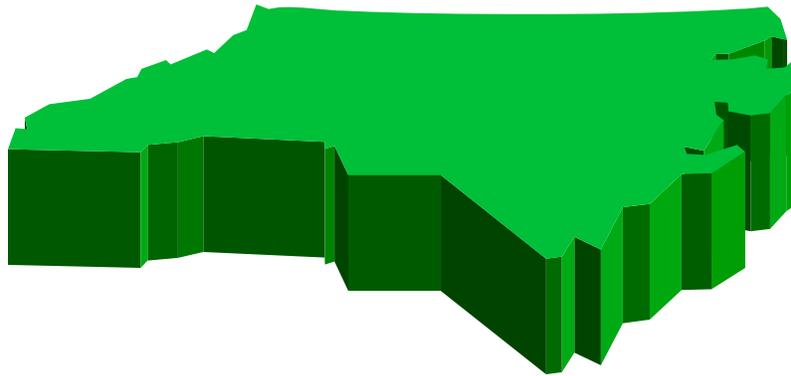


# **A Citizens Guide**

## **to Transportation Planning**

### **in North Carolina**



By  
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May 2006

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# OVERVIEW OF DOCUMENT

## A COMMUNITY GUIDEBOOK TO ROAD BUILDING IN NC

It takes a long time and a significant amount of effort on the part of politicians, planners, engineers, and communities to build or modify a road in North Carolina. There are many regulations, rules, and policies that must be followed and many of these requirements require approval by a wide variety of stakeholders.

The purpose of the guidebook is to describe the major steps involved in building, modifying, or improving a roadway. A short description of each chapter in this guidebook is given below.



**Chapter 1** describes the basic transportation planning requirements within North Carolina. The chapter lists the steps that occur before a project is even considered for funding.



**Chapter 2** provides the legal framework for road building in North Carolina. There are many legal requirements that must be fulfilled before a roadway can be built or modified.



**Chapter 3** describes the National Environmental Policy Act (NEPA) of 1969 and how it affects new transportation projects in the state of North Carolina. NEPA is the main environmental legislation that affects the development of a transportation project.



**Chapter 4** describes the main elements of an Environmental Impact Statement (EIS). An EIS is required when a roadway project will have a significant effect on the environment. Only the most complex projects will write an EIS, but the projects that do complete this step are usually large projects that significantly alter the transportation network.

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# Chapter 1 Transportation Planning Basics

## A COMMUNITY GUIDEBOOK TO ROAD BUILDING IN NC

### INTRODUCTION

Planning for a roadway improvement in North Carolina begins long before the highway or street is built. There are a set of required steps that must take place prior to construction, and this chapter describes the planning process that must be followed prior to building or improving a road.

#### In this Chapter

- 1.1 Introduction
- 1.2 Long Range Planning
- 1.3 Short Range Planning
- 1.4 Project Planning
- 1.4 Project Design
- 1.5 Right of Way
- 1.5 Construction
- 1.6 Public Participation



Figure 1: Transportation Project Life Cycle (Source: NCDOT, 2007a)

Figure 1 (above) illustrates the life cycle of a transportation project. The whole process begins with *Long Range Planning*, where the North Carolina Department of Transportation (NCDOT) and local municipalities define their visions for the transportation system. It is during this process that transportation needs are conceptualized. These visions are formed into actual projects that are forwarded to the NC Board of Transportation during the *Program Development* stage. After a project has been designated for funding by this board, the *Project Planning* begins. During the project planning process, engineers, planners, and scientists try to minimize the impacts of a project. The next stage is the *Project Design*, where the exact location and form of the project is decided upon. After the location for the road has been determined, property is acquired as part of the *Right of Way* stage. Only after all these steps have been completed can roadway *Construction* begin. The remainder of this chapter describes each of these stages in greater detail.

## LONG-RANGE PLANNING

A long range transportation plan provides citizens with a comprehensive picture of a region's current and future transportation needs. This type of plan does not list specific improvement projects. Instead, it outlines the future transportation needs of a region.

Long-range transportation planning in North Carolina begins at the regional level. The state of North Carolina is divided into two types of regional transportation planning organizations. The first type is the Metropolitan Planning Organization, commonly referred to as an MPO, which is a regional transportation planning body for an urban area with a population greater than 50,000. Rural areas within North Carolina have Rural Planning Organizations (RPOs) that plan for the transportation needs of these areas (See Figure 2).

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*Metropolitan Planning Organizations (MPO) identify regional transportation issues and work with communities to find the best solutions.*

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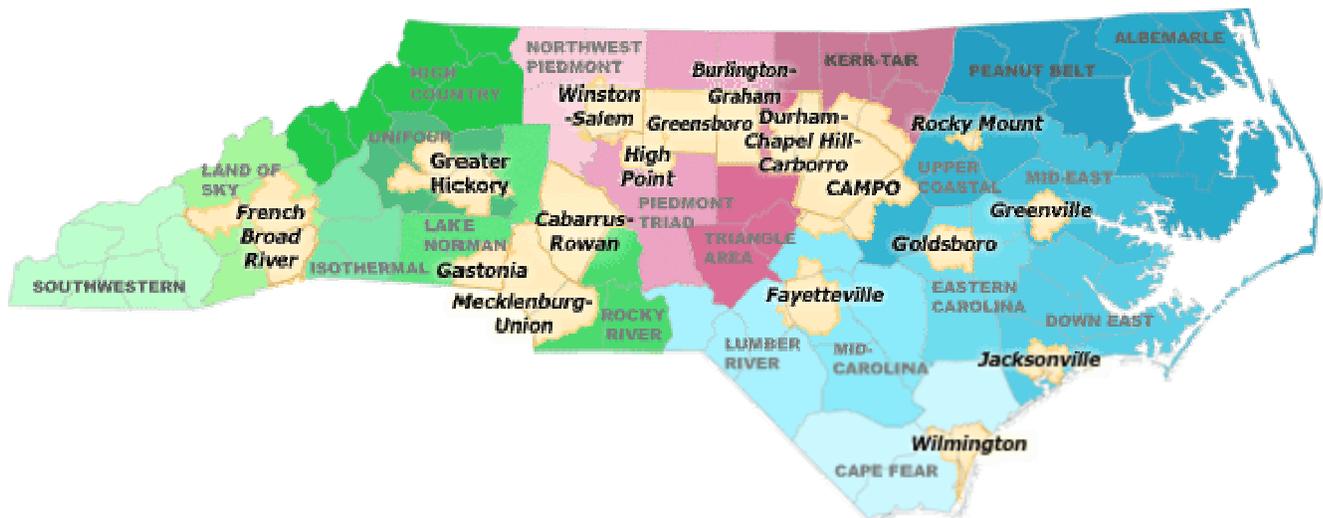


Figure 2: Map of NC showing the planning organizations. The areas in yellow are the Metropolitan Planning Organizations (Source: NCDOT, 2007b)

The state of North Carolina requires that all MPOs develop a Comprehensive Transportation Plan (CTP). The CTP is a 20-25 year plan that gives short term and long term recommendations for transportation improvements. This plan is based on projections of future land use, employment and population changes in an area (Thomas and Williams, 2004). For metropolitan areas, this CTP also includes a Long-Range Transportation Plan (LRTP) that provides a fiscally constrained 20-year plan for future investment. The LRTP is a federally required document that must cover a planning horizon of at least twenty years, and must consider: (1) mobility and access for people and goods, (2) efficient system performance and preservation, and (3) quality of life.

Rural Planning Organizations are a more recent addition to transportation planning in North Carolina; they were legally established in 2000. Their role is not as clearly defined as the MPO, but they are supposed to help counties and municipalities develop Comprehensive Transportation Plans (CTP) and prioritize transportation needs (NCDOT, 2007b).

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*A Long-Range Transportation Plan is a federally required document that describes the future (20+ yrs) transportation needs for a region.*

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## SHORT-RANGE PLANNING

In contrast to long-range transportation planning, which covers 20-25 years, short range planning covers a shorter time frame, usually 3-5 years. A short range transportation plan identifies specific transportation projects and their associated scope and cost. Federal legislation requires that all projects identified in a short range plan specify the estimated cost of the project and the exact sources of funding. This type of plan must also consider the cost of maintaining and operating the existing highways and streets.

The transportation needs identified in the regional and local Comprehensive Transportation Plans (described in previous section) are prioritized by Metropolitan Planning Organizations (MPOs), Rural Planning Organizations (RPOs), municipalities, and citizens and presented to the NCDOT for inclusion in the state’s short-term transportation plan, which is called the State Transportation Improvement Program (or STIP for short). The NC Board of Transportation makes the final decision on the list of projects that will be funded. This State TIP is updated every other year and must be fiscally sound. The last TIP update was published in 2007 and covers the years 2007-2013.

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*The State TIP is a document that lists the priority transportation projects in the state. This document is also referred to as the STIP.*

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### AN EXAMPLE- THE EAST END CONNECTOR PROJECT

Table 1 shows an example of project that is listed in the current 2007-2013 State TIP. The projects listed in the STIP are organized by county, and the county of each project is listed in the upper left corner of each paper. The first column of the table lists the city that the project is going through. In this example, the project is within the city of Durham. Each project is also given a unique identifying number that will stay with the project from start to finish; this ID is listed in the second column of Table 1. (The project shown below has an ID No. of U-0071.) The third column gives a brief description of the project and the number of miles that project covers. The fifth and sixth columns list the estimated cost of the project and funding source. (A funding source of ‘T’ means that the money comes from the North Carolina Highway Trust Fund.)

Table 1: Example of a Transportation Project Listed in the 2007-2013 State TIP (Source: NCDOT, 2007c)

TRANSPORTATION PROGRAM					DURHAM COUNTY		
ROUTE/CITY	ID. NO. / BREAK	LOCATION - DESCRIPTION - MILEAGE - BREAK	WORK TYPE	FUNDING SOURCE	COST ESTIMATES (THOU)	SCHEDULE (FISCAL YEARS)	
<b>URBAN PROJECTS</b>							
DURHAM	U-0071*	EAST END CONNECTOR, NC 147 (BUCK DEAN FREEWAY) TO NORTH OF NC 98. MULTI-LANE DIVIDED, PART ON NEW LOCATION. 2.5 Mile(s)	PLANNING/DESIGN		6,367	PRIOR YEARS IN PROGRESS	
	A	SOUTHERN RAILWAY TO NORTH OF NC 98.	RIGHT-OF-WAY CONSTRUCTION	T	12,500	FY 10	
				T	22,700	FY 12	
	B	US 70 BUSINESS TO SOUTHERN RAILWAY.	RIGHT-OF-WAY CONSTRUCTION	T	3,825	FY 10	
				T	18,400	FY 12	
	C	NC 147 (DURHAM FREEWAY) TO US 70 BUSINESS.	RIGHT-OF-WAY CONSTRUCTION	T	3,000	FY 10	
				T	32,500	FY 12	
STRATEGIC HIGHWAY CORRIDOR			TOTAL PROJECT COST		99,292		

## PROJECT DEVELOPMENT AND ANALYSIS

After transportation planning, the NCDOT begins the project development process, also called project planning. As part of this process, the NCDOT evaluates a proposed roadway project according to established practices and guidelines set forth by federal and state laws and regulations. Transportation planners and decision-makers must develop alternatives for each project that meet the requirements of the National Environmental Policy Act (NEPA) of 1969, Title VI of the Civil Rights Act, and the Clean Air Act. Specialists in a wide range of fields are consulted during this process; these specialists have expertise in noise and air quality, archaeology, architectural history, biology, land-use planning and sociology. This process also involves design and traffic engineering studies, which provide an analysis of highway alternatives to safely, efficiently and economically meet future travel demands.

The NCDOT encourages citizen participation in the planning process; the NCDOT must hold informational workshops and allow for public comment and input on proposed highway projects (NCDOT, 2007d). Comments from citizens are a very important part of the planning process. Citizen input is evaluated and addressed during the development of highway improvements.

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The [NEPA](#) process must be strictly followed when analyzing a new transportation project – *Chapter 4 of this document describes this key process.*

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## DESIGN (DESIGNING THE PROJECT)

The information that is collected during the planning process is used to determine the exact location and type of highway or road to be constructed. Often, the NCDOT will study and begin design of several alternatives to help inform decision-makers about their options. These design options are presented to citizens and environmental agencies for review. After reviewing the existing physical area and the environment, politicians, planners and designers select the exact highway location. Depending on the size and magnitude of the project, the final selection of the “preferred alternative” must be presented to the public for comment (See Chapter 4 for more details.)

After the exact location has been selected, engineers prepare detailed plans for the highway. These plans define the type of highway, the width of the road; the type of intersections and interchanges; bridges; and other features.

These technical engineering plans identify the type of materials to be used during construction and estimate the quantity of each required to construct the highway. These technical plans allow preparation of contract documents and advertisements for contractors wishing to place bids. The successful low-bid is presented to the Board of Transportation for award; the contractor must meet the criteria specified by the Department (NCDOT, 2007a).

## RIGHT OF WAY (ACQUIRING THE PROPERTY)

Right-of-way is the process where the NCDOT obtains land for the construction of highway projects. This is the last major activity to happen between the completion of design for project and the release of the project to bidders for construction.

In many cases, private property must be acquired to construct a highway. The displacement of homes and businesses is minimized to the extent practicable. In the acquisition of right-of-way, the NCDOT is required to treat all property owners with impartiality, fully explain all legal rights, pay just compensation in exchange for property rights, furnish relocation assistance and initiate legal action should a settlement not be reached.

## CONSTRUCTION (BUILDING THE ROAD)

Once the road design is complete, contractors throughout the state bid on the project. Their bids are publicly disclosed and the contract is awarded by the Board of Transportation to the lowest responsible bidder. The bidder (private contractor) is then obligated to construct the project in accordance with plan requirements and specifications upon which the bid was received.

The NCDOT administers the contract and inspects the project throughout construction to assure that the project is properly constructed. A NCDOT engineer and his/her staff will test for quality, check for conformity with contractual requirements and document the amount of work that the contractor does so that they can be paid on a monthly basis. The resident engineer and staff also make certain the environment is protected, manage traffic flow along the project, work with adjacent property owners, and try to ensure safety on the project site (NCDOT, 2007a).

Once the project is complete, an engineer makes a final inspection to verify its proper construction. After all of these steps have been completed, the highway is then opened to public traffic.



NCDOT highway construction on US 70 near Clayton (Source: NCDOT)



NCDOT highway construction on US 70 near Clayton (Source: NCDOT)

## Public Participation

The transportation planning process is ongoing, and there are several ways to make transportation planners aware of your needs and concerns, and also help develop transportation solutions. To make sure that you are following the latest developments, you can:

- Put your name on a mailing list to receive newsletters, updates and other information from the MPO/RPO and the NCDOT.
- Attend meetings of local transportation boards.
- Provide your input on transportation plans.
- Volunteer to serve on a citizen focus group or citizens' advisory committee.
- Ask a transportation official (either from the NCDOT or the MPO) to attend your service club, NAACP, community organizations, schools, and other civic organizations and explain the process.
- Find out what specific public involvement opportunities are available in your area by contacting your MPO, the NCDOT, transit agency, local government, and Federal government.

Remember that vision plans, long-range transportation plans, and transportation improvement programs are the key documents that come from transportation planning. These documents are used to decide on the final selection of individual transportation projects. They are all part of the big transportation picture and are important to the ultimate transportation network and your transportation options in the future. Get involved!

# Chapter 2 Legal Framework

## A COMMUNITY GUIDEBOOK TO ROAD BUILDING IN NC

### INTRODUCTION



Transportation planning in North Carolina has been shaped by a variety of federal and state laws and regulations. This section describes: (1) the key players in transportation planning and (2) the legislation that shaped transportation planning in North Carolina.

#### In this Chapter

- 2.1 Introduction
- 2.2 Key Players
- 2.2 Legislation

### KEY PLAYERS

#### Federal Role

The Federal Government (U.S. DOT) oversees transportation planning and project activities within the state. The Federal Government also supplies funding needed for transportation planning and projects. At least every two years, the Federal Government approves a program of projects submitted by the state that includes projects proposed for Federal Funds.

#### State Role

The North Carolina Department of Transportation is the largest unit of government that develops transportation plans and projects in NC. They are responsible for setting the transportation goals for the state, and they must work with all of the state's transportation organizations and local governments to do this. They are also responsible for planning safe and efficient transportation between cities and towns in the state (NCDOT, 2005).

The North Carolina Board of Transportation is the governing body of the Department of Transportation (NCDOT). It is responsible for formulating policies and priorities for transportation under the NCDOT, including allocating transportation funding, prioritizing and approving Transportation Improvement Program projects, and awarding construction contracts. The Board has some members from the NCDOT and other members are appointed by the Governor.

## KEY PLAYERS CONT...

### Regional Role

Federal law requires the establishment of Metropolitan Planning Organizations (MPOs), which are regional planning bodies that represent areas with a population of 50,000 people or more. A policy board, which is comprised of local elected officials, sets an MPO's transportation policy; but other groups, such as non-profit organizations, community organizations, or environmental organizations, can influence the direction an MPO follows. The MPO mission is to provide short- and long-term solutions to transportation and transportation-related concerns. Section 134(a) of Title 23 United States Code requires the establishment of Metropolitan Planning Organizations. It has since been updated in the federal highway bill of 1991 known as ISTEA, establishing federal law requiring MPOs to have a transportation plan (NCDOT, 2005).

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*Metropolitan Planning Organizations (MPO) identify regional transportation issues and work with communities to find the best solutions.*

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### Local Role

Local municipalities within North Carolina are required to work with their regional planning organization to ensure that their needs are being considered during the transportation planning process.

## TRANSPORTATION LEGISLATION

Highway planning has been a North Carolina requirement since 1959, when NC General Statute 135-66.2 passed requiring the development of a "street system that will serve present and anticipated volumes of vehicular traffic" (Thomas and Williams, 2004).

Although not specifically designed for transportation projects, the National Environmental Policy Act has had a profound effect on how transportation projects are planned and built in North Carolina. This process can be highly complex and plays a crucial role in the development of a project. As such, an entire chapter has been devoted to this legislation. See Chapter 3 for detailed info on this legislation and its associated requirements.

Federal legislation (the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA)) established a detailed transportation planning process that every state and urban area must follow to receive federal funds. This legislation tied transportation planning and funding to air quality standards, and regions with poor air quality had to go through more steps and had less flexibility in how they spent federal dollars. A number of modifications to ISTEA's planning were made by the 1998 Transportation Efficiency Act for the Twenty-First Century (TEA-21). ISTEA and TEA-21 require North Carolina and its metropolitan areas

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*Regional Transportation Planning has been required since the Intermodal Surface Transportation Efficiency Act of 1991.*

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## TRANSPORTATION LEGISLATION CONT...

to prepare two types of transportation plans, long-range plans and short-term plans. The long-range transportation plans have a twenty-year planning horizon and identify major road, transit, and other transportation improvements needed during that time. The plan must be constrained by available funding, though it may be accompanied by an alternative, unconstrained or "visionary" plan that shows any additional facilities and services that could benefit the region. The second plan is the transportation improvement program (TIP) and must be revised at least every two years. The TIP contains individual transportation improvements and projects that have been identified as priorities. All federally funded projects must be part of an improvement program to be implemented.

North Carolina law requires the establishment of Rural Planning Organizations, which are a counterpart to the MPOs (Metropolitan Planning Organizations). In July 2000, North Carolina Senate Bill 1195 became part of Article 17 General Statute 136-210 through 213, which stated that the NCDOT will develop a plan to establish RPOs. The purpose of these organizations is to work cooperatively with NCDOT to plan rural transportation systems and to advise the department on rural transportation policy. RPOs were established for contiguous areas of 3-15 counties and must have a population of at least 50,000 persons.

In 2001, North Carolina law (North Carolina General Statute 136-66.2) was revised to require the development of a transportation plan that considers options other than roadway improvements. Under this law, each municipality or MPO, with the cooperation of the NCDOT, must develop a Comprehensive Transportation Plan (CTP) serving present and anticipated travel demand in and around the municipality or MPO. The plan must be based on the best information available on population growth, economic conditions and prospects, and patterns of land development in and around the municipality. This requirement is relatively new, established in 2004, and in addition to the Long-Range Transportation Plan (NCDOT, 2007e).

The Comprehensive Transportation Plan must be made up of 5 sheets. Each sheet has the same base map with the same scale; the base map contains the existing roadway system, rail lines, water features, and features significant to the area including but not limited to: county boundary, schools, parks, planning boundary, surrounding city/town locations (possibly in the future churches and cemeteries). The five CTP sheets include: Adoption Sheet, Highway Map, Public Transportation and Rail Map, Bicycle Map, and Pedestrian Map. Together, the maps are supposed to give an all-inclusive look

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*The State TIP is a document that lists the priority transportation projects in the state. This document is also referred to as the STIP.*

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## TRANSPORTATION LEGISLATION CONT...

at the transportation system (NCDOT, 2007e).

In 2005, new federal legislation was adopted (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)). This legislation maintains the planning functions established in prior legislation and adds several new requirements; one new requirement states that MPOs must solicit public feedback on Long Range Transportation Plans and “employ visualization techniques to describe plans”.

# Chapter 2 The NEPA Process

## A COMMUNITY GUIDEBOOK TO ROAD BUILDING IN NC

### In this Chapter

- 3.1 What is NEPA?
- 3.2 Overview of NEPA
- 3.2 How does NEPA apply to roads?
- 3.3 NEPA documentation

### Introduction

NEPA is the acronym that is commonly used to describe the National Environmental Policy Act of 1969. Considerable time and effort is required to comply with this federal legislation, as it can take years to complete the required NEPA documentation. This chapter describes the basic requirements of NEPA as it applies to roadway projects in North Carolina.

### Overview of NEPA

In 1970, then-President Nixon signed into law the National Environmental Policy Act (NEPA), forever changing the landscape of transportation planning. Although this legislation was not specifically designed as a transportation planning policy, NEPA has had profound impacts on the way transportation projects are conceived and built. NEPA, which only applies to federally funded projects, was designed to be “a government-wide policy framework – a super mandate - to ensure that all federal agencies would incorporate environmental concerns into their actions” (Andrews, 2006). NEPA requires consideration of more than just the natural environment; it must also consider the human environment and the economic and social impacts that a project can have on the human environment (see adjacent figure). NC has also adopted similar legislation at the state level that applies to projects that receive state funding.



NEPA is frequently misunderstood: it is not an environmental permitting process that must be satisfied to proceed on a project. Most environmental statutes and regulations control or limit certain types of activities, but NEPA was not designed for this purpose. NEPA is a tool, or an architectural framework for planning future actions. It is designed to inform decision makers about the consequences of their decisions before beginning an activity.

NEPA does NOT require decision makers to select a project that has least harm or impacts on the environment. It simply requires that government agencies become informed about the impacts that they are causing. The theory behind NEPA is that people will make better decisions when they have all of the pertinent information. The NEPA regulation specially requires that all information gathered about a project be given “due weight” in decision-making.

## How does NEPA apply to roads?

As mentioned previously, NEPA only applies to a project when federal funding is used or a federal permit is required. Within North Carolina, major roadways usually receive some federal funding. This funding is given to the NCDOT and then used by NCDOT to build new transportation projects. By accepting federal funds, NCDOT is required to follow the requirements of NEPA process.

The environmental review or NEPA process is usually initiated within NC by the NCDOT. They inform the U.S. DOT about the type of work and general location for the project. The notification can be in the form of a letter or through a programmatic document like the State Transportation Improvement Project.

### Lead Agency

To improve the coordination of the NEPA process, one (or more) agency is designated as a “lead agency” on the project. The Federal Highway Administration (FHWA) is always a lead agency on federally funded road projects in NC. The NCDOT acts a co-lead agency since they are responsible for planning, designing and building the project; together these two agencies must agree on a wide range of decisions on a proposed project. The lead agencies have diverse responsibilities that range from involving stakeholders to guiding the development of all supporting documentation (FHWA, n.d.).

### Cooperating Agency

Under NEPA, a cooperating agency has a vested interest in a proposed project. The agency might own needed property, issues a required permit or have special expertise on the environment. Cooperating agencies participate in the early stages of a project to help identify potential issues related to the project. Cooperating agencies may include federal and state resource agencies, local governments, and tribal governments. Cooperating agencies usually review the EIS documents before the public and provide comments to the lead agency. In special cases, they help prepare documents for the EIS (although this is rare) (FHWA, 2006).

### Participating Agency

Federal, State, tribal, regional, and local government agencies can also be invited by the lead agency to serve as participating agencies. Participating agencies are involved in the scoping process and must identify any issues of concern in a timely manner. Nongovernmental organizations and private entities cannot serve as participating agencies (FHWA, n.d.).

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*Lead Agency – The lead agency provides coordination and oversight on the project. They are also responsible for communicating with the public.*

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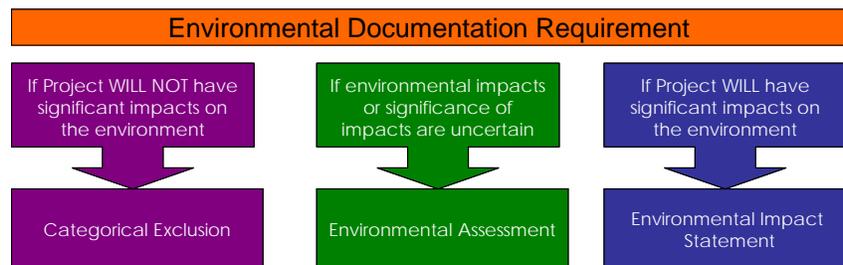
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*The FHWA is responsible for allocating federal transportation funds to the states. North Carolina must follow the NEPA process if it accepts federal money on a project.*

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## Level of NEPA Documentation

The type of document that the NCDOT and the FHWA must prepare for a project depends on the anticipated effects or impacts from the project. The NEPA regulation and implementing regulations require the preparation of different documents for three classes of projects: those Categorically Exempt or Excluded from environmental requirements (CE), those requiring an Environmental Assessment (EA) or Checklist, and those requiring an Environmental Impact Statement (EIS) (see Figure below). A brief description of each type of document is also given below.




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*The Environmental Impact Statement (EIS) is the most involved documentation under NEPA.*

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- **CE.** At the first level, a road project may be categorically excluded from a detailed environmental analysis if it meets certain criteria, which the FHWA has previously determined as having no significant environmental impact. The FHWA has developed lists of actions that are normally categorically excluded from environmental evaluation under their NEPA regulations.
- **EA.** At the second level of analysis, a federal agency prepares a written environmental assessment (EA) to determine whether or not a federal undertaking would significantly affect the environment. If the project does not significantly impact the environment, the FHWA issues a finding of no significant impact (FONSI). The FONSI may address measures that an agency will take to reduce (mitigate) potentially significant impacts. If the EA determines that the environmental consequences of a proposed project may be significant, an EIS is prepared.
- **EIS.** An EIS is a more detailed evaluation of the proposed action and alternatives. The public, other federal agencies and outside parties may provide input into the preparation of an EIS and then comment on the draft EIS when it is completed. If the FHWA anticipates that an undertaking may significantly impact the environment, or if a project is environmentally controversial, the FHWA may choose to prepare an EIS without having to first prepare an EA. After a final EIS is prepared and at the time of its decision, the FHWA will prepare a public record of its decision addressing how the findings of the EIS,

## Level of NEPA Documentation Cont...

including consideration of alternatives, were incorporated into the agency's decision-making process (AASHTO, 2007a).

Given the complexity of the environmental impact statement (EIS) requirement, the next chapter of this guidebook, or chapter 4, describes the requirements of the EIS in greater detail.

# Chapter 4 The Environmental Impact Statement

## A COMMUNITY GUIDEBOOK TO ROAD BUILDING IN NC

### In this Chapter

- 4.1 Introduction
- 4.1 The EIS
- 4.2 Purpose and Need
- 4.3 Range of Alternatives
- 4.4 Impacts
- 4.20 Mitigation

### Introduction

As mentioned in the previous chapter, an Environmental Impact Statement, or EIS, is required if a transportation project will have a “significant effect on the environment”. The EIS must include a lot of information on the types of impacts that the project will have on the natural, physical and human environments. This chapter describes the main elements of an EIS, including each of the different types of impacts that must be examined.

### The Environmental Impact Statement

An environmental impact statement is a full disclosure document that describes how a transportation project was developed. The EIS should include the following: (1) a consideration of a range of reasonable alternatives, (2) an analysis of the potential impacts resulting from the alternatives, and (3) a demonstration that the project complies with other applicable environmental laws and executive orders. The EIS process is completed by finishing each of the following steps in order: Notice of Intent (NOI), draft EIS, final EIS, and record of decision (ROD) (FHWA, n.d.).

The notice of intent (NOI) is published in the Federal Register by the FHWA and signals the beginning of the process. Scoping, an open process involving the public and other Federal, state and local, agencies, then begins immediately to identify the major and important issues that should be considered during the study. Public involvement and agency coordination should continue throughout the entire process. The draft EIS provides a detailed description of the proposal, the purpose and need, reasonable alternatives, the affected environment, and presents analysis of the anticipated positive and negative environmental effects from each of the alternatives. Following a formal comment period and receipt of comments from the public and other agencies, the fEIS is written and then released to the public. The fEIS must address the comments that were submitted from the draft and identify, based on analysis and comments, the "preferred alternative" (FHWA, n.d.).

Federal Highway Administration's policy (Technical Advisory (T6640.8A)) provides more detailed guidance on the preparation of the NOI, the scoping process, and the information that should be included in the EIS (FHWA, n.d.).

## The Purpose and Need

### What is the purpose and need?

The purpose and need states the reasons that the project is being built and is a required element of an Environmental Impact Statement. In many ways, this statement is the most important element of the EIS because it sets the stage for the range of alternatives (see next section) that will be evaluated in the EIS. The following items can be used to describe a purpose and need:

- **Project Status** - Briefly describe the action's history, including measures taken to date, other agencies and governmental units involved, action spending, schedules, etc.
- **Capacity** - Discuss the capacity of the present facility and its ability to meet present and projected traffic demands. Discuss what capacity and levels of service for existing and proposed facilities are needed.
- **System Linkage** - Discuss if the proposed action is a "connecting link" and how it fits into the transportation system.
- **Transportation Demand** - Discuss the action's relationship to any statewide plan or adopted urban transportation plan. In addition, explain any related traffic forecasts that are substantially different from those estimates of the 23 U.S.C. 134 (Section 134) planning process.
- **Legislation** - Explain if there is a Federal, state, or local governmental mandate for the action.
- **Social Demands or Economic Development** - Describe how the action will foster new employment and benefit schools, land use plans, recreation facilities, etc. In addition, describe projected economic development/land use changes that show the need to improve or add to the highway capacity.
- **Modal Interrelationships** - Explain how the proposed action will work with and serve to complement airports, rail and port facilities, mass transit services, etc.
- **Safety** - Explain if the proposed action is necessary to correct an existing or potential safety hazard. In addition, explain if the existing accident rate is excessively high and why, and how the proposed action will improve safety.
- **Roadway Deficiencies** - Explain if and how the proposed action is necessary to correct existing roadway deficiencies (e.g., substandard roadway design, weight limits on structures, high maintenance costs, etc.) In addition, explain how the proposed action will correct these deficiencies (FHWA, 1989).

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*The 'Purpose and Need' provides the scope of the proposed project for the Environmental Impact Statement.*

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*Capacity refers to the amount of cars that a roadway can comfortably carry without delay.*

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## The Range of Alternatives

### What is the range of alternatives?

The phrase range of alternatives or “reasonable alternatives” describes the design alternatives that will be evaluated in the EIS. Prior to selecting the range of alternatives, the lead agency must conduct an alternatives analysis. This analysis should clearly describe why and how the project alternatives were developed. In many ways the alternatives analysis is the heart of the EIS because it requires the NCDOT to:

- (a) Rigorously explore and objectively evaluate all reasonable alternatives; for alternatives that were eliminated from detailed study, briefly discuss the reasons- for their having been eliminated.
- (b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.
- (c) Include reasonable alternatives not within the jurisdiction of the lead agency.
- (d) Include the alternative of no action.
- (e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.
- (f) Include appropriate mitigation measures not already included in the proposed action or alternatives.

-- 40 CFR 1502.14

The Environmental Impact Statement (EIS) needs to discuss why certain alternatives were selected and others rejected. The range of alternatives must always include a “do nothing” or “no build” alternative. Law requires analysis of the no build alternative and the EIS must describe why this alternative will not meet the purpose and need of the project.

In addition to the ‘do nothing’ alternative and the build alternatives, the FHWA also requires the consideration of the following two types of alternatives:

- Transportation System Management alternative: This alternative includes activities that maximize the efficiency of the existing transportation network. Examples include ridesharing, high-occupancy vehicle lanes and traffic signal timing optimization.
- Mass Transit alternatives: This alternative includes reasonable and feasible transit options like bus and rail. These need to be considered on all major highway projects in urbanized areas with more than 200,000 people (FHWA, n.d.).

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*After the project's purpose and need are established, NCDOT develops a range of alternatives to evaluate in the EIS.*

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## What types of impacts are evaluated?

### What is an impact?

NEPA requires that NCDOT evaluate three types of impacts for a project: direct impacts, indirect impacts, and cumulative impacts. The terms 'effects' and 'impacts' are interchangeably used in these regulations.

- *Direct Impact or Effect:* Direct impacts are caused by the project and occur at the same time and place.
- *Indirect Impacts or Effects (also Secondary Impacts):* Indirect impacts caused by and resulting from a specific activity that occur later in time or further removed in distance than direct impacts, but are reasonably foreseeable. Indirect impacts may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.
- *Cumulative Impacts:* Environmental impacts resulting from incremental effects of an activity when added to other past, present, and reasonably foreseeable future activities (regardless of what entities undertake such other actions). Cumulative impacts are the reasonably foreseeable impacts from individually minor but collectively significant activities (FHWA, 2006).

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*Direct Impacts -  
Environmental impacts  
that are caused by an  
activity and occurring at  
the same time and place.*

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An impact can be ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health. Effects may also include those resulting from actions that may have both beneficial and detrimental effects.

### What types of impacts are evaluated in an EIS?

The environmental impact statement must evaluate a wide range of impacts, not just impacts related to the natural or physical environment. The EIS must also consider impacts to the human environment, and their communities. The remainder of this section describes in greater detail the different types of impacts that may be evaluated as part of an EIS. Each impact sheet that follows first describes why that impact is considered in the EIS and then gives the associated rules and regulations that apply to the impact area. Finally, the analysis methods are described for readers.

## Noise

### Why is noise considered in an EIS?

Noise is a sound that is perceived as unpleasant or unwanted, and traffic from roadways has been shown in research to be one of the most pervasive types of noise in the human environment. Under NEPA, the NCDOT is required to evaluate the traffic noise generated by a project. They are also required to mitigate for adverse effects from this noise.

### Noise Fundamentals

The movement of cars and trucks on pavement creates traffic noise. The level of traffic noise depends on three separate things:

1. the volume of traffic, or the number of cars on the road,
2. the speed of the traffic, and
3. the number of trucks on the road.

As expected, noise increases with increasing traffic volume, higher speeds and more trucks.

To help transportation agencies evaluate noise impacts, the Federal Highway Administration has adopted noise standards. This noise standard is called a noise abatement criteria, or NAC. The NAC is measured in decibels, which is commonly abbreviated to dBA. Decibels are measured on a logarithmic scale, which means that a noise that is 70 dBA will sound twice as loud as a noise measured at 60 dBA. For reference, a 3 dBA change in sound is barely perceptible to the human ear.

The FHWA recognizes that different levels of noise are acceptable in different settings. For example, people expect less noise in a park than they do in an urbanized setting. So, they have developed a table or matrix that gives the Noise Abatement Criteria (NAC) for different types of land.

### How are noise impacts analyzed in an EIS?

The NCDOT predicts changes in noise by first establishing the expected traffic levels on the roadway for the design year of the project. Then, noise prediction models are used to translate these traffic volumes into noise levels.

A traffic noise impact occurs when the predicted level of noise approaches or exceeds the noise abatement criteria OR when the predicted traffic noise substantially exceeds the existing noise level. If a project is found to have a noise impact, the NCDOT must develop mitigation strategies to try and address those impacts.



## Air Quality

### Why is air quality considered in an EIS?

The quality of the air that we breathe has been shown to affect our health. In many U.S. cities, the automobile is the biggest contributor of pollution into the air. Nationwide, vehicles account for more than 25 percent of all air pollution.

Almost all transportation projects will have some effect or impact on air quality. A project that improves the flow of traffic can actually improve air quality because cars that idle or sit in traffic give off more air emissions than cars that flow freely on the roadway. Alternatively, a project that encourages more cars to travel on a roadway will decrease overall air quality.

### What rules and regulations protect air quality?

The federal Clean Air Act sets nationwide standards that are called National Ambient Air Quality Standards, or NAAQS. The Environmental Protection Agency is responsible for setting the exact NAAQS and has set standards for six "criteria pollutants": carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulates.

### How is an air quality analysis performed?

The air quality analysis in the draft EIS will depend on the size and magnitude of the project. The analysis can be fairly short for projects where air quality issues are minimal and can be avoided or minimized with standard measures. For larger projects, an air quality study report is required. It should include the following components:

- Review and Research – Collect background information on the project area.
- MOBILE5A - Determine vehicle emissions using an air quality modeling program (EPA, 1992a).
- CAL3QHC - Determine CO concentration for the project using a different model (EPA, 1992b).
- Results/Conclusions – Compare results to National Ambient Air Quality Standards. Findings are reviewed and documented in report format with appropriate supporting data.

The methods for analyzing air quality impacts can be quite complex, so an air quality analyst who is an environmental engineer typically does the analyses. Detailed analyses for all viable alternatives, and the no build alternative, are completed using the above mentioned air quality models. For complex projects, air quality monitoring is also done for the draft EIS (WSDOT, 2006).



## Geology and Soils

### Why are Geology and Soils considered in an EIS?

The geology and soils of a project area include the topography, significant features and landforms, geologic hazards, soil types and relevant properties, erosion potential and geology and soils economic resources. Projects can affect these resources during both construction and operation of the project.

Geology and soils, or earth resources, are considered in an EIS since the National Environmental Policy Act (NEPA) requires that impacts to the earth are given due weight in project decision-making.

### What rules and regulations protect geology and soils?

There are no permits required with respect to potential geology and soils impacts.

### How are geology and soils analyzed in an EIS?

Information about the geology and soils within the project area is found by referencing U.S. Geological Survey topographic and geologic maps, the Department of Natural Resources Geology and Natural Resource Division Geologic Maps and the National Resource Conservation Service County Soil Survey(s).

The draft EIS includes a description of the geologic features, soil types, and relevant geologic and soils-related hazards and economic resources in the vicinity of the project area, and probable environmental impacts and mitigation options for each project alternative. A full analysis of the geology and soils is generally needed when:

- Geologic and soils-related hazards (e.g. critical/sensitive areas, highly erosive soils) are likely to be identified within or near the project area, and the project is likely to impact or be impacted by these hazards;

If a project has only minor impacts on the geology and soils, a concise description of the geologic setting and soils in the vicinity of the project area may be included as part of the overall description of the affected environment if appropriate.



## Energy

### Why is energy considered in an EIS?

Transportation projects can have significant impacts on a region's energy resources. Energy is consumed in the operation of cars and trucks and in the maintenance of facilities. Energy is also used in construction activities. The National Environmental Policy Act, NEPA, requires that impacts to energy resources be given due weight in project decision-making.

### What rules and regulations apply to energy resources?

There are no additional rules and regulations that apply to potential energy impacts.

### How is energy analyzed in an EIS?

For most projects, a separate detailed energy study will not be required. Per the FHWA Technical Advisory 6640.8A, a detailed energy study, including computations, is only required for large-scale EIS projects with potentially substantial energy impacts. Note: These types of projects are relatively rare. When you balance energy used during construction and operation against energy saved by relieving congestion and reducing travel, most projects do not end up having substantial energy impacts. The level of effort for the energy analysis should be based on the anticipated impact the project will have on energy use. If the project is not likely to have substantial impacts on energy consumption, then more generalized procedures can be used to conduct the analysis. For most projects, this means that only general construction and operational energy requirements and conservation potential of the various alternatives needs to be discussed.



## Hazardous Waste

### Why is Hazardous Waste considered in an EIS?

Hazardous materials; hazardous substances; solid, hazardous, or dangerous waste; and contaminated environmental media are considered in an EIS to assess how they may be affected by the proposed project. The concern is that a release or threat of release of contaminants during or after construction of the project could harm human health or the environment. Identification and evaluation of possible effects during the EIS process allows mitigation measures to be identified early on in the process (WSDOT, 2005c).

### What rules and regulations apply to hazardous wastes?

Hazardous waste sites are regulated by the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

### How is a hazardous waste analysis done in an EIS?

During planning, the location of permitted and nonregulated hazardous waste sites should be identified. Early coordination with the appropriate Regional Office of the EPA and the appropriate state agency will help in identifying known or potential hazardous waste sites. If known or potential waste sites are identified, the locations should be clearly marked on a map showing their relationship to the alternatives under consideration. If a known or potential hazardous waste site is affected by an alternative, information about the site, the potential involvement, impacts and public health concerns of the affected alternative(s), and the proposed mitigation measures to eliminate or minimize impacts or public health concerns should be discussed in the draft EIS.

When performing a site characterization, the planners will evaluate the historic land uses, soil and ground water studies, and determine if the site had effective cleanup methods. Sites with contaminated soil or ground water that might be encountered during construction have cost and schedule impacts on projects so it is important that they be identified in the draft EIS. Soil and/or ground water must be either cleaned up prior to construction activities or handled differently than clean material. Materials that are not cleaned up prior to construction are typically excavated and transported to a landfill or treatment center. Disposal of contaminated material increases the cost for construction and special handling can increase construction time. Hazardous materials discovered during construction can dramatically increase construction costs by temporarily stopping construction during excavation and disposal activities.

***Hazardous Materials**—Materials that are toxic or harmful to human health or the environment. Examples include asbestos, leadbased paint, and toxic chemicals such as polychlorinated biphenyls (PCBs)*

***Hazardous Substances**—Materials that are in use that may be toxic or harmful to the environment, but are not regulated by the rules cited above. Examples include petroleum products such as gasoline, diesel, and oils.*

***Solid Waste**—Discarded materials including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, and household activities. Excluded are domestic sewage, industrial discharges, and nuclear materials.*

***Hazardous or Dangerous Waste**—Solid wastes that are toxic or harmful. These wastes include those that are characteristically reactive, corrosive, toxic, or ignitable as well as specified "listed" wastes.*

***Contaminated Media**—Soil, sediment, groundwater surface water, or air that has been contaminated by a release of a hazardous material, hazardous or dangerous waste, or hazardous substance.*

*(source: WSDOT, 2005c)*

## Ecosystems

### Why are ecosystems considered in an EIS?

An ecosystem is defined as a place having unique physical features, encompassing air, water, and land, and habitats that support both plant and animal life (FHWA, 2006). The National Environmental Policy Act (NEPA) requires that the effects of a proposed project on ecosystems be evaluated in an EIS. Specifically, the EIS must look at how the proposed project affects the ecosystem structure, function, and process.

Typically, an ecosystem evaluation would look at three important resources within an ecosystem – wetlands, fish, and wildlife. Water resources are also a vital component of ecosystems, but since discussions of water resources are involved and complex, they are usually given a separate section within the EIS (see next page for a discussion on Water Resources).

### What rules and regulations protect ecosystems?

The primary federal regulations or statutes that apply to wetlands, fish, streams, and wildlife in the project area are the Clean Water Act (CWA) Section 401 and 404, the Endangered Species Act (ESA), the Migratory Bird Treaty Act, the Rivers and Harbors Act, and the Coastal Zone Management Act. Each of these regulations attempts to protect ecosystems. They add protective layers above the National Environmental Policy Act.

### How are ecosystems evaluated in an EIS?

**Wetlands** – Information on wetlands is collected from a variety of sources. The project team identifies the exact location of the wetlands by consulting existing maps from local governments, the National Wetland Inventory data, or aerial photographs. Scientists will also go into the field and verify the location of previously mapped wetlands and look for other wetlands that have not been previously identified.

**Fish** – Biologists collect information on fish species and fish habitat within the project area by examining past reports and studies. If there are sensitive areas within the project area, then biologists may survey the individual streams that might be affected by the project.

**Wildlife** – The project team must look for any wildlife habitat that may be affected by the project. It is particularly important to identify the wildlife habitat of animals that are classified as endangered by the federal government.

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#### *Ecosystem:*

*An interconnected community of living things and the physical environment in which they interact.*

#### *Habitat:*

*The ecosystems, plants, and interactions that support wildlife.*

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## Water Resources

### **Why are water resources considered in an EIS?**

Water resources are vital to our economy and therefore need to be protected from harm. The term 'water resources' encompasses many types of water; It includes surface water, groundwater, and stormwater. Surface water describes the water that flows in rivers and streams and water that is in lakes, ponds, or wetlands. Alternatively, groundwater is found underground, beneath the land surface. Stormwater includes water that runs off of roadways, parking lots, and roofs. Stormwater is usually sent into pipes or ditches where it eventually gets released into a river or stream.



### **What rules and regulations protect water resources?**

The primary federal regulations and statutes that apply to water resources are the Clean Water Act and the Safe Drinking Water Act. Project managers should consult with the NC Division of Water Quality to ensure that the project also considers all applicable state rules and regulations.

### **How are water resources evaluated in an EIS?**

The draft EIS should summarize the existing water resources within the project area. Specifically, the draft EIS should describe the conditions of streams and water bodies that are likely to be impacted and identify the potential impacts of each alternative. The draft EIS should also identify any locations where roadway runoff may have an adverse impact on sensitive water resources such as water supply reservoirs, ground water recharge areas, and high quality streams.

When a principal or sole-source aquifer (under Section 1424(e) of the Safe Drinking Water Act) may be impacted by a proposed project, the project should coordinate with the EPA to assist in identifying potential impacts. If an alternative is selected that affects the aquifer, a design must be developed to assure, to the satisfaction of EPA, that it will not contaminate the aquifer (40 CFR 149). The draft EIS should document coordination with EPA and identify its position on the impacts of the various alternatives. The final EIS should show that EPA's concerns on the preferred alternative have been resolved.

Wellhead protection areas were authorized by the 1986 Amendments to the Safe Drinking Water Act. When a proposed project encroaches on a wellhead protection area, the draft EIS should identify the area, the potential impact of each alternative. If the preferred alternative impacts these areas, the final EIS should document that it complies with the approved wellhead protection plan (AASHTO, 2007b).

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***Sole-Source Aquifer -***  
*An underground source of water that serves as the sole or principle source of water in an area.*

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## Community Impacts

### Why are community impacts considered in an EIS?

Transportation projects can have a major impact on communities. Potential community impacts that may be associated with a transportation project include:

- Employment and tax base affected by project (retail sales, opportunity for development, tax revenues, relocation of employment centers, etc.)
- Businesses affected by project or construction (detours, bypasses, circulation)
- Changes in property values
- Social Impacts
- Changes in neighborhoods or community cohesion
- Community resources (schools, churches, parks, shopping, emergency services, etc.)
- Relocation of housing and commercial, industrial, non-profit businesses due to project implementation.



The National Environmental Policy Act requires that community impacts be given due weight during decision-making (PPS, 2001).

### What rules and regulations protect communities?

There are no permits issued by regulatory agencies in terms of community impacts. However, communication and coordination with neighborhood groups and community based organizations existing in or near the project area is recommended to obtain a better understanding of any potential community impact concerns that might exist in the project area.

### How is a community impact assessment done for an EIS?

A community impact assessment examines economic, social, relocation and community service effects from a proposed project.

#### Economic Impacts

For most transportation projects, with no discernible effect on the local economy, discussion on this topic should be brief and come from existing documentation. However, some of the larger projects may have important effects on the local economy of a neighborhood or community.

- Can it be anticipated that the project will create or eliminate jobs in the local area?
- Can it be anticipated that the local tax base be affected?

## Community Impacts Continued

- Can it be anticipated that the project will affect local businesses? (Relocation, access, visibility, etc.)
- Will the project have economic impacts outside the immediate area?

### Social considerations

*Typical questions that are asked to describe social effects include:*

- Is there evidence that community cohesion exists? Will the proposed project affect interaction among persons and groups?
- Will the project cause a change in social values?
- Will community landmarks or social gathering places be affected by the project?
- Will the project cause redistribution of the population or an influx or loss of population?
- Will certain people be separated or set apart from others?
- What is the perceived impact on quality of life?

### Relocation

- Will the project require the relocation of housing and commercial, industrial, or non-profit businesses?
- Are there available sites to accommodate those displaced?

### Community Services

- Does the project area contain emergency service facilities such as fire stations, police facilities, hospitals/medical facilities; or community services such as schools, libraries, or post offices? Will the project require the relocation of any such facilities or services?
- Are similar facilities or services provided elsewhere in the vicinity?
- Are response times for the emergency services or access for the community services significantly affected by the project?

## Environmental Justice

### **Why is environmental justice considered in an EIS?**

Environmental justice is defined as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means (1) that all persons share in the benefits of our investments; and (2) that no persons (including racial, ethnic, or low income groups) should bear a disproportionate share of the negative consequences resulting from the execution of Federal, State, and local programs and policies”.

On February 11, 1994, President Clinton signed Executive Order 12898 requiring federal agencies to administer and implement programs, policies, and activities that affect human health or the environment to identify and avoid “disproportionately high and adverse” effects on minority and low-income populations. Environmental justice issues are evaluated as part of the National Environmental Policy Act (NEPA) process.

### **What are the rules and regulations related to environmental justice?**

Incorporation of environmental justice (EJ) principles throughout the transportation planning and decision-making processes is an implementation of the principles of NEPA, Title VI of the Civil Rights Act, the Uniform Relocation Act, SAFETEA-LU, and other DOT statutes, regulations, and guidance that affect social, economic, environmental, public health, and public involvement.

### **How is an environmental justice analysis done for an EIS?**

An EJ analysis requires a demographic analysis be done for the project area. As part of this effort, the project team will identify and define where minority and low-income populations live within the study area. The latest U.S. Census data are generally used to identify these areas.

EJ regulations also require that NCDOT conduct targeted public outreach and solicit feedback on the project. This is usually done after the minority and low-income populations have been identified.

As a final step in an EJ analysis, the NCDOT project team will review and assess the potential effects from the project and analyze their location in relation to the minority and low-income populations.

## Transportation

### **Why is transportation considered in an EIS?**

Understanding the effects of a proposed public project and its alternatives on the transportation system is an important part of any environmental impact statement (EIS) and is required by law. The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision-making processes and transportation is considered part of the “built environment.” Federal, state, and local agencies must consider the environmental impacts of their proposed actions and reasonable alternatives to those actions. For example, how would each alternative affect traffic operations on the freeways and local streets? Would congestion improve or get worse? How would each alternative affect traffic volumes? How would moving a freeway ramp from the left side to the right side of a freeway affect traffic operations? Would the project change traffic patterns, causing people to take a different route to work and increasing traffic at one intersection while decreasing traffic at another? It is because of these questions that transportation is included in our EIS (WSDOT, 2006).

### **How is a transportation analysis done for an EIS?**

Project managers on a new project usually use transportation demand models to determine any changes in demand that could affect other transportation systems within the area of the project. These models can also be used to help identify ways to mitigate for any adverse impacts.

### **Bicycles and Pedestrians**

The USDOT Policy Statement on Integrating Bicycling and Walking into Transportation Infrastructure was drafted in response to Section 1202(b) of the Transportation Equity Act for the 21st Century (TEA-21):

“Bicycle and pedestrian ways shall be established in new construction and reconstruction projects in all urbanized areas unless one or more of three conditions are met:

- Bicyclists and pedestrians are prohibited by law from using the roadway. In this instance a greater effort may be necessary to accommodate bicyclists and pedestrians elsewhere within the right-of-way or within the same transportation corridor.
- The cost of establishing bikeways or walkways would be excessively disproportionate to the need or probable use. Excessively disproportionate is defined as exceeding 20 percent of the cost of the larger transportation project.
- Where sparsity of population and other factors indicate an absence of need.”

## Visual Quality and Aesthetics

### **Why is visual quality considered in an EIS?**

Transportation projects are important to the visual environment. When looking at how a project affects the visual quality and aesthetics, the project must consider both the view from the road and the view of the road.

NEPA asks that the EIS consider visual impacts to ensure that environmental considerations such as impacts related to aesthetics and visual quality are given due weight in decision-making.

### **What rules and regulations protect visual quality and aesthetics?**

The Historic Preservation Act of 1966 requires the NCDOT to consider the visual effect of a roadway on historic properties.

### **How are visual impacts analyzed in an EIS?**

A Visual Impact Assessment is prepared to comply with the requirements of NEPA. A Visual Impact Assessment, or VIA, should be considered for every project that has the potential to change the “visual” environment. The level of assessment for the VIA can range from “no formal analysis” to a “complex analysis” and is determined by many factors such as: numbers of viewer groups affected; existence of scenic resources; degree and totality of the proposed changes in the visual environment; local concerns or project controversy; and cumulative impacts along the transportation corridor.

To decide on the need and level of study for a VIA, a preliminary evaluation is performed to determine if the project will cause any physical changes to the environment. Projects that replace or rehabilitate existing facilities (e.g., pavement overlay, striping, sign replacement), and do not change the character of the facilities will not require a formal analysis. The project team should conduct a site visit and estimate potential changes to that character. They should also identify viewer groups and public concerns or opposition to the proposal.

The draft EIS should describe, at a minimum, how the project alternatives may impact visual quality. The draft EIS should also identify the impacts to the existing visual resource, the relationship of the impacts to potential viewers of and from the project. When there is potential for visual quality impacts, the draft EIS should explain the consideration given to design quality, art, and architecture in the project planning. When a proposed project will include features associated with design quality, art or architecture, the draft EIS should be circulated to officially designated state and local arts councils and, as appropriate, other organizations with an interest in design, art, and architecture.

## Archaeological Resources

### **Why are archaeological resources considered in an EIS?**

Highway projects often impact areas where there are culturally sensitive artifacts. To ensure the protection of this irreplaceable heritage, the National Environmental Policy Act requires that cultural resources are given due weight in decision-making.

Archaeological resources are defined as any material remains of past human life or activities that are at least 50 years old and are of archaeological interest, including pieces of pottery, basketry, bottles, weapons, weapon projectiles, tools, structures or portions of structures, rock paintings, rock carvings, intaglios, graves or human skeletal materials.

### **What rules and regulations apply to archaeological resources?**

Archaeological resources are protected by multiple regulations; the most noteworthy are the National Historic Preservation Act of 1966, the Department of Transportation Act, Section 4(f), and the North Carolina Archaeological Resources Protection Act of 1979.

### **How are archaeological resources analyzed in an EIS?**

The North Carolina Department of Transportation (NCDOT) uses Geographic Information Systems (GIS) technology to identify and quantify potential archaeological impacts. By using GIS, a clear understanding of the new alternative's archaeological potential can be generated quickly without the need to revise or create addenda to an existing report.

The NCDOT has an archaeological group that performs surveys and archival research on proposed highway projects. When an archaeological resource evaluation is needed, this group performs a field survey and writes background research on each of the alternatives in the EIS. Sometimes, when a site is especially important, NCDOT will contract with a private firm or university to perform an archaeological excavation of a site within a highway corridor.

The draft EIS should contain a discussion demonstrating that archeological resources have been identified and evaluated for each alternative under consideration in accordance with the requirements. The information for archeological resources needs to state whether each identified resource should be preserved in place or whether it is important chiefly because of what can be learned by data recovery (and therefore has minimal value for preservation in place).

## Historic Architecture

### **Why is historic architecture considered in an EIS?**

The preservation of historic architecture is in the public interest because of its vital legacy of educational, aesthetic, inspirational, economic, and energy benefits (National Historic Preservation Act, 1966). In recognition of the value associated with historic preservation, the National Environmental Policy Act (NEPA) requires that historic resources be given due weight in decision-making.

### **What rules and regulations protect historic architecture?**

The most comprehensive statute that protects historic architecture is the Historic Preservation Act, Section 106, and its associated implementing regulations. Under this law, federal agencies must, to the maximum extent possible, complete planning and actions necessary to minimize harm to any National Historic Landmark.

### **How are historic resources analyzed in an EIS?**

As part of Section 106 compliance, the North Carolina Department of Transportation (NCDOT) must decide if any of the properties within the project area are eligible to be listed on the National Register of Historic Places, and they must decide how the existing historic properties are affected. The NCDOT must then consult with the State Historic Preservation Officer (SHPO) on their specific eligibility/effects determinations.

The National Historic Preservation Act gives the following examples of adverse effects:

- Physical destruction of or damage to all or part of a historic property;
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's standards for the treatment of historic properties,
- Removal of the property from its historic location;
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;
- Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
- Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

- (AASHTO, 2007c)

## Floodplains

### Why are floodplains considered in an EIS?

A floodplain is a land area that is susceptible to being inundated by floodwaters from any source. A floodplain is usually on flat or nearly flat land on the bottom of a stream valley or tidal area that is covered by water during floods (WSDOT, 2006).

Federal law requires that all Federal-aid projects must make diligent efforts to:

- Avoid support of incompatible floodplain development,
- Minimize the impact of highway actions that adversely affect the base floodplain,
- Restore and preserve the natural and beneficial floodplain values, and
- Be consistent with the standards/criteria of the National Flood Insurance Program of the Federal Emergency Management Agency (FEMA).

Given the above requirement, it is important that the project team identify any potential floodplains within the project area during the preparation of the Environmental Impact Statement (EIS).

### What rules and regulations protect floodplains?

Presidential Executive Order 11988 directs federal agencies like the FHWA to avoid to the extent possible adverse impacts within floodplains and to avoid direct or indirect support of floodplain development. Flood control management is also regulated by the Flood Control Management Act of 1935.

### How is a floodplain study done for an EIS?

When transportation improvements encroach on a base floodplain, the FHWA requires the NCDOT to perform a location hydraulic Base Floodplain Elevation Study and assess the risk involved. The *Location Hydraulic Study* is summarized and appended to the environmental document for the project. When the *Location Hydraulic Study* indicates "significant encroachment within the base floodplain", as defined by 23 CFR 650.105, the EIS must include a finding that the project is the "only practicable alternative".

For each alternative that touches a floodway, the draft EIS should provide a preliminary indication of whether the encroachment would be consistent with or require a revision to the regulatory floodway. Engineering and environmental analyses should be undertaken to permit the consistency evaluation and identify impacts. Coordination with the Federal Emergency Management Agency (FEMA) and appropriate state and local government agencies should be undertaken for each floodway encroachment.

## Mitigation

Mitigation is the term that is used to describe the actions that are taken to lessen the impacts caused by a transportation project. The FHWA defines mitigation as:

1. *Avoiding* an impact altogether by not taking a certain action or parts of an action;
2. *Minimizing* impacts by limiting the degree or magnitude of the action and its implementation;
3. *Rectifying* the impact by repairing, rehabilitating, or restoring the affected environment;
4. *Reducing* the impact over time by preservation and maintenance operations during the life of the action; and,
5. *Compensating* for the impact by replacing or providing substitute resources or environments.

Mitigation for adverse impacts can take place on or off the project site. It is generally preferable to mitigate on-site, but sometimes space constraints prevent that from being possible. Also, under special circumstances, agencies will allow out-of-kind mitigation where the lead agency improves a different resource than the one that is affected by the project.

- **Off-site mitigation** - Mitigation for impacts at a location not bordering the impact site.
- **On-site mitigation** - Mitigation for impacts adjacent to the impact site.
- **Out-of-kind mitigation** - Mitigation for impacts with other or different resources or ecological functions as those impacted.

The development of mitigation measures takes time and requires coordination between all of the affected stakeholders. When a project impacts the natural environment, NCDOT will work with resource agencies like the Fish and Wildlife Service and the NC Division of Water Quality to come up with acceptable mitigation measures. If a project affects a community, then the NCDOT must work with the affected community to develop appropriate mitigation measures.

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