. in Austin (g)	Average Time for ROW Acquisition to Meet March 2001 Letting	Environmental Clearance for Construction (Letter of Authority Date)	Letting Date	Total Process Time for ENV, ROW, and P.S.&E.
BCE	N						** 15-Nov-01	(h)				15-Nov-01	28-Dec-01	0	14-Feb-02	3-Apr-02	3-5 months
PCE	N		3-Jul-01	1-Oct-01	15-Oct-01	29-Oct-01	13-Dec-01	(h)				13-Dec-01	26-Jan-02	0	14-Mar-02	1-May-02	6-9 months
PCE	Y		3-Jul-01	1-Oct-01	15-Oct-01	29-Oct-01	13-Dec-01	27-Dec-01				27-Dec-01	12-Sep-02	6-12	28-Dec-02	3-Jan-03	10-18 months
SCE	N		3-Jul-01	1-Oct-01	15-Oct-01	29-Oct-01	13-Dec-01	(h)				13-Dec-01	26-Jan-02	0	14-Mar-02	1-May-02	6-9 months
SCE	Y		3-Jul-01	1-Oct-01	15-Oct-01	29-Oct-01	13-Dec-01	27-Dec-01				27-Dec-01	12-Sep-02	6-12	28-Dec-02	3-Jan-03	10-18 months
CE	N		3-Jul-01	1-Oct-01	15-Oct-01	29-Oct-01	13-Dec-01	(h)	(i) 1-Jan-02			12-Jan-02	26-Feb-02	0	13-Apr-02	5-Jun-02	8-11 months
CE	Y		3-Jul-01	1-Oct-01	15-Oct-01	29-Oct-01	13-Dec-01	27-Dec-01	(i) 1-Jan-02			26-Jan-02	29-Nov-02	6-12	27-Jan-03	6-Mar-03	11-20 months
EA	N		3-Jul-01	1-Oct-01	15-Oct-01	29-Oct-01	13-Dec-01	12-Jan-02	11-Feb-02	28-Mar-02	12-May-02	11-Jun-02	3-Aug-02	0	10-Sep-02	9-Nov-02	12-15 months
EA	Y	1-12	4-May-01	1-Oct-01	15-Oct-01	29-Oct-01	13-Dec-01	12-Jan-02	11-Feb-02	28-Mar-02	12-May-02	11-Jun-02	26-Sep-03	12-18	12-Dec-03	2-Jan-04	20-31 months
EA	Y	25-30	4-May-01	1-Oct-01	15-Oct-01	29-Oct-01	13-Dec-01	12-Jan-02	11-Feb-02	28-Mar-02	12-May-02	11-Jun-02	26-Sep-04	24-30	12-Dec-04	2-Jan-05	32-43 months Continuous Activity memo or Re-evaluation Required
EA	Y	31-60	4-May-01	1-Oct-01	15-Oct-01	29-Oct-01	13-Dec-01	12-Jan-02	11-Feb-02	28-Mar-02	12-May-02	11-Jun-02	2-Apr-05	36	13-Jun-05	10-Jul-05	44-49 months Continuous Activity memo or Re-evaluation Required
EA	Y	61-90	4-May-01	1-Oct-01	15-Oct-01	29-Oct-01	13-Dec-01	12-Jan-02	11-Feb-02	28-Mar-02	12-May-02	11-Jun-02	26-Sep-05	42	13-Dec-05	2-Jan-06	50-55 months Continuous Activity memo or Re-evaluation Required
EA	Y	91-120	4-May-01	1-Oct-01	15-Oct-01	29-Oct-01	13-Dec-01	12-Jan-02	11-Feb-02	28-Mar-02	12-May-02	11-Jun-02	2-Apr-06	48	14-Jun-06	10-Jul-06	56-61 months Continuous Activity memo or Re-evaluation Required

EIS Projects Average 5 years to Complete the Environmental Process, R.O.W. and P.S.&E.

*** Represents Approximately 85% of Projects Received at ENV. Typical Projects are defined as those projects that do not have significant impacts.**

**** Majority of BCEs do not require any coordination with resource agencies. In some instances however, coordination may be appropriate.**

(a) Notify appropriate ENV Branch 3-5 months prior to document submittal (depends on magnitude of surveys). Right-of-Entry is requested prior to survey. Examples: Cultural resource and natural resource

(b) Assumes only 1 revision. (c) Section 106 coordination may take longer or be initiated at different time.

(d) Allow 2 weeks for Meeting with Affected Property Owners and 1 month for Public Meetings - Note: Public Meetings and MAPOS may occur earlier in the process.

(e) District submits advertisement to ENV 2 weeks before 1st publication.

(f) It may be necessary to have a percentage of P.S.&E. complete to grant environmental clearance or secure 404 permits.

(g) P.S.&E. advanced and finalized. (h) It may be appropriate to conduct public involvement. (i) If project does not qualify for a PCE it may require review/approval from FHWA.